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# System Operations Studies for Automated Guideway Transit Systems

## Discrete Event Simulation Model User's Manual

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Warren MI 48090

June 1982
Final Report



US Department of Transportation
**Urban Mass Transportation Administration**

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16. Abstract
In order to examine specific Automated Guideway Transit (AGT) developments and concepts, and to build a better knowledge base for future decision-making, the Urban Mass Transportation Administration (UMTA) undertook a new program of studies and technology investigations called the UMTA Automated Guideway Transit Technology (AGTT) program. The objectives of one segment of the AGTT program, the System Operations Studies (SOS) were to: 1) develop models for the analysis of system operations; 2) evaluate performance and cost; and 3) establish guidelines for the design and operation of AGT systems. This document describes the organization, operational features, user requirements, and procedures necessary for execution of the Discrete Event Simulation Model (DESM). The DESM provides the capability to model the operation of an automated mass transit system operating over a network composed of guideway links and stations within a given time domain. A wide range of user controls and options is available within the simulator to allow modeling the effects of various operational strategies and service policy options on overall system performance. In general, this performance is viewed as the ability to service patron trip requests originating at network stations under time varying demand situations. Although the dynamics of vehicle motion are not specifically modeled in the DESM, the interaction effect between vehicles traversing the automated guideway is accounted for by providing variable and fixed headway regulation schemes for vehicle positioning. In addition, the interaction effects produced between vehicles operating in the network and competing for system resources (links, merges, station berths, etc.) are accounted for in the DESM by allowing automatic event preemption and resumption within the modeling process.

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# PREFACE

In order to examine specific Automated Guideway Transit (AGT) developments and concepts -- and to build a better knowledge base for future decision-making -- the Urban Mass Transportation Administration (UMTA) undertook a new program of studies and technology investigations called the UMTA Automated Guideway Transit Technology (AGTT) program. The objectives of one segment of the AGTT program, the System Operations Studies (SOS), were to develop models for the analysis of system operations, to evaluate performance and cost, and to establish guidelines for the design and operation of AGT systems. A team headed by GM Transportation Systems Division (GMTSD) was awarded a contract by the Transportation Systems Center to pursue these objectives. The Technical Monitor for the project at TSC was Arthur Priver, who was assisted by Li Shin Yuan and Thomas Dooley.

The Discrete Event Simulation Model (DESM) provides the capability to model the operation of a mass transit system operating over a network composed of guideway links and stations within a given time domain. A wide range of transit classes can be modelled using the DESM. User controls and options are available within the simulator to allow modelling the effects of various operating strategies and service policy options on overall system performance in terms of providing transportation service on an individual patron basis.

The DESM User's Manual describes the organization, operational features, user requirements and procedures necessary for execution of the Discrete Event Simulation Model.

# METRIC CONVERSION FACTORS

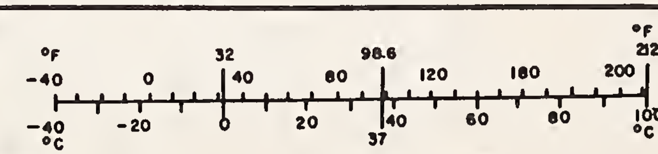
## Approximate Conversions to Metric Measures

| Symbol | When You Know | Multiply by | To Find | Symbol |
|---|---|---|---|---|
| | | **LENGTH** | | |
| in | inches | *2.5 | centimeters | cm |
| ft | feet | 30 | centimeters | cm |
| yd | yards | 0.9 | meters | m |
| mi | miles | 1.6 | kilometers | km |
| | | **AREA** | | |
| $in^2$ | square inches | 6.5 | square centimeters | $cm^2$ |
| $ft^2$ | square feet | 0.09 | square meters | $m^2$ |
| $yd^2$ | square yards | 0.8 | square meters | $m^2$ |
| $mi^2$ | square miles | 2.6 | square kilometers | $km^2$ |
| | acres | 0.4 | hectares | ha |
| | | **MASS (weight)** | | |
| oz | ounces | 28 | grams | g |
| lb | pounds | 0.45 | kilograms | kg |
| | short tons (2000 lb) | 0.9 | tonnes | t |
| | | **VOLUME** | | |
| tsp | teaspoons | 5 | milliliters | ml |
| Tbsp | tablespoons | 15 | milliliters | ml |
| fl oz | fluid ounces | 30 | milliliters | ml |
| c | cups | 0.24 | liters | l |
| pt | pints | 0.47 | liters | l |
| qt | quarts | 0.95 | liters | l |
| gal | gallons | 3.8 | liters | l |
| $ft^3$ | cubic feet | 0.03 | cubic meters | $m^3$ |
| $yd^3$ | cubic yards | 0.76 | cubic meters | $m^3$ |
| | | **TEMPERATURE (exact)** | | |
| °F | Fahrenheit temperature | 5/9 (after subtracting 32) | Celsius temperature | °C |

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.


## Approximate Conversions from Metric Measures

| Symbol | When You Know | Multiply by | To Find | Symbol |
|---|---|---|---|---|
| | | **LENGTH** | | |
| mm | millimeters | 0.04 | inches | in |
| cm | centimeters | 0.4 | inches | in |
| m | meters | 3.3 | feet | ft |
| m | meters | 1.1 | yards | yd |
| km | kilometers | 0.6 | miles | mi |
| | | **AREA** | | |
| $cm^2$ | square centimeters | 0.16 | square inches | $in^2$ |
| $m^2$ | square meters | 1.2 | square yards | $yd^2$ |
| $km^2$ | square kilometers | 0.4 | square miles | $mi^2$ |
| ha | hectares (10,000 $m^2$) | 2.5 | acres | |
| | | **MASS (weight)** | | |
| g | grams | 0.035 | ounces | oz |
| kg | kilograms | 2.2 | pounds | lb |
| t | tonnes (1000 kg) | 1.1 | short tons | |
| | | **VOLUME** | | |
| ml | milliliters | 0.03 | fluid ounces | fl oz |
| l | liters | 2.1 | pints | pt |
| l | liters | 1.06 | quarts | qt |
| l | liters | 0.26 | gallons | gal |
| $m^3$ | cubic meters | 35 | cubic feet | $ft^3$ |
| $m^3$ | cubic meters | 1.3 | cubic yards | $yd^3$ |
| | | **TEMPERATURE (exact)** | | |
| °C | Celsius temperature | 9/5 (then add 32) | Fahrenheit temperature | °F |



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# 1. INTRODUCTION

This document describes the organization, operational features, user requirements, and procedures necessary for execution of the Discrete Event Simulation Model (DESM). The DESM provides the capability to model the operation of an automated mass transit system operating over a network composed of guideway links and stations within a given time domain. A wide range of user controls and options is available within the simulator to allow modeling the effects of various operational strategies and service policy options on overall system performance. In general, this performance is viewed as the ability to service patron trip requests originating at network stations under time varying demand situations.

Although the dynamics of vehicle motion are not specifically modeled in the DESM, the interaction effect between vehicles traversing the automated guideway is accounted for by providing variable and fixed headway regulation schemes for vehicle positioning. In addition, the interaction effects produced between vehicles operating in the network and competing for system resources (links, merges, station berths, etc.) are accounted for in the DESM by allowing automatic event preemption and resumption within the modeling process.

## 1.1 IDENTIFICATION

The identification of this simulation processor is:

- DESM -- Discrete Event Simulation Model

It consists of three standalone components:

| | Version | Date |
|---|---|---|
| o EINPUT -- Input Processor | Final | July 1, 1981 |
| o EMODEL -- Model Processor | Final | July 1, 1981 |
| o EOUTPT -- Output Processor | Final | July 1, 1981 |

The model was designed and developed at IBM Federal Systems Division and enhanced by General Motors Transportation Systems Center.

## 1.2 APPLICABILITY

The DESM is designed to provide a wide range of transit class system simulations ranging from Personalized Rapid Transit (PRT) to more complex forms of Mass Rapid Transit (MRT). The transit class simulated can range from simple to complex depending upon user option selection and data definition. Network configurations ranging from simple shuttle loop to more detailed densely concentrated grids can be modeled with guideway link combinations which include merges, diverges, intersections, or straight links. Station representations can range from simple to complex with the specific event processes within the station being defined by user specification. The degree of control over simulated operation can be varied within a particular experiment by selecting various operational and management strategy options to provide differing levels of service.

Configuration information and system definition data generally reside in a Central Data Base that can be modified or augmented by the user and other models to represent a given transit system definition with parametric variations. Although complex networks and demand loading are generally prepared through other AGT models, appropriately formatted input prepared by the user can be readily input through the data base. The data used in a given simulation run is selectable by the user, thereby allowing the use of previously generated data contained in the data base to be used in any combination for a specific modeling experiment. Thus, the demand sequence, network configuration, or system characteristics can be input to a sequence of runs to achieve parametric variation and obtain analytic results of system performance over a range of operation for a particular transit class. In addition, guideway link, station, and vehicle failures can be simulated to determine their impact on transit system operations.

## 1.3 CAPABILITIES

In the DESM, a fleet of vehicles circulates over a given network according to a selected service policy in order to provide transportation service on an individual patron basis. Simulation functions associated with patrons include: arrival at a station, assignment of a vehicle to service the trip request, waiting for the assigned vehicle, boarding, and deboarding. The travel portion of the patron activity is modeled in conjunction with vehicle travel. Vehicles are dispatched from network stations and move along the guideway and through other stations according to a user-selected system management strategy, which consists of individually selected policies for: type of service, empty vehicle distribution, path selection, dispatch, longitudinal control, headway regulation, and merge control. Other system characteristics, such as vehicle capacity, nominal speed, headway and station process events are other major factors considered in the simulation.

The specific features available within the DESM and necessary to accomplish the simulation of an automated transit system are described below.

### 1.3.1 Model Configuration

Network connectivity within the DESM is initially defined by the user as a sequence of fully connected nodes with guideway link length being implicitly defined by the distance between nodes. This definition is automatically transformed into a sequence of guideway links and stations with upstream and downstream connectivity established. Computation of minimum paths through the network is performed to provide station to station connectivity for vehicle routing. At user option, any configuration related data can be over-ridden by specification of time dependent run-time input to be used during the course of a simulation experiment.

Stations within the DESM are defined by a set of fully connected station links, as shown in Figure 1-1, each containing a particular set of station event processes. All stations in the DESM assume the same basic configuration; however, variations can be obtained by changing individual link characteristics in terms of capacities or availability on a station by station basis.

The desired station configuration is defined by the user through specification of links by type, and the selection of the station processes or events to be performed on the link. Explicit travel times on those links requiring vehicle traversal can be provided by the user or automatically generated by specification of the link length and a station traversal speed. At a minimum, stations within the DESM must be configured to include a dock, which will also act as the input and output ramps. However, specific user options such as Empty Vehicle Distribution may require the definition of station storage links and up to four additional links which allow vehicle entry and exit from the station storage area.

The basic definition of the station event processes required on a specific station link are given by selecting a subset of processes from a canonical link definition as shown in Figure 1-2. Process selection is limited to the event sequence explicitly provided by the canonical definition and the type designation provided for each link as shown in Table 1-1.

The DESM automatically establishes connectivity between successive station links based upon link type definitions according to the flow shown in Figure 1-1.

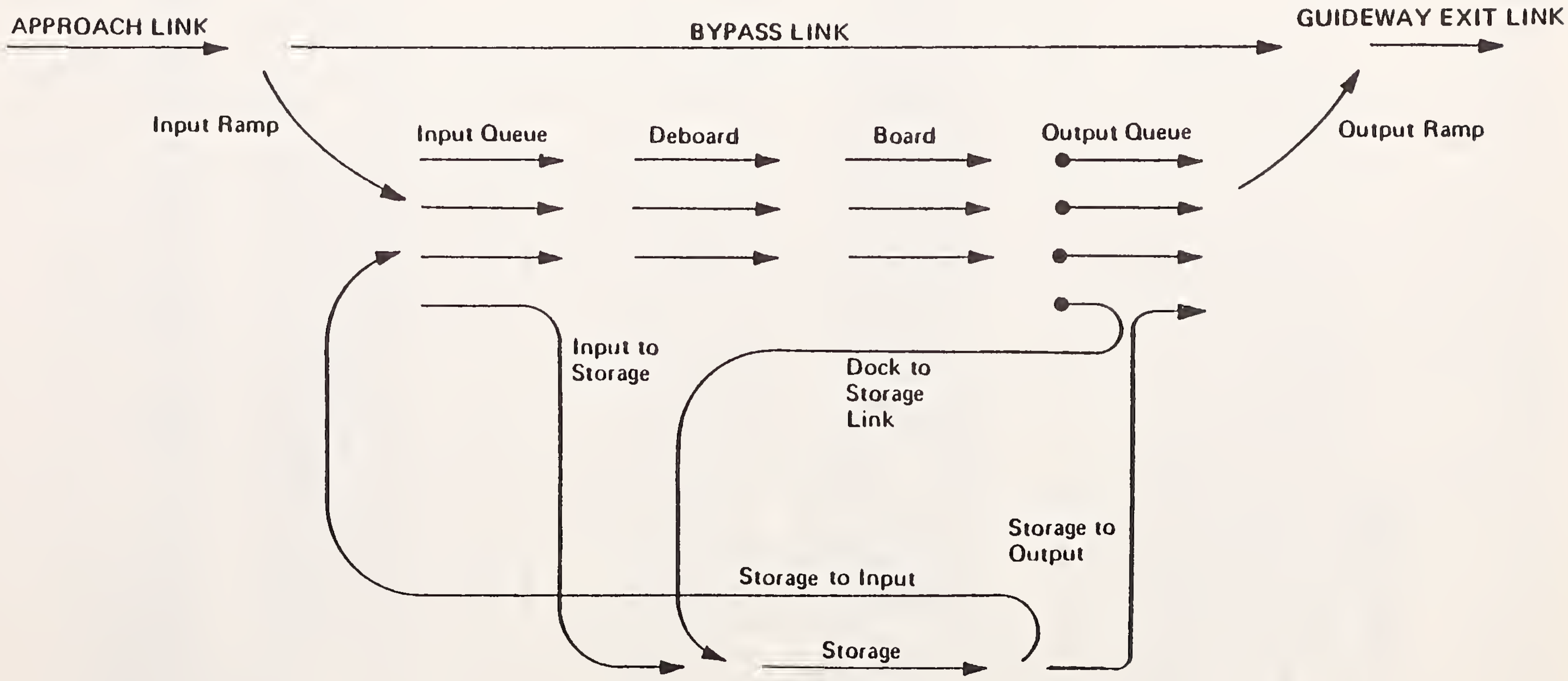
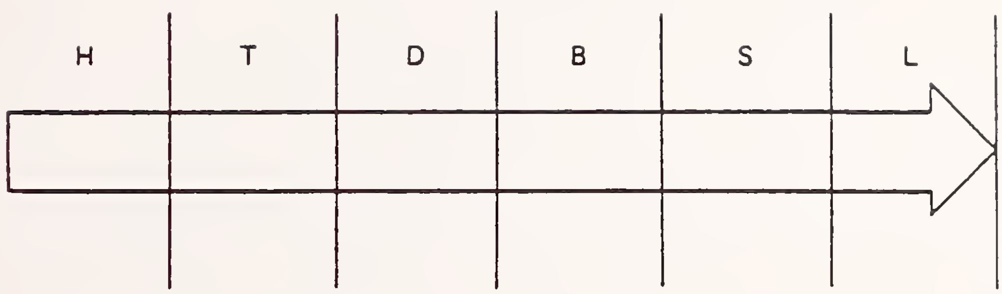



FIGURE 1-1. DESM STATION MODEL CONNECTIVITY




H – travel the headway zone;
T – travel the main body of the link;
D – undergo the deboarding of passengers;
B – undergo the boarding of passengers;
S – store the vehicle on this link;
L – undergo the delay waiting for launch.

FIGURE 1-2. STATION LINK CANONICAL DEFINITION

TABLE 1-1. STATION LINK SPECIFICATION CAPABILITY

| Station Link | Type | Events | Configuration Limits |
|---|---|---|---|
| Input Ramp | IR | H,T | 1 |
| Input Queue | IQ | H,T | 10 Parallel |
| Dock | D | H,T,D,B,L | 10 Parallel |
| Output Queue | OQ | H,T,L | 10 Parallel |
| Output Ramp | OR | H,T,L | 1 |
| Storage | S | S | 1 |
| Storage Connectivity | IS,SI,DS,SO | H,T | 1 |

Since the DESM utilizes station storage for vehicle initialization purposes, implicit definition of station storage occurs in the absence of user specifications. However, in this case, the storage link and other links created by the model are used only for vehicle generation during simulation initialization and are unavailable for use during the course of simulation. The use of these links is transparent to the user and adds no additional station processing time.

Each guideway link in the DESM is automatically configured to contain a link entry segment necessary for maintaining vehicle spacing, a link travel segment, and a link exit queue as shown in Figure 1-3. In this manner, link connectivity is stated in terms of pointers to upstream link queues. This allows alternative link configurations (mainline, merge, diverge) to be defined by at most two upstream link exit queues. A mainline or diverge exit link can be described in terms of one upstream queue pointer, whereas a merge is defined in terms of two upstream queue pointers. Defining link connectivity in this manner allows an offline station or intersection to be modeled as a combination of diverges and merges. In the case of modeling a station, only one diverge/merge combination is necessary to simulate the station entry/exit process. The merge component of this geometry consists of the bypass link queue and the station exit queue.

Intersections within the simulator are modeled in a similar manner as a pair of diverge/merge combinations. The modeling of intersection turn ramps requires user definition of two additional nodes as does the inclusion of cross over guideway. However, the same effect is achieved in the simulator without significant loss of detail by modeling the intersection as a simple pair of diverge/merge combinations. This configuration results in fewer links to be defined and thereby can reduce simulator run time.

### 1.3.2 Service Modes

The DESM supports two basic modes of operation, Demand Responsive and Scheduled Service. In Demand Responsive operation, either single party or multiparty or multiparty single stop or timeout/group service can be provided. In single party service, a single vehicle is utilized by at most one trip, and once an occupied vehicle begins its travel to a destination station, no intermediate station stops are performed. Multiparty operation permits compatible trips to share a common vehicle, providing destination compatibility and vehicle capacity constraints are satisfied. Multiparty single stop service permits compatible trips to share the same vehicle but requires that the compatibility be the exact same single destination. Timeout/group demand responsive service also models multiple parties having the same destination but a minimum group (or maximum wait time) must be achieved before a vehicle is requested. In Scheduled operation, two forms of service are supported, fixed and cyclic route. The operation in both modes of scheduled service are similar in that vehicles are assigned a fixed sequence of station stops and multiple trips are carried by a single vehicle depending upon route destination compatibility and vehicle capacity constraints. However, fixed route

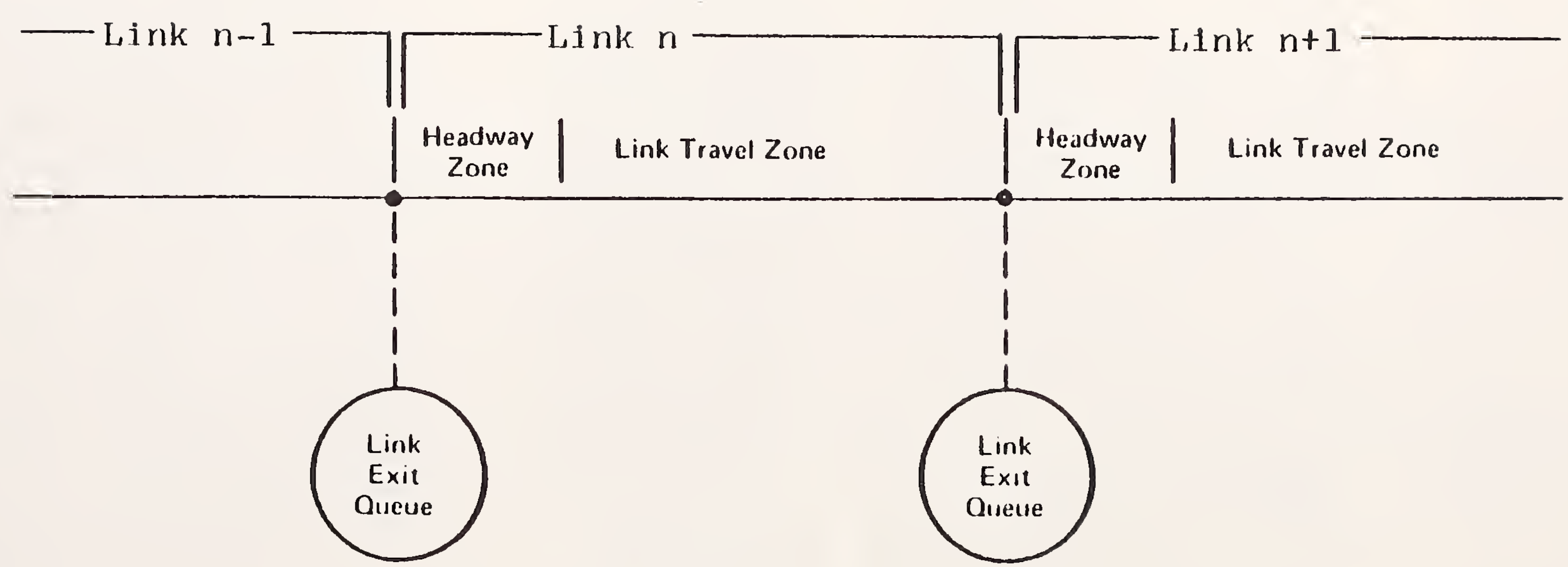



FIGURE 1-3. DESM LINK STRUCTURE

service requires explicit user definition for each route to be followed, and cyclic route results in the automatic generation of a sequence of routes that ensures continuous (non-transfer) travel from any station to any other station in the network.

In Demand Responsive service, initial vehicle placement is performed automatically by the DESM or in response to user specified placement requirements. Automatic placement results in vehicles being defined on each guideway link at entry to network stations, with remaining vehicles being distributed among station storage areas as required, to satisfy a given distribution of demand. At the start of the simulation experiment, vehicles initially placed at station entries begin movement into the respective stations. Stored vehicles become active in the simulation as needed, in response to operational requests. For timeout/group demand responsive service, however, vehicles are initialized on dock links as specified by the user.

Fixed route scheduled service operation requires user definition of the station node sequence to be followed for each route. This definition is converted to a sequence of station stops and the DESM can automatically compute the adjusted route headway, the number of vehicles required to service the route, and initial vehicle dispatch times from each station based on user specified route headway. The user has the option to specify the number of vehicles to serve a particular route instead of the desired route headway, in which case automatic route headway computation is performed. The user may also request the DESM to estimate the number of vehicles for each route by specifying a demand pattern as a basis for the estimate. In this case the DESM automatically computes the number of vehicles required on each route, the route headway and the initial vehicle dispatch times from each station based on the specified demand pattern. The user has the same options for defining the vehicle fleet and schedules for cyclic route scheduled service.

At the start of simulation all required vehicles are scheduled for movement from the station storage area to the docking area at the proper route headway interval.

### 1.3.3 Trip Management

A sequence of trip arrivals can be automatically generated by the DESM based upon user specified demand requirements between origin/destination pairs in the network. The trips may be generated by a Poisson pseudo-random process or by a deterministic uniform distribution as specified by the user. The generated trip sequence is time ordered and read during the conduct of the simulation experiment. If the end of all trip arrivals is encountered prior to termination of an experiment, the trip sequence file is reused with generated arrival times being used as a time displacement from the time at which reuse is initiated. If the automatic generation option is not chosen, the user may create the trip sequence to be processed by any other means, provided adherence to format specifications is maintained.

The DESM attempts to minimize the time a trip must wait for service by determining the immediate availability of vehicles at the time of trip arrival (except for timeout/group demand responsive service) at a network station. In scheduled operations, arriving trips are placed on a currently boarding vehicle, if possible, as a first priority. Vehicle destination compatibility requirements and capacity constraints must be satisfied prior to initiation of the boarding process for the trip on a currently boarding vehicle. Demand Responsive Service provides the following vehicle availability options which are examined according to a specified user sequence:

1. Local station storage

2. Regional Storage -- Another network station designated as a regional center for a particular station.

3. Due to arrive at the docking area and currently in the station.

4. In transit to the station or to another station and bypassing the current station.

5. Circulating Empty assigned to a circuitous route for the origination station.

Option 3 requires user specification of an ordered list of upstream station links which are examined for the existence of an empty or soon to unload vehicle due to arrive at the dock. If a possibility for trip servicing is found in local storage of the station or at a regional center, the vehicle is commanded to leave storage and either move to the dock or begin travel to the station of the arriving trip, respectively. If no possibilities are found in examining available options, an outstanding service request can be entered for the station to cause the diversion, if permitted, of an available passing empty vehicle into the station for servicing of the trip.

The DESM provides an option for creating explicit trip reservations on the vehicles found by the above procedure. Under this scheme, at the time a potential vehicle is located to service a trip, it is designated as reserved and available for serving of the reserving trip. However, this reservation is automatically cancelled if an earlier arriving vehicle reaches the dock and is capable of serving the trip. Reservation cancellation occurs only if the originally reserved vehicle has not yet reached the origin station of the trip it was designated to service. Otherwise, the reserved vehicle is the only one which will service the trip.

Since, in a scheduled operation, a specific user defined fixed route cannot be expected to service every possible destination in the network, the DESM provides a trip transfer capability. This capability allows trips to deboard at a transfer station (route cross-over point), and board a new vehicle in order to continue travel to its destination. As many other transfers as desired can be performed depending upon user specification of transfer points for a given origin/destination pair. This capability can also be employed in Demand Responsive Service, controllable by user option. The transfer capability is also used to model active fleet size changes and failure responses when a vehicle may prematurely deboard all passengers as it changes its destination station.

### 1.3.4 Vehicle Control

Vehicle movement on the guideway can be accomplished according to either fixed or variable headway regulation. The primary difference between the two regulation schemes exists in the relative position on the link a vehicle can occupy in relation to another vehicle traversing the same link. In the fixed headway case, each vehicle can occupy a fixed length of guideway or slot, and vehicle movement is impeded by the occupancy of an immediately preceding "slot" by a stopped vehicle. Link capacity is limited by the number of slot positions which can be defined on the link. In variable headway regulation, vehicles traverse the link at a given velocity while maintaining a headway separation distance. When vehicle movement is impeded by occurrence of a stopped vehicle within a headway distance of a following vehicle, forward movement of the follower is stopped and it assumes a position immediately behind the stopped vehicle. Thus, link capacity is given by the number of stopped vehicles which can occupy the link. These differences are illustrated in Figure 1-4.

The DESM provides three methods of vehicle control on the automated guideway portion of the network; asynchronous, quasisynchronous, and synchronous. In asynchronous operation, vehicles traverse the guideway in vehicle follower mode and in the absence of congestion maintain a fixed distance between one another as given by headway or block length depending upon the position regulation scheme in effect. Under synchronous control, vehicles traverse the guideway under point follower mode with apriori or preplanned maintenance of block separation between vehicles to ensure the absence of conflict at network merges. In the quasisynchronous case, vehicles traverse the guideway in a point follower fashion with advance or retardation of vehicles being performed as required to adjust positioning between vehicles at network merges to minimize congestion.

Station link traversal is performed with vehicle spacing maintained by ensuring that successive entering vehicles are separated by at least the specified headway interval. Actual link travel is performed by having each vehicle traverse the travel segment of the link at the specified traversal speed. Detailed position regulation for successive vehicles is not performed as it is in guideway links, although strict vehicle position ordering on the link is maintained.

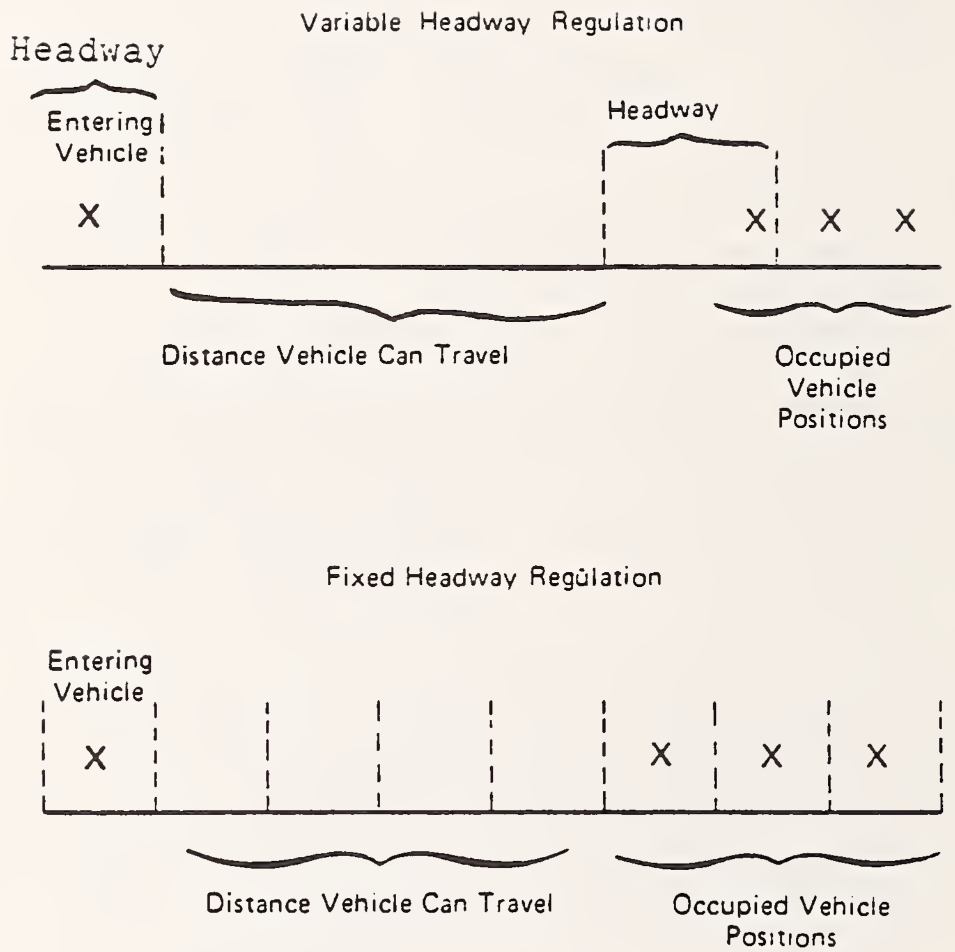



FIGURE 1-4. DESM HEADWAY REGULATION

The selection of successive links for vehicles moving through network stations is performed automatically within the DESM. In the case of diverge points within the station, where one of several links can be selected, the next link is chosen based upon minimum current occupancy or, for dock links, minimum current pseudo-occupancy to model berthing requirements. This is used to maximize the use of station facilities and increase vehicular flow capacity. Also, for timeout/group demand responsive service, the DESM chooses the next dock links based on direction of travel and current vehicle request at the station in order to model two-directional stations. However, to enhance model flexibility, a capability is provided for use of user defined and coded link selection criteria in the form of diverge functions as described in subsection 2.4.

The DESM provides the ability for failure and recovery of guideway links, stations, station links, and vehicles. Guideway link and vehicle failures can be specified to occur at the entry or exit of a specific link. Failure of guideway link entry or exit precludes vehicle entry or exit, respectively, until a recovery response is entered. Failure avoidance is provided by allowing the use of new routing tables at the time of failure occurrence. These routes can be prepared automatically by the DESM. Operational vehicle degradation may be introduced by specification of a guideway link failure which causes the DESM to designate the next vehicle to enter or exit a link as degraded. Degraded vehicles assume a reduced speed (based upon a user specified degradation factor) to their next destination or the first on-line station on its path in scheduled service and to the next station on its path in demand responsive service. The response and delay times associated with vehicle failures are specified by the user.

Station failure in the DESM causes entry and exit from the station to be disallowed until a recovery response is entered. Individual station links can be failed at entry and exit in a manner analogous to guideway links as described above. Degradation failures on station links can be introduced to cause all vehicles traversing the degraded link to assume a reduced traversal speed until the failure condition is cleared.

The control of competing vehicles at network merges can be accomplished according to the following:

1. FIFO -- The vehicle joining the link output queue earliest enters the merge output link first.

2. Heuristic FIFO -- Vehicles entering the merge assume velocity changes based upon the density of traffic approaching the merge.

3. Priority -- Vehicles on one link are merged ahead of vehicles on the other link.

4. Earliest Arrival -- The vehicle arriving at the merge point earliest enters the merge output link first.

### 1.3.5 Vehicle Operational Strategies

The DESM provides the capability for directing the flow and use of vehicles in the transit network under control of various system management strategies. These strategies include a variety of methods for distributing vehicles throughout the network, dispatching vehicles from network stations, and selecting the path a vehicle is to follow in traveling to a particular destination.

All vehicles which complete station processing are subject to launch processing. This processing involves the determination of the next destination and dispatch time for the vehicle, and path selection. In Demand Responsive operation, vehicles which complete boarding and are empty are subject to processing by Empty Vehicle Assignment (EVA). EVA determines the next destination for the vehicle based on a user specified list of priorities as follows:

1. Local station storage
2. Regional station storage
3. Disperse according to anticipated need, not considering current empty availability at stations.
4. Disperse according to anticipated need, while considering current availability at stations.
5. Route to network station with maximum outstanding service requests.
6. Assign vehicle to circuitous empty route.

If EVA fails to find an available option, the empty vehicle is routed to the current station. Any empty vehicle traversing the network can be diverted into bypassed stations to service outstanding trip requests, if diverting is enabled. Non-empty vehicles obtain their next destination based upon destination requirements of passengers currently on board. In the case of scheduled service, the vehicle's next destination is selected as the next station on the vehicle's assigned route.

Path selection can be performed on either an a priori or real-time basis. In a priori path selection, the entire route of the vehicle is determined prior to launch from a network station. Real-time path selection involves the assignment of an initial path to the vehicle prior to launch, however, path reselection can be performed as the vehicle is traversing the automatic guideway. Alternate paths in either mode can be selected according to the following criteria:

1. Link nominal travel time
2. Link length (distance)

3. Link utilization (occupancy/capacity)

4. Weighted combination of 1 and 3, above.

Once path selection has been performed, the launch time of the vehicle is determined as a result of dispatch processing. This processing can be performed as either non-deterministic, quasi-deterministic, or deterministic. Non-deterministic dispatch does not require any preplanning and results in no delay prior to launch of the vehicle from its current station. In quasi-deterministic dispatch, a launch window is determined that attempts to minimize congestion at network merges on the a priori path selected for the vehicle. This window is achieved by delaying vehicle launch until such time that all merges on the vehicle path at the scheduled time of vehicle passage is below some threshold value. Deterministic dispatch is performed in an analogous manner, however, the threshold limit for each merge is set to allow only one vehicle in the merge at any time. This also can result in delaying a vehicle's departure from the station.

The total delay until merge contains another component in the case of scheduled operations. Additional launch delay can occur if schedule adjustments are required to maintain proper spacing between vehicles on a given route. This dispatch processing can be based upon a fixed schedule or upon fixed intervals between departures or upon algorithms which average departures in an attempt to maintain route headways or a fixed schedule.

The DESM provides the capability for fleet size adjustment, to either increase or decrease the number of vehicles available for passenger service. In demand responsive mode, fleet changes are accomplished by decreasing or increasing available empty vehicles resident in station storage areas. Scheduled service fleet adjustment results in the reassignment of the vehicle fleet to serve each defined route with proper headway spacing and proper train consist.

The DESM also provides the ability for entrainment and detrainment of vehicles. In Demand Responsive service, dynamic and guideway entrainment of following vehicles can be performed on the downstream link of merges, provided vehicles are sufficiently close. Station entrainment occurs in output areas of stations. Detrainment is provided at guideway link diverges and prior to dock entry in stations. In Scheduled operation, vehicle entrainment occurs prior to the initial dispatch of vehicles on network routes and remains active during the course of the simulation experiment unless modified by an active fleet size change. Entrainment also can occur to model the push vehicle response to a vehicle degradation.

### 1.3.6 Statistical Recording and Summarization

The DESM provides the capability for collecting and recording in the data base, a variety of statistical data that reflects the state of the transportation system being modeled. The recording is performed at periodic intervals during a simulation experiment. The statistics collected reflect both status and historical data related to the various entities or components of the modeled system. Status data reflects the state of the modeled entity at the instant of sampling (e.g., number of vehicles on guideway link 5), whereas historical data reflects the accumulation of a statistical item over the time interval from when the last periodic sample was taken.

The statistics collected are classified into five major categories as follows:

- o System (SYST) -- Items related to overall system performance
- o Station (STN) -- Items related to individual station performance
- o Station Link (STNL) -- Items related to historical and status data associated with activity on station configuration elements
- o Guideway Links (LINK) -- Items related to historical and status data associated with activity on guideway configuration elements.
- o Route (RTE) -- Items related to historical and status items for scheduled routes.

The data within each major category are further classified by entity number or configuration element (e.g., station link number, guideway link number, station ID), and the activity to which the statistic applies. At user option, an intermediate sampling report, summarizing in snapshot form simulation activity and status at a multiple of the periodic sampling interval, can be output during the simulation experiment.

The statistical data recorded to the data base during a simulation experiment, can be retrieved and summarized by the DESM in response to user defined requests. In addition, certain derived statistics which provide insight into overall performance of the modeled system are available for retrieval and summarization. Six display modes are provided for data formatting as follows:

- o LIST -- A simple time-series listing of the sampled values (10F13.3 format)
- o SUMM -- A statistical summary of the sampled values, which gives the following with and without zero-values being considered:
  - Number of samples
  - Sum of sampled values

- Average value
- Standard deviation
- Minimum value
- Sample time of the minimum
- Maximum value
- Sample time of the maximum.

o PLOT -- A time-series printer-plot of the sampled values (time running down the page).

o HIST -- A class-interval frequency distribution histogram of the sampled values.

o PERF -- Performance summary statistics -- pre-selected set displayed in report form and logged to the data base performance summary file for comparative analysis.

o RPT1 -- Pre-formatted analysis report listing the performance summary measures.

o RPT2 -- Pre-formatted analysis report listing an alternative set of performance measures.

o RPT3 -- Station-to-Station measures report for selected set of statistics gathered from completed trips log.

## 1.4 LIMITATIONS

Certain limits related to network configuration, fleet size, routes, etc., have been placed on the DESM by established compile-time maximums. These do not reflect the maximum configuration which can be supported by the model. These problem-size limits are summarized below:

| Entity | Maximum Value |
|---|---|
| Application Related Parameters | |
| Stations | 120 |
| Guideway links | 350 |
| Vehicle fleet size | 2000 |

| Entity | Maximum Value |
|---|---|
| Simultaneous patron trips (passenger groupings) | 10,000 |
| Station links | 20 |
| Routes | 30 |
| Entries in scheduled route list | 300 |
| Empty vehicle circulation routes | 20 |
| Entries in empty vehicle circulation route list | 400 |
| Entries in empty vehicle anticipated need list | 1,000 |
| Entries in user's ordered empty vehicle priority list for distribution of empties | 10 |
| Entries in user's ordered list for obtaining empty vehicles | 10 |
| Minimum path route tables that can exist simultaneously | 4 |
| Entries in station link event list | 120 |
| Entries in downstream station link list | 100 |
| Entries in upstream station link list | 100 |
| Entries in list of station links downstream from a station link diverge (last entry must be zero) | 20 |
| Guideway merges | 200 |
| Passengers per trip | 10 |
| Network nodes | 300 |
| Network node ID range | 300 |
| Entries in list of O/D pairs using the second or third group size distribution | 150 |
| Rows in guideway link merge table | 10 |

| Entity | Maximum Value |
|---|---|
| Columns in guideway link merge table | 10 |
| Number of failure/recovery cards | 10 |
| Entries in alternate route list | 50 |
| Width of merge reservation table | 720 |
| Entries in route group list | 100 |
| Intervals in demand profile | 25 |
| Number of generated trips in uniform demand interval | 1,000 |
| O/D pairs requiring at least one transfer | 8,000 |
| Simulation System Related Parameters | |
| Simultaneous transactions (vehicles plus trips plus simulation system service) | 15,000 |
| Entries in clock table | 1,000 |
| Number of data header type cards | 14 |
| Number of auxiliary output flags | 400 |
| Number of messages of any type issued before termination | 25 |
| Number of information messages issued before termination | 15 |
| Number of warning messages issued before termination | 15 |
| Number of times any one message can be issued prior to termination | 10 |

In addition to the limits on problem size listed above, the simulation has limited capability in several areas. These limitations do not reduce the ability of the simulator to support analysis and evaluation of AGT systems at the network level. The following paragraphs summarize these limitations.

The guideway network is defined using the following components:

- o Single-lane unidirectional links
- o Two-way diverges (one link into two)

o Two-way merges (two links into one)

o Intersections (two links into two others) with an elevated cross-over.

Combinations of these basic elements can be made to simulate the operation of more elaborate physical configurations.

Vehicle entrainment and detrainment occurs (if requested) only at guideway merge and diverge points and in station output and dock areas.

The entire network must operate under one service policy (for example, fixed schedule or demand responsive), which cannot be changed during a single run of the simulation. However, the parameters which define a given service policy can be changed during the run to modify the level of service.

Mixed station types of online and offline can be accommodated in the DESM. However, since main line flow must proceed through online stations or stop if the station is occupied, only asynchronous vehicle regulation is permitted when online stations are specified.

# 2. PROGRAM DESCRIPTION

## 2.1 OVERVIEW

The DESM provides the ability to simulate the detailed operation of a transit system operating on a network of automated guideways and stations. Vehicles traverse the automated network according to preplanned schedules or in response to patron requests for service. Vehicle movement is affected by operational interactions caused by the simultaneity of vehicle movements on the guideways and in stations, and the occurrence of asynchronous events, reflecting unexpected or preplanned stimuli that affect system operation.

The DESM uses a discrete event modeling technique to perform required transit system simulation. In this approach, entities termed transactions are scheduled on a time-ordered list to reflect time delays associated with a set of actions or interactions which affect or are associated with system operation. When a transaction reaches the top of the list, the required delay time is complete and the simulation clock is advanced to the scheduled time of the transaction and any required event processing is performed. In this manner, the simulation clock is advanced in discrete intervals of time to the occurrence of the most imminent event to be performed. This is in contrast to a continuous or delta time simulation in which the simulation clock is advanced incrementally by a fixed number of time units. This incremental advance procedure requires that the status of all transactions be continually updated at each advance, thereby increasing the time required to complete a given period of simulation time.

Once event processing for a transaction is completed, the transaction is scheduled for its next event completion. If conditions within the system preclude the scheduling of an event, the DESM employs a detailed transaction queuing and dequeuing mechanism for handling event preemption and resumption. This mechanism provides the ability to recognize the interaction effect produced by the simultaneity of event occurrences.

Transactions, in the DESM, represent entities (e.g., vehicles, trips), simulation control or modeling requests, and asynchronous or exogenous simulation processes which have an impact on system operation. These transactions are scheduled to trigger specific events or model processing on a time sequenced Future Events List (FEL). Within the FEL, time is quantized into discrete, finite units called "clock units", with each unit representing some period of simulated time, e.g., one millisecond. The FEL is divided into two components, a clock table for scheduling near time transactions, and an extension (multiple thread list) for scheduling distant time transactions. Each clock table entry begins the list of transactions which require processing during a simulation interval. The point in real-time at which the simulator is currently operating is given by clock time which provides the number of clock units which have passed since the start of the simulation experiment. Transactions are inserted into the FEL by determining the time interval (pointer) within which the event that is being scheduled is to occur. The transaction is then placed in time order into the list of transactions which are to become active in the specified simulation interval. The organization of the clock table portion of FEL is shown in Figure 2-1.

Since the clock table portion of the FEL is of finite length, only a finite number of time intervals can be represented. Transactions which must be scheduled for a time interval greater than the time period represented by the clock table are scheduled on the FEL extension or multiple thread future events list. Entries or quantized intervals in the multiple thread list represent an interval of time corresponding to an entire clock table interval. Multiple thread entries differ from clock table entries in that they are created dynamically as required during the simulation experiment by using other available transactions to serve as a time marker for scheduling other transactions which require processing during that simulation time interval. Transactions are placed on the multiple thread list, without regard to discrete simulation intervals as maintained in the clock table. The organization of the multiple thread list is shown in Figure 2-2. Once the simulation interval encompassed by the clock table has passed (all transactions processed and clock updated to last transaction time), the clock table is updated from the next available multiple thread list.

The basic control loop within the Model Processor (MP) is to determine the next event to be performed, update the simulation clock, and perform the event as summarized in the following:

1. Obtain the next most imminent transaction. The next event to be performed is indicated by the transaction which is first on the FEL.

2. Remove the transaction from the FEL.

3. Update the simulation clock to the time of the transaction. Whenever the simulation clock is updated, it is updated to the time of the next most imminent event.

4. Perform the indicated event. The type of event to be performed is indicated by the transaction.

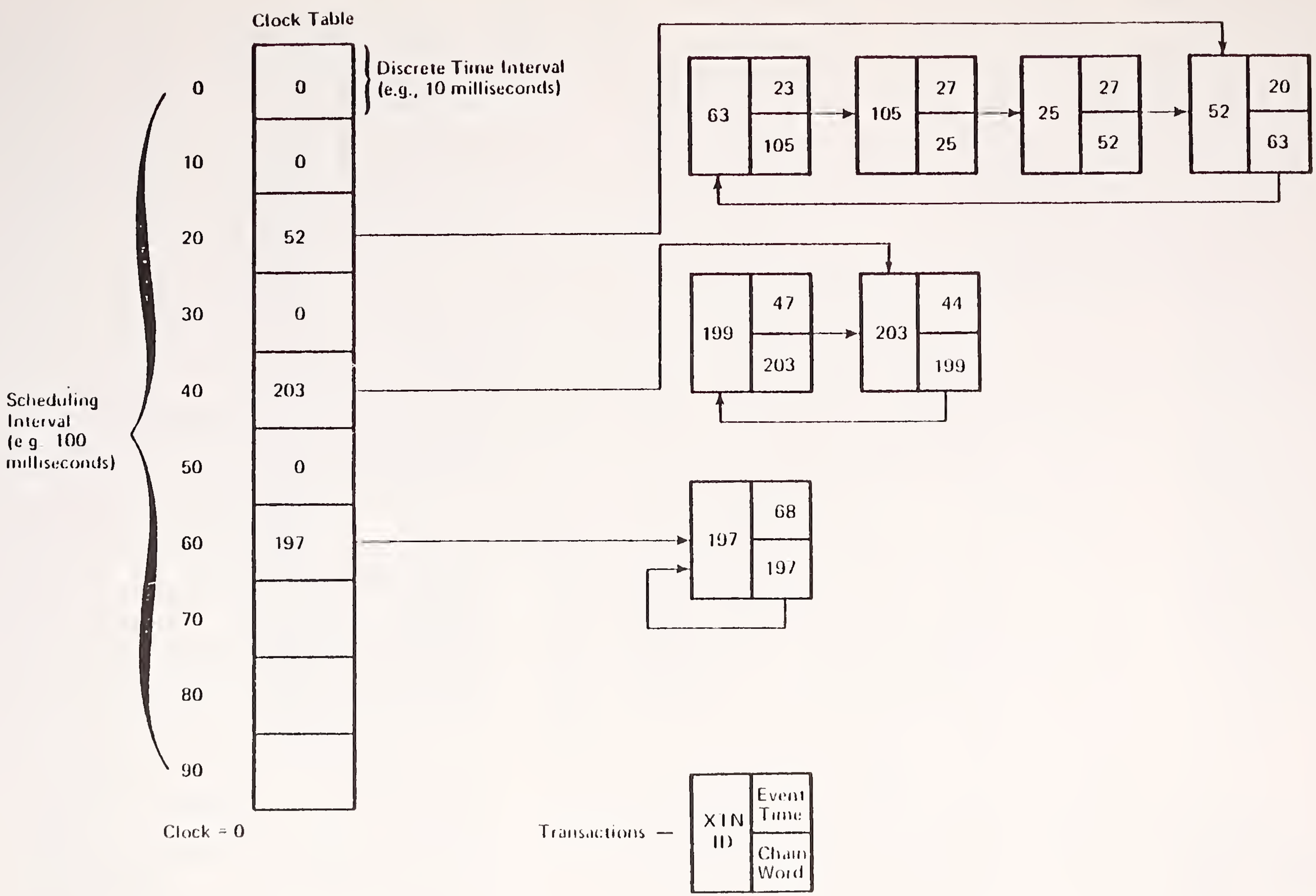



FIGURE 2-1. CLOCK TABLE ORGANIZATION

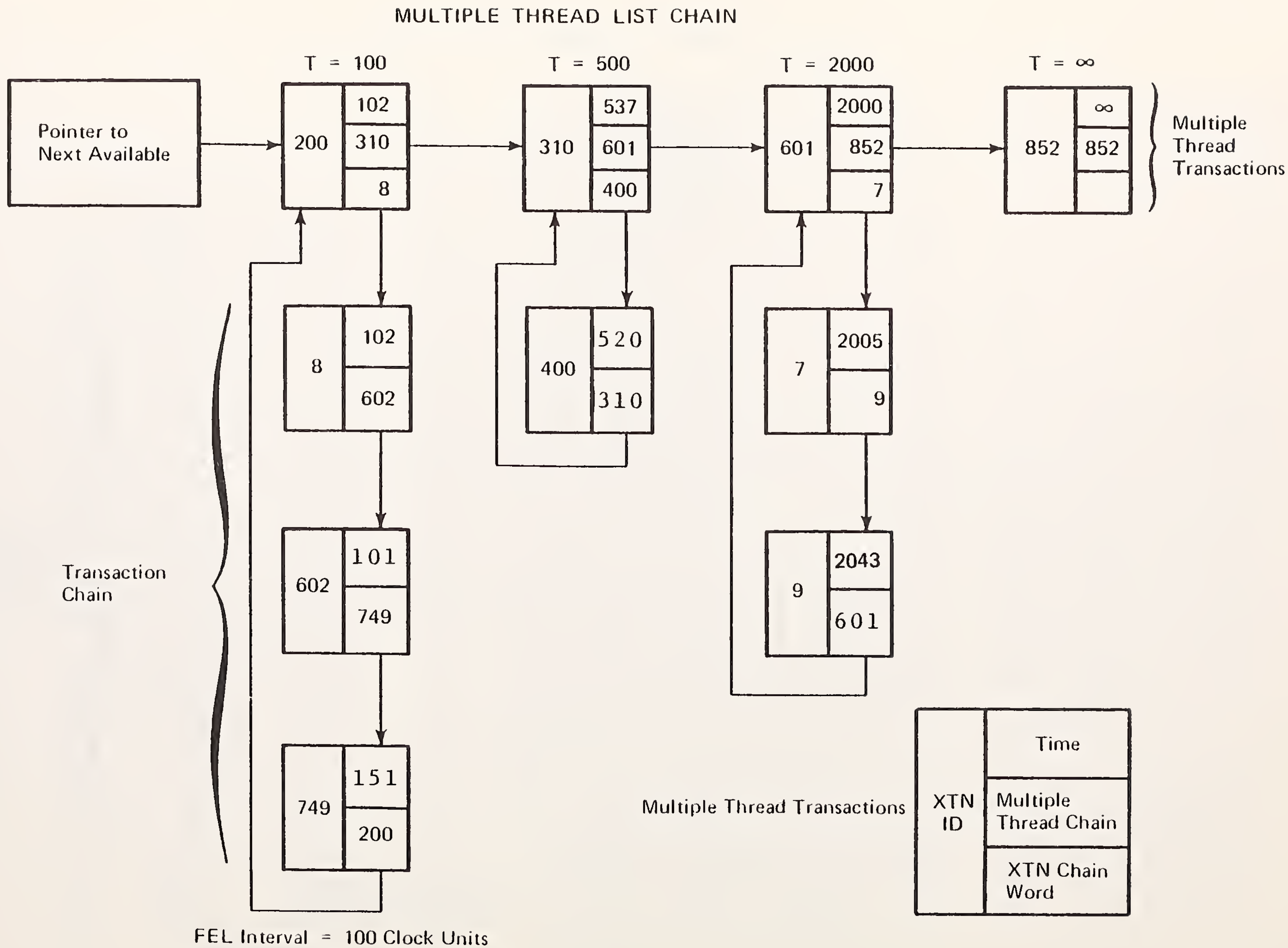



FIGURE 2-2. MULTIPLE THREAD LIST ORGANIZATION

By employing this approach, detailed information related to all transactions within the simulated system need not be maintained to satisfy simulation objectives. This allows simulation to be accomplished more rapidly in terms of CPU time without a significant loss of detail in modeling overall system performance. However, in using this modeling approach the modeling assumptions as identified below are made within the DESM.

Detailed vehicle position on a link and through merges need not be maintained. However, link and merge control functions within the simulator ensures the sequential ordering of vehicles and all link entry and exit processing is performed to ensure that safe headways are maintained. Similarly, detailed vehicle motion within stations is not modeled other than as time delays associated with moving from one area to the next and resulting from congestion delays.

In the DESM, failure occurrences and delay until onset of recovery are explicitly provided by user commands. The specific reason for failure is not modeled; rather, the effect of the failure on links, stations, and/or vehicles is modeled. Statistics on the effects of failure such as number of vehicles affected by the failed entity or average delay related to failure is calculable by comparative analysis of a DESM failure run with an unfailed DESM run.

Storage areas for empty vehicles are modeled as part of some or all stations. There are no remote storage areas unconnected to the main guideway.

Vehicle entrainment and detrainment in stations and on guideway is modeled assuming safe coupling maneuvers.

The various operational features and system management strategies contained within the model offer a baseline capability for examining known feasible alternatives. However, the model does contain the capability for direct replacement or inclusion of other algorithmic alternatives as implemented by the simulation user. For example, the link and station models can be replaced in their entirety, or user defined headway, empty vehicle management or station link diverge processing functions can be included with minor program changes. This substitution capability is detailed in the DESM Programmer's Manual.

## 2.2 ORGANIZATION

The general structure of the DESM, as shown in Figure 2-3 facilitates interface with the user by providing flexible input and output procedures. The major processing functions implemented have been organized into three standalone program components: an Input Processor (IP), a Model Processor (MP), and an Output Processor (OP).

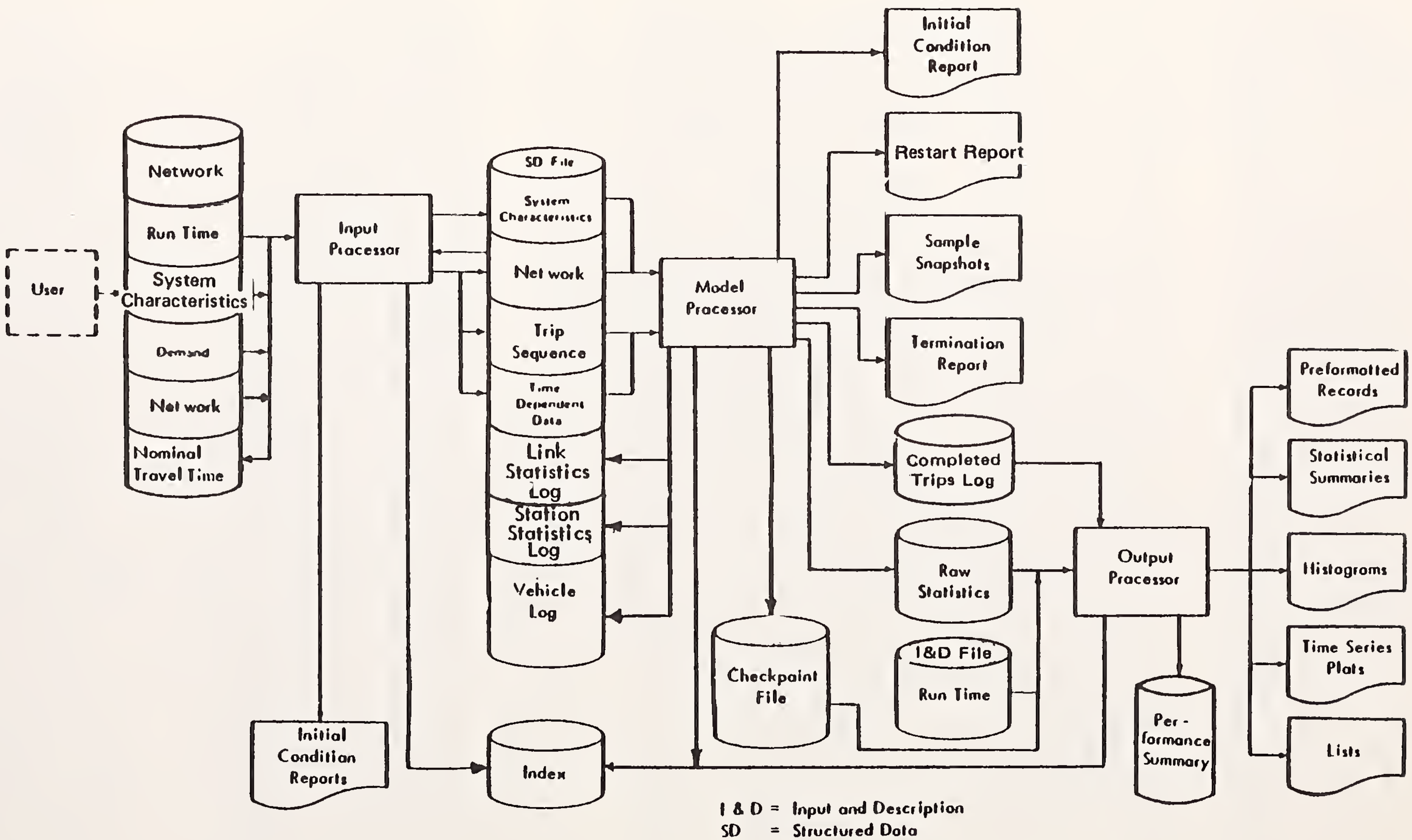



FIGURE 2-3. DESM ORGANIZATION

The Input Processor (IP) is the primary interface between the predefined data base and user run time data and the simulation. The IP provides the user with the ability to define various system and operational characteristics of the transit system to be modeled. Its major functions are to check the input data for consistency and reasonableness and to transform the initialization data from a user-oriented format to a model-oriented format to provide for efficient operation of the Model Processor. Data transformation is performed for three types of input data: network definition, trip demand, and level of service. The network data defined by the user is processed to create a set of link/station connectivity tables based upon both minimum cost and alternate paths. For trip demand, a time sequence of trip arrivals is generated based on origin/destination demand patterns prepared by the user. The level of service is defined in terms of vehicle fleet size, initial placement of vehicles, empty redistribution, routes, and schedules.

The Model Processor performs the discrete event modeling of the desired transit system as defined by the user through the IP. The data provided by the IP through various formatted files, specifying the configuration and characteristics for the network of guideways and stations, establish the two basic modeling entities in the simulation processor. In addition, initial conditions, operational policies, and options which are to direct the flow of transactions, defined as vehicles, trips, and asynchronous stimuli in the simulation system comprise the initialization data set for the Model Processor.

The Model Processor contains the discrete event simulation architecture which provides the time dependent processing of all functions associated with trip management, station, vehicle, and guideway operations. The interaction of these functions over time can cause queues of patrons in stations and propagation of vehicle congestion on the guideway and in stations. Asynchronous command processing provides for time-dependent inputs such as trip requests, fleet size changes, and introduction of failures and other external stimuli.

The Model Processor, in performing a given simulation experiment, collects, summarizes, and formats statistical data at periodic intervals. These data, which are related to completed events, current operational status and queues, are recorded in a data file for subsequent report generation.

The Output Processor provides the services necessary to retrieve the statistical output from the Model Processor, perform summarization functions as requested by the user, and prepare printed reports in a requested format suitable for analysis. The summaries include time series listings, plots, statistical summaries, histograms, and predefined composite reports. Selected performance measures are also evaluated and written to a Performance Summary File for later comparison with the results of other simulation experiments.

The functional organization and program structure of the DESM at the model level and subfunction level are shown in Figures 2-4 through 2-7.

## 2.3 FUNCTIONS

This subsection provides brief descriptions of the general functions and the program modules comprising each functional area within each of the processor components.

### 2.3.1 Input Processor Functions

The Input Processor (IP) performs translation of input definition data and selected control options from the user to structured data files usable by the Model Processor. The IP is basically a sequential processor, having a fixed order of tasks that can be performed. However, the user, through input of control and option selection parameters, defines which of the tasks and processing options are to be executed.

The program begins by initializing a predefined set of parameters to establish model default conditions and to define a baseline for checking user-entered data. Next, initial condition data are read from a specified Input and Description file data set which will contain the system characteristics of a generic transit system. Reading of data cards containing data base overrides, run control parameters, and option selections is then read. This permits the user to modify portions of the transit system characteristics for a series of related simulation exercises.

The IP contains three basic groups of process functions: guideway network configuration processing, trip demand generation, and transit service planning. The user-entered run control parameters define which group(s) are executed in a given run. For example, in a given series of runs, it may be desired to vary the level of service, holding the guideway network and trip demand definitions constant. In this case, the IP will execute only the service planning group which uses the characteristics of the network and demand pattern. However, generation of network minimum paths and a trip file will be bypassed.

Each group of process functions will produce an initial conditions report, summarizing the results of the computations performed. User input data will be checked for consistency and reasonableness and appropriate error messages will be printed.

The IP consists of a major processing loop based on the applicable time associated with the input data. All three groups of functions are included in the major loop. This permits the generation of a trip file

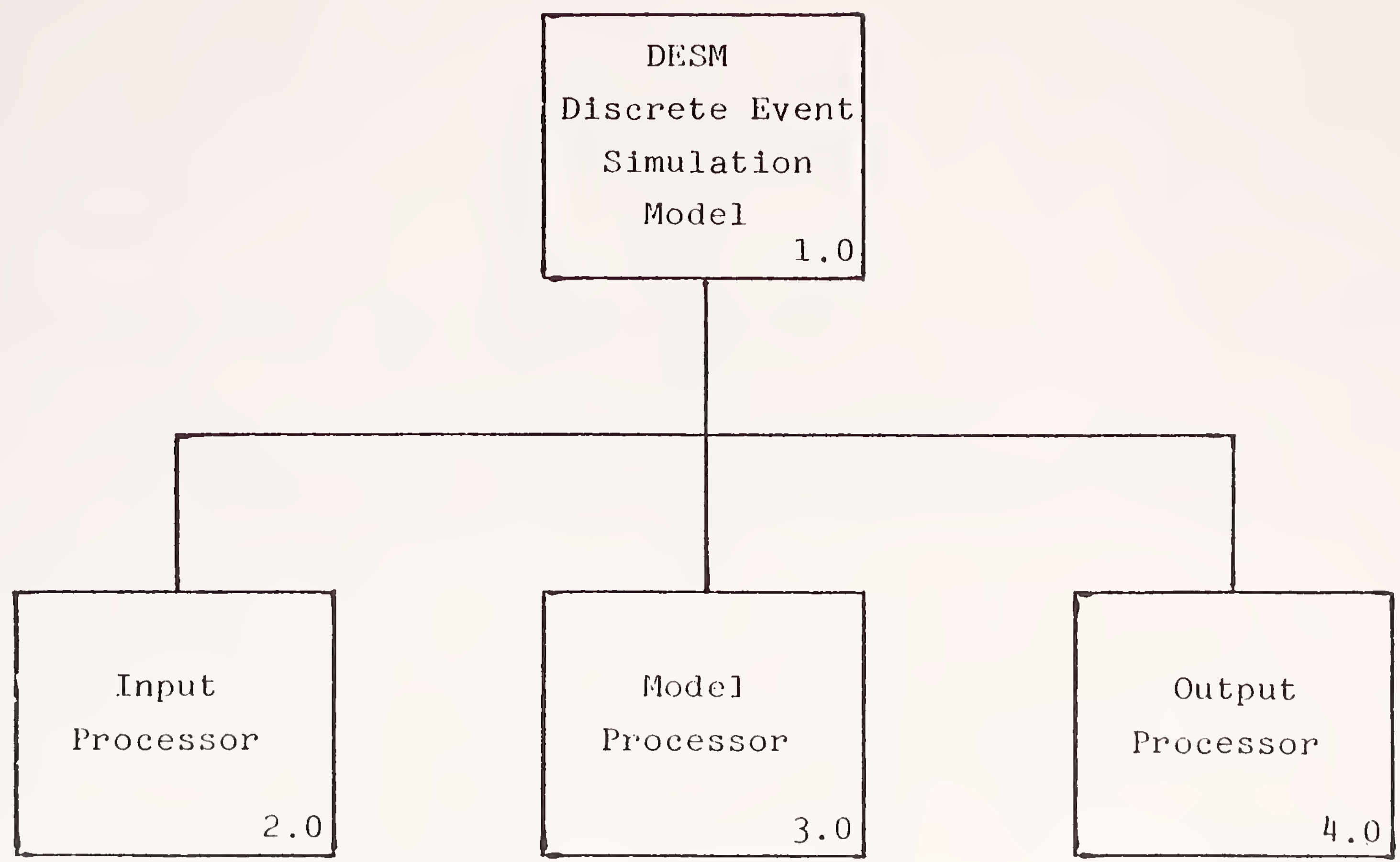



Figure 2-4. DESM General Structure

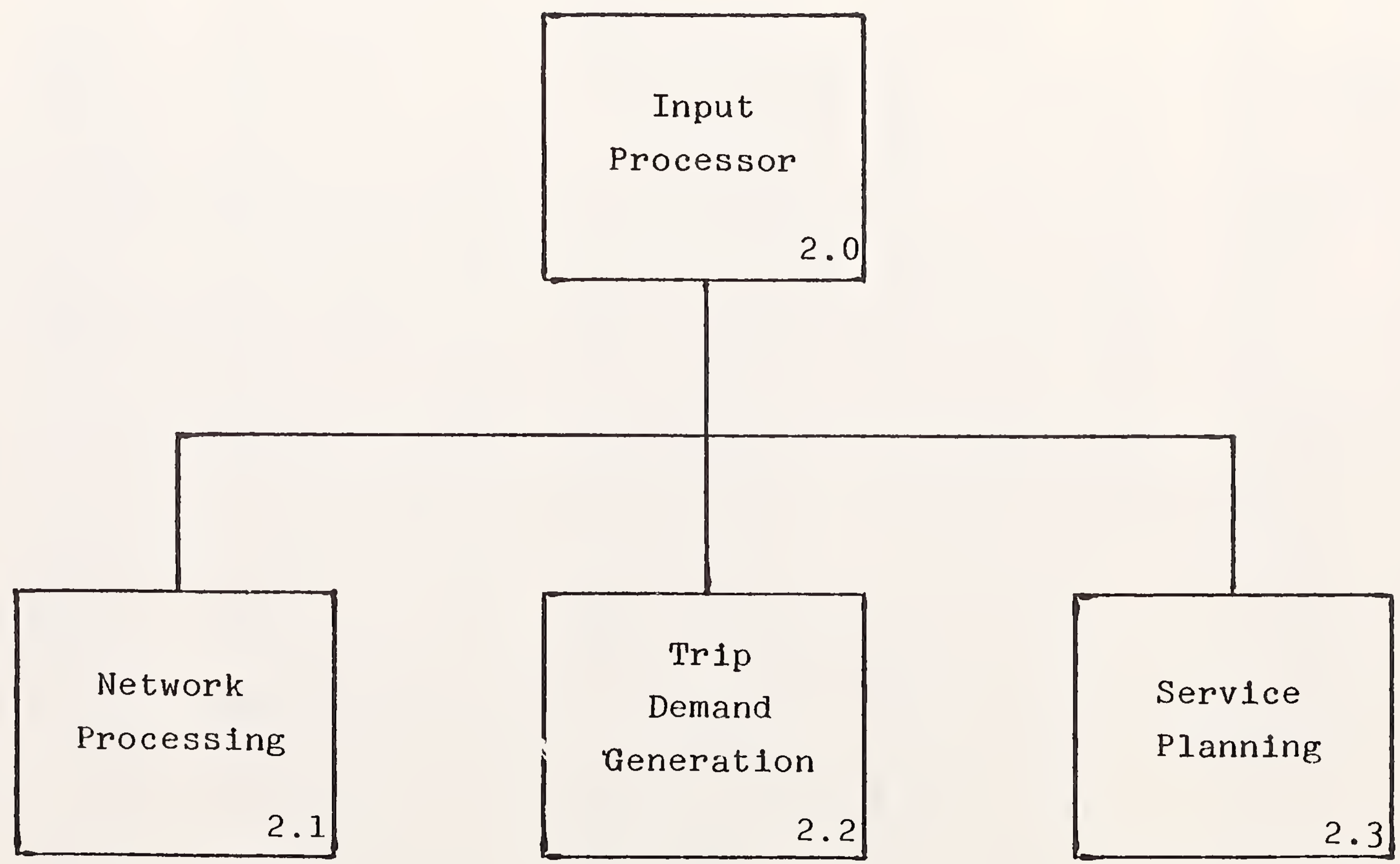



FIGURE 2-5. INPUT PROCESSOR SUBFUNCTION STRUCTURE

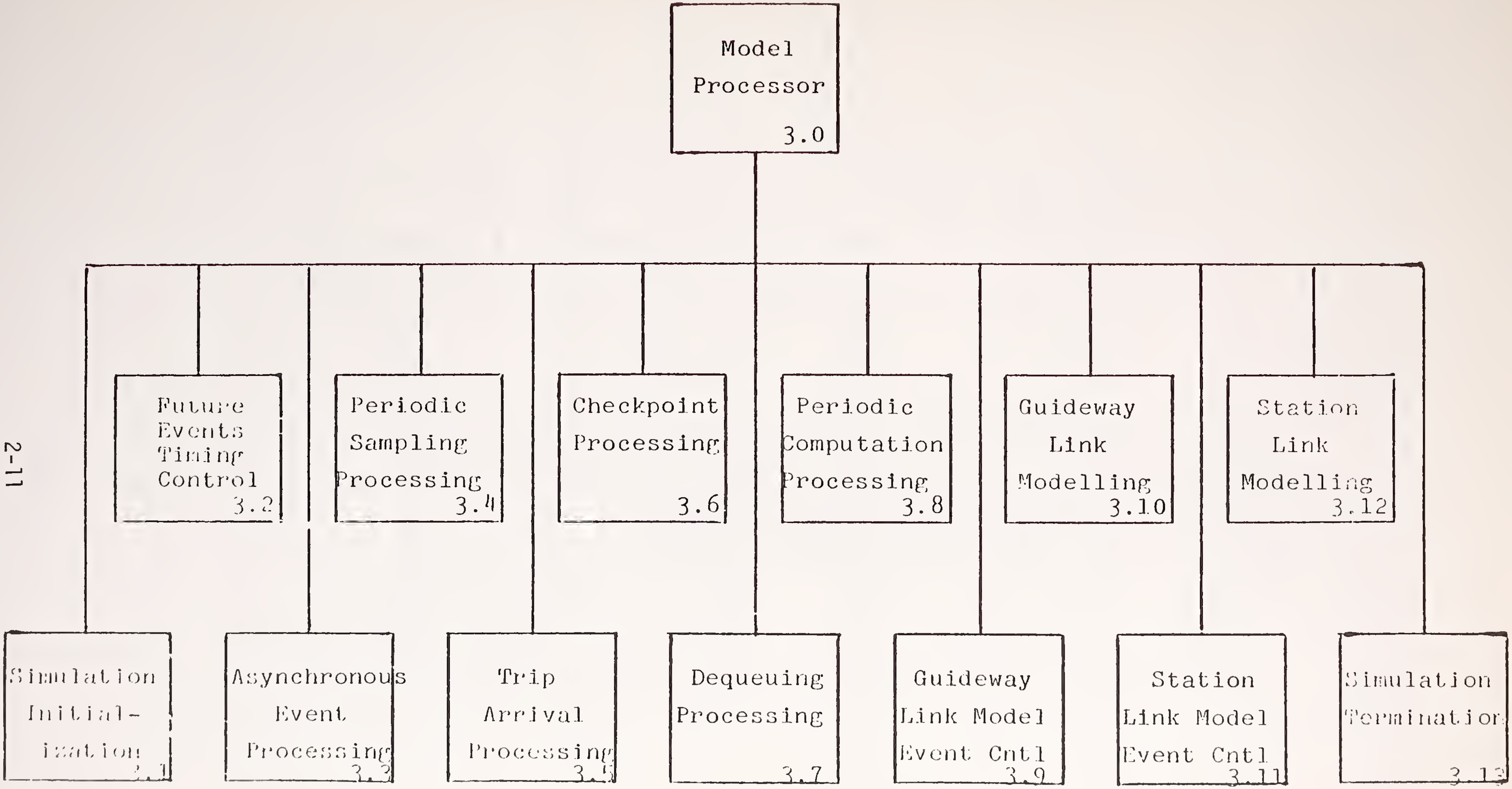



FIGURE 2-6. MODEL PROCESSOR SUBFUNCTION STRUCTURE

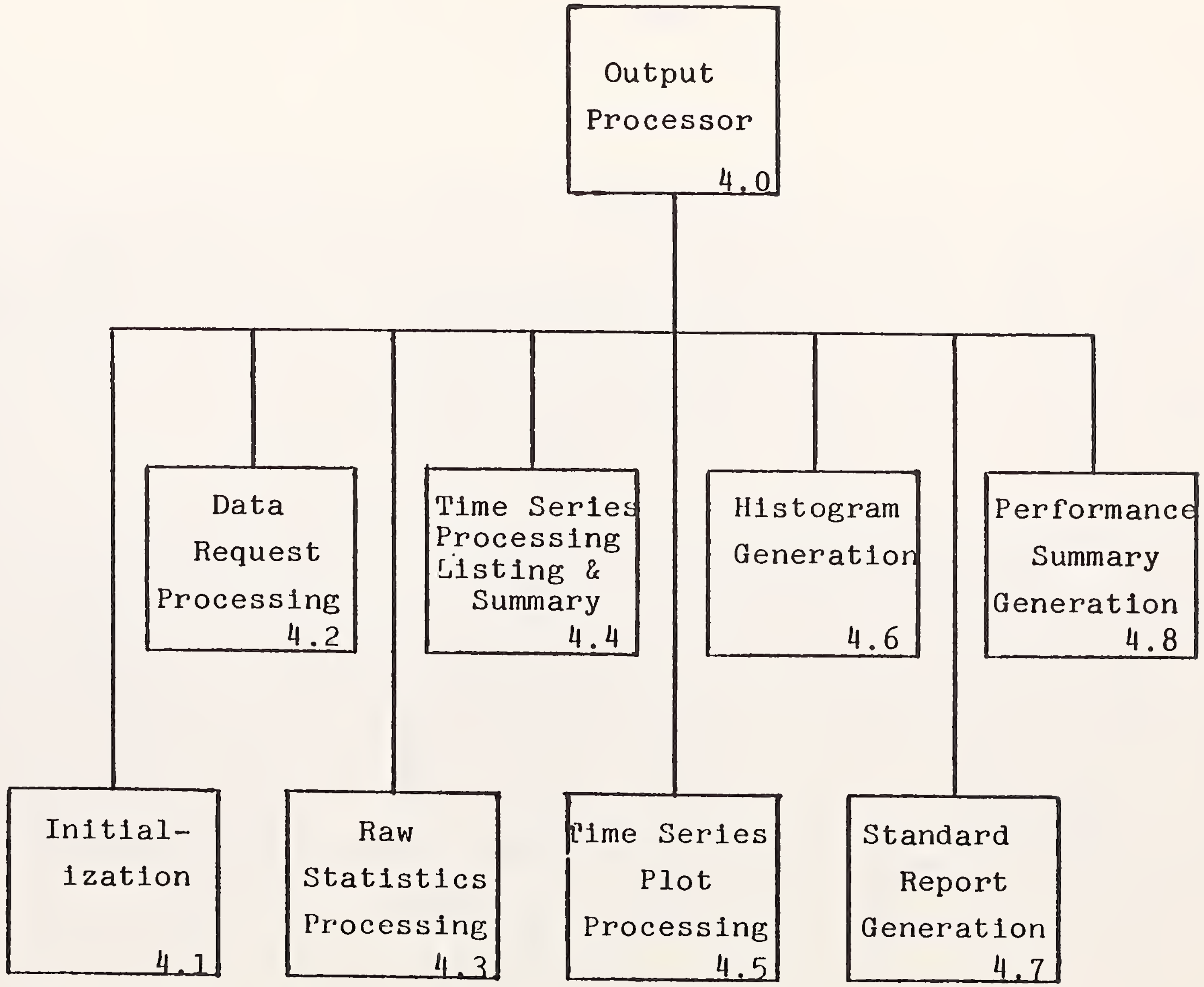



FIGURE 2-7. OUTPUT PROCESSOR SUBFUNCTION STRUCTURE

from a series of demand matrices representing a time of day demand profile. It also permits the level of service to be established using other than the first demand matrix of a series. Further, it permits the recomputation of minimum cost paths when a guideway link or vehicle failure is planned to occur during an exercise.

All initial conditions, whether read from the data base or generated by the IP are written to Structured Data file data sets for access by the Model Processor.

2.3.1.1 Network Processing - If the user requests the processing of a new guideway network configuration, the network definition data are read from the user-specified input and description file. These input data are supplied by the user. After checking the input data to verify that the network is complete and has properly defined station sites, merges, and diverges, the least cost path between each pair of stations is determined. The network connectivity tables required by the Model Processor are then built using the least cost path definitions.

If the user specifies that a previously processed network is to be used for the current experiment, the structured network data are read from the user-specified file. These data are needed to support alternate path processing, guideway failure processing, and transit service planning.

If the user has defined one or more alternate paths in the system characteristics or run time data sets, the program establishes connectivity between the alternate paths and the least cost paths at the common diverge points. The alternate path data are translated from user format to the model processor format.

If either a new network has been processed or new alternate paths have been defined, a new network structured data file is written for use by the Model Processor and subsequent Input Processor runs.

If the user requests a guideway link or vehicle failure, the program penalizes the use of the failed link and recalculates the least cost path definitions if selected by the user. If tow vehicle recovery is selected, links which must be closed to isolate the tow path are also penalized. The failure definition data is translated to Model Processor parameters and written with the new least cost path table to the structured run time data file. If the failure is within a station, the failure definition data is translated to Model Processor parameters and written to the structured run time data file. Least cost paths are not recomputed. Recovery from failure is handled in a similar manner, except that when the last failure is removed, recomputation of least cost paths is not performed.

2.3.1.2 Trip Demand Generation - This function is performed if a new sequence of trip arrivals is to be generated or if the user requests the Input Processor to estimate the number of vehicles required for a specified level of demand and service policy. The function has the capability to process multiple demand input files, to accept overrides to the demand time interval, and to apply a scale factor to the demand to handle time of day variation in level of demand.

The first step is reading of the user-supplied demand definition data from the input and description file, which is expressed in terms of total passengers during a specified time interval for each origin/destination pair. This is converted to trips per hour by origin/destination, using user-specified trip group size distributions (a trip consists of one or more passengers traveling together by their own choice).

The user can enter up to three group size distributions and assign each origin/destination pair to one of the three distributions. The data are entered in frequency distribution format and converted to cumulative distribution format for later use in generating individual trips. If a new sequence of trips is not required, no further processing is performed.

If the generation of a new sequence of trip arrivals has been requested, probability distributions of origin and destination selection are formed from the trips per hour by origin/destination data and the aggregate trip interarrival time is calculated. A Poisson process is used to select individual trip arrival times and pseudo-random numbers are compared to the probability disributions to assign origin, destination, and group size to the trip. Alternatively, the user may choose to generate trips in a deterministic manner using a uniform distribution. This process guarantees the exact number of trips specified in the demand matrix and a constant interarrival time for all trips for a given O-D pair within each demand interval. The trip parameters are then written to the structured demand file. When the trip arrival time exceeds the time interval specified in the demand input data, trip generation terminates and a report summarizing the generated trips is written.

The entire trip generation process is repeated for each set of demand input data specified by the user.

2.3.1.3 Transit Service Planning - This function includes station configuration, system characteristics checking, and transit service policy processing. If the user has defined the station characteristics in the user-oriented notation, this input data is processed to build the station characteristic and connectivity tables required by the Model Processor. The user may elect to input the station characteristic and connectivity tables directly, in which case no processing is required.

The system characteristics input data are checked for reasonableness and consistency to detect parameter value errors and invalid combinations of functions (e.g., synchronous control requires deterministic dispatch). If an error is encountered, a message is written and if further processing is unrealistic due to the nature of the error, the run terminates.

The service policy can be either demand responsive (single or multiparty or multiparty single stop or timeout/group) or scheduled (with user-defined routes or routes determined by the Input Processor). The user may define the vehicle fleet or request the Input Processor to estimate the number of vehicles required based on the network characteristics and the level of trip demand. For scheduled service, the Input Processor calculates the vehicle departure schedules for each station on each route.

After the service planning functions have completed, the structured system characteristics file is written, and a report is written summarizing the system characteristics and transit service policy data.

### 2.3.2 Model Processor Functions

The DESM model processor provides an event-driven simulation for modeling the detailed operation of an automated transit system. Events are scheduled within the simulation for occurrence or completion at some future time, in response to transaction processing requirements. Transactions are appropriately processed when the event time for which they were scheduled is completed and the next event for the transaction becomes the next most imminent task to be performed in the simulation system. Transactions are rescheduled when processing for the current event of the transaction is completed and the next required event and its completion time has been determined. The mechanism which provides the control of this time-oriented event processing is a Future Events List (FEL), which is a time-ordered list of transaction IDs for scheduling of events for occurrence in future simulated time.

Upon entry, the MP performs initialization of the simulation experiment which may involve system restart or initial system definition. Once this is completed, the basic control loop for accomplishing the recognition, scheduling, and processing of transaction events is started. This control process provides for obtaining the next transaction to be processed, updating the simulation clock and invoking the required architectural components or functions.

The processing functions invoked by the architecture to perform the tasks required, as indicated by the active transaction, may cause the reading of asynchronous data input, application of algorithmic computations for updating modeling status, data summarization and recording, or processing within the simulation models (guideway links or stations) of the simulation system. As the result of processing, the transaction which invoked the function may be rescheduled to occur depending upon the task performed. The occurrence of a simulation termination event results in performing termination activities and ending the simulation experiment.

The following sections contain brief descriptions of each of the functional areas of the processor as outlined in Figure 2-6.

2.3.2.1 Simulation Initialization - System initialization is performed to establish the initial conditions for a simulation experiment. This function includes the following procedures:

1. Establishing system status area addresses. The addresses of all data related to transaction management, links, vehicles, stations, trips, and sampling are established and stored for use in order to facilitate the unloading and loading of these areas during system checkpoints or restart.

2. System Restart. This process locates the data (recorded system status) for the desired restart interval from the checkpoint file and initializes the simulator such that the simulation experiment may be resumed from the previously recorded checkpoint.

3. Architecture Initialization. The structured data created by the Input Processor is read to establish all common area definitions containing the simulation initial conditions. The event timing mechanism is also established. Once this is accomplished, the scheduling of system transactions to begin trip processing, sampling, asynchronous data reading, and periodic computations is performed.

4. Modeling subsystem initialization. This process is performed to establish initial conditions for guideway links, stations, and sampling statistics. The initial scheduling of vehicles in the network which is also accomplished is based upon the service policy in effect for the simulation run.

2.3.2.2 Future Events Timing Control - The purpose of this function is to control the scheduling of transactions on the Future Events List (FEL) as well as the retrieval of the next most imminent event to be performed from the list. Every transaction that represents an action to be performed is placed into the FEL at the proper time point. Since the clock table portion of the FEL is of finite length, only a finite number of time intervals can be represented. Transactions which must be scheduled for a time interval greater than the time period represented by the clock table are scheduled on the FEL extension or multiple thread future events list. Entries or quantized intervals in the multiple thread list represent an interval of time corresponding to an entire clock table interval.

In order to obtain the next event to be performed, a sequential scan of successive entries in the clock table, beginning with the currently active interval, is performed until a non-empty interval or the end of the clock table is reached. If a non-empty interval pointer is found, the first transaction chained within the interval is removed and returned as the currently active transaction requiring event processing. If the end of the table is reached during the scan, the first available multiple thread FEL list is removed from the multiple thread chain and reloading of the clock table is performed. Once loading of the clock table is complete, the first available transaction within the current table interval (first reloaded clock interval) is returned as the currently active transaction requiring event processing.

2.3.2.3 Asynchronous Event Processing - The purpose of this function is to perform the processing required in response to the input of asynchronous data in the run-time data stream. These data can be commands which cause status changes within the simulation system or change specifications which modify the value of system parameters and data. The particular event processing initiated is dependent on the type of header card (asynchronous command) as follows:

1. Data Read Command -- The reading of asynchronous input is initiated to recognize successive data change requests and update the global data variables and parameters, as required. Termination of reading occurs upon encountering an 'END' header which signifies end of data input.

2. Checkpoint Command -- A checkpoint of system status is initiated.

3. Failure Command -- Failure events in the DESM encompass both occurrences and recovery of failure conditions on both station and guideway links. The failure header contains the time of occurrence for the scheduling of the failure event. At the time of failure, the data associated with the implementation of the failure condition are read from the asynchronous data stream. When recovery occurs, a system request transaction for possible dequeuing and restart of vehicle transactions affected by the failure in the modeling subsystem is scheduled.

4. Active Fleet Size Management Command -- Fleet size changes in the DESM are initiated in response to this command. The requested change can require the addition or removal of vehicles from service. Fleet size changes for demand responsive service are performed by either increasing or decreasing the number of vehicles in station storage areas. If a necessary fleet size

reduction cannot be achieved in this manner, the next n vehicles to become empty within the network are removed from service to satisfy the required reduction. In the scheduled service case, fleet size changes are accomplished by rearranging the existing vehicle fleet. Vehicles currently serving the route will be allowed to deboard existing trips and be sent to maintenance barns for reconsisting and relaunch on routes, if necessary.

2.3.2.4 Periodic Sampling Processing - Statistical data collection within the DESM is accomplished by recording modeling status and history data for entities and transactions at key event points in the modeling subsystem. The accumulation of statistical data is performed over a sampling interval. The occurrence of a sampling event causes the accumulated statistics to be written to the raw statistics file. The statistics are written to the file as a series of header and data follower records. Each record contains the time of the sample and a type designator for the entity or transaction to which the immediate statistics apply. This header information is used in output processing to determine the format and position of data in the sampling records.

2.3.2.5 Trip Arrival Processing - Trip arrival processing performs placement of an arriving trip into a specific station boarding queue and initial vehicle selection for servicing of the trip demand. The trip transaction indicated by the trip arrival service request transaction is placed in the boarding queue of its origin station if capacity exists. Otherwise, the trip arrival is recorded as a rejection and the trip transaction is returned to the transaction available list. The trip which is processed may be originated as an asynchronous system arrival or a transfer arriving at a transfer station for trip continuation by the modeling process.

If the number of patrons associated with the trip exceeds the maximum trip size, it is subdivided into associated subgroups such that the size of any one subgroup does not exceed the maximum trip size. Each subgroup transaction is placed in the boarding queue at the origin station of the original trip.

If demand responsive service is in effect, processing is performed to ensure timely servicing of the trip request(s). This involves the requesting of a vehicle according to an ordered list of priorities which specifies as possibilities:

1. A vehicle (occupied/empty) about to arrive/pass by the station of the trip

2. In the station of the trip

3. An empty vehicle in local storage

4. An empty vehicle in regional storage

5. An empty vehicle circulating on the guideway.

6. Earliest available, considering all sources

7. Any expected arrival (1 and 5 combined).

In the event all requested methods fail to find a vehicle a "need counter" is incremented for interrogation by vehicles passing the station. For options 1, 5, 6 and 7 specified above, a vehicle reservations scheme is implemented in the DESM. According to this scheme, trips can reserve space on a vehicle found by the above options. This reservation can be cancelled if an earlier arriving vehicle becomes available and can service the trip. However, prior to finalizing a reservation for an arriving trip on a vehicle, all waiting and unreserved trips at the station are given an opportunity to obtain the reservation first. Thus, vehicle reservations are always given to the longest waiting trips in the station.

For timeout/group demand responsive service, arriving trips join a group of trips with a common destination. When the group reaches a user specified minimum size or the oldest trip in the group waits the maximum time a vehicle request is issued.

Once trip arrival processing is completed for the arriving trip, the next trip record is read to determine the next scheduled arrival time. This trip is assigned to a transaction whose ID is recorded within the service request transaction which is scheduled for occurrence at the arrival time for the next trip.

2.3.2.6 Checkpoint Processing - Checkpointing is performed to save the status of a simulation experiment at any point during the simulation run. Checkpointing can occur at periodic intervals or on a demand basis initiated via an asynchronous data request.

The writing of system status during a checkpoint involves recording of all global common data used by the MP. The location of this data and its length is defined to checkpoint processing during initialization.

If the checkpoint was invoked as the result of a periodic transaction event request, the transaction is rescheduled to occur at the next required checkpoint interval.

2.3.2.7 Dequeuing Processing - Transaction dequeuing is the architectural function for resuming movement of vehicle transactions which have been queued on guideway or station links as the result of congestion or failure. Dequeuing is invoked in response to a dequeuing request scheduled by the link or station model via a system service request transaction. Upstream queues are examined for waiting vehicles and if any are present, the first vehicle in the queue or the appropriate vehicle(s) from a set of queues (merge) is dequeued, and scheduled for travel, based on link priority requirements, on its next (guideway or station) entity.

2.3.2.8 Periodic Computation Processing - This functional area provides for the execution of an algorithm on a periodic basis or on a scheduled basis. This capability is used in the Hueristic FIFO merge policy wherein vehicles are delayed at merges based on the traffic density on the two links approaching the merge. When the scheduled time for algorithm execution occurs, the algorithm evaluates the density of moving vehicles on each link that leads to a merge. This density value and the density on the competing link are used to extract a time delay value for each link, which will be used to alter the travel time of all subsequent vehicles entering the link. The time delay values are used until the next scheduled time for algorithm execution occurs. This processing is also used to model failure detection, failure restart, and failure replacement vehicle initialization as well as timeout/group demand responsive inventory management.

2.3.2.9 Guideway Link Model Event Control - This functional area provides the architectural control for directing the event processing and interfacing with the Guideway Link Model. The control processing begins with invoking the link model to process the required model event for a vehicle transaction. Upon completion of the event, a determination is made as to whether all model events have been completed on the current link. If so, the next modeling entity (link or station) for the vehicle transaction is determined and checked for availability. If the next entity is available, link exit processing is accomplished and the appropriate model (link or station) is invoked to process and schedule the next event for the vehicle. Otherwise, the architecture control invokes transaction queuing for the vehicle on the current guideway link.

2.3.2.10 Guideway Link Modeling - This functional area provides for the simulated movement of vehicles along the guideway network links. Basically, the movement of vehicles along the links consists of each vehicle traversing a headway segment (used to ensure proper spacing between vehicles), and a travel segment which comprises the remainder of the link. Vehicles can traverse the travel segment under control of a fixed block or variable block vehicle position regulation scheme. Provision is made in the link model control for recognition of a user defined headway model for accomplishing link traversal.

The modeling of guideway links in the DESM is designed to minimize transaction scheduling requirements and at the same time reflect realism in vehicle movement. As such, all vehicles are required to traverse the headway segment to ensure proper spacing between successive vehicles entering the link. Upon completing headway segment traversal, the vehicle begins traversal of the travel segment. This processing may or may not require transaction scheduling, depending upon the status of the immediately preceding vehicle on the link.

If no prior vehicle exists on the link, the vehicle is scheduled for its link traversal event which encompasses the travel time to link exit. If a prior vehicle is currently on the link, the vehicle either assumes a vehicle follower position or travels to the position on the link immediately behind the vehicle. The latter occurs if the preceding vehicle is currently stopped on the link and is a member of the link exit queue due to downstream congestion or failure. If the preceding vehicle is in the process of active link traversal, individual transaction scheduling for the current vehicle is not required. Instead, the vehicle becomes a follower which is chained to the previous vehicle with time separation equal to the difference in time between travel segment entry of the two vehicles. Following vehicles chained in this manner are scheduled at some future time to close up the gap at the time the leading vehicle either stops on the link (encounters an exit queue) or completes link traversal. Thus, at any one time, only one vehicle on a guideway link requires event scheduling, thereby reducing simulation overhead requirements. In the process of scheduling following vehicles for independent travel, allowance is made for differences in velocity between consecutively traveling vehicles. Thus, the time separation or "gap" to close may be shorter or longer than initially computed at vehicle link entry time as dictated by individual vehicle link traversal speed.

If at completion of a link traversal event, the vehicle encounters the end of the link queue, it joins the queue and moves on the link at the rate of dissipation of the queue. No rescheduling of the vehicle is required until it becomes the lead vehicle in the queue ready for link exit and entry of its next modeling entity.

2.3.2.11 Station Link Model Event Control - This functional area provides the framework for controlling the processing of station link events. The station link control processes are involved in modeling vehicle movement from a station link to a station link, or from a station link to a guideway link and thus are characterized as being "inter-station link" in nature. The components under control of the Station Link Event Control accomplish the following: identify the next link in the network to be taken by a vehicle leaving a station link; determine entry feasibility for a station link; determine entry feasibility for a guideway link; manage vehicles exiting a station link; and queuing a vehicle at the end of a station link when exit is prohibited. Two additional functions, invoked by Station Link Event Control are the Station Link Model, described in the following section and the Guideway Link Model, described previously. These two models process the events associated with "intra-station link" and "intra-guideway link" traversal or those events occurring on a station or guideway link.

2.3.2.12 Station Link Modeling - The Station Link Model provides the control for event processing on station links. These events include:

1. Headway zone travel
2. Travel segment traversal
3. Trip deboarding
4. Trip boarding
5. Vehicle storage processing
6. Launch time determination.

All station links are configured to contain some or all of the above events in some specified sequence as previously described. The Station Link Model simulates the movement and actions of a vehicle within a station link by advancing it through a sequence of events. The processing required to process a vehicle for a station link event consists of the following: event initiation processing, next event determination, and event completion processing. Most events within the station model require these basic processes. For example, event initiation processing for the deboarding of trips event determines which trips will be deboarded and the amount of time required for the deboarding process. The next event processing determines which actions must be performed subsequent to deboarding based on the sequence of events for a particular station link. Event completion processing physically removes trips from the vehicles and performs follow-up processing in the station.

2.3.2.13 Simulation Termination - Simulation termination event processing is invoked by the occurrence of a system service request transaction which indicates the end of the simulation experiment. Termination processing, (orderly shutdown of the Model Processor), is performed for the architecture and modeling subsystems. Modeling subsystem termination involves the gathering and formatting of current modeling status into a simulation termination report. This report summarizes the termination status of each modeling entity and provides selected statistics reflecting operational performances of the transit system being modeled at simulation termination. System termination processing consists of finalizing usage statistics related to event processing efficiency and the display of a simulation termination message which reflects the condition of termination for the simulation experiment.

### 2.3.3 Output Processor

The DESM output processor provides the means by which sampling data, written to the raw statistics file during a simulation experiment, can be retrieved and formatted for transit system analysis. The output processor permits access to and manipulation of the raw statistics in a convenient and unrestrictive manner. This is achieved by providing a user interface which does not require a priori knowledge of how data are formatted, acquired from the input source, or arranged internal to the processor itself.

The processing performed by the output processor is directed by service request commands input by the user. These commands invoke the four basic processes provided by the OP as follows:

1. Data storage allocation
2. Command request processing
3. Data acquisition and manipulation
4. Data display.

Data request commands provide the means by which desired statistics and presentation format are specified for retrieval. Those requests are accumulated until a read command which causes actual accumulation and formatting of data is encountered.

The OP allows the accumulation of up to 400 user requests before data acquisition is required. The exact number of data request commands which are accumulated prior to initiating data acquisition and processing is entirely dependent upon user requirements since data acquisition is performed only in response to a user command request. The OP also contains an automatic request generation facility which allows the user to obtain via a single request a specific item of data over a range of modeling entities.

The basic control loop of the OP involves the reading and filing of user data requests until a data acquisition (READ) command is encountered. This causes the reading of the raw statistics file to begin and data manipulation, summarization, and display to be performed. Once the desired data display and output have been accomplished, the control loop is once again started to process further sets of user command requests. The control loop is executed until all user data requests have been satisfied.

2.3.3.1 Initialization - Upon initial entry, the OP performs initialization processing to establish initial conditions for the processing of a raw statistics file. This involves the initial formatting and allocation of the bin storage area which is used for data (sample value) storage during the acquisition process. Default parameters relating to problem size definition are acquired from the raw statistics file to define the following characteristics of the simulation experiment from which the raw statistics were derived.

1. Number of Guideway Links
2. Number of Stations
3. Number of Station Links
4. Number of Routes and Route Groups
5. Simulation Clock Granularity
6. Sampling Interval
7. Vehicle Capacity
8. Station Link Type Classifications.
9. Vehicle Seating Capacity
10. Vehicle Fleet Size
11. Excess Travel Time Autogram Intervals

These characteristics are used to control data acquisition and format control in processing the raw statistics file and in the computation of system wide performance measures and derived statistical measures.

2.3.3.2 Data Request Processing - Once initialization has been performed, each OP request for data is processed until an acquisition (READ) command is encountered. These requests are entered by the user to control auxiliary (trace) output printing, acquisition of individual statistics, performance summary generation, and pre-formatted report preparation.

As each command request is processed, a region within the data storage area is assigned to contain the data required for satisfying the request, and decoding and filing of the command request is performed. During the decoding process, those requests for individual statistics which require data to be collected over a range of entities, cause the automatic generation and filing of individual requests for each entity in the specified range.

2.3.3.3 Raw Statistics Processing - The actual acquisition of data, from the raw statistics file, is initiated upon encountering an acquisition (READ) command during the processing of user data requests. The acquisition process begins with positioning of the raw statistics file to the beginning of the request accumulation interval and correlating the data associated with filed requests to record types and formats contained in the raw statistics file. The raw statistics file is composed of a sequence of time tagged header records identifying the type of data which follows and a group of follower records which contain the recorded sampled data.

Actual data acquisition from required record types is performed by I/O processing based on individual record type for the major data category indicated in the record group header. This processing iterates upon each of the follower records in turn and then upon each of the requests in the request table associated with the particular record type.

For each iteration, the required data item is located in the follower record, retrieved, and stored in the appropriate storage area. If during the store process, an allocated storage area for a particular request becomes full, it is automatically reallocated to contain more space. Thus, the file reading process does not require a "second guess" of how much each type of data actually resides in the raw statistics file. Once storage of a data item has been performed, the storage space pointers contained in the request table entry are updated to reflect storage utilization.

2.3.3.4 Data Display Processing - Data display processing is performed upon completion of data acquisition to produce the desired output format requested by the user. The display process involves cycling through the filed requests and manipulating, formatting, and outputting the associated data. As part of the formatting process, sixteen character descriptive titles for the requested statistics are retrieved for labeling purposes. In the case of station link data requests, a type mnemonic is assigned for output labeling, based upon the numeric configuration type designation for the requested station link.

2.3.3.4.1 Time Series Processing - The processing of time series listing requests results in the retrieval and sequential display of individual sample values accumulated over the request interval. A statistical summary request results in the preparation of summary displays which reflect the statistical characteristics of the individual sampled data points.

2.3.3.4.2 Time Series Plot Processing - Time series plotting involves determining the range of sampled values in order to establish the necessary plotting grid and scale factors for data plotting purposes. The user may enter the minimum and maximum values to be used for scaling the sampled values to the grid. Once the plotting grid and scale factors are established, each sample point is scaled and plotted on the grid and output along with a listing of the actual sampled value.

2.3.3.4.3 Histogram Processing - Histogram generation involves the computation of the mean and standard deviation for the selected statistic. A frequency distribution of occurrences within specified class intervals is accumulated and output with the information described above.

2.3.3.4.4 Performance Summary Processing - Performance Summary processing involves the collection and manipulation of individually accumulated statistics encompassing a range of entity values over the entire period of data acquisition. These data are used to compute system wide totals, minimum, and maximum values, and system wide averages which provide several measures of system performance. These data are output in the form of a preformatted Performance Summary Report and recorded in the data base Performance Summary File.

2.3.3.4.5 Standard Report Processing - Report processing results in the automatic generation of one of two predefined analysis reports, as selected by the user. Each report contains a selected subset of sampled data, reflecting both system wide and individual measures of system performance.

2.3.3.4.6 Station-to-Station Measures Report Processing - Report processing results in the generation of a report on a station-to-station basis for one of seven selected measures and includes number of samples, average, standard deviation, maximum, and minimum for each O-D pair.

## 2.4 OPTIONS

User control over the DESM is provided by a wide range of standard input options which are used to establish the basis for a given simulation experiment, control the modeling process, and perform data retrieval and display of statistical results. In addition, flexibility of the DESM is enhanced by providing an algorithm replacement capability and a modular system architecture which supports user substitution for features within both the guideway and station modeling subsystems of the MP.

### 2.4.1 Standard User Controls

Standard user options are input to the DESM via the IP. The IP performs translation of input definition data and selected user options to the structured data files within the AGT data base for use in the MP.

Output Processing options are input directly to the OP in the form of command requests, as previously described in subsection 2.3.3.2, to direct acquisition and display of raw statistics output by the MP. The options available for direct input to the DESM for conducting a simulation experiment and subsequent performance analysis are summarized in the decision tree diagrams shown in Figures 2-8 through 2-13.

### 2.4.2 Linkage Editor Controls

DESM function substitution requires user coding and implementation of parallel program segments which satisfy all interface, data, and format conventions as detailed in the DESM Technical Specification and Programmer's Manual. User substituted functions are incorporated into the DESM model by means of linkage editor control statements which identify the program segments for inclusion in the DESM executable load module. Algorithm replacements are also incorporated via linkage editor control by including additional user coded program segments. The execution of these algorithms is provided via direct option control incorporated in the DESM as described below.

2.4.2.1 Station Model Diverge Functions - Station link selection within the DESM is performed automatically as described in subsection 1.3.4. However, as an input option, a user supplied diverge function can be executed to determine the next link which should be entered. Although not used in normal processing, two default diverge functions which duplicate the automatic selection process are provided within the DESM for user interface purposes and possible use by the user in implementing station model control changes.

2.4.2.2 Algorithm Replacement Options - The DESM provides options for user replacement of operational control algorithms for guideway link headway regulation and empty vehicle distribution. In addition, a capability is provided for executing any user specified algorithm incorporated in the model on a periodic basis.

## 2.5 FILE STRUCTURE

As shown by the organization diagram, Figure 2-1, the data base is the essential interface between the three processors of the DESM. Each of the processors requires input data files and produces output data files which in some cases then becomes the input data of another processor. The data files shown are described below in the order in which they would be used if the entire DESM were to be exercised and are summarized in Table 2-1. The input parameters and required formats are defined in Section 4.

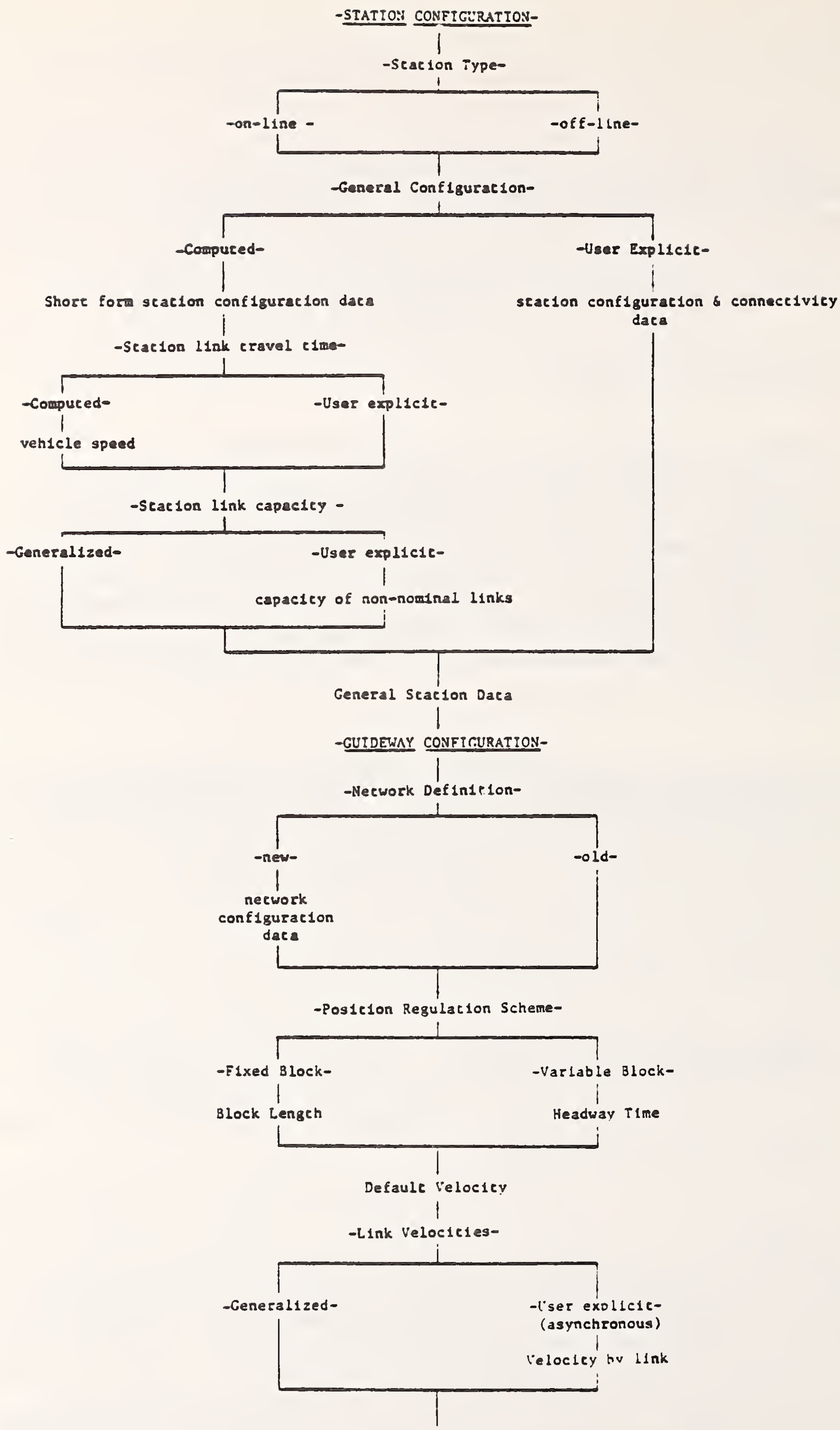



FIGURE 2-8. MODEL CONFIGURATION OPTIONS

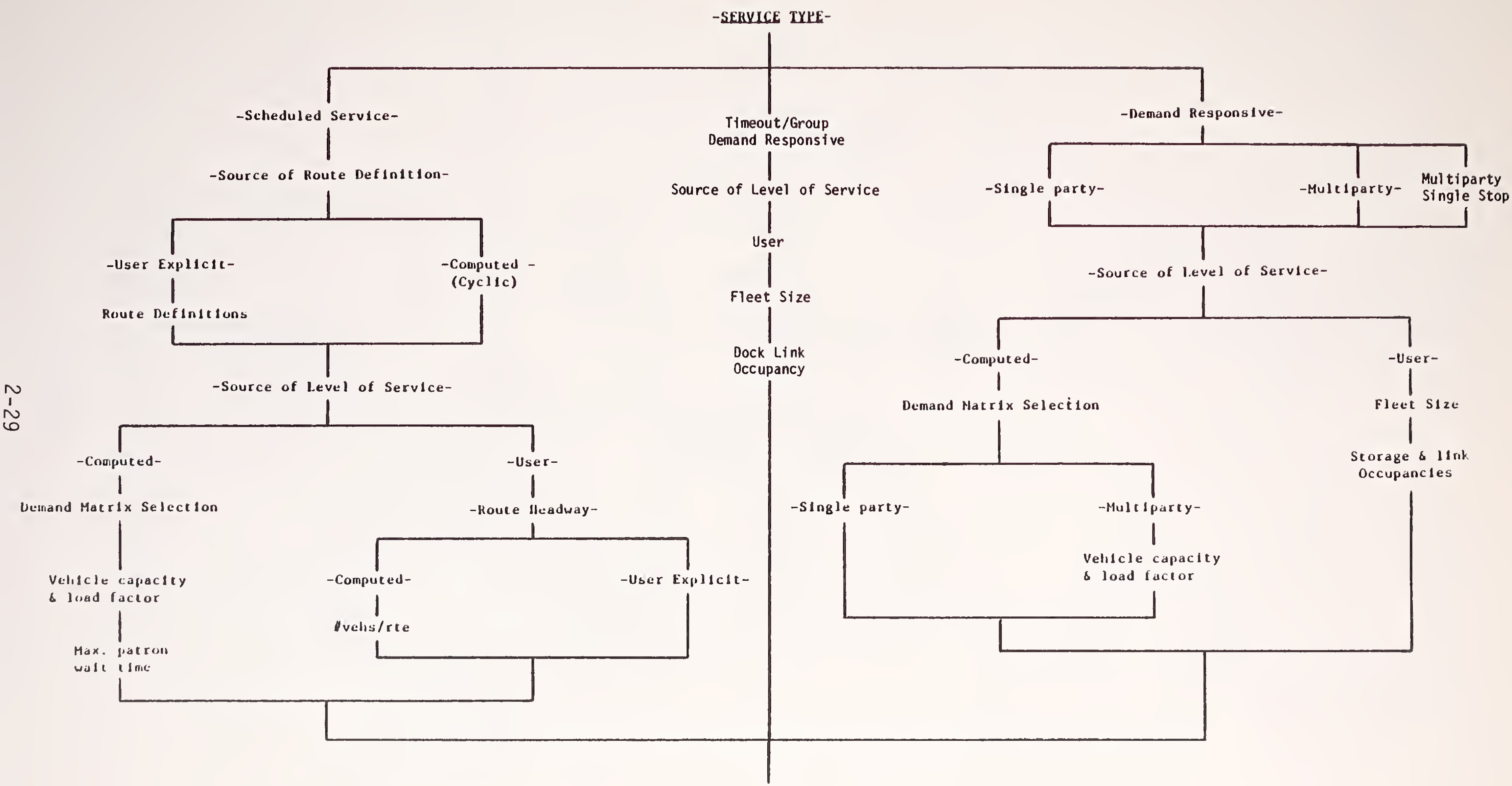



FIGURE 2-9. SERVICE MODE OPTIONS

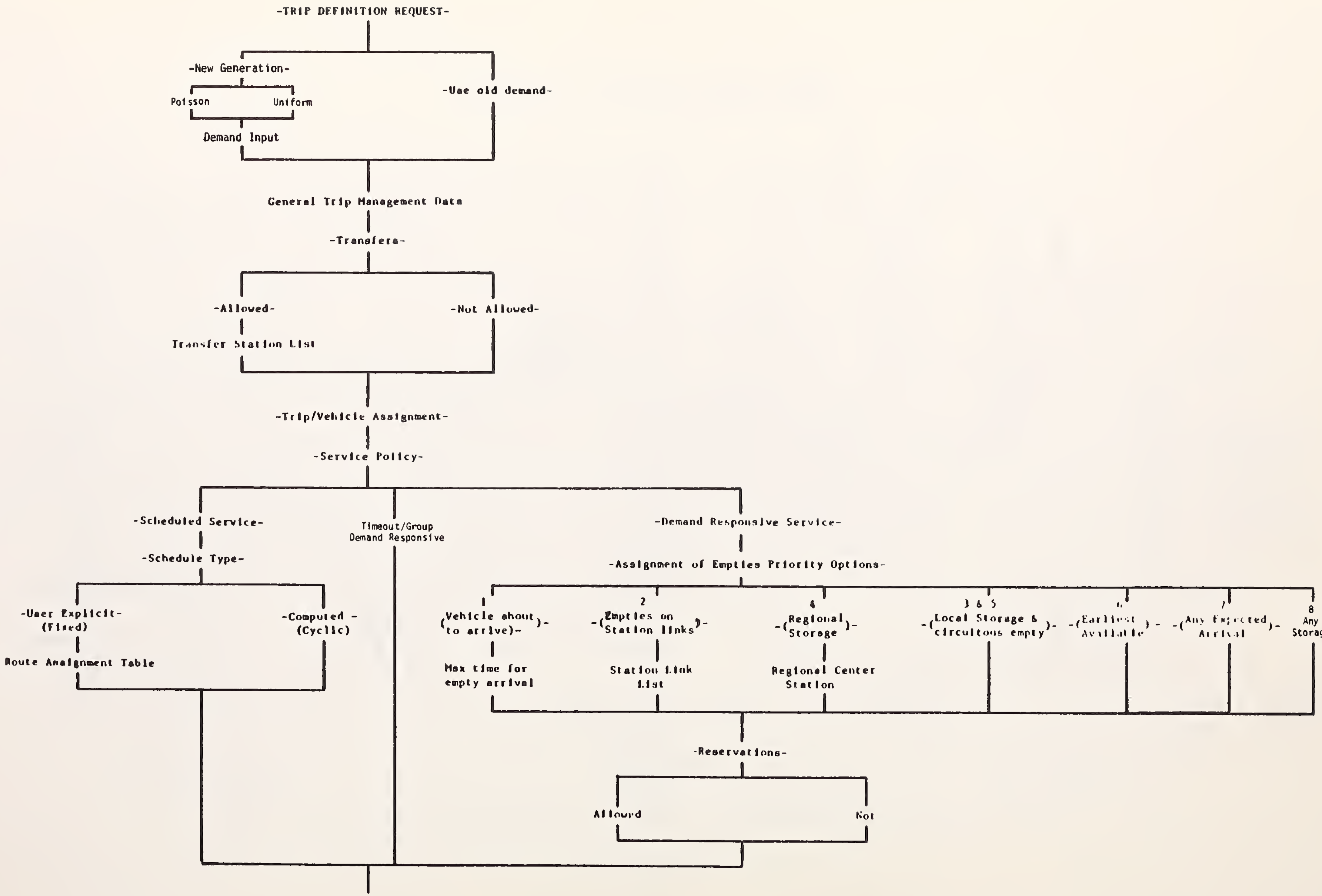



FIGURE 2-10. TRIP MANAGEMENT OPTIONS

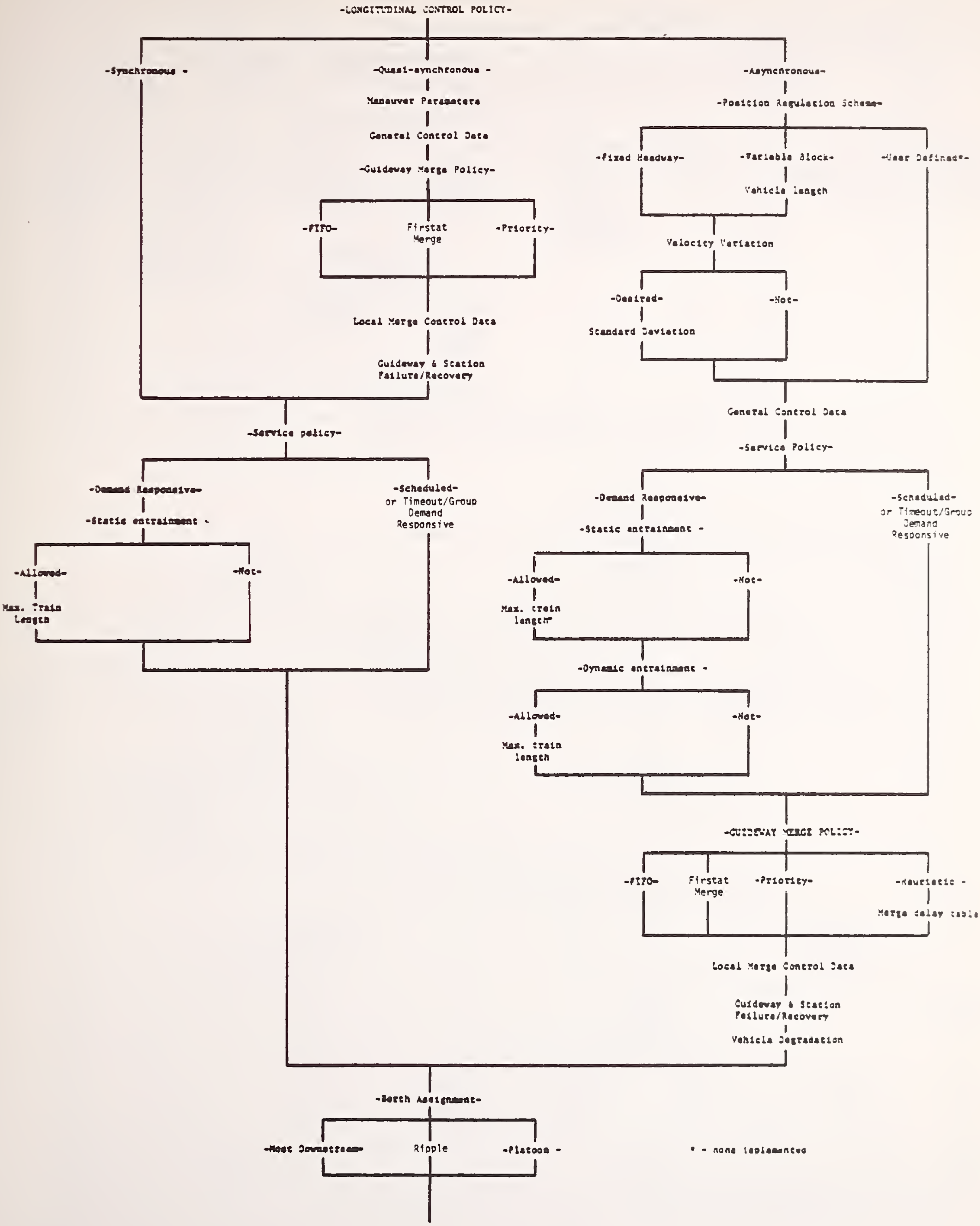



FIGURE 2-11. VEHICLE CONTROL OPTIONS

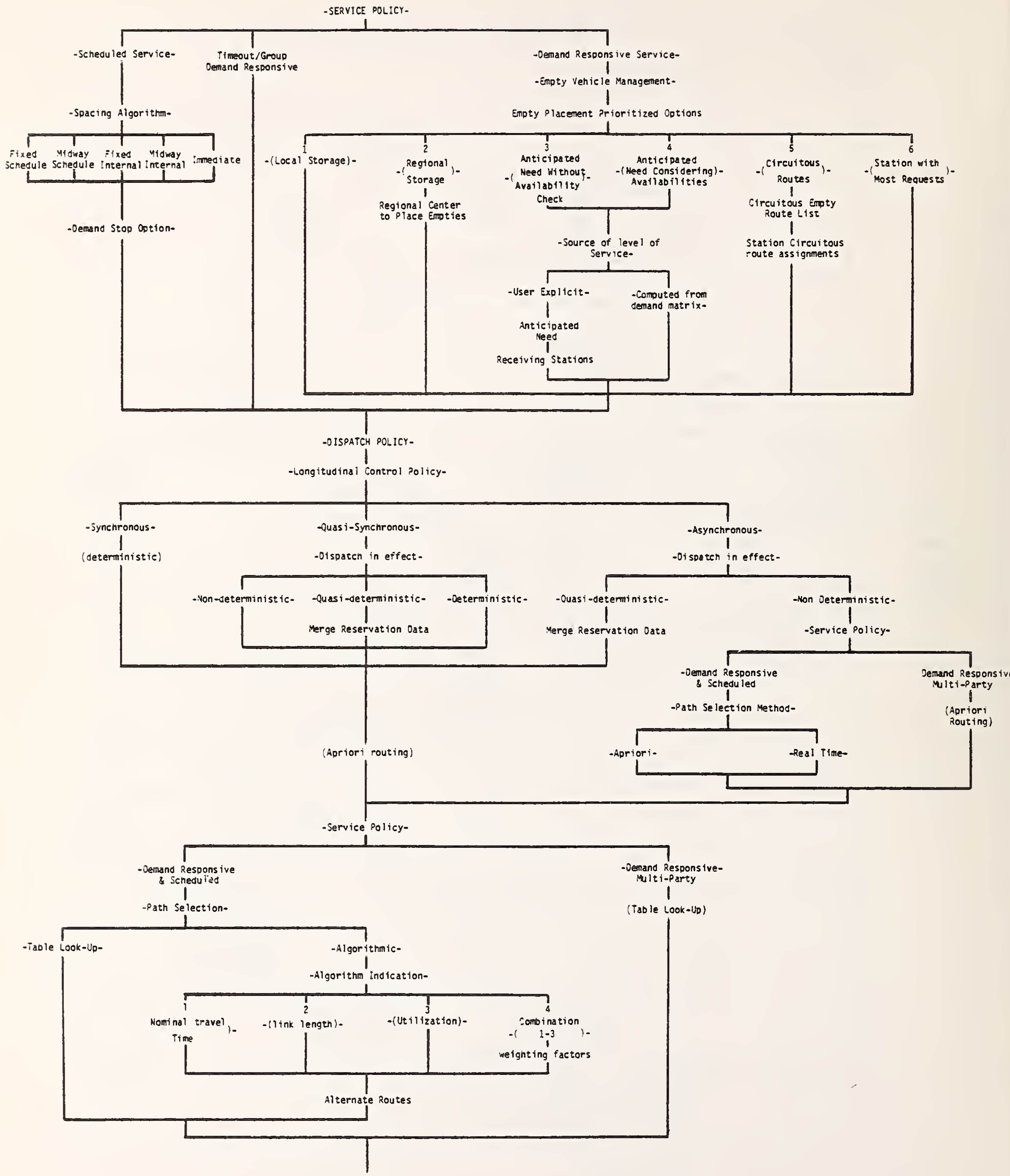



FIGURE 2-12. VEHICLE OPERATIONAL STRATEGY OPTIONS

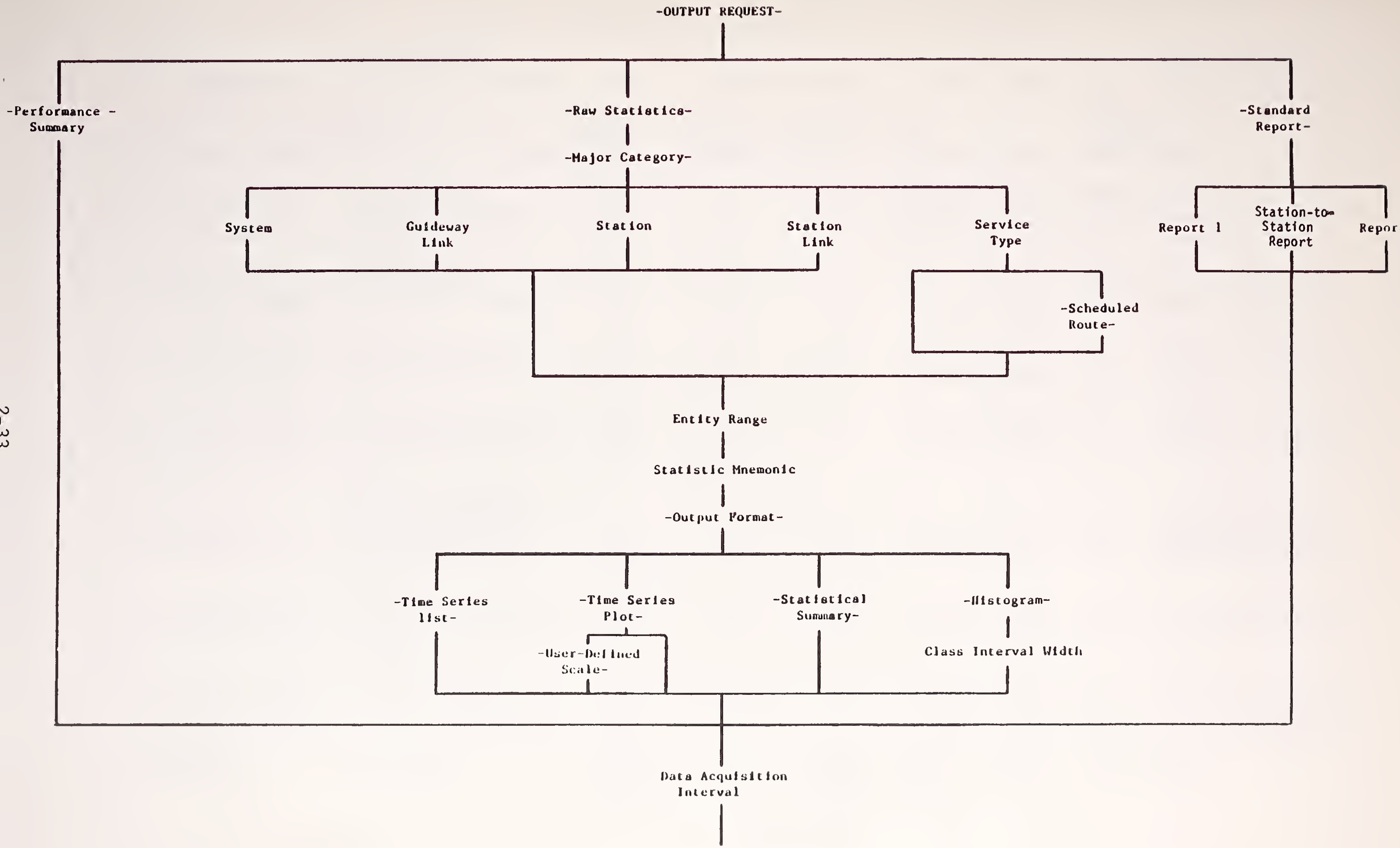



FIGURE 2-13. OUTPUT PROCESSING OPTIONS

TABLE 2-1. DESM DATA FILES (Page 1 of 2)

| | | Attributes | | | | | | |
|---|---|---|---|---|---|---|---|---|
| File Name | Contents | Organi-zation | Record Format | Record Length | Block Size | Type | Source | Use |
| AGT.IANDD.NETWORK | Network Definition | PDS | FB | 80 | 3120 | EBCDIC | User | Input Processor |
| AGT.IANDD.SYSTEM | System Character-istics | PDS | FB | 80 | 3120 | EBCDIC | User | Input Processor |
| AGT.IANDD.DEMAND | Demand Generation Data | PDS | FB | 80 | 3120 | EBCDIC | User | Input Processor |
| AGT.IANDD.RNTIM | Time Dependent Overrides and Option Selection Data | PDS | FB | 80 | 3120 | EBCDIC | User | Input Processor Output Processor |
| AGT.STRUC.NETWORK | Structured Network Definition | PDS | VS | 0 | 3120 | Binary | IP | Model Processor |
| AGT.STRUC.SYSTEM | Structured System Characteristics | PDS | VS | 0 | 3120 | Binary | IP | Model Processor |
| AGT.STRUC.DEMAND | Structured Demand (Trip Arrival Sequence) | PDS | FB | 80 | 3120 | EBCDIC | User and IP | Model Processor |
| AGT.STRUC.RNTIM | Asynchronous Run Time Input | PDS | FB | 80 | 3120 | EBCDIC | IP and User | Model Processor |
| AGT.INDEX.DEINDEX | Run Identification Log | SEQ | FB | 80 | 3120 | EBCDIC | User, IP, MP, OP | User |
| AGT.IANDD.SSP | Station to Station Performance | PDS | FB | 80 | 3120 | EBCDIC | IP | System Planning Model and User |

TABLE 2-1. DESM DATA FILES (Page 2 of 2) (Continued)

| | | Attributes | | | | | | |
|---|---|---|---|---|---|---|---|---|
| File Name | Contents | Organization | Record Format | Record Length | Block Size | Type | Source | Use |
| AGT.STATS.DESM | Raw Statistics | PDS | VS | 0 | 3120 | Binary | MP | Output Processor |
| AGT.CHKPT.DESM | Checkpoint/Restart | PDS | VS | 0 | 3120 | Binary | MP | Model Processor |
| AGT.STRUC.DEMANDVG | Vehicle Log | PDS | FB | 80 | 3120 | EBCDIC | MP | Detailed Station Model and User |
| AGT.STRUC.TRIPLOG | Completed Trips Log | PDS | FB | 80 | 3120 | EBCDIC | MP | User and Output Processor |
| AGT.STRUC.DESMLLOG | Link Statistics Log | PDS | FB | 80 | 3120 | EBCDIC | MP | Dynamics Processors |
| AGT.STRUC.DESMSLOG | Station Statistics Log | PDS | FB | 80 | 3120 | EBCDIC | MP | Dynamics Processors |
| AGT.PERSUM.DESM | Performance Summary Measures | PDS | FB | 80 | 800 | EBCDIC | OP | Comparison Output Processor |

1. Data Set Input to the DESM Input Processor (Input and Description Files).

The Input and Description (I&D) files contain a variety of data that have been assembled for input to the input processor. The files are partitioned data sets whose members are created by users.

a. Network Configuration (AGT.IANDD.NETWORK (member)) -- This file is used by the model input processor to create a structured data file of the network geography for use by the model. Network description includes node classification and connectivity as well as adjacent node separation distances. Network configurations are stored in character form and may be displayed, edited, or printed by the user.

b. System Characteristics (AGT.IANDD.SYSTEM (member)) -- The members of this user-created file are card image data sets with each member containing a complete description of a single system. This file contains the specifications of each station link and vehicle characteristics as well as the overall station configuration. Policies or control regulation characteristics being modeled are described. Parameters for specifying model reporting are also provided. This file is used by the input processor to create a structured data file for use by the model. The data stored in character form may be displayed, edited, or printed by the user.

c. Trip Demand Data (AGT.IANDD.DEMAND (member)) -- This user-created file of card image data sets contains the specifications required to generate trips. These data include the number of stations, the time base for trip generation, an origin-to-destination demand matrix in passengers per time base and group size distribution and selection data. This file is used by the model input processor to create a structured data file for use by the model. The data are stored in character form and may be displayed, edited, or printed by the user.

d. Run-Time Inputs (AGT.IANDD.RNTIM (member)) -- This user-created file contains any data desired to override that provided in the System Characteristics File for a modeling or simulation run. Additionally, the data may contain time-dependent information necessary to trigger specific discrete events, such as failure occurrences, etc. Members of the file are card image data sets in character form which may be displayed, edited, or printed by the user.

2. Data Sets Produced by the Input Processor and Used by the Model Processor (Structured Data Files).

The structured data files, similar to the input and description files are partitioned data sets which are created by the input processor for later use as input to the model processor. Network definition is expanded to include all station connectivity descriptions along with link lengths. The trip demand data are expanded to produce individual trip events of specific origin and destination at given times. The system charcteristics data remain much as they were originally entered as input and description data. However, as structured data, they have been checked for reasonableness and all parameters have been converted to a form usable by the model. Run-time data consist of time-dependent data such as failures and fleet size management requests which have been processed from user inputs at input processor run-time.

a. Network Configuration (AGT.STRUC.NETWORK (member)) -- This input file to the model processor contains a complete description of a single network or the network geography.

   It contains forward and backward guideway link connectivity, station/guideway connectivity, shortest path routes between each pair of stations, and link length. Members are stored in binary form and are therefore not readable by the user.

b. System Characteristics (AGT.STRUC.SYSTEM (member)) -- This file contains the machine-readable version of an initial and complete description of a single system for model processing. In addition, transit service characteristics which have been computed are added. Overrides from the Run-Time file (I&D) are also incorporated in this version of the system characteristics. Members are stored in binary form and are therefore not readable by the user.

c. Trip Sequence Data (AGT.STRUC.DEMAND (member)) -- This file contains a record in arrival time sequence for each trip arriving at the various stations over a time interval. The time, origin, destination, and the number of passengers is included for each trip record. The members of this file are not normally accessed by the user even though the data are in character form and may be displayed, edited, or printed.

d. Run-Time or Time Dependent Data (AGT.STRUC.RNTIM (member)) -- This file, which can be modified by the user prior to model processing, contains the text cards input by the user in the input and description Run-Time file to be printed as titles by the Model Processor. It also contains system characteristics data which is to take effect when time is greater than zero such as insertion or removal of failures and adjustments in the vehicle fleet size. The data are in card image format.

e. Run Index (AGT.INDEX.DEINDEX) -- This file contains a current history of simulation runs performed. A member is first created during execution of the input processor and is then updated each time the model processor or output processor is initiated. At the time it is available to the model processor, the file contains user-specified run description input to the input processor as well as a summary of the output files generated by the input processor. The file is a sequential data set, with entries added as the various processors are executed.

3. Additional Data Sets Produced by Input Processor.

   a. Station to Station Performance (AGT.IANDD.SSP (member)) -- This file contains the nominal travel time between every pair of stations in the network, including dwell time of intermediate stops if the service type is scheduled. The data is in card image format.

4. Data Sets Produced by the Model Processor and Used by the Output Processor.

   a. Raw Statistics (AGT.STATS.DESM (member)) -- This model processor-created file contains machine-readable raw statistics collected at each sampling interval during model execution. Members are stored in binary form and cannot be accessed directly by the user.

   b. Completed Trips Log (AGT.STRUC.TRIPLOG (member)) -- This file serves as a supplement to the raw statistics data recorded by the MP. As each trip terminates, a record summarizing selected trip characteristics is written to the file. These data can be printed directly from the file or serve as input to the station-to-station measures report.

   c. Run Index (AGT.INDEX.DEINDEX) -- This model processor-modified file is used to record the member name, date, and time for the statistics and checkpoint data output during the execution of the model processor (see (e) above).

5. Additional Data Sets Produced by Model Processor.

   a. Vehicle Log (AGT.STRUC.DEMANDVG (member)) -- This file contains vehicle demand data in a format suitable for direct input into the Detailed Station Model. Each record contained in the file corresponds to a vehicle arrival at a selected network station during a given simulation run.

   b. Link Statistics Log (AGT.STRUC.DESMLLOG (member)) -- This file contains link capacity and average occupancy statistics for each link in a format to be processed by the Tektronix 4081 Link Utilization Display Processors.

   c. Station Statistics Log (AGT.STRUC.DESMSLOG (member)) -- This file contains passenger boarding queue capacity and average occupancy statistics for each station in a format to be processed by the Tektronix 4081 Passenger Queue Length Display Processor.

   d. Checkpoint (AGT.CHKPT.DESM (member)) -- This machine readable file contains time tagged records of all global simulation data as recorded on a demand or periodic basis during a simulation run. These data can be used to restart or resume a given simulation experiment at the specific point of execution defined in the checkpoint data.

6. Additional Data Set Input to the Output Processor

   a. Run-Time Data (AGT.IANDD.RNTIM (member)) -- This user-created file contains the control information required by the output processor to produce statistical output. Members of the file are card image data sets in character form which may be displayed, edited, or printed by the user.

7. Data Sets Produced by the Output Processor

   a. Performance Summary File (AGT.PERSUM.DESM (member)) -- This file contains selected performance measurements computed by the OP for a particular model run based upon recorded raw statistics.

# 3. COMPUTER REQUIREMENTS

The DESM requires an IBM System 370, Model 155, 158, 165, or 168 CPU, or a compatible equivalent for program maintenance and execution.

## 3.1 CORE MEMORY

The core storage size required to execute the DESM is a function of maximum problem size, given by System Generation (compile time) definitions for network size, configuration and system capacity. These SYSGEN sizes represent an upper bound on the size of a particular simulation experiment that can be modeled by the DESM. The current SYSGEN definitions as presented in subsection 1.4, require a minimum of 3400K bytes of core storage. This requirement applies specifically to the MP, which represents the largest of the three components of the DESM. This requirement is exclusive of System Control Program Core requirements, which are CPU and installation dependent. In order to support the problem size requirements placed on the DESM, as outlined in the Functional Specification, a minimum of 4.5 million bytes of core storage will be required.

Size requirements can be varied as necessary to support smaller or larger maximum problem sizes or core storage availability, by redefining compile maximum values (see Table 5-1) and recompiling and link editing the IP, MP, and OP components of the DESM. Only the I/O portion of the OP need be recompiled to reflect new maximum size definitions. As a guide to establishing core storage requirements for a particular SYSGEN of the DESM, core requirements for key configuration and capacity related elements within the MP are shown in Table 3-1. The exact core region size required for execution of the IP, MP, and OP components of the DESM, after recompilation and link editing, is provided as a standard output of the link edit process.

## 3.2 PERIPHERAL EQUIPMENT

The DESM is designed for either batch mode or terminal supported background mode operations. In a batch environment, standard system utilities and JCL procedures are used for data base updating and model execution. Background operation requires the use of an online terminal and associated terminal support software to allow online data base editing and job submission. This capability is provided via TSO, if

TABLE 3-1. DESM CORE REQUIREMENTS

| Element | Core Required |
| --- | --- |
| Basic DESM MP | 480K Bytes |
| Vehicles | 167 Bytes per vehicle |
| Guideway Links | 153 Bytes per link |
| Stations | 282 Bytes per station + 18 (number of stations squared) |
| Station Links | (83 x maximum number of stations + 24) Bytes per station link |
| Trips | 69 Bytes per concurrent trip |
| Transactions | 14 Bytes per transaction |
| Routes | (160 + 12 x maximum number of links) Bytes per route + 10 x maximum number of entries in route list |
| Network | 4 x (maximum number of stations x maximum number of links x maximum number of simultaneous path tables) + (maximum number of merges + 2) x maximum number of intervals in merge scheduling table + 16 x (maximum number of merges) Bytes |

available, in a System 370 operating environment. The mode of operation selected for the DESM places certain constraints on the peripheral equipment required for maintenance and execution of the model. The specific equipment requirements are described below.

### 3.2.1 Data Base Storage

The procedures provided for execution of the DESM require the use of direct access storage for online data base access and control. However, with user modification of the standard procedures, other forms of data storage can be used to eliminate online storage requirements or provide a supplement to the online data base.

3.2.1.1 Direct Access Storage - The storage requirements for various functional areas of the DESM are given below, in cylinders of IBM 3330 disk storage (approximately 248,000 bytes):

1. Program Development Libraries (Source, Object, and load) -- 20 cylinders

2. Input from Data Base (per configuration) -- 10 cylinders

3. Trip Arrival Sequence (One hour of 30,000 trips) -- 2.5 cylinders

4. Checkpoint Data (each checkpoint assuming problem size definition given in Section 1.4) -- 1.2 cylinders/checkpoint record

5. Raw Statistics (assuming configuration defined in Section 1.4, one hour simulation, one minute sampling interval) -- .27 cylinders/ sample (5.1 tracks), 16.3 cylinders/hour of simulated time

6. Auxiliary Output

   a. Completed trips log -- 5 cylinders

   b. Vehicle Station Arrival Log -- 1 cylinder

   c. Link Statistics Log -- 1 cylinder

   d. Station Statistics Log -- 1 cylinder.

3.2.1.2 Magnetic Tape - The DESM has no explicit requirement for magnetic tape storage, but it may be a preferable medium over direct access storage for handling of simulation output data. The selection of tape over disk should be based upon the amount of disk space available, frequency of access required, computer center operational procedures, and desired mode of DESM operation. Files resident on magnetic tape are not readily modified and cannot be displayed via background terminal editing and display procedures. For planning estimates, a 2400 foot reel of tape recorded at 1600 bytes/inch has a capacity equivalent to 188 cylinders of 3330 disk space.

### 3.2.2 Unit Record Equipment

The DESM will require a card reader for batch job submission and a high-speed printer for output.

### 3.2.3 Display Terminal

Background data preparation and job submission via standard TSO procedures require a 3270 display terminal or equivalent for DESM operation.

## 3.3 SYSTEM CONTROL PROGRAM

Maintenance and operation of the DESM requires specific operating system and system support software features as described below.

### 3.3.1 Operating System

The DESM executable load module is structured to avoid requirements for the loading and overlaying of individual program segments. Each execution of the DESM assumes the availability of "unlimited" core storage as provided in a virtual storage and virtual machine operating environment. Specifically, the following operating system or a compatible equivalent is required:

OS/VS2 (SVS or MVS option).

Additionally, the use of the DESM in a background environment requires operating system support of a file/editing, updating, and job submission capability which provides for online terminal operations. In an OS/VS environment, this support is provided via the Time Sharing Option (TSO).

### 3.3.2 Compilers/Linkage Editor

Modification or maintenance of the DESM, for supporting the use of user defined algorithms or models requires the availability of programming language support as used in initial model development. The primary source language used in the DESM development is a user oriented structured version of FORTRAN, PARAFOR, supplemented by assembler language for accomplishing system interface and complex data manipulation and core management functions. Structured FORTRAN and Assembler language coding within the DESM requires the following system compilers:

1. FORTRAN IV (H level)

2. PL/I Optimizer

3. Assembler (H).

Executable load module creation, requires the use of a Linkage Editor which supports an overlay option.

### 3.3.3 Support Software

Structured FORTRAN and data base maintenance require the following utility software:

1. PARAFOR

2. OS/VS2 System Utilities.

PARAFOR contains the translation mechanism for converting user coded structured FORTRAN source to executable FORTRAN language via the PL/I Optimizing Compiler. OS/VS2 utilities provide the capability for user batch updating and modification of the AGT data base and program libraries.

# 4. INPUT DATA

User input specifications to the DESM reside in the following data base files:

- AGT.IANDD.NETWORK -- Fixed format network definition data
- AGT.IANDD.DEMAND -- Fixed format origin/destination (O/D) demand definition
- AGT.IANDD.SYSTEM -- Card image formatted system characteristics
- AGT.IANDD.RNTIM -- Card image formatted simulation and output processor data
- AGT.STRUC.RNTIM -- Card image formatted model processor asynchronous data input.

The network and demand files serve as the primary input to the IP for generation of network configuration and trip arrival data for the MP. In typical DESM operation, these files are created by the Network Build Module and Feeder System Model as station and guideway link node definitions and O/D demand matrices, respectively. However, direct user specification of these data is possible providing file formatting conventions, as defined in subsection 4.1.2, are followed. The system and simulation related data, resident in the AGT.IANDD.SYSTEM and RNTIM files, are also input to the IP for generation of system characteristics and time dependent data input for the MP. The initial system characteristics consisting of the IANDD.SYSTEM data along with zero-time IANDD.RNTIM data, are checked for consistency and reasonableness and transferred to the AGT.STRUC.SYSTEM file which serves as input to the MP. Additional time dependent data read or created by the IP in response to user input asynchronous event requests are placed in the MP run time file, AGT.STRUC.RNTIM. Since the AGT.STRUC.RNTIM file is in card image format, the user may insert any system characteristics data prior to executing the model processor. However, the parameters must be in the proper units, must be consistent with other related data and must be structured to conform with model processor data requirements. The recommended procedure is to insert system characteristic data changes in the AGT.IANDD.RNTIM file and run the input processor. Zero time data inserted by the user in the STRUC.RNTIM file to override MP initialization (e.g., system characteristics or network data) must precede all other inputs in the file and must represent a contiguous set of data, option, parameter, selection, or flag type inputs. Any intervening zero time data not specified via one of the preceding categories terminates MP initialization data reading and begins the processing of time dependent data. Zero time data read as time dependent input are read and processed only after model initialization is complete and the actual simulation process has been initiated.

The AGT.IANDO.RNTIM file is also used as an input source for the Output Processor. Processing of raw statistics is controlled by user input command requests contained within this file.

## 4.1 DESCRIPTION OF INPUT

The input files within the AGT data base are organized as partitioned data sets to allow the simultaneous storage of unique data descriptions, identified by member name, within an individual file. This organization permits direct user modification of individual members within the files via standard batch mode utility procedures and terminal supported background editing procedures. In addition, by specification of member names, any combination of data within the data base can be specified as input to the simulation process.

Although any user specified input within the data base can be updated via terminal supported editing procedures, the network and demand input is best suited for batch updating in the absence of Network Build Module or Feeder System Model generation. This is due to the amount of data which must be input to define extended or large scale simulation experiments.

Any data specified as system characteristics input can be defined as run time data to the MP. However, the advantage of consistency and reasonablesness checking provided by the IP are bypassed. In addition, the user must perform any units conversion, data redefinition, and dependent data generation normally performed by the IP prior to creating the structured data used by the MP.

### 4.1.1 System Characteristics and Runtime Inputs

Simulation related data contained in the SYSTEM and RNTIM files are specified in a generalized input format which allows user defined format specification, constrained by variable type, for the particular data being entered. These data are processed by the Generalized Data Input Processing (GDIP) feature of the DESM.

GDIP eliminates the need for pre-initializing data areas prior to program execution and provides the ability to change data formats without requiring modification to embedded read statements contained in executable program modules. The GDIP provides the following features, which are controlled by the user at program execution time:

1. Time dependent data may be entered.

2. Any rectangular section of any array may be modified.

3. The data items to be loaded are specified on input cards or card images of the user's own format, which is specified at execution time.

4. A "repetition factor" allows the loading of consecutive data elements with a single value specification.

All system characteristics and simulation-related run time inputs must be preceded by a header card or card image which identifies the type of data to be entered or represents a request for a system action by the simulator. Header cards which identify text or block data input are followed immediately by data cards with unique formats. The termination of data card processing occurs upon reading the next header statement.

Header Statements

The header statements recognized by the DESM include:

- System Action Requests
  - CKPT -- Perform checkpoint processing
  - REST* -- Perform system restart
  - STOP -- Terminate simulation
  - EOD -- Terminate input data processing.
- Data Processing Requests
  - INDEX -- Initialize run index
  - TEXT -- Write comment to system output
  - COMMENT -- Provide descriptive commentary in input data base

*Valid only for Model Processor

- PARAM -- Begin processing system global parameters
- OPTION -- Begin processing system option selections
- SELECT -- Begin processing system alternatives selections
- DATA -- Begin processing block data
- FAIL -- Perform failure/repair processing
- AFSM -- Perform active fleet size management
- FLAG -- Initiate auxiliary output.

Each header card must be coded according to the following input format:

- o Column 1-6 -- Time in seconds (Flt. Pt. F6.0) at which data or request is to be processed (0 for initialization data only)
- o Columns 7-12 -- Header Name (left justified)
- o Columns 13-72 -- Ignored
- o Columns 73-80 -- Serialization (only printed).

Follower Cards

Follower cards contain the data which are to be processed by the read data routine as identified by a preceding header card. The follower cards required by specific data requests contain unique formats as described below. Following each format definition, an example of the use of that particular header and related follower card or card image (if any) combination is included.

CKPT

No follower card required. Time value in columns 1-6 defines the time at which the checkpoint is to be taken.

Example: 300.CKPT

REST

No follower card required. Time value in columns 1-6 defines the timetag of the checkpoint data to be used. This data type must appear as the first entry in the structured run time file.

Example: 1500.REST

STOP

No follower card required. Time value in columns 1-6 defines the time at which the simulation experiment is to terminate.

Example: 1800.STOP

EOD

No follower card required. The detection of 'EOD' terminates input data reading at the time specified in columns 1-6.

Example: 1800.EOD

INDEX

- o Follower cards 1 through n: A set of n follower cards, each containing up to 72 characters of text in columns 1-72. The text is the user's description of the simulation experiment, which is to be written to the run index file.

- o Follower card n+1:

  - Columns 1-3 -- END

  - Columns 4-72 -- Blank

  - Columns 73-80 -- Blank or serialization

    Example:

    ```
         INDEX
    THIS RUN DEMONSTRATES THE DESM CAPABILITIES OF
    SCHEDULED SERVICE AND A FIXED HEADWAY POSITION
    REGULATION SCHEME. TRANSFERS ARE ENABLED.  A NEW
    NETWORK AND TRIP FILE ARE GENERATED.
    END
    ```

TEXT

One follower card is required, containing up to 72 characters of text to be written to the system output device.

Example:

```
          TEXT
     FAILURE INSERTED - ENTRY TO LINK 12 BLOCKED.
```

COMMENT

A set of n follower cards, each containing up to 72 characters of descriptive commentary in columns 1-72. Card n+1 must contain:

- o Columns 1-3 -- END
- o Columns 4-72 -- Blank
- o Columns 73-80 -- Blank or serialization.

Example:

```
     COMMENT
COMMON ECIVEH:  VEHICLE DATA
  VDFACT-DEGRAD FACTOR                  VLEN-VEH LENGTH(FT)
  VCAP-VEH CAP(PASS)
END
```

PARAM, OPTION, SELECT, DATA, FAIL, AFSM

These data input types provide the capability for modifying simulator parameters and data arrays on a time dependent basis. The beginning of each input request is identified by one of these six types of header statements. The request must be terminated with an END follower card. As many sets of input data as desired can be entered in time order, providing the above requirements for identifying the beginning and end of data are satisfied. The follower cards identifying the input data consist of:

- o Card 1 -- Data Identifier
  - Columns 1-7 -- The name of a simulator parameter, left-justified.
  - Columns 8-9 -- N, the number of data items on a single follower card.
  - Columns 10-15 -- F, the format of a single data item (e.g., I4, L2, F10.5, etc.). This format must be compatible with the data mode of the variable.
  - Columns 16-20, 21-25 -- The lower and upper bounds on the first subscript (if any), respectively.
  - Columns 26-30, 31-35 -- The lower and upper bounds on the second subscript (if two or more).

- Columns 36-40, 41-45 -- The lower and upper bounds on the third subscript (if three or more).

- Columns 46-50, 51-55 -- The lower and upper bounds on the fourth subscript (if four).

- Columns 56-72 -- Ignored.

- Columns 73-80 -- Blank or serialization.

Entries of an array are loaded with the first subscript varying most rapidly within the range specified; the last subscript varies slowest.

o Cards 2 through M -- Data Cards

- Columns 1-2 -- R, the repetition factor (0 or blank means 1).

- Columns 3-72 -- N fields of the format F.

- Columns 73-80 -- Blank or serialization.

If R is greater than 1, then R replications of the set of N data items on the card are used to load the specified array. A data identifier card and data card(s) are entered for each parameter to be input. After all input associated with the data type card has been entered, the following card is required:

- Columns 1-3 -- END

- Columns 4-72 -- Blank

- Columns 73-80 -- Blank or serialization.

Examples:

```
       DATA
VLEN      1I5
 1   40
VCAP      1I5
 1   20
END

       OPTION
NEWNET   1L1
 1T
```

```
DTRPFL   1L1
 1T
END
 1020.FAIL
AFALRE 5F5.0       1    5
 1   5.   0.   0.   1.   2.
END
```

<u>FLAG</u>

This statement represents an auxiliary output request which initiates the simulator trace facility for mapping progress through the simulation system. The data displayed during the trace operation is controlled by the indicators specified by the user on the FLAG follower cards. The FLAG follower cards cause the specified trace indicators to be activated while resetting any previous trace specifications. Each follower card is processed with a format of 18I4 where,

- o A zero field terminates reading of followers,
- o For two fields F1 and F2, then

F1 = 0 ends input

$$F2 \begin{cases} >0 \text{ Flags F1 and F2 set 'on' and continue reading flag input} \\ =0 \text{ Flag F1 set 'on' and end input} \\ <0 \text{ Flags F1 through F2 inclusive turned on and continue reading flag input.} \end{cases}$$

Examples:

3800.FLAG = Flags 1 through 299 'on' begining at time
  1-299     3800 seconds

4000.FLAG = All flags reset at time = 4000 seconds
  0

5000.FLAG = Flags 1, 2, 81, 82 'on' (and only these)
  1  2  81  82  0       beginning at time 5000 seconds.

A summary of processing performed by the IP for the various header definitions as input via the SYSTEM and RNTIM files is shown in Table 4-1.

TABLE 4-1. IP PROCESSING SUMMARY (page 1 of 2)

| | Input Source | |
|---|---|---|
| Data Type | SYSTEM | RNTIM |
| AFSM | | Perform Active Fleet Size Management processing. Generate Fleet Redefinition, Empty Distribution, etc., data and write to MP Runtime File. |
| CKPT | | Write request to MP Runtime File. |
| COMMENT | Copy comment to SYSOUT | 1. Time = 0 -- Copy comment to SYSOUT.<br>2. Time > 0 -- Copy comment to SYSOUT and MP Runtime File. |
| DATA<br>OPTION<br>PARAM<br>SELECT | Update item with input value (Only time = 0 data definitions allowed) | 1. Time = 0 -- Update item with input value.<br>2. Time > 0 -- Write request to SYSOUT and MP Runtime File. |
| EOD | | Copy card image to MP Runtime File, terminate data input and processing. |
| FAIL | | Process network failure/repair request. Write request to SYSOUT. Write request and updated network data to Runtime output. |
| FLAG | | Time = 0 -- Set appropriate flags.<br>Time > 0 -- Copy request to SYSOUT and Runtime output. |

TABLE 4-1. IP PROCESSING SUMMARY (Page 2 of 2)

| | | |
|---|---|---|
| INDEX | | Write run description to SYSOUT and Run Index File. |
| REST | | |
| STOP | | Copy request to MP Runtime File |
| TEXT | Copy text to SYSOUT | Copy text to SYSOUT and MP Runtime File |

Notes: Where no action is specified, the data type is invalid.

### 4.1.2 Network and Demand Input

These data are input to the DESM as sequences of fixed format records that require fixed placement of input parameters as shown in Tables 4-2 and 4-3.

### 4.1.3 Output Processor Commands

Output Processor input data within the AGT.IANDD.RNTIM file consist of a sequence of user command requests which control the acquisition, processing, and display of raw statistics data.

Two basic command requests are input by the user to direct processing within the Output Processor as follows:

- o REQU -- Request for a specific item of data by major category specification.
- o READ -- Begin data acquisition cycle over a specific time interval and output the requested data.

The Output Processor automatically recycles itself, so several scans of the raw statistics file can be made by using one set of REQU cards followed by a READ card, then a second set of REQU card followed by a second READ card, etc. Time intervals on the READ cards may or may not be overlapping depending upon the user's requirements.

Seven display modes may be specified on the REQU cards:

1. LIST -- A simple time-series listing of the sampled values (10F13.3 format).
2. SUMM -- A statistical summary of the sampled values, which gives the following with and without zero-values being considered:

   a. Number of samples

   b. Sum of sampled values

   c. Average value

   d. Standard deviation

   e. Minimum value

   f. Sample time of the minimum

TABLE 4-2. NETWORK INPUT

| Description | Format* |
|---|---|
| Link Definition 1 | |
| Node ID at start of Link 1 | I4 |
| Station indicator (0 = no station on link, 1 = station on 'ink) | I2 |
| Node ID at end of Link 1 | I4 |
| Link length in meters | I6 |
| . | . |
| . | . |
| . | . |
| Link Definition n | |
| Node ID at start of Link n | I4 |
| Station indicator | I2 |
| Node ID at end of Link n | I4 |
| Link length in meters | I6 |

*Note -- Four link definitions per card image.

TABLE 4-3. DEMAND INPUT (Page 1 of 2)

| Data | Format |
|---|---|
| DNSTA DTMBAS | 2I5 |
| DPDMND(1,1) DPDMND(2,1) . . . . . . . . . . . . . . . . . . . . . . . . . . . | 14I5 |
| . . . . . . . . . . . . . . . . . . . . . . . . DPDMND(DNSTA,1) DPDMND(1,2) | 14I5 |
| DPDMND(2,2) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 14I5 |
| DPDMND(DNSTA,2) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 14I5 |
| . . . . . . . . . . . . . . . . . . . . . DPDMND(1,DNSTA), DPDMND(2,DNSTA) | 14I5 |
| . . . . . . . . . . . . . .DPDMND(DNSTA,DNSTA) | 14I5 |
| DNSD2 DNSD3 | 2I5 |
| DIS2OD(1) DIS2OD(2) . . . . . . . . . . . . . . . . . . . . . . .DIS2OD(18) | 18I4 |
| . . . . . . . . . . . . . . . . . DIS2OD(2*DNSD2) | 18I4 |
| DIS3OD(1) DIS3OD(2) . . . . . . . . . . . . . . . . . . . . . . .DIS3OD(18) | 18I4 |
| . . . . . . . . . . . . . . . . . DIS3OD(2*DNSD3) | 18I4 |
| KNG | I3 |
| DTRDST(1,1) DTRDST(2,1) . . . . . . . . . . . . . . . . . . . .DTRDST(12,1) | 12F6.4 |
| . . . . . . . DTRDST(KNG,1) DTRDST(1,2) . . . . . . . . . . . . . . . . . . | 12F6.4 |
| . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . DTRDST(KNG,2) | 12F6.4 |
| DTRDST(1,3) DTRDST(2,3) . . . . . . . . . . . . . . . . . . . . . . . . . . . | 12F6.4 |
| . . . . . . . DTRDST(KNG,3) | 12F6.4 |

where:

DNSTA -- Number of stations in the network.

DTMBAS -- The period of time (in minutes) over which the demand matrix is valid.

DPDMND(i,j) -- The total number of patrons traveling from station i to station j during the interval DTMBAS.

DNSD2 -- The number of O/D pairs that are to use the second of three group size distributions (the first distribution is a default).

DNSD3 -- The number of O/D pairs that are to use the third of three group size distributions.

TABLE 4-3. DEMAND INPUT (Page 2 of 2)

DIS2OD(2*DNSD2) - List of station O/D pairs that are to use the second group size distribution. If there are no entries, then DNSD2 must be zero.

DIS3OD(2*DNSD3) -- List of station O/D pairs that are to use the third group size distribution. If there are no entries, then DNSD3 must be zero.

KNG - The maximum trip group size, considering all three group size distributions.

DTRDST(i,j) -- The probability that a trip consists of i(i=1 to KNG) patrons in group size distribution j(j=1 to 3).

Notes:

1) The user may enter DNSD2, DNSD3, DIS2OD, DIS3OD, DIS3OD, KNG, and DTRDST in the System Characteristics or the Runtime (time=0, only) files instead of the Demand file if he desires. If the group size parameters change when time is greater than zero, these data items must be entered in the Demand input file.

2) Multiple sets of demand data may be placed in the same file. The individual sets must be separated by a card image containing a negative number (format is I5). Do not use the separator card image after the last set.

3) The group size definition data (DNSD2, DNSD3, DIS2OD, DIS3OD, KNG and DTRDST) only need to be entered if a change in the data is desired. It must be entered initially (see note 1).

g. Maximum value

h. Sample time of the maximum.

3. PLOT -- A time-series printer-plot of the sampled values (time running down the page).

4. HIST - A class-interval frequency distribution histogram of the sampled values.

5. PERF -- Performance summary file generation and standard report (RPT1) listing.

6. RPT1 -- Predefined standard report listing the performance summary statistics.

7. RPT2 -- Predefined standard report listing system performance measures.

8. RPT3 or STOS or S-S -- Predefined standard report listing station-to-station performance measures.

The format of a REQU card is as follows:

- Columns 1-4 -- REQU
- Column 5 -- Blank
- Columns 6-9 -- Output format: LIST, HIST, SUMM, PLOT, PERF RPT1, RPT2, RPT3, STOS, S-S
- Column 10 -- Blank
- Columns 11-14 -- Major Category -- Not required for PERF, RPT1, or RPT2
- Columns 15-16 -- Blank
- Columns 17-20 -- Name of requested item (mnemonic left justified)
- Column 21 -- Blank
- Columns 22-26 -- Major entity number (Integer)
- Columns 27-31 -- First or only variable entity number or zero (Integer)
- Columns 32-36 -- Last variable entity number or zero (Integer)
- Columns 37-41 -- Histogram class interval -- Required only for HIST (Integer)
- Column 42 -- Blank
- Columns 43-50 -- Low Plot limit or zero (Real)
- Columns 51-58 -- High Plot limit or zero (Real)

Specification for major category, requested item, entity ranges, and plot limits are described in subsection 4.3.2.

The format of a read command is as follows:

- o Columns 1-4 -- READ
- o Columns 27-31 -- Start time for data acquisition (≥Ø), integer seconds, right justified.
- o Columns 31-36 -- End time for data acquisition (>Ø), integer seconds, right justified.

## 4.2 TERMINAL ENTRY INPUT

The DESM is not designed for online or interactive execution. All data input to the DESM must be entered via the data base or standard system input device in the case of batch mode operation. However, any input within the AGT data base can be manipulated by the user via terminal supported editing procedures prior to model execution.

## 4.3 DATA BASE DEFINITION INPUT

The input data definitions for the DESM are described in this section according to the categories used to discuss the DESM capabilities (subsection 1.3) and options (subsection 2.4). This organization should aid the user in determining the necessary data elements required for the particular modes of operation or options desired for a particular simulation experiment. Subsection 4.3.1, describing the simulation-related data, consists of tables which include the input data element descriptions as well as data type, units, default values, option dependencies, etc., for all of the system characteristics and simulation control parameters input to the Input Processor and/or Model Processor. Note is made within the appropriate tables of the demand input data (described in subsection 4.1.2), which may be entered with the system characteristics parameters. The data descriptions for the Output Processor are discussed in subsection 4.3.2.

### 4.3.1 Simulation Related Data

The simulation data definitions are included in the following tables:

1. Model Configuration, Table 4-4.
2. Service Mode, Table 4-5.

TABLE 4-4. MODEL CONFIGURATION DATA (page 1 of 3)

| VARIABLE NAME | DIMENSION | DATA TYPE | DESCRIPTION | UNITS IPMP | MODEL PROCESSOR NAME | DEFAULT VALUE | FORMAT TYPE G,F | TIME DEPENDENT | OPTION DEPENDENCIES |
|---|---|---|---|---|---|---|---|---|---|
| STYPE | KNS | L | Type of station<br>F = offline T = online | | STYPE | F | G | | Online only for asynchronous control |
| SLCFIG | 13 KNSL | R | Descriptors for each link in station<br>Col 1 = Link Type (see SLTYPE description below)<br>Col 2 = Travel Time<br>Col 3 = Length<br>Col 4 = Default capacity (see SLCAP description below)<br>Col 5 = First event on link (1 to 6)<br>1 = Headway 4 = Board<br>2 = Travel 5 = Store<br>3 = Deboard 6 = Launch<br>(See SLEVL descriptions) (required as an event)<br>Col 6 = Second event on link<br>Col 7 = Third event on link<br>Col 8 = Fourth event on link<br>Col 9 = Fifth event on link<br>Col 10 = Diverge function ID (See SLDIVC description)<br>Col 11 = Upstream link ordering option<br>OPT = Order of upstream links<br>1 = Guideway, storage<br>2 = Storage, guideway<br>Col 12 = Headway time train (See SLHTB description)<br>Col 13 = Headway time vehicle (See SLHTA description) | Seconds (Col 2)<br>Meters (Col 3)<br>No. Vehicles (Col 4)<br>Seconds (Col 12)<br>Seconds (Col 13) | | 0 (Col 2)<br>0 (Col 10)<br>1 (Col 11) | G | | Computed station configuration<br>Not required if user elects to have simulation compute travel time<br>Required if travel time = 0 and computation of travel time desired<br>Store event restricted to storage link only, mutually exclusive of any other event |
| SLVEL | | R | Station Link velocity | Meter/Second | | | G | | Online stations or computed station configuration if travel time = 0 |
| KNSL | | I | Number of station links | | KNSL | | G | | User-explicit station configuration |
| SLTYPE | KNSL | I | Station link type ( 1 to 10)<br>1 = IR-Input Ramp 6 = S-Storage<br>2 = IQ-Input Queue 7 = IS-Input to Storage<br>3 = D-Dock 8 = SI-Storage to Input<br>4 = OQ-Output Queue 9 = DS-Dock to Storage<br>5 = OR-Output Ramp 10 = SO-Storage to Output | | SLTYPE<br>SLIR<br>SLOR<br>SLSTOR | | G | | User-explict station configuration |
| SLTTIM | KNSL | R | Travel time on station link | Seconds/Clock Units | SLTTIM | | G | | User-explicit station configuration |
| SLCAP | KNSL, KNS | I | Capacity (must be ≥ maximum train length if entrainment enabled) | No. Vehicles | SLCAP | | G | | User-explicit station configuration |

TABLE 4-4. MODEL CONFIGURATION DATA (Page 2 of 3)

| VARIABLE NAME | DIMENSION | DATA TYPE | DESCRIPTION | UNITS IPMP | MODEL PROCESSOR NAME | DEFAULT VALUE | FORMAT TYPE G,F | TIME DEPENDENT | OPTION DEPENDENCIES |
|---|---|---|---|---|---|---|---|---|---|
| SLEVL | KNSLE | I | Concatenated list of sublists each of which lists the events from the canonical SL that are to occur on the link being described. The starting entry in each sublist is pointed to by SLEVP and the last entry in each sublist is 0. The events must be in the order H/T/D/B/S/L/0. In the model, the events will be represented as numbers<br>1 = Headway 4 = Board<br>2 = Travel 5 = Store<br>3 = Deboard 6 = Launch<br>0 = End<br>The store and launch events must be the last events on the links on which they appear. A launch event is required and a store event is restricted to a storage link. The board and deboard events can appear only on a dock link. | Event Numbers | SLEVL<br>SLEVP<br>KNSLE | | G | | User-explicit station configuration |
| SLUSL | KNSLU | I | Concatenated list of sublists each of which lists the upstream station links that feed into each station link. The last entry of each sublist is "0". The starting entry of each sublist will be pointed to by SLVSP. | Station Link IDS | SLVSL<br>SLUSP<br>KNSLU | | G | | User-explict station configuration |
| SLDSL | KNSLD | I | Concatenated list of sublists each of which lists the downstream station links feeds into. The last entry of each sublist is "0". The starting entry of each sublist will be pointed to by SLDSP. | Station Link IDS | SLOSL<br>SLDSP<br>KNSLD | | G | | User-explict station configuration |
| SLHTA | KNSL | R | Time to travel the headway zone (total headway zone travel time = SLHTA = (train length) + SLHTB) | Seconds/Clock Units | SLHTA | 0 | G | | User-explicit station configuration |
| SLHTB | KNSL | R | Time to travel the headway zone (See SLHTA) | Seconds/Clock Units | SLHTB | 0 | G | | User-explicit station configuration |
| SLDIVC | KNSL | I | Diverge function number (if more than one downstream station link). The number is user assigned to correspond with the appropriate user implemented code.(No user function is currently available.) | | SLDIVC | 0 | G | | User-explicit station configuration |
| SLPF | KNSL | I | Priority/FIFO indicator (DQ from upstream SLs in FIFO or priority order. If priority then list in order). 0 = FIFO, 1 = Priority | | SLPF<br>SLAVAL | 0<br>T | G<br>G | | |
| SLAVAL | KNSL, KNS | L | Indicates whether SL is available in this run. F = not available, T = available | | | F | G | | |
| NEWNET | | L | Process network definition data<br>F = Use previously defined network definition data | | | | | | |

TABLE 4-4. MODEL CONFIGURATION DATA (Page 3 of 3)

| Variable Name | Dimension | Data Type | Description | Units IP/MP | Model Processor Name | Default Value | Format Type G, F | Time Dependent | Option Dependencies |
|---|---|---|---|---|---|---|---|---|---|
| PSPEED | | R | Default vehicle speed on guideway | Meters/Second | | 15 | G | | |
| GLBLK | | I | Block length for fixed headway regulation | Meters | GLBLK GLCAP* | 75 | G | | Only for fixed block position regulation scheme |
| GLHDWY | KNL | R | Time separation between vehicles at line speed | Seconds/Clock Units | GLHDWY | 5 seconds | G | X | Only for variable headway position regulation scheme, it is computed for fixed block |
| GLVEL | KNL | R | Nominal line speed | M/Sec/M/c.u. | GLVEL | PSPEED | G | X | Can only be entered for asynchronous control. For all other cases or non-entry, it is set to PSPEED |
| NCSEL | | I | Selection of cost for least cost path determination<br>0, use link travel time<br>1, use link length | | | 0 | G | | New network definition |
| NLNPRI | KNL | I | List of node pairs defining the links that have priority at merges. Odd subscripts, node at beginning of link; even subscripts, node at end of link | | | 0 | G | | Priority merge policy |
| SLBVEL | | R | Speed of vehicle through an on-line station if no stop is required | M/Sec | SLBFAC* | PSPEED | G | X | Online stations |
| GLVSD | | R | Standard deviation of vehicle speed on guideway | M/Sec/M/c.u | GLVSD | 0 | G | X | Asynchronous Control |
| SLDTYP | KNSL, KNS | I | Station link dock type | | SLDTYP | | G | | Timeout/group demand responsive service |
| SLPLAT | KNSL, KNS | I | Station link dock platform assignment table | | SLPLAT | | G | | Timeout/group demand responsive service |
| SNCAPI | KNS | I | Total station capacity | No. of vehicles | SNCAPI | Sum of station link capacities | G | | |
| SBARN | KNS | L | Station maintenance barn indicator | | SBARN | F | G | | |
| STNGFL | KNS | L | Switchback station indicator | | STNGFL | F | G | | |

TABLE 4-5. SERVICE MODE DATA (Page 1 of 2)

| Variable Name | Dimension | Data Type | Description | Units IP/MP | Model Processor Name | Default Value | Format Type G, F | Time Dependent | Option Dependencies |
|---|---|---|---|---|---|---|---|---|---|
| POLSER | | I | Service policy in effect<br>1 Demand responsive, single-party<br>2 Demand responsive, multi-party<br>3 Scheduled<br>4 Timeout/group demand responsive | | POLSER | 1 | G | | |
| PRTDEF | | I | Source of route definition in scheduled service<br>0 User defined routes<br>1 Routes generated by input processor (cyclic) | | | 0 | G | | Scheduled service |
| PVRLST | KNRT | I | Scheduled route list - A concatenation of all scheduled routes. First entry of each route pointed to by PVRPTR: A "0" must separate each route definition with an additional "0" at the end of the table. Input processor will strip out zeros and build pointer vector. | Station node/Station ID | PVRLST<br>PVRPTR*<br>KNR*<br>KNRI*<br>KNRT* | | G | | User-defined scheduled service |
| PRTLEN | KNR | I | Train length on each route (0 = no trains) | No. Vehicles | PRTLEN | 0 | G | | User-defined scheduled service |
| PRTEHW | KNR | I | Desired headway between vehicles on the same route | Seconds/Clock Units | PRTEHW<br>KNV*<br>PNVRTE*<br>PNXSLV*<br>PNVDIS* | | G | | User-defined level of service in scheduled service. Not required if user enters PNVRTE |
| PNVRTE | KNR | I | Number of vehicles on each route | No. Vehicles | PNVRTE<br>KNV*<br>PRTEHW*<br>PNXSLV*<br>PNVDIS* | | G | | User-defined level of service in scheduled service. Not required if user enters PRTEHW |
| PMAXWT | | I | Maximum wait time that a person should wait for a vehicle in scheduled service | Seconds | | 900 | G | | Computed level of service |
| PLOSBS | | I | Source of level of service definition<br>0 Defined by user<br>n Defined by simulation using the nth demand matrix | | | 1 | G | | |
| KNV | | I | Fleet size. Total number of vehicles available for service. | No. Vehicles | KNV | | G | | User-defined level of service, demand responsive |
| SLOCC | KNSL, KNS | I | Occupancy, actual count of number of vehicles on the station link | No. Vehicles | SLOCC | 0 | G | | User-defined level of service, demand responsive |
| GLOCC | KNL | I | Link occupancy | No. Vehicles | GLOCC | 0 | G | | User-defined level of service, demand responsive |
| PLDFAC | | R | Estimated achievable vehicle load factor (ratio of occupancy to capacity) | | | 75 | G | | Computed level of service, demand responsive multi-party or scheduled service |

TABLE 4-5. SERVICE MODE DATA (Page 2 of 2)

| Variable Name | Dimension | Oata Type | Description | Units IP/MP | Model Processor Name | Oefault Value | Format Type G, F | Time Dependent | Option Oependencies |
|---|---|---|---|---|---|---|---|---|---|
| SPLTOD | KNS, KNS | I | Station platform type used by O/O trip. | | SPLTOO | | G | | Timeout/Group Demand Responsive Service |
| PMXTIM | | I | Maximum wait time to request vehicle | Seconds/Clock units | PMXTIM | 300 | G | | Timeout/Group Demand Responsive Service |
| PMNGRP | | I | Minimum size group to request vehicle | No. Passengers | PMNGRP | 1 | G | | Timeout/Group Demand Responsive Service |
| PNTVEH | KNR | I | Number of transition vehicles | No. Vehicles | PNTVEH | 0 | G | X | Scheduled Service |
| PSADSP | | I | Station overfull protection; adequate vehicle space | No. Vehicles | PSADSP | 1 | G | | Timeout-Group Demand Responsive Service |
| PSDIRT | | L | Multi-party single stop service indicator | | PSDIRT | F | G | | Multi-party Demand Responsive Service |
| SMNINV | KNS, 4 | I | Minimum inventory goal for directional platform | No. Vehicles | SMNINV | 0 | G | | Timeout/Group Demand Responsive Service |

3. Trip Management, Table 4-6.

4. Vehicle Control, Table 4-7.

5. Vehicle Operational Strategies, Table 4-8.

6. Simulation Control, Table 4-9.

Table 4-10 is an alphabetized listing of all of the simulation data items. Reference is made to the definition table (Tables 4-4 - 4-9) where each item is further described.

The specific information contained within each table, by column, including the meaning of any special notation consists of:

1. Variable Name -- The name of the simulator variable read by the Input Processor. Demand internal variables are enclosed in parentheses since they are typically read from the AGT.IANDD. DEMAND file. However, they may be read as part of the systems characteristics input.

2. Dimension -- The variable mnemonics used within this column signifies the extent or array size of a given variable. Many of these sizing values are computed by the Input Processor as it reads and processes the input data. Others are directly input by the user. A list of the meanings of these "KN" or run time maximum values is included in Table 4-11.

3. Data Type -- This column indicates if the variable is to be processed as an integer (I), real (R), or a logical (L) quantity.

4. Description -- This column contains a description of the variable specified. If specific values assigned to the variable or array have fixed meaning, then each option, whether T or F, 1, 2 or 3, etc., and its definition is discussed.

5. Units -- This column specifies the units, if appropriate, associated with the input variable. If the Input Processor converts the particular value from user specified units to internal modeling units, e.g., seconds to clock units, the resulting units of the field is also noted.

6. Model Processor Name -- This field specifies the related output variable name, which would be entered as an input directly to the Model Processor via the run time data set. In most cases, this column name is identical to the variable listed in Column 1. However, in a few cases, the Input Processor assigns a new variable name(s) to the entity as it is being

TABLE 4-6. TRIP MANAGEMENT DATA (Page 1 of 3)

| Variable Name | Dimension | Data Type | Description | Units IP/MP | Model Processor Name | Default Value | Format Type G, F | Time Dependent | Option Dependencies |
|---|---|---|---|---|---|---|---|---|---|
| DTRPFL | | L | Demand generation request<br>F = Do not generate trips<br>T = Generate trips | | | F | G | | |
| DNDMND | | I | Number of demand profile intervals to process | | | 1 | G | | New trip generation or level of service defined by input processor |
| PHIST1 | | I | First threshold for excess travel time histogram | Seconds/clock units | PHIST1 | 300 | G | | |
| PHIST2 | | I | Second threshold for excess travel time histogram | Seconds/clock units | PHIST2 | 900 | G | | |
| (DNSD2) | | I | No. of station pairs using second trip group size distribution | | | | F-D,G | | New trip generation |
| (DNSD3) | | I | No. of station pairs using third trip group size distribution | | | | F-D,G | | New trip generation |
| (DIS2OD) | KMNOD | I | Origin/destination pairs that use 2nd group size distribution. Odd subscripts = origins, even subscripts = destinations | Node ID | | | F-D,G | | New trip generation |
| (DIS3OO) | KMNOO | I | Origin/destination pairs that use 3rd group size distribution. Odd subscripts = origins, even subscripts = destinations | Node ID | | | F-D,G | | New trip generation |
| (KNG) | | I | Entries in group size distributions | | | | F-D,G | | New trip generation |
| (DTRDST) | KNG,3 | R | As entered by user, each column is probability distribution trip group size (Col 1 is primary distribution). Each column is converted to a cumulative distribution by the Input Processor | | | | F-D,G | | New trip generation |
| SBQCAP | KNS | I | Capacity of boarding queue used to turn away arrivals, if exceeded. May be violated with transfers entering boarding queue | No passengers | SBQCAP | | G | X | |
| PTSPLT | | I | Trip split size. Any trip of size N will be split into K trips of size PTSPLT and one trip consisting of the remainder | | PTSPLT | VCAP | G | X | |
| STDBA | | R | Deboard time function: Time per passenger | Sec./pass./c.u./pass. | STDBA | 0 | G | X | |
| STDHFF | | R | Estimated dwell adjustment factor for nominal travel time | Seconds/Clock Units | STDHFF | 0 | G | X | |
| STBA | | R | Board time function: Time per passenger | Sec./pass./c.u./pass. | STBA | 0 | G | X | |
| SMNDBT | | R | Minimum door open time | Seconds/Clock Units | SMNOBT | 0 | G | X | |
| VCAP | | I | Maximum number of passengers vehicle can accommodate | No. passengers | VCAP | 6 | G | X | |
| VHCAP | | I | Maximum handicapped passenger vehicle capacity | No. passengers | VHCAP | 0 | G | X | Handicapped passenger active |

TABLE 4-6. TRIP MANAGEMENT DATA (Page 2 of 3)

| Variable Name | Dimension | Data Type | Description | Units IP/MP | Model Processor Name | Default Value | Format Type G, F | Time Dependent | Option Dependencies |
|---|---|---|---|---|---|---|---|---|---|
| PXFER | | L | Transfer policy selection<br>F = No transfers<br>T = Transfers permitted | | PXFER | F | G | X | Not valid for cyclic scheduled service |
| PWALKT | KNS,KNS | I | Walk time applied to trips that transfer | Seconds/Clock Units | PWALKT | -2 | G | X | When transfers allowed |
| PRASGN | KNS,KNS | I | Station route assignment table: Element (i,j) identifies route to use for travel from i to j | Route Number | PRASGN | | G | X | User-defined scheduled service |
| PVSPR | KNSVP | I | Ordered list of where to look for empty: PVSPR(1)=First place to look. PVSPR (KNSVP) = last place to look.<br><br>Values — Place<br>1 — A noncircuitous vehicle (occupied/empty) about to arrive/bypass the station (i.e., on the station's arrival list)<br>2 — Use PSLIST<br>3 — Local storage<br>4 — Regional storge<br>5 — An empty circulating on guideway (i.e., on the station's arrival list)<br>6 — Earliest available<br>7 — Any expected arrival<br>8 — Empty from closest station storage | | PVSPR<br>KNSVP* | 6 | G | X | Demand responsive service |
| PEVALM | | I | Empty vehicle arrival limit. If an empty vehicle is expected within this time interval, it will be considered for trip assignment | Seconds/Clock Units | PEVALM | 600 | G | X | Demand responsive service, if a PVSPR value = 1,5,6 or 7 |
| PSLIST | KNSL | I | List of station link types where empty is to be looked for | Station Link Type/<br>Station Link Number | PSLIST | | G | X | Demand responsive service, if a PVSPR value = 2 |
| PSRCFM | KNS | I | Number of the station that acts as the regional center from which this station gets empties when getting them from a regional center | Node/Station ID | PSRCFM | | G | X | Demand responsive service, if a PVSPR value = 4 |
| PVRES | | L | Logic variable for indicating vehicle reservations allowed<br>F = No reservations<br>T = Reservations allowed | | PVRES | F | G | | Demand responsive service |
| PALTET | | I | Alternate station egress time | Seconds/Clock Units | PALTET | 0 | G | X | |

## TABLE 4-6. TRIP MANAGEMENT DATA (Page 3 of 3)

| Variable Name | Dimension | Data Type | Description | Units IP/MP | Model Processor Name | Default Value | Format Type G, F | Time Dependent | Option Dependencies |
|---|---|---|---|---|---|---|---|---|---|
| SMXDBT | | R | Maximum boarding time limit assuming no deboarding passengers | Seconds/clock units | SMXDBT<br>SMXDBP* | Time to fill an empty vehicle | G | X | |
| PRGLST | KMGT | I | Route group list. List of lists of routes comprising groups. Zeros separate the lists | | PRGLST<br>PRGPTR* | | G | | Scheduled service, user-defined routes |
| DMPRDF | 3,KMDPRF | R | Demand scaling profile<br>element (1,i) - scale factor for ith interval<br>element (2,i) - time base for ith interval (if 0, time base stored with input matrix used)<br>element (3,i) - 0, use matrix currently in memory<br>> 0, read a new matrix | 1 none<br>2 min<br>3 none | | 1<br>0<br>1 | G | | Demand generation or service planning by input processor |
| PXFLST | 4,KMXFER | I | Transfer list<br>element (1.i) - origin station<br>element (2,i) - destination station<br>element (3,i) - station to deboard at<br>element (4,i) - station to walk to before reboarding | Node ID/Station ID | PTSTN*<br>PWSTN* | | G | | Transfers allowed |
| VSEAT | | I | Number of seats on vehicle | | VSEAT | VCAP | G | | |
| PWLKTS | | I | System-wide default transfer walk time | Seconds/Clock Units | | 0 | G | | Transfers allowed |
| HCBDLD | | L | Deboard/board time limit check override | | | F | G | | Handicapped passengers active |
| HCPASS | | L | Handicapped passenger processing indicator | | HCPASS | F | G | | |
| SHCBA | | R | Handicapped passenger board door time | Seconds/clock units | SHCBA<br>SHCPA* | 0 | G | | Handicapped passengers active |
| SHCDBA | | R | Handicapped passenger deboard door time | Seconds/clock units | SHCDBA | D | G | | Handicapped passengers active |
| SHCBB | | R | Handicapped passenger board secure time | Seconds/clock units | SHCBB<br>SHCPB* | D | G | | Handicapped passengers active |
| SHCDBB | | R | Handicapped passenger deboard release and move to door time | Seconds/clock units | SHCDBB | 0 | G | | Handicapped passengers active |
| UNFDMD | | L | Uniform demand generation indicator | | | F | G | | |
| TSZARR | 3,KMDPRF | I | Trip site array for uniform demand generation | | | 1 | G | | Uniform demand active |

## TABLE 4-7. VEHICLE CONTROL DATA (Page 1 of 3)

| Variable Name | Dimension | Data Type | Description | Units IP/MP | Model Processor Name | Default Value | Format Type G, F | Time Dependent | Option Dependencies |
|---|---|---|---|---|---|---|---|---|---|
| POLLC | | I | Longitudinal control policy in effect:<br>1 - Synchronous<br>2 - Quasi-synchronous<br>3 - Asynchronous | | POLLC | 3 | G | | |
| POLVPR | | I | Vehicle position regulation scheme in effect:<br>1 - Fixed block<br>2 - Variable block<br>3 - User specified model | | POLVPR | 2 | G | | Variable block requires asynchronous control |
| VLEN | | I | Vehicle length | Meters | VLEN | 6 | G | | Variable headway position regulation scheme |
| PVDVRT | | L | Vehicle diversion from guideway to board trips when station is not the vehicle destination<br>F = No diversion T = Diversion permitted | | PVDVRT | T | G | X | Demand responsive service |
| GLRTIM | | R | Reaction time for accelerating to line speed from stop | Seconds/Clock Units | GLRTIM | 0 | G | X | Asynchronous and quasi-synchronous control |
| PENTS | | L | Logic variable to indicate static (in station) entrainment is to be done<br>T = Entrainment allowed F = No entrainment | | PENTS | F | G | | Demand responsive service |
| PENTD | | L | Logic variable to indicate dynamic (on guideway) entrainment/detrainment is to be done<br>T = Entrainment allowed F = No entrainment | | PENTD | F | G | | Demand responsive service and asynchronous control |
| PMXTRL | | I | Limit on the no. of vehicles in train (0=no entrainment) | | PMXTRL | 1 | G | X | Demand responsive service |
| POLMRG | | I | Merge policy indicator<br>1 - FIFO<br>2 - Maneuvers based on delay table (heuristic)<br>3 - Priority<br>4 - First arrival at merge | | POLMRG | 1 | G | X | Asynchronous and quasi-synchronous control |
| GLMDLY | KMDLY1,KMDLY2 | R | Merge delay table | Seconds/Clock Units | GLMDLY | | G | X | Asynchronous control, heuristic merge policy |
| PBERTH | | I | Berth assignment policy<br>1 - To most downstream available berth ASAP<br>2 - Form platoons, send when berth area clear<br>3 - Ripple berth advancement | | PBERTH | 1 | G | X | Platooning requires one input queue for each dock. Ripple for timeout/group demand responsive service only |
| STMOV1 | | R | Ripple advance time if moving | Seconds/Clock Units | STMOV1 | 0 | G | X | Ripple berth advancement |
| STMOV2 | | R | Ripply advance time if stopped | Seconds/Clock Units | STMOV2 | 0 | G | X | Ripple berth advancement |

TABLE 4-7. VEHICLE CONTROL DATA (Page 3 of 3)

| Variable Name | Dimension | Data Type | Description | Units IP/MP | Model Processor Name | Default Value | Format Type G, F | Time Dependent | Option Dependencies |
|---|---|---|---|---|---|---|---|---|---|
| AFIDEG | | R | Tow vehicle speed degradation factor | | | | G | X | Tow vehicle recovery |
| | KNFAIL | R | | | AFMDEG* | | G | X | |
| AFITOW | KML | I | Tow vehicle path link ID sequence | | | | G | X | Tow vehicle recovery |
| | KML,KNFAIL | I | | | AFMTOW* | | G | X | |
| AFIRSP | KNR | I | Other vehicle failure response | | | | G | X | |
| | KNR,KNFAIL | I | | | AFMRSP* | | G | X | |
| PARMAX | | I | Maximum vehicle maneuver at merge | Slots | PARMAX<br>PARTIM* | 0 | G | X | Quasi-synchronous control |
| PADVNC | | I | Vehicle advance maneuver indicator<br>=0 - no advance<br>>0 - advance permitted | | PADVNC | 0 | G | X | Quasi-synchronous control |
| PMRGWW | | R | Merge reservation window width | Seconds/Clock Units | PMRGWW<br>PMRGTT* | GLHDWY | G | | Quasi-deterministic dispatch |
| PMRGTH | | R | Fraction of merge window to be reserved | No. of vehicles | PNVMRG* | 10 | G | | Quasi-deterministic dispatch |

TABLE 4-7. VEHICLE CONTROL DATA (Page 2 of 3)

<table>
<tr><th>Variable Name</th><th>Dimension</th><th>Data Type</th><th>Description</th><th>Units IP/MP</th><th>Model Processor Name</th><th>Default Value</th><th>Format Type G, F</th><th>Time Dependent</th><th>Option Dependencies</th></tr>
<tr><td>AFALRE</td><td>11</td><td>R</td><td>Failure/Recovery Request Data
<table>
<tr><th>Index</th><th>Guideway</th><th>Station</th><th>Vehicle</th></tr>
<tr><td>1</td><td>0</td><td>Stn node ID</td><td>0</td></tr>
<tr><td>2</td><td>Start node ID</td><td>=0, station<br>>0,link type</td><td>Start node ID</td></tr>
<tr><td>3</td><td>End node ID</td><td>–</td><td>End node ID</td></tr>
<tr><td>4</td><td>=0,entire link<br>=1,link entry<br>=2,link exit</td><td>=1,link entry<br>=2,link exit</td><td>=1,link entry<br>=2,link exit</td></tr>
<tr><td>5</td><td>=1,failure<br>=2,recovery</td><td>=1,failure<br>=2,recovery<br>=3,degrade<br>=4,recovery</td><td>=3,degrade<br>=4, degrad. removed</td></tr>
<tr><td>6</td><td>–</td><td>Degrad. factor</td><td>Degrad. factor</td></tr>
<tr><td>7</td><td>Detection delay</td><td>-</td><td>Detection delay</td></tr>
<tr><td>8</td><td>-</td><td>-</td><td>Recov. method</td></tr>
<tr><td>9</td><td>-</td><td>-</td><td>Delay after detection</td></tr>
<tr><td>10</td><td>-</td><td>-</td><td>Delay until replacement</td></tr>
<tr><td>11</td><td>Minimum path redone<br>=0,no;≠0,yes</td><td>–</td><td>Minimum path redone<br>=0,no;≠0,yes</td></tr>
</table></td><td></td><td></td><td></td><td>G</td><td>X</td><td>Must follow FAIL header. No fail in synchronous mode. No vehicle degradation in quasi-synchronous mode.</td></tr>
<tr><td></td><td>10,KNFAIL</td><td>I</td><td>Failure/Recovery Processing Data
<table>
<tr><th>Index</th><th>Guideway</th><th>Station</th><th>Vehicle</th></tr>
<tr><td>1</td><td>0</td><td>Station no.</td><td>0</td></tr>
<tr><td>2</td><td>Link number</td><td>=0,station<br>>0,sta. link no.</td><td>link number</td></tr>
<tr><td>3</td><td>=0,entire link<br>=1,link entry<br>=2,link exit</td><td>=1,link entry<br>=2,link exit</td><td>=1,link entry<br>=2,link exit</td></tr>
<tr><td>4</td><td>=1,failure<br>=2,recovery</td><td>=1,failure<br>=2,recovery<br>=3,degrade<br>=4,recovery</td><td>=3,degrade<br>=4,degrad. removed</td></tr>
<tr><td>5</td><td>Det. delay</td><td>-</td><td>Det. delay</td></tr>
<tr><td>6</td><td>-</td><td>-</td><td>Recov. method</td></tr>
<tr><td>7</td><td>-</td><td>-</td><td>Restart delay</td></tr>
<tr><td>8</td><td>-</td><td>-</td><td>Delay til repl.</td></tr>
<tr><td>9</td><td>Minimum path table number</td><td>-</td><td>Minimum path table number</td></tr>
<tr><td>10</td><td>Refer recovery to fail data</td><td>–</td><td>Refer recovery to fail data</td></tr>
</table></td><td></td><td>AFAIL*</td><td></td><td>G</td><td>X</td><td></td></tr>
<tr><td></td><td>KNSL,KNS</td><td>R</td><td>Station link travel time penalty factor</td><td></td><td>SLPENT*</td><td></td><td>G</td><td>X</td><td>Station link degradation</td></tr>
<tr><td></td><td>KNFAIL</td><td>R</td><td>Vehicle degradation factor</td><td></td><td>VDFACT*</td><td></td><td>G</td><td>X</td><td>Vehicle degradation</td></tr>
</table>

TABLE 4-8. VEHICLE OPERATIONAL STRATEGIES DATA (Page 1 of 3)

| Variable Name | Dimension | Data Type | Description | Units IP/MP | Model Processor Name | Default Value | Format Type G, F | Time Dependent | Option Dependencies |
|---|---|---|---|---|---|---|---|---|---|
| PVSPAC | | I | Algorithm selection spacing veh. on same sched. route<br>1 Fixed departure time<br>2 Midway between previous vehicle and following vehicle<br>3 Fixed interval after previous<br>4 Midway interval after previous<br>5 Immediate | | PVSPAC | 1 | G | X | Scheduled service |
| PNTRLM | | I | Maximum wait time for entrainment in station | Sec/c.u. | PNTRLM | 15 | G | X | Static entrainment |
| PVEPR | KNEVP | I | Ordered list of where to send an empty vehicle<br>PVEPR(1) = First place to try<br>PVEPR(KNEVP) = Last place to try<br>Values — Place<br>1 Local storage<br>2 Regional storage<br>3 Distribute according to anticipated need without considering current availability of empties<br>4 Distribute according to anticipated need while considering current availability of empties<br>5 Circulate on the guideway on a a predetermined route<br>6 Circulate to next best station, station with most requests<br>7 User empty vehicle algorithm | | PVEPR<br>KNEVP* | 1,3 | G | X | Demand responsive service |
| PSRCTD | KNS | I | No. of the station that acts as a regional center to which this station sends empties when sending them to a regional center | Node/Station ID | PSRCTD | | G | X | Demand responsive service, if a PVEPR value = 2 |
| PANEED | KNANT | I | Concatenated list containing a sublist for each station The sublist contains anticipated no. of empty vehicles needed at corresponding PANSTN entry. (Note: A value is required for each station with a '0'defining the end of the station entries. A station with no entry will be represented with only the delimiting '0'. While determining PANPTR, the IP strips the delimiting zeros from the list, except for the null stations | No. of Vehicles | PANEED<br>PANPTR*<br>PANCD*<br>KNANT*<br>KNST* | | G | X | Demand responsive service, if a PVEPR value = 3 or 4 and user-defined level of service (otherwise automatically computed) |
| PANSTN | KNANT | I | Receiving stations corresponding to PANCD and PANEED. (Note: Must have the same no. of entries corresponding with each entry in PANEED) | Nodes/Station IDs | PANSTN | | G | X | Demand reponsive service, if a PVEPR value = 3 or 4 and user-defined level of service (otherwise automatically computed) |
| PECRTE | KNCRS | I | Circuitous empty route list - a concatenation of empty vehicle circulation routes (lists of station IDs) (A '0' must seperate each route definition with an additional '0' at the end of the table.) | Nodes/Station IDs | PECRTE<br>PECPTR* | | G | X | Demand responsive service if PVEPR value = 5 |
| PECRTN | KNS | I | No. of empty vehicle circulation route onto which this station sends empties when sending them on circulation route (pointer to PECPTR) | Route Number | PECRTN | | G | X | Demand Resposive Service, if PVEPR value = 5 |

TABLE 4-8. VEHICLE OPERATIONAL STRATEGIES DATA (Page 2 of 3)

| Variable Name | Dimension | Data Type | Description | Units IP/MP | Model Processor Name | Default Value | Format Type G, F | Time Dependent | Option Dependencies |
|---|---|---|---|---|---|---|---|---|---|
| PDLDIS | | I | Dispatch policy in effect:<br>1 Deterministic<br>2 Quasi-deterministic<br>3 Non-deterministic | | PDLDIS | 3 | G | | Choice related to longitudinal control policy in effect (see option diagram for Vehicle Control Strategies). |
| PSMETH | | I | Path selection method:<br>1 Apriori (in the station)<br>2 Realtime (at diverge) | | PSMETH | 1 | G | X | Choice only valid for asynychronous non-deterministic dispatch, demand resposive service, single party or scheduled service. Apriori routing is assured for all other cases |
| PSTYPE | | I | Path selection type:<br>1 Table look-up<br>2 Algorithmic | | PSTYPE | 1 | G | X | Choice only valid for demand resposive single party and scheduled service, table look-up assumed for demand resposive multi-party |
| PSALGM | | I | Path selection algorithm indicator:<br>1 Nominal travel time<br>2 Link length<br>3 Utilization<br>4 Weighted combination of 1 and 3 | | PSALGM | 1 | G | X | Algorithmic path selection |
| PSTWT | | R | Weighting factor for nominal travel time | | PSTWT | D | G | X | Algorithmic path selection with selection with weighted combination indicated |
| PSUWT | | R | Weighting factor for utilization | | PSUWT | D | G | X | Algorithmic path selection with selection with weighted combination indicated |
| PALTRT | KNALT | I | User's definition of alternate path node sequences. May be entered to be used with an already defined network. Concatenated list containing a sublist for each common diverge point. First entry in each sublist is node ID of destination station. This is followed by a sequence of nodes defining the path. If more than one alternate path to the same destination from the same common diverge, separate the node sequences by -1. Each sublist ends with zero. | Nodes/Link IDs | PALRTE<br><br>KNALT*<br>PLSLT* | | G | | Algorithmic path selection |
| PMDWT | | R | Weighting factor for merge scheduling delay | Per sec./Per c.u. | PMDWT | D | G | X | Alternate paths and Quasi-deterministic or deterministic dispatch |

TABLE 4-8. VEHICLE OPERATIONAL STRATEGIES DATA (Page 3 of 3)

| Variable Name | Dimension | Data Type | Description | Units IP/MP | Model Processor Name | Default Value | Format Type G, F | Time Dependent | Option Dependencies |
|---|---|---|---|---|---|---|---|---|---|
| POLDMS | | L | Demand stop indicator<br>F - stop at each scheduled stop<br>T - stop only if demand exists | | POLDMS | F | G | X | Scheduled service not synchronous control |
| PMRGL | 2,2 | I | Local merge priority table<br>1, 1 is priority of empty vehicle on guideway<br>2, 1 is priority of full vehicle on guideway<br>1, 2 is priority of empty vehicle in station<br>2, 2 is priority of full vehicle in station<br>Value of 1 is highest priority | | PMRGL | 2,4<br>1,3 | G | X | |
| PVBMP | | L | Vehicle bumping indicator | | PVBMP | F | G | X | Demand Responsive Service |

## TABLE 4-9. SIMULATION CONTROL DATA

| Variable Name | Dimension | Data Type | Description | Units IP/MP | Model Processor Name | Default Value | Format Type G, F | Time Dependent | Option Dependencies |
|---|---|---|---|---|---|---|---|---|---|
| AVLOG | | I | Indicates whether or not vehicles are to be logged as they approach a station. 0 = no log required. N = log vehicles as they arrive at diverge to station n. | Node/station ID | AVLOG | 0 | G | X | |
| AKSEED | | I | User input seed to the random number generator, must be an odd integer ≥ 3. | | AKSEED | 14825 | G | | |
| ATRPLG | | L | User's indication as to whether or not trips are to be written to a file as they exit the simulated area. T = log trips. F= do not. | | ATRPLG | F | G | X | |
| ACKPTI | | I | Periodic checkpoint interval | Seconds/Clock units | ACKPTI | 0 | G | X | |
| ASAMPI | | I | Sampling interval | Seconds/Clock units | ASAMPI | 60 | G | | |
| ASTATU | | I | Number of sampling intervals between snapshot outputs | | ASTATU | 5 | G | X | |
| APCOM1 | | I | Time interval for periodic computation of merge delay parameters. | Seconds/Clock units | APCOM1 | 0 | G | X | Merge policy indicator - heuristic table |
| ATREAD | | I | Time to begin reading trip records | Seconds/Clock Units | ATREAD | 0 | G | | |
| CSIZE | | I | Clock units/minute | | CSIZE | 60 | G | | |
| CLOOP | | I | Number of entries/clock table entry | | CLOOP | KMX-KMT | G | | |
| CLSMAL | | I | Increment in time between successive clock table intervals | Clock Units *10 | CLSMAL | 100 | G | | |
| CLSIZE | | I | Number of entries in clock table | | CLSIZE | KMCLTA | G | | |
| ANOMTT | | L | Nominal travel time file request T, write file | | | F | G | | |
| ALLOG | | L | Link statistics log indicator T = write file, F = do not | | ALLOG | F | G | | |
| ASLOG | | L | Station statistics log indicator T = write file, F = do not. | | ASLOG | F | G | | |

TABLE 4-10. ALPHABETIZED LISTING OF INPUT DATA (Page 1 of 3)

| NAME | DESCRIPTION | TABLE | PAGE |
|---|---|---|---|
| ACKPTI | PERIODIC CHECKPOINT INTERVAL | 4-9 | 4-32 |
| AFALRE | FAILURE/RECOVERY REQUEST | 4-7 | 4-27 |
| AFIDEG | TOW VEHICLE SPEED DEGRADATION | 4-7 | 4-28 |
| AFIRSP | OTHER VEHICLE FAILURE RESPONSE | 4-7 | 4-28 |
| AFITOW | TOW VEHICLE PATH LINK SEQUENCE | 4-7 | 4-28 |
| AKSEED | SEED, RANDOM NUMBER GENERATOR | 4-9 | 4-32 |
| ALLOG | LINK STATISTICS LOG INDICATOR | 4-9 | 4-32 |
| ANOMTT | NOMINAL TRAVEL TIME FILE INDICATOR | 4-9 | 4-32 |
| APCOMI | TIME INTERVAL, PERIODIC COMPUTATIONS | 4-9 | 4-32 |
| ASAMPI | SAMPLING INTERVAL | 4-9 | 4-32 |
| ASLOG | STATION STATISTICS LOG INDICATOR | 4-9 | 4-32 |
| ASTATU | SAMPLING INTERVALS BETWEEN SNAPSHOTS | 4-9 | 4-32 |
| ATREAD | TIME TO BEGIN READING TRIP RECORDS | 4-9 | 4-32 |
| ATRPLG | TRIP LOG INDICATOR | 4-9 | 4-32 |
| AVLOG | VEH LOG INDICATOR | 4-9 | 4-32 |
| CLOOP | ENTRIES/CLOCK TABLE ENTRY | 4-9 | 4-32 |
| CLSIZE | ENTRIES IN CLOCK TABLE | 4-9 | 4-32 |
| CLSMAL | TIME BETWEEN CLOCK TABLE INTERVALS | 4-9 | 4-32 |
| CSIZE | CLOCK UNITS/MINUTE | 4-9 | 4-32 |
| DIRPFL | DEMAND GENERATION REQUEST INDICATOR | 4-6 | 4-23 |
| (DIS2OD) | O/D PAIRS, 2ND GROUP DISTRIBUTION | 4-6 | 4-23 |
| (DIS3OD) | O/D PARIS, 3RD GROUP DISTRIBUTION | 4-6 | 4-23 |
| DMPROF | DEMAND SCALING PROFILE | 4-6 | 4-25 |
| DNDMND | # DEMAND PROFILE INTERVALS | 4-6 | 4-23 |
| (DNSD2) | # STN PAIRS USING 2ND DISTRIBUTION | 4-6 | 4-23 |
| (DNSD3) | # STN PAIRS USING 3RD DISTRIBUTION | 4-6 | 4-23 |
| (DTRDST) | PROB. DIST. OF TRIP GROUP SIZE | 4-6 | 4-23 |
| GLBLK | BLOCK LENGTH--FIXED HEADWAY REG. | 4-4 | 4-19 |
| GLHDWY | TIME SEPARATION BETWEEN VEHICLES | 4-4 | 4-19 |
| GLMDLY | MERGE DELAY TABLE | 4-7 | 4-26 |
| GLOCC | LINK OCCUPANCY | 4-5 | 4-20 |
| GLRTIM | REACTION TIME FROM STOP | 4-7 | 4-26 |
| GLVEL | NOMINAL LINE SPEED | 4-4 | 4-19 |
| GLVSD | STANDARD DEVIATION, VEH SPEED VAR. | 4-4 | 4-19 |
| HCBDLO | DEBOARD/BOARD TIME CHECK OVERRIDE | 4-6 | 4-25 |
| HCPASS | HANDICAPPED PROCESSING INDICATOR | 4-6 | 4-25 |
| (KNG) | ENTRIES IN GROUP SIZE DISTRIBUTIONS | 4-6 | 4-22 |
| KNSL | NUMBER OF STATION LINKS | 4-4 | 4-17 |
| KNV | FLEET SIZE | 4-5 | 4-20 |
| NCSEL | COST SELECTION FOR PATH DETER. | 4-4 | 4-19 |
| NEWNET | PROCESS NETWORK INDICATOR | 4-4 | 4-18 |
| NLNPRI | PRIORITY NODE PAIRS AT MERGES | 4-4 | 4-19 |
| PADVNC | VEHICLE ADVANCE MANEUVER INDICATOR | 4-7 | 4-27 |
| PALTET | ALTERNATE STATION EGRESS TIME | 4-6 | 4-24 |
| PALTRT | ALTERNATE PATH NODE SEQUENCES | 4-8 | 4-30 |
| PANEED | ANTICIPATED # OF VEH NEEDED | 4-8 | 4-29 |
| PANSTN | RESERVING STATONS, RELATED TO ABOVE | 4-3 | 4-29 |
| PARMAX | MAXIMUM VEH MANEUVER AT MERGE | 4-7 | 4-27 |

TABLE 4-10. ALPHABETIZED LISTING OF INPUT DATA (Page 2 of 3)

| NAME | DESCRIPTION | TABLE | PAGE |
|---|---|---|---|
| PBERTH | BERTH ASSIGNMENT POLICY | 4-7 | 4-26 |
| PECRTE | CIRCUITOUS EMPTY ROUTE LIST | 4-8 | 4-29 |
| PECRTN | STN CIRCUITOUS ROUTE # | 4-8 | 4-29 |
| PENTD | DYNAMIC ENTRAINMENT/DETRAINMENT IND. | 4-7 | 4-26 |
| PENTS | STATIC ENTRAINMENT INDICATOR | 4-7 | 4-26 |
| PEVALM | EMPTY VEHICLE ARRIVAL TIME LIMIT | 4-6 | 4-24 |
| PHIST1 | 1ST THRESHOLD, EXCESS TT HISTOGRAM | 4-6 | 4-23 |
| PHIST2 | 2ND THRESHOLD, EXCESS TT HISTOGRAM | 4-6 | 4-23 |
| PLDFAC | ESTIMATED VEH LOAD FACTOR | 4-5 | 4-20 |
| PLOSBS | SOURCE OF LEVEL OF SERVICE | 4-5 | 4-20 |
| PMAXWT | MAXIMUM WAIT TIME FOR VEH. SCHED SER. | 4-5 | 4-20 |
| PMDWT | WEIGHTING FAC. MERGE SCHEDULING DELAY | 4-8 | 4-30 |
| PMNGRP | MINIMUM GROUP SIZE TO REQUEST VEHICLE | 4-5 | 4-21 |
| PMRGL | LOCAL MERGE PRIORITY TABLE | 4-8 | 4-31 |
| PMRGTH | FRACTION OF MERGE WINDOW TO BE RES. | 4-7 | 4-27 |
| PMRGWW | MERGE RESERVATION TABLE WINDOW WIDTH | 4-7 | 4-27 |
| PMXTIM | MAXIMUM WAIT TIME TO REQUEST VEHICLE | 4-5 | 4-21 |
| PMXTRL | MAX # OF VEHS IN TRAIN | 4-7 | 4-26 |
| PNTRLM | MAX WAIT TIME, ENTRAINMENT | 4-8 | 4-29 |
| PNTVEH | NUMBER OF TRANSITION VEHICLES | 4-5 | 4-21 |
| PNVRTE | VEHICLES/ROUTE | 4-5 | 4-20 |
| POLDIS | DISPATCH POLICY | 4-8 | 4-30 |
| POLDMS | DEMAND STOP INDICATOR | 4-8 | 4-31 |
| POLLC | LONGITUDINAL CONTROL POLICY | 4-7 | 4-26 |
| POLMRG | MERGE POLICY | 4-7 | 4-26 |
| POLSER | SERVICE POLICY | 4-5 | 4-20 |
| POLVPR | VEHICLE POSITION REGULATION SCHEME | 4-7 | 4-26 |
| PRASGN | STATION ROUTE ASSIGNMENT TABLE | 4-6 | 4-24 |
| PRGLST | ROUTE GROUP LIST | 4-6 | 4-25 |
| PRTDEF | SOURCE OF ROUTE DEF., SCHEDULED SER. | 4-6 | 4-20 |
| PRTEHY | ROUTE HEADWAY | 4-5 | 4-20 |
| PRTLEN | TRAIN LENGTH, BY ROUTE | 4-5 | 4-20 |
| PSADSP | STATION OVERFULL PROTECTION ADEQUATE SPACE | 4-5 | 4-21 |
| PSALGM | PATH SEL AGORITHM INDICATOR | 4-8 | 4-30 |
| PSDIRT | MULTIPARTY SINGLE STOP DR INDICATOR | 4-5 | 4-21 |
| PSLIST | SL TYPES WHERE EMPTIES SOUGHT | 4-6 | 4-24 |
| PSMETH | PATH SELECTION METHOD | 4-8 | 4-30 |
| PSPEED | VEHICLE SPEED ON GUIDEWAY | 4-4 | 4-19 |
| PSRCFM | REGIONAL CENTER FOR EMPTY SELECTION | 4-6 | 4-24 |
| PSRCTO | REGIONAL CENTER FOR EMPTY DISPURSMNT | 4-8 | 4-29 |
| PSTWT | WEIGHTING FAC. NOMINAL TT | 4-8 | 4-30 |
| PSTYPE | PATH SELECTION TYPE | 4-8 | 4-30 |
| PSUWT | WEIGHTING FAC. UTILIZATION | 4-8 | 4-30 |
| PTSPLT | TRIP SPLIT SIZE | 4-8 | 4-22 |
| PVBMP | VEHICLE BUMPING INDICATOR | 4-8 | 4-31 |
| PVDVRT | VEHICLE GUIDEWAY DIVERSION INDICATOR | 4-7 | 4-26 |
| PVEPR | EMPTY VEH DISPURSEMENT LIST | 4-8 | 4-29 |
| PVRES | RESERVATION INDICATOR | 4-6 | 4-24 |
| PVRLST | SCHEDULED ROUTE LIST | 4-5 | 4-20 |

TABLE 4-10. ALPHABETIZED LISTING OF INPUT DATA (Page 3 of 3)

| NAME | DESCRIPTION | TABLE | PAGE |
|---|---|---|---|
| PVSPAC | ALGORITHM SELECTION, VEH SPACING | 4-8 | 4-29 |
| PVSPR | EMPTY VEH SEARCH LIST | 4-6 | 4-24 |
| PWALKT | TRANSFER WALK TIME | 4-6 | 4-24 |
| PWLKTS | DEFAULT TRANSFER WALK TIME | 4-6 | 4-25 |
| PXFER | TRANSFER POLICY INDICATOR | 4-6 | 4-24 |
| PXFLST | TRANSFER LIST | 4-6 | 4-25 |
| SBARN | STATION MAINTENANCE BARN INDICTOR | 4-4 | 4-19 |
| SBQCAP | BOARDING QUEUE CAPACITY | 4-6 | 4-23 |
| SHCBA | HANDICAPPED BOARD DOOR TIME | 4-6 | 4-25 |
| SHCBB | HANDICAPPED BOARD SECURE TIME | 4-6 | 4-25 |
| SHCDBA | HANDICAPPED DEBOARD DOOR TIME | 4-6 | 4-25 |
| SHCDBB | HANDICAPPED BOARD RELEASE TIME | 4-6 | 4-25 |
| SLAVAL | SL AVAILABILITY | 4-4 | 4-18 |
| SLBVEL | VEH SPEED THROUGH ON-LINE SINS. NO STP | 4-4 | 4-19 |
| SLCAP | STATION LINK CAPACITY | 4-4 | 4-17 |
| SLCFIG | STATION LINK DESCRIPTORS | 4-4 | 4-17 |
| SLDIVC | DIVERGE FUNCTION NUMBER | 4-4 | 4-18 |
| SLDSL | DOWNSTREAM STATION LINKS | 4-4 | 4-18 |
| SLDTYP | STATION LINK DOCK TYPE | 4-4 | 4-19 |
| SLEVL | LISTS OF LINK EVENTS | 4-4 | 4-18 |
| SLHTA | SL HEADWAY TIME--'A' FACTOR | 4-4 | 4-18 |
| SLHTB | SL HEADWAY TIME--'B' FACTOR | 4-4 | 4-18 |
| SLOCC | SL OCCUPANCY | 4-5 | 4-20 |
| SLPF | PRIORITY/FIFO DQ INDICATOR | 4-4 | 4-18 |
| SLPLAT | STATION LINK PLATFORM ASSIGNMENT | 4-4 | 4-19 |
| SLTTIM | TRAVEL TIME ON STATION LINK | 4-4 | 4-17 |
| SLTYPE | STATION LINK TYPE | 4-4 | 4-17 |
| SLUSL | UPSTREAM STATION LINKS | 4-4 | 4-18 |
| SLVEL | STATION LINK VELOCITY | 4-4 | 4-17 |
| SMNDBT | MINIMUM DOOR OPEN TIME | 4-6 | 4-23 |
| SMNINV | MINIMUM INVENTORS GOAL | 4-5 | 4-21 |
| SMXDBT | MAXIMUM BOARD TIME | 4-6 | 4-25 |
| SNCAP1 | TOTAL STATION CAPACITY | 4-4 | 4-19 |
| SPLTOD | STATION PLATFORM TYPE FOR O/D TRIP | 4-5 | 4-21 |
| STBA | BOARD TIME FUNC., TIME/PASS | 4-6 | 4-23 |
| STDBA | DEBOARD TIME FUNC., TIME/PASS | 4-6 | 4-23 |
| STDHFF | ESTIMATED DWELL ADJUSTMENT TIME | 4-6 | 4-23 |
| STMOV1 | RIPPLE ADVANCE TIME IF MOVING | 4-7 | 4-26 |
| STMOV2 | RIPPLE ADVANCE TIME IF STOPPED | 4-7 | 4-26 |
| STNGFL | SWITCHBACK STATION INDICATOR | 4-4 | 4-19 |
| STYPE | TYPE OF STATION | 4-4 | 4-17 |
| TSZARR | UNIFORM DEMAND TRIP SIZE ARRAY | 4-6 | 4-25 |
| UNFDMD | UNIFORM DEMAND GENERATION INDICATOR | 4-6 | 4-25 |
| VCAP | VEHICLE CAPACITY | 4-6 | 4-23 |
| VHCAP | VEHICLE HANDICAPPED PASSENGER CAPACITY | 4-6 | 4-23 |
| VLEN | VEHICLE LENGTH | 4-7 | 4-26 |
| VSEAT | NUMBER OF SEATS ON VEH | 4-6 | 4-25 |

TABLE 4-11. PROBLEM SIZE DEFINITION

| | | |
|---|---|---|
| KNALT | - | Entries in alternate route list |
| KNANT | - | Entries in empty vehicle anticipated need lists |
| KNCRS | - | Entries in circuitous empty route table |
| KNEVP | - | Entries in user's ordered empty vehicle priority list of where to put empties |
| KNG | - | Entries in group size distribution |
| KNL | - | Number of guideway links |
| KNR | - | Number of routes |
| KNRT | - | Entries in scheduled route list |
| KNS | - | Number of stations |
| KNSL | - | Number of station links |
| KNSLD | - | Entries in station link downstream station link list |
| KNSLE | - | Entries in station link event list |
| KNSLU | - | Entries in station link upstream station link list |
| KNSVP | - | Entries in user's ordered list of where to search for empties |
| KMDPRF | - | Number of demand profile intervals |
| KMGT | - | Number of route groups |
| KMNOD | - | Entries in list of O/D pairs using the second or third group size distribution |
| KMDLY1 | - | Number of rows in merge delay table |
| KMDLY2 | - | Number of columns in merge delay table |
| KMXFER | - | Number of O/D pairs requiring transfer data |

processed. If a variable is absent from this column, it is not a Model Processor variable, but a data element used only by the Input Processor, and thereby not subject to MP runtime input.

Variables noted with a "*" are created by the Input Processor for use by the Model. (For example, when a user enters a table, the Input Processor often computes the number of elements entered and pointers to the various starting points within the table. A description of these additional data elements can be found in the output data descriptions of the Input Processor, Section 5.) Thus, this column contains a listing of all of the structured system characteristic variables which are required as input to the Model Processor. Computed network structured data are not included.

7. Default Value -- The default values are those assigned to the variable by the Input Processor at initialization prior to reading user specified values. Only those initialization values that have a particular meaning are listed. (For example, a transfer station table initialized to '0' would not be listed but a variable initialized to '0' which can have a value of '0' or '1' would be included.)

8. Format Type -- The "G" or "F" specified with each data element in this column designates the variable is a "GDIP" variable or a Fixed Formatted variable. Fixed formatted items are further noted with a "D" for demand input data.

9. Time Dependent -- An 'X' in this column indicates that it is possible for this variable to be altered at a specified time within the simulation run. In other words, the variable can be a time-tagged variable in the run time data set. However, it must be emphasized that data changes entered in this manner may produce unpredictable results, because of the system definition and related data dependencies. With the exception of failure entry and active fleet size management data, the Input Processor does not check any MP related data entry for reasonableness or completeness if it is time-tagged with a value greater than zero. This type of checking is also bypassed by the MP.

10. Option Dependencies -- This column identifies any unique conditions that dictate the use of the particular variable. (For example, some variables are only used by the model for scheduled service while others are referenced for demand responsive service policy.) If nothing is specified in this column, then the variable must be entered under all conditions.

Some of the system characteristics parameters affect the calculation of the network structured data. Therefore, when varying these parameters in a related set of simulation experiments, network processing must be requested (NEWNET = T) so that the desired characteristics are reflected in the network structured data. Table 4-12 lists the system characteristics parameters which affect the network characteristics.

### 4.3.2 Output Processor Data

Sampled data items for LIST, SUMM, PLOT, and HIST formats within the Output Processor are classified by major category which define the component or entity set of the simulation to which it pertains as follows:

- System (SYST) -- Items related to overall system performance recorded on a single item basis each sampling interval. Retrieval does not require specification of either a major entity number or variable entity range.

- Station (STN) -- Items related to station performance recorded on an individual station basis. Retrieval requires specification of the station(s) (variable entity range) for which statistics are desired.

- Station Link (STNL) -- Items related to activity on individual station configuration elements. Retrieval requires two levels of qualification, where the major entity ID corresponds to the network station number of interest, and the variable entity range specifies the desired station link numbers.

- Guideway Links (LINK) -- Items related to activity on individual guideway configuration elements. Retrieval requires specification of the links (variable entity range) for which output is desired.

- Routes (RTE) -- Items related to individual scheduled service route and route group performance. Retrieval requires specification of the route or route group ID's (variable entity range) for which retrieval is required. Additional specification of a major entity number, corresponding to a guideway link ID, is required for retrieval of statistics recorded on a route by link basis.

Specification of a variable entity range of zero for non-system related items (STN, STNL, LINK, RTE) results in data being retrieved and displayed for the entire range of available entities. If only one entity in the variable entity range is desired, the first or lower index value in the range should be specified.

TABLE 4-12. SYSTEM CHARACTERISTICS PARAMETERS AFFECTING NETWORK CHARACTERISTICS

| PARAMETER | DEFINITION |
|---|---|
| CSIZE | Clock units/minute |
| GLBLK | Block length for fixed headway regulation |
| GLHDWY | Time separation between vehicles at line speed |
| GLVEL | Nominal line speed |
| KNSL | Number of station links (if an STYPE=T) |
| NCSEL | Cost selection for path determination |
| NLNPRI | Priority link definition |
| POLLC | Longitudinal control policy |
| POLVPR | Vehicle position regulation scheme |
| PSPEED | Default vehicle speed on guideway |
| SLAVAL | Station link availability (if an STYPE=T) |
| SLBVEL | Online station bypass velocity (if an STYPE=T) |
| SLCAP | Station link capacity (if an STYPE=T) |
| SLCFIG | Station configurator input (if an STYPE=T) |
| SLEVL | Station link event list (if an STYPE=T) |
| SLTTIM | Station link travel time (if an STYPE=T) |
| SLTYPE | Station link type (if an STYPE=T) |
| SLVEL | Station link speed (if an STYPE=T) |
| STYPE | Station type |
| VLEN | Vehicle length |

Station-to-station performance measures reports are requested by output format RPT3, STOS, or S-S along with specification of major category as shown below. The report for each station-to-station measure will display total, average, standard deviation, maximum, and minimum by O-D station pair, by origin station, by destination station, and system-wide. For each measure, only total or average by O-D pair is written to the J-file (when requested) as shown by the J-file column in the table below.

| Major Category | Description | J-File |
|---|---|---|
| PASS | Number of passengers served | Total |
| IVEH | Total time in vehicle - board-to-deboard | Average |
| INIT | Initial wait time - arrival-to-launch | Average |
| XFRS | Total number of passenger transfers | Average |
| XTIM | Total time for passenger transfers - intermediate deboard to intermediate board | Average |
| TVLT | Total travel time - arrival-to-completion | Average |
| TVLD | Passenger speed | Average |
| | (The following categories are not station-to-station measures but rather request special functions) | |
| PAGE | Set report page size: lines (in 22-26), cols. (in 27-31) | |
| RPT | Suppress print of station-to-station report for all measures | |
| FILE | Generate UTPS J-file for all requested station-to-station measures | |
| STNS | Set maximum number of stations (in 22-26) | |
| DBG<br>DEBU | Turn on debugging output; the subcategories (17-20) are:<br><br>FMTS - Run time formats<br>KEYS - Temporary file keys<br>RAW - Display raw data items<br>SUMS - Display totals used to compute stats | |

At user option, scale limits may be input for time series data requests (PLOT). The user input scale definition is used in displaying sampled values on the output plot instead of the scale automatically generated by the Output Processor in the absence of user specification. Sampled values which fall outside the range of input scale values are plotted with the special character "#" at the low or high end of the output plot. The time of occurrence for the off scale sampled item is displayed on the time varying plot axis.

The particular item names which can be requested for output, and a description of the statistic available by retrieval of that item, are summarized in Tables 4-13 and 4-14. Table 4-14 lists additional measures which are derived from the raw statistics by the Output Processor. Specific examples of coding output processor command input data are provided in Section 6.

TABLE 4-13. (1 of 8) DESM STATISTICS

| NAME | DESCRIPTION | UNITS |
|---|---|---|
| | SYSTEM STATISTICS | |
| | SYSTEM DATA | |
| ANIR | AVERAGE # OF VEHICLES IN REVENUE SERVICE (OCCUPIED) | VEH. |
| ANDH | AVERAGE NUMBER OF VEHICLES TRAVELLING EMPTY OR DEADHEADING IN D.R. SERVICE | VEH. |
| ANSV | AVERAGE NUMBER OF VEHICLES IN STATION STORAGE AREAS | VEH. |
| ANTV | AVERAGE NUMBER OF TRIPS ON VEHICLES | TRIPS |
| ANPV | AVERAGE NUMBER OF PASSENGERS ON VEHICLES | TRIPS |
| ANSP | AVERAGE NUMBER SEATED PASSENGERS ON VEHICLES | PASS |
| TSDC | SUM TIME DEMAND TO TRIP COMPLETION FOR TRIPS | SEC |
| XRTT | MAXIMUM RATIO NOMINAL TT / ACTUAL TT | - |
| MRTT | MINIMUM RATIO NOMINAL TT / ACTUAL TT | - |
| PDST | SUM OF COMPLETED PASSENGER DISTANCE ON GUIDEWAY | KM. |
| DDST | SUM OF EMPTY OR DEADHEADING DISTANCE TRAVELLED ON GUIDEWAY | KM. |
| RDST | SUM OF REVENUE (OCCUPIED) DISTANCE TRAVELLED ON GDWY | KM. |
| DIST | TOTAL VEHICLE DISTANCE TRAVELLED (STN & GDWY) | KM. |
| NTOV | CURRENT # OF TRIPS ON VEHICLES (INCLUDING BOARDING) | TRIPS |
| NPOV | CURRENT # OF PASSENGERS ON VEHS (INCLUDING BOARDING) | PASS. |
| VRVS | CURRENT # OF VEHICLES IN REVENUE SERVICE (OCCUPIED) | VEH. |
| VDEH | CURRENT NUMBER OF VEHICLES TRAVELLING EMPTY OR DEAD-HEADING | VEH. |
| VSTO | CURRENT NUMBER OF VEHICLES IN STATION STORAGE AREAS | VEH. |
| THT1 | # COMPLETED TRIPS EXCESS TRAVEL TIME <=FIRST CUTOFF | TRIP |
| THT2 | # COMPLETED TRIPS EXCESS TRAVEL TIME >FIRST CUTOFF & <=SECOND CUTOFF | TRIP |
| THT3 | # COMPLETED TRIPS EXCESS TRAVEL TIME >SECOND CUTOFF & | TRIP |
| PHT1 | # COMPLETED PASS. EXCESS TRAVEL TIME <=FIRST CUTOFF | PASS |
| PHT2 | # COMPLETED PASS. EXCESS TRAVEL TIME >FIRST CUTOFF & <=SECOND CUTOFF | PASS |
| PHT3 | # COMPLETED PASS. EXCESS TRAVEL TIME >SECOND CUTOFF & | PASS |
| TVRS | TOTAL # OF VEHICLES ENTERING REVENUE (OCCUPIED) STATE | VEH. |
| TVDH | TOTAL # OF VEHICLES ENTERING DEADHEADING(EMPTY) STATE | VEH. |
| TVST | TOTAL NUMBER OF VEHICLES ENTERING STORAGE STATE | VEH. |
| PSER | TOTAL NUMBER PASSENGERS SERVED (BOARDED & CURRENTLY BOARDING VEHICLES) EXCLUDING TRANSFERS | PASS |
| XFLT | MAXIMUM FLEET SIZE | VEH. |
| MFLT | MINIMUM FLEET SIZE | VEH. |
| NPSV | CURRENT NUMBER OF SEATED PASSENGERS ON VEHICLES | PASS. |
| MVLF | MINIMUM VEHICLE LOAD FACTOR AS PERCENT CAPACITY | - |
| XVLF | MAXIMUM VEHICLE LOAD FACTOR AS PERCENT CAPACITY | - |
| | STATION DATA (TOTALED ACCROSS ALL STATIONS) | |
| VANS | AVERAGE NUMBER OF VEHICLES IN STATIONS | VEH. |
| ANWT | AVERAGE NUMBER OF TRIPS WAITING IN STATIONS | TRIPS |
| ANWP | AVERAGE NUMBER OF WAITING PASSENGERS IN STATIONS | PASS |
| AVIR | AVERAGE NUMBER VEHICLES ON INPUT RAMPS | VEH. |
| AVIQ | AVERAGE NUMBER VEHICLES ON INPUT QUEUES | VEH. |
| AVDK | AVERAGE NUMBER VEHICLES AT DOCKS | VEH. |
| AVOQ | AVERAGE NUMBER VEHICLES ON OUTPUT QUEUES | VEH. |
| AVOR | AVERAGE NUMBER VEHICLES ON OUTPUT RAMPS | VEH. |
| AVST | AVERAGE NUMBER VEHICLES IN STORAGE AREAD | VEH. |
| AQIR | AVERAGE NUMBER VEHICLES QUEUED ON INPUT RAMPS | VEH. |
| AQIQ | AVERAGE NUMBER VEHICLES QUEUED ON INPUT QUEUES | VEH. |
| AQDK | AVERAGE NUMBER VEHICLES QUEUED AT DOCKS | VEH. |
| AQOQ | AVERAGE NUMBER VEHICLES QUEUED ON OUTPUT QUEUES | VEH. |
| AQOR | AVERAGE NUMBER VEHICLES QUEUED ON OUTPUT RAMPS | VEH. |
| AQST | AVERAGE NUMBER VEHICLES QUEUED IN STORAGE AREAS | VEH. |
| VATS | AVERAGE TIME IN STATIONS OF VEHICLES LEAVING | SEC. |
| VXTS | MAXIMUM TIME IN A STATION OF VEHICLES LEAVING | SEC. |

TABLE 4-13. (2 of 8) DESM STATISTICS

| NAME | DESCRIPTION | UNITS |
|---|---|---|
| VTMC | SUM OF TIME DELAY FOR MERGE CONFLICT RESOLUTION (LAUNCH DELAY TIME FOR MERGE SCHEDULING) | SEC. |
| TDXS | MAX TRIP GROUP WAIT TIME (DEMAND TO DISPATCH) (TIME PER PARTY FROM STATION ARRIVAL TO TIME OF VEHICLE LAUNCH FROM STATION) | SEC. |
| TSDS | SUM OF TRIP WAIT TIME (DEMAND TO DISPATCH) (TIME FOR PARTIES FROM STATION ARRIVAL TO TIME OF VEHICLE LAUNCH FROM STATION) | SEC. |
| PDXS | MAX PASS WAIT TIME (DEMAND TO DISPATCH) (TIME PER PASSENGER FROM STATION ARRIVAL TO TIME OF VEHICLE LAUNCH FROM STATION) | SEC. |
| PSDS | SUM OF PASS WAIT TIME (DEMAND TO DISPATCH) (TIME FOR ALL PASSENGERS FROM STATION ARRIVAL TO TIME OF VEHICLE LAUNCH FROM STATION) | SEC. |
| TSAS | SUM OF ACTUAL TRAVEL TIMES FOR COMPLETED TRIPS (INCLUDING SUBGROUPS & TRIPS CURRENTLY DEBOARDING) | SEC. |
| TSNS | SUM OF NOMINAL TRAVEL TIMES FOR COMPLETED TRIPS (INCLUDING SUBGROUPS & TRIPS CURRENTLY DEBOARDING) | SEC. |
| METS | MAXIMUM EXCESS TRAVEL TIME TRIPS (INCLUDING SUB-GROUPS & TRIPS CURRENTLY DEBOARDING) | SEC. |
| TCAS | SUM OF ACTUAL TRAVEL TIMES FOR COALESCED TRIPS | SEC. |
| TCNS | SUM OF NOMINAL TRAVEL TIMES FOR COALESCED TRIPS | SEC. |
| SDIR | SUM VEHICLE DELAY TIME LEAVING INPUT RAMPS | SEC. |
| SDIQ | SUM VEHICLE DELAY TIME LEAVING INPUT QUEUES | SEC. |
| SDDK | SUM VEHICLE DELAY TIME LEAVING DOCKS | SEC. |
| SDOQ | SUM VEHICLE DELAY TIME LEAVING OUPUT QUEUES | SEC. |
| SDOR | SUM VEHICLE DELAY TIME LEAVING OUPUT RAMPS | SEC. |
| SDST | SUM VEHICLE DELAY TIME LEAVING STORAGE AREAS | SEC. |
| MCES | MAXIMUM EXCESS TRAVEL TIME COALESCED TRIPS | SEC. |
| PDMS | MINIMUM PASSENGER TIME DEMAND TO DISPATCH (TIME PER PASSENGER FROM STATION ARRIVAL TO TIME OF VEHICLE LAUNCH FROM STATION) | SEC. |
| VMTS | MINIMUM TIME IN STATION FOR VEHICLES LEAVING | SEC. |
| XDIR | MAXIMUM DELAY TIME FOR VEHICLES LEAVING IR Q | SEC. |
| XDIQ | MAXIMUM DELAY TIME FOR VEHICLES LEAVING IQ Q | SEC. |
| XDDK | MAXIMUM DELAY TIME FOR VEHICLES LEAVING DK Q | SEC. |
| XDOQ | MAXIMUM DELAY TIME FOR VEHICLES LEAVING OQ Q | SEC. |
| XDOR | MAXIMUM DELAY TIME FOR VEHICLES LEAVING OR Q | SEC. |
| XDST | MAXIMUM DELAY TIME FOR VEHICLES LEAVING ST Q | SEC. |
| TDST | SUM OF COMPLETED TRIP GUIDEWAY DISTANCES | KM. |
| SSVD | SUM OF STATION DISTANCE FOR VEHICLES LEAVING | KM. |
| ANIS | AVERAGE NUMBER OF INTERMEDIATE STOPS/COMPLETED PASS. | STPS/P. |
| VNES | TOTAL # OF VEHICLES ENTERING STATIONS | VEH. |
| VNLS | TOTAL # OF VEHICLES LEAVING STATIONS | VEH. |
| VNIS | CURRENT # OF VEHICLES IN STATIONS | VEH. |
| VALT | TOTAL # OF VEHICLES ASSIGNED ALTERNATE STATIONS (DENIED TIMELY ENTRY) | VEH. |
| VNLN | TOTAL # OF VEHICLES LAUNCHED FROM STATION (COMPLETED ANY REQUIRED LAUNCH DELAYS FOR MERGE SCHEDULING OR SCHEDULE ADHERENCE) | VEH. |
| VXNS | MAXIMUM NUMBER OF VEHICLES IN ANY NETWORK STATION | VEH. |
| TNIS | CURRENT # OF TRIPS IN STATION (INCLUDING XFERS) | TRIPS |
| TNRS | TOTAL # OF TRIPS REJECTED FROM STATIONS FOR VIOLATION OF BOARDING QUEUE CAPACITY) | TRIPS |
| TNDS | TOTAL # OF TRIPS DISPATCHED FROM STATIONS (VEHICLE LAUNCH PROCESSING & ASSOCIATED DELAYS COMPLETE) | TRIPS |
| PNIS | CURRENT # OF PASSENGERS IN STATIONS (INCLUDING XFERS) | PASS. |
| PNRS | NUMBER OF PASSENGERS REJECTED FROM STATIONS | PASS. |
| PNDS | NUMBER OF PASSENGERS DISPATCHED FROM STATIONS (VEHICLE LAUNCH PROCESSING & ASSOCIATED DELAYS COMPLETE) | PASS. |
| VREQ | TOTAL # OF UNSATISFIED EMPTY VEHICLE REQUESTS | REQ. |
| VEDC | TOTAL # OF EMPTIES DISPATCHED ON CIRCUITOUS ROUTES | VEH. |
| VELS | TOTAL # OF EMPTIES DISPATCHED TO LOCAL STORAGE | VEH. |

TABLE 4-13. (3 of 8) DESM STATISTICS

| NAME | DESCRIPTION | UNITS |
|---|---|---|
| VERC | TOTAL # OF EMPTIES DISPATCHED TO REGIONAL CENTER | VEH. |
| VEAN | TOTAL # OF EMPTIES DISPATCHED BASED ON ANTICIPATED NEED NOT CONSIDERING CURRENT DISTRIBUTION IN NETWORK) | VEH. |
| VENB | TOTAL # OF EMPTIES DISPATCHED CONSIDERING CURRENT DISTRIBUTION IN NETWORK | VEH. |
| VEDR | TOTAL # OF EMPTIES DISPATCHED BASED ON OUTSTANDING REQUESTS (UNSATISFIED DEMAND REQUESTS AT NETWORK STATIONS) | VEH. |
| VED | NUMBER OF EMPTIES DISPATCHED FROM STATIONS | VEH. |
| TNES | TOTAL # OF TRIPS REQUESTING SERVICE (INCLUDING ALL ARRIVALS REGARDLESS OF REJECTION) | TRIPS |
| TNLS | TOTAL NUMBER TRIPS SERVED (BOARDED & CURRENTLY BOARDING VEHICLES) INCLUDING TRANSFERS | TRIPS |
| PNLS | TOTAL NUMBER PASSENGERS SERVED (BOARDED & CURRENTLY BOARDING VEHICLES) INCLUDING TRANSFERS | PASS |
| PNES | TOAL NUMBER OF PASSENGERS REQUESTING SERVICE (INCLUDING ALL ARRIVALS REGARDLESS OF REJECTION) | PASS. |
| TNCS | TOTAL NUMBER OF COMPLETED TRIPS AT STATIONS (INCLUDING THOSE DEBOARDING) | TRIPS |
| PNCS | TOTAL NUMBER OF COMPLETED PASSENGERS AT STATIONS (INCLUDING THOSE DEBOARDING) | PASS. |
| TCNC | TOTAL NUMBER OF COMPLETED COALESCED TRIPS | TRIPS |
| TSXS | TOTAL NUMBER OF ARRIVING XFERRING PASSENGERS | XFERS |
| TXXF | MAXIMUM NUMBER OF TRANSFERS FOR ANY COMPLETED TRIP INCLUDING SUBGROUPS (SPLIT PARTIES) | XFERS |
| NTAR | TOTAL NUMBER OF ARRIVING TRIPS (INCLUDING XFERS) | TRIPS |
| NPAR | TOTAL NUMBER OF ARRIVING PASSENGERS (INCLUDING XFERS) | PASS. |
| NTWT | CURRENT NUMBER OF WAITING TRIPS IN NETWORK STATIONS (INCLUDING TRANSFERS) | TRIPS |
| XTWT | MAXIMUM NUMBER OF TRIPS WAITING IN NETWORK STATIONS | TRIPS |
| NPWT | CURRENT NUMBER OF WAITING PASSENGERS IN NETWORK STATIONS (INCLUDING TRANSFERS) | PASS. |
| XPWT | MAXIMUM NUMBER OF WAITING PASSENGERS IN NETWORK STNS | PASS |
| TNSS | TOTAL NUMBER OF TRIP SUBGROUPS (SPLIT PARTIES ) CREATED IN NETWORK STATIONS | SUBGRPS |
| TNGS | NUMBER OF COMPLETED SUBGROUPS (SPLIT PARTIES) | SUBGRPS |
| VNNS | TOTAL NUMBER OF ENTRAINED VEHICLES LEAVING STATIONS | VEH. |
| XOIR | MAXIMUM NUMBER VEHICLES ON AN INPUT RAMP | VEH. |
| XOIQ | MAXIMUM NUMBER VEHICLES ON AN INPUT QUEUE | VEH. |
| XODK | MAXIMUM NUMBER VEHICLES AT A DOCK | VEH. |
| XOOQ | MAXIMUM NUMBER VEHICLES ON AN OUTPUT QUEUE | VEH. |
| XOOR | MAXIMUM NUMBER VEHICLES ON AN OUTPUT RAMP | VEH. |
| XOST | MAXIMUM NUMBER VEHICLES IN A STORAGE AREA | VEH. |
| XQIR | MAXIMUM NUMBER VEHICLES QUEUED ON AN INPUT RAMP | VEH. |
| XQIQ | MAXIMUM NUMBER VEHICLES QUEUED ON AN INPUT QUEUE | VEH. |
| XQDK | MAXIMUM NUMBER VEHICLES QUEUED AT A DOCK | VEH. |
| XQOQ | MAXIMUM NUMBER VEHICLES QUEUED ON AN OUTPUT QUEUE | VEH. |
| XQOR | MAXIMUM NUMBER VEHICLES QUEUED ON AN OUTPUT RAMP | VEH. |
| XQST | MAXIMUM NUMBER VEHICLES QUEUED IN A STORAGE AREA | VEH. |
| NLIR | TOTAL NUMBER VEHICLES LEAVING INPUT RAMPS | VEH. |
| NLIQ | TOTAL NUMBER VEHICLES LEAVING INPUT QUEUES | VEH. |
| NLDK | TOTAL NUMBER VEHICLES LEAVING DOCKS | VEH. |
| NLOQ | TOTAL NUMBER VEHICLES LEAVING OUTPUT QUEUES | VEH. |
| NLOR | TOTAL NUMBER VEHICLES LEAVING OUTPUT RAMPS | VEH. |
| NLST | TOTAL NUMBER VEHICLES LEAVING STORAGE AREAS | VEH. |
| NEIR | TOTAL NUMBER VEHICLES ENTERING INPUT RAMPS | VEH. |
| NEIQ | TOTAL NUMBER VEHICLES ENTERING INPUT QUEUES | VEH. |
| NEDK | TOTAL NUMBER VEHICLES ENTERING DOCKS | VEH. |
| NEOQ | TOTAL NUMBER VEHICLES ENTERING OUTPUT QUEUES | VEH. |
| NEOR | TOTAL NUMBER VEHICLES ENTERING OUTPUT RAMPS | VEH. |
| NEST | TOTAL NUMBER VEHICLES ENTERING STORAGE AREAS | VEH. |
| VRNT | TOTAL NUMBER EMPTIES REQUESTED FROM NON-LOCAL STORAGE | VEH. |
| VRLS | TOTAL NUMBER EMPTIES REQUESTED FROM LOCAL STORAGE | VEH. |

TABLE 4-13. (4 of 8) DESM STATISTICS

| NAME | DESCRIPTION | UNITS |
|---|---|---|
| TTXS | TOTAL NUMBER TRANSFERS FOR COMPLETED TRIPS (INCLUDING EACH TIME A TRIP REQUIRED A TRANSFER) | XFERS |
| TPXS | TOTAL NUMBER PASSENGER TRANSFERS FOR COMPLETED TRIPS (TOTAL NUMBER OF XFERS FOR TRIP * NUMBER OF PASSENGERS) | XFERS |
| MPWT | MINIMUM NUMBER PASSENGERS WAITING IN NETWORK STATIONS | PASS. |
| MQIR | MINIMUM NUMBER VEHICLES QUEUED ON AN INPUT RAMP | VEH. |
| MQIQ | MINIMUM NUMBER VEHICLES QUEUED ON AN INPUT QUEUE | VEH. |
| MQDK | MINIMUM NUMBER VEHICLES QUEUED AT A DOCK | VEH. |
| MQOQ | MINIMUM NUMBER VEHICLES QUEUED ON AN OUTPUT QUEUE | VEH. |
| MQOR | MINIMUM NUMBER VEHICLES QUEUED ON AN OUTPUT RAMP | VEH. |
| MQST | MINIMUM NUMBER VEHICLES QUEUED IN A STORE AREA | VEH. |
| XFER | NUMBER OF COMPLETED PASSENGERS HAVING TO TRANSFER AT LEAST ONE TIME ENROUTE TO DESTINATION | PASS. |
| | GUIDEWAY DATA (TOTALED ACROSS ALL GUIDEWAY LINKS) | |
| XQDV | MAX AVERAGE QUEUE DELAY/VEHICLES LEAVING A LINK | SEC/VEH. |
| XQQV | MAX AVERAGE QUEUE DELAY/QUEUED VEHICLE LEAVING A LNK | SEC/VEH. |
| HDWY | SUM GUIDEWAY LINK HEADWAY TIMES | SEC. |
| GANO | AVERAGE NUMBER OF VEHICLES ON GUIDEWAY | VEH. |
| GANQ | AVERAGE NUMBER VEHICLES QUEUED ON GUIDEWAY | VEH. |
| GAPL | AVERAGE NUMBER OF PASSENGERS ON GUIDEWAY | PASS. |
| GSVT | SUM OF COMPLETED GUIDEWAY LINK VEHICLE TRAVEL TIMES | SEC. |
| GSVD | SUM OF COMPLETED GUIDEWAY LINK VEHICLE DISTANCES | KM. |
| GVNO | CURRENT NUMBER OF VEHICLES ON GUIDEWAY | VEH. |
| GVNQ | CURRENT NUMBER OF VEHICLES QUEUED ON GUIDEWAY | VEH. |
| GXTQ | MAXIMUM WAIT TIME OF VEHICLES CURRENTLY QUEUED ON GUIDEWAY | SEC. |
| GXNO | MAXIMUM NUMBER OF VEHICLES ON GUIDEWAY | VEH. |
| GNE | TOTAL NUMBER OF VEHICLES ENTERING GUIDEWAY LINKS | VEH. |
| GNL | TOTAL NUMBER OF VEHICLES LEAVING GUIDEWAY LINKS | VEH. |
| GNVE | TOTAL NUMBER OF VEHICLES ENTRAINED ON GUIDEWAY LINKS | VEH. |
| GNVD | TOTAL NUMBER OF VEHICLES DETRAINED ON GUIDEWAY LINKS | VEH. |
| GXNQ | MAXIMUM NUMBER OF QUEUED VEHICLES ON A GUIDEWAY LINK | VEH. |
| GNLQ | TOTAL NUMBER OF VEHICLES LEAVING GUIDEWAY LINK QUEUES | VEH. |
| GXDQ | MAXIMUM DELAY TIME FOR ANY VEHICLE LEAVING A GUIDEWAY LINK QUEUE | SEC. |
| GSDQ | SUM OF DELAY TIMES FOR VEHICLES LEAVING GUIDEWAY LINK QUEUES | SEC. |
| GCAP | TOTAL GUIDEWAY CAPACITY | VEH. |
| GMOL | MINIMUM NUMBER VEHICLES OCCUPYING ANY GUIDEWAY LINK | VEH. |
| GXPL | MAXIMUM NUMBER PASSENGERS ON ANY GUIDEWAY LINK | PASS. |
| GMPL | MINIMUM NUMBER PASSENGERS ON ANY GUIDEWAY LINK | PASS. |
| GNPL | TOTAL NUMBER OF PASSENGERS ON GUIDEWAY | PASS. |
| | ROUTE STATISTICS (TOTALED ACROSS ALL ROUTES) | |
| RATR | AVG NUMBER OF TRIPS USING ROUTES (INCLUDING TRIPS CURRENTLY DEBOARDING VEHICLES) | TRIPS |
| RAPR | AVG NUMBER OF PASSENGERS USING ROUTES (INCLUDING PASSENGERS CURRENTLY DEBOARDING VEHICLES) | PASS. |
| RXSD | MAX SCHEDULE DEVIATION FOR ANY ROUTE (FIXED SCHEDULE) (AMOUNT OF TIME OR BEHIND OR AHEAD OF FIXED SCHEDULE STATION DEPARTURE TIME) | SEC. |
| RVTD | TOTAL ACCUMULATED SCHEDULE DEVIATION (SUM OF TIMES BEHIND OR AHEAD OF FIXED SCHEDULE STATION DEPARTURE TIME) | SEC. |
| RTID | TOTAL INTERDISPATCH TIME (VARIABLE SCHEDULE) (SUM OF TIMES BETWEEN VEHICLE DEPARTURES) | SEC. |
| RXID | MAX INTERDISPATCH TIME ON ANY ROUTE (MAXIMUM TIME BETWEEN VEHICLE DEPARTURES) | SEC. |
| RMID | MIN INTERDISPATCH TIME ON ANY ROUTE (MINIMUM TIME BETWEEN VEHICLE DEPARTURES) | SEC. |

TABLE 4-13. (5 of 8) DESM STATISTICS

| NAME | DESCRIPTION | UNITS |
|---|---|---|
| RMSD | MIN SCHEDULE DEVIATION FOR ANY ROUTE (FIXED SCHEDULE) (AMOUNT OF TIME OR BEHIND OR AHEAD OF FIXED SCHEDULE STATION DEPARTURE TIME) | SEC. |
| RTSE | NUMBER OF TRIPS SERVED ON ROUTES (BOARDED & CURRENTLY BOARDING VEHICLES) INCLUDING TRANSFERS | TRIPS |
| RPSE | NUMBER OF PASSENGERS SERVED ON ROUTES (BOARDED & CURRENTLY BOARDING VEHICLES) INCLUDING TRANSFERS | PASS. |
| RTN | NUMBER OF TRIPS CURRENTLY IN PROCESS ON ROUTE (INCLUDES TRIPS ONBOARD & BOARDING VEHICLES) | TRIPS |
| RPN | NUMBER OF PASSENGERS CURRENTLY IN PROCESS ON ROUTE (INCLUDES PASSENGERS ONBOARD & BOARDING VEHICLES) | PASS. |
| RVDI | TOTAL NUMBER OF VEHICLE DEPARTURES ON ROUTES (COMPLETED ANY REQUIRED LAUNCH DELAYS FOR MERGE SCHEDULING OR SCHEDULE ADHERENCE) | VEH. |
| | STATION STATISTICS (AVAILABLE FOR EACH STATION IN NETWORK) | |
| VANS | AVERAGE NUMBER OF VEHICLES IN STATION | VEH. |
| VATS | AVERAGE TIME IN STATION OF VEHICLES LEAVING | SEC. |
| ANWT | AVERAGE NUMBER OF TRIPS WAITING | TRIPS |
| ANWP | AVERAGE NUMBER OF WAITING PASSENGERS | PASS |
| VSTS | SUM OF TIMES IN STATION OF VEHICLES LEAVING | SEC. |
| VXTS | MAXIMUM TIME IN STATION OF VEHICLES LEAVING | SEC. |
| VTMC | SUM OF TIME DELAY FOR MERGE CONFLICT RESOLUTION (LAUNCH DELAY TIME FOR MERGE SCHEDULING) | SEC. |
| TDXS | MAX TRIP GROUP WAIT TIME (DEMAND TO DISPATCH) (TIME PER PARTY FROM STATION ARRIVAL TO TIME OF VEHICLE LAUNCH FROM STATION) | SEC. |
| TSDS | SUM OF TRIP WAIT TIME (DEMAND TO DISPATCH) (TIME FOR PARTIES FROM STATION ARRIVAL TO TIME OF VEHICLE LAUNCH FROM STATION) | SEC. |
| PDXS | MAX PASS WAIT TIME (DEMAND TO DISPATCH) (TIME PER PASSENGER FROM STATION ARRIVAL TO TIME OF VEHICLE LAUNCH FROM STATION) | SEC. |
| PSDS | SUM OF PASS WAIT TIME (DEMAND TO DISPATCH) (TIME FOR ALL PASSENGERS FROM STATION ARRIVAL TO TIME OF VEHICLE LAUNCH FROM STATION) | SEC. |
| TSAS | SUM OF ACTUAL TRAVEL TIMES FOR COMPLETED TRIPS (INCLUDING SUBGROUPS & TRIPS CURRENTLY DEBOARDING) | SEC. |
| TSNS | SUM OF NOMINAL TRAVEL TIMES FOR COMPLETED TRIPS (INCLUDING SUBGROUPS & TRIPS CURRENTLY DEBOARDING) | SEC. |
| METS | MAXIMUM EXCESS TRAVEL TIME TRIPS (INCLUDING SUB-GROUPS & TRIPS CURRENTLY DEBOARDING) | SEC. |
| TCAS | SUM OF ACTUAL TRAVEL TIMES FOR COALESCED TRIPS | SEC. |
| TCNS | SUM OF NOMINAL TRAVEL TIMES FOR COALESCED TRIPS | SEC. |
| MCES | MAXIMUM EXCESS TRAVEL TIME COALESCED TRIPS | SEC. |
| VMTS | MINIMUM TIME IN STATION FOR VEHICLES LEAVING | SEC. |
| PDMS | MINIMUM PASSENGER TIME DEMAND TO DISPATCH (TIME PER PASSENGER FROM STATION ARRIVAL TO TIME OF VEHICLE LAUNCH FROM STATION) | SEC. |
| TDST | SUM OF COMPLETED TRIP GUIDEWAY DISTANCE | KM. |
| VNES | TOTAL # OF VEHICLES ENTERING STATION | VEH. |
| VNLS | TOTAL # OF VEHICLES LEAVING STATION | VEH. |
| VNIS | CURRENT # OF VEHICLES IN STATION | VEH. |
| VALT | TOTAL # OF VEHICLES ASSIGNED ALTERNATE STATION (DENIED TIMELY ENTRY) | VEH. |
| VNLN | TOTAL # OF VEHICLES LAUNCHED FROM STATION (COMPLETED ANY REQUIRED LAUNCH DELAYS FOR MERGE SCHEDULING OR SCHEDULE ADHERENCE) | VEH. |
| VXNS | MAXIMUM NUMBER OF VEHICLES IN ANY NETWORK STATION | VEH. |
| TNIS | CURRENT # OF TRIPS IN STATION (INCLUDING XFERS) | TRIPS |
| TNRS | TOTAL # OF TRIPS REJECTED FROM STATION FOR VIOLATION OF BOARDING QUEUE CAPACITY) | TRIPS |

TABLE 4-13. (6 of 8) DESM STATISTICS

| NAME | DESCRIPTION | UNITS |
|---|---|---|
| TNDS | TOTAL # OF TRIPS DISPATCHED FROM STATIONS (VEHICLE LAUNCH PROCESSING & ASSOCIATED DELAYS COMPLETE) | TRIPS |
| PNIS | CURRENT # OF PASSENGERS IN STATION (INCLUDING XFERS) | PASS. |
| PNRS | NUMBER OF PASSENGERS REJECTED FROM STATION | PASS. |
| PNDS | NUMBER OF PASSENGERS DISPATCHED FROM STATIONS (VEHICLE LAUNCH PROCESSING & ASSOCIATED DELAYS COMPLETE) | PASS. |
| VREQ | TOTAL # OF UNSATISFIED EMPTY VEHICLE REQUESTS | REQ. |
| VEDC | TOTAL # OF EMPTIES DISPATCHED ON CIRCUITOUS ROUTES | VEH. |
| VELS | TOTAL # OF EMPTIES DISPATCHED TO LOCAL STORAGE | VEH. |
| VERC | TOTAL # OF EMPTIES DISPATCHED TO REGIONAL CENTER | VEH. |
| VEAN | TOTAL # OF EMPTIES DISPATCHED BASED ON ANTICIPATED NEED NOT CONSIDERING CURRENT DISTRIBUTION IN NETWORK) | VEH. |
| VENB | TOTAL # OF EMPTIES DISPATCHED CONSIDERING CURRENT DISTRIBUTION IN NETWORK | VEH. |
| VEDR | TOTAL # OF EMPTIES DISPATCHED BASED ON OUTSTANDING REQUESTS (UNSATISFIED DEMAND REQUESTS AT NETWORK STATIONS) | VEH. |
| VED | NUMBER OF EMPTIES DISPATCHED FROM STATION | VEH. |
| TNES | TOTAL # OF TRIPS REQUESTING SERVICE (INCLUDING ALL ARRIVALS REGARDLESS OF REJECTION) | TRIPS |
| TNLS | TOTAL NUMBER TRIPS SERVED (BOARDED & CURRENTLY BOARDING VEHICLES) INCLUDING TRANSFERS | TRIPS |
| PNLS | TOTAL NUMBER PASSENGERS SERVED (BOARDED & CURRENTLY BOARDING VEHICLES) INCLUDING TRANSFERS | PASS |
| PNES | TOAL NUMBER OF PASSENGERS REQUESTING SERVICE (INCLUDING ALL ARRIVALS REGARDLESS OF REJECTION) | PASS. |
| TNCS | TOTAL NUMBER OF COMPLETED TRIPS AT STATION (INCLUDING THOSE DEBOARDING) | TRIPS |
| PNCS | TOTAL NUMBER OF COMPLETED PASSENGERS AT STATION (INCLUDING THOSE DEBOARDING) | PASS. |
| TCNC | TOTAL NUMBER OF COMPLETED COALESCED TRIPS | TRIPS |
| TSXS | TOTAL NUMBER OF ARRIVING XFERRING PASSENGER | XFERS |
| TXXF | MAXIMUM NUMBER OF TRANSFERS FOR ANY COMPLETED TRIP INCLUDING SUBGROUPS (SPLIT PARTIES) | XFERS |
| NTAR | TOTAL NUMBER OF ARRIVING TRIPS (INCLUDING XFERS) | TRIPS |
| NPAR | TOTAL NUMBER OF ARRIVING PASSENGERS (INCLUDING XFERS) | PASS. |
| NTWT | CURRENT NUMBER OF WAITING TRIPS IN NETWORK (INCLUDING TRANSFERS) | TRIPS |
| XTWT | MAXIMUM NUMBER OF TRIPS WAITING IN NETWORK | TRIPS |
| NPWT | CURRENT NUMBER OF WAITING PASSENGERS IN NETWORK (INCLUDING TRANSFERS) | PASS. |
| XPWT | MAXIMUM NUMBER OF WAITING PASSENGERS IN NETWORK | PASS |
| TNSS | TOTAL NUMBER OF TRIP SUBGROUPS (SPLIT PARTIES ) CREATED IN STATION | SUBGRPS |
| TNGS | NUMBER OF COMPLETED SUBGROUPS (SPLIT PARTIES) | SUBGRPS |
| VNNS | TOTAL NUMBER OF ENTRAINED VEHICLES LEAVING STATION | VEH. |
| VRNT | TOTAL NUMBER EMPTIES REQUESTED FROM NON-LOCAL STORAGE | VEH. |
| VRLS | TOTAL NUMBER EMPTIES REQUESTED FROM LOCAL STORAGE | VEH. |
| TTXS | TOTAL NUMBER TRANSFERS FOR COMPLETED TRIPS (INCLUDING EACH TIME A TRIP REQUIRED A TRANSFER) | XFERS |
| TPXS | TOTAL NUMBER PASSENGER TRANSFERS FOR COMPLETED TRIPS (TOTAL NUMBER OF XFERS FOR TRIP * NUMBER OF PASSENGERS) | XFERS |
| MPWT | MINIMUM NUMBER PASSENGERS WAITING IN NETWORK | PASS. |
| NPEG | NUMBER OF PASSENGERS ENTERING STATION FROM GUIDEWAY | PASS. |
| NPLG | NUMBER OF PASSENGERS EXITING STATION ON VEHICLES | PASS. |
| VMNS | MINIMUM NUMBER OF VEHICLES IN STATION | VEH. |

STATION LINK STATISTICS (AVAILABLE FOR EACH STATION LINK IN EACH STATION)

| | | |
|---|---|---|
| VANO | AVERAGE NUMBER OF VEHICLES ON STATION LINK J | VEH. |
| VATO | AVERAGE TIME OF VEHICLES LEAVING STATION LINK J | SEC. |
| VTIO | TIME INTEGRAL OF VEHICLE OCCUPANCY | VEHSEC |

TABLE 4-13. (7 of 8) DESM STATISTICS

| NAME | DESCRIPTION | UNITS |
|---|---|---|
| VSTO | SUM OF TIMES OF VEHICLES LEAVING STATION LINK J | SEC. |
| VXTO | MAXIMUM TIME OF VEHICLES LEAVING STATION LINK J | SEC. |
| VNEO | NUMBER OF VEHICLES ENTERING STATION LINK J | VEH. |
| VNLO | NUMBER OF VEHICLES LEAVING STATION LINK J | VEH. |
| VNIO | CURRENT NUMBER OF VEHICLES ON STATION LINK J | VEH. |
| VXNO | MAXIMUM NUMBER OF VEHICLES IN STATION LINK J | VEH. |
| VANQ | AVERAGE NUMBER OF VEHICLES IN STATION LINK J QUEUE | VEH. |
| VATQ | AVERAGE TIME OF VEHICLES LEAVING STATION LINK J QUEUE | SEC. |
| VTIQ | TIME INTEGRAL OF VEHICLE QUEUE OCCUPANCY | VEHSEC |
| VSTQ | SUM OF TIMES OF VEHICLES LEAVING STATION LINK J QUEUE | SEC. |
| VXTQ | MAXIMUM TIME OF VEHICLES LEAVING STATION LINK J QUEUE | SEC. |
| VNEQ | NUMBER OF VEHICLES ENTERING STATION LINK J QUEUE | VEH. |
| VNLQ | NUMBER OF VEHICLES LEAVING STATION LINK J QUEUE | VEH. |
| VNIQ | CURRENT NUMBER OF VEHICLES IN STATION LINK J QUEUE | VEH. |
| VXNQ | MAXIMUM NUMBER OF VEHICLES IN STATION LINK J | VEH. |
| VQDV | MINIMUM NUMBER OCCUPYING LINK | VEH. |
| VQDQ | MINIMUM NUMBER OCCUPYING LINK QUEUE | VEH. |
| | GUIDEWAY LINK DATA (AVAILABLE FOR EACH LINK IN NETWORK) | |
| HDWY | GUIDEWAY LINK HEADWAY | SEC. |
| GANO | AVERAGE NUMBER OF VEHICLES ON LINKS | VEH. |
| GANQ | AVERAGE NUMBER VEHICLES QUEUED ON LINK | VEH. |
| GAPL | AVERAGE NUMBER PASSENGERS ON LINK | PASS. |
| GSVT | SUM OF COMPLETED LINK TRAVEL TIMES | SEC. |
| GSVD | SUM OF COMPLETED LINK DISTANCES | KM. |
| GVNO | CURRENT NUMBER OF VEHICLES ON LINKS | VEH. |
| GVNQ | CURRENT NUMBER OF VEHICLES QUEUED ON LINKS | VEH. |
| GXTQ | MAXIMUM WAIT TIME OF VEHICLES CURRENTLY QUEUED | SEC. |
| GXNO | MAXIMUM NUMBER OF VEHICLES ON LINK | VEH. |
| GNE | NUMBER OF VEHICLES ENTERING LINK | VEH. |
| GNL | NUMBER OF VEHICLES LEAVING LINK | VEH. |
| GNVE | NUMBER OF VEHICLES ENTRAINED ON LINK | VEH. |
| GNVD | NUMBER OF VEHICLES DETRAINED ON LINK | VEH. |
| GXNQ | MAXIMUM NUMBER OF QUEUED VEHICLES ON LINK | VEH. |
| GNLQ | NUMBER OF VEHICLES LEAVING LINK QUEUE | VEH. |
| GXDQ | MAXIMUM DELAY TIME FOR THOSE LEAVING QUEUE | SEC. |
| GSDQ | SUM OF DELAY TIMES FOR THOSE LEAVING QUEUE | SEC. |
| GSTA | GUIDEWAY LINK STATUS - 0==>AVAILABLE, 1==>FAILED | - |
| GCAP | GUIDEWAY LINK CAPACITY | VEH. |
| GMNO | MINIMUM NUMBER VEHICLES ON LINK | VEH. |
| GXPL | MAXIMUM NUMBER PASSENGERS ON LINK | PASS. |
| GMPL | MINIMUM NUMBER PASSENGERS ON LINK | PASS. |
| GNPL | CURRENT NUMBER PASSENGERS ON LINK | PASS. |
| | ROUTE STATISTICS (AVAILABLE FOR EACH DEFINED ROUTE OR ROUTE GROUP IN NETWORK) | |
| RATR | AVG NUMBER OF TRIPS USING ROUTES (INCLUDING TRIPS CURRENTLY DEBOARDING) | TRIPS |
| RAPR | AVG NUMBER OF PASSENGERS USING ROUTES (INCLUDING TRIPS CURRENTLY DEBOARDING) | PASS. |
| RAVS | AVERAGE NUMBER VEHICLES IN SERVICE | VEH. |
| RASP | AVERAGE NUMBER SEATED PASSENGERS | PASS. |
| RAPW | AVERAGE NUMBER PASSENGERS WAITING | PASS. |
| RMSD | MIN SCHEDULE DEVIATION FOR ANY ROUTE (FIXED SCHEDULE) (AMOUNT OF TIME OR BEHIND OR AHEAD OF FIXED SCHEDULE STATION DEPARTURE TIME) | SEC. |
| TSAS | SUM ACTUAL TRAVEL TIME FOR COMPLETED TRIPS | SEC. |
| TSNS | SUM NOMINAL TRAVEL TIME FOR COMPLETED TRIPS | SEC. |
| XRTT | MAXIMUM RATIO ACTUAL TT / NOMINAL TT | - |
| MRTT | MINIMUM RATIO ACTUAL TT / NOMINAL TT | - |
| GVST | SUM VEHICLE TIME ON GUIDEWAY LINKS | SEC. |
| SVTS | SUM VEHICLE TIMES IN STATIONS | SEC. |

TABLE 4-13. (8 of 8) DESM STATISTICS

| NAME | DESCRIPTION | UNITS |
|---|---|---|
| PSDS | SUM OF PASS WAIT TIME (DEMAND TO DISPATCH) (TIME FOR ALL PASSENGERS FROM STATION ARRIVAL TO TIME VEHICLE IS LAUNCHED FROM STATION) | SEC. |
| PDXS | MAX PASS WAIT TIME (DEMAND TO DISPATCH) (TIME PER PASSENGER FROM STATION ARRIVAL TO TIME VEHICLE IS LAUNCHED FROM STATION) | SEC. |
| PDMS | MINIMUM PASSENGER TIME DEMAND TO DISPATCH (TIME PER PASSENGER FROM STATION ARRIVAL TO TIME VEHICLE IS LAUNCHED FROM STATION) | SEC. |
| RXSD | MAX SCHEDULE DEVIATION FOR ANY ROUTE (FIXED SCHEDULE) (AMOUNT OF TIME OR BEHIND OR AHEAD OF FIXED SCHEDULE STATION DEPARTURE TIME) | SEC. |
| RVTD | TOTAL ACCUMULATED SCHEDULE DEVIATION (SUM OF TIMES BEHIND OR AHEAD OF FIXED SCHEDULE STATION DEPARTURE TIME) | SEC. |
| RTID | TOTAL INTERDISPATCH TIME (VARIABLE SCHEDULE) (SUM OF TIMES BETWEEN VEHICLE DEPARTURES) | SEC. |
| RXID | MAX INTERDISPATCH TIME ON ANY ROUTE (MAXIMUM TIME BETWEEN VEHICLE DEPARTURES)SEC. | SEC. |
| RMID | MIN INTERDISPATCH TIME ON ANY ROUTE (MINIMUM TIME BETWEEN VEHICLE DEPARTURES) | SEC. |
| GVSD | SUM VEHICLE DISTANCE ON GUIDEWAY | KM. |
| PDST | SUM PASSENGER DISTANCE ON GUIDEWAY | KM. |
| SDST | SUM COMPLETED STATION DISTANCE | KM. |
| RTSE | NUMBER OF TRIPS SERVED ON ROUTES (BOARDED & CURRENTLY BOARDING VEHICLES) INCLUDING TRANSFERS | TRIPS |
| RPSE | NUMBER OF PASSENGERS SERVED ON ROUTES (BOARDED & CURRENTLY BOARDING VEHICLES) INCLUDING TRANSFERS | PASS. |
| RTN | NUMBER OF TRIPS CURRENTLY IN PROCESS ON ROUTE (INCLUDES TRIPS CURRENTLY DEBOARDING) | TRIPS |
| RPN | NUMBER OF PASSENGERS CURRENTLY IN PROCESS ON ROUTE (INCLUDES TRIPS CURRENTLY DEBOARDING) | PASS. |
| RVDI | TOTAL NUMBER OF VEHICLE DEPARTURES ON ROUTES (COMPLETED ANY REQUIRED LAUNCH DELAYS FOR MERGE SCHEDULING OR SCHEDULE ADHERENCE) | VEH. |
| XFLT | MAXIMUM FLEET SIZE | VEH. |
| MFLT | MINIMUM FLEET SIZE | VEH. |
| TSXS | NUMBER ARRIVING XFERRING PASSENGERS | PASS. |
| NPAR | NUMBER OF ARRIVING PASSENGERS | PASS. |
| NPCS | NUMBER COMPLETED PASSENGERS | PASS. |
| NPWT | TOTAL NUMBER PASSENGERS WAITING | PASS. |
| XPWT | MAXIMUM NUMBER PASSENGERS WAITING | PASS. |
| MPWT | MINIMUM NUMBER PASSENGERS WAITING | PASS. |
| PNDS | NUMBER OF PASSENGERS DISPATCHED | PASS. |
| NPSV | CURRENT NUMBER OF SEATED PASSENGERS | PASS. |
| RNV | CURRENT NUMBER OF VEHICLES ON ROUTE | VEH. |
| MVLF | MINIMUM VEHICLE LOAD FACTOR AS PERCENT CAPACITY | - |
| XVLF | MAXIMUM VEHICLE LOAD FACTOR AS PERCENT CAPACITY | - |

TABLE 4-14. (1 of 2) DERIVED STATISTICS

| NAME | DESCRIPTION | UNITS |
|---|---|---|
| | DERIVED SYSTEM STATISTICS | |
| RVSP | PROPORTION VEHICLES IN REVENUE SERVICE | - |
| DEHP | PROPORTION VEHICLES TRAVELLING EMPTY OR DEADHEADING | - |
| STOP | PROPORTION OF VEHICLES IN STATION STORAGE AREAS | - |
| ATPV | AVERAGE NUMBER OF TRIPS/VEHICLE | TRIP/VEH |
| APPV | AVERAGE NUMBER OF PASSENGERS/VEHICLE | PASS/VEH |
| AVLF | % VEHICLE LOAD (OCCUPANCY AS A PERCENT OF CAPACITY) | - |
| ADIR | AVERAGE QUEUE DELAY FOR VEHICLES LEAVING INPUT RAMPS | SEC. |
| ADIQ | AVERAGE QUEUE DELAY FOR VEHICLES LEAVING INPUT QUEUES | SEC. |
| ADDK | AVERAGE QUEUE DELAY FOR VEHICLES LEAVING DOCKS | SEC. |
| ADOQ | AVERAGE QUEUE DELAY FOR VEHICLES LEAVING OUTPUT QUEUES | SEC. |
| ADOR | AVERAGE QUEUE DELAY FOR VEHICLES LEAVING STORAGE AREAS | SEC. |
| ADST | AVERAGE QUEUE DELAY FOR VEHICLES LEAVING OUTPUT RAMPS | SEC. |
| ADVH | AVERAGE PASSENGER DISTANCE/VEH HR | KM./VEH*HR. |
| ADVD | AVERAGE PASSENGER DISTANCE/VEHICLE UNIT DISTANCE | - |
| ADV | AVERAGE DISTANCE/VEHICLE | KM./VEH |
| ADCT | AVERAGE DISTANCE/COMPLETED TRIP | KM./TRIP |
| ADRS | AVERAGE DISTANCE/REVENUE SERVICE VEHICLE | KM. |
| ADDH | AVERAGE DISTANCE/DEADHEADING OR EMPTY VEHICLE | KM. |
| AVSP | AVERAGE VEHICLE GUIDEWAY SPEED | KM./SEC |
| ADVQ | AVERAGE QUEUE DELAY / VEHICLES LEAVING GDWY LINKS | SEC/VEH. |
| ADVL | AVERAGE QUEUE DELAY / QUEUED VEHICLE LEAVING LINKS | SEC/VEH. |
| AVFR | AVERAGE VEHICLE FLOW RATE LEAVING GUIDEWAY LINKS | VEH/HR |
| AFIR | AVERAGE VEHICLE FLOW RATE LEAVING INPUT RAMPS | VEH/HR |
| AFIQ | AVERAGE VEHICLE FLOW RATE LEAVING INPUT QUEUES | VEH/HR |
| AFDK | AVERAGE VEHICLE FLOW RATE LEAVING DOCKS | VEH/HR |
| AFOQ | AVERAGE VEHICLE FLOW RATE LEAVING OUTPUT QUEUES | VEH/HR |
| AFOR | AVERAGE VEHICLE FLOW RATE LEAVING OUTPUT RAMPS | VEH/HR |
| AFST | AVERAGE VEHICLE FLOW RATE LEAVING STORAGE AREAS | VEH/HR |
| PALT | PROPORTION OF VEHICLES DENIED TIMELY STATION ENTRY (ASSIGNED AN ALTERNATE STATION) | - |
| ADMC | AVERAGE DELAY FOR MERGE CONFLICT RESOLUTION | SEC. |
| ADRT | AVERAGE NUMBER OF DISPATCHES/ROUTE | VEH/RT |
| ASRT | AVERAGE SCHEDULE DEVIATION/ROUTE | SEC/RT |
| APWT | AVERAGE NUMBER CURRENTLY WAITING PASS / STATION | PASS |
| ATWT | AVERAGE NUMBER CURRENTLY WAITING TRIPS / STATION | TRIPS. |
| AATT | AVERAGE ACTUAL TRAVEL TIME | SEC. |
| ANTT | AVERAGE NOMINAL TRAVEL TIME | SEC. |
| AETT | AVERAGE EXCESS TRAVEL TIME | SEC. |
| ANXF | AVERAGE NUMBER OF TRANSFERS / COMPLETED TRIP | - |
| VOGP | PROPORTION VEHICLES ON GUIDEWAY | - |
| VISP | PROPORTION VEHICLES IN STATIONS | - |
| ALLF | AVERAGE % LINK LOAD (VEHICLES AS PERCENT CAPACITY) | - |
| ATV | AVERAGE NUMBER TRIPS/VEHICLE | TRPS/VEH |
| AVRT | AVERAGE NUMBER VEHICLES/ROUTE | VEH. |
| APRT | AVERAGE NUMBER PASSENGERS/ROUTE | PASS. |
| ATRT | AVERAGE NUMBER TRIPS/ROUTE | TRIPS |
| APDD | AVERAGE DELAY DEMAND TO DISPATCH PASSENGERS | SEC. |
| ATTS | AVERAGE TRIP TRAVEL SPEED | M/SEC. |
| ATDD | AVERAGE DELAY DEMAND TO DISPATCH TRIPS (WAIT TIME) (TIME PER TRIP FROM STATION ARRIVAL TO TIME VEHICLE IS ASSIGNED A STATION LAUNCH TIME) | SEC. |
| AFLT | AVERAGE VEHICLE FLEET SIZE | VEH. |
| SCAP | TOTAL VEHICLE SEAT CAPACITY | SEATS |
| SAVL | TOTAL SEAT AVAILABILITY | SEATS |
| VTVL | TOTAL VEHICLE DISTANCE TRAVELLED ON GUIDEWAY | KM. |
| AVSD | AVERAGE VEHICLE SPEED INCLUDING DWELL IN STATIONS | M/SEC |
| PCPT | PERCENT COMPLETED PASSENGER XFERS | - |
| NPIS | CURRENT NUMBER OF PASSENGERS IN SYSTEM | PASS |
| RTT | RATIO OF NOMINAL TO ACTUAL TRAVEL TIME | - |

TABLE 4-14. (2 of 2) DERIVED STATISTICS

| NAME | DESCRIPTION | UNITS |
|---|---|---|
| | DERIVED STATION STATISTICS | |
| NTSH | TRIPS SERVED / HOUR | TRIP/HR. |
| NPSH | PASSENGERS SERVED / HOUR | PASS/HR. |
| APDD | AVERAGE PASSENGER WAIT TIME | SECS. |
| VLFI | VEHICLE LOAD FACTOR AS PERCENT CAPACITY ENTERING STN | - |
| VLFO | VEHICLE LOAD FACTOR AS PERCENT CAPACITY EXITING STN | - |
| | DERIVED STATION LINK STATISTICS | |
| VQDV | QUEUE DELAY / VEHICLE | SEC/VEH. |
| VQDQ | QUEUE DELAY / QUEUED VEHICLE | SEC/VEH. |
| VFLW | VEHICLE FLOW RATE | VEH/HR. |
| | DERIVED ROUTE STATISTICS | |
| SCAP | SEAT CAPACITY | SEATS |
| SAVL | SEAT AVAILABILITY | SEATS |
| AVLF | AVERAGE VEHICLE LOAD FACTOR AS PERCENT CAPACITY | - |
| APDD | AVERAGE PASSENGER DELAY DEMAND TO DISPATCH | SECS. |
| RTT | RATIO OF NOMINAL TO ACTUAL TRAVEL TIME | - |
| AVSP | AVERAGE VEHICLE SPEED EXCLUDING STATION DWELL | M/SEC. |
| AVSD | AVERAGE VEHICLE SPEED INCLUDING STATION DWELL | M/SEC. |
| PAPX | PERCENT ARRIVING TRANSFERS | |
| AVLL | AVERAGE VEHICLE LOAD FACTOR AS PERCENT CAPACITY BY GUIDEWAY LINK | - |
| | DERIVED GUIDEWAY LINK STATISTICS | |
| GQDV | AVERAGE QUEUE DELAY / VEHICLE | SEC. |
| GQDQ | AVERAGE QUEUE DELAY / QUEUED VEHICLE | SEC. |
| AVSP | AVERAGE LINK SPEED | M/SEC. |
| AVLL | AVG % LINK LOAD (OCCUPANCY AS % CAPACITY) | - |
| GVFR | AVERAGE VEHICLE FLOW RATE LEAVING LINK | VEH/HR. |
| AVLF | AVERAGE VEHICLE LOAD FACTOR AS PERCENT CAPACITY | - |

# 5. OUTPUT DATA

The DESM produces various output files which are used for formatted data transfer between the IP, MP, and OP. These files are used for establishing the basis for modeling and resultant analysis of a given simulation experiment. The DESM MP can produce output data suitable for input to the Detailed Station Model (DSM) for conducting individual station performance analysis. Each component of the DESM updates a run index file which is used to record descriptive information reflecting each execution of the DESM. This run index can be used to assist the user in correlating data base files with experimental output for planning simulation run setup and results analysis.

## 5.1 DATA SET DESCRIPTIONS

The output files within the AGT data base are organized as partitioned data sets with the exception of the run index file which is maintained as a sequential file. In general, the member names of output files created by the DESM, are specified by the user at execution time as described in Section 6. The specific output files produced by the three components of the DESM are described in the following sections. The sizes of the output files described in the following sections are given in terms of the simulation compile-time parameters. These parameters and their current values are defined in Table 5-1.

### 5.1.1 Input Processor

The DESM IP creates the following files for use by the MP:

1. System Characteristics

2. Network Definition

3. Run Time Input

4. Trip.

These files provide the necessary information for establishing the characteristics (options, policies, etc.), network configuration, asynchronous stimuli, and demand requirements for a given simulation run. The IP also creates an initial index file entry, identifying the generation of DESM simulation data and a station to station performance file for use by the Feeder System Model. The contents of these files are summarized in Tables 5-2 through 5-7.

TABLE 5-1. COMPILE TIME MAXIMA (Page 1 of 2)

| Parameter | Description | Current Value |
|---|---|---|
| KMS | Stations | 120 |
| KML | Guideway Links | 350 |
| KMV | Vehicles | 2000 |
| KMT | Simultaneous Trips | 10000 |
| KMX | Transactions (KMV + KMT + number of system service transactions) | 15000 |
| KMCLTA | Entries in Clock Table | 1000 |
| KMMSGS | Messages of any kind issued before termination | 25 |
| KMMSGI | Information Messages Before Termination | 15 |
| KMMSGW | Warning Messages Before Termination | 15 |
| KMMTYP | Message of Any Type Before Termination | 10 |
| KMFLAG | Auxiliary Output Flags | 400 |
| KMSL | Station Links | 20 |
| KMR | Routes | 30 |
| KMRT | Entries in Scheduled Route List | 300 |
| KMEVP | Entries in Priority List of Where to Put Empty Vehicles | 10 |
| KMSVP | Entries in Priority List of Where to Search for Empty Vehicles | 10 |
| KMSLE | Entries in Station Link Event List | 120 |
| KMSLD | Entries in Downstream Station Link List | 100 |
| KMSLU | Entries in Upstream Station Link List | 100 |
| KMSLDS | Entries in List of Station Links Downstream from a Station Link Diverge | 20 |

TABLE 5-1. COMPILE TIME MAXIMA (Page 2 of 2)

| Parameter | Description | Current Value |
|---|---|---|
| KMG | Passengers per Trip | 10 |
| KMN | Network Nodes | 300 |
| KMNID | Network Node ID Range | 300 |
| KMNOD | Entries in list of O/D Pairs Using the Second or Third Group Size Distribution | 150 |
| KMHDR | Data Card Header Types | 14 |
| KMDLY1 | Rows in Merge Delay Table | 10 |
| KMDLY2 | Columns in Merge Delay Table | 10 |
| KMM | Merges | 200 |
| KMCR | Empty Vehicle Circulation Routes | 20 |
| KMCRS | Entries in Empty Vehicle Circulation Route List | 400 |
| KMANT | Entries in Empty Vehicle Anticipated Need Lists | 1000 |
| KMLSLT | Simultaneous Minimum Path Tables | 4 |
| KMALT | Entries in Alternate Route List | 50 |
| KMWMAX | Intervals in Merge Reservation Table | 720 |
| KMGT | Entries in Route Group List | 100 |
| KMDPRF | Intervals in Demand Profile | 25 |
| KMXFER | Origin/Destination Pairs Requiring Transfer | 8000 |
| KMTR | Number of Uniform Demand Trips Generated | 1000 |
| KMFAIL | Number of Failure/Recovery Cards | 10 |

TABLE 5-2. (1 of 6) SYSTEM CHARACTERISTICS FILE

```
**********************************************************************
*                    SYSTEM CHARACTERISTICS DATA                     *
*  FILE NAME: AGT.STRUC.SYSTEM                        TYPE: BINARY   *
**********************************************************************
--------------------------------------------------------------------------
SIZE (BYTES)  DESCRIPTION                                       VARIABLE
--------------------------------------------------------------------------
RUN-TIME MAXIMA:
  THE FOLLOWING VARIABLE NAMES DEFINE THE ACTUAL NUMBER
  OF ENTITIES USED IN A GIVEN RUN.  THESE ARE READ IN AT
  RUN-TIME AND MUST BE LESS THAN OR EQUAL TO THEIR
  COMPILE-TIME MAXIMA COUNTERPARTS.

 2          NUMBER OF STATION LINKS                             KNSL
 2          NUMBER OF VEHICLES ACTIVE IN SIMULATION RUN         KNV
 2          MAXIMUM FLEET SIZE                                  KNFLT
 2          NUMBER OF SIMULTANEOUS TRIP TRANSACTIONS            KNT
 2          NUMBER OF ROUTES                                    KNR
 2          ENTRIES IN PVRPTR = KNR+1                           KNR1
 2          ENTRIES IN CIRCUITOUS EMPTY ROUTE TABLE (PECRTE)    KNCRS
 2          ENTRIES IN EMPTY VEHICLE ANTICIPATED NEED LISTS     KNANT
                      (PANSTN,PANEED,PANCD)
 2          ENTRIES IN SCHEDULED SERVICE ROUTE LIST             KNRT
 2          ENTRIES IN USER'S ORDERED EMPTY VEHICLE PRIORITY    KNEVP
                      LIST OF WHERE TO PUT EMPTIES (PVEPR)
 2          ENTRIES IN USER'S ORDERED LIST OF WHERE TO SEARCH   KNSVP
                      FOR EMPTIES (PVSPR)
 2          MIN PATH ROUTE TABLES THERE ARE IN SIMULATION       KNLSLT
                      SIMULTANEOUSLY
 2          ENTRIES IN STATION LINK EVENT LIST (SLEVL)          KNSLE
 2          ENTRIES IN STATION LINK DOWNSTREAM SL LIST (SLDSL)  KNSLD
 2          ENTRIES IN STATION LINK UPSTREAM SL LIST (SLUSL)    KNSLU
 2          NUMBER OF FAILURE/RECOVERY CARDS PROCESSED          KNFAIL
 2          NUMBER OF LINKS IN FAILURE RESPONSE TOW PATH        KNTOW

TIME CONTROL VARIABLES:
  THE FOLLOWING VARIABLE NAMES DEFINE THE FUTURE EVENTS LIST
  ALLOCATION & USAGE REQUIREMENTS.

 4          CLOCK SCALE FACTOR (CLOCK UNITS/MINUTE)             CSIZE
 4          NUMBER OF ENTRIES ALLOWED IN ANY CLOCK TABLE        CLOOP
             INTERVAL
 4          INCREMENT IN TIME BETWEEN SUCCESSIVE CLOCK TABLE    CLSMAL
                    INTERVALS (CLOCK UNITS*10)
 4          NUMBER OF ENTRIES IN CLOCK TABLE                    CLSIZE

STATION LINK CHARACTERISTICS:
  THE FOLLOWING VARIABLE NAMES DEFINE THE CHARACTERISTICS OF
  THE STATION LINKS FOR EACH REQUIRED NETWORK STATION

 4*KMSL*    PENALTY FACTOR TO BE APPLIED TO LINK TRAVERSAL      SLPENT
   KMS
 4*KMSL     TRAVEL TIME ON STATION LINK, INCLUDING HEADWAY      SLTTIM
                    ZONE
 4*KMSL     TIME TO TRAVEL THE HEADWAY ZONE (VARIABLE TERM)     SLHTA
                      <TOTAL HEADWAY ZONE TRAVEL TIME =
                         SLHTA*(TRAIN LENGTH) + SLHTB >
 4*KMSL     TIME TO TRAVEL THE HEADWAY ZONE (CONSTANT TERM)     SLHTB
 4          TRAVEL TIME ADJUSTMENT FACTOR FOR VEHICLES NOT      SLBFAC
                   STOPPING AT ON-LINE STATION
 2*KMSL*    STATION LINK CAPACITY (#VEHICLES)                   SLCAP
   KMS
 2*KMSL*    INITIAL STATION LINK OCCUPANCY (# VEH IN STORAGE)   SLOCC
   KMS
```

## TABLE 5-2. (2 of 6) SYSTEM CHARACTERISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| 2*KMSL | STATION LINK GENERIC TYPE<br>SLTYPE — USER<br>1 — IR<br>2 — IQ<br>3 — D (THE DEBOARD & BOARD EVENTS CAN APPEAR ONLY ON THIS TYPE)<br>4 — OQ<br>5 — OR<br>6 — S<br>7 — IS<br>8 — SI<br>9 — DS<br>10 — SO | SLTYPE |
| 2*KMSL | POINTER TO STARTING ENTRY IN SLEVL FOR EACH SL | SLEVP |
| 2*KMSLE | STATION LINK EVENT LISTS<br>LISTS OF THE EVENTS FROM THE CANONICAL SL THAT ARE TO OCCUR ON THE LINK BEING DESCRIBED. THE STARTING ENTRY IN EACH SUBLIST IS POINTED TO BY SLEVP AND THE LAST ENTRY IN EACH SUBLIST IS 0. THE EVENTS MUST BE IN THE ORDER H/T/D/B/S/L/0. IN THE MODEL PROCESSOR THE EVENTS WILL BE REPRESENTED AS NUMBERS: (1,H) (2,T) (3,D) (4,B) (5,S) (6,L) (0,END OF EVENTS ON SL). THE STORE AND LAUNCH EVENTS MUST BE THE LAST EVENTS ON THE LINKS ON WHICH THEY APPEAR.<br>(SLEVL(SLEVP(I)-1)=0 ,I=2,KNSL)<br>(SLEVL(SLEVP(I))¬=0 ,I=1,KNSL)<br>(SLEVL(KMSLE)=0) | SLEVL |
| 2*KMSL | POINTER TO STARTING ENTRY IN SLUSL FOR EACH SL | SLUSP |
| 2*KMSLU | LIST OF UPSTREAM SL'S THAT FEED THIS SL<br>STARTING ENTRY IN EACH SUBLIST IS POINTED TO BY SLUSP AND THE LAST ENTRY IN EACH SUBLIST IS 0.<br>(SLUSL(SLUSP(I)-1)=0 ,I=2,KNSL)<br>(SLUSL(SLUSP(I))¬=0 ,I=1,KNSL)<br>(SLUSL(KMSLU)=0) | SLUSL |
| 2*KMSL | POINTER TO START ENTRY IN SLDSL FOR SL | SLDSP |
| 2*KMSLD | LIST OF DOWNSTREAM SL'S THAT THIS SL FEEDS<br>STARTING ENTRY IN EACH SUBLIST IS POINTED TO BY SLDSP AND THE LAST ENTRY IN EACH SUBLIST IS 0.<br>(SLDSL(SLDSP(I)-1)=0 ,I=2,KNSL)<br>(SLDSL(SLDSP(I))¬=0 ,I=1,KNSL)<br>(SLDSL(KMSLD)=0) | SLDSL |
| 2*KMSL | DIVERGE FN # (IF MORE THAN 1 DOWNSTREAM SL) (USER ASSIGNED TO COINCIDE WITH USER IMPLEMENTED CODE) | SLDIVC |
| 2*KMSL | PRIORITY/FIFO INDICATOR (DQ FROM UPSTREAM SLS) | SLPF |
| 2*KMSL*KMS | TIMEOUT/GROUP DEMAND RESPONSIVE STATION LINK DOCK TYPE | SLDTYP |
| 2*KMSL*KMS | TIMEOUT/GROUP DEMAND RESPONSIVE DOCK LINK PLATFORM ASSIGNMENT | SLPLAT |
| KMSL*KMS | STATION LINK AVAILABILITY | SLAVAL |

TABLE 5-2. (3 of 6) SYSTEM CHARACTERISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| GUIDEWAY LINK CHARACTERISTICS: THE FOLLOWING VARIABLE NAMES DEFINE THE CHARACTERISTICS OF THE GUIDEWAY LINKS DEFINED IN THE SIMULATED NETWORK | | |
| 4 | STANDARD DEVIATION OF VEHICLE SPEED ON GUIDEWAY | GLVSD |
| 4 | REACTION TIME FOR ACCELERATING TO LINE SPEED FROM STOP | GLRTIM |
| 4*KMDLY1* KMDLY2 | MERGE DELAY TABLE FOR HEURISTIC MERGE POLICY. EACH ENTRY CONTAINS A TIME DELAY | GLMDLY |
| 2*KML | INITIAL LINK OCCUPANCY FOR VEHICLE INITIALIZATION | GLOCC |
| VEHICLE CHARACTERISTICS: THE FOLLOWING VARIABLE NAMES DEFINE THE CHARACTERISTICS OF THE VEHICLES USED IN THE SIMULATION | | |
| 4*KMFAIL | VEHICLE DEGRADATION FACTOR | VDFACT |
| 2 | VEHICLE LENGTH | VLEN |
| 2 | VEHICLE CAPACITY | VCAP |
| 2 | VEHICLE SEAT CAPACITY | VSEAT |
| 2 | VEHICLE HANDICAPPED CAPACITY | VHCAP |
| STATION CHARACTERISTICS: THE FOLLOWING VARIABLE NAMES DEFINE THE CHARACTERISTICS OF THE STATIONS DEFINED IN THE SIMULATED NETWORK | | |
| 4 | DEBOARD TIME PER DEBOARDING PASSENGER (INPUT BY USER IN SEC. & CONVERTED BY IP TO C.U.) | STDBA |
| 4 | ESTIMATED DWELL ADJUSTMENT FACTOR FOR NOMINAL TRAVEL TIME (INPUT BY USER IN SEC. & CONVERTED BY IP TO C.U.) | STDHFF |
| 4 | BOARD TIME PER BOARDING PASSENGER (INPUT BY USER IN SEC. & CONVERTED BY IP TO C.U.) | STBA |
| 4 | MINIMUM DOOR OPEN TIME (INPUT BY USER IN SEC. & CONVERTED BY IP TO C.U.) | SMNDBT |
| 4 | MAXIMUM BOARDING TIME LIMIT ASSUMING NO BOARDING BOARDING PASSENGERS. | SMXDBT |
| 4 | HANDICAPPED PASSENGER BOARD DOOR TIME | SHCBA |
| 4 | HANDICAPPED PASSENGER DEBOARD DOOR TIME | SHCDBA |
| 4 | HANDICAPPED PASSENGER BOARD SECURE TIME | SHCBB |
| 4 | HANDICAPPED PASSENGER DEBOARD RELEASE AND MOVE TO TO DOOR TIME | SHCDBB |
| 4 | TIMEOUT/GROUP DEMAND RESPONSIVE RIPPLE BERTH ADVANCEMENT TIME IF MOVING | STMOV1 |
| 4 | TIMEOUT/GROUP DEMAND RESPONSIVE RIPPLE BERTH ADVANCEMENT TIME IF STOPPED. | STMOV2 |
| 2*KMS | NUMBER OF THE STATION THAT ACTS AS THE REGIONAL CENTER TO WHICH THIS STATION SENDS EMPTIES | PSRCTO |
| 2*KMS | NUMBER OF THE STATION THAT ACTS AS THE REGIONAL CENTER FROM WHICH THIS STATION GETS EMPTIES | PSRCFM |
| 2*KMS | NUMBER OF THE EMPTY VEHICLE CIRCUITOUS ROUTE ONTO WHICH THIS STATION SENDS EMPTIES | PECRTN |
| 2*KMS | CAPACITY OF BOARDING QUEUE (# PASSENGERS) | SBQCAP |
| 2 | NUMBER OF THE SL ACTING AS THE INPUT RAMP | SLIR |
| 2 | NUMBER OF THE SL ACTING AS THE OUTPUT RAMP | SLOR |
| 2 | NUMBER OF THE SL DESIGNATED AS STORAGE | SLSTOR |
| 2 | STATION LINK TRAVEL TIME FROM LAUNCH TO EXIT | SEMTIM |
| 2 | NUMBER OF SLOTS FROM LAUNCH EVENT TO STATION EXIT | SEMSLT |

## TABLE 5-2. (4 of 6) SYSTEM CHARACTERISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| 2 | MAXIMUM BOARDING PASSENGERS LIMIT ASSUMING NO DEBOARDING PASSENGERS | SMXDBP |
| 2*KMS | TOTAL STATION CAPACITY | SNCAP1 |
| 2 | HANDICAPPED PASSENGER BOARD DOOR TIME ORDINARY PASSENGER EQUIVILENT COUNT | SHCPA |
| 2 | HANDICAPPED PASSENGER BOARD SECURE TIME ORDINARY PASSENGER EQUIVILENT COUNT | SHCPB |
| 2*KMS*4 | TIMEOUT/GROUP DEMAND RESPONSIVE MINIMUM INVENTORY GOAL FOR EACH DIRECTIONAL PLATFORM | SMNINV |
| KMS | STATION TYPE INDICATOR | STYPE |
| KMS | STATION MAINTENANCE BARN INDICATOR | SBARN |
| KMS | SWITCHBACK STATION INDICATOR | STNGFL |
| GENERAL SYSTEM CHARACTERISTICS: | | |
| 4 | WEIGHTING FACTOR FOR LINK NOMINAL TRAVEL TIME | PSTWT |
| 4 | WEIGHTING FACTOR FOR LINK UTILIZATION | PSUWT |
| 4 | WEIGHTING FACTOR FOR MERGE SCHEDULING DELAY | PMDWT |
| 4*KMANT | CUMULATIVE DISTRIBUTION FUNCTIONS OF ANTICIPATED NEED FOR EVM OPTION #3 | PANCD |
| 4 | MERGE RESERVATION TABLE WINDOW WIDTH | PMRGWW |
| 4 | TOTAL TIME COVERED BY MERGE RESERVATION TABLE | PMRGTT |
| 4*KMRT | CONTAINS THE TIME AT WHICH THE NEXT VEHICLE ON THIS ROUTE SHOULD LEAVE | PNXSLV |
| 4*KMRT | THE NUMBER OF VEHICLES REQUIRED FOR SCHEDULING FROM EACH STATION ON EACH DEFINED SCHEDULED ROUTE | PNVDIS |
| 4*KMR | DESIRED HEADWAY BETWEEN VEHICLES ON THE SAME ROUTE (SECONDS) (FOR SCHEDULED) | PRTEHW |
| 4 | TRANSFER WALK TIME SYSTEM-WIDE DEFAULT VALUE | PWLKTS |
| 4*KMS*KMS | TRANSFER WALK TIME PRIOR TO BOARDING QUEUE ENTRY | PWALKT |
| 4 | ALTERNATE STATION EGRESS TIME | PALTET |
| 4 | FIRST THRESHOLD FOR EXCESS TRAVEL TIME HISTOGRAM | PHIST1 |
| 4 | SECOND THRESHOLD FOR EXCESS TRAVEL TIME HISTOGRAM | PHIST2 |
| 2 | LONGITUDINAL CONTROL POLICY IN EFFECT | POLLC |
| 2 | DISPATCH POLICY IN EFFECT | POLDIS |
| 2 | VEHICLE POSITION REGULATION SCHEME IN EFFECT | POLVPR |
| 2 | THE SERVICE POLICY TO BE USED FOR THIS RUN | POLSER |
| 2 | ALGORITHM SELECTION FOR SPACING BETWEEN VEHICLES ON THE SAME SCHEDULED ROUTE (USED ONLY WHEN POLSER=3=SCHEDULED) | PVSPAC |
| 2*KMRT | SCHEDULED ROUTE LIST - A CONCATENTATION OF ALL THE SCHEDULED ROUTES; HEAD ENTRY OF EACH ROUTE POINTED TO BY PVRPTR | PVRLST |
| 2*KMR1 | POINTER TO STARTING ENTRY (HOME STATION) FOR EACH ROUTE IN PVRLST:<br>I < KNR+1 ===> ENTRY IN PVRLST OF FIRST STN STOP ON ROUTE I<br>I = KNR+1 ===> (LENGTH OF PVRLST)+1 | PVRPTR |
| 2 | BERTH ASSIGNMENT POLICY | PBERTH |
| 2*KMR | NUMBER OF VEHICLES ON EACH ROUTE | PNVRTE |
| 2*KMR | TRAIN LENGTH ON EACH ROUTE | PRTLEN |
| 2*KMCRS | CONCATENATION OF LISTS OF STATION NUMBERS THAT FORM ROUTES ON WHICH TO CIRCULATE EMPTY VEHICLES | PECRTE |
| 2*KMCR | POINTER TO STARTING ENTRY IN PECRTE<br>PECPTR(I) = ENTRY IN PECRTE OF FIRST STN STOP ON ROUTE I | PECPTR |
| 2 | PATH SELECTION METHOD | PSMETH |
| 2 | PATH SELECTION TYPE | PSTYPE |
| 2 | PATH SELECTION ALGORITHM INDICATOR | PSALGM |
| 2*KMEVP | ORDERED LIST OF WHERE TO PUT EMPTY | PVEPR |
| 2*KMSVP | ORDERED LIST OF WHERE TO LOOK FOR EMPTY | PVSPR |
| 2*KMSL | LIST OF SL'S WHERE EMPTY IS TO BE LOOKED FOR | PSLIST |

TABLE 5-2. (5 of 6) SYSTEM CHARACTERISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| 2*KMS1 | POINTER TO START OF LIST OF STATIONS TO RECEIVE EMPTIES FROM THIS STATION BASED ON ANTICIPATED NEED | PANPTR |
| 2*KMANT | ANTICIPATED NEED FOR EMPTY VEHICLE MANAGEMENT OPTION 4 | PANEED |
| 2*KMANT | STATION LIST CORRESPONDING TO PANEED | PANSTN |
| 2*KMS*KMS | TRANSFER STATION TABLE | PTSTN |
| 2*KMS*KMS | STATION TO WALK TO BEFORE REBOARDING A VEHICLE WHEN TRANSFERRING | PWSTN |
| 2 | MAXIMUM TRAIN LENGTH | PMXTRL |
| 2 | TRIP SPLIT SIZE; ANY TRIP OF SIZE N WILL BE SPLIT INTO: K TRIPS OF SIZE (PTSPLT) AND 1 TRIP OF SIZE L | PTSPLT |
| 2 | THE LENGTH OF A TIME INTERVAL SUCH THAT WHEN THE ETA OF A VEHICLE IN THE ARRIVAL LIST OF A STATION IS GREATER THAN THE CURRENT CLOCK PLUS THIS INTERVAL, THE VEHICLE WILL NOT BE CONSIDERED | PEVALM |
| 2 | MERGE POLICY INDICATOR | POLMRG |
| 2*KMS*KMS | STATION ROUTE ASSIGNMENT TABLE: ELEMENT I,J IDENTIFIES ROUTE TO USE FOR TRAVEL FROM I TO J | PRASGN |
| 2*KMR | POINTER TO STARTING ENTRY IN LIST OF ROUTES COMPRISING A GROUP OF ROUTES THAT CAN SERVE A TRIP | PRGPTR |
| 2*KMGT | LIST OF LISTS OF ROUTES COMPRISING GROUPS OF ROUTES THAT CAN SERVE A TRIP | PRGLST |
| 2*KMS*KMS | NOMINAL TRAVEL TIME TABLE (STATION TO STATION) | PNOMTM |
| 2 | MAXIMUM VEHICLE MANEUVER AT MERGE IN SLOTS | PARMAX |
| 2 | MAXIMUM VEHICLE MANEUVER AT MERGE IN C.U. | PARTIM |
| 2 | VEHICLE ADVANCE MANEUVER INDICATOR | PADVNC |
| 2*KMM | NUMBER OF MERGE RESERVATIONS ALLOWED PER WINDOW | PNVMRG |
| 8 | LOCAL MERGE PRIORITY TABLE | PMRGL |
| 2 | TIME ALLOWABLE TO ACCOMPLISH STATIC ENTRAINMENT | PNTRLM |
| 2*KMS*KMS | TIMEOUT/GROUP DEMAND RESPONSIVE PLATFORM TYPE USED BY ORIGIN/DESTINATION TRIPS | SPLTOD |
| 2 | TIMEOUT/GROUP DEMAND RESPONSIVE MAXIMUM PASSENGER WAIT TIME PRIOR TO VEHICLE REQUEST | PMXTIM |
| 2 | TIMEOUT/GROUP DEMAND RESPONSIVE MINIMUM PASSENGER GROUP SIZE PRIOR TO VEHICLE REQUEST | PMNGRP |
| 2*KMR | NUMBER OF TRANSITION VEHICLES FOR SCHEDULED SERVICE ACTIVE FLEET SIZE MANAGEMENT | PNTVEH |
| 2*KMR | MAINTENANCE BARN ASSIGNED TO EACH ROUTE (CALCULATED BY INPUT PROCESSOR) | PRBARN |
| 2*KMR | LAST STATION STOP ON ROUTE BEFORE VEHICLE SENT TO BARN FOR SCHEDULED SERVICE ACTIVE FLEET SIZE CHANGE (CALCULATED BY INPUT PROCESSOR) | PRSTOP |
| 2*KMR | POINTER TO FIRST STATION STOP (IN PVRLST) ON ROUTE AFTER RELAUNCH FROM BARN FOR SCHEDULED SERVICE SERVICE ACTIVE FLEET SIZE MANAGEMENT (CALCULATED BY INPUT PROCESSOR) | PRNTRY |
| 2 | TIMEOUT/GROUP DEMAND RESPONSIVE STATION OVERFULL PROTECTION ADEQUATE SPACE FOR VEHICLE STATION STATION ENTRY | PSADSP |
| 1 | TRANSFER POLICY SELECTION | PXFER |
| 1 | VEHICLE DIVERSION FROM GUIDEWAY TO BOARD | PVDVRT |
| 1 | RESERVATIONS REQUIRED INDICATOR | PVRES |
| 1 | IN STATION ENTRAINMENT INDICATOR | PENTS |
| 1 | DYNAMIC ENTRAINMENT/DETRAINMENT INDICATOR | PENTD |
| 1 | DEMAND STOP INDICATOR | POLDMS |
| 1 | VEHICLE BUMPING INDICATOR (DEMAND RESPONSIVE SERVICE) | PVBMP |

TABLE 5-2. (6 of 6) SYSTEM CHARACTERISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| 1 | SINGLE STOP INDICATOR FOR DEMAND RESPONSIVE MULTI-PARTY SERVICE | PSDIRT |
| 1 | DEBOARD/BOARD TIME LIMIT CHECK OVERRIDE | HCBDLO |
| 1 | HANDICAPPED PASSENGER PROCESSING INDICATOR | HCPASS |
| CONTROL VARIABLES: THE FOLLOWING VARIABLES DEFINE THE CONTROL OPTIONS FOR THE SIMULATION RUN | | |
| 4*KMFAIL | TOW VEHICLE SPEED DEGRADATION FACTOR | AFMDEG |
| 4 | INITIALLY CONTAINS THE USER SEED TO THE RANDOM NUMBER GENERATOR; THIS STARTING MUST BE AN ODD INTEGER >= 3 | AKSEED |
| 4 | SAMPLING INTERVAL (0===>NO SAMPLING) (INPUT BY USER IN SEC. & CONVERTED BY IP TO C.U.) | ASAMPI |
| 4 | PERIODIC CHECKPOINT INTERVAL (0===>NO CHECKPT) (INPUT BY USER IN SEC. & CONVERTED BY IP TO C.U.) | ACKPTI |
| 4 | TIME TO BEGIN READING TRIP ARRIVAL DATA | ATREAD |
| 40*KMFAIL | FAILURE DATA | AFAIL |
| 2 | RECORD VEHICLE ARRIVALS AT STATION N | AVLOG |
| 2 | NUMBER OF SAMPLING INTERVALS PER INTERMEDIATE SAMPLING REPORT | ASTATU |
| 2 | PERIODIC COMPUTATION INTERVAL FOR VELOCITY ADJUSTMENTS IN APPLYING HEURISTIC MERGE POLICY | APCOMI |
| 2*KML* KMFAIL | TOW VEHICLE PATH LINK SEQUENCE | AFMTOW |
| 2*KMR* KMFAIL | OTHER VEHICLE RESPONSE CHOICE (BY ROUTE) | AFMRSP |
| 1 | COMPLETED TRIP LOG RECORDING INDICATOR | ATRPLG |
| KMFLAG | AUXILIARY OUTPUT CONTROL FLAGS | AFLAG |
| 1 | LINK STATISTICS LOG INDICATOR | ALLOG |
| 1 | STATION STATISTICS LOG INDICATOR | ALLOG |

TABLE 5-3. NETWORK DEFINITION DATA

```
**********************************************************************
*              NETWORK CHARACTERISTICS DATA                          *
*  FILE NAME: AGT.STRUC.NETWORK                        TYPE: BINARY  *
**********************************************************************
-----------------------------------------------------------------------
SIZE (BYTES)  DESCRIPTION                                     VARIABLE
-----------------------------------------------------------------------

 4*KML       GUIDEWAY LINK VELOCITY                             GLVEL
 4*KML       GUIDEWAY LINK HEADWAY                              GLHDWY
 4*KML       GUIDEWAY LINK TRAVEL TIME                          GLTTIM
 4*KML       GUIDEWAY LINK LENGTH IN METERS (AN INTEGER         GLLEN
                    MULTIPLE OF BLOCK LENGTH IF FIXED
                    BLOCK REGULATION
 4*KML*KMS   MINIMUM PATH ROUTING TABLE                         PLSLT
   *KMLSLT
 2           NUMBER OF GUIDEWAY LINKS                           KNL
 2           NUMBER OF NETWORK STATIONS                         KNS
 2           NUMBER OF NETWORK STATIONS+1                       KNS1
 2           NUMBER OF GUIDEWAY MERGES                          KNM
 2*KML       DIVERGE ID AT EXIT OF GUIDEWAY LINK                GLDVGN
 2*KML       MERGE ID AT ENTRY OF GUIDEWAY LINK                 GLMRGN
 4*KML       UPSTREAM GUIDEWAY LINK POINTERS                    GLENTY
 2*KMM       GUIDEWAY MERGE OUPTUT LINKS                        GMENTY
 2*KML       STATION ID AT EXIT OF GUIDEWAY LINK                GLSTN
 2           NUMBER OF CURRENTLY ACTIVE MINIMUM PATH ROUTING    PLSLTN
                     TABLE
 2*KMALT     ALTERNATE ROUTE TABLE                              PALRTE
 2*KMS*KMS   SUCCESSOR STATION TABLE: ELEMENT I,J IS            PSSTN
                     NEXT STATION ON MINIMUM PATH FROM I TO J
 2*KMS       GUIDEWAY LINK ID AT STATION ENTRY                  SILINK
 2*KMS       GUIDEWAY LINK ID AT STATION EXIT                   SELINK
 2*KMS       NEXT DOWNSTREAM STATION FROM ANY STATION           SNXDSS
 2*KML       GUIDEWAY LINK CAPACITY                             GLCAP
 2           FIXED HEADWAY LENGTH IN METERS                     GLBLK
 2*KML       COMPETING LINK ID ENTERING NETWORK MERGE           GLMRGC

THE FOLLOWING PARAMETERS ARE USED BY THE INPUT PROCESSOR FOR
  PLANNING TRANSIT SERVICE AND PROCESSING FAILURE/REPAIR
  REQUESTS USING A PREVIOUSLY PROCESSED NETWORK

 4*KMS*KMS   STATION TO STATION TRAVEL TIME TABLE               NODTIM
 4           NOMINAL GUIDEWAY LINK SPEED METERS/SEC             PSPEED
 2           NUMBER OF NETWORK NODES                            KNN
 2*KML       ID OF NODE AT END OF LINK                          NLDEST
 2*KML       ID OF NODE AT BEGINNING OF LINK                    NLORIG
 2*KMNID     MAPS USER NODE ID'S TO A CONTIGUOUS SET OF         NMAPUS
                  NODE ID'S BEGINNING WITH 1
 2*KMN       MAPS INTERNAL NODE ID'S TO USER NODE ID'S          NMAPSU
 4*KMN       DEFINES LINK(S) LEAVING EACH NODE                  NLLIST
 4*KMN       DEFINES LINK(S) ENTERING EACH NODE                 NDLLST
 2*KMN       NODE LIST IN WHICH STATION NODES ARE ASSIGNED      NSLIST
                  UNIQUE ID'S
 2           MINIMUM PATH COMPUTATION METHOD SELECTION          NCSEL
```

TABLE 5-4. TRIP ARRIVAL FILE

```
1   **************************************************************************
1   *              TRIP ARRIVAL FILE FORMAT                                   *
1   *  FILE NAME: AGT.STRUC.DEMAND                        TYPE: EBCDIC        *
1   **************************************************************************
1   ---------------------------------------------------------------------------
1   SIZE (BYTES)  DESCRIPTION                                     FORMAT
1   ---------------------------------------------------------------------------
2    10         ARRIVAL TIME (SECS)                                F10.3
3     4         ORIGIN STATION                                     I4
3     4         DESTINATION STATION                                I4
3     4         NUMBER OF PASSENGERS                               I4
3     4         HANDICAPPED TRIP FLAG                              I4
3     8         UNUSED
```

## TABLE 5-5. (1 of 2) ASYNCHRONOUS RUN TIME FILE

```
***********************************************************************
*             ASYNCHRONOUS RUN TIME DATA                              *
*  FILE NAME: AGT.STRUC.RNTIM                       TYPE: EBCDIC      *
***********************************************************************
------------------------------------------------------------------------
SIZE (BYTES)  DESCRIPTION                                       FORMAT
------------------------------------------------------------------------
HEADER RECORDS
  6         TIME FOR PROCESSING REQUEST                          F6.0
  7         REQUEST NAME (TYPE)  AS FOLLOWS:                     A7
              CKPT    - DEMAND CHECKPOINT
              REST    - PERFORM SYSTEM RESTART
              STOP    - TERMINATE SIMULATION ACTIVITY
              EOD     - END OF ASYNCHRONOUS DATA DEFINITIONS
              TEXT    - COMMENT TO BE REPRODUCED ON SYSTEM
                        OUTPUT DEVICE
              PARAM   - PARAMETER DEFINITION
              OPTION  - OPTION SELECTION
              SELECT  - POLICY SELECTION
              DATA    - DATA INITIALIZATION OR SPECIFICATION
              FAIL    - ASYNCHRONOUS GUIDEWAY OR STATION
                        FAILURE OCCURRENCE
              AFSM    - ACTIVE FLEET SIZE MANAGEMENT
              FLAG    - AUXILIARY OUTPUT REQUEST
              COMMENT- ANY SET OF USER DEFINED COMMENTS
              INDEX   - USER DEFINED RUN DESCRIPTION COPIED TO INDEX FILE
 59         UNUSED
  8         BLANK OR SERIALIZATION                               A8

FOLLOWER RECORDS (DATA INITIALIZATION)
------------------------------------------------------------------------
SIZE (BYTES)  DESCRIPTION                                       FORMAT
----------- ------------------------------------------------------------
   THE FOLLOWING ASYNCHRONOUS REQUEST TYPES REQUIRE FORMATTED INPUT
   SPECIFICATIONS FOLLOWING HEADER DESIGNATIONS:
     TEXT - 1 FOLLOWER
 72         ANY USER DESIRED COMMENT                             A72
  8         BLANK OR SERIALIZATION                               A8
     COMMENT - A SET OF FOLLOWERS TERMINATED BY AN END CARD
 72         ANY USER DESIRED COMMENT                             A72
  8         BLANK OR SERIALIZATION                               A8
 72         . . . . . . . . . . . .                              A72
  8         BLANK OR SERIALIZATION                               A8
  3         END                                                  A3
 69         UNUSED
  8         BLANK OR SERIALIZATION                               A8

     INDEX - A SET OF FOLLOWERS TERMINATED BY AN END CARD
 72         ANY USER DESIRED DESCRIPTIVE INFORMATION             A72
  8         BLANK OR SERIALIZATION                               A8
 72         . . . . . . . . . . . .                              A72
  8         BLANK OR SERIALIZATION                               A8
  3         END                                                  A3
 69         UNUSED
  8         BLANK OR SERIALIZATION                               A8
```

TABLE 5-5. (2 of 2) ASYNCHRONOUS RUN TIME FILE

| SIZE (BYTES) | DESCRIPTION | FORMAT |
|---|---|---|
| | PARAM,OPTION,SELECT,DATA,AFSM,FAIL - N SETS OF VARIABLE DEFINITION DATA | |
| | VARIABLE, ARRAY OR PARAMETER SELECTION: | |
| 7 | SIMULATION PARAMETER NAME | A7 |
| 2 | THE NUMBER OF DATA ITEMS DEFINED ON EACH DATA SPECIFICATION CARD | A2 |
| 6 | FORMAT OF DATA ITEMS ON FOLLOWING SPECIFICATIONS | A6 |
| 5 | LOWER INDEX RANGE OF FIRST SUBSCRIPT | I5 |
| 5 | UPPER INDEX RANGE OF FIRST SUBSCRIPT | I5 |
| 5 | LOWER INDEX RANGE OF SECOND SUBSCRIPT | I5 |
| 5 | UPPER INDEX RANGE OF SECOND SUBSCRIPT | I5 |
| 5 | LOWER INDEX RANGE OF THIRD SUBSCRIPT | I5 |
| 5 | UPPER INDEX RANGE OF THIRD SUBSCRIPT | I5 |
| 5 | LOWER INDEX RANGE OF FOURTH SUBSCRIPT | I5 |
| 5 | UPPER INDEX RANGE OF FOURTH SUBSCRIPT | I5 |
| 17 | UNUSED | |
| 8 | BLANK OR SERIALIZATION | A8 |
| | VARIABLE, ARRAY OR PARAMETER DEFINITION: | |
| 2 | REPETITION FACTOR | I2 |
| 70 | N FIELDS OF SPECIFIED FORMAT | |
| 8 | BLANK OR SERIALIZATION | A8 |
| | AFTER LAST VARIABLE: | |
| 3 | END | A3 |
| 69 | UNUSED | |
| 8 | BLANK OR SERIALIZATION | A8 |
| | FLAG - AUXILIARY OUTPUT REQUEST INDICATORS: | |
| 4 | FLAG ID 1 | I4 |
| . | . . . | . |
| . | . . . | . |
| . | . . . | . |
| 4 | FLAG ID N | I4 |

TABLE 5-6. (1 of 2) INDEX FILE WRITTEN BY INPUT PROCESSOR

```
***********************************************************************
*              INDEX FILE FORMAT                                      *
*  FILE NAME:  AGT.INDEX.DENAME                      TYPE: EBCDIC     *
*              NAME=USER DEFINED                                      *
***********************************************************************
-----------------------------------------------------------------------
SIZE (BYTES)  DESCRIPTION                                      FORMAT
-----------------------------------------------------------------------
     INPUT PROCESSOR MODULE IDENTIFIER
  7            DESM-IP                                          A7
  2            UNUSED
 22            AGT.AGT.LOAD(MEMBER)                             A22
  8            UNUSED
  2            MONTH                                            I2
  1            /                                                A1
  2            DAY                                              I2
  1            /                                                A1
  2            YEAR                                             I2
  2            UNUSED
  2            HOUR                                             I2
  1            :                                                A1
  2            MINUTE                                           I2
 26            UNUSED

     DESCRIPTION ENTERED VIA INDEX SPECIFICATION TO IP:
 72            RUN DESCRIPTION TEXT 1                           A72
  8            UNUSED
 72            RUN DESCRIPTION TEXT 2                           A72
  8            UNUSED
 72            RUN DESCRIPTION TEXT 3                           A72
  8            UNUSED
 72             .    .    .     .    .                          A72
  8            UNUSED
 72            RUN DESCRIPTION TEXT N                           A72
  8            UNUSED

     INPUT FILE TYPE IDENTIFIER
 14            UNUSED
 11            INPUT FILES                                      A11
 55            UNUSED

     FILE DEFINITIONS (ONE RECORD/INPUT FILE):
 26            AGT.IANDD.SYSTEM(MEMBER)                         A26
 54            UNUSED

 25            AGT.IANDD.RNTIM(MEMBER)                          A25
 55            UNUSED

 27            AGT.IANDD.NETWORK(MEMBER)                        A27
 53            UNUSED

 27            AGT.STRUC.NETWORK(MEMBER)                        A27
 53            UNUSED

 26            AGT.IANDD.DEMAND(MEMBER)                         A26
 54            UNUSED
```

## TABLE 5-6. (2 of 2) INDEX FILE WRITTEN BY INPUT PROCESSOR

| SIZE (BYTES) | DESCRIPTION | FORMAT |
|---|---|---|
| | OUTPUT FILE TYPE IDENTIFIER | |
| 14 | UNUSED | |
| 12 | OUTPUT FILES | A12 |
| 54 | UNUSED | |
| | FILE DEFINITIONS (ONE RECORD/OUTPUT FILE): | |
| 26 | AGT.STRUC.SYSTEM(MEMBER) | A26 |
| 54 | UNUSED | |
| 25 | AGT.STRUC.RNTIM(MEMBER) | A25 |
| 55 | UNUSED | |
| 27 | AGT.STRUC.NETWORK(MEMBER) | A27 |
| 53 | UNUSED | |
| 26 | AGT.STRUC.DEMAND(MEMBER) | A26 |
| 54 | UNUSED | |
| 23 | AGT.IANDD.SSP(MEMBER) | A23 |
| 57 | UNUSED | |

TABLE 5-7. STATION TO STATION PERFORMANCE FILE

```
*************************************************************************
*            STATION TO STATION PERFORMANCE FILE FORMAT                 *
*  FILE NAME: AGT.IANDD.SSP(NAME)                   TYPE: EBCDIC        *
*             NAME=USER DEFINED                                         *
*************************************************************************
```

| SIZE (BYTES) | DESCRIPTION | FORMAT |
|---|---|---|
| 5*KNS*KNS | NOMINAL TRAVEL TIME BETWEEN ALL STATION PAIRS | 14I5 |
| 10 | BLANK AFTER EACH GROUP OF 14 VALUES | |

### 5.1.2 Model Processor

The DESM MP creates the following output files:

1. Checkpoint
2. Vehicle Log
3. Raw Statistics
4. Completed Trips Log
5. Link Statistics Log
6. Station Statistics Log

The checkpoint file contains a copy of all simulation status data recorded on either a demand or periodic basis. These data can be used to restart execution of the MP at a specified point in time at which a checkpoint is available. The vehicle log is used to record all vehicle arrivals at a particular network station in a format compatible for input to the DSM. The raw statistics file is written on a periodic basis to provide simulation status and historical statistics for processing and summarization by the OP. The completed trips log provides a detailed supplement to the raw statistics containing origination and termination data related to individual trips completing during a given simulation run. The link and station statistics logs provide data needed to drive the dynamic display processors on the Tektronix 4081. In addition, the MP updates the run index file to reflect the data files input and output as the result of current model execution. The contents of these files are summarized in Tables 5-8 through 5-14.

### 5.1.3 Output Processor

The DESM OP can produce a performance summary file for subsequent use in comparative run analysis via the Comparison Output Processor. The OP updates the run index to reflect the raw statistics input and, if requested, the performance summary file generated. The contents of these files are summarized in Tables 5-15 and 5-16.

## 5.2 STANDARD REPORTS

The content of the preformatted reports generated by the DESM are described in this section. Sample reports and the derivations of the measures included in the reports are included in Appendix B.

### 5.2.1 Input Processor Reports

As each of the major IP functions is completed, the IP writes a report summarizing the parameters related to the function. The following is a list of the reports provided:

TABLE 5-8. (1 of 2) CHECKPOINT FILE

```
*************************************************************************
*                    CHECKPOINT FORMAT                                  *
*    FILE NAME: AGT.CHKPT.DESM                         TYPE: BINARY    *
*************************************************************************
```

| SIZE (BYTES) | DESCRIPTION |
|---|---|
| SYSTEM CHARACTERISTICS | |
| 34 | RUN TIME MAXIMUM VALUES |
| 16 | TIME CONTROL PARAMETERS |
| 4+24*KMSL+13*(KMSL*KMS)+ 2*KMSLE+2*KMSLU+2*KMSLD | STATION LINK DATA |
| 8+2*KML+4*(KMDLY1*KMDLY2) | GUIDEWAY LINK DATA |
| 8+4*KMFAIL | VEHICLE DATA |
| 60+21*KMS | STATION DATA |
| 98+8*KMANT+10*KMRT+20*KMR+ 2*KMS+12*(KMS*KMS)+2*KMCR+ 2*KMEVP+2*KMSVP+2*KMSL+ 2*KMCRS+2*KMGT+2*KMM | GENERAL SYSTEM CHARACTERISTICS |
| 25+KMFLAG+44*KMFAIL+ 2*(KML*KMFAIL)+ 2*(KMR*KMFAIL) | CONTROL OPTIONS |
| NETWORK CHARACTERISTICS | |
| 12+30*KML+2*KMM+6*KMS+ 2*KMALT+4*(KML*KMS*KMLSLT)+ 2*(KMS*KMS) | NETWORK DEFINITION |
| MODEL DATA | |
| 147+2*KMCLTA | TIME CONTROL VARIABLES |
| 31*KML+KMS | GUIDEWAY LINK VARIABLES |
| 32+12*KMM+(KMM+2)*KMWMAX+ 2*(KMS*KMS)+4*KMR | POLICY VARIABLES |
| 10*(KMSL*KMS) | STATION LINK VARIABLES |
| 20+64*KMS | STATION VARIABLES |
| 200+2*KMSLDS+4*KMFAIL | SYSTEM VARIABLES |
| 37*KMT | TRIP VARIABLES |
| 137*KMV | VEHICLE VARIABLES |
| 10+14*KMX | TRANSACTION VARIABLES |
| 11+4*KMMSGS | MESSAGE CONTROL VARIABLES |

TABLE 5-8. (2 of 2) CHECKPOINT FILE

| SIZE (BYTES) | DESCRIPTION |
|---|---|
| MODEL STATISTICS | |
| 102 | SYSTEM WIDE STATISTICS |
| 336 | SYSTEM WIDE STATISTICS - STATIONS |
| 82 | SYSTEM WIDE STATISTICS - GUIDEWAY |
| 60 | SYSTEM WIDE STATISTICS - ROUTES |
| 188*KMS | STATION STATISTICS |
| 60*KMSL*KMS | STATION LINK STATISTICS |
| 70*KML | GUIDEWAY LINK STATISTICS |
| 136*KMR+12*(KML*KMR) | ROUTE STATISTICS |
| 30*KMV | VEHICLE STATISTICS |
| 32*KMT | TRIP STATISTICS |

TABLE 5-9. VEHICLE ARRIVAL LOG

```
***********************************************************************
*               VEHICLE ARRIVAL LOG FORMAT                            *
*    FILE NAME: AGT.STRUC.DEMANDVG                      TYPE: EBCDIC  *
***********************************************************************
```

| SIZE (BYTES) | DESCRIPTION | FORMAT |
|---|---|---|
| VEHICLE RECORD | | |
| 10 | ARRIVAL TIME (SECS) | F10.3 |
| 3 | DESTINATION STATION | I3 |
| 2 | DIVERT TO STORAGE | I2 |
| 2 | SINK=1=GUIDEWAY | I2 |
| 2 | ROUTE ID | I2 |
| 3 | NUMBER OF PASSENGERS | I3 |
| 2 | TRAIN LENGTH | I2 |
| 3 | NUMBER OF TRIPS (FOLLOWER RECORDS) | I3 |
| 13 | UNUSED | |

TRIP FOLLOWER RECORDS

| SIZE (BYTES) | DESCRIPTION | FORMAT |
|---|---|---|
| 3 | ORIGIN STATION | I3 |
| 3 | DESTINATION STATION | I3 |
| 3 | NUMBER OF PASSENGERS | I3 |
| 31 | UNUSED | |

## TABLE 5-10. LINK STATISTICS LOG

```
**********************************************************************
*                LINK STATISTICS LOG FORMAT                          *
*    FILE NAME: AGT.STRUC.DESMLLOG                     TYPE: EBCDIC  *
**********************************************************************
```

| SIZE (BYTES) | DESCRIPTION | FORMAT |
|---|---|---|
| HEADER RECORDS | | |
| 2 | CHARACTER STRING 'HE' | A2 |
| 3 | CURRENT NUMBER OF LINKS | I3 |
| 12 | CURRENT TIME IN SECONDS | F12.3 |
| FOLLOWER RECORDS | | |
| 5*KML | GUIDEWAY LINK CAPACITY (FOR EACH LINK) | 14I5 |
| 7*KML | GUIDEWAY LINK OCCUPANCY (FOR EACH LINK) | 10F7.2 |

## TABLE 5-11. STATION STATISTICS LOG

```
**********************************************************************
*              STATION STATISTICS LOG FORMAT                         *
*   FILE NAME: AGT.STRUC.DESMSLOG                     TYPE: EBCDIC   *
**********************************************************************
```

| SIZE (BYTES) | DESCRIPTION | FORMAT |
|---|---|---|
| HEADER RECORDS | | |
| 2 | CHARACTER STRING 'HE' | A2 |
| 3 | CURRENT NUMBER OF STATIONS | I3 |
| 12 | CURRENT TIME IN SECONDS | F12.3 |
| FOLLOWER RECORDS | | |
| 5*KMS | STATION BOARDING QUEUE CAPACITY (BY STATION) | 14I5 |
| 10*KMS | AVERAGE NUMBER PASSENGERS IN STATION BOARDING QUEUE (BY STATION) | 7F10.2 |

TABLE 5-12. (1 of 8) RAW STATISTICS FILE

```
**********************************************************************
*             RAW STATISTICS FILE FORMAT                             *
*   FILE NAME: AGT.STATS.DESM                       TYPE: BINARY     *
**********************************************************************
-----------------------------------------------------------------------
SIZE (BYTES)  DESCRIPTION                                    VARIABLE
------------ ----------------------------------------------------------
SYSTEM CONSTANTS

 4           NUMBER OF GUIDEWAY LINKS                         NUML
 4           NUMBER OF STATIONS                               NUMS
 4           NUMBER OF STATION LINKS                          NUMSL
 4           NUMBER OF ROUTES                                 NUMR
 4           CLOCK UNITS/MINUTE                               CSIZE
 4           SAMPLING INTERVAL (C.U.)                         CSAMPL
 2           VEHICLE CAPACITY                                 VCAP
 4           HISTOGRAM CUTOFF VALUES                          PHIST1
                                                              PHIST2
 4           NUMBER OF ROUTE GROUPS                           NUMRG
 2           VEHICLE SEAT CAPACITY                            VSEAT
 2           FLEET SIZE                                       KNFLT
 2*KMSL      SL GENERIC TYPE DESIGNATIONS                     KTYPE

               --SYSTEM WIDE STATISTICS--

    SYSTEM DATA

 4           TIME INTEGRAL OF REVENUE SERVICE (OCCUPIED) VEHS ZTTIRV
 4           TIME INTEGRAL OF DEADHEADING (EMPTY) VEHS        ZTTIDH
 4           TIME INTEGRAL OF VEHICLES IN STORAGE             ZTTISV
 4           TIME INTEGRAL OF TRIPS ON VEHICLES               ZTTITV
 4           TIME INTEGRAL OF PASSENGERS ON VEHICLES          ZPTITV
 4           TIME INTEGRAL SEATED PASSENGERS ON VEHICLES      ZTSEAT
 4           SUM TIMES DEMAND TO COMPLETION FOR COMPLETED     ZTSDCS
               TRIPS
 4           MAXIMUM RATIO NOMINAL TT / ACTUAL TT             ZTXRTT
 4           MINIMUM RATIO NOMINAL TT / ACTUAL TT             ZTMRTT
 4           SUM OF PASSENGER DISTANCE TRAVELLED ON GUIDEWAY  ZDTDST
 4           SUM OF VEHICLE DEADHEADING (EMPTY) DISTANCE      ZDDDST
 4           SUM OF REVENUE SERVICE (OCCUPIED) DISTANCE       ZDRDST
 4           TOTAL VEHICLE DISTANCE TRAVELLED (GDWY & STN)    ZTVDST
 4           UNDEFINED
 4           UNDEFINED
 2           CURRENT NUMBER OF TRIPS ON VEHICLES              ZNTOV
 2           CURRENT NUMBER OF PASSENGERS ON VEHICLES         ZNPOV
 2           CURRENT NUMBER OF VEHS IN REV SERVICE (OCCUPIED) ZNVRVS
 2           CURRENT NUMBER OF VEHS DEADHEADNG (EMPTY)        ZNVDEH
 2           CURRENT NUMBER OF VEHICLES IN STORAGE            ZNVSTO
               COMPLETED TRIPS HISTOGRAM VALUES
 2           # TRIPS EXCESS TRAVEL TT <= PHIST1               ZNTT1
 2           # TRIPS EXCESS TRAVEL TT >PHIST1 & <=PHIST2      ZNTT2
 2           # TRIPS EXCESS TRAVEL TIME >PHIST2               ZNTT3

               COMPLETED PASSENGER HISTOGRAM VALUES
 2           # PASSENGERS EXCESS TRAVEL TT <= PHIST1          ZNPP1
 2           # PASSENGERS EXCESS TRAVEL TT >PHIST1 & <=PHIST2 ZNPP2
 2           # PASSENGERS EXCESS TRAVEL TIME >PHIST2          ZNPP3

 2           TOTAL NUMBER OF VEHS ENTERING REVENUE STATE      ZTVRVS
 2           TOTAL NUMBER OF VEHS ENTERING EMPTY STATE        ZTVDEH
 2           TOTAL NUMBER OF VEHS ENTERING STORAGE STATE      ZTVSTO
 2           TOTAL PASSENGERS SERVED EXCLUDING ARRIVING XFERS ZTPSVD
 2           MAXIMUM FLEET SIZE                               ZTXFLT
 2           MINIMUM FLEET SIZE                               ZTMFLT
 2           CURRENT NUMBER OF SEATED PASSENGERS ON VEHICLES  ZNPSV
 2           MINIMUM VEHICLE LOAD FACTOR                      ZTMVLF
 2           MAXIMUM VEHICLE LOAD FACTOR                      ZTXVLF
```

TABLE 5-12. (2 of 8) RAW STATISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| 2 | UNDEFINED | |
| | STATION-WIDE STATISTICS | |
| 4 | TIME INTEGRAL OF VEHICLES IN STATIONS | ZTVTIS |
| 4 | TIME INTEGRAL OF TRIPS WAITING IN STATIONS | ZTTTIS |
| 4 | TIME INTEGRAL OF PASSENGERS WAITING IN STATIONS | ZTPTIS |
| 4 | TIME INTEGRAL OF VEHICLES ON INPUT RAMPS | ZVTIIR |
| 4 | TIME INTEGRAL OF VEHICLES ON INPUT QUEUES | ZVTIIQ |
| 4 | TIME INTEGRAL OF VEHICLES AT DOCKS | ZVTIDK |
| 4 | TIME INTEGRAL OF VEHICLES ON OUTPUT QUEUES | ZVTIOQ |
| 4 | TIME INTEGRAL OF VEHICLES ON OUTPUT RAMPS | ZVTIOR |
| 4 | TIME INTEGRAL OF VEHICLES IN STATION STORAGES | ZVTIST |
| 4 | TIME INTEGRAL OF VEHICLES QUEUED ON INPUT RAMPS | ZQTIIR |
| 4 | TIME INTEGRAL OF VEHICLES QUEUED ON INPUT QUEUES | ZQTIIQ |
| 4 | TIME INTEGRAL OF VEHICLES QUEUED AT DOCKS | ZQTIDK |
| 4 | TIME INTEGRAL OF VEHICLES QUEUED ON OUTPUT QUEUES | ZQTIOQ |
| 4 | TIME INTEGRAL OF VEHICLES QUEUED ON OUTPUT RAMPS | ZQTIOR |
| 4 | TIME INTEGRAL OF VEHICLES QUEUED IN STORAGES | ZQTIST |
| 4 | SUM OF TIMES IN STATIONS FOR VEHICLES LEAVING | ZTVSTS |
| 4 | MAXIMUM TIME IN A STATION FOR VEHICLES LEAVING | ZTVMTS |
| 4 | SUM OF TIME FOR MERGE CONFLICT RESOLUTIONS | ZTVTMC |
| 4 | MAX DELAY DEMAND TO DISPATCH FOR ANY TRIP GROUP | ZTTDXS |
| 4 | SUM DELAY DEMAND TO DISPATCH FOR TRIPS | ZTTSDS |
| 4 | MAX DELAY DEMAND TO DISPATCH ANY PASSENGER | ZTPDXS |
| 4 | SUM DELAY DEMAND TO DISPATCH FOR PASSENGERS | ZTPSDS |
| 4 | SUM ACTUAL TRAVEL TIME FOR COMPLETED TRIPS | ZTTSAS |
| 4 | SUM OF NOMINAL TRAVEL TIME FOR COMPLETED TRIPS | ZTTSNS |
| 4 | MAXIMUM EXCESS TRAVEL TIME FOR COMPLETED TRIPS | ZTMETS |
| 4 | SUM ACTUAL TRAVEL TIME FOR COALESCED TRIPS | ZTTCAS |
| 4 | SUM OF NOMINAL TRAVEL TIME FOR COALESCED TRIPS | ZTTCNS |
| 4 | TOTAL Q DELAY VEHICLES LEAVING INPUT RAMP | ZDTIR |
| 4 | TOTAL Q DELAY VEHICLES LEAVING INPUT QUEUES | ZDTIQ |
| 4 | TOTAL Q DELAY VEHICLES LEAVING DOCKS | ZDTDK |
| 4 | TOTAL Q DELAY VEHICLES LEAVING OUTPUT QUEUES | ZDTOQ |
| 4 | TOTAL Q DELAY VEHICLES LEAVING OUTPUT RAMPS | ZDTOR |
| 4 | TOTAL Q DELAY VEHICLES LEAVING STORAGE AREAS | ZDTST |
| 4 | MAXIMUM EXCESS TRAVEL TIME FOR COALESCED TRIPS | ZTMCES |
| 4 | MINIMUM TIME DEMAND TO DISPATCH PASSENGERS | ZTPDMS |
| 4 | MINIMUM TIME IN ANY STATION FOR VEHICLES LEAVING | ZTVNTS |
| 4 | MAXIMUM TIME FOR VEHICLES LEAVING IR QUEUE | ZXDIR |
| 4 | MAXIMUM TIME FOR VEHICLES LEAVING IQ QUEUE | ZXDIQ |
| 4 | MAXIMUM TIME FOR VEHICLES LEAVING DK QUEUE | ZXDDK |
| 4 | MAXIMUM TIME FOR VEHICLES LEAVING OQ QUEUE | ZXDOQ |
| 4 | MAXIMUM TIME FOR VEHICLES LEAVING OR QUEUE | ZXDOR |
| 4 | MAXIMUM TIME FOR VEHICLES LEAVING ST QUEUE | ZXDST |
| 4 | TOTAL DISTANCE TRAVELLED FOR COMPLETED TRIPS | ZTTDST |
| 4 | TOTAL STATION DISTANCE FOR VEHICLES LEAVING | ZTSDST |
| 4 | TOTAL NUMBER OF INTERMDIATE PASSENGER STOPS | ZTSTOP |
| 4 | UNDEFINED | |
| 2 | TOTAL # OF VEHICLES ENTERING STATIONS | ZTVNES |
| 2 | TOTAL # OF VEHICLES LEAVING STATIONS | ZTVNLS |
| 2 | CURRENT NUMBER OF VEHICLES IN STATIONS | ZTVNIS |
| 2 | TOTAL # OF VEHICLES DENIED TIMELY ENTRY | ZTVALT |
| 2 | TOTAL # OF VEHICLES LAUNCHED FROM STATIONS | ZTVNLN |
| 2 | MAXIMUM NUMBER OF VEHICLES IN ANY STATION | ZTVMNS |
| 2 | CURRENT # OF TRIPS IN STATIONS INCLUDING THOSE ON VEHICLES IN STATION | ZTTNIS |
| 2 | TOTAL # OF TRIPS REJECTED (BOARDING Q CAPACITY) | ZTTNRS |
| 2 | TOTAL # OF TRIPS DISPATCHED FROM STATIONS | ZTTNDS |
| 2 | CURRENT # PASSENGERS IN STATIONS INCLUDING THOSE ON VEHICLES IN STATION | ZTPNIS |

TABLE 5-12. (3 of 8) RAW STATISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| 2 | TOTAL # OF PASSENGERS REJECTED (BOARDING Q CAPACITY) | ZTPNRS |
| 2 | TOTAL # OF PASSENGERS DISPATCHED FROM STATIONS - EXCLUDING TRANSFERS | ZTPNDS |
| 2 | TOTAL # OF UNSATISFIED EMPTY REQUESTS | ZTVREQ |
| 2 | TOTAL # OF EMPTIES DISPATCH ON CIRCUITOUS ROUTES | ZTVEDC |
| 2 | TOTAL # OF EMPTIES DISPATCHED TO LOCAL STORAGES | ZTVELS |
| 2 | TOTAL # OF EMPTIES DISPATCHD TO REGIONAL CENTERS | ZTVERC |
| 2 | TOTAL # OF EMPTIES DISPATCHED BASED ON ANTICIPA-TED NEED (NOT CONSIDERING CURRENT DISTRIBUTION) | ZTVEAN |
| 2 | TOTAL # OF EMPTIES DISPATCHED BASED ON ANTICIPA-TED NEED (CONSIDERING CURRENT DISTRIBUTION) | ZTVENB |
| 2 | TOTAL # OF EMPTIES DISPATCHED OUTSTANDING REQS | ZTVEDR |
| 2 | TOTAL NUMBER OF EMPTIES DISPATCHED | ZTVED |
| 2 | TOTAL # OF TRIPS ENTERING STATIONS INCLUDING TRANSFERS & REJECTIONS FOR CAPACITY | ZTTNES |
| 2 | TOTAL # OF TRIPS SERVED IN STATIONS | ZTTNLS |
| 2 | TOTAL # OF PASSENGERS SERVED IN STATIONS | ZTPNLS |
| 2 | TOTAL # OF PASSENGERS ENTERING STATIONS IN-CLUDING TRANSFERS & THOSE REJECTED FOR CAPACITY | ZTPNES |
| 2 | TOTAL # OF TRIPS COMPLETED AT STATIONS | ZTTNCS |
| 2 | TOTAL # OF PASSENGERS COMPLETED AT STATIONS | ZTPNCS |
| 2 | TOTAL # OF COALESCED TRIPS COMPLETED AT STATIONS | ZTTCNC |
| 2 | TOTAL NUMBER OF ARRIVING TRANSFERS AT STATIONS | ZTTSXS |
| 2 | MAXIMUM NUMBER OF TRANSFERS FOR ANY COMPLETED TRIP | ZTTMXS |
| 2 | TOTAL # OF TRIPS ARRIVING AT STATIONS & ENTERING BOARDING QUEUE INCLUDING TRANSFERS | ZTNTAR |
| 2 | TOTAL # OF PASSENGERS ARRIVING AT STATIONS & ENTERING BOARDING QUEUE INCLUDING TRANSFERS | ZTNPAR |
| 2 | CURRENT NUMBER OF TRIPS WAITING AT STATIONS | ZTNTWT |
| 2 | MAX NUMBER OF TRIPS WAITING IN ALL STATIONS | ZTXTWT |
| 2 | CURRENT NUMBER PASSENGERS WAITING IN STATIONS | ZTNPWT |
| 2 | MAX NUMBER OF PASSENGER WAITING IN ALL STATIONS | ZTXPWT |
| 2 | TOTAL # OF SPLIT TRIPS CREATED (SUBGROUPS) | ZTTNSS |
| 2 | TOTAL # OF COMPLETED TRIP SUBGROUPS AT STATIONS | ZTTNGS |
| 2 | TOTAL # OF ENTRAINED VEHICLES LEAVING STATIONS | ZTVNNS |
| 2 | MAXIMUM NUMBER OF VEHICLES ON INPUT RAMPS | ZMOIR |
| 2 | MAXIMUM NUMBER OF VEHICLES ON INPUT QUEUES | ZMOIQ |
| 2 | MAXIMUM NUMBER OF VEHICLES AT DOCKS | ZMODK |
| 2 | MAXIMUM NUMBER OF VEHICLES ON OUTPUT QUEUES | ZMOOQ |
| 2 | MAXIMUM NUMBER OF VEHICLES ON OUTPUT RAMPS | ZMOOR |
| 2 | MAXIMUM NUMBER OF VEHICLES IN STORAGE AREAS | ZMOST |
| 2 | MAXIMUM NUMBER OF VEHICLES QUEUED ON INPUT RAMPS | ZMQIR |
| 2 | MAXIMUM NUMBER OF VEHICLES QUEUED ON INPUT QUEUES | ZMQIQ |
| 2 | MAXIMUM NUMBER OF VEHICLES QUEUED AT DOCKS | ZMQDK |
| 2 | MAXIMUM NUMBER OF VEHICLES QUEUED ON OUTPUT QUEUES | ZMQOQ |
| 2 | MAXIMUM NUMBER OF VEHICLES QUEUED ON OUTPUT RAMPS | ZMQOR |
| 2 | MAXIMUM NUMBER OF VEHICLES QUEUED IN STORAGE | ZMQST |
| 2 | TOTAL NUMBER VEHICLES LEAVING INPUT RAMP | ZNQIR |
| 2 | TOTAL NUMBER VEHICLES LEAVING INPUT QUEUES | ZNQIQ |
| 2 | TOTAL NUMBER VEHICLES LEAVING DOCKS | ZNQDK |
| 2 | TOTAL NUMBER VEHICLES LEAVING OUTPUT QUEUES | ZNQOQ |
| 2 | TOTAL NUMBER VEHICLES LEAVING OUTPUT RAMPS | ZNQOR |
| 2 | TOTAL NUMBER VEHICLES LEAVING STORAGE AREAS | ZNQST |
| 2 | TOTAL NUMBER VEHICLES ENTERING INPUT RAMP | ZNEIR |
| 2 | TOTAL NUMBER VEHICLES ENTERING INPUT QUEUES | ZNEIQ |
| 2 | TOTAL NUMBER VEHICLES ENTERING DOCKS | ZNEDK |
| 2 | TOTAL NUMBER VEHICLES ENTERING OUTPUT QUEUES | ZNEOQ |
| 2 | TOTAL NUMBER VEHICLES ENTERING OUTPUT RAMPS | ZNEOR |

TABLE 5-12. (4 of 8) RAW STATISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| 2 | TOTAL NUMBER VEHICLES ENTERING STORAGE AREAS | ZNEST |
| 2 | TOTAL NUMBER EMPTIES REQUESTED NON-LOCAL STORE | ZTVRNT |
| 2 | TOTAL NUMBER EMPTIES REQUESTED LOCAL STORE | ZTVRLS |
| 2 | TOTAL NUMBER OF TRANSFERS COMPLETED TRIPS | ZTTTXS |
| 2 | TOTAL NUMBER OF PASSENGER TRANSFERS FOR COMPLETED TRIPS (# XFERS X # PASSENGERS) | ZTTPXS |
| 2 | MINIMUM NUMBER OF PASSENGERS WAITING IN STATIONS | ZTMPWT |
| 2 | MINIMUM NUMBER VEHICLES QUEUED INPUT RAMPS | ZTMQIR |
| 2 | MINIMUM NUMBER VEHICLES QUEUED INPUT QUEUES | ZTMQIQ |
| 2 | MINIMUM NUMBER VEHICLES QUEUED DOCK AREAS | ZTMQDK |
| 2 | MINIMUM NUMBER VEHICLES QUEUED OUTPUT QUEUES | ZTMQOQ |
| 2 | MINIMUM NUMBER VEHICLES QUEUED OUTPUT RAMPS | ZTMQOR |
| 2 | MINIMUM NUMBER VEHICLES QUEUED STORAGE AREAS | ZTMQST |
| 2 | TOTAL # OF COMPLETED PASSENGER HAVING XFERRED AT LEAST ONCE | ZTXFER |
| 2 | UNDEFINED | |
| 2 | UNDEFINED | |
| | GUIDEWAY LINK STATISTICS | |
| 4 | MAX AVERAGE QUEUE DELAY/VEH FOR ANY LINK | ZTQDV |
| 4 | MAX AVERAGE QUEUE DELAY/QUEUED VEH FOR ANY LINK | ZTQDQV |
| 4 | SUM OF GUIDEWAY LINK HEADWAY TIMES | GTHDWY |
| 4 | TIME INTEGRAL OF VEHICLE OCCUPANCY ON GUIDEWAY | ZTTIOL |
| 4 | TIME INTEGRAL OF VEHICLE Q OCCUPANCY ON GUIDEWAY | ZTTIQL |
| 4 | TIME INTEGRAL PASSENGERS ON GUIDEWAY | ZTTIPL |
| 4 | SUM OF COMPLETED LINK TRAVEL TIMES ON GUIDEWAY | ZTTSCL |
| 4 | SUM OF COMPLETED LINK DISTANCES ON GUIDEWAY | ZTDSCL |
| 4 | UNDEFINED | |
| 4 | UNDEFINED | |
| 4 | UNDEFINED | |
| 2 | CURRENT NUMBER OF VEHICLES OCCUPYING GUIDEWAY | ZTVNOL |
| 2 | CURRENT NUMBER OF VEHICLES QUEUED ON GUIDEWAY | ZTVNQL |
| 2 | MAXIMUM TIME OF VEHICLE OCCUPANCY FOR VEHICLES CURRENTLY QUEUED ON ANY GUIDEWAY LINK | ZTMTQL |
| 2 | MAXIMUM NUMBER OF VEHICLES ON THE GUIDEWAY | ZTMNOL |
| 2 | TOTAL # OF VEHICLES ENTERING ALL GUIDEWAY LINKS | ZTNEL |
| 2 | TOTAL # OF VEHICLES LEAVING ALL GUIDEWAY LINKS | ZTNLL |
| 2 | TOTAL # OF VEHICLES ENTRAINED ON GUIDEWAY LINKS | ZTNVEL |
| 2 | TOTAL # OF VEHICLES DETRAINED ON GUIDEWAY LINKS | ZTNVDL |
| 2 | MAXIMUM NUMBER OF VEHICLES QUEUED ON ANY LINK | ZTMNQL |
| 2 | TOTAL # OF VEHICLES LEAVING GUIDEWAY LINK QUEUES | ZTNLQL |
| 2 | MAXIMUM TIME DELAY FOR VEHICLES LEAVING ANY Q | ZTMDQL |
| 2 | SUM OF DELAY FOR VEHS LEAVING GUIDEWAY QUEUES | ZTSDQL |
| 2 | TOTAL GUIDEWAY CAPACITY | GTCAP |
| 2 | MINIMUM NUMBER VEHICLES OCCUPYING ANY LINK | ZTMXOL |
| 2 | MAXIMUM NUMBER PASSENGERS ON ANY LINK | ZTGXPL |
| 2 | MINIMUM NUMBER PASSENGERS ON ANY LINK | ZTGMPL |
| 2 | TOTAL NUMBER OF PASSENGERS ON GUIDEWAY LINKS | ZTGNPL |
| 2 | UNDEFINED | |
| 2 | UNDEFINED | |
| | ROUTE STATISTICS | |
| 4 | TIME INTEGRAL OF TRIPS ON ALL ROUTES | ZTTSTI |
| 4 | TIME INTEGRAL OF PASSENGERS ON ALL ROUTES | ZTPSTI |
| 4 | MAXIMUM SCHEDULE DEVIATION FOR ANY ROUTE | ZTVMDV |
| 4 | SUM SCHEDULE DEVIATION FOR ALL ROUTES | ZTVTDV |
| 4 | SUM INTERDISPATCH TIME FOR ALL ROUTES | ZTTIDT |
| 4 | MAXIMUM INTERDISPATCH TIME FOR ANY ROUTE | ZTXIDT |
| 4 | MINIMUM INTERDISPATCH TIME FOR ANY ROUTE | ZTMIDT |
| 4 | MINIMUM SCHEDULE DEVIATION FOR ANY ROUTE | ZTVXDV |
| 4 | UNDEFINED | |

TABLE 5-12. (5 of 8) RAW STATISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| 4 | UNDEFINED | |
| 4 | UNDEFINED | |
| 2 | TOTAL # OF TRIPS SERVED ON ROUTES | ZTTSER |
| 2 | TOTAL # OF PASSENGERS SERVED ON ROUTES | ZTPSER |
| 2 | CURRENT NUMBER OF TRIPS TRAVELLING ALL ROUTES | ZTTNO |
| 2 | CURRENT NUMBER OF PASSENGERS TRAVELLING ROUTES | ZTPNO |
| 2 | TOTAL # OF VEHICLES DISPATCHED ON ALL ROUTES | ZTVDIS |
| 2 | UNDEFINED | |
| 2 | UNDEFINED | |
| 2 | UNDEFINED | |
| | --STATION-WIDE STATISTICS-- | |
| | (ONE RECORD/STATION) | |
| 4 | AVERAGE NUMBER OF VEHICLES IN STATION | ZSVANS |
| 4 | AVERAGE TIME OF VEHICLES IN STATION | ZSVATS |
| 4 | TIME INTEGRAL OF VEHICLES IN STATION | ZSVTIS |
| 4 | TIME INTEGRAL OF TRIPS WAITING IN STATION | ZSTTIS |
| 4 | TIME INTEGRAL OF PASSENGERS WAITING IN STATION | ZSPTIS |
| 4 | SUM OF TIMES FOR VEHICLES LEAVING STATION | ZSVSTS |
| 4 | MAXIMUM TIME IN STATION FOR VEHICLES LEAVING | ZSVMTS |
| 4 | SUM OF TIMES FOR MERGE CONFLICT RESOLUTION | ZSVTMC |
| 4 | MAX DELAY DEMAND TO DISPATCH FOR ANY TRIP GROUP ( = DELAY * # PASSENGERS) | ZSPDXS |
| 4 | SUM DELAY DEMAND TO DISPATCH FOR ALL TRIPS | ZSTSDS |
| 4 | MAX DELAY DEMAND TO DISPATCH FOR ANY PASSENGER ( = MAX DELAY TRIP GROUP/# PASS IN GROUP) | ZSTDXS |
| 4 | SUM DELAY DEMAND TO DISPATCH ALL PASSENGERS | ZSPSDS |
| 4 | SUM ACTUAL TRAVEL TIME FOR COMPLETED TRIPS | ZSTSAS |
| 4 | SUM OF NOMINAL TRAVEL TIME FOR COMPLETED TRIPS | ZSTSNS |
| 4 | MAX EXCESS TRAVEL TIME FOR ANY COMPLETED TRIP | ZSMETS |
| 4 | SUM ACTUAL TRAVEL TIME FOR ALL COALESCED TRIPS | ZSTCAS |
| 4 | SUM OF NOMINAL TRAVEL TIME FOR COALESCED TRIPS | ZSTCNS |
| 4 | MAXIMUM EXCESS TRAVEL TIME FOR A COALESCED TRIP | ZSMCES |
| 4 | MINIMUM TIME IN STATION FOR VEHICLES LEAVING | ZSVNTS |
| 4 | MINIMUM DELAY DEMAND TO DISPATCH FOR A PASSENGER | ZSPDMS |
| 4 | TOTAL DISTANCE TRAVELLED FOR ALL COMPLETING TRPS | ZSTDST |
| 4 | UNDEFINED | |
| 4 | UNDEFINED | |
| 4 | UNDEFINED | |
| 2 | TOTAL # OF VEHICLES ENTERING STATION | ZSVNES |
| 2 | TOTAL # OF VEHICLES LEAVING STATION | ZSVNLS |
| 2 | CURRENT NUMBER OF VEHICLES IN STATION | ZSVNIS |
| 2 | TOTAL # VEHICLES DENIED TIMELY ENTRY | ZSVALT |
| 2 | TOTAL # OF VEHICLES LAUNCHED FROM STATION | ZSVNLN |
| 2 | MAXIMUM NUMBER OF VEHICLES IN STATION | ZSVMNS |
| 2 | TOTAL # OF TRIPS IN STATION INCLUDING THOSE ON VEHICLES CURRENTLY IN STATION | ZSTNIS |
| 2 | TOTAL # OF TRIPS REJECTED (BOARDING Q CAPACITY) | ZSTNRS |
| 2 | TOTAL # OF TRIPS DISPATCHED FROM STATION | ZSTNDS |
| 2 | TOTAL # OF PASSENGERS IN STATION INCLUDING THOSE ON VEHICLES CURRENTLY IN STATION | ZSPNIS |
| 2 | TOTAL # OF PASSENGERS REJECTED (BOARDING Q CAPACITY) | ZSPNRS |
| 2 | TOTAL # OF PASSENGERS DISPATCHED FROM STATION | ZSPNDS |
| 2 | TOTAL # OF UNSATISFIED EMPTY REQUESTS | ZSVREQ |
| 2 | TOTAL # OF EMPTIES DISPATCH ON CIRCUITOUS ROUTES | ZSVEDC |
| 2 | TOTAL # OF EMPTIES DISPATCHED TO LOCAL STORAGE | ZSVELS |
| 2 | TOTAL # OF EMPTIES DISPATCHED TO REGIONAL CENTER | ZSVERC |
| 2 | TOTAL # OF EMPTIES DISPATCHED BASED ON ANTICIPATED NEED (NOT CONSIDERING CURRENT DISTRIBUTION) | ZSVEAN |
| 2 | TOTAL # OF EMPTIES DISPATCHED BASED ON ANTICIPATED NEED (CONSIDERING CURRENT DISTRIBUTION) | ZSVENB |

TABLE 5-12. (6 of 8) RAW STATISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| 2 | TOTAL # OF EMPTIES DISPATCHED FOR UNSATISFD REQS | ZSVEDR |
| 2 | TOTAL NUMBER OF EMPTIES DISPATCHED FROM STATION | ZSVED |
| 2 | TOTAL # OF TRIPS ENTERING STATION INCLUDING TRANSFERS & THOSE REJECTED FOR CAPACITY | ZSTNES |
| 2 | TOTAL # OF TRIPS SERVED IN STATION | ZSTNLS |
| 2 | TOTAL # OF PASSENGERS SERVED IN STATION | ZSPNLS |
| 2 | TOTAL # OF PASSSENGERS ENTERING STATION INCLU-DING TRANSFERS & THOSE REJECTED FOR CAPACITY | ZSPNES |
| 2 | TOTAL # OF TRIPS COMPLETED AT STATION | ZSTNCS |
| 2 | TOTAL # OF PASSENGERS COMPLETED AT STATION | ZSPNCS |
| 2 | TOTAL # OF COALESCED TRIPS COMPLETED AT STATION | ZSTCNC |
| 2 | TOTAL NUMBER OF ARRIVING TRANSFERS AT STATION | ZSTSXS |
| 2 | MAXIMUM NUMBER OF TRANSFERS FOR COMPLETED TRIPS | ZSTMXS |
| 2 | TOTAL # OF TRIPS ARRIVING & ENTERING BOARDING Q | ZSNTAR |
| 2 | TOTAL # OF PASSENGERS ARRIVING & ENTERING BOARD-ING QUEUE | ZSNPAR |
| 2 | CURRENT NUMBER OF TRIPS WAITING AT STATION | ZSNTWT |
| 2 | MAX NUMBER OF TRIPS WAITING AT STATION | ZSXTWT |
| 2 | CURRENT NUMBER OF PASSENGERS WAITING AT STATION | ZSNPWT |
| 2 | MAX NUMBER OF PASSENGER WAITING AT STATION | ZSXPWT |
| 2 | TOTAL # OF SPLIT TRIPS CREATED | ZSTNSS |
| 2 | TOTAL # OF COMPLETED TRIP SUBGROUPS | ZSTNGS |
| 2 | TOTAL # OF ENTRAINED VEHICLES LEAVING STATION | ZSVNNS |
| 2 | TOTAL # EMPTIES REQUESTED NON-LOCAL STORAGE | ZSVRNT |
| 2 | TOTAL # OF EMPTIES REQUESTED LOCAL STORAGE | ZSVRLS |
| 2 | TOTAL NUMBER OF TRANSFERS FOR COMPLETED TRIPS | ZSTTXS |
| 2 | TOTAL NUMBER PASSENGER XFERS COMPLETED TRIPS (= TOTAL XFERS FOR TRIPS X # PASSENGERS) | ZSTPXS |
| 2 | MINIMUM NUMBER PASSENGERS WAITING AT STATION | ZSMPWT |
| 2 | TOTAL # OF PASSENGERS ENTERING STATION FROM GDWY | ZSNPEG |
| 2 | TOTAL # OF PASSENGERS EXITING STATION TO GDWY | ZSNPLG |
| 2 | MINIMUM NUMBER OF VEHICLES IN STATION | ZSVXNS |
| | --STATION LINK STATISTICS-- (ONE RECORD/STATION LINK -- FOR EACH STATION) | |
| 4 | AVERAGE NUMBER OF VEHICLES OCCUPYING LINK | ZSVAN |
| 4 | AVERAGE TIME OF OCCUPANCY FOR VEHICLES LEAVING | ZSVAT |
| 4 | TIME INTEGRAL OF VEHICLE OCCUPANCY | ZSVTI |
| 4 | SUM OF TIME FOR VEHICLES OCCUPYING LINK | ZSVST |
| 4 | MAXIMUM TIME FOR ANY VEHICLE OCCUPYING LINK | ZSVMT |
| 2 | TOTAL # OF VEHICLES ENTERING LINK | ZSVNE |
| 2 | TOTAL # OF VEHICLES LEAVING THE LINK | ZSVNL |
| 2 | CURRENT NUMBER OF VEHICLES OCCUPYING LINK | ZSVNI |
| 2 | MAXIMUM NUMBER OF VEHICLES OCCUPYING LINK | ZSVMN |
| 2 | AVERAGE NUMBER OF VEHICLES OCCUPYING QUEUE | ZSVAN |
| 2 | AVERAGE TIME IN QUEUE FOR VEHICLES LEAVING | ZSVAT |
| 2 | TIME INTEGRAL OF VEHICLE QUEUE OCCUPANCY | ZSVTI |
| 2 | SUM OF QUEUE DELAY FOR VEHICLES LEAVING | ZSVST |
| 2 | MAXIMUM QUEUE DELAY FOR VEHICLES LEAVING | ZSVMT |
| 2 | TOTAL # OF VEHICLES ENTERING QUEUE | ZSVNE |
| 2 | TOTAL # OF VEHICLES LEAVING THE QUEUE | ZSVNL |
| 2 | CURRENT NUMBER OF VEHICLES OCCUPYING QUEUE | ZSVNI |
| 2 | MAXIMUM NUMBER OF VEHICLES OCCUPYING QUEUE | ZSVMN |
| 2 | MINIMUM NUMBER OCCUPYING LINK | ZSMXQ |
| 2 | MINIMUM NUMBER OCCUPYING LINK QUEUE | ZSMXQ |
| | --GUIDEWAY LINK STATISTICS-- (ONE RECORD/GUIDEWAY LINK) | |
| 4 | GUIDEWAY LINK HEADWAY | GLHDWY |
| 4 | TIME INTEGRAL OF VEHICLE OCCUPANCY | ZGTIOL |
| 4 | TIME INTEGRAL OF VEHICLE QUEUE OCCUPANCY | ZGTIQL |

TABLE 5-12. (7 of 8) RAW STATISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| 4 | TIME INTEGRAL PASSENGERS ON LINK | ZGTIPL |
| 4 | SUM OF COMPLETED LINK TRAVEL TIMES | ZGTSCL |
| 4 | SUM OF COMPLETED LINK DISTANCES | ZGDSCL |
| 4 | UNDEFINED | |
| 4 | UNDEFINED | |
| 4 | UNDEFINED | |
| 2 | CURRENT NUMBER OF VEHICLES OCCUPYING LINK | ZGVNOL |
| 2 | CURRENT NUMBER OF VEHICLES OCCUPYING QUEUE | ZGVNQL |
| 2 | MAXIMUM TIME OF OCCUPANCY FOR VEHICLES LEAVING | ZGMTQL |
| 2 | MAXIMUM NUMBER OF VEHICLES ON THE LINK | ZGMNOL |
| 2 | TOTAL # OF VEHICLES ENTERING THE LINK | ZGNEL |
| 2 | TOTAL # OF VEHICLES LEAVING THE LINK | ZGNLL |
| 2 | TOTAL # OF VEHICLES ENTRAINED ON LINK | ZGNVEL |
| 2 | TOTAL # OF VEHICLES DETRAINED ON LINK | ZGNVDL |
| 2 | MAXIMUM NUMBER OF VEHICLES QUEUED ON LINK | ZGMNQL |
| 2 | TOTAL # OF VEHICLES LEAVING QUEUE | ZGNLQL |
| 2 | MAXIMUM TIME DELAY FOR VEHICLES LEAVING QUEUE | ZGMDQL |
| 2 | SUM OF DELAY FOR VEHICLES LEAVING QUEUE | ZGSDQL |
| 2 | GUIDEWAY LINK STATUS | ZGSTAL |
| 2 | GUIDEWAY LINK CAPACITY | GLCAP |
| 2 | MINIMUM NUMBER OF VEHICLES OCCUPYING LINK | ZGMXOL |
| 2 | MAXIMUM NUMBER PASSENGERS ON LINK | ZGXPL |
| 2 | MINIMUM NUMBER PASSENGERS ON GUIDEWAY LINKS | ZGMPL |
| 2 | CURRENT NUMBER OF PASSENGER ON GUIDEWAY LINK | ZGNPL |
| 2 | UNDEFINED | |
| 2 | UNDEFINED | |
| | --ROUTE STATISTICS-- (ONE RECORD/ACTIVE ROUTE) | |
| 4 | TIME INTEGRAL OF TRIPS ON ROUTE | ZRTSTI |
| 4 | TIME INTEGRAL OF PASSENGERS ON ROUTE | ZRPSTI |
| 4 | TIME INTEGRAL VEHICLES IN SERVICE ON ROUTE | ZRTIVF |
| 4 | TIME INTEGRAL SEATED PASSENGERS ON ROUTE | ZRTISP |
| 4 | TIME INTEGRAL PASSENGERS WAITING ON ROUTE | ZRTIPW |
| 4 | MINIMUM SCHEDULE DEVIATION FOR ROUTE | ZRVXDV |
| 4 | SUM ACTUAL TRAVEL TIME COMPLETED TRIPS ON ROUTE | ZRTSAS |
| 4 | SUM NOMINAL TRAVEL TIME COMPLETED TRIPS ON ROUTE | ZRTSNS |
| 4 | MAXIMUM RATIO NOMINAL TT / ACTUAL TT | ZRXRTT |
| 4 | MINIMUM RATIO NOMINAL TT / ACTUAL TT | ZRMRTT |
| 4 | SUM VEHICLE TIMES ON GUIDEWAY | ZRGVST |
| 4 | SUM TIME IN STATIONS FOR VEHICLES LEAVING | ZRSVTS |
| 4 | SUM TIME PASSENGERS DEMAND TO DISPATCH | ZRPSDS |
| 4 | MAXIMUM PASSENGER TIME DEMAND TO DISPATCH | ZRPDXS |
| 4 | MINIMUM PASSENGER TIME DEMAND TO DISPATCH | ZRPDMS |
| 4 | MAXIMUM SCHEDULE DEVIATION FOR ROUTE | ZRVMDV |
| 4 | SUM SCHEDULE DEVIATION FOR ROUTE | ZRVTDV |
| 4 | SUM INTERDISPATCH TIME FOR ROUTE | ZRTIDT |
| 4 | MAXIMUM INTERDISPATCH TIME FOR ROUTE | ZRXIDT |
| 4 | MINIMUM INTERDISPATCH TIME FOR ROUTE | ZRMIDT |
| 4 | SUM VEHICLE DISTANCE ON GUIDEWAY | ZRGVSD |
| 4 | SUM PASSENGER DISTANCE TRAVELLED | ZRPDST |
| 4 | TOTAL DISTANCE TRAVELLED BY VEH LEAVING STNS | ZRSDST |
| 4 | UNDEFINED | |
| 4 | UNDEFINED | |
| 2 | TOTAL # OF TRIPS SERVED ON ROUTE | ZRTSER |
| 2 | NUMBER OF PASSENGERS SERVED ON ROUTE | ZRPSER |
| 2 | CURRENT NUMBER OF TRIPS TRAVELLING ROUTE | ZRTNO |
| 2 | CURRENT NUMBER OF PASSENGERS TRAVELLING ROUTE | ZRPNO |
| 2 | NUMBER OF VEHICLES DISPATCHED ON ROUTE | ZRVDIS |
| 2 | MAXIMUM FLEET SIZE | ZRXFLT |
| 2 | MINIMUM FLEET SIZE | ZRMFLT |
| 2 | TOTAL # OF ARRIVING TRANSFER PASSENGERS | ZRTSXS |

TABLE 5-12. (8 of 8) RAW STATISTICS FILE

| SIZE (BYTES) | DESCRIPTION | VARIABLE |
|---|---|---|
| 2 | TOTAL # OF ARRIVING PASSENGERS | ZRNPAR |
| 2 | TOTAL # OF COMPLETED PASSENGERS | ZRNPCS |
| 2 | TOTAL NUMBER OF PASSENGERS WAITING | ZRNPWT |
| 2 | MAXIMUM NUMBER OF PASSENGERS WAITING | ZRXPWT |
| 2 | MINIMUM NUMBER OF PASSENGERS WAITING | ZRMPWT |
| 2 | TOTAL NUMBER OF PASSENGERS DISPATCHED | ZRPNDS |
| 2 | CURRENT NUMBER OF SEATED PASSENGERS ON VEHICLES | ZRNPSV |
| 2 | CURRENT NUMBER OF VEHICLES ON ROUTE | ANVRTE |
| 2 | MINIMUM VEHICLE LOAD FACTOR | ZRMVLF |
| 2 | MAXIMUM VEHICLE LOAD FACTOR | ZRXVLF |
| | --LINK-ROUTE STATISTICS-- (ONE RECORD/ROUTE--FOR EACH LINK LINK 1, ROUTE 1 LINK 1, ROUTE 2 ETC.) | |
| 4 | TIME INTEGRAL VEHICLE OCCUPANCY GDWY LINK N, ROUTE M | ZRTIVL |
| 4 | TIME INTEGRAL PASSENGER OCCUPANCY GDWY LINK N ROUTE M | ZRTIPL |
| 2 | NUMBER OF VEHICLES ON GDWY LINK N, ROUTE M | ZRVNOL |
| 2 | NUMBER OF PASSENGERS ON GDWY LINK N, ROUTE M | ZRNPL |

TABLE 5-13. COMPLETED TRIPS LOG

```
***********************************************************************
*              COMPLETED TRIPS LOG FORMAT                             *
*   FILE NAME: AGT.STRUC.TRIPLOG                       TYPE: EBCDIC   *
***********************************************************************
```

| SIZE (BYTES) | DESCRIPTION | FORMAT |
|---|---|---|
| 10 | TERMINATION TIME (SECS) | F10.3 |
| 10 | ORIGINATION TIME (SECS) | F10.3 |
| 10 | TRIP DISPATCH TIME FROM ORIGIN STATION (SECS) | F10.3 |
| 10 | NOMINAL TRAVEL TIME (SECS) | F10.3 |
| 10 | ACTUAL TRAVEL TIME (SECS) | F10.3 |
| 3 | ORIGIN STATION | I3 |
| 3 | DESINATION STATION | I3 |
| 3 | NUMBER OF PASSENGERS | I3 |
| 7 | TRAVEL DISTANCE (METERS) | F7.3 |
| 2 | NUMBER OF TRANSFERS | I2 |
| 10 | TOTAL TRIP TRANSFER TIME (SECS) | F10.3 |
| 2 | UNUSED | |

TABLE 5-14. (1 of 2) INDEX FILE WRITTEN BY MODEL PROCESSOR

```
************************************************************************
*             MP INDEX FILE UPDATE FORMAT                              *
*  FILE NAME: AGT.INDEX.DENAME                       TYPE: EBCDIC      *
*             NAME=USER DEFINED                                        *
************************************************************************
-------------------------------------------------------------------------
SIZE (BYTES)  DESCRIPTION                                         FORMAT
-------------------------------------------------------------------------
     MODEL PROCESSOR MODULE IDENTIFIER
  7         DESM-MP                                                A7
  2         UNUSED
 22         AGT.AGT.LOAD(MEMBER)                                   A22
  8         UNUSED
  2         MONTH                                                  I2
  1         /                                                      A1
  2         DAY                                                    I2
  1         /                                                      A1
  2         YEAR                                                   I2
  2         UNUSED
  2         HOUR                                                   I2
  1         :                                                      A1
  2         MINUTE                                                 I2
 26         UNUSED

     DESCRIPTION ENTERED VIA INDEX SPECIFICATION TO MP:
 72         RUN DESCRIPTION TEXT 1                                 A72
  8         UNUSED
 72         RUN DESCRIPTION TEXT 2                                 A72
  8         UNUSED
 72         RUN DESCRIPTION TEXT 3                                 A72
  8         UNUSED
 72          .    .    .    .    .                                 A72
  8         UNUSED
 72         RUN DESCRIPTION TEXT N                                 A72
  8         UNUSED

     INPUT FILE TYPE IDENTIFIER
 14         UNUSED
 11         INPUT FILES                                            A11
 55         UNUSED

     FILE DEFINITIONS (ONE RECORD/INPUT FILE):
 24         AGT.CHKPT.DESM(MEMBER)                                 A24
 56         UNUSED

 26         AGT.STRUC.SYSTEM(MEMBER)                               A26
 54         UNUSED

 27         AGT.STRUC.NETWORK(MEMBER)                              A27
 53         UNUSED

 26         AGT.STRUC.DEMAND(MEMBER)                               A26
 54         UNUSED

 25         AGT.STRUC.RNTIM(MEMBER)                                A25
 55         UNUSED
```

TABLE 5-14. (2 of 2) INDEX FILE WRITTEN BY MODEL PROCESSOR

| SIZE (BYTES) | DESCRIPTION | FORMAT |
|---|---|---|
| | OUTPUT FILE TYPE IDENTIFIER | |
| 14 | UNUSED | |
| 12 | OUTPUT FILES | A12 |
| 54 | UNUSED | |
| | FILE DEFINITIONS (ONE RECORD/OUTPUT FILE): | |
| 24 | AGT.STATS.DESM(MEMBER) | A24 |
| 56 | UNUSED | |
| 24 | AGT.CHKPT.DESM(MEMBER) | A24 |
| 56 | UNUSED | |
| 27 | AGT.STRUC.TRIPLOG(MEMBER) | A27 |
| 53 | UNUSED | |
| 28 | AGT.STRUC.DEMANDVG(MEMBER) | A28 |
| 52 | UNUSED | |
| 28 | AGT.STRUC.DESMLLOG(MEMBER) | A28 |
| 52 | UNUSED | |
| 28 | AGT.STRUC.DESMSLOG(MEMBER) | A28 |
| 52 | UNUSED | |

TABLE 5-15. (1 of 3) PERFORMANCE SUMMARY FILE

```
*********************************************************************
*            PERFORMANCE SUMMARY FILE FORMAT                        *
*   FILE NAME: AGT.PERSUM.DESM                     TYPE: EBCDIC     *
*********************************************************************
-----------------------------------------------------------------------
SIZE (BYTES)  DESCRIPTION                                    FORMAT (1)
------------ ----------------------------------------------------------

RESOURCE UTILIZATION
  SYSTEM RELATED
 10          PERFORMANCE SUMMARY REQUEST INTERVAL (SECS.)         F10.3
 10          NUMBER OF VEHICLES REQUIRED (# VEHICLES AVAILABLE)   F10.3
 10          VEHICLE CAPACITY  (PASSENGERS)                       F10.3
 10          AVERAGE NUMBER OF PASSENGERS / VEHICLE               F10.3
 10          AVERAGE NUMBER OF PASSENGERS / REVENUE SERVICE       F10.3
                  VEHICLE
 10          MAXIMUM AVERAGE OF THE NUMBER OF PASSENGERS / REVENUE F10.3
                  SERVICE VEHICLE
 10          AVERAGE PROPORTION OF VEHICLES IN REVENUE SERVCE     F10.3
 10          AVERAGE PROPORTION OF VEHICLES DEADHEADING           F10.3
 10          AVERAGE PROPORTION OF VEHICLES IN STORAGE            F10.3
 10          PASSENGERS SERVED / VEHICLE HOUR                     F10.3

  LINK RELATED (AVERAGED ACROSS ALL LINKS)
 10          AVERAGE PROPORTION OF VEHICLES ON GUIDEWAY           F10.3
 10          AVERAGE DISTANCE TRAVELLED / VEHICLE  (KM/VEH)       F10.3
 10          TOTAL VEHICLE DISTANCE TRAVELLED / HOUR (KM/HR)      F10.3
 10          TOTAL VEHICLE REVENUE SERVICE DISTANCE / HOUR (KM/HR) F10.3
 10          TOTAL PASSENGER DISTANCE TRAVELLED / HOUR  (KM/HR)   F10.3
 10          NUMBER OF VEHICLES LEAVING GUIDEWAY LINKS / HOUR     F10.3
 10          MAXIMUM NUMBER OF VEHICLES LEAVING GUIDEWAY LINKS /  F10.3
                   HOUR
 10          TOTAL REVENUE SERVICE VEHICLE HOURS                  F10.3
 10          TOTAL DEADHEADING VEHICLE HOURS                      F10.3

  STATION RELATED (AVERAGED ACROSS ALL STATIONS)
 10          TOTAL NUMBER OF VEHICLES DISPATCHED                  F10.3
 10          AVERAGE NUMBER OF PASSENGERS WAITING / STATION       F10.3
 10          MAXIMUM NUMBER OF PASSENGERS WAITING IN STATIONS     F10.3

  ROUTE RELATED (AVERAGED ACROSS ALL ROUTES)
 10          AVERAGE NUMBER OF VEHICLES / ROUTE                   F10.3

PERFORMANCE
  SYSTEM RELATED
 10          AVERAGE DISTANCE / COMPLETED TRIP  (KM/TRP)          F10.3
 10          AVERAGE VEHICLE SPEED  (M/SEC)                       F10.3
 10          AVERAGE TRIP TRAVEL SPEED  (M/SEC)                   F10.3
 10          AVERAGE PASSENGER DISTANCE / VEHICLE HOUR  (KM/VHR)  F10.3
 10          AVERAGE PASSENGER DISTANCE / VEHICLE UNIT DISTANCE   F10.3

  LINK RELATED (AVERAGED ACROSS ALL LINKS)
 10          MAXIMUM NUMBER OF VEHICLES QUEUED ON GUIDEWAY        F10.3
 10          AVERAGE NUMBER OF VEHICLES QUEUED ON GUIDEWAY        F10.3
 10          AVERAGE QUEUE DELAY / QUEUED VEHICLE  (SEC/V)        F10.3
 10          AVERAGE QUEUE DELAY / VEHICLE  (SEC/V)               F10.3
 10          MAXIMUM QUEUE DELAY / QUEUED VEHICLE  (SEC)          F10.3
 10          MAXIMUM QUEUE DELAY / VEHICLE  (SEC)                 F10.3

    STATION RELATED (AVERAGED OVER ALL STATIONS)
 10          AVERAGE NUMBER OF VEHICLES QUEUED ON INPUT RAMPS     F10.3
 10          AVERAGE NUMBER OF VEHICLES QUEUED ON INPUT QUEUES    F10.3
```

TABLE 5-15. (2 of 3) PERFORMANCE SUMMARY FILE

| SIZE (BYTES) | DESCRIPTION | FORMAT |
|---|---|---|
| 10 | AVERAGE NUMBER OF VEHICLES QUEUED AT BERTHING AREAS | F10.3 |
| 10 | AVERAGE NUMBER OF VEHICLES QUEUED ON OUTPUT QUEUES | F10.3 |
| 10 | AVERAGE NUMBER OF VEHICLES QUEUED ON OUTPUT RAMPS | F10.3 |
| 10 | AVERAGE NUMBER OF VEHICLES QUEUED IN STORAGE AREAS | F10.3 |
| 10 | MAXIMUM NUMBER OF VEHICLES QUEUED ON INPUT RAMPS | F10.3 |
| 10 | MAXIMUM NUMBER OF VEHICLES QUEUED ON INPUT QUEUES | F10.3 |
| 10 | MAXIMUM NUMBER OF VEHICLES QUEUED AT BERTHING AREAS | F10.3 |
| 10 | MAXIMUM NUMBER OF VEHICLES QUEUED ON OUTPUT QUEUES | F10.3 |
| 10 | MAXIMUM NUMBER OF VEHICLES QUEUED ON OUTPUT RAMPS | F10.3 |
| 10 | MAXIMUM NUMBER OF VEHICLES QUEUED IN STORAGE AREAS | F10.3 |
| 10 | AVERAGE QUEUE DELAY ON INPUT RAMPS (SEC/V) | F10.3 |
| 10 | AVERAGE QUEUE DELAY ON INPUT QUEUES (SEC/V) | F10.3 |
| 10 | AVERAGE QUEUE DELAY AT BERTHING AREAS (SEC/V) | F10.3 |
| 10 | AVERAGE QUEUE DELAY ON OUTPUT QUEUES (SEC/V) | F10.3 |
| 10 | AVERAGE QUEUE DELAY ON OUTPUT RAMPS (SEC/V) | F10.3 |
| 10 | AVERAGE QUEUE DELAY IN STORAGE AREAS (SEC/V) | F10.3 |
| 10 | MAXIMUM QUEUE DELAY ON INPUT RAMPS (SEC) | F10.3 |
| 10 | MAXIMUM QUEUE DELAY ON INPUT QUEUES (SEC) | F10.3 |
| 10 | MAXIMUM QUEUE DELAY AT BERTHING AREAS (SEC) | F10.3 |
| 10 | MAXIMUM QUEUE DELAY ON OUTPUT QUEUES (SEC) | F10.3 |
| 10 | MAXIMUM QUEUE DELAY ON OUTPUT RAMPS (SEC) | F10.3 |
| 10 | MAXIMUM QUEUE DELAY IN STORAGE AREAS (SEC) | F10.3 |
| 10 | AVERAGE FLOW RATE FROM BERTHING AREA (V/HR) | F10.3 |
| 10 | PROPORTION OF VEHICLES DENIED TIMELY ENTRY | F10.3 |
| 10 | NUMBER OF EMPTIES REQUESTED FROM LOCAL STORAGE | F10.3 |
| 10 | NUMBER OF EMPTIES REQUESTED FROM ELSEWHERE IN NETWRK | F10.3 |
| 10 | AVERAGE STATION DELAY DUE TO MERGE CONFLICT RESOLU- TION (SEC/V) | F10.3 |
| ROUTE RELATED | | |
| 10 | AVERAGE SCHEDULE DEVIATION (SEC/V) | F10.3 |
| 10 | MAXIMUM SCHEDULE DEVIATION (SEC) | F10.3 |
| 10 | MINIMUM SCHEDULE DEVIATION (SEC) | F10.3 |
| 10 | AVERAGE INTER-DISPATCH TIME (SEC/V) | F10.3 |
| 10 | MAXIMUM INTER-DISPATCH TIME (SEC) | F10.3 |
| 10 | MINIMUM INTER-DISPATCH TIME (SEC) | F10.3 |
| LEVEL OF SERVICE | | |
| 10 | TOTAL NUMBER OF ARRIVING PASSENGERS | F10.3 |
| 10 | TOTAL NUMBER OF PASSENGERS SERVED | F10.3 |
| 10 | TOTAL NUMBER OF PASSENGERS COMPLETING TRIPS | F10.3 |
| 10 | AVERAGE PASSENGER DELAY DEMAND TO DISPATCH (SEC/P) | F10.3 |
| 10 | MAXIMUM PASSENGER DELAY DEMAND TO DISPATCH (SEC) | F10.3 |
| 10 | AVERAGE ACTUAL TRAVEL TIME / COMPLETED TRIP (SEC/T) | F10.3 |
| 10 | AVERAGE EXCESS TRAVEL TIME / COMPLETED TRIP (SEC/T) | F10.3 |
| 10 | MAXIMUM EXCESS TRAVEL TIME / COMPLETED TRIP (SEC) | F10.3 |
| 10 | NUMBER OF COMPLETED PASSENGERS WITH EXCESS TRAVEL TIME <= THRESHOLD 1 | F10.3 |
| 10 | NUMBER OF COMPLETED PASSENGERS WITH EXCESS TRAVEL TIME > THRESHOLD 1 AND <= THRESHOLD 2 | F10.3 |
| 10 | NUMBER OF COMPLETED PASSENGERS WITH EXCESS TRAVEL TIME > THRESHOLD 2 | F10.3 |
| 10 | NUMBER OF COMPLETED TRIPS WITH EXCESS TRAVEL TIME <= THRESHOLD 1 | F10.3 |
| 10 | NUMBER OF COMPLETED TRIPS WITH EXCESS TRAVEL TIME > THRESHOLD 1 AND <= THRESHOLD 2 | F10.3 |
| 10 | NUMBER OF COMPLETED TRIPS WITH EXCESS TRAVEL TIME > THRESHOLD 2 | F10.3 |

TABLE 5-15. (3 of 3) PERFORMANCE SUMMARY FILE

| SIZE (BYTES) | DESCRIPTION | FORMAT |
|---|---|---|
| 10 | AVERAGE NUMBER OF TRANSFERS / COMPLETED TRIPS | F10.3 |
| 10 | RATIO OF COMPLETED PASSENGER TRANSFERS TO TOTAL COMPLETED PASSENGERS | F10.3 |
| 10 | AVERAGE TRIP TIME DEMAND TO TRIP COMPLETION (SEC/T) | F10.3 |

NOTE: (1) THERE ARE 5 UNUSED 10-BYTE FIELDS AT THE END OF THE FILE FOR ANALYSIS USE.

TABLE 5-16. INDEX FILE WRITTEN BY OUTPUT PROCESSOR

```
*************************************************************************
*              OP INDEX FILE UPDATE FORMAT                              *
*  FILE NAME:  AGT.INDEX.DENAME                     TYPE: EBCDIC        *
*              NAME=USER DEFINED                                        *
*************************************************************************
---------------------------------------------------------------------------
SIZE (BYTES)  DESCRIPTION                                     FORMAT
---------------------------------------------------------------------------
     OUTPUT PROCESSOR MODULE IDENTIFIER
  7         DESM-OP                                             A7
  2         UNUSED
 22         AGT.AGT.LOAD(MEMBER)                                A22
  8         UNUSED
  2         MONTH                                               I2
  1         /                                                   A1
  2         DAY                                                 I2
  1         /                                                   A1
  2         YEAR                                                I2
  2         UNUSED
  2         HOUR                                                I2
  1         :                                                   A1
  2         MINUTE                                              I2
 26         UNUSED

     INPUT FILE TYPE IDENTIFIER
 14         UNUSED
 11         INPUT FILES                                         A11
 55         UNUSED

     FILE DEFINITIONS (ONE RECORD/INPUT FILE):
 24         AGT.STATS.DESM(MEMBER)                              A24
 56         UNUSED

 25         AGT.IANDD.RNTIM(MEMBER)                             A25
 55         UNUSED

     OUTPUT FILE TYPE IDENTIFIER
 14         UNUSED
 12         OUTPUT FILES                                        A12
 54         UNUSED

     FILE DEFINITIONS (ONE RECORD/OUTPUT FILE):
 25         AGT.PERSUM.DESM(MEMBER)                             A25
 55         UNUSED
```

- o Network Definition
  - Initial Network Configuration
  - Alternate Path Summary
  - Failure/Repair Summary
- o Trip Demand Generation
- o System Characteristics
- o Service Planning
  - Initial Level of Service
  - Active Fleet Size Management

<u>Initial Network Configuration Report</u>

This report will be prepared when network input and description data are processed. It includes:

- o Network configuration summary - link, station, merge and diverge connectivity
- o Link characteristics - length, capacity, nominal travel time, headway and linespeed
- o Station to station summary - closest downstream station, nominal guideway travel time to each station from each station and next station on path from each station to each station
- o Successor link table - next link on least cost path from each link to each station.

<u>Alternate Path Summary</u>

This report will be prepared when alternate path data are processed. It includes for each alternate path:

- o Common diverge point identification
- o Destination station
- o Link sequence.

Failure/Repair Summary

This report will be prepared each time a failure is inserted or removed. It includes:

- o Time
- o Location (guideway link, station number and link)
- o Type (link exit, link entry, degradation)
- o Inserted/Removed
- o Failure response selection and delay times
- o Other vehicle response selections
- o Tow vehicle path link sequence
- o Vehicle degradation factor
- o Successor link table (if guideway link failure exists).

Trip Demand Generation Report

This report will be prepared for each demand interval that is processed. It includes:

- o Trip size probability distributions and mean trip sizes (only if a new demand matrix was read)
- o Origin and destination probability distributions (only if a new demand matrix was read)
- o Summary of input trip/hour demand for each origin-destination pair
- o Summary of passenger demand generated for each origin-destination pair.

System Characteristics Report

This report will summarize the attributes of the system configured for the simulation experiment. It includes:

- o Position regulation policy
- o Longitudinal control policy
- o Dispatch policy
- o Merge policy
- o Empty vehicle management policy (if demand responsive service)

- o Path selection policy
- o Entrainment policy
- o Vehicle characteristics
- o Station characteristics
  - Trip split size
  - Deboard/board time data
  - Alternate station egress time
  - Excess travel time histogram class intervals
  - Nominal travel information
  - Berth assignment policy
  - Link characteristics and connectivity
  - For each station:

    Online/Offline
    Available links and capacity
    Boarding queue capacity
    Number of input queues
    Number of parallel docks
    Capacity of dock area
    Number of output queues.

Data related to the selected policies will also be listed.

<u>Initial Level of Service Report</u>

This report will summarize the transit service characteristics established for the simulation experiment. It includes:

- o Source of level of service
- o Type of service
  - Demand responsive service:

    Vehicle reservation option
    Vehicle diversion option
    Vehicle fleet size and placement

- Timeout/Group Demand Response Service

  Vehicle request parameters
  Platform summary

- Scheduled service:

  Source of route definition
  Vehicle spacing policy
  Demand stop option
  Route data (each route):

    Number of vehicles
    Train length
    Route headway
    Station stop sequence
    Initial vehicle dispatch schedule

  Trip to route assignment data

- Transfer policy

- Nominal travel time between each pair of stations.

<u>Active Fleet Size Management Report</u>

This report will summarize the key parameters associated with a change in the level of service. It includes:

- o Time

- o Source of level of service

- o Type of service

  - Demand responsive service:

    Vehicle fleet size
    Empty vehicle management revisions

  - Scheduled service:

    Route data (each route):

      Number of vehicles
      Train length
      Route headway
      Station stop sequence
      Initial vehicle dispatch schedule
      Transition vehicles
      Maintenance barn identification.

### 5.2.2 Model Processor Reports

The Model Processor produces the following reports:

- o Initial Conditions Report
- o Restart Conditions Report
- o Intermediate Sampling Report
- o Termination Status Report.

Initial Conditions Report

This report provides a summary of system characteristics used to initiate the simulation experiment. The information is organized according to the following classifications:

1. System and simulation control parameters
2. Vehicle characteristics
3. Route control parameters (for a scheduled service simulation)
4. Guideway link characteristics
5. Station characteristics.

The type of data provided reflects such items as initial entity occupancies, fleet size, general system constants, service policy options and network configuration.

Restart Conditions Report

This report provides a summary of the system characteristics and status data associated with a restarted simulation experiment. The system characteristics provide a summary of options and parameters active in the restarted simulation run. Status data reflects conditions on both guideway links and in network stations at the point of simulation resumption.

Intermediate Sampling Report

This report provides a "snapshot" of simulation status at the end of a specific data recording interval. In addition to providing current or "at the moment" status information, data which have been accumulated over the interval such as the maximum number of vehicles to occupy the guideway links at any one time, etc. are reported. Statistics are displayed according to the following major categories:

1. General vehicle summary
2. Link statistics
   - Occupancy and queue summaries
3. Route statistics (for scheduled service)
4. Station statistics
   - Vehicle, trip, and passenger summaries
   - Station link occupancy and queue summaries.

Termination Status Report

This report summarizes the status of the model at the moment of simulation termination. Snapshot statistics are displayed in categories identical to the intermediate sampling reports. A summary of error messages is provided as is a summary of input and output files and timing mechanism usage.

### 5.2.3 Output Processor Reports

Under user control, the Output Processor will provide two pre-formatted reports listing a selected list of performance measures to support system analysis and another report listing sample size, average, standard deviation, maximum, and minimum value for selected station to station measures. In addition, the Output Processor will compute a set of effectiveness measures and write the results to the Performance Summary file.

The first pre-formatted report contains performance summary information derived from available system level raw statistics and summarized over a user specified time interval. This report is automatically generated when a performance summary file request is entered, or when standard report 1 (RPT1) is requested. The derivation of measures contained in this pre-formatted report and the report format are shown in Appendix B.

The second pre-formatted report contains selected performance related statistics and derived performance measures on both a system wide and individual guideway, station and scheduled route basis. The information displayed is accumulated over a user specified time interval in response to a request for standard report 2 (RPT2). A summary of the information available, a derivation of measures in this report, and the report format are provided in Appendix B.

## 5.3 GENERAL PARAMETER OUTPUT

The Output Processor provides four basic display formats for individual variables retrieved from the raw statistics file.

1. Time series listing of sampled values

2. Statistical Summary (including and excluding zero values)

   a. Number of samples

   b. Sum of values

   c. Mean

   d. Standard deviation

   e. Minimum value

   f. Time of minimum

   g. Maximum value

   h. Time of maximum.

3. Histogram

   a. Mean

   b. Variance

   c. Class interval frequency distribution.

4. Time series printer plot.

Examples of these formats are shown in Figure 5-1. The variables that can be requested are listed in Tables 4-13 and 4-14.

```
....CATEGORY= SYST  ID= ANOV  ENTITY ID=    1    SAMPLED VALUES
                    AVG # TRPS ON V

     0.750     4.800    12.600    32.117    39.850    45.600    57.133    62.417    71.667    84.250
    95.117    98.133    88.400    69.667    89.233    85.833    88.483    68.333    90.850    89.550
    87.883    91.700    95.183   103.533   113.900   119.700   124.783   129.250   130.300   122.200
```

LIST - Listing of Consecutive Sample Values

```
....CATEGORY= SYST  ID= ANOV   ENTITY ID=    1
                       AVG # TRPS ON V
                                  ALL VALUES    ZEROS EXCLUDED
NUMBER OF SAMPLES                     30.000            30.000
SUM OF VALUES                       2433.118          2433.118
MEAN PER SAMPLE                       81.104            81.104
STD.DEV. FROM MEAN                    34.662            34.682
MINIMUM VALUE                          0.750             0.750
TIME OF MIN (SECS)                    60.000            60.000
MAXIMUM VALUE                        130.300           130.300
TIME OF MAX (SECS)                  1740.000          1740.000
```

SUMM - Summary of Sample Values

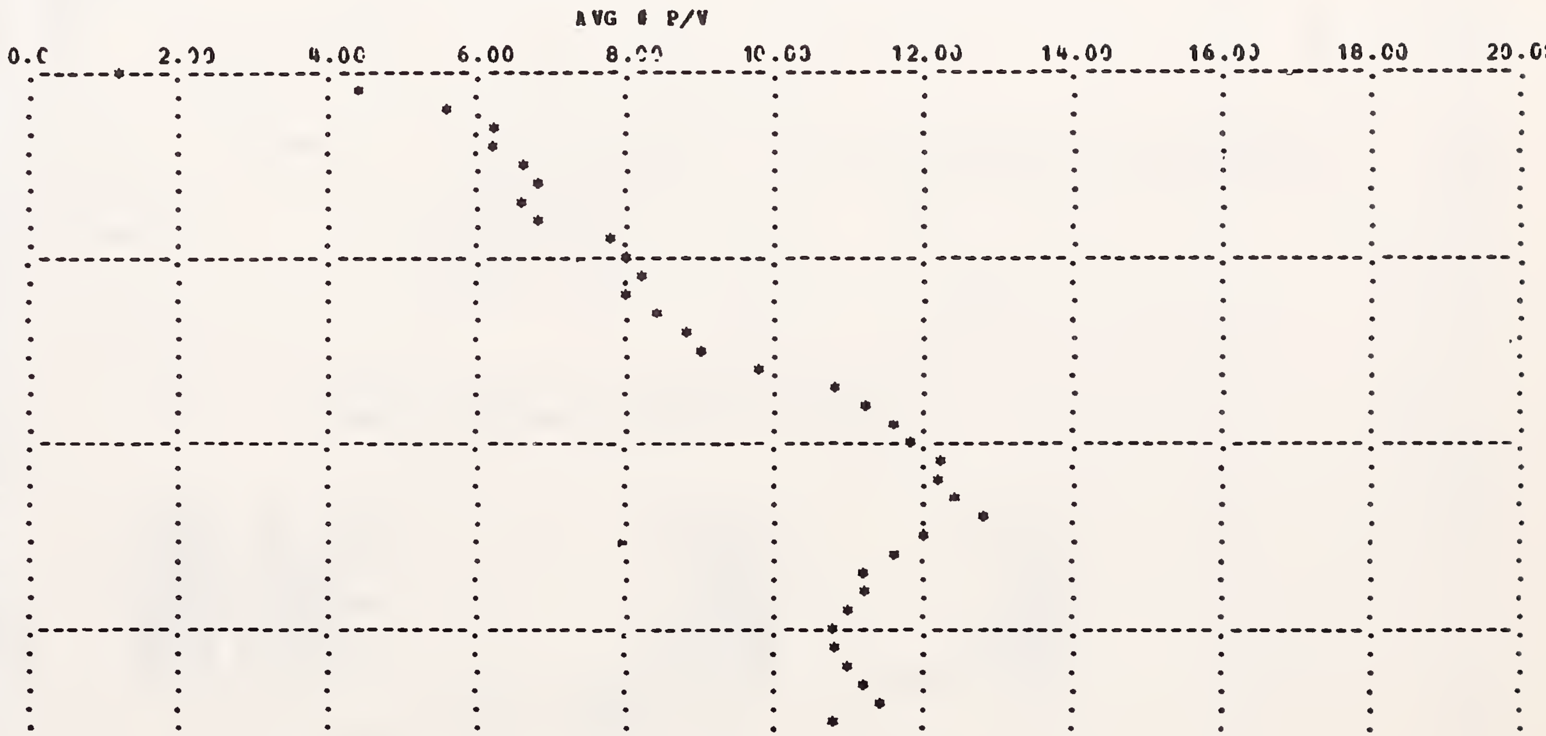
```
....CATEGORY= SYST  ID= APPV  ENTITY ID=    1    .... (HISTOGRAM)

                  AVG # P/V
                              MEAN =     9.335  VARIANCE =     7.043  AMPLITUDE PER INTERVAL MARKER =    1.000
VARIABLE VALUE     COUNT  -0-
INTERVAL BOUNDARY

          1.000       1    XX      .     .     .     .     .     .     .     .     .
          2.000       0    X       .     .     .     .     .     .     .     .     .
          3.000       0    X       .     .     .     .     .     .     .     .     .
          4.000       1    XX      .     .     .     .     .     .     .     .     .
          5.000       1    XX      .     .     .     .     .     .     .     .     .
          6.000       6    XXXXXXX .     .     .     .     .     .     .     .     .
          7.000       2    XXX     .     .     .     .     .     .     .     .     .
          8.000       5    XXXXXX  .     .     .     .     .     .     .     .     .
          9.000       1    XX      .     .     .     .     .     .     .     .     .
         10.000       5    XXXXXX  .     .     .     .     .     .     .     .     .
         11.000      10    XXXXXXXXXXX   .     .     .     .     .     .     .     .
         12.000       4    XXXXX   .     .     .     .     .     .     .     .     .
         13.000       0    X       .     .     .     .     .     .     .     .     .
```

HIST - Histogram (Frequency Distribution) of Sample Values

FIGURE 5-1. DISPLAY FORMATS (Page 1 of 2)

....CATEGORY= SYST ID= APPV ENTITY ID= 1 ..... (PLOT SYMBOL'*') .... (OFF SCALE SYMBOL'#')

| SAMPLE VALUE | TIME (SEC) |
|---|---|
| 1.2297 | 100.000 |
| 4.4712 | 200.000 |
| 5.5612 | 300.000 |
| 6.2201 | 400.000 |
| 6.1089 | 500.000 |
| 6.5964 | 600.000 |
| 6.7270 | 700.000 |
| 6.6605 | 800.000 |
| 6.7269 | 900.000 |
| 7.7553 | 1000.000 |
| 7.9171 | 1100.000 |
| 8.2606 | 1200.000 |
| 8.0204 | 1300.000 |
| 8.4812 | 1400.000 |
| 8.7374 | 1500.000 |
| 8.9000 | 1600.000 |
| 9.8530 | 1700.000 |
| 10.8583 | 1800.000 |
| 11.1991 | 1900.000 |
| 11.5498 | 2000.000 |
| 11.7954 | 2100.000 |
| 12.1565 | 2200.000 |
| 12.1833 | 2300.000 |
| 12.4741 | 2400.000 |
| 12.7178 | 2500.000 |
| 11.9889 | 2600.000 |
| 11.5533 | 2700.000 |
| 11.1337 | 2800.000 |
| 11.1211 | 2900.000 |
| 10.9793 | 3000.000 |
| 10.7520 | 3100.000 |
| 10.8813 | 3200.000 |
| 11.0687 | 3300.000 |
| 11.2285 | 3400.000 |
| 11.4187 | 3500.000 |
| 10.7809 | 3600.000 |




PLOT - Time Series Plot of Sample Values

FIGURE 5-1. DISPLAY FORMATS (Page 2 of 2)

# 6. OPERATING PROCEDURES

Prior to executing the DESM, the user must determine if the size definitions assumed by the model are appropriate for the problem size to be executed and that installation requirements (core and peripheral storage availability) are satisfied (see Limitations, subsection 1.4). If changes are required, the user may decrease or increase the compile maximum values and perform the system generation procedures discussed in subsection 6.1. This procedure must also be followed if additional user defined algorithm alternatives or modeling features are to be exercised. Once the user is ready to execute the components of the model, a logical sequence of general procedures as described below should be followed. Batch mode and terminal mode procedural differences are discussed in subsections 6.2 and 6.3, respectively.

1. Input Processor Procedures -- The steps required to run the Input Processor include:

   a. Decide which IP functions in addition to transit service planning are to be executed:

      (1) Trip generation

      (2) Network configuration

   b. If trip generation is required, create a Trip Demand File member (AGT.IANDD.DEMAND (.....)) describing the characteristics of the Trip Arrival File member (AGT.STRUC.DEMAND (.....)) to be generated. (See Figure 6-1 for a sample of user supplied demand input.)

   c. If network generation is required, create a Network Definition File member (AGT.IANDD.NETWORK (.....)) describing the Network Configuration File member (AGT. STRUC.NETWORK (.....)) to be generated. (Sample user input required to define a network is shown in Figure 6-2. Figure 6-3 portrays the station guideway link connectivity defined by the network input.)

   d. Create a System Characteristics Input File member (AGT. IANDD.SYSTEM (.....)) describing the station configuration and system parameters (AGT.STRUC.SYSTEM (.....)) necessary for a Model Processor run. (A sample input System Characteristics File member is shown in Figure 6-4.) Note: The output structured system characteristics will

```
    5    5           DESM DEMAND FOR IP TESTING                         2/21/78
    0    8   10   10    8    4    0   11    8   15   10    3    0   12
   12   10   12    9    0   13    6    4    0   14    0
```

Demand input contains 7 types of data:

1. number of stations in network and time interval (min.) of this demand input
2. number of passengers traveling between each origin-destination during the time interval
3. number of origin-destination pairs using trip size distribution 2 and 3
4. origin-destination pairs using trip size distribution 2
5. origin-destination pairs using trip size distribution 3
6. maximum trip size for all distributions
7. trip size distributions.

See Section 4 for further discussion of variables and for input format.

FIGURE 6-1. DEMAND INPUT

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 2 | 1177 | 2 | 1 | 3 | 645 | 3 | 0 | 4 | 1177 | 4 | 0 | 5 | 3000 |
| 5 | 0 | 6 | 3000 | 6 | 0 | 7 | 1177 | 7 | 1 | 8 | 645 | 8 | 0 | 9 | 1177 |
| 9 | 0 | 10 | 1177 | 10 | 1 | 11 | 645 | 11 | 0 | 12 | 1177 | 12 | 0 | 1 | 3000 |
| 1 | 0 | 13 | 3000 | 13 | 0 | 14 | 1177 | 14 | 1 | 15 | 645 | 15 | 0 | 16 | 1177 |
| 12 | 0 | 16 | 3000 | 16 | 0 | 17 | 1177 | 17 | 1 | 18 | 645 | 18 | 0 | 19 | 1177 |
| 19 | 0 | 9 | 3000 | 5 | 0 | 12 | 3000 | | | | | | | | |

Each four items above defines one link as follows:

- o identification of node at start of link
- o station indicator (0 = no station on link, 1 = station on link)
- o identification of node at end of link
- o length of link in meters.

The format for each line of input is 4(I4, I2, I4, I6). All links and stations are assigned numbers based on the order of input by the Input Processor.

FIGURE 6-2. NETWORK DEFINITION

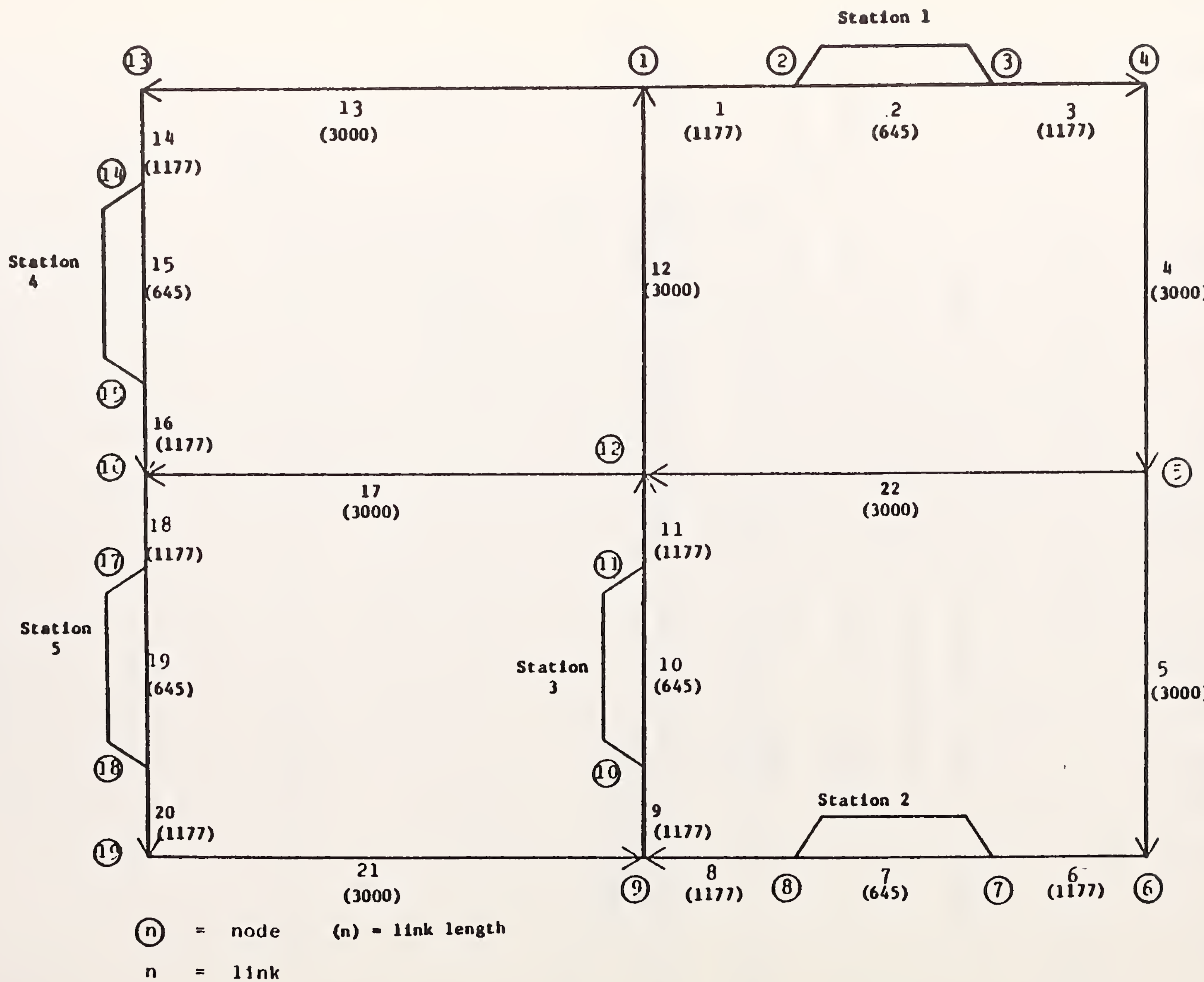



FIGURE 6-3. NETWORK CONNECTIVITY

```
      COMMENT      MODEL CONFIGURATION DATA
NAME               DESCRIPTION                                        DEFAULT
------    --------------------------------------------------------    -------
NEWNET    NETWORK DEFINITION (F=EXISTING NETWORK, T=NEW NETWORK)         F
NCSEL     COST BASIS FOR PATH CALCULATION (0=TRAVEL TIME, 1=LENGTH)      0
PSPEED    NOMINAL SPEED ON GUIDEWAY                                     15
GLVEL     LINE SPEED BY LINK                                         PSPEED
GLVSD     STANDARD DEVIATION OF LINE SPEED                               0
GLHDWY    VEHICLE HEADWAY                                                5
GLBLK     BLOCK LENGTH FOR FIXED BLOCK REGULATION                       75
NLNPRI    END POINTS OF LINKS THAT HAVE PRIORITY                         -
STYPE     STATION TYPE (F=OFFLINE, T=ONLINE)                             F
SLBVEL    SPEED THROUGH ONLINE STATION WHEN NOT STOPPING              GLVEL
SLPF      STATION LINK FIFO/PRIORITY DEQUEUE (0=FIFO, 1=PRIORITY)        0
SLAVAL    STATION LINK AVAILABILITY (F= NOT, T=AVAILABLE)                T
SLVEL     VELOCITY ON STATION LINKS                                      -
SLCFIG    STATION CONFIGURATOR DATA
             COL  1 - LINK TYPE (SEE SLTYPE)                             -
             COL  2 - LINK TRAVEL TIME                                   0
             COL  3 - LINK LENGTH                                        -
             COL  4 - LINK CAPACITY                                      -
             COL  5 - FIRST EVENT ON LINK                                -
             COL  6 - SECOND EVENT ON LINK                               -
             COL  7 - THIRD EVENT ON LINK                                -
             COL  8 - FOURTH EVENT ON LINK                               -
             COL  9 - FIFTH EVENT ON LINK                                -
             COL 10 - DIVERGE FUNCTION SELECTION (SEE SLDIVC)            -
             COL 11 - UPSTREAM LINK ORDERING OPTION                      1
             COL 12 - HEADWAY TIME PER TRAIN (SEE SLHTA)                 0
             COL 13 - HEADWAY TIME PER VEHICLE IN TRAIN (SEE SLHTB)      0

THE FOLLOWING PARAMETERS MUST BE ENTERED IF THE STATION
CONFIGURATOR IS NOT USED

KNSL      NUMBER OF STATION LINKS                                        -
SLTYPE    STATION LINK TYPE (1=IR, 2=IQ, 3=D, 4=OQ, 5=OR, 6=S,           -
                             7=IS, 8=SI, 9=DS, 10=SO)                    -
SLTTIM    STATION LINK TRAVEL TIME                                       -
SLCAP     STATION LINK CAPACITY                                          -
SLEVL     STATION LINK EVENT LIST (1=H, 2=T, 3=DB, 4=B, 5=S, 6=L)        -
SLUSL     STATION LINK UPSTREAM LINK LIST                                -
SLDSL     STATION LINK DOWNSTREAM LINK LIST                              -
SLDIVC    STATION LINK DIVERGE FUNCTION (USER DEFINED) SELECTION         -
SLHTA     STATION LINK HEADWAY ZONE TRAVEL TIME PER VEHICLE              0
SLHTB     STATION LINK HEADWAY ZONE TRAVEL TIME CONSTANT TERM            0
END
      TEXT
            MODEL CONFIGURATION DATA
      OPTION
NEWNET   1L1
  T
NCSEL    1I1
  1
END
      PARAM
GLHDWY   1F5.0        1    22
22    2
KNSL     1I5
      8
END
      DATA
SLTYPE   8I5          1    8
      1    2    2    3    3    3    4    5
SLTTIM   8F5.0        1    8
     10    8    8   12   12   12    8   10
SLCAP    8I5          1    8    1    5
```

FIGURE 6-4. (1 of 4) SYSTEM CHARACTERISTICS INPUT

```
 5    5    8    8    1    1    1    8    5
SLEVL   30I2          1    30
   1 2 0 1 2 0 1 2 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 6 0 1 2
SLUSL   19I2          1    19
   0 1 0 1 0 2 3 0 2 3 0 2 3 0 4 5 6 0 7
SLDSL   18I2          1    18
   2 3 0 4 5 6 0 4 5 6 0 7 0 7 0 7 0 8
SLHTA    1F5.0        1     8
 8    1
SLHTB    1F5.0        1     8
 8    1
END
      COMMENT         SERVICE MODE DATA
NAME                  DESCRIPTION                                              DEFAULT
------   -----------------------------------------------------          -------
POLSER   SERVICE POLICY (1=DRSP, 2=DRMP, 3=SCHED)                             1
PLOSBS   LEVEL OF SERVICE BASIS (0=USER, N=NTH DEMAND INTERVAL)               1
KNV      FLEET SIZE                                                           -
PRTDEF   ROUTE DEFINITION (0=BY USER, 1=BY INPUT PROCESSOR)                   0
PVRLST   SCHEDULED SERVICE ROUTE LIST                                         -
PRTEHW   HEADWAY ON EACH ROUTE                                                -
PNVRTE   NUMBER OF VEHICLES ON EACH ROUTE                                     -
PRTLEN   TRAIN LENGTH ON EACH ROUTE (0=NO TRAINS)                             0
PLDFAC   ESTIMATED ACHIEVABLE VEHICLE LOAD FACTOR                           .75
PMAXWT   MAXIMUM WAIT TIME IN SCHEDULED SERVICE (IP PLANNED)                900
SLOCC    STATION LINK INITIAL OCCUPANCY                                       0
GLOCC    GUIDEWAY LINK INITIAL OCCUPANCY                                      0
END
      TEXT
            SERVICE MODE DATA
      SELECT
POLSER   1I2
   3
PRTDEF   1I2
   1
PMAXWT   1I3
  450
END
      COMMENT         TRIP MANAGEMENT DATA
NAME                  DESCRIPTION                                              DEFAULT
------   -----------------------------------------------------          -------
DTRPFL   DEMAND GENERATION REQUEST (T=GENERATE TRIPS, F=DO NOT)               F
DNDMND   NUMBER OF DEMAND PROFILE INTERVALS TO PROCESS                        1
DMPROF   DEMAND SCALING PROFILE
           ELEMENT(1,I) - SCALE FACTOR FOR ITH INTERVAL                       1
           ELEMENT(2,I) - TIME BASE OVERRIDE FOR ITH INTERVAL                 0
                              (0=NO OVERRIDE)
           ELEMENT(3,I) - =0, USE THE MATRIX CURRENTLY IN MEMORY              1
                          >0, READ A NEW MATRIX
PTSPLT   TRIP SPLIT SIZE                                                   VCAP
SBQCAP   BOARDING QUEUE CAPACITY                                              -
STDBA    DEBOARD TIME PER PASSENGER                                           0
STDHFF   ESTIMATED DWELL ADJUSTMENT FACTOR                                    0
STBA     BOARD TIME PER PASSENGER                                             0
SMNDBT   MINIMUM DOOR OPEN TIME                                               0
SMXDBT   MAXIMUM BOARDING TIME                                          TIME TO
                                                                        FILL AN
                                                                        EMPTY
                                                                        VEHICLE
VCAP     VEHICLE CAPACITY                                                     6
VSEAT    NUMBER OF SEATS ON VEHICLE                                        VCAP
PRASGN   ROUTE ASSIGNMENT TABLE                                               -
PRGLST   ROUTE GROUP LIST FOR TRIPS SERVED BY MULTIPLE ROUTES                 -
PXFER    TRANSFER POLICY (F=NO TRANSFERS, T=TRANSFERS)                        F
PXFLST   TRANSFER LIST                                                        -
           ELEMENT(1,I) - ORIGIN STATION
```

FIGURE 6-4. (2 of 4) SYSTEM CHARACTERISTICS INPUT

```
          ELEMENT(2,I) - DESTINATION STATION
          ELEMENT(3,I) - STATION AT WHICH TO DEBOARD
          ELEMENT(4,I) - STATION TO WHICH TO WALK BEFORE REBOARDING
                         (0=REBOARD AT STATION GIVEN IN (3,I))
PWALKT   WALK TIME FOR TRANSFERING TRIPS                                 0
PVRES    VEHICLE RESERVATIONS INDICATOR (F=NO RESERVATIONS,              F
          T=RESERVATIONS)
PALTET   ALTERNATE STATION EGRESS TIME                                   0
PVSPR    ORDERED LIST OF WHERE TO OBTAIN AN EMPTY VEHICLE                6
          (1=AN EXPECTED ARRIVAL, 2=VEHICLE CURRENTLY IN
          STATION, 3=LOCAL STORAGE, 4=REGIONAL STORAGE,
          5=CIRCULATING EMPTY, 6=EARLIEST AVAILABLE)
PEVALM   EMPTY VEHICLE ARRIVAL LIMIT                                   600
PSLIST   LIST OF STATION LINKS WHERE EMPTY IS TO BE SOUGHT               -
PSRCFM   REGIONAL STORAGE FOR OBTAINING EMPTY VEHICLES                   -
PHIST1   FIRST THRESHOLD FOR EXCESS TRAVEL TIME HISTOGRAM              300
PHIST2   SECOND THRESHOLD FOR EXCESS TRAVEL TIME HISTOGRAM             900
END
      TEXT
           TRIP MANAGEMENT DATA
      OPTION
DTRPFL  1L1
  T
END
      DATA
SBQCAP  1I5        1    5
 5 1000
STDHFF  1F5.0
     10
SMNDBT  1F5.0
     10
VCAP    1I5
     20
END
      COMMENT      VEHICLE CONTROL DATA
NAME               DESCRIPTION                                        DEFAULT
------   --------------------------------------------------------    -------
POLLC    LONGITUDINAL CONTROL POLICY (1=SYNC, 2=QSYNC, 3=ASYNC)         3
POLVPR   VEHICLE POSITION REGULATION SCHEME (1=FB, 2=VB, 3=USER)        2
POLMRG   MERGE POLICY INDICATOR (1=FIFO, 2=HEURISTIC, 3=PRIORITY)       1
VLEN     VEHICLE LENGTH                                                 6
GLRTIM   REACTION TIME FOR ACCELERATION TO LINE SPEED FROM STOP         0
GLMDLY   HEURISTIC MERGE DELAY TABLE                                    -
PMRGWW   MERGE RESERVATION TABLE WINDOW WIDTH                         GLHDWY
PMRGTH   FRACTION OF MERGE WINDOW TO BE RESERVED                      1.0
PARMAX   MAXIMUM MANEUVER AT MERGE (QSYNC CONTROL)                      0
PADVNC   VEHICLE ADVANCE MANEUVER INDICATOR (0=NO, >0=YES)              0
PVDVRT   VEHICLE GUIDEWAY DIVERSION INDICATOR (T=YES, F=NO)             T
PBERTH   BERTH ASSIGNMENT INDICATOR (1=MOST DOWNSTREAM, 2=PLATOON)      1
PENTS    STATIC (IN STATION) ENTRAINMENT INDICATOR (T=YES, F=NO)        F
PENTD    DYNAMIC (ON GUIDEWAY) ENTRAINMENT INDICATOR (T=YES, F=NO)      F
PMXTRL   MAXIMUM TRAIN LENGTH                                           1
PNTRLM   MAXIMUM WAIT TIME FOR STATIC ENTRAINMENT                      15
PVSPAC   SCHEDULED SERVICE DISPATCH ALGORITHM (1=FIXED, 2=MIDPOINT)     1
PVEPR    ORDERED LIST OF EMPTY DISPERSAL PRIORITIES  (1=LOCAL         1,3
          STORE, 2=REGIONAL STORE, 3=ANTICIPATED NEED,
          4=CURRENT NEED, 5=CIRCUITOUS RTE,
          6=STN WITH MOST OUTSTANDING REQUESTS)
PSRCTO   REGIONAL CENTER DESIGNATION FOR EMPTY DISTRIBUTION             -
PANEED   ANTICIFATED NUMBER OF EMPTIES REQUIRED/STATION                 -
PANSTN   RECEIVING STATIONS FOR PANEED                                  -
PECRTE   CIRCUITOUS EMPTY ROUTE LISTS                                   -
PECRTN   CIRCUITOUS EMPTY ROUTE STATION ASSIGNMENT LIST                 -
AFALRE   FAILURE/RECOVERY REQUEST DATA (STATION AND GUIDEWAY)           -
END
      TEXT
```

FIGURE 6-4. (3 of 4) SYSTEM CHARACTERISTICS INPUT

```
          VEHICLE CONTROL DATA
      DATA
VLEN    1I5
      5
END
      COMMENT      VEHICLE OPERATIONAL STRATEGIES
NAME               DESCRIPTION                                           DEFAULT
------   -----------------------------------------------------------   -------
POLDIS   DISPATCH POLICY (1=DETERMINISTIC, 2=QUASI-DETERMINISTIC,         3
           3=NON-DETERMINISTIC)
POLDMS   SCHEDULED SERVICE DEMAND STOP INDICATOR (F=STOP, T=SKIP)         F
PMRGL    LOCAL MERGE PRIORITY TABLE
              (1,1)=GUIDEWAY EMPTY PRIORITY                               2
              (2,1)=GUIDEWAY IN SERVICE VEHICLE PRIORITY                  1
              (1,2)=STATION EMPTY PRIORITY                                4
              (2,2)=STATION IN SERVICE VEHICLE PRIORITY                   3
PSMETH   PATH SELECTION METHOD (1=APRIORI, 2=REAL TIME)                   1
PSTYPE   PATH SELECTION TYPE (1=TABLE LOOK-UP, 2=ALGORITHMIC)             1
PSALGM   PATH SELECTION ALGORITHM (1=NOMINAL TRAVEL TIME,                 1
           2=DISTANCE, 3=UTILIZATION (OCCUPANCY/CAPACITY),
           4=WEIGHTED COMBINATION OF 1 & 3)
PSTWT    WEIGHTING FACTOR FOR NOMINAL TRAVEL TIME                         0
PSUWT    WEIGHTING FACTOR FOR UTILIZATION                                 0
PMDWT    WEIGHTING FACTOR FOR MERGE SCHEDULING DELAY                      0
PALTRT   USER DEFINED ALTERNATE PATH LISTS                                -
END
      COMMENT      SIMULATION CONTROL DATA
NAME               DESCRIPTION                                           DEFAULT
------   -----------------------------------------------------------   -------
AKSEED   RANDOM NUMBER SEED                                           14825
ATREAD   TIME TO BEGIN READING TRIP ARRIVALS                              0
ASAMPI   PERIODIC SAMPLING INTERVAL                                      60
ASTATU   SAMPLING INTERVALS BETWEEN ON-LINE SNAPSHOT REPORTS              5
APCOMI   PERIDIC COMPUTATION INTERVAL FOR HEURISTIC MERGE DELAY           0
ACKPTI   PERIODIC CHECKPOINT INTERVAL                                     0
AVLOG    VEHICLE ARRIVAL LOG (0=NO, >0=STATION # FOR LOGGING)             0
ATRPLG   LOG COMPLETED TRIPS INDICATOR (T=YES, F=NO)                      F
ANOMTT   NOMINAL TRAVEL TIME FILE OUTPUT INDICATOR (T=YES, F=NO)          F
CSIZE    CLOCK GRANULARITY (C.U./MINUTE)                                 60
CLOOP    MAXIMUM NUMBER OF XTNS ALLOWED IN CLOCK TABLE INTERVAL         500
CLSMAL   TIME INCREMENT ENCOMPASSED BY EACH CLOCK TABLE INTERVAL        100
CLSIZE   NUMBER OF ENTRIES IN CLOCK TABLE                              1000
END
      TEXT
          SIMULATION CONTROL DATA
      PARAM
AKSEED  1I5
  91577
ASAMPI  1I5
    100
ASTATU  1I5
      1
ANOMTT  1L1
   T
END
```

FIGURE 6-4. (4 of 4) SYSTEM CHARACTERISTICS INPUT

```
       COMMENT       VEHICLE CONTROL DATA
NAME                 DESCRIPTION                                                  DEFAULT
------   --------------------------------------------------------------------    -------
POLLC    LONGITUDINAL CONTROL POLICY (1=SYNC, 2=QSYNC, 3=ASYNC)                     3
POLVPR   VEHICLE POSITION REGULATION SCHEME (1=FB, 2=VB, 3=USER)                    2
POLMPG   MERGE POLICY INDICATOR (1=FIFO, 2=HEURISTIC, 3=PRIORITY)                   1
VLEN     VEHICLE LENGTH                                                             6
GLRTIM   REACTION TIME FOR ACCELERATION TO LINE SPEED FROM STOP                     0
GLMDLY   HEURISTIC MERGE DELAY TABLE                                                -
PMRGWW   MERGE RESERVATION TABLE WINDOW WIDTH                                    GLHDWY
PMRGTH   FRACTION OF MERGE WINDOW TO BE RESERVED                                  1.0
PAPMAX   MAXIMUM MANEUVER AT MERGE (QSYNC CONTROL)                                  0
PADVNC   VEHICLE ADVANCE MANEUVER INDICATOR (0=NO, >0=YES)                          0
PVDVRT   VEHICLE GUIDEWAY DIVERSION INDICATOR (T=YES, F=NO)                         T
PBERTH   BERTH ASSIGNMENT INDICATOR (1=MOST DOWNSTREAM, 2=PLATOON)                  1
PENTS    STATIC (IN STATION) ENTRAINMENT INDICATOR (T=YES, F=NO)                    F
PENTD    DYNAMIC (ON GUIDEWAY) ENTRAINMENT INDICATOR (T=YES, F=NO)                  F
PMXTRL   MAXIMUM TRAIN LENGTH                                                       1
PNTRLM   MAXIMUM WAIT TIME FOR STATIC ENTRAINMENT                                  15
PVSPAC   SCHEDULED SERVICE DISPATCH ALGORITHM (1=FIXED, 2=MIDPOINT)                 1
PVEPR    ORDERED LIST OF EMPTY DISPERSAL PRIORITIES  (1=LOCAL                     1,3
            STORE, 2=REGIONAL STORE, 3=ANTICIPATED NEED,
            4=CURRENT NEED, 5=CIRCUITOUS RTE,
            6=STN WITH MOST OUTSTANDING REQUESTS)
PSRCTO   REGIONAL CENTER DESIGNATION FOR EMPTY DISTRIBUTION                         -
PANEED   ANTICIPATED NUMBER OF EMPTIES REQUIRED/STATION                             -
PANSTN   RECEIVING STATIONS FOR PANEED                                              -
PECRTE   CIRCUITOUS EMPTY ROUTE LISTS .                                             -
PECRTN   CIRCUITOUS EMPTY ROUTE STATION ASSIGNMENT LIST                             -
AFALRE   FAILURE/RECOVERY REQUEST DATA (STATION AND GUIDEWAY)                       -
END
       TEXT
        VEHICLE CONTROL DATA
       DATA
VLEN      1I5
      20
END
```

FIGURE 6-4. SYSTEM CHARACTERISTICS INPUT (Page 5 of 6)

```
     COMMENT        VEHICLE OPERATIONAL STRATEGIES
NAME                DESCRIPTION                                                  DEFAULT
------   ---------------------------------------------------------------------   -------
POLDIS   DISPATCH POLICY (1=DETERMINISTIC, 2=QUASI-DETERMINISTIC,                   3
           3=NON-DETERMINISTIC)
POLDMS   SCHEDULED SERVICE DEMAND STOP INDICATOR (F=STOP, T=SKIP)                   F
PMRGL    LOCAL MERGE PRIORITY TABLE
              (1,1)=GUIDEWAY EMPTY PRIORITY                                          2
              (2,1)=GUIDEWAY IN SERVICE VEHICLE PRIORITY                             1
              (1,2)=STATION EMPTY PRIORITY                                           4
              (2,2)=STATION IN SERVICE VEHICLE PRIORITY                              3
PSMETH   PATH SELECTION METHOD (1=APRIORI, 2=REAL TIME)                              1
PSTYPE   PATH SELECTION TYPE (1=TABLE LOOK-UP, 2=ALGORITHMIC)                        1
PSALGM   PATH SELECTION ALGORITHM (1=NOMINAL TRAVEL TIME,                            1
           2=DISTANCE, 3=UTILIZATION (OCCUPANCY/CAPACITY),
           4=WEIGHTED COMBINATION OF 1 & 3)
PSTWT    WEIGHTING FACTOR FOR NOMINAL TRAVEL TIME                                    0
PSUWT    WEIGHTING FACTOR FOR UTILIZATION                                            0
PMDWT    WEIGHTING FACTOR FOR MERGE SCHEDULING DELAY                                 0
PALTPT   USER DEFINED ALTERNATE PATH LISTS                                           -
END
     TEXT
      VEHICLE OPERATIONAL STRATEGIES
     DATA
PMRGL     4I2          1    2    1    2
   1 3 0 2
END
     COMMENT        SIMULATION CONTROL DATA
NAME                DESCRIPTION                                                  DEFAULT
------   ---------------------------------------------------------------------   -------
AKSEED   RANDOM NUMBER SEED                                                       14825
ATREAD   TIME TO BEGIN READING TRIP ARRIVALS                                          0
ASAMPI   PERIODIC SAMPLING INTERVAL                                                  60
ASTATU   SAMPLING INTERVALS BETWEEN ON-LINE SNAPSHOT REPORTS                          5
APCOM1   PERIDIC COMPUTATION INTERVAL FOR HEURISTIC MERGE DELAY                       0
ACKPTI   PERIODIC CHECKPOINT INTERVAL                                                 0
AVLOG    VEHICLE ARRIVAL LOG (0=NO, >0=STATION # FOR LOGGING)                         0
ATRPLG   LOG COMPLETED TRIPS INDICATOR (T=YES, F=NO)                                  F
ANOMTT   NOMINAL TRAVEL TIME FILE OUTPUT INDICATOR (T=YES, F=NO)                      F
CSIZE    CLOCK GRANULARITY (C.U./MINUTE)                                             60
CLOOP    MAXIMUM NUMBER OF XTNS ALLOWED IN CLOCK TABLE INTERVAL                     500
CLSMAL   TIME INCREMENT ENCOMPASSED BY EACH CLOCK TABLE INTERVAL                    100
CLSIZE   NUMBER OF ENTRIES IN CLOCK TABLE                                          1000
END
     TEXT
      SIMULATION CONTROL DATA
     DATA
AKSEED   1I5
 91577
ASAMPI   1I5
   100
ASTATU   1I5
     1
ATRPLG   1L1
     T
END
```

FIGURE 6-4. SYSTEM CHARACTERISTICS INPUT (PAGE 6 of 6) always be generated. If an input System Characteristics File member is not created, all of the essential parameters must be input via the Runtime File (see Step e).

e. Create a Runtime Input File member (AGT.IANDD.RNTIM (.....)) containing run index data, requests for IP functions determined in Step a (for new demand or network definition), system characteristics overrides, non-zero time data (e.g., failures), and action requests passed on to the Model Processor (AGT.STRUC.RNTIM (.....)). (See Figures 6-5 and 6-6 for sample input and output Runtime data members.)

f. Verify that there are no conflicting data in Steps b through e, e.g., trip generation is requested in step e but no demand input is created in step b.

g. Set up Job Control Language (JCL) to invoke the IP.

   (1) Supply a job card conforming to local computer installation standards.

   (2) Follow the job card with a JCL statement containing all of the substitutable parameters (and comments) necessary to execute the IP cataloged procedure, AGTEIP. Cataloged procedure AGTEIP is listed in subsection 6.4. (Figure A-4 contains an example of Input Processor JCL.)

h. Submit the JCL for execution. This step is dependent upon the method of job submission (i.e., batch or terminal).

i. When the IP run has completed, perform the following:

   (1) Verify that the Trip Arrival, Network Configuration, System Characteristics, and Runtime output files were generated as requested. The existence of a new Index file entry should also be verified.

   (2) Check the IP summary reports (see Appendix B) to verify that the IP has read and interpreted all user input correctly.

```
      TEXT
DEMO 1, IP DEMAND GENERATION AND NETWORK PROCESSING OPTIONS
      INDEX
DEMO 1, INPUT PROCESSOR OPTIONS:
          DEMAND GENERATION
          NETWORK PROCESSING
END
      DATA
GLVEL   1F5.0       17   17
    5
DNSD2   1I5
    3
DNSD3   1I5
    2
DIS2OD  6I5          1    6
    1    3    2    4    4    1
DIS3OD  4I5          1    4
    3    4    5    2
KNG     1I5
    8
DTRDST 14F5.2        1    8    1    3
  .60  .20  .10  .03  .03  .02  .01  .01  .40  .30  .20  .02  .02  .02
  .02  .02  .70  .20  .10  .00  .00  .00  .00  .00
DMPROF  3F5.1        1    3    3    5
  1.5  0.0  0.0
  1.0  5.0  0.0
  6.0 18.0  0.0
PLOSBS  1I5
    5
NCSEL   1I5
    0
DNDMND  1I5
    9
ANOMTT  1L1
    F
ATRPLG  1L1
    T
ALLOG   1L1
    T
ASLOG   1L1
    T
END
 1200.CKPT
 3601.STOP
 3601.EOD
```

FIGURE 6-5. INPUT RUNTIME DATA

```
    0.TEXT
TEST 30, USER-DEFINED SCHEDULED SERVICE, AFSM MODIFICATIONS
  600.FLAG
 161 162 113 114 165-170 313 314 307-310 303 304 298 299 317 318    0    0
  600.AFSM
KNV      1I5
 1   39
PNVRTE 14I5         1    3
 1    9   12   18
PRTEHW 14I5         1    3
 1  300  225  189
PRTLEN 14I5         1    3
 1    3    3    3
PNTVEH 14I5         1    3
 1    0    0    3
PRBARN 14I5         1    3
 1    3    3    3
PRSTOP 14I5         1    3
 1    3    3    3
PRNTRY 14I5         1    3
 1    3    4    9
END
 1800.STOP
 1800.EOD
```

FIGURE 6-6.  OUTPUT RUNTIME DATA

j. If any errors are found in step i, correct the input and rerun only the function in error.

2. Model Processor Procedures -- The steps required to run the Model Processor include:

   a. Decide which model definitions are to be used for the simulation experiment. A member name must be chosen for the following input files:

      (1) System characteristics (AGT.STRUC.SYSTEM (.....))

      (2) Network definition (AGT.STRUC.NETWORK (.....)

      (3) Trip arrival. (AGT.STRUC.DEMAND (.....))

   b. Determine the Runtime file member to be input (AGT.STRU[illegible] RNT[illegible] (.....)) to the run. At this time, any required modifications to the data for direct input to the model should be performed noting previous restrictions on this activity mentioned earlier in this document. Since these alterations are not edited for correctness, all unit specifications must be correct and all dependent data must be changed in order that no conflict with the remaining system definition exists.

   c. If statistics are to be recorded throughout the simulation (AGT.STATS.DESM (.....)), a name for the file member to be created must be determined so it can later be selected for use by the Output Processor.

   d. Set up JCL to invoke the model processor

      (1) Supply a job card conforming to local computer installation standards.

      (2) Follow the job cards with a JCL statement containing all of the substitutable parameters (and comments) necessary to execute the MP cataloged procedure, AGTEMP. Cataloged procedure AGTEMP is listed in subsection 6.4. (Figure A-5 contains an example of Model Processor JCL.)

   e. Submit the JCL for execution (method dependent on whether batch or terminal submission is required).

   f. When the MP run has completed, operational analysis should be performed to determine if any inconsistencies exist due to improper data definition. Several model output reports can be scanned as follows:

(1) Check the Initial Conditions Report and the Sampling Reports to verify that the MP read the intended model definition file members and interpreted the input correctly.

(2) Scan the output for the termination report to determine if the simulation exercise terminated as requested.

g. If any errors or unexpected results are found, review the substitutable parameters in the cataloged procedure, the parameter values specified in the JCL, and the input data specifications.

3. Output Processor Procedures -- The steps required to run the Output Processor include:

a. Decide which set of raw statistics (AGT.STATS.DESM (.....)) is to be used as input to the run.

b. Create a request input file member (AGT.IANDD.RNTIM (.....)) containing command requests used to direct processing within the OP. (A sample request member is shown in Figure 6-7).

c. Verify that there is not a conflict between the statistical member used and the requests generated, e.g., requests for route statistical output and a raw statistics file generated from a demand responsive run.

d. Set up JCL to invoke the Output Processor

(1) Supply a job card conforming to local computer installation standards.

(2) Follow the job card with a JCL statement containing all of the substitutable parameters (and comments) necessary to execute the OP cataloged procedures, AGTEOP (see subsection 6.4). (Figure A-6 contains an example of Output Processor JCL.)

e. Submit the JCL according to batch or terminal submission procedures.

f. Review the general parameter output (see subsection 5.3).

```
REQU SUMM SYST  PHT1
REQU SUMM SYST  PHT2
REQU SUMM SYST  PHT3
REQU LIST SYST  ANPV
REQU LIST SYST  ANSP
REQU LIST SYST  MRTT
REQU LIST SYST  XVLF
REQU LIST SYST  ANWT
REQU LIST SYST  ANWP
REQU LIST SYST  PDXS
REQU LIST SYST  METS
REQU LIST SYST  TNDS
REQU LIST SYST  PNDS
REQU LIST SYST  NTAR
REQU LIST SYST  NPAR
REQU LIST SYST  NTWT
REQU LIST SYST  XTWT
REQU LIST SYST  XQDV
REQU LIST SYST  XQQV
REQU LIST SYST  GANO
REQU LIST SYST  GVNO
REQU LIST SYST  RAPR
REQU LIST SYST  RXSD
REQU LIST SYST  ATPV
REQU PLOT SYST  APPV                            0.     20.
REQU HIST SYST  APPV                    1
REQU LIST SYST  AVLF
REQU PLOT SYST  ADVH                            0.   1000.
REQU PLOT SYST  ADVD                            0.     20.
REQU LIST SYST  AETT
REQU LIST SYST  ATV
REQU PLOT SYST  ATTS                            0.     20.
REQU HIST SYST  ATDD                   10
REQU PLOT SYST  SAVL                            0.   1000.
REQU LIST SYST  RTT
READ                          1 3600
REQU LIST STN   ANWP
REQU LIST STN   PNDS
REQU LIST STN   NPAR
REQU LIST STN   XPWT
REQU LIST STN   NPSH
REQU LIST STN   APDD
READ                          1 3600
REQU LIST RTE   RAPR
REQU LIST RTE   RAPW
REQU LIST RTE   SAVL
REQU LIST RTE   AVLF
REQU LIST RTE   APDD
READ                          1 3600
REQU RPT1
READ                          1 3600
REQU RPT2
READ                          1 3600
REQU S-S  PASS
REQU STOS IVEH
REQU RPT3 INIT
READ                          1 3600
```

FIGURE 6-7. OUTPUT PROCESSOR SAMPLE REQUEST COMMANDS

## 6.1 SYSTEM GENERATION

System Generation of the DESM must be performed if redefinition of system capacity or the inclusion of user coded algorithmic alternatives is required. The redefinition of system capacity involves the modification of SYSGEN values as defined in Table 5-1, recompilation, and the link editing of new executable load modules. The inclusion of user coded algorithmic alternatives involves only the link editing of the DESM MP after proper object module substitutions or replacement has been performed.

### 6.1.1 Redefinition Requirements

Updates to SYSGEN values for the DESM require modification of both FORTRAN and Assembler source members which are used to define problem size limits to all routines in the system. These size-definition members are:

- o ESYSMAX
- o ECOMMAX

contained in AGT.DESM.FORT and AGT.DESM.ASM, respectively. Once updates to these source members are performed, the source modules identified in Tables 6-1 through 6-3, must be recompiled or assembled as required to generate new object code which can be used to create executable load modules for the IP, MP, and OP components of the system. Executable load module creation requires the link editing of all DESM object modules. The link edit procedure involves three submissions to create separate executable versions of the IP, MP, and OP. The linkage control input necessary for directing the link edit process is provided in Appendix A of this document.

### 6.1.2 Algorithm Replacement Requirements

The DESM MP provides a direct interface for the inclusion of user defined and coded algorithmic alternatives. Specifically, the following modules contained in the MP can be replaced by the user:

- o EUEVA -- Empty Vehicle Management
- o EUEVB -- Empty Vehicle Bumping
- o EUDIVF -- Station Link Diverge Function Definitions
- o EUPCMP -- Periodic Computation Processing
- o EGUNTR --
- o EGUTVL --

User Defined Guideway Link Headway Regulation Scheme

TABLE 6-1. INPUT PROCESSOR SOURCE MODULES TO COMPILE/ASSEMBLE

| ROUTINE | TYPE | DESCRIPTION |
|---|---|---|
| EACOMN | FORTRAN | FORCE ORDERING COMMONS FOR INTERFACE TO MP |
| EINPUT | FORTRAN | INPUT PROCESSOR CONTROL |
| EIBWRT | FORTRAN | BINARY INPUT/OUTPUT |
| EICHCK | FORTRAN | INPUT PARAMETER CHECKING |
| EISCHD | FORTRAN | SCHEDULED SERVICE PLANNING |
| EIDRSP | FORTRAN | DEMAND RESPONSIVE SERVICE PLANNING |
| EIEMTY | FORTRAN | EMPTY VEHICLE ALLOCATION |
| EIMORG | FORTRAN | MORGANTOWN DEMAND MODE SERVICE PLANNING |
| EIINIT | FORTRAN | INPUT PROCESSOR INITIALIZATION |
| EIMNAM | FORTRAN | PARAMETER LIST DECODE |
| EIMPTH | FORTRAN | LEAST COST PATH DETERMINATION |
| EIMNTP | FORTRAN | TRANSPORTATION ALGORITHM |
| EINDPP | FORTRAN | NETWORK DEFINITION PREPROCESSING |
| EINTWK | FORTRAN | NETWORK PROCESSING CONTROL |
| EINRPT | FORTRAN | NETWORK SUMMARY REPORT |
| EIALTP | FORTRAN | ALTERNATE PATH TABLE GENERATION |
| EIFAIL | FORTRAN | FAILURE/RECOVERY PROCESSING |
| EISCFG | FORTRAN | STATION CONFIGURATOR |
| EITNIT | FORTRAN | TRIP DEMAND INITIALIZATION |
| EITRIP | FORTRAN | TRIP DEMAND GENERATION |
| EIUDGN | FORTRAN | DETERMINISTIC TRIP DEMAND GENERATION |
| EINFMT | FORTRAN | NETWORK DATA FORMATTING |
| EINSLT | FORTRAN | BUILD SUCCESSOR LINK TABLE |
| EIDRPT | FORTRAN | TRIP DEMAND SUMMARY REPORT |
| EISRPT | FORTRAN | SYSTEM CHARACTERISTICS SUMMARY REPORT |
| EIARPT | FORTRAN | ACTIVE FLEET SIZE MANAGEMENT REPORT |
| EIRNG | FORTRAN | RANDOM NUMBER GENERATOR |
| EIRSEL | FORTRAN | SAMPLE FROM CUMULATIVE PROBABILITY DIST. |
| EISERV | FORTRAN | SERVICE PLANNING CONTROL |
| EINERR | FORTRAN | ERROR MESSAGES |
| EIGDIP4 | ASSEMBLER | DEFINE GENERALIZED DATA INPUT VARIABLES |
| EAFLAG | FORTRAN | PROCESS AN AUXILIARY OUTPUT REQUEST |
| EIERROR | FORTRAN | PROCESS AN ERROR MESSAGE |

TABLE 6-2. (1 of 2) MODEL PROCESSOR SOURCE MODULES TO COMPILE/ASSEMBLE

| ROUTINE | TYPE | DESCRIPTION |
|---|---|---|
| EACOMN | FORTRAN | FORCE ORDERING DATA IN CHECKPOINT REGION |
| EAINDX | FORTRAN | DECODE PARM FIELD & WRITE INDEX FILE |
| EANTSA | FORTRAN | INTIALIZE SYS CHAR & NETWORK DATA |
| EACKR | FORTRAN | PERFORM CHECKPOINT/RESTART |
| EADADD | FORTRAN | OBTAIN COMMON AREA ADDRESSES |
| EAASYN | FORTRAN | PERFORM ASYNCHRONOUS DATA PROCESSING |
| EAFLAG | FORTRAN | PROCESS AN AUXILLARY OUTPUT REQUEST |
| EATORG | FORTRAN | PROCESS A TRIP ARRIVAL |
| EANMDL | FORTRAN | PERFORM MODEL INITIALIZATION |
| EANRPT | FORTRAN | DISPLAY INITIAL CONDITIONS REPORT |
| EARRPT | FORTRAN | DISPLAY RESTART CONDITIONS REPORT |
| EAPLNK | FORTRAN | PERFORM A GUIDEWAY DEQUEUING EVENT |
| EAPSTN | FORTRAN | PERFORM A STATION DEQUEUING EVENT |
| EAPCMP | FORTRAN | PERFORM PERIODIC COMPUTATION EVENT |
| EAAFSM | FORTRAN | PERFORM ACTIVE FLEET SIZE MANAGEMENT |
| EAIVEH | FORTRAN | INITIALIZE NEW SCHED SERVICE VEHICLES |
| EASTOR | FORTRAN | SEARCH STORAGE FOR AVAILABLE VEHICLES |
| EANTRN | FORTRAN | COUPLE AND LAUNCH NEW SCHED SERV TRAINS |
| EAFTRN | FORTRAN | COUPLE FOR PUSH BY TRAILING VEHICLE |
| EGNEXT | FORTRAN | DETERMINE THE NEXT ENTITY FOR GUIDEWAY VEH |
| EGVLOG | FORTRAN | LOG VEHICLE ARRIVALS AT STATION ENTRY |
| EGGNXT | FORTRAN | DETERMINE NEXT GUIDEWAY LINK |
| EGTEST | FORTRAN | TEST AVAILABILITY OF A GUIDEWAY LINK |
| EASAMP | FORTRAN | PERFORM PERIODIC SAMPLING |
| EASRPT | FORTRAN | DISPLAY INTERMEDIATE SAMPLING REPORT |
| EAFRPT | FORTRAN | DISPLAY TERMINATION REPORT |
| EAZNIT | FORTRAN | PERFORM STATISTICS INITIALIZATION |
| EZINT | FORTRAN | COMPUTE TIME INTEGRALS |
| EZZERO | FORTRAN | ZERO STATUS STATISITCS FOR NEXT SAMPLE |
| EZHDR | FORTRAN | WRITE A HEADER REOCRD TO RAW STATS FILE |
| EANDR | FORTRAN | PERFORM DR SERVICE INITIALIZATION |
| EANSCD | FORTRAN | PERFORM SCHEDULED SERVICE INITIALIZATION |
| EANMRG | FORTRAN | PERFORM MORGANTOWN DEM MODE INITIALIZATION |
| EMODEL | FORTRAN | MODELLING CONTROL |
| EAINIT | FORTRAN | INITIALIZATION CONTROL |
| EANFEL | FORTRAN | PERFORM FUTURE EVENTS LIST INITIALIZATION |
| EANXTN | FORTRAN | PERFORM TRANSACTION DATA INITIALIZATION |
| EAPFEL | FORTRAN | PLACE A TRANSACTION ON FUTRE EVENTS LIST |
| EAERR | FORTRAN | PROCESS AN ERROR MESSAGE |
| ESFAIL | FORTRAN | PERFORM STATION FAILURE PROCESSING |
| EGFAIL | FORTRAN | PERFORM GUIDEWAY FAILURE PROCESSING |
| EGLEAV | FORTRAN | GUIDEWAY LINK EXIT PROCESSING |
| EGLMDL | FORTRAN | GUIDEWAY LINK MODEL CONTROL |
| EGLNTR | FORTRAN | GUIDEWAY LINK ENTRY PROCESSING |
| EGLWTQ | FORTRAN | QUEUE A VEHICLE ON A GUIDEWAY LINK |
| EGASTN | FORTRAN | ALTERNATE STATION ASSIGNMENT |
| EGQMRG | FORTRAN | QUASI-SYNCHRONOUS CONTROL |
| EGFNTR | FORTRAN | FIXED HEADWAY TRAVEL SEGMENT ENTRY |
| EGVNTR | FORTRAN | VARIABLE HEADWAY TRAVEL SEGMENT ENTRY |
| EGFTVL | FORTRAN | FIXED BLOCK TRAVEL SEGMENT TRAVERSAL |
| EGVTVL | FORTRAN | VARIABLE BLOCK TRAVEL SEGMENT TRAVERSAL |
| EGDTRN | FORTRAN | DYNAMIC (ON GUIDEWAY) DETRAINMENT |
| EGETRN | FORTRAN | DYNAMIC (ON GUIDEWAY) ENTRAINMENT |
| EGTRNC | FORTRAN | TRAIN COMPATIBILITY CHECK |
| EGSCHD | FORTRAN | SCHEDULE VEHICLE FOLLOWER |
| EGRESV | FORTRAN | GUIDEWAY LINK EMPTY & RESERVED VEHICLE PR. |
| EGEMTY | FORTRAN | GUIDEWAY LINK EMPTY VEHICLE PROCESSING |
| EGCNXT | FORTRAN | NEXT STATION - CIRCUITOUS EMPTY |
| EGVALS | FORTRAN | VEHICLE ETA & ARRIVAL LIST RECORDING |
| EGHTRN | FORTRAN | TRAIN HEADWAY TRAVERSAL PROCESSING |
| EGTCTL | FORTRAN | TRIP COMPATIBILITY CHECK CONTROL |
| EGTCHK | FORTRAN | TRIP COMPATIBILITY CHECK |
| EGDSTP | FORTRAN | DEMAND STOP SERVICE PROCESSING |

TABLE 6-2. (2 of 2) MODEL PROCESSOR SOURCE MODULES TO COMPILE/ASSEMBLE

| ROUTINE | TYPE | DESCRIPTION |
|---|---|---|
| EGQNTR | FORTRAN | ADVANCE POSITIONING PROCESSING |
| EGPATH | FORTRAN | REAL-TIME PATH SELECTION |
| EGPRMY | FORTRAN | PRIMARY PATH COST COMPUTATION |
| EGALT | FORTRAN | ALTERNATE PATH COST COMPUTATION |
| ESVALS | FORTRAN | RECORD VEHICLES PREDICTED STATION ARRIVAL |
| ESTEST | FORTRAN | STATION LINK ENTRY PROCESSING |
| ESTABQ | FORTRAN | PERFORM TIRP STATION ARRIVAL PROCESSING |
| ESVREQ | FORTRAN | MORGANTOWN REQUEST VEHICLE PROCESSING |
| ESAREQ | FORTRAN | MORGANTOWN ASSIGN VEHICLE PROCESSING |
| ESEVA | FORTRAN | PERFORM EMPTY VEHICLE ASSIGNMENT |
| ESEVB | FORTRAN | PERFORM EMPTY VEHICLE BUMPING |
| ESVRES | FORTRAN | RESERVE A VEHICLE FOR AN ARRIVING TRIP |
| ESNEXT | FORTRAN | DETERMINE NEXT ENTITY FOR VEH IN STATION |
| ESDIVF | FORTRAN | USER STATION DIVERGE FUNCTION SELECTION |
| ESDIVO | FORTRAN | USER DIVERGE ORDERING OF STATION LINKS |
| ESLWTQ | FORTRAN | QUEUE A VEH ON A STATION LINK |
| ESLMDL | FORTRAN | STATION MODEL CONTROL |
| ESMDLN | FORTRAN | DETERMINE NEXT STATION MODEL EVENT |
| ESMDLA | FORTRAN | PERFORM AFTER STATION EVENT PROCESSING |
| ESMDLB | FORTRAN | PERFORM BEFORE STATION EVENT PROCESSING |
| ESSDLY | FORTRAN | COMPUTE SCHEDULE DELAY |
| ESLDLY | FORTRAN | COMPUTE LAUNCH DELAY |
| ESMDLY | FORTRAN | PERFORM MERGE RESERVATION |
| ESNTRN | FORTRAN | PERFORM STATIC VEHICLE ENTRAINMENT |
| ESLEAV | FORTRAN | PERFORM STATION LINK EXIT PROCESSING |
| ESBDL | FORTRAN | CREATE A LIST OF BOARDING TRIPS |
| ESTCHK | FORTRAN | MULTI-PARTY COMPATIBILITY CHECK |
| ESDBL | FORTRAN | CREATE A LIST OF DEBOARDING TRIPS |
| ESTLOG | FORTRAN | CREATE A COMPLETED TRIP LOG ENTRY |
| ESNSTN | FORTRAN | DETERMINE THE NEXT STATION FOR A VEH |
| ESPATH | FORTRAN | SELECT A VEHICLE PATH |
| EAFINS | FORTRAN | PERFORM MODEL TERMINATION PROCESSING |
| EMGDIP4 | ASSEMBLER | DEFINE GENERALIZED DATA INPUT VARIABLES |
| EUEVA | FORTRAN | USER DEFINED EMPTY VEHICLE ASSIGNMENT |
| EUEVB | FORTRAN | USER DEFINED EMPTY VEHICLE BUMPING |
| EUDIVF | FORTRAN | USER DEFINED DIVERGE FUNCTION |
| EUPCMP | FORTRAN | USER DEFINED PERIODIC COMPUTATION PROCESS |
| EGUNTR | FORTRAN | USER DEFINED GUIDEWAY LINK ENTRY |
| EGUTVL | FORTRAN | USER DEFINED GUIDEWAY LINK TRAVEL |

TABLE 6-3. OUTPUT PROCESSOR SOURCE MODULES TO COMPILE

| ROUTINE | TYPE | DESCRIPTION |
|---|---|---|
| EOUTPT | FORTRAN | OUTPUT PROCESSOR CONTROL |
| EOINDX | FORTRAN | WRITE INDEX FILE |
| EOZNIT | FORTRAN | OUTPUT PROCESSOR INITIALIZATION |
| EOFLAG | FORTRAN | PROCESS AN AUXILLARY OUTPUT REQUEST |
| EDBIN | FORTRAN | PERFORM INITIAL BIN ALLOCATIONS |
| EOERR | FORTRAN | PROCESS AN ERROR MESSAGE |
| EODATA | FORTRAN | DEFINE OUTPUT PROCESSOR DATA |
| ESKIPFO | FORTRAN | SKIP FOLLOWER RECORDS |
| EHEADER | FORTRAN | READ A HEADER RECORD |
| ESETUP | FORTRAN | PERFORM DATA TABLE INITIALIZATION |
| EREQTLU | FORTRAN | PERFORM REQUEST CORRELATION |
| EREQU | FORTRAN | PROCESS A USER DATA REQUEST |
| ESHIFT | FORTRAN | SHIFT CONTENTS OF A BIN TO ACQUIRE SPACE |
| EBNCHK | FORTRAN | CHECK BIN FOR SUFFICIENT STORAGE SPACE |
| EABIN | FORTRAN | PERFORM BIN AREA REALLOCATION |
| EDUMBIN | FORTRAN | DUMP THE CONTENTS OF A BIN |
| EZREAD | FORTRAN | CONTROL READING OF RAW STATISTICS FILE |
| ESTORE | FORTRAN | STORE A SAMPLED ITEM IN A BIN |
| EZPLOT | FORTRAN | PLOT CONTROL |
| EZLIST | FORTRAN | LIST CONTROL |
| ELIST | FORTRAN | DISPLAY TIME SERIES LIST OR STAT. SUMMARY |
| EZHIST | FORTRAN | HISTOGRAM CONTROL |
| EMNMX | FORTRAN | DETERMINE MIN MAX OF SAMPLED ITEMS |
| EHIST | FORTRAN | DISPLAY A HISTOGRAM OF SAMPLED ITEMS |
| EGRAPH | FORTRAN | DISPLAY TIME SERIES PLOT OF SAMPLED ITEMS |
| EREAD02 | FORTRAN | PROCESS SYSTEM STATISTICS |
| EREAD03 | FORTRAN | PROCESS STATION STATISTICS |
| EREAD04 | FORTRAN | PROCESS STATION LINK STATISTICS |
| EREAD05 | FORTRAN | PROCESS GUIDEWAY STATISTICS |
| EREAD06 | FORTRAN | PROCESS ROUTE STATISTICS |
| EOPSUM | FORTRAN | PERFORMANCE SUMMARY GENERATION |
| EOPRPT | FORTRAN | PERFORMANCE SUMMARY REPORT |
| EOSSUM | FORTRAN | SYSTEM SUMMARY STATISTICS GENERATION |
| EOSRPT | FORTRAN | SYSTEM SUMMARY STATISTICS REPORT |
| AADATE | FORTRAN | GET DATE IN CHARACTER FORMAT |
| DERROR | FORTRAN | ERROR TERMINATION ROUTINE |
| ETACUM | FORTRAN | ACCUMULATE THE RAW STATISTICS |
| ETCAPT | FORTRAN | CAPTURE THE RAW DATA |
| ETCOMP | FORTRAN | COMPUTE THE MEASURE REQUESTED |
| ETMERG | FORTRAN | CONVERT STATISTICS TO UTPS FORMAT |
| ETMEAS | FORTRAN | COMPUTE RAW DATA FOR MEASURE |
| ETNMBR | FORTRAN | CONVERT A NUMBER TO EBCDIC |
| ETRPTS | FORTRAN | GENERATE THE STATION REPORT |
| ETSSPM | FORTRAN | STN TO STN PERFORMANCE MEASURES CONTROL |
| ETSTID | FORTRAN | CONVERT STATION ID TO EBCDIC |
| ETSTAT | FORTRAN | COMPUTE STATISTICS |
| ETTOTL | FORTRAN | TOTAL THE RAW STATISTICS |

The implementation of a user headway model requires the replacement of two modules in order to satisfy architecture restrictions with the MP. These two routines correspond to the initial entry processing for vehicles entering a guideway link and the processing required for actual link traversal. Once the object modules corresponding to user developed code have been replaced in the system, linkage editing of the DESM MP can be performed to produce a new executable load module.

## 6.2 BATCH MODE

Batch mode execution of the DESM involves performing the procedural steps as described in Section 6 via the use of standard system utilities and batch job submission procedures. The characteristics of the user modifiable input files contained in the AGT data base are defined to permit direct user update via the IEBUPDTE utility program (see IBM Publication GC35-005). Using this system utility, the sample JCL shown in Figure 6-8 can be used to create new members within the data base files or to modify existing data.

The cataloged procedures provided for invoking the DESM IP, MP, and OP are designed for direct interface to the AGT data base for the input of all model related data during execution. The user need only define the member names and specify the cataloged procedure to execute, to invoke execution of the DESM, as described in Section 6. However, any file reference contained within the cataloged procedures can be overriden via standard JCL procedures to allow the submission of in-stream data which uses the system input device as the source medium. Figure A-7 provides a sample of the job setup required for instream specification of user defined demand input. Any card image formatted (EBCDIC) file used by the DESM can be overridden in this manner. The specific file assignments which must be specified in overriding a particular input file are shown in subsection 6.4.

## 6.3 TERMINAL MODE

The procedures for terminal assisted operation of the DESM are identical to those for batch operation. However, data base modification can be performed via the TSO supported editing capability (see IBM Publication GC 28-0645). This feature permits online user entry of data and eliminates the need for maintaining card decks which are required in batch mode operation.

The job control language for executing the DESM via the terminal is placed in the AGT.DESM.CNTL library. This library can be updated via the TSO editing procedure and submitted for execution via TSO job submission

```
//JOBCARD
//NULL1 EXEC PGM=IEBUPDTE,PARM=NEW
//SYSPRINT DD SYSOUT=A
//SYSUT2 DD DSNAME=PROJECT.LIBRARY.TYPE,                     (SEE NOTE 1)
// DISP=OLD
//SYSIN DD *
./ ADD NAME=MEMNAME
./ NUMBER NEW1=100,INCR=100
             .
             .
             .
     USER CODED DATA
             .
             .
             .
/*
```

INITIAL MEMBER CREATION JCL

```
//JOBCARD
//NULL2 EXEC PGM=IEBUPDTE
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD DSNAME=PROJECT.LIBRARY.TYPE,                     (SEE NOTE 1)
// DISP=OLD
//SYSUT2 DD DSNAME=PROJECT.LIBRARY.TYPE,                     (SEE NOTE 1)
// DISP=OLD
//SYSIN DD *
./ CHANGE NAME=MEMNAME
             .
             .
             .
    UTILITY CONTROL & USER CODED CHANGES
       E.G.,
./ DELETE SEQ1=100,SEQ2=100
             .
             .
             .
/*
```

FILE UPDATE JCL

```
NOTE 1  THE FOLLOWING FILES ARE ELIGIBLE FOR CREATION AND/OR UPDATE
           AGT.IANDD.NETWORK
           AGT.IANDD.SYSTEM
           AGT.IANDD.DEMAND
           AGT.IANDD.RNTIM
           AGT.STRUC.DEMAND
           AGT.STRUC.RNTIM
           AGT.INDEX.DEINDEX
```

FIGURE 6-8. JCL FOR FILE MEMBER CREATION/UPDATE commands. Execution of the model via the terminal provides identical outputs to those obtained by batch mode operation. Direct or interactive use of the DESM during execution is not provided by the model.

## 6.4 CATALOGED PROCEDURES

The user interface for execution of the DESM processors is provided via cataloged procedures and the JCL (identified in Section 6). The procedures require minimum information from the user related to required files in order to invoke the various functions.

The cataloged procedures for invoking the DESM Input Processor (AGTEIP), Model Processor (AGTEMP), and Output Processor (AGTEOP) are shown in Figures 6-9, 6-10, and 6-11, respectively. These procedures are installed in the system procedure library on an installation dependent basis. Overrides for any of the data base input referenced by the procedure may be included as part of the JCL job input stream. As mentioned in subsection 6.2, this is accomplished by coding an appropriate override card or card image of the form:

    // (DD NAME) DD*

following the execute statement. The user-specified input data must then follow. All overrides specified in this manner must be sequenced within job control by the order in which they occur in the cataloged procedures.

```
//* JOHN F. DUKE 5-8430 TSC-TOP OFTROY
//* NAME--AGTEIP
//* EXAMPLE--
//*    // EXEC AGTEIP,SYSTEM=PRT,DEMAND=AMPEAK,NETIN=GRID,
//*    //      RUNTIME=PRTX
//*   NOTE** ALL DATA SETS EXCEPT INDEX MUST BE CATALOGUED PRIOR TO
//*          INVOKING THE PROC FOR A SIMULATION EXPERIMENT.
//*             EACH SUBSTITUTABLE PARAMETER SPECIFIED BELOW IS NOTED
//*          AS 'REQUIRED' OR 'OPTIONAL'. OPTIONAL PARAMETER VALUES
//*          REMAIN 'NULL' UNLESS OVERRIDEN BY USER-SPECIFIED FILE
//*          NAMES. REQUIRED PARAMETERS WITHOUT DEFAULT VALUES IDENTI-
//*          FIED REQUIRE EXPLICIT USER DEFINITION. DEFAULT VALUES MAY
//*          ALSO BE OVERRIDEN VIA THE JCL INVOKING THE PROCEDURE.
//* FUNCTION--
//*    INVOKE THE DISCRETE EVENT SIMULATION MODEL INPUT PROCESSOR TO
//*    CREATE THE DATA NECESSARY TO SUPPORT A GIVEN DEMAND AND SYSTEM
//*    CONFIGURATION TO PERFORM A SIMULATION EXPERIMENT VIA THE DESM
//***********************************************************************
//AGTEIP  PROC PROJECT=AGT,                  PROJECT NAME (REQUIRED)
//             LIBRARY=AGT,                  LIBRARY NAME (REQUIRED)
//             MODULE=EINPUT,                DESM IP LOAD MODULE (REQUIRED)
//             IREGION=2200K,                MODEL EXECUTION REGION
//*                                               (REQUIRED)
//             IPTIME='(0,5)',               MAXIMUM EXECUTION TIME
//*                                               (REQUIRED)
//             OUTPUT=A,                     SYSOUT CLASS  (REQUIRED)
//             SYSTEM=NULL,                  MEMBER NAME FOR SYSTEM CHARAC-
//*                                          TERISTICS INPUT (OPTIONAL)
//             INDEX=INDEX,                  SIX CHARACTER INDEX FILE
//*                                          IDENTIFIER (REQUIRED)
//             DEMAND=NULL,                  MEMBER NAME FOR FIRST DEMAND
//*                                          MATRIX AND TRIP ARRIVAL DATA
//*                                          (OPTIONAL)
//             DEMAND2=NULL,                 MEMBER NAME FOR SECOND DEMAND
//*                                          MATRIX (OPTIONAL)
//             DEMAND3=NULL,                 MEMBER NAME FOR THIRD DEMAND
//*                                          MATRIX (OPTIONAL)
//             DEMAND4=NULL,                 MEMBER NAME FOR FOURTH DEMAND
//*                                          MATRIX (OPTIONAL)
//             DEMAND5=NULL,                 MEMBER NAME FOR FIFTH DEMAND
//*                                          MATRIX (OPTIONAL)
//             NETIN='',                     MEMBER NAME FOR NETWORK DATA
//*                                          INPUT (REQUIRED)
//             RUNTIME='',                   MEMBER NAME FOR RUN TIME DATA
//*                                               (REQUIRED)
//             NETWORK=NULL,                 MEMBER NAME FOR NETWORK DATA
//*                                          OUTPUT (OPTIONAL)
//             NOMTIME=NULL                  MEMBER NAME FOR NOMINAL TRAVEL
//*                                          TIME MATRIX (OPTIONAL)
//EIP EXEC PGM=&MODULE,
//             TIME=&IPTIME,
//             REGION=&IREGION,
//             PARM=(&MODULE,&SYSTEM,&RUNTIME,&NETIN,&NETWORK,
//             &NOMTIME,&DEMAND,&DEMAND2,&DEMAND3,&DEMAND4,
//             &DEMAND5)
//STEPLIB DD DSN=&PROJECT..&LIBRARY..LOAD,DISP=SHR,VOLUME=PRIVATE
//FT05F001 DD DSN=&PROJECT..IANDD.SYSTEM(&SYSTEM),
//            DISP=SHR,LABEL=(,,,IN)
//FT05F002 DD DSN=&PROJECT..IANDD.RNTIM(&RUNTIME),
//            DISP=SHR,LABEL=(,,,IN)
//FT06F001 DD SYSOUT=&OUTPUT
//FT10F001 DD DSN=&PROJECT..IANDD.NETWORK(&NETIN),
//            DISP=SHR,LABEL=(,,,IN)
//FT11F001 DD DSN=&PROJECT..IANDD.DEMAND(&DEMAND),
//            DISP=SHR,LABEL=(,,,IN)
//FT11F002 DD DSN=&PROJECT..IANDD.DEMAND(&DEMAND2),
//
//
//
```

FIGURE 6-9. (1 of 2) INPUT PROCESSOR CATALOG PROCEDURE

```
//              DISP=SHR,LABEL=(,,,IN)
//FT11F003 DD DSN=&PROJECT..IANDD.DEMAND(&DEMAND3),
//              DISP=SHR,LABEL=(,,,IN)
//FT11F004 DD DSN=&PROJECT..IANDD.DEMAND(&DEMAND4),
//              DISP=SHR,LABEL=(,,,IN)
//FT11F005 DD DSN=&PROJECT..IANDD.DEMAND(&DEMAND5),
//              DISP=SHR,LABEL=(,,,IN)
//FT12F001 DD DSN=&PROJECT..STRUCPVT.NETWORK(&NETIN),
//              VOLUME=PRIVATE,
//              DISP=SHR,LABEL=(,,,IN)
//FT13F001 DD DSN=&PROJECT..INDEX.DE&INDEX,
//               DISP=(MOD,CATLG),
//               DCB=(RECFM=FB,LRECL=80,  IN CASE WE ABEND WITHOUT
//               BLKSIZE=3120),                OPENING THE FILE
//               UNIT=SYSDA,              ALLOCATION PARAMETERS IF NEW
//               SPACE=(TRK,(1,1))
//FT14F001 DD DSN=&PROJECT..STRUCPVT.NETWORK(&NETWORK),
//              VOLUME=PRIVATE,
//              DISP=OLD,LABEL=(,,,OUT)
//FT15F001 DD DSN=&PROJECT..STRUCPVT.DEMAND(&DEMAND),
//              VOLUME=PRIVATE,
//              DISP=OLD,LABEL=(,,,OUT)
//FT16F001 DD DSN=&PROJECT..STRUCPVT.SYSTEM(&RUNTIME),
//              VOLUME=PRIVATE,
//              DISP=OLD,LABEL=(,,,OUT)
//FT17F001 DD DSN=&PROJECT..STRUC.RNTIM(&RUNTIME),
//              DISP=OLD,LABEL=(,,,OUT)
//FT18F001 DD DSN=&PROJECT..IANDD.SSP(&NOMTIME),
//              DISP=OLD,LABEL=(,,,OUT)
```

FIGURE 6-9. (2 of 2) INPUT PROCESSOR CATALOG PROCEDURE

```
//* JOHN F. DUKE 5-8430 TSC-TOP OFTROY
//* NAME--AGTEMP
//* EXAMPLE--
//*    // EXEC AGTEMP,SYSTEM=PRT,NETWORK=GRID,DEMAND=TRIPD,
//*    //      RUNTIME=PRTX
//*  NOTE** ALL DATA SETS MUST BE CATALOGED PRIOR TO INVOKING
//*         THE PROC FOR A SIMULATION EXPERIMENT
//*            EACH SUBSTITUTABLE PARAMETER SPECIFIED BELOW IS NOTED
//*         AS 'REQUIRED' OR 'OPTIONAL'. OPTIONAL PARAMETER VALUES
//*         REMAIN 'NULL' UNLESS OVERIDDEN BY USER-SPECIFIED FILE
//*         NAMES. REQUIRED PARAMETERS WITHOUT DEFAULT VALUES IDENTI-
//*         FIED REQUIRE EXPLICIT USER DEFINITION. DEFAULT VALUES
//*         MAY ALSO BE OVERRIDDEN VIA THE JCL INVOKING THE PROCEDURE.
//* FUNCTION--
//*    INVOKE THE DETAILED EVENT SIMULATION MODEL TO PERFORM AN
//*    EXPERIMENT FOR A GIVEN STATION CONFIGURATION AND DEMAND
//*    LEVEL.
//*************************************************************************
//AGTEMP   PROC PROJECT=AGT,                PROJECT NAME (REQUIRED)
//              LIBRARY=AGT,                LIBRARY NAME (REQUIRED)
//              MODULE=EMODEL,              DESM LOAD MODULE (REQUIRED)
//              MREGION=3400K,              MODEL EXECUTION REGION
//*                                             (REQUIRED)
//              MPTIME='(0,10)',            MAXIMUM EXECUTION TIME
//*                                             (REQUIRED)
//              OUTPUT=A,                   SYSOUT CLASS (REQUIRED)
//              SYSTEM='',                  MEMBER NAME FOR SYSTEM
//*                                         CHARACTERISTICS (REQUIRED)
//              NETWORK='',                 MEMBER NAME FOR NETWORK
//*                                         CHARACTERISTICS (REQUIRED)
//              INDEX=INDEX,                SIX CHARACTER INDEX FILE
//*                                         IDENTIFIER (REQUIRED)
//              SAMPLE=NULL,                MEMBER NAME FOR RAW STATISTICS
//*                                         & CHECKPOINT FILE (OPTIONAL)
//              DEMAND='',                  MEMBER NAME FOR TRIP ARRIVAL
//*                                              (REQUIRED)
//              RUNTIME='',                 MEMBER NAME FOR RUN TIME DATA
//*                                         INPUT (REQUIRED)
//              RESTART=NULL                MEMBER NAME FOR CHEKPOINT DATA
//*                                         FOR RESTART (OPTIONAL)
//EMP      EXEC PGM=&MODULE,
//              TIME=&MPTIME,
//              REGION=&MREGION,
//              PARM=(&MODULE,&RESTART,&SYSTEM,&NETWORK,&DEMAND,
//              &RUNTIME,&SAMPLE)
//STEPLIB   DD DSN=&PROJECT..&LIBRARY..LOAD,
//              DISP=SHR,VOLUME=PRIVATE
//FT05F001  DD DSN=&PROJECT..STRUC.RNTIM(&RUNTIME),
//              DISP=SHR,LABEL=(,,,IN)
//FT06F001  DD SYSOUT=&OUTPUT
//FT13F001  DD DSN=&PROJECT..INDEX.DE&INDEX,
//              DISP=MOD
//FT14F001  DD DSN=&PROJECT..STRUCPVT.NETWORK(&NETWORK),
//              VOLUME=PRIVATE,
//              DISP=SHR,LABEL=(,,,IN)
//FT15F001  DD DSN=&PROJECT..STRUCPVT.DEMAND(&DEMAND),
//              VOLUME=PRIVATE,
//              DISP=SHR,LABEL=(,,,IN)
//FT16F001  DD DSN=&PROJECT..STRUCPVT.SYSTEM(&SYSTEM),
//              VOLUME=PRIVATE,
//              DISP=SHR,LABEL=(,,,IN)
//FT18F001  DD DSN=&PROJECT..CHKPTPVT.DESM(&SAMPLE),
//              VOLUME=PRIVATE,
//              DISP=SHR,LABEL=(,,,OUT)
//FT19F001  DD DSN=&&STATS,                      RAW STATISTICS FILE
//              DISP=(MOD,PASS,DELETE),
//              UNIT=SYSDA,
//              SPACE=(CYL,(2,2)),
//              DCB=(RECFM=VBS,LRECL=0,BLKSIZE=19069)
//F
```

FIGURE 6-10. (1 of 2) MODEL PROCESSOR CATALOG PROCEDURE

```
               UNIT=SYSDA,
               SPACE=(CYL,([illegible]
               DCB=(RECFM=V[illegible]
FT21F001  DD DSN=&PROJECT..STRUC.TRIPLOG(&SAMPLE),
               VOLUME=PRIVATE,
               DISP=OLD,LABEL=(,,,OUT)
FT22F001  DD DSN=&PROJECT..STRUC.DEMANDVG(&SAMPLE),
               DISP=OLD,LABEL=(,,,OUT)
FT23F001  DD DSN=&PROJECT..STRUC.DESMLLOG(&SAMPLE),
               DISP=OLD,LABEL=(,,,OUT)
FT24F001  DD DSN=&PROJECT..STRUC.DESMSLOG(&SAMPLE),
               DISP=OLD,LABEL=(,,,OUT)
FT27F001  DD DSN=&PROJECT..CHKPTPVT.DESM(&RESTART),
               VOLUME=PRIVATE,
               DISP=SHR,LABEL=(,,,IN)
```

FIGURE 6-10. (2 of 2)  MODEL PROCESSOR CATALOG PROCEDURE

```
//* JOHN F. DUKE 5-8430 TSC-TOP OFTROY
//* NAME--AGTEMPTL
//* EXAMPLE--// EXEC AGTEMPTL,OUTPUT=X,SYSTEM=PRT,NETWORK=GRID,
//*          //              DEMAND=TRIPD,RUNTIME=PRTX
//*  NOTE** ALL DATA SETS MUST BE CATALOGED PRIOR TO
//*         INVOKING THE PROC FOR A SIMULATION EXPERIMENT
//*         EACH SUBSTITUTABLE PARAMETER SPECIFIED BELOW IS NOTED
//*         AS 'REQUIRED' OR 'OPTIONAL'. OPTIONAL PARAMETER VALUES
//*         REMAIN 'NULL' UNLESS OVERIDDEN BY USER-SPECIFIED FILE
//*         NAMES. REQUIRED PARAMETERS WITHOUT DEFAULT VALUES IDENTI-
//*         FIED REQUIRE EXPLICIT USER DEFINITION. DEFAULT VALUES
//*         MAY ALSO BE OVERRIDDEN VIA THE JCL INVOKING THE PROCEDURE.
//* FUNCTION--
//*   INVOKE THE DETAILED EVENT SIMULATION MODEL TO PERFORM AN
//*   EXPERIMENT FOR A GIVEN STATION CONFIGURATION AND DEMAND
//*   LEVEL.
//*******************************************************************
//AGTEMPTL PROC PROJECT=AGT,                PROJECT NAME (REQUIRED)       X
//              LIBRARY=AGT,                LIBRARY NAME (REQUIRED)       X
//              MODULE=EMODEL,              DESM LOAD MODULE              X
//              MREGION=3400K,              MODEL EXECUTION REGION        X
//              MPTIME='(0,10)',            MAXIMUM EXECUTION TIME        X
//              OUTPUT=A,                   SYSOUT DEVICE                 X
//              SYSTEM='',                  MEMBER NAME FOR SYSTEM        X
//*                                         CHARACTERISTICS (REQUIRED)
//              NETWORK='',                 MEMBER NAME FOR NETWORK       X
//*                                         CHARACTERISTICS (REQUIRED)
//              INDEX=INDEX,                SIX CHARACTER INDEX FILE      X
//*                                         IDENTIFIER (OPTIONAL)
//              SAMPLE=NULL,                MEMBER NAME FOR RAW STATISTICS X
//*                                         & CHECKPOINT FILE (OPTIONAL)
//              DEMAND=,                    MEMBER NAME FOR TRIP ARRIVAL  X
//*                                         (REQUIRED)
//              RUNTIME=,                   MEMBER NAME FOR RUN TIME DATA X
//*                                         INPUT (REQUIRED)
//              RESTART=NULL                MEMBER NAME FOR CHEKPOINT DATA
//*                                         FOR RESTART (OPTIONAL)
//EMP      EXEC PGM=&MODULE,
//              TIME=&MPTIME,
//              REGION=&MREGION,
//              PARM=(&MODULE,&RESTART,&SYSTEM,&NETWORK,&DEMAND,
//              &RUNTIME,&SAMPLE)
//STEPLIB   DD DSN=&PROJECT..&LIBRARY..LOAD,
//              DISP=SHR,VOLUME=PRIVATE
//FT05F001  DD DSN=&PROJECT..STRUC.RNTIM(&RUNTIME),
//              DISP=SHR,LABEL=(,,,IN)
//FT06F001  DD SYSOUT=&OUTPUT
//FT13F001  DD DSN=&PROJECT..INDEX.DE&INDEX,
//              DISP=MOD
//FT14F001  DD DSN=&PROJECT..STRUCPVT.NETWORK(&NETWORK),
//              VOLUME=PRIVATE,
//              DISP=SHR,LABEL=(,,,IN)
//FT15F001  DD DSN=&PROJECT..STRUCPVT.DEMAND(&DEMAND),
//              VOLUME=PRIVATE,
//              DISP=SHR,LABEL=(,,,IN)
//FT16F001  DD DSN=&PROJECT..STRUCPVT.SYSTEM(&SYSTEM),
//              VOLUME=PRIVATE,
//              DISP=SHR,LABEL=(,,,IN)
//FT18F001  DD DSN=&PROJECT..CHKPTPVT.DESM(&SAMPLE),
//              VOLUME=PRIVATE,
//              DISP=SHR,LABEL=(,,,OUT)
//FT19F001  DD DSN=&&STATS,                         RAW STATISTICS FILE
//              DISP=(MOD,PASS,DELETE),
//              UNIT=SYSDA,
//              SPACE=(CYL,(2,2)),
//              DCB=(RECFM=VBS,LRECL=0,BLKSIZE=19069)
```

FIGURE 6-11. (1 of 2) MODEL PROCESSOR (WITH SORTED TRIP LOG) CATALOG PROCEDURE

```
//FT21F001   DD DSN=&PROJECT..STRUC.TRIPLOG(&SAMPLE).
                DISP=(NEW,PASS,DELETE),UNIT=SYSDA,
//              SPACE=(CYL,(1,1)),DCB=(RECFM=FB,
//              LRECL=80,BLKSIZE=3120)
//FT22F001  DD  DSNAME=&PROJECT..STRUC.DEMANDVG(&SAMPLE),
//              DISP=OLD,LABEL=(,,,OUT)
//FT23F001  DD  DSNAME=&PROJECT..STRUC.DESMLLOG(&SAMPLE),
//              DISP=OLD,LABEL=(,,,OUT)
//FT24F001  DD  DSNAME=&PROJECT..STRUC.DESMSLOG(&SAMPLE),
//              DISP=OLD,LABEL=(,,,OUT)
//FT27F001  DD  DSN=&PROJECT..CHKPTPVT.DESM(&RESTART),
//              VOLUME=PRIVATE,
//              DISP=SHR,LABEL=(,,,IN)
//SORT   EXEC   PGM=ICEMAN,REGION=240K,COND=(0,NE,EMP)
//SORTLIB DD    DSNAME=SYS1.SORTLIB,DISP=SHR
//SYSOUT DD     SYSOUT=&OUTPUT,DCB=BLKSIZE=133
//SYSIN  DD     DSNAME=&PROJECT..IANDD.SYSIN(ASORT01),
//              DISP=SHR,LABEL=(,,,IN)
//SORTIN DD     DSNAME=*.EMP.FT21F001,DISP=(OLD,DELETE)
//SORTOUT DD    DSN=&PROJECT..STRUC.TRIPLOG(&SAMPLE),
//              VOLUME=PRIVATE,
//              DISP=OLD,LABEL=(,,,OUT)
//SORTWK01 DD   UNIT=SYSDA,SPACE=(CYL,(1,1),,CONTIG)
//SORTWK02 DD   UNIT=SYSDA,SPACE=(CYL,(1,1),,CONTIG)
//SORTWK03 DD   UNIT=SYSDA,SPACE=(CYL,(1,1),,CONTIG)
//SYSUDUMP DD   DUMMY
```

FIGURE 6-11. (2 of 2) MODEL PROCESSOR (WITH SORTED TRIP LOG) CATALOG PROCEDURE

```
//* JOHN F. DUKE 5-8430 TSC-TOP OFTROY
//* NAME--AGTEOP
//* EXAMPLE--// EXEC AGTEOP,PROJECT=AGT,SAMPLE=PRT,REQUEST=PRT1
//*  NOTE** ALL DATA SETS MUST BE CATALOGED PRIOR TO
//*         INVOKING THE PROC FOR A SIMULATION EXPERIMENT
//*         EACH SUBSTITUTABLE PARAMETER SPECIFIED BELOW IS NOTED
//*         AS 'REQUIRED' OR 'OPTIONAL'. OPTIONAL PARAMETER VALUES
//*         REMAIN 'NULL' UNLESS OVERRIDDEN BY USER-SPECIFIED FILE
//*         NAMES. REQUIRED PARAMETERS WITHOUT DEFAULT VALUES IDENTI-
//*         FIED REQUIRE EXPLICIT USER DEFINITION. DEFAULT VALUES MAY
//*         ALSO BE OVERRIDDEN VIA THE JCL INVOKING THE PROCEDURE.
//* FUNCTION--
//*   INVOKE THE DETAILED EVENT SIMULATION MODEL OUTPUT PROCESSOR
//*   TO PROCESS A RAW STATISTICS FILE CREATED FROM A GIVEN SIMULATION
//*   EXPERIMENT.
//*********************************************************************
//AGTEOP  PROC PROJECT=AGT,                PROJECT NAME (REQUIRED)        X
//             LIBRARY=AGT,                LIBRARY NAME (REQUIRED)       X
//             MODULE=EOUTPT,              OUTPUT PROCESSOR LOAD MODULE   X
//             OREGION=1450K,              O.P. EXECUTION REGION          X
//             OPTIME='(0,1)',             MAXIMUM EXECUTION TIME         X
//             OUTPUT=A,                   SYSOUT DEVICE                  X
//             INDEX=INDEX,                SIX CHARACTER INDEX FILE       X
//*                                        IDENTIFIER (OPTIONAL)
//             COLS=137,                   PRINTED OUTPUT LOGICAL RECORD
//*                                        LENGTH (5 GREATER THAN SIZE
//*                                        SPECIFIED ON PAGE CARD)
//             TEMP=SYSDA,                 TEMPORARY STORAGE
//             SAMPLE='',                  MEMBER NAME FOR RAW STATISTICS X
//*                                        FILE (REQUIRED)
//             TRIPLOG=NULL,               MEMBER NAME FOR TRIP LOG FILE  X
//*                                        (OPTIONAL)
//             PERSUM=NULL,                MEMBER NAME FOR PERFORMANCE    X
//*                                        SUMMARY FILE (OPTIONAL)
//             REQUEST=''                  MEMBER NAME FOR USER REQUESTS
//*                                        (REQUIRED)
//EOP EXEC PGM=&MODULE,                                                   X
//             TIME=&OPTIME,                                             X
//             REGION=&OREGION,                                           X
//             PARM=(&MODULE,&SAMPLE,&REQUEST,&PERSUM)
//STEPLIB DD DSN=&PROJECT..&LIBRARY..LOAD,DISP=SHR,VOLUME=PRIVATE
//FT02F001  DD DDNAME=UTPS
//FT03F001  DD UNIT=&TEMP,SPACE=(480,840)   4*NSTN, 7*NSTN
//FT04F001  DD DSN=&&STATS,                         RAW STATISTICS FILE
//             DISP=(OLD,DELETE)
//FT05F001  DD DDNAME=SYSIN
//FT06F001  DD SYSOUT=&OUTPUT,
//             DCB=(RECFM=VBA,LRECL=&COLS,BLKSIZE=4096)
//FT13F001  DD DSN=&PROJECT..INDEX.DE&INDEX,DISP=MOD
//FT14F001  DD DSN=&PROJECT..PERSUM.DESM(&PERSUM),
//             DISP=OLD,LABEL=(,,,OUT)
//FT21F001  DD DSN=&PROJECT..STRUC.TRIPLOG(&TRIPLOG),
//             VOLUME=PRIVATE,
//             DISP=SHR,LABEL=(,,,IN)
//SYSIN     DD DSN=&PROJECT..IANDD.RNTIM(&REQUEST),
//             DISP=SHR,LABEL=(,,,IN)
//UTPS      DD DUMMY,DCB=(RECFM=VBS,LRECL=1604,BLKSIZE=1608)
```

FIGURE 6-12. OUTPUT PROCESSOR CATALOG PROCEDURE

# 7. MESSAGES

Error messages are issued by the DESM whenever anomalous or unacceptable conditions are detected during program execution. These conditions can arise as a result of inconsistent or incorrect user input specifications, user runtime data specifications which inappropriately alter program execution via runtime overrides, or as the result of user expansion or substitution for modeling or output processing features. Several messages which can be issued are related strictly to program code modification and maintenance functions and are intended to serve merely as debug aids for future program expansion.

All messages output by the DESM have the same basic format which includes descriptive information, an indication of corrective action required, or termination status and in the case of the MP and OP, an indication of the simulated time at which the error condition was detected. Each message is formatted as follows:

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*    EXXnnnT - Description
*              Action or Termination Status
*
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

where:

XX -- identifies the DESM processor issuing the message as follows: IP, MP, OP

nnn -- message number

T -- Severity

I - information

W -- warning

S - severe (immediate termination required)

Description -- Message text providing a brief statement of the error condition

Action Termination Status -- a brief statement of required user action or execution status as follows:

1. Condition may be acceptable to the user

2. Condition must be corrected prior to the next run

3. Program execution cannot proceed beyond this point.

Time -- The current clock time as related to the MP and OP as follows:

1. MP -- Current simulated time XXXXX seconds

2. OP -- Time of last record read XXXXX seconds.

During error message processing, counts of all type I and W messages are maintained and if the number issued for a particular message or type exceeds sysgen limits, automatic program termination is performed. If this occurs, the user is notified of termination by issuance of one of the following messages:

1. TOO MANY OCCURRENCES OF THIS ERROR -- RUN FORCED TO TERMINATE

2. TOO MANY OCCURRENCES OF THIS TYPE OF ERROR -- RUN FORCED TO TERMINATE.

In many cases errors detected during execution can lead to other anomalous conditions which preclude graceful termination activities. If such a condition is noted in attempting to terminate execution after the occurrence of an error, automatic shutdown is performed and the user is notified by issuance of the following message:

o ERROR NOTED IN PROCESSING AFTER AN ERROR OCCURRENCE -- RUN ABRUPTLY TERMINATED.

## 7.1 INPUT PROCESSOR MESSAGES

The following categories of messages are defined for the DESM IP:

o Message number

  - 000-099 -- Control parameters

  - 100-199 -- System characteristics parameters

  - 200-299 -- Network definition processing

  - 300-399 -- Trip demand processing

- 400-499 -- Service Planning
- 500-599 -- Failure/repair requests
- 600-699 -- Active fleet size management
- 700-799 -- Station configuration.

Table 7-1 summarizes the messages which can be issued by the IP.

## 7.2 MODEL PROCESSOR MESSAGES

Table 7-2 summarizes by processing component the messages which can be issued by the MP.

## 7.3 OUTPUT PROCESSOR MESSAGES

Table 7-3 summarizes the messages which can be issued by the OP.

## 7.4 ERROR MESSAGE SOURCE ROUTINES

Table 7-4 lists the name of the routine which generates each error message keyed by the MSGID for each error message in Tables 7-1, 7-2, or 7-3. An "*" indicates that the error message is not used in the final version of the DESM. Some error messages may be called by more than one routine. Also, some error codes are generated by PL/1 macros (indicated by (PLI) after the source name) and can thus actually be generated by any routine using the specified macro.

TABLE 7-1. (1 of 15) INPUT PROCESSOR MESSAGES

CONTROL PARAMETER ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 1 | S | 'RUN MODEL PROCESSOR FOR RESTART'<br>RESTART IS AN INVALID REQUEST IN IP. |
| 2 | S | 'INVALID DATA HEADER'<br>RUNTIME OR SYSTEM CHARACTERISTICS DATA HAS INVALID DATA HEADER. |
| 3 | S | 'DATA TIME TAG OUT OF SEQUENCE'<br>RUNTIME DATA MUST BE IN INCREASING TIME ORDER. |
| 4 | W | 'MISSING RUN DESCRIPTION'<br>NO RUN INDEX DESCRIPTION DATA WAS SUPPLIED. INSERT RUN DESCRIPTION DATA INTO RUN INDEX FILE VIA EDIT. |
| 5 | S | 'TIME FIELD MUST BE ZERO FOR INITIALIZATION'<br>SYSTEM CHARACTERISTICS DATA MUST BE ENTERED WITH TIME EQUAL TO ZERO. |
| 6 | S | 'INVALID SYSTEM CHARACTERISTICS DATA TYPE'<br>ILLEGAL DATA HEADER TYPE. |
| 7 | S | 'INVALID LEVEL OF SERVICE BASIS'<br>THE DESIGNATED DEMAND MATRIX IS GREATER THAN THE NUMBER OF DEMAND INTERVALS TO PROCESS. |
| 8 | W | 'NAME NOT FOUND IN TABLE'<br>PARAMETER NAME IS MISSPELLED OR IS NOT A VALID INPUT. |

SYSTEM CHARACTERISTICS ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 101 | S | 'NOMINAL GUIDEWAY SPEED UNREASONABLE'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 102 | S | 'INVALID VEHICLE HEADWAY'<br>VEHICLE HEADWAY MUST BE LESS THAN TRAVEL TIME ON SHORTEST LINK. |
| 103 | S | 'INVALID VEHICLE LENGTH'<br>VEHICLE LENGTH MUST BE SHORTER THAN SHORTEST LINK. |
| 104 | W,S | 'UNREASONABLE VEHICLE CAPACITY'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 105 | S | 'INVALID REGULATION/CONTROL POLICY COMBINATION'<br>REVIEW OPTION SELECTION CAPABILITY IN USER'S MANUAL. |
| 106 | S | 'INVALID DISPATCH/CONTROL POLICY COMBINATION'<br>REVIEW OPTION SELECTION CAPABILITY IN USER'S MANUAL. |
| 107 | S | 'INVALID ENTRAINMENT/CONTROL POLICY COMBINATION'<br>REVIEW OPTION SELECTION CAPABILITY IN USER'S MANUAL. |
| 108 | S | 'INVALID ENTRAINMENT/SERVICE POLICY COMBINATION'<br>REVIEW OPTION SELECTION CAPABILITY IN USER'S MANUAL. |

TABLE 7-1. (2 of 15) INPUT PROCESSOR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 109 | S | 'INVALID MERGE/CONTROL POLICY COMBINATION'<br>REVIEW OPTION SELECTION CAPABILITY IN USER'S MANUAL. |
| 110 | S | 'INVALID PATH SELECTION/CONTROL POLICY COMBINATION'<br>REVIEW OPTION SELECTION CAPABILITY IN USER'S MANUAL. |
| 111 | S | 'INVALID PATH SELECTION/SERVICE POLICY COMBINATION'<br>REVIEW OPTION SELECTION CAPABILITY IN USER'S MANUAL. |
| 112 | S | 'INVALID PATH SELECTION METHOD'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 113 | S | 'INVALID PATH SELECTION ALGORITHM'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 114 | S | 'INVALID VEHICLE SPACING METHOD'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 115 | W,S | 'INVALID DISPOSITION OF EMPTY VEHICLES'<br>MUTUALLY EXCLUSIVE SELECTIONS APPEAR IN PVEPR.<br>CHECK EXPECTED RANGE IN EILIMITS. HIGHER PRIORITY<br>SELECTIONS TAKE PRECEDENCE. |
| 116 | S | 'INVALID EMPTY VEHICLE SOURCE LIST'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 117 | S | 'INVALID STATION LINK MERGE POLICY'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 118 | S | 'INVALID STATION LINK DIVERGE FUNCTION SELECTION'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 120 | W | 'INVALID VEHICLE MANEUVER'<br>MAXIMUM ADVANCE WAS GREATER THAN, IS NOW EQUAL TO, THE<br>NUMBER OF SLOTS ON THE SHORTEST LINK. |
| 121 | W | 'ONLINE STATIONS NOT PERMITTED WITH SYNCHRONOUS OR<br>QUASISYNCHRONOUS CONTROL, STATION MADE OFFLINE' |
| 122 | W | 'GUIDEWAY SPEED DEFAULTED TO PSPEED FOR SYNCHRONOUS<br>AND QUASI-SYNCHRONOUS CONTROL' |
| 123 | W | 'UNREASONABLE VEHICLE SPEED THROUGH ONLINE STATION'<br>SPEED IS EXPECTED TO BE LE THE SPEED ON THE<br>UPSTREAM LINK. |
| 124 | W | 'UNREASONABLE VEHICLE SPEED STANDARD DEVIATION'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 125 | W | 'VEHICLE SPEED VARIATION NOT PERMITTED WITH SYNCHRONOUS<br>OR QUASI-SYNCHRONOUS CONTROL'<br>STANDARD DEVIATION WILL BE SET TO ZERO. |
| 126 | W | 'UNREASONABLE BOARDING QUEUE CAPACITY'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 127 | I,W,S | 'UNREASONABLE BOARD/DEBOARD PARAMETERS'<br>CHECK EXPECTED RANGE OF STDBA, SMNDBT, STBA AND<br>STDHFF IN EILIMITS. |
| 128 | W | 'UNREASONABLE TRANSFER WALK TIME'<br>CHECK EXPECTED RANGE IN EILIMITS. |

TABLE 7-1. (3 of 15) INPUT PROCESSOR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 129 | S | 'INVALID LONGITUDINAL CONTROL POLICY SELECTION' VALUE MUST BE 1, 2 OR 3. |
| 130 | W | 'UNREASONABLE VEHICLE REACTION TIME TO ACCELERATE TO LINESPEED FROM STOP' CHECK EXPECTED RANGE IN EILIMITS. |
| 131 | W | 'UNREASONABLE VALUE(S) IN MERGE DELAY TABLE' CHECK EXPECTED RANGE IN EILIMITS. |
| 132 | S | 'INVALID BERTH ASSIGNMENT POLICY SELECTION' VALUE MUST BE 1 OR 2. |
| 133 | W | 'UNREASONABLE MERGE RESERVATION TABLE WINDOW WIDTH' CHECK EXPECTED RANGE IN EILIMITS. |
| 134 | S | 'UNREASONABLE FRACTION OF MERGE WINDOW TO BE RESERVED' VALUE MUST BE BETWEEN ZERO AND ONE INCLUSIVE. |
| 135 | W | 'DEMAND STOP NOT PERMITTED WITH SYNCHRONOUS CONTROL, REQUEST IGNORED' |
| 136 | S | 'UNREASONABLE LOCAL MERGE PRIORITY VALUE(S)' CHECK EXPECTED RANGE IN EILIMITS. |
| 137 | S | 'UNREASONABLE WEIGHTING FACTOR(S) FOR PATH SELECTION ALGORITHM' CHECK EXPECTED RANGE IN EILIMITS. |
| 138 | S | 'INVALID VEHICLE ARRIVAL LOG REQUEST' THE SPECIFIED NODE IS NOT A STATION ENTRY. |
| 139 | S | 'INVALID RANDOM NUMBER SEED' VALUE MUST BE ODD AND GE 3. |
| 140 | S | 'UNREASONABLE CHECKPOINT INTERVAL' CHECK EXPECTED RANGE IN EILIMITS. |
| 141 | S | 'UNREASONABLE SAMPLING INTERVAL' CHECK EXPECTED RANGE IN EILIMITS. |
| 142 | S | 'UNREASONABLE SNAPSHOT INTERVAL' CHECK EXPECTED RANGE IN EILIMITS. |
| 143 | S | 'UNREASONABLE PERIODIC COMPUTATION INTERVAL' CHECK EXPECTED RANGE IN EILIMITS. |
| 144 | W | 'UNREASONABLE TIME TO BEGIN READING TRIP RECORDS' CHECK EXPECTED RANGE IN EILIMITS. |
| 145 | W | 'UNREASONABLE CLOCK SCALE FACTOR' CHECK EXPECTED RANGE IN EILIMITS. |
| 146 | W | 'UNREASONABLE THRESHOLD ON TRANSACTIONS PER CLOCK TABLE ENTRY' CHECK EXPECTED RANGE IN EILIMITS. |
| 147 | W | 'UNREASONABLE TIME INCREMENT BETWEEN SUCCESSIVE CLOCK TABLE INTERVALS' CHECK EXPECTED RANGE IN EILIMITS. |

TABLE 7-1. (4 of 15) INPUT PROCESSOR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 148 | W | 'UNREASONABLE NUMBER OF ENTRIES IN CLOCK TABLE' CHECK EXPECTED RANGE IN EILIMITS. |
| 149 | S | 'SERIOUS ERROR FOUND IN PARAMETER CHECKS' SEE MESSAGES PRINTED ABOVE. |
| 150 | I | 'EMPTY VEHICLE SOURCE OPTION 6 PRECLUDES OTHER OPTIONS' |
| 151 | S | 'INVALID STATION LINK TRAVEL TIME' CHECK EXPECTED RANGE IN EILIMITS. TRAVEL TIME MUST BE EQUAL TO OR GREATER THAN THE HEADWAY ZONE TRAVEL TIME. |
| 152 | W | 'CLOCK TABLE PARAMETERS MAY RESULT IN INEFFICIENT CLOCK TABLE UTILIZATION' EITHER TOO FEW EVENTS WILL BE SCHEDULED IN THE CLOCK TABLE, RESULTING IN EXCESSIVE USE OF THE MULTIPLE THREAD LIST OR TOO MANY EVENTS WILL BE SCHEDULED IN THE CLOCK TABLE, RESULTING IN EXCESSIVE MANIPULATION OF THE CLOCK TABLE. |
| 153 | S | 'FIRST EVENT IN STATION MUST HAVE TIME GREATER THAN ZERO' HEADWAY(SLHTA OR SLHTB), TRAVEL(SLTTIM OR SLCFIG(2,*)) OR DEBOARD(STDBB), IF FIRST EVENT, MUST HAVE NONZERO TIME. |
| 154 | W | 'INVALID TOTAL STATION CAPACITY, DEFAULTS TO SUM OF ACTIVE LINKS' |
| 155 | S | 'INVALID HANDICAPPED PASSENGER BOARD/DEBOARD PARAMETERS' CHECK EXPECTED RANGE IN EILIMITS. |
| 156 | S | 'INVALID VEHICLE HANDICAPPED PASSENGER CAPACITY' CHECK EXPECTED RANGE IN EILIMITS. |
| 157 | S | 'UNREASONABLE MORGANTOWN BERTH ADVANCEMENT PARAMETERS' CHECK EXPECTED RANGE IN EILIMITS. |

NETWORK CONFIGURATION ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 200 | S | 'NETWORK DEFINITION DATA NOT SUPPLIED' USER REQUESTED A NEW NETWORK TO BE PROCESSED BUT DID NOT ENTER NETWORK DEFINITION DATA. |
| 201 | S | 'INVALID ORIGIN NODE IDENTIFICATION' DATA CHECKING WILL CONTINUE BUT MESSAGE 216 WILL BE GENERATED. |
| 202 | S | 'INVALID DESTINATION NODE IDENTIFICATION' DATA CHECKING WILL CONTINUE BUT MESSAGE 216 WILL BE GENERATED. |
| 203 | S | 'INVALID NODE TYPE' DATA CHECKING WILL CONTINUE BUT MESSAGE 216 WILL BE GENERATED. |

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 204 | S | 'EXCESSIVE NUMBER OF LINKS DEFINED'<br>NETWORK SIZE EXCEEDS SIMULATION CAPABILITY. |
| 205 | S | 'UNREASONABLE LINK LENGTH'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 206 | S | 'ORIGIN NODE MULTIPLE OCCURRENCE'<br>A NODE APPEARS AS AN ORIGIN MORE THAN TWICE. DATA CHECKING WILL CONTINUE BUT MESSAGE 216 WILL BE GENERATED. |
| 207 | S | 'DESTINATION NODE MULTIPLE USE'<br>A NODE APPEARS AS A DESTINATION MORE THAN TWICE. DATA CHECKING WILL CONTINUE BUT MESSAGE 216 WILL BE GENERATED. |
| 208 | S | 'STATION MULTIPLE OCCURRENCE'<br>A STATION NODE APPEARS AS AN ORIGIN OR AS A DESTINATION MORE THAN ONCE. DATA CHECKING WILL CONTINUE BUT MESSAGE 216 WILL BE GENERATED. |
| 209 | S | 'EXCESSIVE MERGES'<br>NUMBER OF MERGES EXCEEDS SIMULATION CAPABILITY. DATA CHECKING WILL CONTINUE BUT MESSAGE 216 WILL BE GENERATED. |
| 210 | S | 'EXCESSIVE STATIONS'<br>NUMBER OF STATIONS EXCEEDS SIMULATION CAPABILITY. DATA CHECKING WILL CONTINUE BUT MESSAGE 216 WILL BE GENERATED. |
| 211 | S | 'NETWORK NOT CONNECTED'<br>AN ORIGIN DOES NOT APPEAR AS A DESTINATION OR A DESTINATION DOES NOT APPEAR AS AN ORIGIN. DATA CHECKING WILL CONTINUE BUT MESSAGE 216 WILL BE GENERATED. |
| 216 | S | 'NETWORK DEFINITION ERROR'<br>ONE OR MORE SERIOUS ERRORS DETECTED IN NETWORK DEFINITION DATA, FURTHER PROCESSING PRECLUDED. |
| 217 | S | 'TOO MANY NETWORK NODES'<br>NETWORK SIZE EXCEEDS SIMULATION CAPABILITY. |
| 218 | S | 'MAXIMUM NUMBER OF CIJ EXCEEDED'<br>NETWORK CONFIGURATION EXCEEDS SIMULATION CAPABILITY. |
| 219 | S | 'TOO MANY BASIC VARIABLES'<br>NETWORK CONFIGURATION EXCEEDS SIMULATION CAPABILITY. |
| 220 | S | 'CELL INDEX CANNOT BE FOUND,PGM INDEX'<br>CHECK NETWORK CONFIGURATION. |
| 221 | S | 'CELL INDEX CANNOT BE FOUND,PGM CELLNR'<br>CHECK NETWORK CONFIGURATION. |
| 222 | S | 'LOOP CANNOT CONNECT'<br>CHECK NETWORK CONFIGURATION. |

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 223 | S | 'PARAMETRIC MODIFICATION ERROR'<br>PROGRAM ERROR IN EIMPTH. |
| 224 | S | 'DUAL VARIABLES CANNOT BE FOUND'<br>CHECK NETWORK CONFIGURATION. |
| 225 | S | 'INPUT VECTORS NOT EQUAL IN SUM'<br>PROGRAM ERROR IN EIMPTH. |
| 226 | S | 'NOT AT LEAST ONE COST PER ROW'<br>PROGRAM ERROR IN EIMPTH. |
| 227 | S | 'STATION EXITS TO A MERGE OR DIVERGE'<br>STATION MUST EXIT TO LINK UPSTREAM FROM MERGE OR DIVERGE. |
| 228 | S | 'ALTERNATE PATH DESTINATION INVALID'<br>THE SPECIFIED NODE IS NOT A STATION. |
| 229 | S | 'ALTERNATE PATH NODE INVALID'<br>SPECIFIED NODE IS NOT ON THE NETWORK. |
| 230 | S | 'ALTERNATE PATH NODE SEQUENCE INVALID'<br>TWO CONSECUTIVE NODES IN INPUT DATA ARE NOT ADJACENT ON THE NETWORK. |
| 231 | S | 'ALTERNATE PATH EXTENDS BEYOND DESTINATION'<br>PATH WILL BE TERMINATED AT THE DESTINATION. |
| 232 | S | 'INVALID SELECTION OF COST FOR LEAST COST PATH DETERMINATION'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 233 | I | 'INVALID PRIORITY LINK DEFINITION'<br>NODE LIST CONTAINS NON-EXISTENT NODES, NON-ADJACENT NODES OR DEFINE A LINK THAT DOES NOT END AT A MERGE. THE INVALID NODE PAIR WILL BE IGNORED. |
| 234 | I | 'SECOND ALTERNATE PATH DEFINITION FOR SAME COMMON DIVERGE'<br>SECOND DEFINITION WILL OVERRIDE THE FIRST. |
| 235 | S | 'ONE OR MORE SEVERE ERRORS DETECTED PROCESSING NETWORK PARAMETERS'<br>SEE MESSAGE(S) LISTED PREVIOUSLY. |

DEMAND GENERATION ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 300 | S | 'DEMAND DATA NOT SUPPLIED'<br>DEMAND GEN REQUESTED BUT NO DEMAND DATA WAS ENTERED. |
| 301 | S | 'DEMAND AND NETWORK ARE NOT COMPATIBLE'<br>NUMBER OF STATIONS IN NETWORK DATA DOES NOT EQUAL NUMBER OF STATIONS IN DEMAND DATA. |

TABLE 7-1. (7 of 15) INPUT PROCESSOR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 302 | S | 'DEMAND TIMEBASE UNREASONABLE' TIME PERIOD FOR DEMAND GENERATION IS NOT WITHIN LIMITS ALLOWED. CHECK DEMAND. |
| 305 | S | 'MAXIMUM TRIP GROUP SIZE UNREASONABLE' TRIP GROUP SIZE MAX IS NOT WITHIN LIMITS ALLOWED. CHECK DEMAND DATA. |
| 306 | S | 'INSUFFICIENT GROUP SIZE DATA' CHECK DEMAND INPUT DATA. |
| 307 | S | 'AT LEAST ONE DEMAND DATA SET REQD' USER REQUESTED DEMAND GENERATION OR SERVICE PLANNING BUT DID NOT SUPPLY DEMAND DATA INPUT. |
| 308 | S | 'INSUFFICIENT DEMAND DATA' PREMATURE END OF DEMAND DATA. CHECK INPUT. |
| 309 | S | 'TRIP GROUP SIZE DATA NOT SUPPLIED' CHECK DEMAND INPUT. |
| 310 | S | 'INSUFFICIENT GROUP SIZE SELECTION DATA' CHECK DEMAND INPUT DATA. |
| 311 | W | 'GROUP SIZE DISTRIBUTIONS 2 AND 3 SPECIFIED FOR ONE O-D PAIR. 3 WILL BE USED' USER INPUT SPECIFIED BOTH TRIP SIZE DISTRIBUTION 2 AND 3 FOR THE SAME ORIG-DEST. 3 WILL OVERLAY THE 2 SPECIFICATION. |
| 312 | S | 'INVALID ORIGIN OR DESTINATION SPECIFIED FOR GROUP SIZE DISTRIBUTION 2' INVALID STATION NO. |
| 313 | S | 'ONE OR MORE INVALID STATIONS SPECIFIED IN GROUP SIZE DISTRIBUTION DATA' |
| 314 | S | 'INVALID NUMBER OF PASSENGERS PER TIME INTERVAL' |
| 315 | S | 'INPUT DATA RESULTS IN INVALID NUMBER OF TRIPS PER HOUR' |
| 316 | S | 'INVALID ORIGIN OR DESTINATION SPECIFIED FOR GROUP SIZE SIZE DISTRIBUTION 3' |
| 317 | S | 'ERROR IN GROUP SIZE DISTRIBUTION INPUT' GROUP SIZE DISTRIBUTION COULD NOT BE CONVERTED TO CUMULATIVE PROBABILITY DISTRIBUTION |
| 318 | S | 'UNEXPECTED ERROR WHILE TRYING TO SAMPLE DESTINATION DISTRIBUTION' |
| 319 | S | 'ERROR IN DEMAND MATRIX GENERATES INVALID CUMULATIVE PROB. OR ORIGIN DISTRIBUTION' |
| 320 | S | 'TOO MANY TRIPS/HR/ORIGIN OR TRIPS/HR HAVE BEEN SPECIFIED' |
| 321 | S | 'ONE OR MORE SEVERE ERRORS FOUND IN TRIP DEMAND INPUT MATRIX' |

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 322 | S | 'ERROR IN DEMAND MATRIX GENERATES INVALID CUMULATIVE PROB. OF DESTINATION DISTRIBUTION' |
| 323 | S | 'UNEXPECTED ERROR WHILE TRYING TO SAMPLE CUMULATIVE PROBABILITY OF ORIGIN DISTRIBUTION' |
| 324 | S | 'UNEXPECTED ERROR WHILE TRYING TO SAMPLE TRIP SIZE DISTRIBUTION' |
| 325 | S | 'DEMAND MATRIX IS EMPTY'<br>A DEMAND MATRIX WITH NO DEMAND WAS SPECIFIED. |
| 326 | S | 'END OF FILE EXPECTED IN DEMAND INPUT AND DESCRIPTION FILE'<br>MULTIPLE DEMAND MATRICES IN THE SAME DATA SET MUST BE SEPARATED BY AN END OF FILE INDICATOR (-1). |

SERVICE PLANNING ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 400 | S | 'INVALID SERVICE TYPE' |
| 401 | S | 'INVALID SYSTEM LOAD FACTOR'<br>VALUE MUST BE GT 0 AND LE 1. |
| 402 | W | 'INVALID TRIP SUBGROUP SIZE'<br>VALUE MADE EQUAL TO VEHICLE CAPACITY. |
| 403 | S | 'UNREASONABLE MAXIMUM WAIT TIME'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 404 | S | 'INVALID GUIDEWAY LINK OCCUPANCY'<br>GUIDEWAY LINKS IMMEDIATELY UPSTREAM FROM STATIONS ARE THE ONLY LINKS ON WHICH TO PLACE VEHICLES. DISPATCH POLICY MUST BE NON-DETERMINISTIC. |
| 405 | S | 'INVALID NUMBER OF VEHICLES'<br>VALUE NOT ENTERED OR EXCEEDS SIMULATION CAPACITY. |
| 406 | S | 'MISSING EMPTY VEHICLE ALLOCATION DATA'<br>USER DEFINED LEVEL OF SERVICE AND DID NOT ENTER EMPTY ALLOCATION TABLE. |
| 407 | S | 'INVALID EMPTY VEHICLE ALLOCATION DATA'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 408 | I | 'MISSING STATION IN EMPTY VEHICLE ALLOCATION DATA'<br>AT LEAST ONE ENTRY SHOULD EXIST FOR EACH STATION. |
| 409 | S | 'INVALID STATION ID'<br>EMPTY VEHICLE RECEIVING NODE IS NOT A STATION. |
| 410 | S | 'MISSING EMPTY VEHICLE CIRCULATION DATA'<br>CIRCULATION ROUTES NOT ENTERED. |

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 411 | S | 'INVALID STATION ID'<br>EMPTY VEHICLE CIRCULATION ROUTE CONTAINS A NODE THAT IS NOT A STATION. |
| 412 | W | 'COMPUTED FLEET SIZE EXCEEDS MAXIMUM. WILL USE MAX (KMV)' |
| 413 | S | 'INITIAL VEHICLE PLACEMENT INCONSISTENT WITH FLEET SIZE'<br>THE TOTAL NUMBER OF VEHICLES PLACED ON GUIDEWAY LINKS AND IN STATIONS MUST BE EQUAL TO KNV. |
| 414 | S | 'USER REQUESTED EMPTIES BE SENT TO LOCAL STORAGE. THERE IS NO LOCAL STORAGE LINK' |
| 415 | S | 'REGIONAL STORAGE NOT SPECIFIED OR INVALID VALUE'<br>USER REQUESTED EMPTIES BE SENT TO REGIONAL STORAGE. THERE IS NO REGIONAL STORAGE SPECIFIED OR THE SPECIFIED NODE IS NOT A STATION. |
| 416 | S | 'TOO MANY EMPTY VEHICLE CIRCULATION ROUTES'<br>NUMBER OF ROUTES PERMITTED IS KMCR MINUS 1. |
| 417 | S | 'VEHICLE NEED ARRAYS DIMENSIONED TOO SMALL (KMANT)' |
| 418 | S | 'SERIOUS ERROR IN SERVICE PLANNING DATA. SEE MESSAGES ABOVE' |
| 419 | S | 'INVALID NUMBER OF ROUTES IN SCHEDULED SERVICE INPUT'<br>NO. OF ROUTES LESS THAN 1 OR GREATER THAN KMR |
| 420 | S | 'SCHEDULED SERVICE INPUT NODE FOR A ROUTE COMPONENT IS NOT A STATION' |
| 421 | S | 'SCHEDULED SERVICE INPUT DATA RESULT IN INVALID FLEET SIZE' |
| 422 | S | 'MAXIMUM NUMBER OF CIJ EXCEEDED'<br>NETWORK CONFIGURATION EXCEEDS SIMULATION CAPABILITY. |
| 423 | S | 'TOO MANY BASIC VARIABLES'<br>NETWORK CONFIGURATION EXCEEDS SIMULATION CAPABILITY. |
| 424 | S | 'CELL INDEX CANNOT BE FOUND,PGM INDEX'<br>CHECK NETWORK CONFIGURATION. |
| 425 | S | 'CELL INDEX CANNOT BE FOUND,PGM CELLNR'<br>CHECK NETWORK CONFIGURATION. |
| 426 | S | 'LOOP CANNOT CONNECT'<br>CHECK NETWORK CONFIGURATION. |
| 427 | S | 'PARAMETRIC MODIFICATION ERROR'<br>PROGRAM ERROR IN EIEMTY. |
| 428 | S | 'DUAL VARIABLES CANNOT BE FOUND'<br>CHECK NETWORK CONFIGURATION. |
| 429 | S | 'INPUT VECTORS NOT EQUAL IN SUM'<br>PROGRAM ERROR IN EIEMTY. |

TABLE 7-1. (10 of 15) INPUT PROCESSOR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 430 | S | 'NOT AT LEAST ONE COST PER ROW' PROGRAM ERROR IN EIEMTY. |
| 431 | W | 'TRANSFER STATION TABLE CONTAINS A NODE THAT IS NOT A STATION. ZERO SUBSTITUTED' |
| 432 | W | 'TRANSFER STATION TABLE CONTAINS AN INVALID NODE ID. ZERO SUBSTITUTED' |
| 433 | I | 'TRANSFERS NOT NECESSARY' TRANSFERS ARE NOT NECESSARY IN CYCLIC SCHEDULED SERVICE. |
| 434 | S | 'STATION NOT SERVED' A STATION DOES NOT APPEAR IN USER DEFINED ROUTES. |
| 435 | S | 'UNREASONABLE TRAIN LENGTH' CHECK EXPECTED RANGE IN EILIMITS. |
| 436 | S | 'LEVEL OF SERVICE UNDEFINED' EITHER HEADWAY OR NUMBER OF VEHICLES MUST BE SPECIFIED FOR EACH ROUTE. |
| 437 | S | 'INVALID ROUTE HEADWAY' VALUE IS LESS THAN VEHICLE HEADWAY OR GREATER THAN PERIOD OF ROUTE. |
| 438 | S | 'INVALID NUMBER OF VEHICLES PER ROUTE' VALUE MUST BE AT LEAST 1 AND CANNOT BE MORE THAN THE NUMBER OF VEHICLE HEADWAYS PER ROUTE. VALUE MUST BE A MULTIPLE OF THE TRAIN LENGTH. |
| 439 | S | 'INVALID SOURCE OF ROUTE DEFINITION' VALUE MUST BE 0 OR 1. |
| 440 | S | 'INVALID STATION LINK OCCUPANCY' STORAGE LINK IS THE ONLY LINK ON WHICH TO PLACE VEHICLES. STORAGE LINK MUST BE AVAILABLE. |
| 441 | S | 'GUIDEWAY LINK OCCUPANCY EXCEEDS CAPACITY' |
| 442 | S | 'INVALID ROUTE ASSIGNMENT' ROUTE ASSIGNMENT TABLE SPECIFIES A ROUTE THAT DOES NOT EXIST. |
| 443 | S | 'INVALID STATION LINK IN PSLIST' STATION DOES NOT INCLUDE ANY OF THE LINK TYPES ENTERED OR AN INVALID TYPE WAS ENTERED. VALID TYPES ARE: 1 (IR), 2 (IQ), 3 (DOCK WITHOUT BOARD EVENT), 8 (SI) |
| 444 | S | 'INVALID REGIONAL STORAGE ID' THE REGIONAL STORAGE LISTS CONTAIN A NODE THAT IS NOT A STATION. |
| 445 | I | 'RESERVATIONS PERMITTED ONLY IN DEMAND RESPONSIVE SERVICE, REQUEST IGNORED' |
| 446 | S | 'ROUTE ARRAYS DIMENSIONED TOO SMALL' PROCESSING STATUS IS PRINTED TO AID IN SELECTING NEW VALUES FOR KMR AND/OR KMRT. |

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 447 | S | 'NO STATION STORAGE AND TOTAL FLEET DOES NOT FIT ON GUIDEWAY' LINK CAPACITIES ARE TOO SMALL OR DEMAND TOO LARGE. |
| 448 | S | 'SERIOUS ERROR FOUND DURING SERVICE PLANNING. SEE MESSAGES ABOVE' |
| 449 | S | 'EMPTY VEHICLE SOURCE LIST INCLUDES LOCAL STORAGE, NONE DEFINED' |
| 450 | S | 'EMPTY VEHICLE SOURCE LIST INCLUDES CIRCUITOUS ROUTES, EMPTY ALLOCATION DOES NOT' |
| 451 | S | 'INVALID ROUTE IDENTIFICATION IN ROUTE GROUP LIST' |
| 452 | S | 'INSUFFICIENT ROUTE GROUPS DEFINED' ROUTE ASSIGNMENT MATRIX CONTAINS AT LEAST ONE GROUP FOR WHICH THE ROUTES COMPRISING THE GROUP ARE NOT DEFINED. |
| 453 | W | 'INVALID NUMBER OF VEHICLE SEATS' VALUE MADE EQUAL TO VEHICLE CAPACITY. |
| 454 | S | 'INVALID EMPTY VEHICLE CIRCULATION ROUTE ASSIGNMENT' VALUE MUST BE GREATER THAN ZERO AND LESS THAN OR EQUAL TO THE NUMBER OF CIRCULATION ROUTES DEFINED. |
| 455 | I | 'CIRCUITOUS EMPTY VEHICLES WITH STATIC ENTRAINMENT ALSO SELECTS DYNAMIC ENTRAINMENT' DYNAMIC DETRAINMENT IS REQUIRED TO PERMIT TRAIN SEPARATION AT STATION ENTRY FOR ONE VEHICLE TO ENTER. DYNAMIC ENTRAINMENT WILL BE ENABLED. |
| 456 | I | 'CALCULATED ROUTE HEADWAY EXCEEDS ROUTE PERIOD, HEADWAY RESET TO EQUAL PERIOD' |
| 457 | I | 'DUPLICATE EMPTY VEHICLE DISTRIBUTION SCHEME HAS BEEN IGNORED' |
| 458 | W | 'ENTRAINMENT NOT ALLOWED FOR MORGANTOWN DEMAND MODE' |
| 459 | S | 'LEVEL OF SERVICE MUST BE USER DEFINED FOR MORGANTOWN DEMAND MODE' |
| 460 | S | 'INVALID PLATFORM ASSIGNMENT FOR ORIGIN-DESTINATION TRIP' |
| 461 | S | 'INVALID MAXIMUM WAIT TIME FOR MORGANTOWN DEMAND MODE' CHECK EXPECTED RANGE IN EILIMITS. |
| 462 | S | 'INVALID MINIMUM GROUP TO REQUEST VEHICLE FOR MORGANTOWN DEMAND MODE' CHECK EXPECTED RANGE IN EILIMITS. |
| 463 | S | 'LEVEL OF SERVICE MUST BE MORGANTOWN DEMAND MODE TO USE MORGANTOWN RIPPLE BERTHING' |
| 464 | S | 'INVALID ADEQUATE SPACE IN CHANNELS FOR VEHICLES PARAMETER FOR MORGANTOWN DEMAND MODE' CHECK EXPECTED RANGE IN EILIMITS. |

TABLE 7-1. (12 of 15) INPUT PROCESSOR MESSAGES

FAILURE / RECOVERY ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 501 | S | 'GUIDEWAY LINK NODES SPECIFIED IN REQUEST ARE NOT ADJACENT' |
| 502 | S | 'FOR FAILURE OR RECOVERY REQUEST, EITHER LINK ENTRY OR EXIT OPTION MUST BE SPECIFIED' |
| 503 | S | 'REQUEST MUST BE FAILURE,RECOVERY,DEGRADATION, OR DEGRADATION RECOVERY' |
| 504 | S | 'NODE SPECIFIED IN STATION REQUEST IS NOT A STATION NODE' |
| 505 | S | 'INVALID STATION LINK TYPE SPECIFIED IN REQUEST' |
| 506 | S | 'VEHICLE DEGRADATION FACTOR IS NOT WITHIN THE LIMITS ALLOWED' |
| 507 | S | 'STATION LINK DEGRADATION FACTOR IS NOT WITHIN THE LIMITS ALLOWED' |
| 508 | S | 'ILLEGAL LINK NODES ENTERED IN REQUEST' CORRECT AFALRE INPUT. |
| 509 | W | 'TOO MANY FAILURE/RECOVERY REQUESTS. ADDITIONAL REQUESTS WILL BE IGNORED' CHANGE KNSLTN LIMIT TO ENABLE MODEL TO BUILD MORE LINK SUCCESSOR TABLES. |
| 510 | W | 'GUIDEWAY LINK ENTRY/EXIT IS ALREADY IN FAILURE MODE. REQUEST WILL BE IGNORED' |
| 511 | W | 'GUIDEWAY LINK ENTRY/EXIT IS NOT IN FAILURE MODE. RECOVERY REQUEST WILL BE IGNORED' |
| 512 | W | 'VEHICLE DEGRADATION NOT PERMITTED IN SYNCHRONOUS OR QUASI-SYNCHRONOUS CONTROL, REQUEST IGNORED' |
| 513 | S | 'MAXIMUM NUMBER OF FAILURES EXCEEDED' |
| 514 | S | 'TOW VEHICLE DEGRADATION FACTOR IS NOT WITHIN THE LIMITS ALLOWED' CHECK EXPECTED RANGE IN EILIMITS. |
| 515 | S | 'INVALID TOW PATH. BOTH LINKS FORMING MERGE ARE ON TOW PATH' |
| 516 | S | 'INVALID TOW PATH. NEITHER LINK FORMING MERGE IS ON TOW PATH' |
| 517 | W | 'INVALID RECOVERY METHOD. 1 = RESTART IS ASSUMED' |
| 518 | W | 'INVALID OTHER VEHICLE RESPONSE. 1 = REVENUE SERVICE IS ASSUMED' |
| 519 | S | 'NO PREVIOUS FAILURE REQUEST FOUND TO MATCH DEGRADATION RECOVERY' |
| 520 | W | 'WAIT IN STATION OTHER VEHICLE RESPONSE INVALID WITH PUSH COUPLE RECOVERY. 1 = REVENUE SERVICE ASSUMED' |

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 521 | W | 'INVALID LINK NUMBER ON TOW PATH' |
| 522 | S | 'NO VALID LINKS ON TOW PATH' |

ACTIVE FLEET SIZE MANAGEMENT ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 600 | S | 'INVALID DEMAND SELECTION'<br>ACTIVE FLEET SIZE MANAGEMENT MUST BE BASED ON A DEMAND MATRIX WHICH FOLLOWS THE MATRIX USED TO PLAN THE PREVIOUS LEVEL OF SERVICE. VALUE MUST NOT BE GREATER THAN THE NUMBER OF DEMAND INTERVALS TO PROCESS. |

STATION CONFIGURATION ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 700 | S | 'INVALID STATION LINK TYPE'<br>VALUE MUST BE BETWEEN ONE AND TEN INCLUSIVE. |
| 701 | W,S | 'NO VALID INPUT RAMP LINK'<br>INPUT RAMP OR LINK ACTING AS INPUT RAMP NOT DEFINED; DEFINE SINGLE LINK ENTERING STATION. |
| 702 | W,S | 'NO VALID OUTPUT RAMP LINK'<br>OUTPUT RAMP OR LINK ACTING AS OUTPUT RAMP NOT DEFINED; DEFINE SINGLE LINK EXITING THE STATION. |
| 703 | W,S | 'NO LAUNCH EVENT DEFINED'<br>DEFINE LAUNCH EVENT IN INPUT DATA. |
| 704 | W | 'DEBOARD-BOARD LINKS NOT EQUAL'<br>DOCK DEBOARD LINK NEEDS ONE-TO-ONE DEFINITION TO DOCK BOARD LINK; CORRECT ONE-TO-ONE DEFINITION IN SLCFIG USER DATA. |
| 705 | S | 'NO DOCK LINK'<br>NO DOCK DEBOARD LINK DEFINED; DEFINE DOCK IN INPUT DATA. |
| 706 | W | 'NUMBER OF INPUT QUEUES AND PARALLEL DOCKS NOT EQUAL'<br>MULTIPLE IQ'S NEED ONE-TO-ONE CORRESPONDENCE TO DOCKS; CORRECT INPUT DATA OR RECONFIGURE STATION. |
| 707 | W | 'NUMBER OF PARALLEL DOCKS AND OUTPUT QUEUES NOT EQUAL'<br>MULTIPLE OQ'S NEED ONE-TO-ONE CORRESPONDENCE TO DOCKS; CORRECT INPUT DATA OR RECONFIGURE STATION. |
| 708 | W | 'MORE THAN TEN LINKS OF SAME TYPE IN PARALLEL'<br>EITHER IQ, DOCK, OR OQ IS DEFINED TO BE GREATER THAN 10 PARALLEL LINKS. |

TABLE 7-1. (14 of 15) INPUT PROCESSOR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 709 | W,S | 'STORAGE EVENT NOT ON STORAGE LINK'<br>DEFINE STORAGE EVENT ON STORAGE LINK IN INPUT DATA. |
| 710 | W,S | 'STATION LINK EVENTS OUT OF ORDER'<br>DEFINE EVENTS IN ASCENDING NUMERIC ORDER IN INPUT DATA |
| 711 | W | 'MULTIPLE INPUT LINKS CONNECT TO GUIDEWAY'<br>MISSING IR LINK OR INCORRECT NUMBER OF IQ LINKS; DEFINE SINGLE LINK TO ENTER STATION. |
| 712 | W | 'NO UPSTREAM INPUT RAMP LINK'<br>MISSING IR LINK FOR CONFIGURATION; DEFINE IR LINK OR RECONFIGURE STATION. |
| 713 | W | 'NO STORAGE LINK'<br>CONFIGURATION NEEDS STORAGE LINK; DEFINE STORAGE LINK OR RECONFIGURE STATION. |
| 714 | W | 'MULTIPLE OUTPUT LINKS CONNECT TO GUIDEWAY'<br>NO SINGLE LINK TO EXIT STATION ONTO NETWORK; DEFINE SINGLE LINK TO EXIT STATION. |
| 715 | W,S | 'NO DOCK LINK'<br>CONFIGURATION REQUIRES DOCK LINK; DEFINE DOCK LINK. |
| 716 | S | 'INVALID NUMBER OF STATION LINKS (KNSL)'<br>USER MUST ENTER KNSL IF STATION CONFIGURATOR IS NOT USED. VALUE MUST BE LESS THAN OR EQUAL TO KMSL. |
| 717 | S | 'MAXIMUM TRAIN LENGTH AND STATION LINK CAPACITY ARE NOT COMPATIBLE'<br>EACH STATION LINK MUST BE ABLE TO HOLD AN ENTIRE TRAIN |
| 718 | S | 'INVALID STATION LINK CONNECTIVITY'<br>UPSTREAM OR DOWNSTREAM CONNECTIVITY DATA CONTAIN AN INVALID STATION LINK. |
| 719 | S | 'UNREASONABLE STATION LINK HEADWAY ZONE TRAVEL PARAMETERS'<br>CHECK EXPECTED RANGE IN EILIMITS. |
| 720 | S | 'INVALID STATION LINK EVENT SUBLIST DATA'<br>THE NUMBER OF SUBLISTS DOES NOT EQUAL KNSL. |
| 721 | S | 'UNREASONABLE SPEED ON STATION LINK'<br>VALUE NOT SUPPLIED OR VALUE IS NOT REASONABLE. |
| 722 | S | 'INVALID STATION LINK EVENT'<br>VALUE MUST BE IN THE RANGE ONE THROUGH SIX INCLUSIVE. |
| 723 | S | 'LAUNCH EVENT DEFINED ON LINK OF IMPROPER TYPE'<br>VALID TYPES ARE: 3(DOCK), 4(OUTPUT QUEUE), 5(OUTPUT RAMP) |
| 724 | S | 'NO DEBOARD AND/OR BOARD EVENT DEFINED' |
| 725 | S | 'LAUNCH EVENT DEFINED ON MORE THAN ONE TYPE OF LINK' |
| 726 | S | 'STORAGE TO OUTPUT LINK MUST LEAD TO A LAUNCH EVENT'<br>REVIEW STATION LINK CONNECTIVITY. |
| 727 | S | 'MAINTENANCE BARN MUST INCLUDE STORAGE LINK' |

| MSGID | SEVR | MESSAGE |
| --- | --- | --- |
| 728 | S | 'SCHEDULED SERVICE FLEET MODIFICATION REQUIRES AT LEAST ONE BARN' |
| 729 | S | 'INVALID STATION LINK DOCK TYPE FOR MORGANTOWN DEMAND MODE' |
| 730 | S | 'INVALID STATION LINK DOCK PLATFORM FOR MORGANTOWN DEMAND MODE' |

TABLE 7-2. (1 of 4) MODEL PROCESSOR MESSAGES

CODING & SPECIFICATION ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 100 | S | 'ATTEMPT TO REMOVE NULL ENTITY' AN ILLEGAL TRANSACTION ID WAS SPECIFIED IN ATTEMPTING TO DEQUEUE FROM A CHAINED LIST OF POINTERS IN A SIMULATION LIST MACRO DQUEM. PROBABLE USER CODING OR ASYNCHRONOUS DATA INPUT SPECIFICATION ERROR. |
| 101 | S | 'ATTEMPT TO CHECK NULL ENTITY' AN ILLEGAL TRANSACTION ID WAS SPECIFIED IN ATTEMPTING TO CHECK FOR THE PRESENCE OF A PARTICULAR ID IN A SIMULATION LIST MACRO QCHECK. PROBABLE USER CODING OR ASYNCHRONOUS DATA INPUT SPECIFICATION ERROR. |
| 102 | S | 'ATTEMPT TO RETURN 'TYPE' ENTITY WHEN STILL SOME CHAIN' IN ATTEMPTING TO RETURN A TRANSACTION OF 'TYPE' X-SYSTEM, V-VEHICLE, T-TRIP, THE TRANSACTION WAS STILL IN USE AS INDICATED BY ITS PRESENCE IN A SIMULATION LIST MACRO FREE. PROBABLE USER CODING OR ASYNCHRONOUS DATA INPUT SPECIFICATION ERROR. |
| 104 | S | 'ALL AVAILABLE ENTITIES OF TYPE 'TYPE' IN USE - SYSTEM CAPACITY EXCEDDED' IN ATTEMPTING TO OBTAIN A TRANSACTION OF 'TYPE' X-SYSTEM, V-VEHICLE, T-TRIP, NONE WERE FOUND. PROBABLE USER ERROR IN SPECIFYING INITIAL SIMULATION REQUIREMENTS OR PROBLEM SIZE EXCEEDS SYSGEN LIMITS (MACRO GET). |
| 106 | S | 'ATTEMPT TO PUT ENTITY 'TYPE' INTO CHAIN 'NAME' WHEN STILL IN SOME CHAIN' IN ATTEMPTING TO ENQUEUE A TRANSACTION OF 'TYPE' X-SYSTEM, V-VEHICLE, T-TRIP, INTO A SIMULATION LIST 'NAME' IT WAS FOUND TO ALREADY BELONG TO ANOTHER LIST. PROBABLE USER CODING OR ASYNCHRONOUS DATA INPUT SPECIFICATION ERROR. |

MODEL ARCHITECTURE ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 108 | W | 'ATTEMPT TO SCHEDULE AN EVENT FOR A NEGATIVE TIME DELAY - ZERO ASSUMED' THE TIME DELAY ASSOCIATED WITH A SIMULATION EVENT RESULTS IN A NEGATIVE DELAY - ZERO IS SUBSTITUTED. PROBABLE CODING OR USER DATA SPECIFICATION ERROR. |

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 150 | W | 'ATTEMPT TO BOARD IN SERVICE DR VEHICLE' |
| 200 | I | 'EMPTY DISTRIBUTION FAILED - VEHICLE ROUTED TO CURRENT STATION' |
| 201 | S | 'SYSTEM EVENT N.G.- PGM ERROR'<br>IN SCHEDULING A SYSTEM EVENT AN UNDEFINED PROCESS WAS SPECIFIED.<br>PROBABLE USER CODING ERROR IN IMPLEMENTING USER DEFINED ALGORITHM OR MODEL. |
| 204 | I | 'NO STOP CARD ENCOUNTERED - SIMULATION TERMINATED'<br>THE END OF ALL SCHEDULED TRANSACTIONS WAS REACHED WITHOUT ENCOUNTERING A USER DEFINED SIMULATION TERMINATION REQUEST. THE SIMULATION EXPERIMENT IS TERMINATED AS COMPLETE. |

GENERAL INPUT/OUTPUT ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 203 | S | 'ILLEGAL ASYNCHRONOUS INPUT REQUEST'<br>AN ILLEGAL ASYNCHRONOUS DATA IDENTIFIER WAS ENCOUNTERED IN READING THE RUNTIME DATA SET. PROBABLE USER ERROR IN MODIFY RUNTIME FILE. |
| 205 | W | 'NAME NOT FOUND IN TABLE'<br>VARIABLE NAME NOT RECOGNIZED BY GDIP. CHECK TABLE IN USER'S MANUAL. |
| 217 | S | 'CHECKPOINT NOT FOUND AT REQUESTED TIME'<br>AN ILLEGAL RESTART REQUEST WAS ENTERED. |
| 218 | W | 'UNEXPECTED END OF TRIP FILE DURING SYSTEM RESTART'<br>IN ATTEMPTING TO REPOSITION THE DEMAND INPUT FILE DURING RESTART AN END FILE WAS READ. THE FILE IS REWOUND AND USED BEGINNING WITH THE FIRST RECORD.<br>USER ERROR - INCONSISTENT FILE SPECIFICATION OR DEMAND INPUT DOESNT COINCIDE WITH THE REQUIRED SIMULATION INTERVAL. |
| 219 | W | 'UNEXPECTED END OF RUNTIME FILE DURING SYSTEM RESTART'<br>IN ATTEMPTING TO REPOSITION THE RUNTIME INPUT FILE DURING RESTART AN END FILE WAS READ. ASYNCHRONOUS RUNTIME DATA PROCESSING IS TERMINATED.<br>USER ERROR - INCONSISTENT FILE SPECIFICATION. |
| 220 | S | 'ILLEGAL HEADER TYPE ENCOUNTERED AT RESTART'<br>IN REPOSITIONING THE ASYNCHRONOUS RUNTIME INPUT FILE, AN ILLEGAL INPUT REQUEST WAS ENCOUNTERED.<br>USER ERROR - INCONSISTENT FILE SPECIFICATION. |

TABLE 7-2. (3 of 4) MODEL PROCESSOR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 221 | W | 'UNEXPECTED END OF RUN TIME DATA' AN END FILE WAS ENCOUNTERED IN READING THE ASYNCHRONOUS RUNTIME FILE. |
| 223 | S | 'ILLEGAL HANDICAPPED TRIP RECORD, PROCESS HALTED' PROBABLE USER ERROR - CHECK INPUT |

INTIALIZATION ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 222 | S | 'UNEXPECTED END OF TRIP FILE DURING INITIALIZATION' IN SCHEDULING THE FIRST TRIP ARRIVAL, AN IMMEDIATE END FILE WAS ENCOUNTERED. |
| 250 | W | 'CONNECTIVITY TO STATION STORAGE NOT COMPLETE - EMPTY DISTRIBUTION MAY FAIL' THE USER STATION DEFINITION IS INCOMPLETE AND MAY BE IN CONSISTENT WITH EMPTY VEHICLE DISTRIBUTION REQUIREMENTS. |
| 251 | W | 'CONNECTIVITY TO STATION STORAGE NOT COMPLETE - INTIALIZATION MAY FAIL' |

MODELLING ERROR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 301 | S | 'USER EMPTY MANAGEMENT ALGORITHM NOT IMPLEMENTED' THE USER HAS SELECTED A USER DEFINED ALGORITHM NOT AVAILABLE. |
| 302 | S | 'USER DIVERGE FUNCTION NOT IMPLEMENTED' THE USER HAS SELECTED A USER DEFINED ALGORITHM NOT AVAILABLE. |
| 303 | S | 'USER HEADWAY MODEL NOT AVAILABLE' THE USER HAS SELECTED A USER DEFINED ALGORITHM NOT AVAILABLE. |
| 304 | S | 'ILLEGAL SCHEDULED ROUTE' AN ILLEGAL ROUTE WAS ENCOUNTERED IN MODELLING VEHICLE TRAVERSAL OF A USER DEFINED ROUTE. PROBABLE USER ERROR IN SPECIFYING RUNTIME OVERRIDES. |
| 305 | W | 'EMPTY DISTRIBUTION FAILED- VEHICLE ROUTED TO CURRENT STATION' IN PERFORMING EMPTY VEHICLE ASSINMENT FOR DEMAND RESPONSIVE SERVICE, ALL EMPTY VEHICLE NEEDS IN THE NETWORK WERE STATISFIED. THE VEHICLE IS ROUTED THROUGH THE NETWORK TO ITS CURRENT DESTINATION. |

TABLE 7-2. (4 of 4) MODEL PROCESSOR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 306 | S | 'USER PERIODIC COMPUTATION PROCESSING NOT AVAILABLE'<br>THE USER HAS SELECTED A USER DEFINED ALGORITHM NOT AVAILABLE. |
| 307 | S | 'TRIP ARRIVAL AT WRONG STATION - INCONSISTENT DEMAND INPUT'<br>AN ORIGINATING TRIP HAS ARRIVED AT STATION WHICH CAN ONLY BE REACHED BY FIRST TRANSFERRING AT ANOTHER STATION AS GIVEN BY THE USER INPUT TRANSFER TABLE. |
| 308 | I | 'ATTEMPT TO INCREASE FLEET BEYOND AVAILABLE STORAGE CAPACITY'<br>A DEMAND RESPONSIVE FLEET SIZE MODIFICATION REQUESTING MORE VEHICLES THAN CAN BE ACCOMMODATED IN LOCAL STATION STORAGE AREAS WAS ENTERED. |
| 309 | S | 'ATTEMPT TO PERFORM FLEET MODIFICATION WHILE PRIOR REQUEST STILL ACTIVE'<br>A PREVIOUSLY REQUESTED ACTIVE FLEET SIZE MANAGEMENT REQUEST IS STILL BEING PERFORMED. |
| 310 | I | 'SIMULATION CHECKPOINT PERFORMED'<br>A CHECKPOINT RECORD HAS BEEN WRITTEN TO THE CHECKPOINT FILE. |
| 312 | I | 'NOT ENOUGH BARN CAPACITY FOR AFSM'<br>A SCHEDULED SERVICE FLEET MODIFICATION REQUESTED MORE VEHICLES TO BE DEFINED THAN CAN BE ACCOMODATED AT THE CLOSEST BARN. |
| 313 | S | 'FAILURE EVENT OCCURENCE MIS-MATCH'<br>A FAILURE OR DEGRADATION EVENT OR RECOVERY EVENT HAS OCCURRED OUT OF THE SEQUENCE IMPLIED BY THE INPUT CARDS. REVIEW FAILURE TIMES AND DELAYS. |
| 314 | S | 'NO AVAILABLE PATH THRU ON-LINE STATION' |
| 315 | I | 'NO VEHICLE CAPTURED BY DEGRADATION CONDITION'<br>DEGRADATION RECOVERY CARD PROCESSED BEFORE ANY VEHICLE REACHED SPECIFIED DEGRADATION LOCATION. |
| 316 | S | 'NO MAINTENANCE BARNS SPECIFIED WITH DEMAND RESPONSIVE DEGRADED VEHICLE RESPONSE' |
| 317 | S | 'MODELING ERROR, TRIP IN READY GROUP WILL NOT FIT ON VEHICLE' |
| 355 | W | 'CONNECTIVITY TO STATION STORAGE NOT COMPLETE - EMPTY DISTRIBUTION MAY FAIL'<br>REVISE STATION LINK CONFIGURATION. |
| 356 | W | 'CONNECTIVITY TO STATION STORAGE NOT COMPLETE - INITIALIZATION MAY FAIL'<br>REVISE STATION LINK CONFIGURATION. |

TABLE 7-3. (1 of 2) OUTPUT PROCESSOR MESSAGES

| MSGID | SEVR | MESSAGE |
|---|---|---|
| 101 | W | 'FORM FIELD INVALID - TSER ASSUMED' |
| 103 | I | 'NORMAL END OF RUN' |
| 104 | W | 'NO READ REQUEST ENTERED'<br>A SEQUENCE OF OUTPUT REQUESTS WERE ENTERED WITHOUT A SUBSEQUENT DATA AQUISITION COMMAND - NO OUTPUT PROCESSING IS PERFORMED. USER DATA SPECIFICATION ERROR. |
| 105 | W | 'NO DATA REQUESTS - OUTPUT FILE NOT READ' |
| 106 | S | 'END OF FILE DURING INITIALIZATION'<br>AN IMMEDIATE END FILE WAS ENCOUNTERED WHILE ATTEMPTING TO READ HEADER INFORMATION FROM THE RAW STATISTICS FILE.<br>PROBABLE I/O OR USER FILE SPECIFICATION ERROR. |
| 107 | W | 'TIME EXCEEDS TIME OF LAST RECORD'<br>A DATA ACQUISITION REQUEST WAS ENTERED SPECIFYING A TIME INTERVAL FOR DATA ACCUMULATION WHICH EXCEEDS THE RECORDED DATA IN THE RAW STATISTICS FILE. |
| 108 | W | 'NO RECORDS IN REQUESTED INTERVAL'<br>NO SAMPLE RECORDS CONTAINING REQUESTED DATA WERE FOUND WITHIN THE REQUESTED ACCUMLATION INTERVAL SPECIFIED VIA A READ COMMAND. |
| 109 | W | 'UNRECOGNIZED RECORD TYPE ON SIMULATION FILE'<br>A SAMPLING RECORD FOR AN UNRECOGNIZED STATISTICAL TYPE WAS READ FROM THE RAW STATISTICS FILE. PROBABLE USER ERROR - INCORRECT MEMBER SPECIFICATION. |
| 110 | W | 'BIN EMPTY'<br>NO SAMPLED DATA FOR A REQUESTED STATISTIC WAS FOUND. PROBABLE USER ERROR IN SPECIFYING THE STATISTIC NAME OR INPUT FILE. SPECIFICATION. |
| 301 | W | 'TOO MANY REQUESTS ENTERED - REQUEST IGNORED'<br>MORE THAN 400 EXPLICIT OR GENERATED DATA REQUESTS WERE SPECIFIED WITHOUT AN INTERVENING READ COMMAND. ALL SUBSEQUENT DATA REQUESTS IGNORED UNTIL A READ COMMAND OR END FILE IS ENCOUNTERED. |
| 302 | W | 'FORM INVALID - TSER HAS BEEN SUBSTITUTED'<br>AN ILLEGAL DISPLAY FORMAT HAS BEEN SPECIFIED, TIME SERIES LIST IS ASSUMED. |
| 307 | S | 'BAD FORM NUMBER IN REQUEST TABLE' |
| 308 | S | 'LOOP DETECTED IN REQUEST TABLE ENTRY CHAINING'<br>PROGRAM ERROR DUE TO CODE MODIFICATION OR MACHINE PROBLEM. |
| 309 | S | 'REQTLU SHOULD NOT HAVE BEEN CALLED'<br>DBUG AID ONLY FOR PROGRAM MODIFICATION. |

TABLE 7-3. (2 of 2) OUTPUT PROCESSOR MESSAGES

| MSGID | SEVR | MESSAGE |
| --- | --- | --- |
| 310 | W | 'EXPECTED HEADER RECORD NOT FOUND'<br>THE FORMAT OF THE RAW STATISTICS FILE IS INCORRECT.<br>PROBABLE I/O OR USER FILE SPECIFICATION ERROR. |
| 311 | W | 'ERROR DETECTED IN ATTEMPTING TO READ A HEADER'<br>AN UNCORRECTABLE I/O ERROR HAS BEEN ENCOUNTERED<br>IN READING THE RAW STATISTICS FILE. |
| 312 | W | 'EXPECTED FOLLOWER DOES NOT EXIST' |
| 313 | S | 'END OF DATA DURING SKIP OPERATION'<br>IN SKIPPING RECORDS IN THE RAW STATISTICS<br>FILE AN ERRONEOUS FILE FORMAT WAS DETECTED.<br>PROBABLE I/O OR USER FILE SPECIFICATION ERROR. |
| 314 | S | 'BAD SUB CATEGORY IN REQUEST TABLE' |
| 315 | S | 'END OF DATA IN FOLLOWERS'<br>UNEXPECTED END FILE ENCOUNTERED DURING READ OF<br>THE RAW STATISTICS FILE.<br>PROBABLE I/O OR USER FILE SPECIFICATION ERROR. |
| 316 | W | 'NO FOLLOWER'<br>EXPECTED FOLLOWER REOCORD NOT FOUND DURING<br>PROCESSING OF STATISTICS FILE.<br>FILE FORMAT IS INCORRECT.<br>PROBABLE I/O OR USER FILE SPECIFICATION ERROR. |
| 400 | S | 'NO SPACE IN BIN AREA'<br>DATA ACCUMULATION EXCEEDS SYSGEN SIZE OF OP. |
| 401 | S | 'WRONG DIRECTION'<br>DBUG AID FOR PROGAM MODIFICATION ONLY. |
| 402 | W | 'ABOVE CARD NOT RECOGNIZED - IGNORED'<br>AN ILLEGAL OP COMMAND REQUEST HAS BEEN ENTERED |
| 404 | S | 'NOT PUSH'<br>MODELLING ERROR IN BIN ALLOCATION. |
| 405 | S | 'BAD BIN'<br>AN ILLEGAL OP COMMAND REQUEST HAS BEEN ENTERED<br>DBUG AID FOR PROGAM MODIFICATION ONLY. |

TABLE 7-4. ERROR MESSAGE SOURCE (Page 1 of 7)

Input Processor

| MSGID | SOURCE ROUTINE |
|---|---|
| 1 | EINPUT |
| 2 | EINPUT |
| 3 | EINPUT |
| 4 | EINPUT |
| 5 | EINPUT |
| 6 | EINPUT |
| 7 | EINPUT |
| 8 | EIGDIP4 |
| 101 | EINDPP |
| 102 | EINDPP |
| 103 | EICHCK, EINDPP |
| 104 | EICHCK |
| 105 | EICHCK |
| 106 | EICHCK |
| 107 | EICHCK |
| 108 | EICHCK |
| 109 | EICHCK |
| 110 | EICHCK |
| 111 | EICHCK |
| 112 | EICHCK |
| 113 | EICHCK |
| 114 | EICHCK |
| 115 | EIDRSP |
| 116 | EICHCK |
| 117 | EICHCK |
| 118 | EICHCK |
| 120 | EICHCK |
| 121 | EINDPP |
| 122 | EINDPP |
| 123 | EINDPP |
| 124 | EICHCK |
| 125 | EICHCK |
| 126 | EICHCK |
| 127 | EICHCK |
| 128 | EICHCK |
| 129 | EICHCK |
| 130 | EICHCK |
| 131 | EICHCK |
| 132 | EICHCK |
| 133 | EICHCK |
| 134 | EICHCK |
| 135 | EICHCK |
| 136 | EICHCK |
| 137 | EICHCK |
| 138 | EICHCK |
| 139 | EICHCK |
| 140 | EICHCK |

Input Processor (Cont'd.)

| MSGID | SOURCE ROUTINE |
|---|---|
| 141 | EICHCK |
| 142 | EICHCK |
| 143 | EICHCK |
| 144 | EICHCK |
| 145 | EICHCK |
| 146 | EICHCK |
| 147 | EICHCK |
| 148 | EICHCK |
| 149 | EICHCK |
| 150 | EICHCK |
| 151 | EICHCK |
| 152 | EICHCK |
| 153 | EICHCK |
| 154 | EICHCK |
| 155 | EICHCK |
| 156 | EICHCK |
| 157 | EICKCK |
| 200 | EINTWK |
| 201 | EINDPP |
| 202 | EINDPP |
| 203 | EINDPP |
| 204 | EINTWK |
| 205 | EINDPP |
| 206 | EINDPP |
| 207 | EINDPP |
| 208 | EINDPP |
| 209 | EINDPP |
| 210 | EINDPP |
| 211 | EINDPP |
| 216 | EIALTP |
| 217 | EINDPP |
| 218 | * |
| 219 | * |
| 220 | * |
| 221 | * |
| 222 | * |
| 223 | * |
| 224 | * |
| 225 | * |
| 226 | * |
| 227 | EINDPP |
| 228 | EIALTP |
| 229 | EIALTP |
| 230 | EIALTP |
| 231 | EIALTP |
| 232 | EINDPP |
| 233 | EINDPP |
| 234 | EIALTP |

TABLE 7-4. ERROR MESSAGE SOURCE (Page 3 of 7)

Input Processor (Cont'd.)

| MSGID | SOURCE ROUTINE |
|---|---|
| 235 | EINDPP |
| 300 | EINPUT |
| 301 | EINPUT |
| 302 | EINPUT |
| 305 | EINPUT |
| 306 | EINPUT |
| 307 | EINPUT |
| 308 | EINPUT |
| 309 | EINPUT |
| 310 | EINPUT |
| 311 | EITNIT |
| 312 | EITNIT |
| 313 | EITNIT |
| 314 | EITNIT |
| 315 | EITNIT |
| 316 | EITNIT |
| 317 | EITNIT |
| 318 | EITRIP |
| 319 | EITRIP |
| 320 | EITRIP |
| 321 | EINPUT, EITRIP |
| 322 | EITRIP |
| 323 | EITRIP |
| 324 | EITRIP |
| 325 | EITRIP |
| 326 | EINPUT |
| 400 | EISERV |
| 401 | EICHCK |
| 402 | EICHCK |
| 403 | EICHCK |
| 404 | EICHCK |
| 405 | EIDRSP |
| 406 | EIDRSP |
| 407 | EIDRSP |
| 408 | EIDRSP |
| 409 | EIDRSP |
| 410 | EIDRSP |
| 411 | EIDRSP |
| 412 | EIDRSP |
| 413 | EICHCK |
| 414 | EIDRSP |
| 415 | EIDRSP |
| 416 | EIDRSP |
| 417 | EIDRSP |
| 418 | * |
| 419 | EISCHD |
| 420 | EISCHD |
| 421 | EISCHD |

Input Processor (Cont'd.)

| MSGID | SOURCE ROUTINE |
|---|---|
| 422 | EIEMTY |
| 423 | EIEMTY |
| 424 | EIEMTY |
| 425 | EIEMTY |
| 426 | EIEMTY |
| 427 | EIEMTY |
| 428 | EIEMTY |
| 429 | EIEMTY |
| 430 | EIEMTY |
| 431 | EICHCK |
| 432 | EICHCK |
| 433 | EICHCK |
| 434 | EISCHD |
| 435 | EICHCK |
| 436 | EISCHD |
| 437 | EISCHD |
| 438 | EISCHD |
| 439 | EICHCK |
| 440 | EICHCK |
| 441 | EICHCK |
| 442 | EISCHD |
| 443 | EICHCK |
| 444 | EICHCK |
| 445 | EICHCK |
| 446 | EISCHD |
| 447 | EIDRSP |
| 448 | EIDRSP, EIMORG, EISCHD |
| 449 | EICHCK |
| 450 | EICHCK |
| 451 | EISCHD |
| 452 | EISCHD |
| 453 | EICHCK |
| 454 | EIDRSP |
| 455 | EIDRSP |
| 456 | EISCHD |
| 457 | EIDRSP |
| 458 | EICHCK |
| 459 | EICHCK |
| 460 | EIMORG |
| 461 | EIMORG |
| 462 | EIMORG |
| 463 | EICHCK |
| 464 | EIMORG |
| 501 | EIFAIL |
| 502 | EIFAIL |
| 503 | EIFAIL |
| 504 | EIFAIL |
| 505 | EIFAIL |

Input Processor

| MSGID | SOURCE ROUTINE |
|---|---|
| 506 | EIFAIL |
| 507 | EIFAIL |
| 508 | EIFAIL |
| 509 | EIFAIL |
| 510 | EIFAIL |
| 511 | EIFAIL |
| 512 | EIFAIL |
| 513 | EIFAIL |
| 514 | EIFAIL |
| 515 | EIFAIL |
| 516 | EIFAIL |
| 517 | EIFAIL |
| 518 | EIFAIL |
| 519 | EIFAIL |
| 520 | EIFAIL |
| 521 | EIFAIL |
| 522 | EIFAIL |
| 600 | EINPUT |
| 700 | EICHCK, EISCFG |
| 701 | EICHCK, EISCFG |
| 702 | EICHCK, EISCFG |
| 703 | EICHCK, EISCFG |
| 704 | EISCFG |
| 705 | EISCFG |
| 706 | EISCFG |
| 707 | EISCFG |
| 708 | EISCFG |
| 709 | EICHCK, EISCFG |
| 710 | EICHCK, EISCFG |
| 711 | EISCFG |
| 712 | EISCFG |
| 713 | EISCFG |
| 714 | EISCFG |
| 715 | EICHCK, EISCFG |
| 716 | EICHCK, EINDPP |
| 717 | EICHCK, EISCHD |
| 718 | EICHCK |
| 719 | EICHCK |
| 720 | EICHCK |
| 721 | EICHCK |
| 722 | EICHCK, EISCFG |
| 723 | EICHCK, EISCFG |
| 724 | EICHCK, EISCFG |
| 725 | EICHCK, EISCFG |
| 726 | EICHCK |
| 727 | EICHCK |
| 728 | EIFAIL, EISCHD |
| 729 | EICHCK |
| 730 | EICHCK |

TABLE 7-4. ERROR MESSAGE SOURCE (Page 6 of 7)

Model Processor

| MSGID | SOURCE ROUTINE |
|---|---|
| 100 | DQUEM (PLI) |
| 101 | * |
| 102 | FREE (PLI) |
| 104 | GET (PLI) |
| 106 | MULTICK (PLI) |
| 108 | EAPFEL |
| 150 | ESBDL |
| 200 | ESEVA, ESEVB |
| 201 | EMODEL |
| 203 | EAASYN |
| 204 | EMODEL |
| 205 | EMGDIP4 |
| 217 | EACKR |
| 218 | EACKR |
| 219 | EACKR |
| 220 | EACKR |
| 221 | * |
| 222 | * |
| 223 | EACKR, EAINIT, EATORG |
| 250 | * |
| 251 | * |
| 301 | EUEVA, EUEVB |
| 302 | EUDIVF |
| 303 | EGSCHD, EGTEST, EGUNTR, EGUTVL |
| 304 | * |
| 305 | * |
| 306 | EUPCMP |
| 307 | * |
| 308 | EAAFSM, EAPCMP |
| 309 | EAASYN |
| 310 | EACKR |
| 312 | EAIVEH |
| 313 | EAPCMP, EGFAIL, EGSCHD |
| 314 | EAPCMP |
| 315 | EGFAIL |
| 316 | ESNSTN |
| 317 | ESBDL |
| 355 | EANMDL |
| 356 | EANMDL |

Output Processor

| MSGID | SOURCE ROUTINE |
|---|---|
| 101 | EOUTPT |
| 103 | EOUTPT |
| 104 | EOUTPT |
| 105 | EZREAD |

TABLE 7-4. ERROR MESSAGE SOURCE (Page 7 of 7)

Output Processor (Cont'd.)

| MSGID | SOURCE ROUTINE |
|---|---|
| 106 | EZREAD |
| 107 | EZREAD |
| 108 | EZREAD |
| 109 | * |
| 110 | * |
| 301 | EREQU |
| 302 | EREQU |
| 307 | ESETUP |
| 308 | EREQTLU |
| 309 | EREQTLU |
| 310 | EHEADER |
| 311 | EHEADER |
| 312 | ESKIPFO |
| 313 | ESKIPFO |
| 314 | EREAD02, EREAD03, EREAD04, EREAD05, EREAD06 |
| 315 | EREAD02, EREAD03, EREAD04, EREAD05, EREAD06 |
| 316 | CKFOLLOW (PLI) |
| 400 | EABIN, EBNCHK |
| 401 | ESHIFT |
| 402 | EOUTPT |
| 404 | EABIN |
| 405 | EABIN |

# APPENDIX A. SAMPLE RUN SETUPS

- o Input Processor Linkage Editor Input
- o Model Processor Linkage Editor Input
- o Output Processor Linkage Editor Input
- o Batch Mode Operation
  - \- Input Processor JCL
  - \- Model Processor JCL
  - \- Output Processor JCL
  - \- Instream Data Definition
- o Terminal Mode Operation

## Terminal Mode Operation

To execute the DESM from a terminal, create data set members containing the same information shown for Batch Mode Operation (e.g., Figures A-4 through A-7). Submit the desired member to the job stream using the Time Sharing Option (TSO) SUBMIT command as follows:

SUBMIT 'AGT.AGT.CNTL(DESMIP)'

where

AGT.AGT.CNTL (DESMIP) contains the JCL shown in Figure A-4.

```
INCLUDE OBJECT(EIPSAV)      ESTABLISH COMMON AREA ADDRESSABILITY
INCLUDE OBJECT(EACOMN)      FORCE ORDERING COMMONS FOR INTERFACE TO MP
INCLUDE OBJECT(EINPUT)      INPUT PROCESSOR CONTROL
INCLUDE OBJECT(EIBWRT)      BINARY INPUT/OUTPUT
INCLUDE OBJECT(EICHCK)      INPUT PARAMETER CHECKING
INCLUDE OBJECT(EISCHD)      SCHEDULED SERVICE PLANNING
INCLUDE OBJECT(EIDRSP)      DEMAND RESPONSIVE SERVICE PLANNING
INCLUDE OBJECT(EIEMTY)      EMPTY VEHICLE ALLOCATION
INCLUDE OBJECT(EIMORG)      MORGANTOWN DEMAND MODE SERVICE PLANNING
INCLUDE OBJECT(EIINIT)      INPUT PROCESSOR INITIALIZATION
INCLUDE OBJECT(EIMNAM)      PARAMETER LIST DECODE
INCLUDE OBJECT(EIMPTH)      LEAST COST PATH DETERMINATION
INCLUDE OBJECT(EIMNTP)      TRANSPORTATION ALGORITHM
INCLUDE OBJECT(EINDPP)      NETWORK DEFINITION PREPROCESSING
INCLUDE OBJECT(EINTWK)      NETWORK PROCESSING CONTROL
INCLUDE OBJECT(EINRPT)      NETWORK SUMMARY REPORT
INCLUDE OBJECT(EIALTP)      ALTERNATE PATH TABLE GENERATION
INCLUDE OBJECT(EIFAIL)      FAILURE/RECOVERY PROCESSING
INCLUDE OBJECT(EIPARM)      ESTABLISH PARM FIELD ADDRESSABILITY
INCLUDE OBJECT(EISCFG)      STATION CONFIGURATOR
INCLUDE OBJECT(EITNIT)      TRIP DEMAND INITIALIZATION
INCLUDE OBJECT(EITRIP)      TRIP DEMAND GENERATION
INCLUDE OBJECT(EIUDGN)      DETERMINISTIC TRIP DEMAND GENERATION
INCLUDE OBJECT(EINFMT)      NETWORK DATA FORMATTING
INCLUDE OBJECT(EINSLT)      BUILD SUCCESSOR LINK TABLE
INCLUDE OBJECT(EIDRPT)      TRIP DEMAND SUMMARY REPORT
INCLUDE OBJECT(EISRPT)      SYSTEM CHARACTERISTICS SUMMARY REPORT
INCLUDE OBJECT(EIARPT)      ACTIVE FLEET SIZE MANAGEMENT REPORT
INCLUDE OBJECT(EIRNG)       RANDOM NUMBER GENERATOR
INCLUDE OBJECT(EIRSEL)      SAMPLE FROM CUMULATIVE PROBABILITY DIST.
INCLUDE OBJECT(EISERV)      SERVICE PLANNING CONTROL
INCLUDE OBJECT(EINERR)      ERROR MESSAGES
INCLUDE OBJECT(DAYTIM)      OBTAIN DATE AND TIME
INCLUDE OBJECT(DTIMEL)      READ SYSTEM CLOCK
INCLUDE OBJECT(EIADDR)      ESTABLISH ADDRESSABILITY TO COMMONS
INCLUDE OBJECT(XNDBOR)      PERFORM GENERALIZED DATA INPUT PROCESSING
INCLUDE OBJECT(XPSEUDO)     PERFORM GENERALIZED DATA INPUT I/O
INCLUDE OBJECT(EIGDIP4)     DEFINE GENERALIZED DATA INPUT VARIABLES
INCLUDE OBJECT(XGDIPX4)     PROCESS BYTE DATA IN GDIP FORMAT
INCLUDE OBJECT(XGDIPF4)     PROCESS FULLWORD DATA IN GDIP FORMAT
INCLUDE OBJECT(XGDIPH4)     PROCESS HALFWORD DATA IN GDIP FORMAT
INCLUDE OBJECT(EAFLAG)      PROCESS AN AUXILIARY OUTPUT REQUEST
INCLUDE OBJECT(EIERROR)     PROCESS AN ERROR MESSAGE
INCLUDE OBJECT(XTRACBK)     INTERRUPT HANDLER
INCLUDE OBJECT(XTRCBKP)     SAVE AREA TRACE FORMATTING
CHANGE FIOCS#(PFIOCS)       INTERCEPT FORTRAN I/O
INCLUDE SYSLIB(IBCOM#)      INCLUDE FORTRAN I/O ROUTINE
OVERLAY REGION1(REGION)
INSERT BEGCOM               DEFINE START OF DATA COMMONS
OVERLAY REGION1A            PLACE IP DATA IN COMMON REGION
INSERT ECICFG                1 - STATION CONFIGURATION DATA
INSERT ECNSYS                2 - SYSTEM DATA
INSERT ECNDMD                3 - DEMAND DATA
INSERT ECNPOL                4 - POLICY DATA
INSERT ECNNET                5 - NETWORK DATA
INSERT ECAMSG                6 - MESSAGE DATA
OVERLAY REGION2             START OF STRUCTURED DATA REGION
INSERT IPNET                 START OF NETWORK STRUCTURED DATA
OVERLAY REGION2A
INSERT ECINET                 1 - NETWORK STRUCTURED DATA
INSERT ECNSTR                 2 - NETWORK STRUCTURED DATA USED BY IP
OVERLAY REGION3
INSERT IPSYS                 START OF SYS CHAR STRUCTURED DATA
OVERLAY REGION3A
INSERT ECIMAX                 1 - PROBLEM SIZE LIMITS
INSERT ECIFEL                 2 - FUTURE EVENTS LIST DATA
```

FIGURE A-1. (1 of 2) INPUT PROCESSOR LINKAGE EDITOR INPUT

```
INSERT ECISL                      3 - STATION LINK DATA
INSERT ECIGL                      4 - GUIDEWAY LINK DATA
INSERT ECIVEH                     5 - VEHICLE DATA
INSERT ECISTN                     6 - STATION DATA
INSERT ECIPOL                     7 - POLICY DATA
INSERT ECISYS                     8 - SIMULATION SYSTEM DATA
OVERLAY REGION4
INSERT ENDCOM                   DEFINE END OF DATA COMMONS
ENTRY EIPARM                    DEFINE PSUEDO ENTRY TO GET PARM FIELD ADDR
NAME EINPUT(R)                  NAME THE EXECUTABLE LOAD MODULE
```

FIGURE A-1. (2 of 2) INPUT PROCESSOR LINKAGE EDITOR INPUT

```
INCLUDE OBJECT(ESASAV)          ESTABLISH COMMON AREA ADDRESSABILITY
INCLUDE OBJECT(EACOMN)          FORCE ORDERING DATA IN CHECKPOINT REGION
INCLUDE OBJECT(EANTIX)          ESTABLISH PARM FIELD ADDRESSABILITY
INCLUDE OBJECT(EAINDX)          DECODE PARM FIELD & WRITE INDEX FILE
INCLUDE OBJECT(DAYTIM)          OBTAIN DATE & TIME
INCLUDE OBJECT(DTIMEL)          READ SYSTEM CLOCK
INCLUDE OBJECT(EANTSA)          INTIALIZE SYS CHAR & NETWORK DATA
INCLUDE OBJECT(EANSAV)          INITALIZE COMMON AREA ADDRESSES
INCLUDE OBJECT(EACKR)           PERFORM CHECKPOINT/RESTART
INCLUDE OBJECT(EADADD)          OBTAIN COMMON AREA ADDRESSES
INCLUDE OBJECT(EAASYN)          PERFORM ASYNCHRONOUS DATA PROCESSING
INCLUDE OBJECT(EAFLAG)          PROCESS AN AUXILLARY OUTPUT REQUEST
INCLUDE OBJECT(EATORG)          PROCESS A TRIP ARRIVAL
INCLUDE OBJECT(EANMDL)          PERFORM MODEL INITIALIZATION
INCLUDE OBJECT(EANRPT)          DISPLAY INITIAL CONDITIONS REPORT
INCLUDE OBJECT(EARRPT)          DISPLAY RESTART CONDITIONS REPORT
INCLUDE OBJECT(EAPLNK)          PERFORM A GUIDEWAY DEQUEUING EVENT
INCLUDE OBJECT(EAPSTN)          PERFORM A STATION DEQUEUING EVENT
INCLUDE OBJECT(EAPCMP)          PERFORM PERIODIC COMPUTATION EVENT
INCLUDE OBJECT(EAAFSM)          PERFORM ACTIVE FLEET SIZE MANAGEMENT
INCLUDE OBJECT(EAIVEH)          INITIALIZE NEW SCHED SERVICE VEHICLES
INCLUDE OBJECT(EASTOR)          SEARCH STORAGE FOR AVAILABLE VEHICLES
INCLUDE OBJECT(EANTRN)          COUPLE AND LAUNCH NEW SCHED SERV TRAINS
INCLUDE OBJECT(EAFTRN)          COUPLE FOR PUSH BY TRAILING VEHICLE
INCLUDE OBJECT(EGNEXT)          DETERMINE THE NEXT ENTITY FOR GUIDEWAY VEH
INCLUDE OBJECT(EGVLOG)          LOG VEHICLE ARRIVALS AT STATION ENTRY
INCLUDE OBJECT(EGGNXT)          DETERMINE NEXT GUIDEWAY LINK
INCLUDE OBJECT(EGTEST)          TEST AVAILABILITY OF A GUIDEWAY LINK
INCLUDE OBJECT(EASAMP)          PERFORM PERIODIC SAMPLING
INCLUDE OBJECT(EASRPT)          DISPLAY INTERMEDIATE SAMPLING REPORT
INCLUDE OBJECT(EAFRPT)          DISPLAY TERMINATION REPORT
INCLUDE OBJECT(EAZNIT)          PERFORM STATISTICS INITIALIZATION
INCLUDE OBJECT(EZINT)           COMPUTE TIME INTEGRALS
INCLUDE OBJECT(EZZERO)          ZERO STATUS STATISITCS FOR NEXT SAMPLE
INCLUDE OBJECT(EZHDR)           WRITE A HEADER REOCRD TO RAW STATS FILE
INCLUDE OBJECT(EANDR)           PERFORM DR SERVICE INITIALIZATION
INCLUDE OBJECT(EANSCD)          PERFORM SCHEDULED SERVICE INITIALIZATION
INCLUDE OBJECT(EANMRG)          PERFORM MORGANTOWN DEM MODE INITIALIZATION
INCLUDE OBJECT(EMODEL)          MODELLING CONTROL
INCLUDE OBJECT(EAINIT)          INITIALIZATION CONTROL
INCLUDE OBJECT(EANFEL)          PERFORM FUTURE EVENTS LIST INITIALIZATION
INCLUDE OBJECT(EANXTN)          PERFORM TRANSACTION DATA INITIALIZATION
INCLUDE OBJECT(EAPFEL)          PLACE A TRANSACTION ON FUTRE EVENTS LIST
INCLUDE OBJECT(EAERR)           PROCESS AN ERROR MESSAGE
INCLUDE OBJECT(ESFAIL)          PERFORM STATION FAILURE PROCESSING
INCLUDE OBJECT(EGFAIL)          PERFORM GUIDEWAY FAILURE PROCESSING
INCLUDE OBJECT(EGLEAV)          GUIDEWAY LINK EXIT PROCESSING
INCLUDE OBJECT(EGLMDL)          GUIDEWAY LINK MODEL CONTROL
INCLUDE OBJECT(EGLNTR)          GUIDEWAY LINK ENTRY PROCESSING
INCLUDE OBJECT(EGLWTQ)          QUEUE A VEHICLE ON A GUIDEWAY LINK
INCLUDE OBJECT(EGASTN)          ALTERNATE STATION ASSIGNMENT
INCLUDE OBJECT(EGQMRG)          QUASI-SYNCHRONOUS CONTROL
INCLUDE OBJECT(EGFNTR)          FIXED HEADWAY TRAVEL SEGMENT ENTRY
INCLUDE OBJECT(EGVNTR)          VARIABLE HEADWAY TRAVEL SEGMENT ENTRY
INCLUDE OBJECT(EGFTVL)          FIXED BLOCK TRAVEL SEGMENT TRAVERSAL
INCLUDE OBJECT(EGVTVL)          VARIABLE BLOCK TRAVEL SEGMENT TRAVERSAL
INCLUDE OBJECT(EGDTRN)          DYNAMIC (ON GUIDEWAY) DETRAINMENT
INCLUDE OBJECT(EGETRN)          DYNAMIC (ON GUIDEWAY) ENTRAINMENT
INCLUDE OBJECT(EGTRNC)          TRAIN COMPATIBILITY CHECK
INCLUDE OBJECT(EGSCHD)          SCHEDULE VEHICLE FOLLOWER
INCLUDE OBJECT(EGRESV)          GUIDEWAY LINK EMPTY & RESERVED VEHICLE PR.
INCLUDE OBJECT(EGEMTY)          GUIDEWAY LINK EMPTY VEHICLE PROCESSING
INCLUDE OBJECT(EGCNXT)          NEXT STATION - CIRCUITOUS EMPTY
INCLUDE OBJECT(EGVALS)          VEHICLE ETA & ARRIVAL LIST RECORDING
INCLUDE OBJECT(EGHTRN)          TRAIN HEADWAY TRAVERSAL PROCESSING
INCLUDE OBJECT(EGTCTL)          TRIP COMPATIBILITY CHECK CONTROL
```

FIGURE A-2. (1 of 3) MODEL PROCESSOR LINKAGE EDITOR INPUT

```
INCLUDE OBJECT(EGTCHK)       TRIP COMPATIBILITY CHECK
INCLUDE OBJECT(EGDSTP)       DEMAND STOP SERVICE PROCESSING
INCLUDE OBJECT(EGQNTR)       ADVANCE POSITIONING PROCESSING
INCLUDE OBJECT(EGPATH)       REAL-TIME PATH SELECTION
INCLUDE OBJECT(EGPRMY)       PRIMARY PATH COST COMPUTATION
INCLUDE OBJECT(EGALT)        ALTERNATE PATH COST COMPUTATION
INCLUDE OBJECT(ESVALS)       RECORD VEHICLES PREDICTED STATION ARRIVAL
INCLUDE OBJECT(ESTEST)       STATION LINK ENTRY PROCESSING
INCLUDE OBJECT(ESTABQ)       PERFORM TIRP STATION ARRIVAL PROCESSING
INCLUDE OBJECT(ESVREQ)       MORGANTOWN REQUEST VEHICLE PROCESSING
INCLUDE OBJECT(ESAREQ)       MORGANTOWN ASSIGN VEHICLE PROCESSING
INCLUDE OBJECT(ESEVA)        PERFORM EMPTY VEHICLE ASSIGNMENT
INCLUDE OBJECT(ESEVB)        PERFORM EMPTY VEHICLE BUMPING
INCLUDE OBJECT(ESVRES)       RESERVE A VEHICLE FOR AN ARRIVING TRIP
INCLUDE OBJECT(ESNEXT)       DETERMINE NEXT ENTITY FOR VEH IN STATION
INCLUDE OBJECT(ESDIVF)       USER STATION DIVERGE FUNCTION SELECTION
INCLUDE OBJECT(ESDIVO)       USER DIVERGE ORDERING OF STATION LINKS
INCLUDE OBJECT(ESLWTQ)       QUEUE A VEH ON A STATION LINK
INCLUDE OBJECT(ESLMDL)       STATION MODEL CONTROL
INCLUDE OBJECT(ESMDLN)       DETERMINE NEXT STATION MODEL EVENT
INCLUDE OBJECT(ESMDLA)       PERFORM AFTER STATION EVENT PROCESSING
INCLUDE OBJECT(ESMDLB)       PERFORM BEFORE STATION EVENT PROCESSING
INCLUDE OBJECT(ESSDLY)       COMPUTE SCHEDULE DELAY
INCLUDE OBJECT(ESLDLY)       COMPUTE LAUNCH DELAY
INCLUDE OBJECT(ESMDLY)       PERFORM MERGE RESERVATION
INCLUDE OBJECT(ESNTRN)       PERFORM STATIC VEHICLE ENTRAINMENT
INCLUDE OBJECT(ESLEAV)       PERFORM STATION LINK EXIT PROCESSING
INCLUDE OBJECT(ESBDL)        CREATE A LIST OF BOARDING TRIPS
INCLUDE OBJECT(ESTCHK)       MULTI-PARTY COMPATIBILITY CHECK
INCLUDE OBJECT(ESDBL)        CREATE A LIST OF DEBOARDING TRIPS
INCLUDE OBJECT(ESTLOG)       CREATE A COMPLETED TRIP LOG ENTRY
INCLUDE OBJECT(ESNSTN)       DETERMINE THE NEXT STATION FOR A VEH
INCLUDE OBJECT(ESPATH)       SELECT A VEHICLE PATH
INCLUDE OBJECT(EAFINS)       PERFORM MODEL TERMINATION PROCESSING
INCLUDE OBJECT(XNDBOR)       PERFORM GENERALIZED DATA INPUT PROCESSING
INCLUDE OBJECT(XPSEUDO)      PERFORM GENERALIZED DATA INPUT I/O
INCLUDE OBJECT(EMGDIP4)      DEFINE GENERALIZED DATA INPUT VARIABLES
INCLUDE OBJECT(XGDIPX4)      PROCESS BYTE DATA IN GDIP FORMAT
INCLUDE OBJECT(XGDIPF4)      PROCESS FULLWORD DATA IN GDIP FORMAT
INCLUDE OBJECT(XGDIPH4)      PROCESS HALFWORD DATA IN GDIP FORMAT
INCLUDE OBJECT(XTRACBK)      INTERRUPT HANDLER
INCLUDE OBJECT(XTRCBKP)      SAVE AREA TRACE FORMATTING
INCLUDE OBJECT(EUEVA)        USER DEFINED EMPTY VEHICLE ASSIGNMENT
INCLUDE OBJECT(EUEVB)        USER DEFINED EMPTY VEHICLE BUMPING
INCLUDE OBJECT(EUDIVF)       USER DEFINED DIVERGE FUNCTION
INCLUDE OBJECT(EUPCMP)       USER DEFINED PERIODIC COMPUTATION PROCESS
INCLUDE OBJECT(EGUNTR)       USER DEFINED GUIDEWAY LINK ENTRY
INCLUDE OBJECT(EGUTVL)       USER DEFINED GUIDEWAY LINK TRAVEL
CHANGE FIOCS#(PFIOCS)        INTERCEPT FORTAN I/O
INCLUDE SYSLIB(IBCOM#)       INCLUDE FORTAN I/O ROUTINE
OVERLAY REGION1(REGION)
INSERT BEGCOM                DEFINE START OF CHECKPOINT REGION
OVERLAY REGION1A              PLACE MP DATA IN COMMON REGION
INSERT ECMSYS                   1-  SYSTEM DATA
INSERT ECMFEL                   2-  FUTURE EVENTS LIST DATA
INSERT ECAMSG                   3-  MESSAGE DATA
INSERT ECMVEH                   4-  VEHICLE DATA
INSERT ECMSTN                   5-  STATION DATA
INSERT ECMSL                    6-  STATION LINK DATA
INSERT ECMGL                    7- GUIDEWAY LINK DATA
INSERT ECMXTN                   8- TRANSACTION DATA
INSERT ECMTRP                   9-  TRIP DATA
INSERT ECMPOL                   10- POLICY OPTIONS
INSERT ZCLNK                    11- GUIDEWAY LINK STATISTICS
INSERT ZCVEH                    12- VEHICLE STATISTICS
INSERT ZCSTN                    13- STATION STATISTICS
```

FIGURE A-2. (2 of 3) MODEL PROCESSOR LINKAGE EDITOR INPUT

```
INSERT ZCSL                   14- STATION LINK STATISTICS
INSERT ZCSYST                 15- SYSTEM STATISTICS
INSERT ZCSYSS                 16- SYSTEM STATISTICS - STATIONS
INSERT ZCSYSG                 17- SYSTEM STATISTICS - GUIDEWAYS
INSERT ZCSYSR                 18- SYSTEM STATISTICS - ROUTES
INSERT ZCRTE                  19- ROUTE STATISTICS
INSERT ZCTRP                  20- TRIP STATISTICS
OVERLAY REGION2              START OF INITIALIZATION REGION
INSERT IPNET                  START OF IP DEFINED NETWORK DATA
OVERLAY REGION2A
INSERT ECINET                  IP DEFINED NETWORK DATA
OVERLAY REGION3
INSERT IPSYS                  START OF IP DEFINED SYS CHAR
OVERLAY REGION3A
INSERT ECIMAX                 1-  PROBLEM SIZE LIMITS
INSERT ECIFEL                 2-  FUTURE EVENTS LISTS DATA
INSERT ECISL                  3-  STATION LINK DATA
INSERT ECIGL                  4-  GUIDEWAY LINK DATA
INSERT ECIVEH                 5-  VEHICLE DATA
INSERT ECISTN                 6-  STATION DATA
INSERT ECIPOL                 7-  POLICY SELECTION DATA
INSERT ECISYS                 8-  SIMULATION OPTIONS
OVERLAY REGION4              END INITIALIZATION REGION
INSERT ENDCOM                DEFINE END OF CHECKPOINT REGION
ENTRY EANTIX                DEFINE PSUEDO MODEL ENTRY FOR PARM ADDR
NAME EMODEL(R)             NAME THE EXECUTABLE LOAD MODULE
```

FIGURE A-2. (3 of 3) MODEL PROCESSOR LINKAGE EDITOR INPUT

```
INCLUDE OBJECT(EOUTPT)         OUTPUT PROCESSOR CONTROL
INCLUDE OBJECT(EONTIX)         ESTABLISH PARM FIELD ADDRESSABILITY
INCLUDE OBJECT(EOINDX)         WRITE INDEX FILE
INCLUDE OBJECT(DAYTIM)         OBTAIN DATE & TIME
INCLUDE OBJECT(DTIMEL)         CONVERT TIME TO HHMMSECS
INCLUDE OBJECT(EOZNIT)         OUTPUT PROCESSOR INITIALIZATION
INCLUDE OBJECT(EOFLAG)         PROCESS AN AUXILLARY OUTPUT REQUEST
INCLUDE OBJECT(EDBIN)          PERFORM INITIAL BIN ALLOCATIONS
INCLUDE OBJECT(EOERR)          PROCESS AN ERROR MESSAGE
INCLUDE OBJECT(EODATA)         DEFINE OUTPUT PROCESSOR DATA
INCLUDE OBJECT(ESKIPFO)        SKIP FOLLOWER RECORDS
INCLUDE OBJECT(EHEADER)        READ A HEADER RECORD
INCLUDE OBJECT(ESETUP)         PERFORM DATA TABLE INITIALIZATION
INCLUDE OBJECT(EREQTLU)        PERFORM REQUEST CORRELATION
INCLUDE OBJECT(EREQU)          PROCESS A USER DATA REQUEST
INCLUDE OBJECT(ESHIFT)         SHIFT CONTENTS OF A BIN TO ACQUIRE SPACE
INCLUDE OBJECT(EBNCHK)         CHECK BIN FOR SUFFICIENT STORAGE SPACE
INCLUDE OBJECT(EABIN)          PERFORM BIN AREA REALLOCATION
INCLUDE OBJECT(EDUMBIN)        DUMP THE CONTENTS OF A BIN
INCLUDE OBJECT(EZREAD)         CONTROL READING OF RAW STATISTICS FILE
INCLUDE OBJECT(ESTORE)         STORE A SAMPLED ITEM IN A BIN
INCLUDE OBJECT(EZPLOT)         PLOT CONTROL
INCLUDE OBJECT(EZLIST)         LIST CONTROL
INCLUDE OBJECT(ELIST)          DISPLAY TIME SERIES LIST OR STAT. SUMMARY
INCLUDE OBJECT(EZHIST)         HISTOGRAM CONTROL
INCLUDE OBJECT(EMNMX)          DETERMINE MIN MAX OF SAMPLED ITEMS
INCLUDE OBJECT(EHIST)          DISPLAY A HISTOGRAM OF SAMPLED ITEMS
INCLUDE OBJECT(EGRAPH)         DISPLAY TIME SERIES PLOT OF SAMPLED ITEMS
INCLUDE OBJECT(EREAD02)        PROCESS SYSTEM STATISTICS
INCLUDE OBJECT(EREAD03)        PROCESS STATION STATISTICS
INCLUDE OBJECT(EREAD04)        PROCESS STATION LINK STATISTICS
INCLUDE OBJECT(EREAD05)        PROCESS GUIDEWAY STATISTICS
INCLUDE OBJECT(EREAD06)        PROCESS ROUTE STATISTICS
INCLUDE OBJECT(EOPSUM)         PERFORMANCE SUMMARY GENERATION
INCLUDE OBJECT(EOPRPT)         PERFORMANCE SUMMARY REPORT
INCLUDE OBJECT(EOSSUM)         SYSTEM SUMMARY STATISTICS GENERATION
INCLUDE OBJECT(EOSRPT)         SYSTEM SUMMARY STATISTICS REPORT
INCLUDE OBJECT(AADATE)
INCLUDE OBJECT(DERROR)
INCLUDE OBJECT(ETACUM)
INCLUDE OBJECT(ETCAPT)
INCLUDE OBJECT(ETCOMP)
INCLUDE OBJECT(ETMERG)
INCLUDE OBJECT(ETMEAS)
INCLUDE OBJECT(ETNMBR)
INCLUDE OBJECT(ETRPTS)
INCLUDE OBJECT(ETSSPM)
INCLUDE OBJECT(ETSTID)
INCLUDE OBJECT(ETSTAT)
INCLUDE OBJECT(ETTOTL)
INCLUDE OBJECT(XPSEUDO)        I/O INTERRUPT HANDLING
INCLUDE OBJECT(XTRACBK)        INTERRUPT HANDLER
INCLUDE OBJECT(XTRCBKP)        SAVE AREA TRACE FORMATTING
CHANGE FIOCS#(PFIOCS)          INTERCEPT FORTAN I/O
INCLUDE SYSLIB(IBCOM#)         INCLUDE FORTRAN I/O PACKAGE
ENTRY EONTIX                   DEFINE PSUEDO OP ENTRY FOR PARM ADDR
NAME EOUTPT(R)                 NAME THE EXECUTABLELOAD MODULE
```

FIGURE A-3. OUTPUT PROCESSOR LINKAGE EDITOR INPUT

```
//STANDARD JOB CARD INFORMATION
//*
//*       EXECUTE DESM INPUT PROCESSOR
//*
//EIP     EXEC AGTEIP,
//             PROJECT=TSCA,                DATA FILE PROJECT NAME
//             LIBRARY=DESMPVT,             LOAD LIBRARY
//             MODULE=EINPUT,               DESM IP LOAD MODULE
//             IREGION=2200K,               REGION SIZE
//             IPTIME='(1,0)',              MAX RUN TIME
//             OUTPUT=A,                    OUTPUT CLASS
//             SYSTEM=EDEMO1,               SYSTEM CHARACTERISTICS INPUT
//             INDEX=DEMO,                  RUN INDEX FILE
//             DEMAND=EDEMO1A,              TRIP DEMAND INPUT/OUTPUT
//             DEMAND2=EDEMO1B,             TRIP DEMAND INPUT 2
//             DEMAND3=EDEMO1C,             TRIP DEMAND INPUT 3
//             DEMAND4=NULL,                TRIP DEMAND INPUT 4
//             DEMAND5=NULL,                TRIP DEMAND INPUT 5
//             NETIN=EDEMO1,                NETWORK INPUT
//             RUNTIME=EDEMO1,              RUNTIME INPUT/OUTPUT
//             NETWORK=EDEMO1,              NETWORK OUTPUT
//             NOMTIME=NULL                 NOMINAL TRAVEL TIME MATRIX
```

FIGURE A-4. INPUT PROCESSOR JCL

```
//STANDARD JOB CARD INFORMATION
//*
//*       EXECUTE DESM MODEL PROCESSOR
//*
//EMP   EXEC AGTEMP,
//           PROJECT=TSCA,                        DATA FILE PROJECT NAME
//           LIBRARY=DESMPVT,                     LOAD LIBRARY
//           MODULE=EMODEL,                       DESM MP LOAD MODULE
//           MREGION=3400K,                       REGION SIZE
//           MPTIME='(0,45)',                     MAX EXECUTION TIME
//           OUTPUT=A,                            OUTPUT DEVICE
//           SYSTEM=EDEMO1,                       SYSTEM CHARACTERISTICS
//           NETWORK=EDEMO1,                      NETWORK CHARACTERISTICS
//           INDEX=DEMO,                          INDEX FILE
//           SAMPLE=EDEMO1,                       RAW STATS,CHECKPOINT,TRIP LOG
//           DEMAND=EDEMO1A,                      TRIP ARRIVAL LIST
//           RUNTIME=EDEMO1,                      RUN TIME DATA
//           RESTART=NULL                         RESTART MEMBER
```

FIGURE A-5. MODEL PROCESSOR JCL

```
//STANDARD JOB CARD INFORMATION
//*
//*       EXECUTE DESM OUTPUT PROCESSOR
//*
//EOP   EXEC AGTEOP,
//           PROJECT=TSCA,              DATA FILE PROJECT NAME
//           LIBRARY=DESMPVT,           LOAD LIBRARY
//           MODULE=EOUTPT,             DESM OP LOAD MODULE
//           OREGION=1450K,             REGION SIZE
//           OPTIME='(0,15)',           MAX EXECUTION TIME
//           OUTPUT=A,                  OUTPUT DEVICE
//           INDEX=DEMO,                INDEX FILE
//           SAMPLE=EDEMO1,             RAW STATISTICS FILE MEMBER
//           TRIPLOG=NULL,              TRIP LOG FILE MEMBER
//           PERSUM=NULL,               PERFORMANCE SUMMARY FILE MEMBER
//           REQUEST=EODEMO1            REQUEST FILE MEMBER
```

FIGURE A-6. OUTPUT PROCESSOR JCL

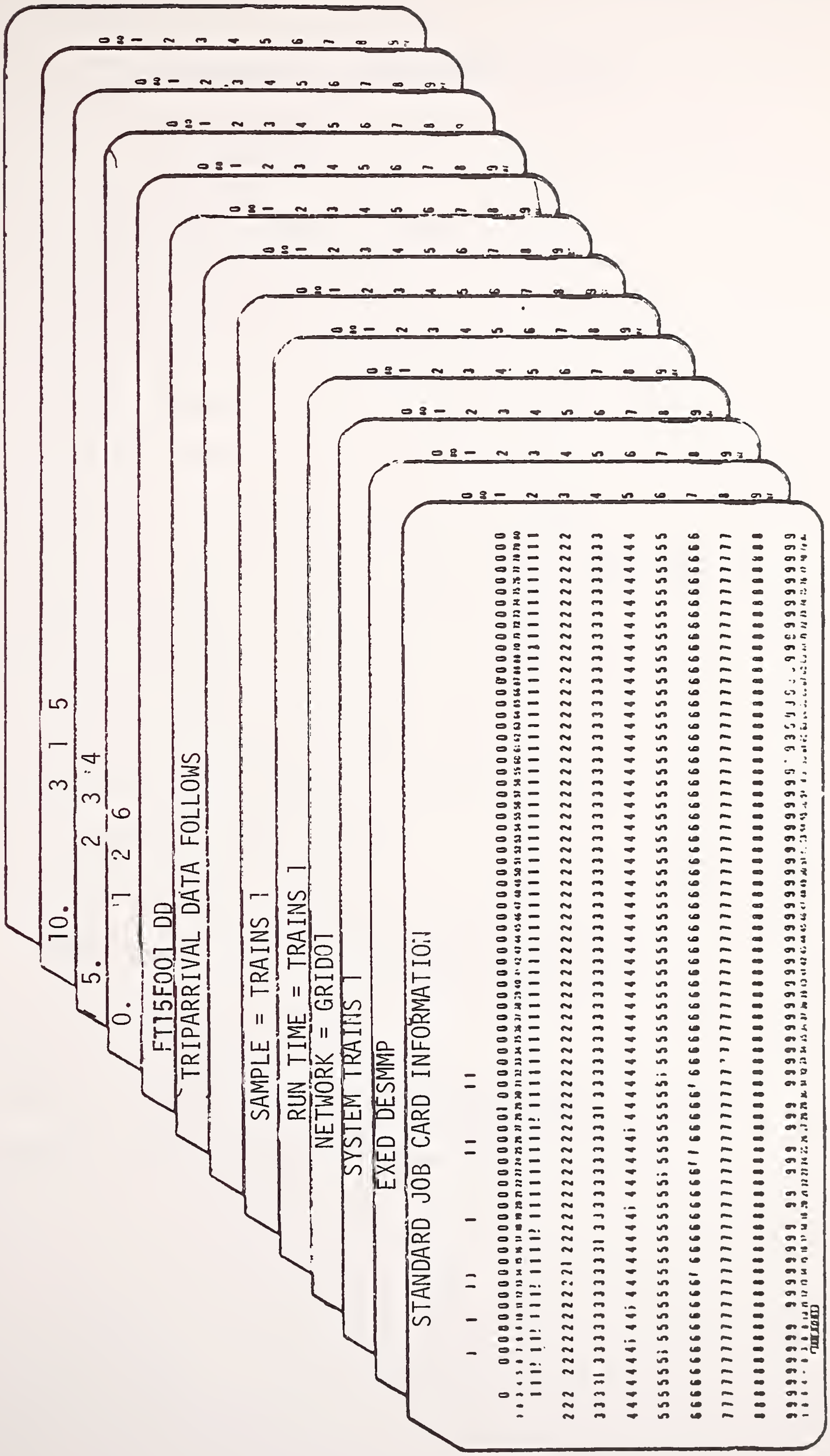



FIGURE A-7. JCL INCLUDING INSTREAM DATA DEFINITION

# APPENDIX B. SAMPLE MODEL OUTPUTS

- o Input Processor Network Summary Report
- o Input Processor Trip Demand Generation Report
- o Input Processor System Characteristics Report
- o Input Processor Initial Level of Service Report
- o Input Processor Alternate Path Report
- o Input Processor Failure/Recovery Summary
- o Input Processor Active Fleet Size Management Report
- o Model Processor Initial Conditions Report
- o Model Processor Intermediate Sampling Report
- o Model Processor Termination Status Report
- o Model Processor Restart Conditions Report
- o Performance Summary Report
- o System Summary Report
- o Station-to-Station Performance Measures Report

Table B-1 - Raw Statistics

Table B-2 - Derivations of Performance Summary Measures

Table B-3 - Derivations of System Summary Measures

DESM NETWORK SUMMARY

NETWORK CONFIGURATION

NUMBER OF LINKS = 22
NUMBER OF STATIONS = 5
NUMBER OF MERGES = 9

| LINK ID | NODES START | NODES END | STATION ID | STATION ON/OFF LINE | STATION ENTRY LINK | STATION EXIT LINK | DIVERGE ID | DIVERGE TO LINKS | | MERGE ID | MERGE FROM LINKS | | MERGE FROM STATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2 | | | | | | | | | | | |
| 2 | 2 | 3 | 1 | OFF | 1 | 3 | | | | | | | |
| 3 | 3 | 4 | | | | | | | | 5 | 2 | | 1 |
| 4 | 4 | 5 | | | | | 1 | 5 | 22 | | | | |
| 5 | 5 | 6 | | | | | | | | | | | |
| 6 | 6 | 7 | | | | | | | | | | | |
| 7 | 7 | 8 | 2 | OFF | 6 | 8 | | | | | | | |
| 8 | 8 | 9 | | | | | | | | 6 | 7 | | 2 |
| 9 | 9 | 10 | | | | | | | | 2 | 8 | 21 | |
| 10 | 10 | 11 | 3 | OFF | 9 | 11 | | | | | | | |
| 11 | 11 | 12 | | | | | 2 | 12 | 17 | 7 | 10 | | 3 |
| 12 | 12 | 1 | | | | | 3 | 1 | 13 | 3 | 11 | 22 | |
| 13 | 1 | 13 | | | | | | | | | | | |
| 14 | 13 | 14 | | | | | | | | | | | |
| 15 | 14 | 15 | 4 | OFF | 14 | 16 | | | | | | | |
| 16 | 15 | 16 | | | | | | | | 8 | 15 | | 4 |
| 17 | 12 | 16 | | | | | | | | 4 | 11 | 22 | |
| 18 | 16 | 17 | | | | | | | | 1 | 16 | 17 | |
| 19 | 17 | 18 | 5 | OFF | 18 | 20 | | | | | | | |
| 20 | 18 | 19 | | | | | | | | 9 | 19 | | 5 |
| 21 | 19 | 9 | | | | | | | | | | | |
| 22 | 5 | 12 | | | | | 4 | 12 | 17 | | | | |

FIGURE B-1. (1 of 6) INPUT PROCESSOR NETWORK SUMMARY REPORT

DESM NETWORK SUMMARY (CONT'D)

LINK CHARACTERISTICS

| LINK ID | LENGTH (M) | CAPACITY (VEH) | NOMINAL TRAVEL TIME (SEC) | HEADWAY (SEC) | LINE SPEED (M/SEC) |
|---|---|---|---|---|---|
| 1 | 1170 | 230 | 78.00 | 2.00 | 15.00 |
| 2 | 645 | 124 | 43.00 | 2.00 | 15.00 |
| 3 | 1170 | 230 | 78.00 | 2.00 | 15.00 |
| 4 | 3000 | 595 | 200.00 | 2.00 | 15.00 |
| 5 | 3000 | 595 | 200.00 | 2.00 | 15.00 |
| 6 | 1170 | 230 | 78.00 | 2.00 | 15.00 |
| 7 | 645 | 124 | 43.00 | 2.00 | 15.00 |
| 8 | 1170 | 230 | 78.00 | 2.00 | 15.00 |
| 9 | 1170 | 230 | 78.00 | 2.00 | 15.00 |
| 10 | 645 | 124 | 43.00 | 2.00 | 15.00 |
| 11 | 1170 | 230 | 78.00 | 2.00 | 15.00 |
| 12 | 3000 | 595 | 200.00 | 2.00 | 15.00 |
| 13 | 3000 | 595 | 200.00 | 2.00 | 15.00 |
| 14 | 1170 | 230 | 78.00 | 2.00 | 15.00 |
| 15 | 645 | 124 | 43.00 | 2.00 | 15.00 |
| 16 | 1170 | 230 | 78.00 | 2.00 | 15.00 |
| 17 | 3000 | 599 | 600.00 | 2.00 | 5.00 |
| 18 | 1170 | 230 | 78.00 | 2.00 | 15.00 |
| 19 | 645 | 124 | 43.00 | 2.00 | 15.00 |
| 20 | 1170 | 230 | 78.00 | 2.00 | 15.00 |
| 21 | 3000 | 595 | 200.00 | 2.00 | 15.00 |
| 22 | 3000 | 595 | 200.00 | 2.00 | 15.00 |

FIGURE B-1. (2 of 6) INPUT PROCESSOR NETWORK SUMMARY REPORT

DESM NETWORK SUMMARY (CONT'D)

STATION TO STATION SUMMARY

| FROM STATION | CLOSEST DOWNSTREAM STATION | TO STATION | NOMINAL TRAVEL TIME (SEC) | NEXT STATION | TO STATION | NOMINAL TRAVEL TIME (SEC) | NEXT STATION |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 0.0 | 0 | 4 | 956.00 | 4 |
| | | 2 | 556.00 | 2 | 5 | 1155.00 | 4 |
| | | 3 | 755.00 | 2 | | | |
| 2 | 3 | 1 | 555.00 | 3 | 4 | 755.00 | 3 |
| | | 2 | 0.0 | 0 | 5 | 954.00 | 3 |
| | | 3 | 156.00 | 3 | | | |
| 3 | 1 | 1 | 356.00 | 1 | 4 | 556.00 | 4 |
| | | 2 | 955.00 | 1 | 5 | 755.00 | 4 |
| | | 3 | 0.0 | 0 | | | |
| 4 | 5 | 1 | 954.00 | 5 | 4 | 0.0 | 0 |
| | | 2 | 1553.00 | 5 | 5 | 156.00 | 5 |
| | | 3 | 555.00 | 5 | | | |
| 5 | 3 | 1 | 755.00 | 3 | 4 | 955.00 | 3 |
| | | 2 | 1354.00 | 3 | 5 | 0.0 | 0 |
| | | 3 | 356.00 | 3 | | | |

FIGURE B-1. (3 of 6) INPUT PROCESSOR NETWORK SUMMARY REPORT

DESM NETWORK SUMMARY (CONT'D)

MINIMUM PATH TABLE

| FROM LINK | TO STATION | NEXT LINK (1) | NOMINAL TRAVEL TIME (SEC) | TO STATION | NEXT LINK (1) | NOMINAL TRAVEL TIME (SEC) |
|---|---|---|---|---|---|---|
| 1 | 1 | 0 | 0.0 | 4 | 2 | 43.00 |
| | 2 | 2 | 43.00 | 5 | 2 | 43.00 |
| | 3 | 2 | 43.00 | | | |
| 2 | 1 | 3 | 78.00 | 4 | 3 | 78.00 |
| | 2 | 3 | 78.00 | 5 | 3 | 78.00 |
| | 3 | 3 | 78.00 | | | |
| 3 | 1 | 4 | 200.00 | 4 | 4 | 200.00 |
| | 2 | 4 | 200.00 | 5 | 4 | 200.00 |
| | 3 | 4 | 200.00 | | | |
| 4 | 1 | 22 | 200.00 | 4 | 22 | 200.00 |
| | 2 | 5 | 200.00 | 5 | 22 | 200.00 |
| | 3 | 5 | 200.00 | | | |
| 5 | 1 | 6 | 78.00 | 4 | 6 | 78.00 |
| | 2 | 6 | 78.00 | 5 | 6 | 78.00 |
| | 3 | 6 | 78.00 | | | |
| 6 | 1 | 7 | 43.00 | 4 | 7 | 43.00 |
| | 2 | 0 | 0.0 | 5 | 7 | 43.00 |
| | 3 | 7 | 43.00 | | | |
| 7 | 1 | 8 | 78.00 | 4 | 8 | 78.00 |
| | 2 | 8 | 78.00 | 5 | 8 | 78.00 |
| | 3 | 8 | 78.00 | | | |
| 8 | 1 | 9 | 78.00 | 4 | 9 | 78.00 |
| | 2 | 9 | 78.00 | 5 | 9 | 78.00 |
| | 3 | 9 | 78.00 | | | |
| 9 | 1 | 10 | 43.00 | 4 | 10 | 43.00 |
| | 2 | 10 | 43.00 | 5 | 10 | 43.00 |
| | 3 | 0 | 0.0 | | | |
| 10 | 1 | 11 | 78.00 | 4 | 11 | 78.00 |
| | 2 | 11 | 78.00 | 5 | 11 | 78.00 |
| | 3 | 11 | 78.00 | | | |

NOTE (1): ZERO INDICATES THAT THE STATION ENTRY RAMP IS AT THE END OF THE CURRENT LINK

FIGURE B-1. (4 of 6) INPUT PROCESSOR NETWORK SUMMARY REPORT

DESM NETWORK SUMMARY (CONT'D)

MINIMUM PATH TABLE

| FROM LINK | TO STATION | NEXT LINK (1) | NOMINAL TRAVEL TIME (SEC) | TO STATION | NEXT LINK (1) | NOMINAL TRAVEL TIME (SEC) |
|---|---|---|---|---|---|---|
| 11 | 1 | 12 | 200.00 | 4 | 12 | 200.00 |
| | 2 | 12 | 200.00 | 5 | 12 | 200.00 |
| | 3 | 12 | 200.00 | | | |
| 12 | 1 | 1 | 78.00 | 4 | 13 | 200.00 |
| | 2 | 1 | 78.00 | 5 | 13 | 200.00 |
| | 3 | 1 | 78.00 | | | |
| 13 | 1 | 14 | 78.00 | 4 | 14 | 78.00 |
| | 2 | 14 | 78.00 | 5 | 14 | 78.00 |
| | 3 | 14 | 78.00 | | | |
| 14 | 1 | 15 | 43.00 | 4 | 0 | 0.0 |
| | 2 | 15 | 43.00 | 5 | 15 | 43.00 |
| | 3 | 15 | 43.00 | | | |
| 15 | 1 | 16 | 78.00 | 4 | 16 | 78.00 |
| | 2 | 16 | 78.00 | 5 | 16 | 78.00 |
| | 3 | 16 | 78.00 | | | |
| 16 | 1 | 18 | 78.00 | 4 | 18 | 78.00 |
| | 2 | 18 | 78.00 | 5 | 18 | 78.00 |
| | 3 | 18 | 78.00 | | | |
| 17 | 1 | 18 | 78.00 | 4 | 18 | 78.00 |
| | 2 | 18 | 78.00 | 5 | 18 | 78.00 |
| | 3 | 18 | 78.00 | | | |
| 18 | 1 | 19 | 43.00 | 4 | 19 | 43.00 |
| | 2 | 19 | 43.00 | 5 | 0 | 0.0 |
| | 3 | 19 | 43.00 | | | |
| 19 | 1 | 20 | 78.00 | 4 | 20 | 78.00 |
| | 2 | 20 | 78.00 | 5 | 20 | 78.00 |
| | 3 | 20 | 78.00 | | | |
| 20 | 1 | 21 | 200.00 | 4 | 21 | 200.00 |
| | 2 | 21 | 200.00 | 5 | 21 | 200.00 |
| | 3 | 21 | 200.00 | | | |

NOTE (1): ZERO INDICATES THAT THE STATION ENTRY RAMP IS AT THE END OF THE CURRENT LINK

FIGURE B-1. (5 of 6) INPUT PROCESSOR NETWORK SUMMARY REPORT

DESM NETWORK SUMMARY (CONT'D)

MINIMUM PATH TABLE

| FROM LINK | TO STATION | NEXT LINK (1) | NOMINAL TRAVEL TIME (SEC) | TO STATION | NEXT LINK (1) | NOMINAL TRAVEL TIME (SEC) |
|---|---|---|---|---|---|---|
| 21 | 1 | 9 | 78.00 | 4 | 9 | 78.00 |
| | 2 | 9 | 78.00 | 5 | 9 | 78.00 |
| | 3 | 9 | 78.00 | | | |
| 22 | 1 | 12 | 200.00 | 4 | 12 | 200.00 |
| | 2 | 12 | 200.00 | 5 | 12 | 200.00 |
| | 3 | 12 | 200.00 | | | |

NOTE (1): ZERO INDICATES THAT THE STATION ENTRY RAMP IS AT THE END OF THE CURRENT LINK

FIGURE B-1. (6 of 6) INPUT PROCESSOR NETWORK SUMMARY REPORT

DESM TRIP DEMAND GENERATION REPORT 1

TRIP SIZE CUMULATIVE PROBABILITY DISTRIBUTION(S)

| TRIP SIZE | DIST.1 | DIST.2 | DIST.3 |
|---|---|---|---|
| 1 | 0.60 | 0.40 | 0.70 |
| 2 | 0.80 | 0.70 | 0.90 |
| 3 | 0.90 | 0.90 | 1.00 |
| 4 | 0.93 | 0.92 | 1.00 |
| 5 | 0.96 | 0.94 | 1.00 |
| 6 | 0.98 | 0.96 | 1.00 |
| 7 | 0.99 | 0.98 | 1.00 |
| 8 | 1.00 | 1.00 | 1.00 |

ORIGIN CUMULATIVE PROBABILITY DISTRIBUTION

| ORIGIN | PROB. | ORIGIN | PROB. |
|---|---|---|---|
| 1 | 0.16 | 4 | 0.71 |
| 2 | 0.29 | 5 | 1.00 |
| 3 | 0.48 | | |

DESTINATION CUMULATIVE PROBABILITY DISTRIBUTIONS

| ORIGIN | DESTI- NATION | PROB. | DESTI- NATION | PROB. |
|---|---|---|---|---|
| 1 | 1 | 0.0 | 4 | 0.79 |
| | 2 | 0.14 | 5 | 1.00 |
| | 3 | 0.44 | | |
| 2 | 1 | 0.32 | 4 | 0.84 |
| | 2 | 0.32 | 5 | 1.00 |
| | 3 | 0.44 | | |
| 3 | 1 | 0.30 | 4 | 1.00 |
| | 2 | 0.64 | 5 | 1.00 |
| | 3 | 0.64 | | |
| 4 | 1 | 0.20 | 4 | 0.67 |
| | 2 | 0.39 | 5 | 1.00 |
| | 3 | 0.67 | | |
| 5 | 1 | 0.15 | 4 | 1.00 |
| | 2 | 0.53 | 5 | 1.00 |
| | 3 | 0.75 | | |

FIGURE B-2. (1 of 3) INPUT PROCESSOR TRIP DEMAND GENERATION REPORT

DESM TRIP DEMAND (CONT'D)

HOURLY TRIP DEMAND BASED ON MATRIX 1

SCALE FACTOR . . . . . . . . . . . . . 1.000

| ORIGIN | DESTI-NATION | TRIPS/HR (SCALED) | TRIP SIZE DIST. | MEAN TRIP SIZE | PASS/HOUR (SCALED) |
|---|---|---|---|---|---|
| 1 | 1 | 0.0 | 1 | 1.8 | 0 |
| 1 | 2 | 26.1 | 1 | 1.8 | 48 |
| 1 | 3 | 54.5 | 2 | 2.2 | 120 |
| 1 | 4 | 65.2 | 1 | 1.8 | 120 |
| 1 | 5 | 39.1 | 1 | 1.8 | 72 |
| 2 | 1 | 52.2 | 1 | 1.8 | 96 |
| 2 | 2 | 0.0 | 1 | 1.8 | 0 |
| 2 | 3 | 19.6 | 1 | 1.8 | 36 |
| 2 | 4 | 65.5 | 2 | 2.2 | 144 |
| 2 | 5 | 26.1 | 1 | 1.8 | 48 |
| 3 | 1 | 65.2 | 1 | 1.8 | 120 |
| 3 | 2 | 71.7 | 1 | 1.8 | 132 |
| 3 | 3 | 0.0 | 1 | 1.8 | 0 |
| 3 | 4 | 77.1 | 3 | 1.4 | 108 |
| 3 | 5 | 0.0 | 1 | 1.8 | 0 |
| 4 | 1 | 54.5 | 2 | 2.2 | 120 |
| 4 | 2 | 52.2 | 1 | 1.8 | 96 |
| 4 | 3 | 78.3 | 1 | 1.8 | 144 |
| 4 | 4 | 0.0 | 1 | 1.8 | 0 |
| 4 | 5 | 91.3 | 1 | 1.8 | 168 |
| 5 | 1 | 52.2 | 1 | 1.8 | 96 |
| 5 | 2 | 128.6 | 3 | 1.4 | 180 |
| 5 | 3 | 78.3 | 1 | 1.8 | 144 |
| 5 | 4 | 84.8 | 1 | 1.8 | 156 |
| 5 | 5 | 0.0 | 1 | 1.8 | 0 |

FIGURE B-2. (2 of 3) INPUT PROCESSOR TRIP DEMAND GENERATION REPORT

DESM TRIP DEMAND (CONT'D)

SUMMARY OF PASSENGERS GENERATED DURING
5. MIN. INTERVAL

| ORIGIN | DESTI- NATION | NO. PASS | % OF TOTAL | DESTI- NATION | NO. PASS | % OF TOTAL |
|---|---|---|---|---|---|---|
| 1 | 1 | 0 | 0.0 | 4 | 4 | 2.0 |
| | 2 | 0 | 0.0 | 5 | 5 | 2.5 |
| | 3 | 17 | 8.5 | | | |
| 2 | 1 | 5 | 2.5 | 4 | 6 | 3.0 |
| | 2 | 0 | 0.0 | 5 | 1 | 0.5 |
| | 3 | 10 | 5.0 | | | |
| 3 | 1 | 12 | 6.0 | 4 | 17 | 8.5 |
| | 2 | 11 | 5.5 | 5 | 0 | 0.0 |
| | 3 | 0 | 0.0 | | | |
| 4 | 1 | 6 | 3.0 | 4 | 0 | 0.0 |
| | 2 | 8 | 4.0 | 5 | 18 | 9.0 |
| | 3 | 24 | 12.1 | | | |
| 5 | 1 | 9 | 4.5 | 4 | 14 | 7.0 |
| | 2 | 17 | 8.5 | 5 | 0 | 0.0 |
| | 3 | 14 | 7.0 | | | |

FIGURE B-2. (3 of 3) INPUT PROCESSOR TRIP DEMAND GENERATION REPORT

```
          DESM SYSTEM CHARACTERISTICS SUMMARY


     POSITION REGULATION POLICY
          VARIABLE BLOCK

     LONGITUDINAL CONTROL POLICY
          ASYNCHRONOUS, VELOCITY STANDARD DEVIATION =  0.0   M/SEC

     DISPATCH POLICY
          NON-DETERMINISTIC

     MERGE POLICY
          FIRST IN, FIRST OUT
            TIME TO ATTAIN LINE SPEED FROM STOP  =  0.0  SEC

     PATH SELECTION POLICY
          A PRIORI  TABLE LOOK UP

     VEHICLE CHARACTERISTICS
          LENGTH   =   5 METERS
          CAPACITY
            SEATED   =  20
            STANDEES =   0
                      -----
            TOTAL    =  20
```

FIGURE B-3. (1 of 5) INPUT PROCESSOR SYSTEM CHARACTERISTICS REPORT

DESM STATION CHARACTERISTICS SUMMARY

CHARACTERISTICS COMMON TO ALL STATIONS

TRIP MANAGEMENT DATA

TRIP SPLIT SIZE = 20 PASSENGERS

DEBOARD/BOARD TIME DATA (SECONDS)
TIME PER PASSENGER
DEBOARD 0.0
BOARD 0.0

MINIMUM OPEN DOOR TIME = 10.00 MAXIMUM OPEN DOOR TIME = 10.00

ALTERNATE STATION EGRESS TIME = 0 SEC

EXCESS TRAVEL TIME HISTOGRAM CLASS INTERVALS
1) LESS THAN OR EQUAL TO 300 SEC
2) GREATER THAN 300 SEC AND LESS THAN OR EQUAL TO 900 SEC
3) GREATER THAN 900 SEC

NOMINAL TRAVEL TIME THROUGH STATION = 48 SEC
TRAVEL TIME FROM LAUNCH TO EXIT MERGE = 10.00 SEC
BERTH ASSIGNMENT POLICY: TO MOST DOWNSTREAM BERTH

STATION LINKS

| LINK | TYPE | HEADWAY PER VEHICLE (SEC) | TIME FIXED TERM (SEC) | TRAVEL TIME (SEC) | EVENTS | CONNECTIVITY FROM LINKS | CONNECTIVITY TO LINKS |
|---|---|---|---|---|---|---|---|
| 1 | INPUT RAMP | 1.00 | 1.00 | 10.00 | HEADWAY<br>TRAVEL | - | 2<br>3 |
| 2 | INPUT QUEUE | 1.00 | 1.00 | 8.00 | HEADWAY<br>TRAVEL | 1 | 4<br>5<br>6 |
| 3 | INPUT QUEUE | 1.00 | 1.00 | 8.00 | HEADWAY<br>TRAVEL | 1 | 4<br>5<br>6 |
| 4 | DOCK | 1.00 | 1.00 | 12.00 | HEADWAY<br>TRAVEL<br>DEBOARD<br>BOARD | 2<br>3 | 7 |
| 5 | DOCK | 1.00 | 1.00 | 12.00 | HEADWAY | 2 | 7 |

FIGURE B-3. (2 of 5) INPUT PROCESSOR SYSTEM CHARACTERISTICS REPORT

DESM STATION CHARACTERISTICS SUMMARY (CONT'D)

STATION LINKS

| LINK | TYPE | HEADWAY PER VEHICLE (SEC) | TIME FIXED TERM (SEC) | TRAVEL TIME (SEC) | EVENTS | CONNECTIVITY FROM LINKS | TO LINKS |
|---|---|---|---|---|---|---|---|
| | | | | | TRAVEL<br>DEBOARD<br>BOARD | 3 | |
| 6 | DOCK | 1.00 | 1.00 | 12.00 | HEADWAY<br>TRAVEL<br>DEBOARD<br>BOARD | 2<br>3 | 7 |
| 7 | OUTPUT QUEUE | 1.00 | 1.00 | 8.00 | HEADWAY<br>TRAVEL<br>LAUNCH | 4<br>5<br>6 | 8 |
| 8 | OUTPUT RAMP | 1.00 | 1.00 | 10.00 | HEADWAY<br>TRAVEL | 7 | - |

FIGURE B-3. (3 of 5) INPUT PROCESSOR SYSTEM CHARACTERISTICS REPORT

DESM STATION CHARACTERISTICS SUMMARY (CONT'D)

CHARACTERISTICS UNIQUE TO EACH STATION

| STATION ID | STATION NODE | ON/OFF LINE | ACTIVE LINKS ID | ACTIVE LINKS TYPE | ACTIVE LINKS CAP | BOARDING QUEUE CAPACITY | NUMBER OF INPUT QUEUES | NUMBER OF PARALLEL DOCKS | CAPACITY OF DOCK AREA | NUMBER OF OUTPUT QUEUES | TOTAL STATION CAPACITY |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | OFF | 1 | IR | 5 | 1000 | 2 | 3 | 3 | 1 | 37 |
| | | | 2 | IQ | 8 | | | | | | |
| | | | 3 | IQ | 8 | | | | | | |
| | | | 4 | D | 1 | | | | | | |
| | | | 5 | D | 1 | | | | | | |
| | | | 6 | D | 1 | | | | | | |
| | | | 7 | OQ | 8 | | | | | | |
| | | | 8 | OR | 5 | | | | | | |
| 2 | 7 | OFF | 1 | IR | 5 | 1000 | 2 | 3 | 3 | 1 | 37 |
| | | | 2 | IQ | 8 | | | | | | |
| | | | 3 | IQ | 8 | | | | | | |
| | | | 4 | D | 1 | | | | | | |
| | | | 5 | D | 1 | | | | | | |
| | | | 6 | D | 1 | | | | | | |
| | | | 7 | OQ | 8 | | | | | | |
| | | | 8 | OR | 5 | | | | | | |
| 3 | 10 | OFF | 1 | IR | 5 | 1000 | 2 | 3 | 3 | 1 | 37 |
| | | | 2 | IQ | 8 | | | | | | |
| | | | 3 | IQ | 8 | | | | | | |
| | | | 4 | D | 1 | | | | | | |
| | | | 5 | D | 1 | | | | | | |
| | | | 6 | D | 1 | | | | | | |
| | | | 7 | OQ | 8 | | | | | | |
| | | | 8 | OR | 5 | | | | | | |
| 4 | 14 | OFF | 1 | IR | 5 | 1000 | 2 | 3 | 3 | 1 | 37 |
| | | | 2 | IQ | 8 | | | | | | |
| | | | 3 | IQ | 8 | | | | | | |
| | | | 4 | D | 1 | | | | | | |
| | | | 5 | D | 1 | | | | | | |
| | | | 6 | D | 1 | | | | | | |
| | | | 7 | OQ | 8 | | | | | | |
| | | | 8 | OR | 5 | | | | | | |
| 5 | 17 | OFF | 1 | IR | 5 | 1000 | 2 | 3 | 3 | 1 | 37 |
| | | | 2 | IQ | 8 | | | | | | |
| | | | 3 | IQ | 8 | | | | | | |
| | | | 4 | D | 1 | | | | | | |
| | | | 5 | D | 1 | | | | | | |
| | | | 6 | D | 1 | | | | | | |

FIGURE B-3. (4 of 5) INPUT PROCESSOR SYSTEM CHARACTERISTICS REPORT

DESM STATION CHARACTERISTICS SUMMARY (CONT'D)

| STATION ID | NODE | ON/OFF LINE | ACTIVE LINKS ID | TYPE | CAP | BOARDING QUEUE CAPACITY | NUMBER OF INPUT QUEUES | NUMBER OF PARALLEL DOCKS | CAPACITY OF DOCK AREA | NUMBER OF OUTPUT QUEUES | TOTAL STATION CAPACITY |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 7 | OQ | 8 | | | | | | |
| | | | 8 | OR | 5 | | | | | | |

FIGURE B-3. (5 of 5) INPUT PROCESSOR SYSTEM CHARACTERISTICS REPORT

DESM TRANSIT SERVICE CHARACTERISTICS SUMMARY

| | |
|---|---|
| LEVEL OF SERVICE: | BASED ON DEMAND PROFILE INTERVAL 5 |
| TYPE OF SERVICE: | SCHEDULED |
| ROUTES DEFINED BY: | INPUT PROCESSOR |
| VEHICLE SPACING POLICY: | ON SCHEDULE |
| DEMAND STOP: | INACTIVE |

ROUTE SUMMARY

| ROUTE | NUMBER OF VEHICLES | TRAIN LENGTH | VEHICLE HEADWAY | STATION ID | STATION NODE | VEHICLES TO DISPATCH | INITIAL DEPARTURE TIME |
|---|---|---|---|---|---|---|---|
| 1 | 7 | 0 | 181 | 1 | 2 | 3 | 5 |
| | | | | 2 | 7 | 3 | 83 |
| | | | | 3 | 10 | 1 | 126 |
| 2 | 9 | 0 | 230 | 1 | 2 | 4 | 1 |
| | | | | 4 | 14 | 4 | 104 |
| | | | | 5 | 17 | 1 | 98 |
| 3 | 20 | 0 | 123 | 2 | 7 | 12 | 9 |
| | | | | 4 | 14 | 6 | 91 |
| | | | | 5 | 17 | 2 | 68 |
| 4 | 12 | 0 | 106 | 3 | 10 | 4 | 0 |
| | | | | 4 | 14 | 5 | 94 |
| | | | | 5 | 17 | 3 | 0 |

FLEET SIZE 48 VEHICLES

TRIP/ROUTE ASSIGNMENT

| FROM STATION ID | FROM STATION NODE | TO STATION ID | TO STATION NODE | USE ROUTE | TO STATION ID | TO STATION NODE | USE ROUTE |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 2 | 0 | 4 | 14 | 2 |
| | | 2 | 7 | 1 | 5 | 17 | 2 |
| | | 3 | 10 | 1 | | | |
| 2 | 7 | 1 | 2 | 1 | 4 | 14 | 3 |
| | | 2 | 7 | 0 | 5 | 17 | 3 |
| | | 3 | 10 | 1 | | | |

FIGURE B-4. (1 of 3) INPUT PROCESSOR LEVEL OF SERVICE REPORT

DESM TRANSIT SERVICE CHARACTERISTICS SUMMARY (CONT'D)

| FROM STATION ID | FROM STATION NODE | TO STATION ID | TO STATION NODE | USE ROUTE | TO STATION ID | TO STATION NODE | USE ROUTE |
|---|---|---|---|---|---|---|---|
| 3 | 10 | 1 | 2 | 1 | 4 | 14 | 4 |
| | | 2 | 7 | 1 | 5 | 17 | 4 |
| | | 3 | 10 | 0 | | | |
| 4 | 14 | 1 | 2 | 2 | 4 | 14 | 0 |
| | | 2 | 7 | 3 | 5 | 17 | 4 |
| | | 3 | 10 | 4 | | | |
| 5 | 17 | 1 | 2 | 2 | 4 | 14 | 4 |
| | | 2 | 7 | 3 | 5 | 17 | 0 |
| | | 3 | 10 | 4 | | | |

TRANSFERS: INACTIVE

NOMINAL TRAVEL TIME BY ORIGIN/DESTINATION

| FROM STATION ID | FROM STATION NODE | TO STATION ID | TO STATION NODE | NOMINAL TRAVEL TIME (SEC) | TO STATION ID | TO STATION NODE | NOMINAL TRAVEL TIME (SEC) |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 1 | 2 | 0.0 | 4 | 14 | 1004.0 |
| | | 2 | 7 | 604.0 | 5 | 17 | 1228.0 |
| | | 3 | 10 | 828.0 | | | |
| 2 | 7 | 1 | 2 | 628.0 | 4 | 14 | 803.0 |
| | | 2 | 7 | 0.0 | 5 | 17 | 1027.0 |
| | | 3 | 10 | 204.0 | | | |
| 3 | 10 | 1 | 2 | 404.0 | 4 | 14 | 604.0 |
| | | 2 | 7 | 1028.0 | 5 | 17 | 828.0 |
| | | 3 | 10 | 0.0 | | | |
| 4 | 14 | 1 | 2 | 1027.0 | 4 | 14 | 0.0 |
| | | 2 | 7 | 1626.0 | 5 | 17 | 204.0 |
| | | 3 | 10 | 628.0 | | | |
| 5 | 17 | 1 | 2 | 803.0 | 4 | 14 | 1028.0 |
| | | 2 | 7 | 1402.0 | 5 | 17 | 0.0 |
| | | 3 | 10 | 404.0 | | | |

FIGURE B-4. (2 of 3) INPUT PROCESSOR LEVEL OF SERVICE REPORT

DESM SIMULATION CONTROL PARAMETERS

| | |
|---|---|
| RANDOM NUMBER SEED: | 91577 |
| COMPLETED TRIPS LOG: | ACTIVE |
| VEHICLE LOG: | INACTIVE |
| LINK LOG: | ACTIVE |
| STATION LOG: | ACTIVE |
| NOMINAL TRAVEL TIME FILE: | NOT REQUESTED |
| BEGIN TRIP DEMAND AT: | 0 SEC |
| STATISTICS SAMPLING INTERVAL: | 100 SEC |
| INTERMEDIATE SAMPLING REPORT: | EVERY 1 SAMPLES |
| PERIODIC SIMULATION CHECKPOINT: | INACTIVE |
| CLOCK SIZE: | 60 CLOCK UNITS PER MINUTE |
| TIME BETWEEN CLOCK TABLE ENTRIES: | 100 CLOCK UNITS TIMES 10 |
| NUMBER OF ENTRIES IN CLOCK TABLE: | 1000 |
| NUMBER OF ENTRIES PER CLOCK UNIT: | 5000 |

FIGURE B-4. (3 of 3) INPUT PROCESSOR LEVEL OF SERVICE REPORT

PAGE 1

DESM ALTERNATE PATH SUMMARY

| COMMON DIVERGE (NODE) | DESTINATION NODE | DESTINATION STATION | LINK SEQUENCE | | | | |
|---|---|---|---|---|---|---|---|
| 12 | 17 | 5 | 12 | 13 | 14 | 15 | 16 |

FIGURE B-5. INPUT PROCESSOR ALTERNATE PATH REPORT

DESM FAILURE/RECOVERY SUMMARY

TIME = 210 SEC

NEXT VEHICLE TO LEAVE GUIDEWAY LINK 20 (NODE 18 TO NODE 19)
WILL BE DEGRADED

RECOVERED VEHICLE SPEED DEGRADATION FACTOR = 0.90

DELAY FROM FAILURE UNTIL DETECTION = 60.00 SECS
DELAY FROM DETECTION UNTIL RESTART = 60.00 SECS
DELAY FROM DETECTION UNTIL REPLACEMENT = 90.00 SECS

RECOVERY METHOD TOWED BY SERVICE VEHICLE

SERVICE VEHICLE DEGRADATION FACTOR 0.80
SERVICE VEHICLE WILL TRAVERSE LINKS
8 21

OTHER VEHICLES RESPONSE
ROUTE
1 CONTINUE REVENUE SERVICE
2 CONTINUE REVENUE SERVICE
3 CONTINUE REVENUE SERVICE

DESM FAILURE/RECOVERY SUMMARY (CONT'D) PAGE 2

MINIMUM PATH TABLE

| FROM LINK | TO STATION | NEXT LINK (1) | NOMINAL TRAVEL TIME (SEC) |
|---|---|---|---|
| 1 | 1 | 0 | 0.0 |
| | 2 | 2 | 26.00 |
| | 3 | 2 | 26.00 |
| | 4 | 2 | 26.00 |
| | 5 | 2 | 26.00 |
| 2 | 1 | 3 | 47.00 |
| | 2 | 3 | 47.00 |
| | 3 | 3 | 47.00 |
| | 4 | 3 | 47.00 |
| | 5 | 3 | 47.00 |
| 3 | 1 | 4 | 120.00 |
| | 2 | 4 | 120.00 |
| | 3 | 4 | 120.00 |
| | 4 | 4 | 120.00 |
| | 5 | 4 | 120.00 |
| 4 | 1 | 22 | 120.00 |
| | 2 | 5 | 120.00 |
| | 3 | 5 | 120.00 |
| | 4 | 22 | 120.00 |
| | 5 | 22 | 120.00 |
| 5 | 1 | 6 | 47.00 |
| | 2 | 6 | 47.00 |
| | 3 | 6 | 47.00 |
| | 4 | 6 | 47.00 |
| | 5 | 6 | 47.00 |
| 6 | 1 | 7 | ******* |
| | 2 | 0 | 0.0 |
| | 3 | 7 | ******* |
| | 4 | 7 | ******* |
| | 5 | 7 | ******* |
| 7 | 1 | 8 | 47.00 |
| | 2 | 8 | 47.00 |
| | 3 | 8 | 47.00 |
| | 4 | 8 | 47.00 |
| | 5 | 8 | 47.00 |
| 8 | 1 | 9 | 47.00 |
| | 2 | 9 | 47.00 |
| | 3 | 9 | 47.00 |
| | 4 | 9 | 47.00 |
| | 5 | 9 | 47.00 |
| 9 | 1 | 10 | 26.00 |
| | 2 | 10 | 26.00 |
| | 3 | 0 | 0.0 |
| | 4 | 10 | 26.00 |
| | 5 | 10 | 26.00 |
| 10 | 1 | 11 | 47.00 |
| | 4 | 11 | 47.00 |

NOTE (1): ZERO INDICATES THAT THE STATION ENTRY RAMP IS AT THE END OF THE CURRENT LINK

FIGURE B-6. (1 of 2) INPUT PROCESSOR FAILURE/RECOVERY SUMMARY

PAGE 3

DESM FAILURE/RECOVERY SUMMARY (CONT'D)

| FROM LINK | TO STATION | NEXT LINK (1) | NOMINAL TRAVEL TIME (SEC) | TO STATION | NEXT LINK (1) | NOMINAL TRAVEL TIME (SEC) |
|---|---|---|---|---|---|---|
| | 2 | 11 | 47.00 | 5 | 11 | 47.00 |
| | 3 | 11 | 47.00 | | | |
| 11 | 1 | 12 | 120.00 | 4 | 12 | 120.00 |
| | 2 | 12 | 120.00 | 5 | 17 | 120.00 |
| | 3 | 12 | 120.00 | | | |
| 12 | 1 | 1 | 47.00 | 4 | 13 | 120.00 |
| | 2 | 1 | 47.00 | 5 | 13 | 120.00 |
| | 3 | 1 | 47.00 | | | |
| 13 | 1 | 14 | 47.00 | 4 | 14 | 47.00 |
| | 2 | 14 | 47.00 | 5 | 14 | 47.00 |
| | 3 | 14 | 47.00 | | | |
| 14 | 1 | 15 | 26.00 | 4 | 0 | 0.0 |
| | 2 | 15 | 26.00 | 5 | 15 | 26.00 |
| | 3 | 15 | 26.00 | | | |
| 15 | 1 | 16 | 47.00 | 4 | 16 | 47.00 |
| | 2 | 16 | 47.00 | 5 | 16 | 47.00 |
| | 3 | 16 | 47.00 | | | |
| 16 | 1 | 18 | 47.00 | 4 | 18 | 47.00 |
| | 2 | 18 | 47.00 | 5 | 18 | 47.00 |
| | 3 | 18 | 47.00 | | | |
| 17 | 1 | 18 | 47.00 | 4 | 18 | 47.00 |
| | 2 | 18 | 47.00 | 5 | 18 | 47.00 |
| | 3 | 18 | 47.00 | | | |
| 18 | 1 | 19 | 26.00 | 4 | 19 | 26.00 |
| | 2 | 19 | 26.00 | 5 | 0 | 0.0 |
| | 3 | 19 | 26.00 | | | |
| 19 | 1 | 20 | ******* | 4 | 20 | ******* |
| | 2 | 20 | ******* | 5 | 20 | ******* |
| | 3 | 20 | ******* | | | |
| 20 | 1 | 21 | 120.00 | 4 | 21 | 120.00 |

PAGE 4

DESM FAILURE/RECOVERY SUMMARY (CONT'D)

| | | | | | | |
|---|---|---|---|---|---|---|
| | 2 | 21 | 120.00 | 5 | 21 | 120.00 |
| | 3 | 21 | 120.00 | | | |
| 21 | 1 | 9 | 47.00 | 4 | 9 | 47.00 |
| | 2 | 9 | 47.00 | 5 | 9 | 47.00 |
| | 3 | 9 | 47.00 | | | |
| 22 | 1 | 12 | 120.00 | 4 | 12 | 120.00 |
| | 2 | 12 | 120.00 | 5 | 17 | 120.00 |
| | 3 | 12 | 120.00 | | | |

FIGURE B-6. (2 of 2) INPUT PROCESSOR FAILURE/RECOVERY SUMMARY

ACTIVE FLEET SIZE MANAGEMENT SCHEDULED AT 600 SEC

LEVEL OF SERVICE: USER-DEFINED

TYPE OF SERVICE: SCHEDULED

ROUTE SUMMARY

| ROUTE | NUMBER OF VEHICLES | TRAIN LENGTH | VEHICLE HEADWAY | STATION ID | STATION NODE | TRANSITION VEHICLES | TRAIN RECONSISTING LAST STOP | TRAIN RECONSISTING BARN | TRAIN RECONSISTING FIRST STOP |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 9 | 3 | 300 | 1 | 2 | 0 | 3 | 3 | 3 |
| | | | | 2 | 7 | | | | |
| | | | | 3 | 10 | | | | |
| 2 | 12 | 3 | 225 | 3 | 10 | 0 | 3 | 3 | 3 |
| | | | | 4 | 14 | | | | |
| | | | | 5 | 17 | | | | |
| 3 | 18 | 3 | 189 | 1 | 2 | 3 | 3 | 3 | 3 |
| | | | | 5 | 17 | | | | |
| | | | | 3 | 10 | | | | |

FLEET 39 VEHICLES

FIGURE B-7. INPUT PROCESSOR ACTIVE FLEET SIZE MANAGEMENT REPORT

AGT DESM SIMULATION INITIAL CONDITIONS REPORT 7/30/81 19: 3

| | |
|---|---|
| TYPE OF SERVICE | SCHEDULED |
| ROUTE SPACING | FIXED |
| LONGITUDINAL CONTROL | ASYNCHRONOUS |
| POSITION REGULATION | VARIABLE HEADWAY |
| DISPATCH POLICY | NON-DETERMINISTIC |
| MERGE POLICY | FIFO |
| PATH SELECTION METHOD | APRIORI |
| PATH SELECTION CRITERIA | TABLE LOOK-UP |
| BERTHING POLICY | FIFO |
| TRANSFER POLICY | INACTIVE |

SIMULATION TIME STATISTICS

| | |
|---|---|
| BEGIN SIMULATION | 0 |
| SAMPLING INTERVAL | 100.0 |
| CHECKPOINT INTERVAL | 0.0 |
| CLOCK UNITS / MINUTE | 60 |
| REACTION TIME | 0.0 |

SIMULATION VEHICLE STATISTICS

| | |
|---|---|
| TOTAL FLEET SIZE | 48 |
| NUMBER VEHICLES IN STATION STORAGE | 48 |
| NUMBER OF VEHICLES IN SERVICE | 0 |
| VEHICLE CAPACITY | 20 |

ROUTE SUMMARY

NUMBER OF ROUTES 4

| ROUTE NUMBER | NUMBER OF VEHICLES | HEADWAY | TRAIN LENGTH |
|---|---|---|---|
| 1 | 7 | 181.0 | 0 |
| 2 | 9 | 230.0 | 0 |
| 3 | 20 | 123.0 | 0 |
| 4 | 12 | 106.0 | 0 |

GUIDEWAY LINK SUMMARY

TOTAL NUMBER OF LINKS 22

| LINK NUMBER | CAPACITY | OCCUPANCY | TRAVEL TIME | HEADWAY TIME | STATUS |
|---|---|---|---|---|---|
| 1 | 230 | 0 | 78.00 | 2.00 | IN SERVICE |
| 2 | 124 | 0 | 43.00 | 2.00 | IN SERVICE |
| 3 | 230 | 0 | 78.00 | 2.00 | IN SERVICE |
| 4 | 595 | 0 | 200.00 | 2.00 | IN SERVICE |
| 5 | 595 | 0 | 200.00 | 2.00 | IN SERVICE |
| 6 | 230 | 0 | 78.00 | 2.00 | IN SERVICE |
| 7 | 124 | 0 | 43.00 | 2.00 | IN SERVICE |

FIGURE B-8. (1 of 3) MODEL PROCESSOR INITIAL CONDITIONS REPORT

| | | | | | |
|---|---|---|---|---|---|
| 8 | 230 | 0 | 78.00 | 2.00 | IN SERVICE |
| 9 | 230 | 0 | 78.00 | 2.00 | IN SERVICE |
| 10 | 124 | 0 | 43.00 | 2.00 | IN SERVICE |
| 11 | 230 | 0 | 78.00 | 2.00 | IN SERVICE |
| 12 | 595 | 0 | 200.00 | 2.00 | IN SERVICE |
| 13 | 595 | 0 | 200.00 | 2.00 | IN SERVICE |
| 14 | 230 | 0 | 78.00 | 2.00 | IN SERVICE |
| 15 | 124 | 0 | 43.00 | 2.00 | IN SERVICE |
| 16 | 230 | 0 | 78.00 | 2.00 | IN SERVICE |
| 17 | 599 | 0 | 600.00 | 2.00 | IN SERVICE |
| 18 | 230 | 0 | 78.00 | 2.00 | IN SERVICE |
| 19 | 124 | 0 | 43.00 | 2.00 | IN SERVICE |
| 20 | 230 | 0 | 78.00 | 2.00 | IN SERVICE |
| 21 | 595 | 0 | 200.00 | 2.00 | IN SERVICE |
| 22 | 595 | 0 | 200.00 | 2.00 | IN SERVICE |
| TOTALS | 7089 | 0 | | | |

STATION SUMMARY DATA

TOTAL NUMBER OF STATIONS 5

INPUT RAMP LINK NUMBER 1
STORAGE LINK NUMBER UNDEFINED
OUTPUT RAMP LINK NUMBER 8

GENERALIZED STATION CONFIGURATION

| LINK | TYPE | HEADWAY PER VEHICLE (SEC) | TIME PER TRAIN (SEC) | TRAVEL TIME (SEC) | EVENTS | CONNECTIVITY FROM LINKS | TO LINKS |
|---|---|---|---|---|---|---|---|
| 1 | INPUT RAMP | 1.00 | 1.00 | 10.00 | HEADWAY<br>TRAVEL | - | 2<br>3 |
| 2 | INPUT QUEUE | 1.00 | 1.00 | 8.00 | HEADWAY<br>TRAVEL | 1<br>10 | 4<br>5<br>6 |
| 3 | INPUT QUEUE | 1.00 | 1.00 | 8.00 | HEADWAY<br>TRAVEL | 1<br>10 | 4<br>5<br>6 |
| 4 | DOCK | 1.00 | 1.00 | 12.00 | HEADWAY<br>TRAVEL<br>DEBOARD<br>BOARD | 2<br>3 | 7 |
| 5 | DOCK | 1.00 | 1.00 | 12.00 | HEADWAY<br>TRAVEL<br>DEBOARD<br>BOARD | 2<br>3 | 7 |
| 6 | DOCK | 1.00 | 1.00 | 12.00 | HEADWAY<br>TRAVEL<br>DEBOARD | 2<br>3 | 7 |

FIGURE B-8. (2 of 3) MODEL PROCESSOR INITIAL CONDITIONS REPORT

```
                                                  BOARD
  7  OUTPUT QUEUE         1.00     1.00    8.00   HEADWAY     4       8
                                                  TRAVEL      5
                                                  LAUNCH      6

  8  OUTPUT RAMP          1.00     1.00   10.00   HEADWAY     7       -
                                                  TRAVEL

                     STATION SUMMARY

STN  TYPE LINK CAP  OCC AVAIL  LINK CAP  OCC AVAIL  LINK CAP  OCC AVAIL  LINK CAP  OCC AVAIL  LINK CAP  OCC AVAIL
---  ---- ---- ---  --- -----  ---- ---  --- -----  ---- ---  --- -----  ---- ---  --- -----  ---- ---  --- -----
  1  OFF   1    5    0    T     2    8    0    T     3    8    0    T     4    1    0    T     5    1    0    T

           6    1    0    T     7    8    0    T     8    5    0    T

           TOTAL STATION CAPACITY -  44
           INITIAL STATION OCCUPANCY -   0 VEHICLES

  2  OFF   1    5    0    T     2    8    0    T     3    8    0    T     4    1    0    T     5    1    0    T

           6    1    0    T     7    8    0    T     8    5    0    T

           TOTAL STATION CAPACITY -  52
           INITIAL STATION OCCUPANCY -   0 VEHICLES

  3  OFF   1    5    0    T     2    8    0    T     3    8    0    T     4    1    0    T     5    1    0    T

           6    1    0    T     7    8    0    T     8    5    0    T

           TOTAL STATION CAPACITY -  42
           INITIAL STATION OCCUPANCY -   0 VEHICLES

  4  OFF   1    5    0    T     2    8    0    T     3    8    0    T     4    1    0    T     5    1    0    T

           6    1    0    T     7    8    0    T     8    5    0    T

           TOTAL STATION CAPACITY -  52
           INITIAL STATION OCCUPANCY -   0 VEHICLES

  5  OFF   1    5    0    T     2    8    0    T     3    8    0    T     4    1    0    T     5    1    0    T

           6    1    0    T     7    8    0    T     8    5    0    T

           TOTAL STATION CAPACITY -  43
           INITIAL STATION OCCUPANCY -   0 VEHICLES
```

FIGURE B-8. (3 of 3) MODEL PROCESSOR INITIAL CONDITIONS REPORT

AGT DESM INTERMEDIATE SAMPLING REPORT 7/30/81

| | |
|---|---|
| SIMULATION TIME | 700 SECONDS |
| NUMBER VEHICLES IN ACTIVE STORAGE | 8 |
| NUMBER OF VEHICLES TRAVELLING LOADED | 38 |
| NUMBER OF VEHICLES TRAVELLING EMPTY | 2 |
| IN SERVICE EMPTY DISTANCE (KM) | 5.340 |
| NUMBER OF PARTIES ON VEHICLES | 152 |
| NUMBER OF PASSENGERS ON VEHICLES | 271 |
| PASSENGER DISTANCE (KM) | 314.865 |

GUIDEWAY LINK SUMMARY

TOTAL NUMBER OF LINKS 22

| LINK | CAPACITY | OCCUPANCY STATISTICS | | | QUEUE STATISTICS | | | QUEUE DELAY | | LOAD FACTOR | | AVERAGE | STATUS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NOS. | | CURRENT | AVERAGE | MAXIMUM | CURRENT | AVERAGE | MAXIMUM | AVERAGE | MAXIMUM | VEHICLE | LINK | VELOCITY | |
| 1 | 230 | 1 | 0.57 | 1 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.800 | 0.002 | 0.0 | IN SERVICE |
| 2 | 124 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | IN SERVICE |
| 3 | 230 | 0 | 0.78 | 1 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.700 | 0.003 | 15.00 | IN SERVICE |
| 4 | 595 | 3 | 2.16 | 3 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.445 | 0.004 | 0.0 | IN SERVICE |
| 5 | 595 | 1 | 1.00 | 1 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.500 | 0.002 | 0.0 | IN SERVICE |
| 6 | 230 | 0 | 0.19 | 1 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0.001 | 15.00 | IN SERVICE |
| 7 | 124 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | IN SERVICE |
| 8 | 230 | 2 | 0.71 | 2 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.577 | 0.003 | 15.00 | IN SERVICE |
| 9 | 230 | 4 | 2.85 | 4 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.520 | 0.012 | 15.00 | IN SERVICE |
| 10 | 124 | 0 | 0.78 | 2 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.217 | 0.006 | 15.00 | IN SERVICE |
| 11 | 230 | 3 | 2.49 | 4 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.296 | 0.011 | 15.00 | IN SERVICE |
| 12 | 595 | 7 | 7.38 | 9 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.284 | 0.012 | 15.00 | IN SERVICE |
| 13 | 595 | 4 | 3.21 | 4 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.227 | 0.005 | 15.00 | IN SERVICE |
| 14 | 230 | 1 | 0.72 | 1 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.242 | 0.003 | 15.00 | IN SERVICE |
| 15 | 124 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | IN SERVICE |
| 16 | 230 | 2 | 2.09 | 3 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.373 | 0.009 | 15.00 | IN SERVICE |
| 17 | 599 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | IN SERVICE |
| 18 | 230 | 2 | 1.46 | 2 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.113 | 0.006 | 15.00 | IN SERVICE |
| 19 | 124 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | IN SERVICE |
| 20 | 230 | 1 | 2.28 | 3 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.350 | 0.010 | 15.00 | IN SERVICE |
| 21 | 595 | 5 | 4.12 | 5 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.444 | 0.007 | 15.00 | IN SERVICE |
| 22 | 595 | 1 | 1.00 | 1 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.350 | 0.002 | 0.0 | IN SERVICE |
| TOTALS | 7089 | 37 | 33.79 | 9 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.361 | 0.005 | 15.00 | |

SCHEDULED ROUTE SUMMARY

| ROUTE | \|---VEHICLE SUMMARY---\| | | \|------------PASSENGER SUMMARY----------\| | | | | | \|--PARTY SUMMARY--\| | | \|----SCHEDULE----\| | | HEADWAY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ARRIVALS | | | | IN | | IN | DEVIATION | | |
| | DEPARTURES | TRAVELLING | TOTAL | XFERS | WAITING | SERVED | PROCESS | SERVED | PROCESS | TOTAL | MAXIMUM | |

FIGURE B-9. (1 of 3) MODEL PROCESSOR INTERMEDIATE SAMPLING REPORT

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 7 | 1 | 0 | 3 | 4 | 58 | 4 | 35 | 2.000 | 2.000 | 181.0 |
| 2 | 2 | 9 | 12 | 0 | 12 | 0 | 46 | 0 | 24 | 10.000 | 10.000 | 230.0 |
| 3 | 3 | 20 | 8 | 0 | 4 | 14 | 82 | 7 | 48 | 22.000 | 10.000 | 123.0 |
| 4 | 3 | 12 | 11 | 0 | 7 | 6 | 85 | 6 | 45 | 30.000 | 10.000 | 106.0 |

STATION ACTIVITY SUMMARY

| | | VEHICLE SUMMARY | | | PARTY SUMMARY | | | | | | | | PASSENGER SUMMARY | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | MAX | SPLIT PARTIES | | ARRIVALS | | | |
| STN | TYPE | ENTER | LEAVE | IN | ARRIVE | SERVED | CMPLT | WAIT | REJ | EXCESS TT | CREATED | CMPLT | TOTAL | XFERS | SERVED | WAIT |
| 1 | OFF | 0 | 1 | 1 | 1 | 0 | 0 | 3 | 0 | 0.0 | 0 | 0 | 1 | 0 | 0 | 3 |
| 2 | OFF | 1 | 2 | 6 | 5 | 8 | 0 | 2 | 0 | 0.0 | 0 | 0 | 6 | 0 | 11 | 2 |
| 3 | OFF | 2 | 1 | 1 | 2 | 1 | 2 | 1 | 0 | 10.00 | 0 | 0 | 4 | 0 | 1 | 3 |
| 4 | OFF | 1 | 3 | 2 | 9 | 4 | 0 | 9 | 0 | 0.0 | 0 | 0 | 15 | 0 | 8 | 15 |
| 5 | OFF | 2 | 3 | 1 | 6 | 4 | 0 | 3 | 0 | 0.0 | 0 | 0 | 6 | 0 | 4 | 3 |
| TOTALS | | 6 | 10 | 11 | 23 | 17 | 2 | 18 | 0 | 10.00 | 0 | 0 | 32 | 0 | 24 | 26 |

STATION LINK SUMMARY

| STN | LINK | CAPACITY | OCCUPANCY STATISTICS | | | QUEUE STATISTICS | | | | LINK | TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | NUMBER | | CURRENT | AVERAGE | MAXIMUM | CURRENT | AVERAGE | MAXIMUM | MAX DELAY | LOAD | |
| 1 | | | | | | | | | | | |
| | 1 | 5 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | IR |
| | 2 | 8 | 0 | 0.080 | 1 | 0 | 0.0 | 0 | 0.0 | 0.010 | IQ |
| | 3 | 8 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | IQ |
| | 4 | 1 | 1 | 0.010 | 1 | 0 | 0.0 | 0 | 0.0 | 0.010 | D |
| | 5 | 1 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | D |
| | 6 | 1 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | D |
| | 7 | 8 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | OQ |
| | 8 | 5 | 0 | 0.060 | 1 | 0 | 0.0 | 0 | 0.0 | 0.012 | OR |
| | TOTALS | 37 | 1 | | | 0 | | | | 0.004 | |

| STN | LINK | CAPACITY | OCCUPANCY STATISTICS | | | QUEUE STATISTICS | | | | LINK | TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | NUMBER | | CURRENT | AVERAGE | MAXIMUM | CURRENT | AVERAGE | MAXIMUM | MAX DELAY | LOAD | |
| 2 | | | | | | | | | | | |
| | 1 | 5 | 0 | 0.100 | 1 | 0 | 0.0 | 0 | 0.0 | 0.020 | IR |
| | 2 | 8 | 0 | 0.080 | 1 | 0 | 0.0 | 0 | 0.0 | 0.010 | IQ |
| | 3 | 8 | 0 | 0.080 | 1 | 0 | 0.0 | 0 | 0.0 | 0.010 | IQ |
| | 4 | 1 | 0 | 0.220 | 1 | 0 | 0.0 | 0 | 0.0 | 0.220 | D |
| | 5 | 1 | 0 | 0.220 | 1 | 0 | 0.0 | 0 | 0.0 | 0.220 | D |
| | 6 | 1 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | D |
| | 7 | 8 | 0 | 0.330 | 2 | 0 | 0.0 | 0 | 0.0 | 0.041 | OQ |
| | 8 | 5 | 0 | 0.200 | 2 | 0 | 0.0 | 0 | 0.0 | 0.040 | OR |
| | TOTALS | 37 | 0 | | | 0 | | | | 0.070 | |

| STN | LINK | CAPACITY | OCCUPANCY STATISTICS | | | QUEUE STATISTICS | | | | LINK | TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | NUMBER | | CURRENT | AVERAGE | MAXIMUM | CURRENT | AVERAGE | MAXIMUM | MAX DELAY | LOAD | |

FIGURE B-9. (2 of 3) MODEL PROCESSOR INTERMEDIATE SAMPLING REPORT

| STN | LINK NUMBER | CAPACITY | OCCUPANCY STATISTICS CURRENT | AVERAGE | MAXIMUM | QUEUE STATISTICS CURRENT | AVERAGE | MAXIMUM | MAX DELAY | LINK LOAD | TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | | | | | | | | | | | |
| | 1 | 5 | 0 | 0.200 | 1 | 0 | 0.0 | 0 | 0.0 | 0.040 | IR |
| | 2 | 8 | 0 | 0.160 | 1 | 0 | 0.0 | 0 | 0.0 | 0.020 | IQ |
| | 3 | 8 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | IQ |
| | 4 | 1 | 0 | 0.440 | 1 | 0 | 0.0 | 0 | 0.0 | 0.440 | D |
| | 5 | 1 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | D |
| | 6 | 1 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | D |
| | 7 | 8 | 1 | 0.190 | 1 | 0 | 0.0 | 0 | 0.0 | 0.024 | OQ |
| | 8 | 5 | 0 | 0.100 | 1 | 0 | 0.0 | 0 | 0.0 | 0.020 | OR |
| | TOTALS | 37 | 1 | | | 0 | | | | 0.068 | |

| STN | LINK NUMBER | CAPACITY | OCCUPANCY STATISTICS CURRENT | AVERAGE | MAXIMUM | QUEUE STATISTICS CURRENT | AVERAGE | MAXIMUM | MAX DELAY | LINK LOAD | TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | | | | | | | | | | | |
| | 1 | 5 | 0 | 0.100 | 1 | 0 | 0.0 | 0 | 0.0 | 0.020 | IR |
| | 2 | 8 | 0 | 0.080 | 1 | 0 | 0.0 | 0 | 0.0 | 0.010 | IQ |
| | 3 | 8 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | IQ |
| | 4 | 1 | 0 | 0.220 | 1 | 0 | 0.0 | 0 | 0.0 | 0.220 | D |
| | 5 | 1 | 0 | 0.130 | 1 | 0 | 0.0 | 0 | 0.0 | 0.130 | D |
| | 6 | 1 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | D |
| | 7 | 8 | 0 | 0.480 | 1 | 0 | 0.0 | 0 | 0.0 | 0.060 | OQ |
| | 8 | 5 | 0 | 0.300 | 1 | 0 | 0.0 | 0 | 0.0 | 0.060 | OR |
| | TOTALS | 37 | 0 | | | 0 | | | | 0.062 | |

| STN | LINK NUMBER | CAPACITY | OCCUPANCY STATISTICS CURRENT | AVERAGE | MAXIMUM | QUEUE STATISTICS CURRENT | AVERAGE | MAXIMUM | MAX DELAY | LINK LOAD | TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | | | | | | | | | | | |
| | 1 | 5 | 0 | 0.200 | 1 | 0 | 0.0 | 0 | 0.0 | 0.040 | IR |
| | 2 | 8 | 0 | 0.160 | 1 | 0 | 0.0 | 0 | 0.0 | 0.020 | IQ |
| | 3 | 8 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | IQ |
| | 4 | 1 | 1 | 0.300 | 1 | 0 | 0.0 | 0 | 0.0 | 0.300 | D |
| | 5 | 1 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | D |
| | 6 | 1 | 0 | 0.0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | D |
| | 7 | 8 | 0 | 0.320 | 2 | 0 | 0.0 | 0 | 0.0 | 0.040 | OQ |
| | 8 | 5 | 0 | 0.300 | 2 | 0 | 0.0 | 0 | 0.0 | 0.060 | OR |
| | TOTALS | 37 | 1 | | | 0 | | | | 0.057 | |

FIGURE B-9. (3 of 3) MODEL PROCESSOR INTERMEDIATE SAMPLING REPORT

AGT DESM TERMINATION STATUS REPORT 7/30/81

| | | |
|---|---|---|
| SIMULATION TIME | 3601 | SECONDS |
| NUMBER VEHICLES IN STATION STORAGE | 0 | |
| NUMBER OF VEHICLES IN REVENUE SERVICE | 40 | |
| NUMBER OF VEHICLES IN NON REVENUE SERVICE | 8 | |
| NUMBER OF PARTIES ON VEHICLES | 100 | |
| NUMBER OF PASSENGERS ON VEHICLES | 465 | |

GUIDEWAY LINK SUMMARY

| LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | STATUS |
|---|---|---|---|---|
| 1 | 230 | 2 | 0 | IN SERVICE |
| 2 | 124 | 1 | 0 | IN SERVICE |
| 3 | 230 | 0 | 0 | IN SERVICE |
| 4 | 595 | 4 | 0 | IN SERVICE |
| 5 | 595 | 4 | 0 | IN SERVICE |
| 6 | 230 | 0 | 0 | IN SERVICE |
| 7 | 124 | 0 | 0 | IN SERVICE |
| 8 | 230 | 1 | 0 | IN SERVICE |
| 9 | 230 | 1 | 0 | IN SERVICE |
| 10 | 124 | 0 | 0 | IN SERVICE |
| 11 | 230 | 4 | 0 | IN SERVICE |
| 12 | 595 | 8 | 0 | IN SERVICE |
| 13 | 595 | 4 | 0 | IN SERVICE |
| 14 | 230 | 1 | 0 | IN SERVICE |
| 15 | 124 | 0 | 0 | IN SERVICE |
| 16 | 230 | 2 | 0 | IN SERVICE |
| 17 | 599 | 0 | 0 | IN SERVICE |
| 18 | 230 | 1 | 0 | IN SERVICE |
| 19 | 124 | 0 | 0 | IN SERVICE |
| 20 | 230 | 2 | 0 | IN SERVICE |
| 21 | 595 | 5 | 0 | IN SERVICE |
| 22 | 595 | 1 | 0 | IN SERVICE |
| TOTALS | 7089 | 41 | 0 | |

ROUTE SUMMARY

| ROUTE | NUMBER WAITING PASSENGERS | NUMBER IN PROCESS PARTY | PASSENGERS | NUMBER VEHICLES |
|---|---|---|---|---|
| 1 | 27 | 18 | 86 | 7 |
| 2 | 4 | 16 | 101 | 9 |
| 3 | 17 | 42 | 144 | 20 |
| 4 | 15 | 24 | 134 | 12 |

FIGURE B-10. (1 of 4) MODEL PROCESSOR TERMINATION STATUS REPORT

## STATION SUMMARY

| STN | PASSENGERS WAITING | PARTIES WAITING | VEHICLES IN STATION |
|---|---|---|---|
| 1 | 8 | 2 | 0 |
| 2 | 23 | 3 | 1 |
| 3 | 0 | 0 | 2 |
| 4 | 4 | 1 | 2 |
| 5 | 28 | 4 | 2 |
| TOTALS | 63 | 10 | 7 |

## STATION LINK SUMMARY

| STN 1 | LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | TYPE |
|---|---|---|---|---|---|
| | 1 | 5 | 0 | 0 | IR |
| | 2 | 8 | 0 | 0 | IQ |
| | 3 | 8 | 0 | 0 | IQ |
| | 4 | 1 | 0 | 0 | D |
| | 5 | 1 | 0 | 0 | D |
| | 6 | 1 | 0 | 0 | D |
| | 7 | 8 | 0 | 0 | OQ |
| | 8 | 5 | 0 | 0 | OR |
| | TOTALS | 37 | 0 | 0 | |

| STN 2 | LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | TYPE |
|---|---|---|---|---|---|
| | 1 | 5 | 0 | 0 | IR |
| | 2 | 8 | 0 | 0 | IQ |
| | 3 | 8 | 0 | 0 | IQ |
| | 4 | 1 | 1 | 0 | D |
| | 5 | 1 | 0 | 0 | D |
| | 6 | 1 | 0 | 0 | D |
| | 7 | 8 | 0 | 0 | OQ |
| | 8 | 5 | 0 | 0 | OR |
| | TOTALS | 37 | 1 | 0 | |

| STN 3 | LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | TYPE |
|---|---|---|---|---|---|
| | 1 | 5 | 1 | 0 | IR |
| | 2 | 8 | 0 | 0 | IQ |

FIGURE B-10. (2 of 4) MODEL PROCESSOR TERMINATION STATUS REPORT

| STN | LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | TYPE |
|---|---|---|---|---|---|
| | 3 | 8 | 0 | 0 | IQ |
| | 4 | 1 | 0 | 0 | D |
| | 5 | 1 | 0 | 0 | D |
| | 6 | 1 | 0 | 0 | D |
| | 7 | 8 | 1 | 0 | OQ |
| | 8 | 5 | 0 | 0 | OR |
| | TOTALS | 37 | 2 | 0 | |

| STN 4 | LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | TYPE |
|---|---|---|---|---|---|
| | 1 | 5 | 0 | 0 | IR |
| | 2 | 8 | 0 | 0 | IQ |
| | 3 | 8 | 0 | 0 | IQ |
| | 4 | 1 | 1 | 0 | D |
| | 5 | 1 | 0 | 0 | D |
| | 6 | 1 | 0 | 0 | D |
| | 7 | 8 | 1 | 0 | OQ |
| | 8 | 5 | 0 | 0 | OR |
| | TOTALS | 37 | 2 | 0 | |

| STN 5 | LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | TYPE |
|---|---|---|---|---|---|
| | 1 | 5 | 1 | 0 | IR |
| | 2 | 8 | 0 | 0 | IQ |
| | 3 | 8 | 0 | 0 | IQ |
| | 4 | 1 | 0 | 0 | D |
| | 5 | 1 | 0 | 0 | D |
| | 6 | 1 | 0 | 0 | D |
| | 7 | 8 | 0 | 0 | OQ |
| | 8 | 5 | 1 | 0 | OR |
| | TOTALS | 37 | 2 | 0 | |

FILE SUMMARY
INPUT FILES
AGT.STRUC.SYSTEM(EDEMO1 )
AGT.STRUC.NETWORK(EDEMO1 )
AGT.STRUC.DEMAND(EDEMO1A )
AGT.STRUC.RNTIM(EDEMO1 )
OUTPUT FILES
AGT.STATS.DESM(EDEMO1 )
AGT.CHKPT.DESM(EDEMO1 )
AGT.STRUC.TRIPLOG(EDEMO1 )
AGT.STRUC.DESMLLOG(EDEMO1 )
AGT.STRUC.DESMSLOG(EDEMO1 )

EVENT SCHEDULING SUMMARY

| SCHEDULING INTERVAL (C.U.) | NUMBER OF EVENTS | FRACTION OF TOTAL |
|---|---|---|

FIGURE B-10. (3 of 4) MODEL PROCESSOR TERMINATION STATUS REPORT

| | | | |
|---|---|---|---|
| 0 | 10000 | 8125. | 1.00 |
| 10001 | 20000 | 0. | 0.0 |
| 20001 | 30000 | 0. | 0.0 |
| 30001 | 40000 | 0. | 0.0 |
| 40001 | 50000 | 0. | 0.0 |
| 50001 | 60000 | 0. | 0.0 |
| 60001 | 70000 | 0. | 0.0 |
| 70001 | 80000 | 0. | 0.0 |
| 80001 | 90000 | 0. | 0.0 |
| GREATER THAN | 90001 | 0. | 0.0 |

MEAN DELTA T / SCHEDULED EVENT = 12.706
STANDARD DEVIATION = 52.444

| | |
|---|---|
| TOTAL NUMBER OF MESSAGES ISSUED | 1 |
| INFORMATION | 1 |
| WARNING | 0 |
| SEVERE | 0 |

FIGURE B-10. (4 of 4) MODEL PROCESSOR TERMINATION STATUS REPORT

AGT DESM SIMULATION RESTART CONDITIONS REPORT

| | |
|---|---|
| TYPE OF SERVICE | SCHEDULED |
| ROUTE SPACING | FIXED |
| LONGITUDINAL CONTROL | ASYNCHRONOUS |
| POSITION REGULATION | VARIABLE HEADWAY |
| DISPATCH POLICY | NON-DETERMINISTIC |
| MERGE POLICY | FIFO |
| PATH SELECTION METHOD | APRIORI |
| PATH SELECTION CRITERIA | TABLE LOOK-UP |
| BERTHING POLICY | FIFO |
| TRANSFER POLICY | INACTIVE |

SIMULATION TIME STATISTICS

| | |
|---|---|
| BEGIN SIMULATION | 1200 |
| SAMPLING INTERVAL | 100.0 |
| CHECKPOINT INTERVAL | 0.0 |
| CLOCK UNITS / MINUTE | 60 |
| REACTION TIME | 0.0 |

SIMULATION VEHICLE STATISTICS

| | |
|---|---|
| TOTAL FLEET SIZE | 48 |
| NUMBER VEHICLES IN STATION STORAGE | 2 |
| NUMBER OF VEHICLES IN SERVICE | 46 |
| VEHICLE CAPACITY | 20 |

| | |
|---|---|
| NUMBER VEHICLES IN STATION STORAGE | 2 |
| NUMBER OF VEHICLES IN REVENUE SERVICE | 44 |
| NUMBER OF VEHICLES IN NON-REVENUE SERVICE | 2 |

| | |
|---|---|
| NUMBER OF PARTIES ON VEHICLES | 201 |
| NUMBER OF PASSENGERS ON VEHICLES | 358 |

GUIDEWAY LINK SUMMARY

| LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | STATUS |
|---|---|---|---|---|
| 1 | 230 | 2 | 0 | IN SERVICE |
| 2 | 124 | 0 | 0 | IN SERVICE |
| 3 | 230 | 2 | 0 | IN SERVICE |
| 4 | 595 | 4 | 0 | IN SERVICE |
| 5 | 595 | 1 | 0 | IN SERVICE |
| 6 | 230 | 0 | 0 | IN SERVICE |
| 7 | 124 | 0 | 0 | IN SERVICE |
| 8 | 230 | 1 | 0 | IN SERVICE |

FIGURE B-11. (1 of 3) MODEL PROCESSOR RESTART CONDITIONS REPORT

| | | | | |
|---|---|---|---|---|
| 9 | 230 | 5 | 0 | IN SERVICE |
| 10 | 124 | 0 | 0 | IN SERVICE |
| 11 | 230 | 2 | 0 | IN SERVICE |
| 12 | 595 | 6 | 0 | IN SERVICE |
| 13 | 595 | 5 | 0 | IN SERVICE |
| 14 | 230 | 2 | 0 | IN SERVICE |
| 15 | 124 | 0 | 0 | IN SERVICE |
| 16 | 230 | 1 | 0 | IN SERVICE |
| 17 | 599 | 0 | 0 | IN SERVICE |
| 18 | 230 | 2 | 0 | IN SERVICE |
| 19 | 124 | 0 | 0 | IN SERVICE |
| 20 | 230 | 0 | 0 | IN SERVICE |
| 21 | 595 | 5 | 0 | IN SERVICE |
| 22 | 595 | 1 | 0 | IN SERVICE |
| TOTALS | 7089 | 39 | 0 | |

ROUTE SUMMARY

| ROUTE | NUMBER WAITING PASSENGERS | NUMBER IN PROCESS PARTY | NUMBER IN PROCESS PASSENGERS | NUMBER VEHICLES |
|---|---|---|---|---|
| 1 | 2 | 34 | 49 | 7 |
| 2 | 11 | 40 | 88 | 9 |
| 3 | 1 | 78 | 132 | 20 |
| 4 | 0 | 49 | 89 | 12 |

STATION SUMMARY

| STN | PASSENGERS WAITING | PARTIES WAITING | VEHICLES IN STATION |
|---|---|---|---|
| 1 | 0 | 0 | 1 |
| 2 | 1 | 1 | 3 |
| 3 | 2 | 2 | 1 |
| 4 | 1 | 1 | 2 |
| 5 | 10 | 8 | 2 |
| TOTALS | 14 | 12 | 9 |

STATION LINK SUMMARY

| STN 1 | LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | TYPE |
|---|---|---|---|---|---|
| | 1 | 5 | 0 | 0 | IR |
| | 2 | 8 | 0 | 0 | IQ |
| | 3 | 8 | 0 | 0 | IQ |
| | 4 | 1 | 0 | 0 | D |
| | 5 | 1 | 0 | 0 | D |
| | 6 | 1 | 0 | 0 | D |
| | 7 | 8 | 0 | 0 | OQ |
| | 8 | 5 | 1 | 0 | OR |
| | TOTALS | 37 | 1 | 0 | |

FIGURE B-11. (2 of 3) MODEL PROCESSOR RESTART CONDITIONS REPORT

| STN 2 | LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | TYPE |
|---|---|---|---|---|---|
| | 1 | 5 | 0 | 0 | IR |
| | 2 | 8 | 0 | 0 | IQ |
| | 3 | 8 | 0 | 0 | IQ |
| | 4 | 1 | 1 | 0 | D |
| | 5 | 1 | 0 | 0 | D |
| | 6 | 1 | 0 | 0 | D |
| | 7 | 8 | 0 | 0 | OQ |
| | 8 | 5 | 0 | 0 | OR |
| | TOTALS | 37 | 1 | 0 | |

| STN 3 | LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | TYPE |
|---|---|---|---|---|---|
| | 1 | 5 | 0 | 0 | IR |
| | 2 | 8 | 0 | 0 | IQ |
| | 3 | 8 | 0 | 0 | IQ |
| | 4 | 1 | 0 | 0 | D |
| | 5 | 1 | 0 | 0 | D |
| | 6 | 1 | 0 | 0 | D |
| | 7 | 8 | 1 | 0 | OQ |
| | 8 | 5 | 0 | 0 | OR |
| | TOTALS | 37 | 1 | 0 | |

| STN 4 | LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | TYPE |
|---|---|---|---|---|---|
| | 1 | 5 | 1 | 0 | IR |
| | 2 | 8 | 0 | 0 | IQ |
| | 3 | 8 | 0 | 0 | IQ |
| | 4 | 1 | 0 | 0 | D |
| | 5 | 1 | 0 | 0 | D |
| | 6 | 1 | 0 | 0 | D |
| | 7 | 8 | 1 | 0 | OQ |
| | 8 | 5 | 0 | 0 | OR |
| | TOTALS | 37 | 2 | 0 | |

| STN 5 | LINK NUMBER | CAPACITY | TOTAL OCCUPANCY | TOTAL Q OCCUPANCY | TYPE |
|---|---|---|---|---|---|
| | 1 | 5 | 0 | 0 | IR |
| | 2 | 8 | 0 | 0 | IQ |
| | 3 | 8 | 0 | 0 | IQ |
| | 4 | 1 | 0 | 0 | D |
| | 5 | 1 | 1 | 0 | D |
| | 6 | 1 | 0 | 0 | D |
| | 7 | 8 | 1 | 0 | OQ |
| | 8 | 5 | 0 | 0 | OR |
| | TOTALS | 37 | 2 | 0 | |

FIGURE B-11. (3 of 3) MODEL PROCESSOR RESTART CONDITIONS REPORT

DESM STANDARD REPORT 1----PERFORMANCE SUMMARY REPORT

RESOURCE UTILIZATION

| | |
|---|---|
| **--SYSTEM RELATED--** | |
| PERFORMANCE SUMMARY REQUEST INTERVAL (SEC) | 3600.000 |
| NUMBER OF VEHICLES REQUIRED | 48.000 |
| VEHICLE CAPACITY (PASSENGERS) | 20.000 |
| AVERAGE NUMBER OF PASSENGERS / VEHICLE | 8.795 |
| AVERAGE NUMBER OF PASSENGERS / REVENUE SERVICE VEHICLE | 9.447 |
| MAXIMUM AVERAGE OF THE NUMBER OF PASSENGERS / REVENUE SERVICE VEHICLE | 11.891 |
| AVERAGE PROPORTION OF VEHICLES IN REVENUE SERVICE | 0.840 |
| AVERAGE PROPORTION OF VEHICLES DEADHEADING | 0.055 |
| AVERAGE PROPORTION OF VEHICLES IN STORAGE | 0.105 |
| PASSENGERS SERVED / VEHICLE HOUR | 45.987 |
| **--GUIDEWAY RELATED--** | |
| AVERAGE PROPORTION OF VEHICLES ON GUIDEWAY | 0.783 |
| AVERAGE DISTANCE TRAVELLED / VEHICLE (KM/VEH) | 41.311 |
| TOTAL VEHICLE DISTANCE TRAVELLED / HOUR (KM/HR) | 1982.940 |
| TOTAL VEHICLE REVENUE SERVICE DISTANCE / HOUR (KM/HR) | 1884.900 |
| TOTAL PASSENGER DISTANCE TRAVELLED / HOUR (KM/HR) | 18855.309 |
| NUMBER OF VEHICLES LEAVING GUIDEWAY LINKS / HOUR | 1169.000 |
| MAXIMUM NUMBER OF VEHICLES LEAVING GUIDEWAY LINKS / HOUR | 1512.000 |
| TOTAL REVENUE SERVICE VEHICLE HOURS | 40.311 |
| TOTAL DEADHEADING VEHICLE HOURS | 2.658 |
| **--STATION RELATED--** | |
| TOTAL NUMBER OF VEHICLES DISPATCHED | 294.000 |
| AVERAGE NUMBER OF PASSENGERS WAITING / STATION | 9.485 |
| MAXIMUM NUMBER OF PASSENGERS WAITING IN STATIONS | 114.000 |
| **--ROUTE RELATED--** | |
| AVERAGE NUMBER OF VEHICLES / ROUTE | 12.000 |

PERFORMANCE

| | |
|---|---|
| **--SYSTEM RELATED--** | |
| AVERAGE DISTANCE / COMPLETED TRIP (KM/TRP) | 11.014 |
| AVERAGE VEHICLE SPEED (M/SEC) | 14.999 |
| AVERAGE TRIP TRAVEL SPEED (M/SEC) | 13.188 |
| AVERAGE PASSENGER DISTANCE / VEHICLE HOUR (KM/VHR) | 438.819 |
| AVERAGE PASSENGER DISTANCE / VEHICLE UNIT DISTANCE | 9.509 |
| **--GUIDEWAY RELATED--** | |
| MAXIMUM NUMBER OF VEHICLES QUEUED ON GUIDEWAY | 1.000 |
| AVERAGE NUMBER OF VEHICLES QUEUED ON GUIDEWAY | 0.004 |
| AVERAGE QUEUE DELAY / QUEUED VEHICLE (SEC/V) | 1.444 |

FIGURE B-12. (1 of 2) PERFORMANCE SUMMARY REPORT

| | |
|---|---|
| AVERAGE QUEUE DELAY / VEHICLE (SEC/V) | 0.011 |
| MAXIMUM QUEUE DELAY / QUEUED VEHICLE (SEC) | 2.000 |
| MAXIMUM QUEUE DELAY / VEHICLE (SEC) | 1.000 |

--STATION RELATED--

| | |
|---|---|
| AVERAGE NUMBER OF VEHICLES QUEUED ON INPUT RAMPS | 0.0 |
| AVERAGE NUMBER OF VEHICLES QUEUED ON INPUT QUEUES | 0.0 |
| AVERAGE NUMBER OF VEHICLES QUEUED AT BERTHING AREAS | 0.0 |
| AVERAGE NUMBER OF VEHICLES QUEUED ON OUTPUT QUEUES | 0.001 |
| AVERAGE NUMBER OF VEHICLES QUEUED ON OUTPUT RAMPS | 0.000 |
| AVERAGE NUMBER OF VEHICLES QUEUED IN STORAGE AREAS | 0.0 |
| MAXIMUM NUMBER OF VEHICLES QUEUED ON INPUT RAMPS | 0.0 |
| MAXIMUM NUMBER OF VEHICLES QUEUED ON INPUT QUEUES | 0.0 |
| MAXIMUM NUMBER OF VEHICLES QUEUED AT BERTHING AREAS | 0.0 |
| MAXIMUM NUMBER OF VEHICLES QUEUED ON OUTPUT QUEUES | 1.000 |
| MAXIMUM NUMBER OF VEHICLES QUEUED ON OUTPUT RAMPS | 1.000 |
| MAXIMUM NUMBER OF VEHICLES QUEUED IN STORAGE AREAS | 0.0 |
| AVERAGE QUEUE DELAY ON INPUT RAMPS (SEC/V) | 0.0 |
| AVERAGE QUEUE DELAY ON INPUT QUEUES (SEC/V) | 0.0 |
| AVERAGE QUEUE DELAY AT BERTHING AREA (SEC/V) | 0.0 |
| AVERAGE QUEUE DELAY ON OUTPUT QUEUES (SEC/V) | 0.017 |
| AVERAGE QUEUE DELAY ON OUTPUT RAMPS (SEC/V) | 0.003 |
| AVERAGE QUEUE DELAY IN STORAGE AREAS (SEC/V) | 0.0 |
| MAXIMUM QUEUE DELAY ON INPUT RAMPS (SEC) | 0.0 |
| MAXIMUM QUEUE DELAY ON INPUT QUEUES (SEC) | 0.0 |
| MAXIMUM QUEUE DELAY AT BERTHING AREAS (SEC) | 0.0 |
| MAXIMUM QUEUE DELAY ON OUTPUT QUEUES (SEC) | 2.000 |
| MAXIMUM QUEUE DELAY ON OUTPUT RAMPS (SEC) | 1.000 |
| MAXIMUM QUEUE DELAY IN STORAGE AREAS (SEC) | 0.0 |
| AVERAGE FLOW RATE FROM BERTHING AREA (V/HR) | 296.000 |
| PROPORTION OF VEHICLES DENIED TIMELY ENTRY | 0.0 |
| AVERAGE STATION DELAY DUE TO MERGE CONFLICT RESOLUTION (SEC/V) | 0.0 |

--ROUTE RELATED--

| | |
|---|---|
| AVERAGE SCHEDULE DEVIATION (SEC/V) | 8.639 |
| MAXIMUM SCHEDULE DEVIATION (SEC) | 10.000 |
| MINIMUM SCHEDULE DEVIATION (SEC) | 1.000 |
| AVERAGE INTER-DISPATCH TIME (SEC/V) | 0.0 |
| MAXIMUM INTER-DISPATCH TIME (SEC) | 0.0 |
| MINIMUM INTER-DISPATCH TIME (SEC) | 0.0 |

LEVEL OF SERVICE
----------------

| | |
|---|---|
| TOTAL NUMBER OF ARRIVING PASSENGERS | 2050.000 |
| TOTAL NUMBER OF PASSENGERS SERVED | 1976.000 |
| TOTAL NUMBER OF PASSENGERS COMPLETING TRIPS | 1500.000 |
| AVERAGE PASSENGER DELAY DEMAND TO DISPATCH (SEC/P) | 108.325 |
| MAXIMUM PASSENGER DELAY DEMAND TO DISPATCH (SEC) | 403.000 |
| AVERAGE ACTUAL TRAVEL TIME / COMPLETED TRIP (SEC/T) | 821.039 |
| AVERAGE EXCESS TRAVEL TIME / COMPLETED TRIP (SEC/T) | 8.712 |
| MAXIMUM EXCESS TRAVEL TIME / COMPLETED TRIP (SEC) | 12.000 |
| NUMBER OF COMPLETED PASSENGERS WITH EXCESS TRAVEL TIME <= T1 | 1500.000 |
| NUMBER OF COMPLETED PASSENGERS WITH EXCESS TRAVEL TIME > T1 & <= T2 | 0.0 |
| NUMBER OF COMPLETED PASSENGERS WITH EXCESS TRAVEL TIME > T2 | 0.0 |
| NUMBER OF COMPLETED TRIPS WITH EXCESS TRAVEL TIME <= T1 | 772.000 |
| NUMBER OF COMPLETED TRIPS WITH EXCESS TRAVEL TIME > T1 & <= T2 | 0.0 |
| NUMBER OF COMPLETED TRIPS WITH EXCESS TRAVEL TIME > T2 | 0.0 |
| AVERAGE NUMBER OF TRANSFERS / COMPLETED TRIPS | 0.0 |
| RATIO OF COMPLETED PASSENGER TRANSFERS TO TOTAL COMPLETED PASSENGERS | 0.0 |
| AVERAGE TRIP TIME DEMAND TO TRIP COMPLETION (SEC/T) | 904.679 |

FIGURE B-12. (2 of 2) PERFORMANCE SUMMARY REPORT

DESM STANDARD REPORT 2----SYSTEM SUMMARY STATISTICS

SYSTEM-WIDE MEASUREMENTS

| | TOTAL | AVERAGE | MINIMUM | MAXIMUM |
|---|---|---|---|---|
| VEHICLE FLEET SIZE | - | 48.000 | 48.000 | 48.000 |
| SEAT CAPACITY | - | 960.000 | 960.000 | 960.000 |
| SEAT AVAILABILITY | - | 561.161 | 394.450 | 955.000 |
| VEHICLE METERS TRAVELLED | 1982940.00 | - | 0.0 | 74490.000 |
| VEHICLE LOAD FACTOR | - | 0.415 | 0.0 | 1.000 |
| NUMBER OF PASSENGERS IN SYSTEM | - | 458.278 | 79.000 | 628.000 |
| PASSENGER METERS TRAVELLED | 18855312.0 | - | 0.0 | 823440.000 |
| PASSENGER WAIT TIME (SEC) | - | 108.325 | 14.000 | 403.000 |
| NUMBER OF PASSENGERS WAITING | - | 47.425 | 0.0 | 114.000 |
| PERCENT COMPLETED TRANSFERS | 0.0 | - | 0.0 | 0.0 |
| NOMINAL TRAVEL TIME / ACTUAL TRAVEL TIME | 0.989 | - | 0.953 | 0.998 |
| VEHICLE SPEED IN NETWORK--INCLUDING STATION TIME (M/SEC) | 12.815 | - | 6.218 | 14.545 |
| VEHICLE SPEED ON GUIDEWAY--EXCLUDING STATION TIME (M/SEC) | 14.999 | - | 14.984 | 15.000 |

STATION MEASUREMENTS (BY STATION)

| | TOTAL | AVERAGE | MINIMUM | MAXIMUM |
|---|---|---|---|---|
| --STATION 1-- | | | | |
| NUMBER OF VEHICLES | - | 1.190 | 0.0 | 7.000 |
| NUMBER OF VEHICLES QUEUED: | | | | |
| INPUT RAMP | - | 0.0 | 0.0 | 0.0 |
| INPUT QUEUES | - | 0.0 | 0.0 | 0.0 |
| DOCKS | - | 0.0 | 0.0 | 0.0 |
| OUTPUT QUEUES | - | 0.0 | 0.0 | 0.0 |
| OUTPUT RAMP | - | 0.000 | 0.0 | 1.000 |
| STORAGE | - | 0.0 | 0.0 | 0.0 |
| VEHICLE TIME IN STATION (SEC) | - | 119.028 | 59.000 | 749.000 |
| NUMBER OF PASSENGERS: | | | | |
| ENTERING | 346.000 | - | 0.0 | 34.000 |
| EXITING | 289.000 | - | 0.0 | 36.000 |
| TRANSFERRING | 0.0 | - | 0.0 | 0.0 |
| WAITING | - | 10.090 | 0.0 | 41.000 |
| PASSENGER WAIT TIME | - | 132.607 | 17.000 | 357.000 |
| VEHICLE LOAD FACTOR--IN | - | 0.636 | 0.0 | 1.000 |
| VEHICLE LOAD FACTOR--OUT | - | 0.581 | 0.025 | 1.000 |
| --STATION 2-- | | | | |
| NUMBER OF VEHICLES | - | 3.358 | 0.0 | 15.000 |
| NUMBER OF VEHICLES QUEUED: | | | | |
| INPUT RAMP | - | 0.0 | 0.0 | 0.0 |

FIGURE B-13. (1 of 9) SYSTEM SUMMARY REPORT

| | | | | |
|---|---|---|---|---|
| INPUT QUEUES | - | 0.0 | 0.0 | 0.0 |
| DOCKS | - | 0.0 | 0.0 | 0.0 |
| OUTPUT QUEUES | - | 0.0 | 0.0 | 0.0 |
| OUTPUT RAMP | - | 0.0 | 0.0 | 0.0 |
| STORAGE | - | 0.0 | 0.0 | 0.0 |
| VEHICLE TIME IN STATION (SEC) | - | 246.143 | 61.000 | 1420.000 |
| NUMBER OF PASSENGERS: | | | | |
| ENTERING | 418.000 | - | 0.0 | 37.000 |
| EXITING | 321.000 | - | 0.0 | 31.000 |
| TRANSFERRING | 0.0 | - | 0.0 | 0.0 |
| WAITING | - | 9.117 | 0.0 | 41.000 |
| PASSENGER WAIT TIME | - | 97.479 | 14.000 | 273.000 |
| VEHICLE LOAD FACTOR--IN | - | 0.539 | 0.0 | 1.000 |
| VEHICLE LOAD FACTOR--OUT | - | 0.438 | 0.050 | 0.900 |

--STATION 3--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 1.212 | 0.0 | 5.000 |
| NUMBER OF VEHICLES QUEUED: | | | | |
| INPUT RAMP | - | 0.0 | 0.0 | 0.0 |
| INPUT QUEUES | - | 0.0 | 0.0 | 0.0 |
| DOCKS | - | 0.0 | 0.0 | 0.0 |
| OUTPUT QUEUES | - | 0.0 | 0.0 | 0.0 |
| OUTPUT RAMP | - | 0.0 | 0.0 | 0.0 |
| STORAGE | - | 0.0 | 0.0 | 0.0 |
| VEHICLE TIME IN STATION (SEC) | - | 81.358 | 58.000 | 376.000 |
| NUMBER OF PASSENGERS: | | | | |
| ENTERING | 313.000 | - | 0.0 | 20.000 |
| EXITING | 347.000 | - | 0.0 | 28.000 |
| TRANSFERRING | 0.0 | - | 0.0 | 0.0 |
| WAITING | - | 6.577 | 0.0 | 27.000 |
| PASSENGER WAIT TIME | - | 102.948 | 22.000 | 323.000 |
| VEHICLE LOAD FACTOR--IN | - | 0.558 | 0.0 | 1.000 |
| VEHICLE LOAD FACTOR--OUT | - | 0.459 | 0.0 | 0.950 |

--STATION 4--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 2.999 | 0.0 | 15.000 |
| NUMBER OF VEHICLES QUEUED: | | | | |
| INPUT RAMP | - | 0.0 | 0.0 | 0.0 |
| INPUT QUEUES | - | 0.0 | 0.0 | 0.0 |
| DOCKS | - | 0.0 | 0.0 | 0.0 |
| OUTPUT QUEUES | - | 0.001 | 0.0 | 1.000 |
| OUTPUT RAMP | - | 0.0 | 0.0 | 0.0 |
| STORAGE | - | 0.0 | 0.0 | 0.0 |
| VEHICLE TIME IN STATION (SEC) | - | 139.286 | 64.000 | 852.000 |
| NUMBER OF PASSENGERS: | | | | |
| ENTERING | 392.000 | - | 0.0 | 24.000 |
| EXITING | 343.000 | - | 0.0 | 39.000 |
| TRANSFERRING | 0.0 | - | 0.0 | 0.0 |
| WAITING | - | 6.813 | 0.0 | 27.000 |
| PASSENGER WAIT TIME | - | 90.263 | 17.000 | 239.000 |
| VEHICLE LOAD FACTOR--IN | - | 0.384 | 0.0 | 0.825 |
| VEHICLE LOAD FACTOR--OUT | - | 0.341 | 0.0 | 0.675 |

--STATION 5--

FIGURE B-13. (2 of 9) SYSTEM SUMMARY REPORT

| | TOTAL | AVERAGE | MINIMUM | MAXIMUM |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 1.656 | 0.0 | 6.000 |
| NUMBER OF VEHICLES QUEUED: | | | | |
| INPUT RAMP | - | 0.0 | 0.0 | 0.0 |
| INPUT QUEUES | - | 0.0 | 0.0 | 0.0 |
| DOCKS | - | 0.0 | 0.0 | 0.0 |
| OUTPUT QUEUES | - | 0.001 | 0.0 | 1.000 |
| OUTPUT RAMP | - | 0.0 | 0.0 | 0.0 |
| STORAGE | - | 0.0 | 0.0 | 0.0 |
| VEHICLE TIME IN STATION (SEC) | - | 75.564 | 58.000 | 270.000 |
| NUMBER OF PASSENGERS: | | | | |
| ENTERING | 581.000 | - | 1.000 | 39.000 |
| EXITING | 200.000 | - | 0.0 | 16.000 |
| TRANSFERRING | 0.0 | - | 0.0 | 0.0 |
| WAITING | - | 14.828 | 0.0 | 59.000 |
| PASSENGER WAIT TIME | - | 116.664 | 18.000 | 403.000 |
| VEHICLE LOAD FACTOR--IN | - | 0.345 | 0.050 | 0.575 |
| VEHICLE LOAD FACTOR--OUT | - | 0.552 | 0.100 | 1.000 |

GUIDEWAY LINK MEASUREMENTS (BY LINK)

| | TOTAL | AVERAGE | MINIMUM | MAXIMUM |
|---|---|---|---|---|
| --LINK 1-- | | | | |
| NUMBER OF VEHICLES | - | 1.146 | 0.0 | 3.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.005 | 0.0 | 0.013 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 12.738 | 0.0 | 52.000 |
| VEHICLE LOAD FACTOR | - | 0.556 | 0.118 | 0.886 |
| BY ROUTE: | | | | |
| 1 | - | 0.582 | 0.100 | 1.000 |
| 2 | - | 0.708 | 0.0 | 1.000 |
| 3 | - | 0.457 | 0.0 | 0.800 |
| --LINK 2-- | | | | |
| NUMBER OF VEHICLES | - | 0.266 | 0.0 | 1.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.002 | 0.0 | 0.008 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 2.508 | 0.0 | 16.000 |
| VEHICLE LOAD FACTOR | - | 0.471 | 0.100 | 0.800 |
| BY ROUTE: | | | | |
| 3 | - | 0.471 | 0.100 | 0.800 |
| --LINK 3-- | | | | |
| NUMBER OF VEHICLES | - | 1.257 | 0.0 | 3.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.005 | 0.0 | 0.013 |

FIGURE B-13. (3 of 9) SYSTEM SUMMARY REPORT

| | | | | |
|---|---|---|---|---|
| VEHICLE SPEED (M/SEC) | 15.000 | | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 13.607 | 0.0 | 44.000 |
| VEHICLE LOAD FACTOR | - | 0.541 | 0.024 | 0.792 |
| BY ROUTE: | | | | |
| 1 | - | 0.602 | 0.0 | 1.000 |
| 2 | - | 0.553 | 0.0 | 0.950 |
| 3 | - | 0.477 | 0.100 | 0.771 |

--LINK 4--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 3.051 | 0.0 | 5.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.005 | 0.0 | 0.008 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 32.628 | 0.0 | 76.000 |
| VEHICLE LOAD FACTOR | - | 0.535 | 0.025 | 0.776 |
| BY ROUTE: | | | | |
| 1 | - | 0.598 | 0.0 | 1.000 |
| 2 | - | 0.528 | 0.0 | 0.909 |
| 3 | - | 0.481 | 0.206 | 0.710 |

--LINK 5--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 2.063 | 0.0 | 4.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.003 | 0.0 | 0.007 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 22.051 | 0.0 | 62.000 |
| VEHICLE LOAD FACTOR | - | 0.534 | 0.0 | 0.819 |
| BY ROUTE: | | | | |
| 1 | - | 0.605 | 0.0 | 1.000 |
| 3 | - | 0.469 | 0.206 | 0.710 |

--LINK 6--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 0.758 | 0.0 | 2.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.003 | 0.0 | 0.009 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 8.168 | 0.0 | 33.000 |
| VEHICLE LOAD FACTOR | - | 0.539 | 0.0 | 0.831 |
| BY ROUTE: | | | | |
| 1 | - | 0.624 | 0.0 | 1.000 |
| 3 | - | 0.458 | 0.100 | 0.800 |

--LINK 7--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 0.0 | 0.0 | 0.0 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.0 | 0.0 | 0.0 |
| VEHICLE SPEED (M/SEC) | 0.0 | - | 0.0 | 0.0 |
| NUMBER OF PASSENGERS | - | 0.0 | 0.0 | 0.0 |

FIGURE B-13. (4 of 9) SYSTEM SUMMARY REPORT

| | | | | |
|---|---|---|---|---|
| VEHICLE LOAD FACTOR | - | 0.0 | 0.0 | 0.0 |
| BY ROUTE: | | | | |

--LINK 8--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 1.046 | 0.0 | 2.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.001 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.005 | 0.0 | 0.009 |
| VEHICLE SPEED (M/SEC) | 14.992 | - | 14.810 | 15.000 |
| NUMBER OF PASSENGERS | - | 8.991 | 0.0 | 30.000 |
| VEHICLE LOAD FACTOR | - | 0.430 | 0.050 | 0.815 |
| BY ROUTE: | | | | |
| 1 | - | 0.511 | 0.100 | 0.950 |
| 3 | - | 0.376 | 0.0 | 0.893 |

--LINK 9--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 2.560 | 0.0 | 5.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.011 | 0.0 | 0.022 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 25.724 | 0.0 | 81.000 |
| VEHICLE LOAD FACTOR | - | 0.502 | 0.050 | 0.801 |
| BY ROUTE: | | | | |
| 1 | - | 0.505 | 0.100 | 0.850 |
| 2 | - | 0.693 | 0.0 | 1.000 |
| 3 | - | 0.402 | 0.0 | 0.735 |
| 4 | - | 0.590 | 0.0 | 1.000 |

--LINK 10--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 0.814 | 0.0 | 3.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.001 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.007 | 0.0 | 0.024 |
| VEHICLE SPEED (M/SEC) | 14.974 | - | 14.659 | 15.000 |
| NUMBER OF PASSENGERS | - | 7.526 | 0.0 | 39.000 |
| VEHICLE LOAD FACTOR | - | 0.462 | 0.050 | 0.825 |
| BY ROUTE: | | | | |
| 2 | - | 0.693 | 0.0 | 1.000 |
| 3 | - | 0.403 | 0.010 | 0.750 |

--LINK 11--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 2.566 | 0.0 | 5.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.000 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.011 | 0.0 | 0.022 |
| VEHICLE SPEED (M/SEC) | 14.998 | - | 14.952 | 15.000 |
| NUMBER OF PASSENGERS | - | 23.922 | 0.0 | 75.000 |
| VEHICLE LOAD FACTOR | - | 0.466 | 0.0 | 0.769 |
| BY ROUTE: | | | | |
| 1 | - | 0.571 | 0.100 | 1.000 |
| 2 | - | 0.695 | 0.0 | 1.000 |

FIGURE B-13. (5 of 9) SYSTEM SUMMARY REPORT

| | | | | |
|---|---|---|---|---|
| 3 | - | 0.413 | 0.0 | 0.736 |
| 4 | - | 0.396 | 0.0 | 0.887 |

--LINK 12--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 7.071 | 0.0 | 10.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.012 | 0.0 | 0.017 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 65.919 | 0.0 | 137.000 |
| VEHICLE LOAD FACTOR | - | 0.466 | 0.0 | 0.730 |
| BY ROUTE: | | | | |
| 1 | - | 0.577 | 0.120 | 1.000 |
| 2 | - | 0.589 | 0.050 | 0.918 |
| 3 | - | 0.410 | 0.050 | 0.691 |
| 4 | - | 0.390 | 0.0 | 0.739 |

--LINK 13--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 3.744 | 0.0 | 5.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.006 | 0.0 | 0.008 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 29.536 | 0.0 | 74.000 |
| VEHICLE LOAD FACTOR | - | 0.394 | 0.0 | 0.707 |
| BY ROUTE: | | | | |
| 2 | - | 0.456 | 0.0 | 0.900 |
| 3 | - | 0.389 | 0.050 | 0.812 |
| 4 | - | 0.373 | 0.0 | 0.739 |

--LINK 14--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 1.394 | 0.0 | 3.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.006 | 0.0 | 0.013 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 10.780 | 0.0 | 52.000 |
| VEHICLE LOAD FACTOR | - | 0.387 | 0.0 | 0.835 |
| BY ROUTE: | | | | |
| 2 | - | 0.442 | 0.0 | 0.900 |
| 3 | - | 0.387 | 0.050 | 0.851 |
| 4 | - | 0.364 | 0.0 | 0.800 |

--LINK 15--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 0.0 | 0.0 | 0.0 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.0 | 0.0 | 0.0 |
| VEHICLE SPEED (M/SEC) | 0.0 | - | 0.0 | 0.0 |
| NUMBER OF PASSENGERS | - | 0.0 | 0.0 | 0.0 |
| VEHICLE LOAD FACTOR | - | 0.0 | 0.0 | 0.0 |
| BY ROUTE: | | | | |

FIGURE B-13. (6 of 9) SYSTEM SUMMARY REPORT

--LINK 16--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 1.642 | 0.0 | 3.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.007 | 0.0 | 0.013 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 11.079 | 0.0 | 40.000 |
| VEHICLE LOAD FACTOR | - | 0.337 | 0.054 | 0.587 |
| BY ROUTE: | | | | |
| 2 | - | 0.403 | 0.0 | 1.000 |
| 3 | - | 0.316 | 0.0 | 0.782 |
| 4 | - | 0.326 | 0.0 | 1.000 |

--LINK 17--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 0.0 | 0.0 | 0.0 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.0 | 0.0 | 0.0 |
| VEHICLE SPEED (M/SEC) | 0.0 | - | 0.0 | 0.0 |
| NUMBER OF PASSENGERS | - | 0.0 | 0.0 | 0.0 |
| VEHICLE LOAD FACTOR | - | 0.0 | 0.0 | 0.0 |
| BY ROUTE: | | | | |

--LINK 18--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 1.618 | 0.0 | 3.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.007 | 0.0 | 0.013 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 11.050 | 0.0 | 40.000 |
| VEHICLE LOAD FACTOR | - | 0.342 | 0.099 | 0.640 |
| BY ROUTE: | | | | |
| 2 | - | 0.403 | 0.0 | 1.000 |
| 3 | - | 0.318 | 0.004 | 0.900 |
| 4 | - | 0.333 | 0.022 | 1.000 |

--LINK 19--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 0.0 | 0.0 | 0.0 |
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.0 | 0.0 | 0.0 |
| VEHICLE SPEED (M/SEC) | 0.0 | - | 0.0 | 0.0 |
| NUMBER OF PASSENGERS | - | 0.0 | 0.0 | 0.0 |
| VEHICLE LOAD FACTOR | - | 0.0 | 0.0 | 0.0 |
| BY ROUTE: | | | | |

--LINK 20--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 1.667 | 0.0 | 3.000 |

FIGURE B-13. (7 of 9) SYSTEM SUMMARY REPORT

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES QUEUED | - | 0.0 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.007 | 0.0 | 0.013 |
| VEHICLE SPEED (M/SEC) | 15.000 | - | 15.000 | 15.000 |
| NUMBER OF PASSENGERS | - | 18.245 | 0.0 | 51.000 |
| VEHICLE LOAD FACTOR | - | 0.547 | 0.107 | 0.847 |
| BY ROUTE: | | | | |
| 2 | - | 0.647 | 0.0 | 1.000 |
| 3 | - | 0.423 | 0.0 | 0.800 |
| 4 | - | 0.608 | 0.0 | 1.000 |

--LINK 21--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 4.130 | 0.0 | 5.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.001 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.007 | 0.0 | 0.008 |
| VEHICLE SPEED (M/SEC) | 14.996 | - | 14.925 | 15.000 |
| NUMBER OF PASSENGERS | - | 44.705 | 0.0 | 82.000 |
| VEHICLE LOAD FACTOR | - | 0.541 | 0.178 | 0.831 |
| BY ROUTE: | | | | |
| 2 | - | 0.659 | 0.0 | 1.000 |
| 3 | - | 0.409 | 0.0 | 0.710 |
| 4 | - | 0.599 | 0.096 | 0.982 |

--LINK 22--

| | | | | |
|---|---|---|---|---|
| NUMBER OF VEHICLES | - | 0.790 | 0.0 | 1.000 |
| NUMBER OF VEHICLES QUEUED | - | 0.000 | 0.0 | 0.0 |
| VEHICLE VOLUME / LINK CAPACITY | - | 0.001 | 0.0 | 0.002 |
| VEHICLE SPEED (M/SEC) | 14.995 | - | 14.925 | 15.000 |
| NUMBER OF PASSENGERS | - | 7.997 | 0.0 | 18.000 |
| VEHICLE LOAD FACTOR | - | 0.506 | 0.0 | 0.900 |
| BY ROUTE: | | | | |
| 2 | - | 0.506 | 0.0 | 0.900 |

ROUTE MEASUREMENTS (BY ROUTE)

--ROUTE 1--

| | TOTAL | AVERAGE | MINIMUM | MAXIMUM |
|---|---|---|---|---|
| VEHICLE FLEET SIZE | - | 7.000 | 0.0 | 7.000 |
| SEAT CAPACITY | - | 140.000 | 140.000 | 140.000 |
| SEAT AVAILABILITY | - | 65.556 | 21.800 | 140.000 |
| VEHICLE METERS TRAVELLED | 291870.000 | - | 0.0 | 12510.000 |
| VEHICLE LOAD FACTOR | - | 0.532 | 0.0 | 1.000 |
| NUMBER OF PASSENGERS | - | 74.444 | 0.0 | 126.000 |
| PASSENGER METERS TRAVELLED | 3410010.00 | - | 0.0 | 211650.000 |
| PASSENGER WAIT TIME (SEC) | - | 121.000 | 16.000 | 323.000 |
| NUMBER OF PASSENGERS WAITING | - | 14.189 | 0.0 | 47.000 |
| PERCENT TRANSFERS TO ROUTE | 0.0 | - | 0.0 | 0.0 |

FIGURE B-13. (8 of 9) SYSTEM SUMMARY REPORT

| | | | | |
|---|---|---|---|---|
| NOMINAL TRAVEL TIME / ACTUAL TRAVEL TIME | 0.987 | - | 0.953 | 0.994 |
| VEHICLE SPEED IN NETWORK--INCLUDING STATION TIME (M/SEC) | 13.308 | - | 6.104 | 14.575 |
| VEHICLE SPEED ON GUIDEWAY--EXCLUDING STATION TIME (M/SEC) | 14.998 | - | 14.953 | 15.000 |
| --ROUTE 2-- | | | | |
| VEHICLE FLEET SIZE | - | 9.000 | 0.0 | 9.000 |
| SEAT CAPACITY | - | 180.000 | 180.000 | 180.000 |
| SEAT AVAILABILITY | - | 91.364 | 49.150 | 179.310 |
| VEHICLE METERS TRAVELLED | 383070.000 | - | 0.0 | 16155.000 |
| VEHICLE LOAD FACTOR | - | 0.492 | 0.0 | 1.000 |
| NUMBER OF PASSENGERS | - | 88.636 | 1.000 | 131.000 |
| PASSENGER METERS TRAVELLED | 4311180.00 | - | 0.0 | 221460.000 |
| PASSENGER WAIT TIME (SEC) | - | 149.156 | 19.000 | 403.000 |
| NUMBER OF PASSENGERS WAITING | - | 12.640 | 0.0 | 38.000 |
| PERCENT TRANSFERS TO ROUTE | 0.0 | - | 0.0 | 0.0 |
| NOMINAL TRAVEL TIME / ACTUAL TRAVEL TIME | 0.990 | - | 0.985 | 0.994 |
| VEHICLE SPEED IN NETWORK--INCLUDING STATION TIME (M/SEC) | 12.961 | - | 6.212 | 15.000 |
| VEHICLE SPEED ON GUIDEWAY--EXCLUDING STATION TIME (M/SEC) | 14.998 | - | 14.964 | 15.000 |
| --ROUTE 3-- | | | | |
| VEHICLE FLEET SIZE | - | 20.000 | 0.0 | 20.000 |
| SEAT CAPACITY | - | 400.000 | 400.000 | 400.000 |
| SEAT AVAILABILITY | - | 262.750 | 191.500 | 399.190 |
| VEHICLE METERS TRAVELLED | 812700.000 | - | 0.0 | 31635.000 |
| VEHICLE LOAD FACTOR | - | 0.343 | 0.0 | 0.899 |
| NUMBER OF PASSENGERS | - | 137.250 | 11.000 | 214.000 |
| PASSENGER METERS TRAVELLED | 6757785.00 | - | 0.0 | 311955.000 |
| PASSENGER WAIT TIME (SEC) | - | 80.751 | 14.000 | 191.000 |
| NUMBER OF PASSENGERS WAITING | - | 8.338 | 0.0 | 50.000 |
| PERCENT TRANSFERS TO ROUTE | 0.0 | - | 0.0 | 0.0 |
| NOMINAL TRAVEL TIME / ACTUAL TRAVEL TIME | 0.994 | - | 0.987 | 0.998 |
| VEHICLE SPEED IN NETWORK--INCLUDING STATION TIME (M/SEC) | 12.307 | - | 5.718 | 14.709 |
| VEHICLE SPEED ON GUIDEWAY--EXCLUDING STATION TIME (M/SEC) | 14.999 | - | 14.985 | 15.000 |
| --ROUTE 4-- | | | | |
| VEHICLE FLEET SIZE | - | 12.000 | 0.0 | 12.000 |
| SEAT CAPACITY | - | 240.000 | 240.000 | 240.000 |
| SEAT AVAILABILITY | - | 141.491 | 89.160 | 236.500 |
| VEHICLE METERS TRAVELLED | 495300.000 | - | 0.0 | 16020.000 |
| VEHICLE LOAD FACTOR | - | 0.410 | 0.0 | 1.000 |
| NUMBER OF PASSENGERS | - | 98.509 | 5.000 | 150.000 |

FIGURE B-13. (9 of 9) SYSTEM SUMMARY REPORT

DESM STATION-TO-STATION PERFORMANCE MEASURES
INITIAL WAIT TIME (SECS)

| ORIGIN STATION | DESTINATION STATION 1 | 2 | 3 | 4 | 5 | ALL | |
|---|---|---|---|---|---|---|---|
| 1 | 0. | 5372. | 2617. | 4579. | 2390. | 14958. | TOTAL |
| | 0.0 | 111.92 | 124.62 | 134.68 | 132.78 | 123.62 | AVERAGE |
| | 0.0 | 58.80 | 55.16 | 59.65 | 58.67 | 59.27 | STD. DEV. |
| | 0. | 238. | 227. | 238. | 222. | 238. | MAXIMUM |
| | 0. | 18. | 17. | 25. | 39. | 0. | MINIMUM |
| 2 | 3436. | 0. | 4335. | 2669. | 4019. | 14459. | TOTAL |
| | 104.12 | 0.0 | 114.08 | 83.41 | 77.29 | 93.28 | AVERAGE |
| | 50.99 | 0.0 | 44.94 | 35.51 | 35.99 | 44.50 | STD. DEV. |
| | 256. | 0. | 188. | 138. | 140. | 256. | MAXIMUM |
| | 19. | 0. | 16. | 14. | 19. | 0. | MINIMUM |
| 3 | 3085. | 3671. | 0. | 4798. | 0. | 11554. | TOTAL |
| | 128.54 | 114.72 | 0.0 | 71.61 | 0.0 | 93.93 | AVERAGE |
| | 66.25 | 49.28 | 0.0 | 26.90 | 0.0 | 50.00 | STD. DEV. |
| | 323. | 190. | 0. | 122. | 0. | 323. | MAXIMUM |
| | 22. | 26. | 0. | 22. | 0. | 0. | MINIMUM |
| 4 | 5349. | 1953. | 5509. | 0. | 2147. | 14958. | TOTAL |
| | 140.76 | 72.33 | 76.51 | 0.0 | 76.68 | 90.65 | AVERAGE |
| | 57.68 | 37.13 | 29.82 | 0.0 | 35.21 | 48.41 | STD. DEV. |
| | 239. | 136. | 132. | 0. | 130. | 239. | MAXIMUM |
| | 41. | 17. | 19. | 0. | 28. | 0. | MINIMUM |
| 5 | 7003. | 5785. | 4523. | 4510. | 0. | 21821. | TOTAL |
| | 184.29 | 81.48 | 88.69 | 93.96 | 0.0 | 104.91 | AVERAGE |
| | 103.98 | 36.45 | 52.25 | 48.12 | 0.0 | 71.16 | STD. DEV. |
| | 403. | 141. | 220. | 218. | 0. | 403. | MAXIMUM |
| | 19. | 18. | 20. | 24. | 0. | 0. | MINIMUM |
| ALL | 18873. | 16781. | 16984. | 16556. | 8556. | 77750. | TOTAL |
| | 141.90 | 94.28 | 93.32 | 91.47 | 87.31 | 100.71 | AVERAGE |
| | 79.86 | 49.04 | 47.01 | 47.78 | 46.25 | 57.78 | STD. DEV. |
| | 403. | 238. | 227. | 238. | 222. | 403. | MAXIMUM |
| | 0. | 0. | 0. | 0. | 0. | 0. | MINIMUM |

FIGURE B-14. STATION-TO-STATION PERFORMANCE MEASURES

TABLE B-1. RAW STATISTICS (Page 1 of 8)

DESM RAW STATISTICS USED IN COMPUTING THE PERFORMANCE SUMMARY
MEASURE AND SYSTEM SUMMARY STATISTICS
** ALL TIME VALUES IN CLOCK UNITS
** ALL DISTANCES IN METERS

| XREF # | DESCRIPTION | VARIABLE |
|---|---|---|
| | SYSTEM CONSTANTS | |
| | NUMBER OF GUIDEWAY LINKS | NUML |
| | NUMBER OF STATIONS | NUMS |
| | NUMBER OF STATION LINKS | NUMSL |
| | NUMBER OF ROUTES | NUMR |
| | NUMBER OF ROUTE GROUPS | NUMRG |
| | CLOCK UNITS/MINUTE | CSIZE |
| | SAMPLING INTERVAL (C.U.) | CSAMPL |
| | VEHICLE CAPACITY | VCAP |
| | VEHICLE SEAT CAPACITY | VSEAT |
| | SL GENERIC TYPE DESIGNATIONS | KTYPE |
| | FLEET SIZE | KNFLT |
| | HISTOGRAM CUTOFF VALUES | PHIST1<br>PHIST2 |
| | --SYSTEM WIDE STATISTICS-- | |
| | SYSTEM DATA | |
| 1 | TIME INTEGRAL OF REVENUE SERVICE VEHICLES | ZTTIRV |
| 2 | TIME INTEGRAL OF DEADHEADING VEHICLES | ZTTIDH |
| 3 | TIME INTEGRAL OF VEHICLES IN STORAGE | ZTTISV |
| 4 | TIME INTEGRAL OF TRIPS ON VEHICLES | ZTTITV |
| 5 | TIME INTEGRAL OF PASSENGERS ON VEHICLES | ZPTITV |
| 6 | TIME INTEGRAL SEATED PASSENGERS ON VEHICLES | ZTSEAT |
| 7 | SUM TIMES DEMAND TO COMPLETION FOR COMPLETED TRIPS | ZTSDCS |
| 8 | MAXIMUM RATIO NOMINAL TT / ACTUAL TT | ZTXRTT |
| 9 | MINIMUM RATIO NOMINAL TT / ACTUAL TT | ZTMRTT |
| 10 | SUM OF PASSENGER DISTANCE TRAVELIED ON GUIDEWAY | ZDTDST |
| 11 | SUM OF VEHICLE DEADHEADING DISTANCE | ZDDDST |
| 12 | SUM OF REVENUE SERVICE DISTANCE | ZDRDST |
| 13 | UNDEFINED | |
| 14 | UNDEFINED | |
| 15 | UNDEFINED | |
| 16 | CURRENT NUMBER OF TRIPS ON VEHICLES | ZNTOV |
| 17 | CURRENT NUMBER OF PASSENGERS ON VEHICLES | ZNPOV |
| 18 | CURRENT NUMBER OF VEHICLES IN REVENUE SERVICE | ZNVRVS |
| 19 | CURRENT NUMBER OF VEHICLES DEADHEADING | ZNVDEH |
| 20 | CURRENT NUMBER OF VEHICLES IN STORAGE | ZNVSTO |
| | --COMPLETED TRIPS HISTORAM VALUES | |
| 21 | # TRIPS EXCESS TRAVEL TT <= PHIST1 | ZNTT1 |
| 22 | # TRIPS EXCESS TRAVEL TT >PHIST1 & <=PHIST2 | ZNTT2 |
| 23 | # TRIPS EXCESS TRAVEL TIME >PHIST2 | ZNTT3 |
| | --COMPLETED PASSENGER HISTOGRAM VALUES | |
| 24 | # PASSENGERS EXCESS TRAVEL TT <= PHIST1 | ZNPP1 |
| 25 | # PASSENGERS EXCESS TRAVEL TT >PHIST1 & <=PHIST2 | ZNPP2 |
| 26 | # PASSENGERS EXCESS TRAVEL TIME >PHIST2 | ZNPP3 |
| 27 | TOTAL NUMBER OF VEHICLES IN REVENUE SERVICE | ZTVRVS |
| 28 | TOTAL NUMBER OF VEHICLES DEADHEADING | ZTVDEH |

TABLE B-1. RAW STATISTICS (Page 2 of 8)

| XREF # | DESCRIPTION | VARIABLE |
|---|---|---|
| 29 | TOTAL NUMBER OF VEHICLES IN STORAGE | ZTVSTO |
| 30 | TOTAL PASSENGERS SERVED EXCLUDING ARRIVING XFERS | ZTPSVD |
| 31 | MAXIMUM FLEET SIZE | ZTXFLT |
| 32 | MINIMUM FLEET SIZE | ZTMFLT |
| 33 | CURRENT NUMBER OF SEATED PASSENGERS ON VEHICLES | ZNPSV |
| 34 | MINIMUM VEHICLE LOAD FACTOR | ZTMVLF |
| 35 | MAXIMUM VEHICLE LOAD FACTOR | ZTXVLF |
| 36 | UNDEFINED | |
| | STATION-WIDE STATISTICS | |
| 37 | TIME INTEGRAL OF VEHICLES IN STATIONS | ZTVTIS |
| 38 | TIME INTEGRAL OF TRIPS WAITING IN STATIONS | ZTTTIS |
| 39 | TIME INTEGRAL OF PASSENGERS WAITING IN STATIONS | ZTPTIS |
| 40 | TIME INTEGRAL OF VEHICLES ON INPUT RAMPS | ZVTIIR |
| 41 | TIME INTEGRAL OF VEHICLES ON INPUT QUEUES | ZVTIIQ |
| 42 | TIME INTEGRAL OF VEHICLES AT DOCKS | ZVTIDK |
| 43 | TIME INTEGRAL OF VEHICLES ON OUTPUT QUEUES | ZVTIOQ |
| 44 | TIME INTEGRAL OF VEHICLES ON OUTPUT RAMPS | ZVTIOR |
| 45 | TIME INTEGRAL OF VEHICLES IN STATION STORAGES | ZVTIST |
| 46 | TIME INTEGRAL OF VEHICLES QUEUED ON INPUT RAMPS | ZQTIIR |
| 47 | TIME INTEGRAL OF VEHICLES QUEUED ON INPUT QUEUES | ZQTIIQ |
| 48 | TIME INTEGRAL OF VEHICLES QUEUED AT DOCKS | ZQTIDK |
| 49 | TIME INTEGRAL OF VEHICLES QUEUED ON OUTPUT QUEUES | ZQTIOQ |
| 50 | TIME INTEGRAL OF VEHICLES QUEUED ON OUTPUT RAMPS | ZQTIOR |
| 51 | TIME INTEGRAL OF VEHICLES QUEUED IN STORAGES | ZQTIST |
| 52 | SUM OF TIMES IN STATIONS FOR VEHICLES LEAVING | ZTVSTS |
| 53 | MAXIMUM TIME IN A STATION FOR VEHICLES LEAVING | ZTVMTS |
| 54 | SUM OF TIME FOR MERGE CONFLICT RESOLUTIONS | ZTVTMC |
| 55 | MAX DELAY DEMAND TO DISPATCH FOR ANY TRIP GROUP | ZTTDXS |
| 56 | SUM DELAY DEMAND TO DISPATCH FOR TRIPS | ZTTSDS |
| 57 | MAX DELAY DEMAND TO DISPATCH ANY PASSENGER | ZTPDXS |
| 58 | SUM DELAY DEMAND TO DISPATCH FOR PASSENGERS | ZTPSDS |
| 59 | SUM ACTUAL TRAVEL TIME FOR COMPLETED TRIPS | ZTTSAS |
| 60 | SUM OF NOMINAL TRAVEL TIME FOR COMPLETED TRIPS | ZTTSNS |
| 61 | MAXIMUM EXCESS TRAVEL TIME FOR COMPLETED TRIPS | ZTMETS |
| 62 | SUM ACTUAL TRAVEL TIME FOR COALESCED TRIPS | ZTTCAS |
| 63 | SUM OF NOMINAL TRAVEL TIME FOR COALESCED TRIPS | ZTTCNS |
| 64 | TOTAL Q DELAY VEHICLES LEAVING INPUT RAMP | ZDTIR |
| 65 | TOTAL Q DELAY VEHICLES LEAVING INPUT QUEUES | ZDTIQ |
| 66 | TOTAL Q DELAY VEHICLES LEAVING DOCKS | ZDTDK |
| 67 | TOTAL Q DELAY VEHICLES LEAVING OUTPUT QUEUES | ZDTOQ |
| 68 | TOTAL Q DELAY VEHICLES LEAVING OUTPUT RAMPS | ZDTOR |
| 69 | TOTAL Q DELAY VEHICLES LEAVING STORAGE AREAS | ZDTST |
| 70 | MAXIMUM EXCESS TRAVEL TIME FOR COALESCED TRIPS | ZTMCES |
| 71 | MINIMUM TIME DEMAND TO DISPATCH PASSENGERS | ZTPDMS |
| 72 | MINIMUM TIME IN ANY STATION FOR VEHICLES LEAVING | ZTVNTS |
| 73 | MAXIMUM TIME FOR VEHICLES LEAVING IR QUEUE | ZXDIR |
| 74 | MAXIMUM TIME FOR VEHICLES LEAVING IQ QUEUE | ZXDIQ |
| 75 | MAXIMUM TIME FOR VEHICLES LEAVING DK QUEUE | ZXDDK |
| 76 | MAXIMUM TIME FOR VEHICLES LEAVING OQ QUEUE | ZXDOQ |
| 77 | MAXIMUM TIME FOR VEHICLES LEAVING OR QUEUE | ZXDOR |
| 78 | MAXIMUM TIME FOR VEHICLES LEAVING ST QUEUE | ZXDST |
| 79 | TOTAL DISTANCE TRAVELLED FOR COMPLETED TRIPS | ZTTDST |
| 80 | TOTAL STATION DISTANCE FOR VEHICLES LEAVING | ZTSDST |
| 81 | UNDEFINED | |
| 82 | UNDEFINED | |

TABLE B-1. RAW STATISTICS (Page 3 of 8)

| XREF # | DESCRIPTION | VARIABLE |
|---|---|---|
| 83 | TOTAL # OF VEHICLES ENTERING STATIONS | ZTVNES |
| 84 | TOTAL # OF VEHICLES LEAVING STATIONS | ZTVNLS |
| 85 | CURRENT NUMBER OF VEHICLES IN STATIONS | ZTVNIS |
| 86 | TOTAL # OF VEHICLES DENIED TIMELY ENTRY | ZTVALT |
| 87 | TOTAL # OF VEHICLES LAUNCHED FROM STATIONS | ZTVNLN |
| 88 | MAXIMUM NUMBER OF VEHICLES IN ANY STATION | ZTVMNS |
| 89 | CURRENT # OF TRIPS IN STATIONS INCLUDING THOSE ON VEHICLES IN STATIONS | ZTTNIS |
| 90 | TOTAL # OF TRIPS REJECTED (BOARDING Q CAPACITY) | ZTTNRS |
| 91 | TOTAL # OF TRIPS DISPATCHED FROM STATIONS | ZTTNDS |
| 92 | CURRENT # PASSENGERS IN STATIONS INCLUDING THOSE ON VEHICLES IN STATION | ZTPNIS |
| 93 | TOTAL # OF PASSENGERS REJECTED (BOARDING Q CAPACITY | ZTPNRS |
| 94 | TOTAL # OF PASSENGERS DISPATCHED FROM STATIONS - EXCLUDING TRANSFERS | ZTPNDS |
| 95 | TOTAL # OF UNSATISFIED EMPTY REQUESTS | ZTVREQ |
| 96 | TOTAL # OF EMPTIES DISPATCHD ON CIRCUITOUS RTES | ZTVEDC |
| 97 | TOTAL # OF EMPTIES DISPATCHED TO LOCAL STORAGES | ZTVELS |
| 98 | TOTAL # OF EMPTIES DISPATCHED TO REGIONAL CNTRS | ZTVERC |
| 99 | TOTAL # OF EMPTIES DISPATCHED BASED ON ANTICIPATED NEED (NOT CONSIDERING CURRENT DISTRIBUTION) | ZTVEAN |
| 100 | TOTAL # OF EMPTIES DISPATCHED BASED ON ANTICIPATED NEED (CONSIDERING CURRENT DISTRIBUTION) | ZTVENB |
| 101 | TOTAL # OF EMPTIES DISPATCHED OUTSTANDING REQS | ZTVEDR |
| 102 | TOTAL NUMBER OF EMPTIES DISPATCHED | ZTVED |
| 103 | TOTAL # OF TRIPS ENTERING STATIONS INCLUDING TRANSFERS & REJECTIONS FOR CAPACITY | ZTTNES |
| 104 | TOTAL # OF TRIPS SERVED IN STATIONS | ZTTNLS |
| 105 | TOTAL # OF PASSENGERS SERVED IN STATIONS | ZTPNLS |
| 106 | TOTAL # OF PASSENGERS ENTERING STATIONS INCLUDING TRANSFERS AND THOSE REJECTED FOR CAPACITY | ZTPNES |
| 107 | TOTAL # OF TRIPS COMPLETED AT STATIONS | ZTTNCS |
| 108 | TOTAL # OF PASSENGERS COMPLETED AT STATIONS | ZTPNCS |
| 109 | TOTAL # OF COALESCED TRIPS COMPLETED AT STATIONS | ZTTCNC |
| 110 | TOTAL NUMBER OF ARRIVING TRANSFERS AT STATIONS | ZTTSXS |
| 111 | MAXIMUM NUMBER OF TRANSFERS FOR ANY COMPLETED TRIP | ZTTMXS |
| 112 | TOTAL # OF TRIPS ARRIVING AT STATIONS & ENTERING BOARDING QUEUE INCLUDING TRANSFERS | ZTNTAR |
| 113 | TOTAL # OF PASSENGERS ARRIVING AT STATIONS & ENTERING BOARDING QUEUE INCLUDING TRANSFERS | ZTNPAR |
| 114 | CURRENT NUMBER OF TRIPS WAITING AT STATIONS | ZTNTWT |
| 115 | MAX NUMBER OF TRIPS WAITING IN ALL STATIONS | ZTXTWT |
| 116 | CURRENT NUMBER PASSENGERS WAITING IN STATIONS | ZTNPWT |
| 117 | MAX NUMBER OF PASSENGERS WAITING IN ALL STATIONS | ZTXPWT |
| 118 | TOTAL # OF SPLIT TRIPS CREATED (SUBGROUPS) | ZTTNSS |
| 119 | TOTAL # OF COMPLETED TRIP SUBGROUPS AT STATIONS | ZTTNGS |
| 120 | TOTAL # OF ENTRAINED VEHICLES LEAVING STATIONS | ZTVNNS |
| 121 | MAXIMUM NUMBER OF VEHICLES ON INPUT RAMPS | ZMOIR |
| 122 | MAXIMUM NUMBER OF VEHICLES ON INPUT QUEUES | ZMOIQ |
| 123 | MAXIMUM NUMBER OF VEHICLES AT DOCKS | ZMODK |
| 124 | MAXIMUM NUMBER OF VEHICLES ON OUTPUT QUEUES | ZMOOQ |
| 125 | MAXIMUM NUMBER OF VEHICLES ON OUTPUT RAMPS | ZMOOR |
| 126 | MAXIMUM NUMBER OF VEHICLES IN STORAGE AREAS | ZMOST |
| 127 | MAXIMUM NUMBER OF VEHICLES QUEUED ON INPUT RAMPS | ZMQIR |
| 128 | MAXIMUM NUMBER OF VEHICLES QUEUED ON INPUT QUEUES | ZMQIQ |

| XREF # | DESCRIPTION | VARIABLE |
|---|---|---|
| 129 | MAXIMUM NUMBER OF VEHICLES QUEUED AT DOCKS | ZMQDK |
| 130 | MAXIMUM NUMBER OF VEHICLES QUEUED ON OUTPUT QUEUES | ZMQOQ |
| 131 | MAXIMUM NUMBER OF VEHICLES QUEUED ON OUTPUT RAMPS | ZMQOR |
| 132 | MAXIMUM NUMBER OF VEHICLES QUEUED IN STORAGE | ZMQST |
| 133 | TOTAL NUMBER VEHICLES LEAVING INPUT RAMP | ZNQIR |
| 134 | TOTAL NUMBER VEHICLES LEAVING INPUT QUEUES | ZNQIQ |
| 135 | TOTAL NUMBER VEHICLES LEAVING DOCKS | ZNQDK |
| 136 | TOTAL NUMBER VEHICLES LEAVING OUTPUT QUEUES | ZNQOQ |
| 137 | TOTAL NUMBER VEHICLES LEAVING OUTPUT RAMPS | ZNQOR |
| 138 | TOTAL NUMBER VEHICLES LEAVING STORAGE AREAS | ZNQST |
| 139 | TOTAL NUMBER VEHICLES ENTERING INPUT RAMP | ZNEIR |
| 140 | TOTAL NUMBER VEHICLES ENTERING INPUT QUEUES | ZNEIQ |
| 141 | TOTAL NUMBER VEHICLES ENTERING DOCKS | ZNEDK |
| 142 | TOTAL NUMBER VEHICLES ENTERING OUTPUT QUEUES | ZNEOQ |
| 143 | TOTAL NUMBER VEHICLES ENTERING OUTPUT RAMPS | ZNEOR |
| 144 | TOTAL NUMBER VEHICLES ENTERING STORAGE AREAS | ZNEST |
| 145 | TOTAL NUMBER EMPTIES REQUESTED NON-LOCAL STORE | ZTVRNT |
| 146 | TOTAL NUMBER EMPTIES REQUESTED LOCAL STORE | ZTVRLS |
| 147 | TOTAL NUMBER OF TRANSFERS COMPLETED TRIPS | ZTTTXS |
| 148 | TOTAL NUMBER OF PASSENGER TRANSFERS FOR COMPLETED TRIPS (# XFERS X # PASSENGERS) | ZTTPXS |
| 149 | MINIMUM NUMBER OF PASSENGERS WAITING IN STATIONS | ZTMPWT |
| 150 | MINIMUM NUMBER VEHICLES QUEUED INPUT RAMPS | ZTMQIR |
| 151 | MINIMUM NUMBER VEHICLES QUEUED INPUT QUEUES | ZTMQIQ |
| 152 | MINIMUM NUMBER VEHICLES QUEUED DOCK AREAS | ZTMQDK |
| 153 | MINIMUM NUMBER VEHICLES QUEUED OUTPUT QUEUES | ZTMQOQ |
| 154 | MINIMUM NUMBER VEHICLES QUEUED OUTPUT RAMPS | ZTMQOR |
| 155 | MINIMUM NUMBER VEHICLES QUEUED STORAGE AREAS | ZTMQST |
| 156 | TOTAL # OF COMPLETED PASSENGERS HAVING TRANSFERRED AT LEAST ONCE | ZTXFER |
| 157 | UNDEFINED | |
| 158 | UNDEFINED | |
| | GUIDEWAY LINK STATISTICS | |
| 159 | MAX AVERAGE QUEUE DELAY/VEH FOR ANY LINK | ZTQDV |
| 160 | MAX AVERAGE QUEUE DELAY/QUEUED VEH FOR ANY LINK | ZTQDQV |
| 161 | SUM OF GUIDEWAY LINK HEADWAY TIMES | GTHDWY |
| 162 | TIME INTEGRAL OF VEHICLE OCCUPANCY ON GUIDEWAY | ZTTIOL |
| 163 | TIME INTEGRAL OF VEHICLE Q OCCUPANCY ON GUIDEWAY | ZTTIQL |
| 164 | TIME INTEGRAL PASSENGERS ON GUIDEWAY | ZTTIPL |
| 165 | SUM OF COMPLETED LINK TRAVEL TIMES ON GUIDEWAY | ZTTSCL |
| 166 | SUM OF COMPLETED LINK DISTANCES ON GUIDEWAY | ZTDSCL |
| 167 | UNDEFINED | |
| 168 | UNDEFINED | |
| 169 | UNDEFINED | |
| 170 | CURRENT NUMBER OF VEHICLES OCCUPYING GUIDEWAY | ZTVNOL |
| 171 | CURRENT NUMBER OF VEHICLES QUEUED ON GUIDEWAY | ZTVNQL |
| 172 | MAXIMUM TIME OF VEHICLE OCCUPANCY FOR VEHICLES CURRENTLY QUEUED ON ANY GUIDEWAY LINK | ZTMTQL |
| 173 | MAXIMUM NUMBER OF VEHICLES ON THE GUIDEWAY | ZTMNOL |
| 174 | TOTAL # OF VEHICLES ENTERING ALL GUIDEWAY LINKS | ZTNEL |
| 175 | TOTAL # OF VEHICLES LEAVING ALL GUIDEWAY LINKS | ZTNLL |
| 176 | TOTAL # OF VEHICLES ENTRAINED ON GUIDEWAY LINKS | ZTNVEL |
| 177 | TOTAL # OF VEHICLES DETRAINED ON GUIDEWAY LINKS | ZTNVDL |
| 178 | MAXIMUM NUMBER OF VEHICLES QUEUED ON ANY LINK | ZTMNQL |

TABLE B-1. RAW STATISTICS (Page 5 of 8)

| XREF # | DESCRIPTION | VARIABLE |
|---|---|---|
| 179 | TOTAL # OF VEHICLES LEAVING GUIDEWAY LINK QUEUES | ZTNLQL |
| 180 | MAXIMUM TIME DELAY FOR VEHICLES LEAVING ANY Q | ZTMDQL |
| 181 | SUM OF DELAY FOR VEHS LEAVING GUIDEWAY QUEUES | ZTSDQL |
| 182 | TOTAL GUIDEWAY CAPACITY | GTCAP |
| 183 | MINIMUM NUMBER VEHICLES OCCUPYING ANY LINK | ZTMXOL |
| 184 | MAXIMUM NUMBER PASSENGERS ON ANY LINK | ZTGXPL |
| 185 | MINIMUM NUMBER PASSENGERS ON ANY LINK | ZTGMPL |
| 186 | TOTAL NUMBER OF PASSENGERS ON GUIDEWAY LINKS | ZTGNPL |
| 187 | UNDEFINED | |
| 188 | UNDEFINED | |

ROUTE STATISTICS

| XREF # | DESCRIPTION | VARIABLE |
|---|---|---|
| 189 | TIME INTEGRAL OF TRIPS ON ALL ROUTES | ZTTSTI |
| 190 | TIME INTEGRAL OF PASSENGERS ON ALL ROUTES | ZTPSTI |
| 191 | MAXIMUM SCHEDULE DEVIATION FOR ANY ROUTE | ZTVMDV |
| 192 | SUM SCHEDULE DEVIATION FOR ALL ROUTES | ZTVTDV |
| 193 | SUM INTERDISPATCH TIME FOR ALL ROUTES | ZTTIDT |
| 194 | MAXIMUM INTERDISPATCH TIME FOR ANY ROUTE | ZTXIDT |
| 195 | MINIMUM INTERDISPATCH TIME FOR ANY ROUTE | ZTMIDT |
| 196 | MINIMUM SCHEDULE DEVIATION FOR ANY ROUTE | ZTVXDV |
| 197 | UNDEFINED | |
| 198 | UNDEFINED | |
| 199 | UNDEFINED | |
| 200 | TOTAL # OF TRIPS SERVED ON ROUTES | ZTTSER |
| 201 | TOTAL # OF PASSENGERS SERVED ON ROUTES | ZTPSER |
| 202 | CURRENT NUMBER OF TRIPS TRAVELLING ALL ROUTES | ZTTNO |
| 203 | CURRENT NUMBER OF PASSENGERS TRAVELLING ROUTES | ZTPNO |
| 204 | TOTAL # OF VEHICLES DISPATCHED ON ALL ROUTES | ZTVDIS |
| 205 | UNDEFINED | |
| 206 | UNDEFINED | |
| 207 | UNDEFINED | |

--STATION-WIDE STATISTICS--
(ONE RECORD/STATION)

| XREF # | DESCRIPTION | VARIABLE |
|---|---|---|
| 208 | TIME INTEGRAL OF VEHICLES IN STATION | ZSVTIS |
| 209 | TIME INTEGRAL OF TRIPS WAITING IN STATION | ZSTTIS |
| 210 | TIME INTEGRAL OF PASSENGERS WAITING IN STATION | ZSPTIS |
| 211 | SUM OF TIMES FOR VEHICLES LEAVING STATION | ZSVSTS |
| 212 | MAXIMUM TIME IN STATION FOR VEHICLES LEAVING | ZSVMTS |
| 213 | SUM OF TIMES FOR MERGE CONFLICT RESOLUTION | ZSVTMC |
| 214 | MAX DELAY DEMAND TO DISPATCH FOR ANY TRIP GROUP ( = DELAY * # PASSENGERS) | ZSPDXS |
| 215 | SUM DELAY DEMAND TO DISPATCH FOR ALL TRIPS | ZSTSDS |
| 216 | MAX DELAY DEMAND TO DISPATCH FOR ANY PASSENGER ( = MAX DELAY TRIP GROUP/# PASS IN GROUP) | ZSTDXS |
| 217 | SUM DELAY DEMAND TO DISPATCH ALL PASSENGERS | ZSPSDS |
| 218 | SUM ACTUAL TRAVEL TIME FOR COMPLETED TRIPS | ZSTSAS |
| 219 | SUM OF NOMINAL TRAVEL TIME FOR COMPLETED TRIPS | ZSTSNS |
| 220 | MAX EXCESS TRAVEL TIME FOR ANY COMPLETED TRIP | ZSMETS |
| 221 | SUM ACTUAL TRAVEL TIME FOR ALL COALESCED TRIPS | ZSTCAS |
| 222 | SUM OF NOMINAL TRAVEL TIME FOR COALESCED TRIPS | ZSTCNS |
| 223 | MAXIMUM EXCESS TRAVEL TIME FOR A COALESCED TRIP | ZSMCES |
| 224 | MINIMUM TIME IN STATION FOR VEHICLES LEAVING | ZSVNTS |
| 225 | MINIMUM DELAY DEMAND TO DISPATCH FOR A PASSENGER | ZSPDMS |
| 226 | TOTAL DISTANCE TRAVELLED FOR ALL COMPLETING TRPS | ZSTDST |

TABLE B-1. RAW STATISTICS (Page 6 of 8)

| XREF # | DESCRIPTION | VARIABLE |
|---|---|---|
| 227 | UNDEFINED | |
| 228 | UNDEFINED | |
| 229 | UNDEFINED | |
| 230 | TOTAL # OF VEHICLES ENTERING STATION | ZSVNES |
| 231 | TOTAL # OF VEHICLES LEAVING STATION | ZSVNLS |
| 232 | CURRENT NUMBER OF VEHICLES IN STATION | ZSVNIS |
| 233 | TOTAL # VEHICLES DENIED TIMELY ENTRY | ZSVALT |
| 234 | TOTAL # OF VEHICLES LAUNCHED FROM STATION | ZSVNLN |
| 235 | MAXIMUM NUMBER OF VEHICLES IN STATION | ZSVMNS |
| 236 | TOTAL # OF TRIPS IN STATION INCLUDING THOSE ON VEHICLES CCURRENTLY IN STATION | ZSTNIS |
| 237 | TOTAL # OF TRIPS REJECTED (BOARDING Q CAPACITY) | ZSTNRS |
| 238 | TOTAL # OF TRIPS DISPATCHED FROM STATION | ZSTNDS |
| 239 | TOTAL # OF PASSENGERS IN STATION INCLUDING THOSE ON VEHICLES CURRENTLY IN STATION | ZSPNIS |
| 240 | TOTAL # OF PASSENGERS REJECTED (BOARDING Q CAPA- CITY | ZSPNRS |
| 241 | TOTAL # OF PASSENGERS DISPATCHED FROM STATION | ZSPNDS |
| 242 | TOTAL # OF UNSATISFIED EMPTY REQUESTS | ZSVREQ |
| 243 | TOTAL # OF EMPTIES DISPATCHD ON CIRCUITOUS RTES | ZSVEDC |
| 244 | TOTAL # OF EMPTIES DISPATCHED TO LOCAL STORAGE | ZSVELS |
| 245 | TOTAL # OF EMPTIES DISPATCHED TO REGIONAL CENTER | ZSVERC |
| 246 | TOTAL # OF EMPTIES DISPATCHED BASED ON ANTICIPA- TED NEED (NOT CONSIDERING CURRENT DISTRIBUTION) | ZSVEAN |
| 247 | TOTAL # OF EMPTIES DISPATCHED BASED ON ANTICIPA- TED NEED (CONSIDERING CURRENT DISTRIBUTION) | ZSVENB |
| 248 | TOTAL # OF EMPTIES DISPATCHED FOR UNSATISFD REQS | ZSVEDR |
| 249 | TOTAL NUMBER OF EMPTIES DISPATCHED FROM STATION | ZSVED |
| 250 | TOTAL # OF TRIPS ENTERING STATION INCLUDING TRANSFERS & THOSE REJECTED FOR CAPACITY | ZSTNES |
| 251 | TOTAL # OF TRIPS SERVED IN STATION | ZSTNLS |
| 252 | TOTAL # OF PASSENGERS SERVED IN STATION | ZSPNLS |
| 253 | TOTAL # OF PASSENGERS ENTERING STATION INCLUDING TRANSFERS & THOSE REJECTED FOR CAPACITY | ZSPNES |
| 254 | TOTAL # OF TRIPS COMPLETED AT STATION | ZSTNCS |
| 255 | TOTAL # OF PASSENGERS COMPLETED AT STATION | ZSPNCS |
| 256 | TOTAL # OF COALESCED TRIPS COMPLETED AT STATION | ZSTCNC |
| 257 | TOTAL NUMBER OF ARRIVING TRANSFERS AT STATION | ZSTSXS |
| 258 | MAXIMUM NUMBER OF TRANSFERS FOR COMPLETED TRIPS | ZSTMXS |
| 259 | TOTAL # OF TRIPS ARRIVING & ENTERING BOARDING Q | ZSNTAR |
| 260 | TOTAL # OF PASSENGERS ARRIVING & ENTERING BOARD- ING QUEUE | ZSNPAR |
| 261 | CURRENT NUMBER OF TRIPS WAITING AT STATION | ZSNTWT |
| 262 | MAX NUMBER OF TRIPS WAITING AT STATION | ZSXTWT |
| 263 | CURRENT NUMBER OF PASSENGERS WAITING AT STATION | ZSNPWT |
| 264 | MAX NUMBER OF PASSENGERS WAITING AT STATION | ZSXPWT |
| 265 | TOTAL # OF SPLIT TRIPS CREATED | ZSTNSS |
| 266 | TOTAL # OF COMPLETED TRIP SUBGROUPS | ZSTNGS |
| 267 | TOTAL # OF ENTRAINED VEHICLES LEAVING STATION | ZSVNNS |
| 268 | TOTAL # OF EMPTIES REQUESTED NON-LOCAL STORAGE | ZSVRNT |
| 269 | TOTAL # OF EMPTIES REQUESTED LOCAL STORAGE | ZSVRLS |
| 270 | TOTAL NUMBER OF TRANSFERS FOR COMPLETED TRIPS | ZSTTXS |
| 271 | TOTAL NUMBER PASSENGER XFERS COMPLETED TRIPS (= TOTAL XFERS FOR TRIPS X # PASSENGERS) | ZSTPXS |
| 272 | MINIMUM NUMBER PASSENGERS WAITING AT STATION | ZSMPWT |
| 273 | TOTAL # OF PASSENGERS ENTERING STATION FROM GDWY | ZSNPEG |
| 274 | TOTAL # OF PASSENGERS EXITING STATION TO GDWY | ZSNPLG |
| 275 | MINIMUM NUMBER OF VEHICLES IN STATION | ZSVXNS |

| XREF # | DESCRIPTION | VARIABLE |
|---|---|---|
| | --STATION LINK STATISTICS-- (ONE RECORD/STATION LINK - FOR EACH STATION) | |
| 276 | AVERAGE NUMBER OF VEHICLES OCCUPYING LINK | ZSVAN |
| 277 | AVERAGE TIME OF OCCUPANCY FOR VEHICLES LEAVING | ZSVAT |
| 278 | TIME INTEGRAL OF VEHICLE OCCUPANCY | ZSVTI |
| 279 | SUM OF TIME FOR VEHICLES OCCUPYING LINK | ZSVST |
| 280 | MAXIMUM TIME FOR ANY VEHICLE OCCUPYING LINK | ZSVMT |
| 281 | TOTAL # OF VEHICLES ENTERING LINK | ZSVNE |
| 282 | TOTAL # OF VEHICLES LEAVING THE LINK | ZSVNL |
| 283 | CURRENT NUMBER OF VEHICLES OCCUPYING LINK | ZSVNI |
| 284 | MAXIMUM NUMBER OF VEHICLES OCCUPYING LINK | ZSVMN |
| 285 | AVERAGE NUMBER OF VEHICLES OCCUPYING QUEUE | ZSVAN |
| 286 | AVERAGE TIME IN QUEUE FOR VEHICLES LEAVING | ZSVAT |
| 287 | TIME INTEGRAL OF VEHICLE QUEUE OCCUPANCY | ZSVTI |
| 288 | SUM OF QUEUE DELAY FOR VEHICLES LEAVING | ZSVST |
| 289 | MAXIMUM QUEUE DELAY FOR VEHICLES LEAVING | ZSVMT |
| 290 | TOTAL # OF VEHICLES ENTERING QUEUE | ZSVNE |
| 291 | TOTAL # OF VEHICLES LEAVING THE QUEUE | ZSVNL |
| 292 | CURRENT NUMBER OF VEHICLES OCCUPYING QUEUE | ZSVNI |
| 293 | MAXIMUM NUMBER OF VEHICLES OCCUPYING QUEUE | ZSVMN |
| 294 | MINIMUM NUMBER OCCUPYING LINK | ZSMXQ |
| 295 | MINIMUM NUMBER OCCUPYING LINK QUEUE | ZSMXQ |
| | --GUIDEWAY LINK STATISTICS-- (ONE RECORD/GUIDEWAY LINK) | |
| 296 | GUIDEWAY LINK HEADWAY | GLHDWY |
| 297 | TIME INTEGRAL OF VEHICLE OCCUPANCY | ZGTIOL |
| 298 | TIME INTEGRAL OF VEHICLE QUEUE OCCUPANCY | ZGTIQL |
| 299 | TIME INTEGRAL PASSENGERS ON LINK | ZGTIPL |
| 300 | SUM OF COMPLETED LINK TRAVEL TIMES | ZGTSCL |
| 301 | SUM OF COMPLETED LINK DISTANCES | ZGDSCL |
| 302 | UNDEFINED | |
| 303 | UNDEFINED | |
| 304 | UNDEFINED | |
| 305 | CURRENT NUMBER OF VEHICLES OCCUPYING LINK | ZGVNOL |
| 306 | CURRENT NUMBER OF VEHICLES OCCUPYING QUEUE | ZGVNQL |
| 307 | MAXIMUM TIME OF OCCUPANCY FOR VEHICLES LEAVING | ZGMTOL |
| 308 | MAXIMUM NUMBER OF VEHICLES ON THE LINK | ZGMNOL |
| 309 | TOTAL # OF VEHICLES ENTERING THE LINK | ZGNEL |
| 310 | TOTAL # OF VEHICLES LEAVING THE LINK | ZGNLL |
| 311 | TOTAL # OF VEHICLES ENTRAINED ON LINK | ZGNVEL |
| 312 | TOTAL # OF VEHICLES DETRAINED ON LINK | ZGNVDL |
| 313 | MAXIMUM NUMBER OF VEHICLES QUEUED ON LINK | ZGMNQL |
| 314 | TOTAL # OF VEHICLES LEAVING QUEUE | ZGNLQL |
| 315 | MAXIMUM TIME DELAY FOR VEHICLES LEAVING QUEUE | ZGMDQL |
| 316 | SUM OF DELAY FOR VEHICLES LEAVING QUEUE | ZGSDQL |
| 317 | GUIDEWAY LINK STATUS | ZGSTAL |
| 318 | GUIDEWAY LINK CAPACITY | GLCAP |
| 319 | MINIMUM NUMBER OF VEHICLES OCCUPYING LINK | ZGMXOL |
| 320 | MAXIMUM NUMBER PASSENGERS ON LINK | ZGXPL |
| 321 | MINIMUM NUMBER PASSENGERS ON GUIDEWAY LINKS | ZGMPL |
| 322 | CURRENT NUMBER OF PASSENGERS ON GUIDEWAY LINK | ZGNPL |
| 323 | UNDEFINED | |
| 324 | UNDEFINED | |

TABLE B-1. RAW STATISTICS (Page 8 of 8)

| XREF # | DESCRIPTION | VARIABLE |
|---|---|---|
| | --ROUTE STATISTICS-- (ONE RECORD/ACTIVE ROUTE) | |
| 325 | TIME INTEGRAL OF TRIPS ON ROUTE | ZRTSTI |
| 326 | TIME INTEGRAL OF PASSENGERS ON ROUTE | ZRPSTI |
| 327 | TIME INTEGRAL VEHICLES IN SERVICE ON ROUTE | ZRTIVF |
| 328 | TIME INTEGRAL SEATED PASSENGERS CN ROUTE | ZRTISP |
| 329 | TIME INTEGRAL PASSENGERS WAITING ON ROUTE | ZRTIPW |
| 330 | MINIMUM SCHEDULE DEVIATION FOR ROUTE | ZRVXDV |
| 331 | SUM ACTUAL TRAVEL TIME COMPLETED TRIPS ON ROUTE | ZRTSAS |
| 332 | SUM NOMINAL TRAVEL TIME COMPLETED TRIPS ON ROUTE | ZRTSNS |
| 333 | MAXIMUM RATIO NOMINAL TT / ACTUAL TT | ZRXRTT |
| 334 | MINIMUM RATIO NOMINAL TT / ACTUAL TT | ZRMRTT |
| 335 | SUM VEHICLE TIMES ON GUIDEWAY | ZRGVST |
| 336 | SUM TIME IN STATIONS FOR VEHICLES LEAVING | ZRSVTS |
| 337 | SUM TIME PASSENGERS DEMAND TO DISPATCH | ZRPSDS |
| 338 | MAXIMUM PASSENGER TIME DEMAND TO DISPATCH | ZRPDXS |
| 339 | MINIMUM PASSENGER TIME DEMAND TO DISPATCH | ZRPDMS |
| 340 | MAXIMUM SCHEDULE DEVIATION FOR ROUTE | ZRVMDV |
| 341 | SUM SCHEDULE DEVIATION FOR ROUTE | ZRVTDV |
| 342 | SUM INTERDISPATCH TIME FOR ROUTE | ZRTIDT |
| 343 | MAXIMUM INTERDISPATCH TIME FOR ROUTE | ZRXIDT |
| 344 | MINIMUM INTERDISPATCH TIME FOR ROUTE | ZRMIDT |
| 345 | SUM VEHICLE DISTANCE ON GUIDEWAY | ZRGVSD |
| 346 | SUM PASSENGER DISTANCE TRAVELLED | ZRPDST |
| 347 | TOTAL DISTANCE TRAVELLED BY VEH LEAVING STNS | ZRSDST |
| 348 | UNDEFINED | |
| 349 | UNDEFINED | |
| 350 | TOTAL # OF TRIPS SERVED ON ROUTE | ZRTSER |
| 351 | NUMBER OF PASSENGERS SERVED ON ROUTE | ZRPSER |
| 352 | CURRENT NUMBER OF TRIPS TRAVELLING ROUTE | ZRTNO |
| 353 | CURRENT NUMBER OF PASSENGERS TRAVELLING ROUTE | ZRPNO |
| 354 | NUMBER OF VEHICLES DISPATCHED ON ROUTE | ZRVDIS |
| 355 | MAXIMUM FLEET SIZE | ZRXFLT |
| 356 | MINIMUM FLEET SIZE | ZRMFLT |
| 357 | TOTAL # OF ARRIVING TRANSFER PASSENGERS | ZRTSXS |
| 358 | TOTAL # OF ARRIVING PASSENGERS | ZRNPAR |
| 359 | TOTAL # OF COMPLETED PASSENGERS | ZRNPCS |
| 360 | TOTAL NUMBER OF PASSENGERS WAITING | ZRNPWT |
| 361 | MAXIMUM NUMBER OF PASSENGERS WAITING | ZRXPWT |
| 362 | MINIMUM NUMBER OF PASSENGERS WAITING | ZRMPWT |
| 363 | TOTAL NUMBER OF PASSENGERS DISPATCHED | ZRPNDS |
| 364 | CURRENT NUMBER OF SEATED PASSENGERS ON VEHICLES | ZRNPSV |
| 365 | CURRENT NUMBER OF VEHICLES ON ROUTE | PNVRTE |
| 366 | MINIMUM VEHICLE LOAD FACTOR | ZRMVLF |
| 367 | MAXIMUM VEHICLE LOAD FACTOR | ZRXVLF |
| 368 | UNDEFINED | |
| | --LINK-ROUTE STATISTICS-- (ONE RECORD/ROUTE---FOR EACH LINK) LINK 1, ROUTE 1 LINK 1, ROUTE 2 ETC.) | |
| 369 | TIME INTEGRAL VEHICLE OCCUPANCY GDWY LINK, RTE | ZRTIVL |
| 370 | TIME INTEGRAL PASSENGER OCCUPANCY GDWY LINK, RTE | ZRTIPL |

TABLE B-2. DERIVATIONS OF PERFORMANCE SUMMARY MEASURES (Page 1 of 4)

```
*************************************************************************
*         ---DESM PERFORMANCE SUMMARY MEASURE DERIVATIONS---            *
*    EACH MEASURE IS DEFINED IN TERMS OF SYSTEM LEVEL STATISTICS        *
*    IDENTIFIED BY ( ) IN EACH DERIVATION WHICH FOLLOWS THE DESCRIP-    *
*    TION OF EACH REQUIRED MEASURE. THE APPRIOPRIATE STATISTIC OR       *
*    STATISTICS USED IN EACH DERIVATION CAN BE DETERMINED BY USING      *
*    THE NUMBERS IN ( ) AS A CROSS REFERENCE TO THE MEASURES IDENTI-    *
*    FIED IN THE LIST OF RAW STATISTICS. THE INDICATION OF A SUM IN     *
*    A PARTICULAR DERIVATION IMPLIES THAT THE APPROPRIATE SYSTEM        *
*    STATISTIC IS SUMMED ACROSS ALL INDIVIDUAL SAMPLE RECORDS IN THE    *
*    REQUESTED PERFORMANCE SUMMARY INTERVAL. THE MAX/MIN IN A DERIVA-   *
*    TION IMPLIES THE MAXIMUMUM/MINIMUM OF THE SPECIFIED MEASURE  IS    *
*    DETERMINED ACROSS ALL SAMPLES IN THE SUMMARY INTERVAL.             *
*                                                                       *
* *** NOTE:                                                             *
*        NSAMP=NUMBER OF SAMPLES OVER WHICH VALUES ARE SUMMED           *
*        CONV1= 60. * CSIZE / (NSAMP * CSAMPL)  FOR CONVERSION          *
*                           TO /HR OF NON T.I. DATA                     *
*             WHERE CSIZE = C.U./MIN,  CSAMPL = C.U./SAMPLE             *
*        CONV2= 60. * CSIZE    FOR CONVERSION TO /HR OF T.I. DATA       *
*             WHERE CSIZE = C.U./MIN                                    *
*************************************************************************

  A. RESOURCE UTILIZATION

     SYSTEM RELATED

   1.  PERFORMANCE SUMMARY REQUEST INTERVAL                       SEC
        TIME LAST RECORD (PEND) - TIME FIRST RECORD IN
               REQUEST INTERVAL (PSTART)
   2.  NUMBER OF VEHICLES REQUIRED                                VEH
        KNFLT
   3.  VEHICLE CAPACITY                                           PASS
        VCAP
   4.  AVERAGE NUMBER OF PASSENGERS/VEHICLE                       PASS/VEH
          (AVERAGE OF AVERAGES---AVERAGE TAKEN WHEN
             (1) + (2) NOT EQUAL TO 0)
        SUM ((5) / ((1) + (2)))/ # OF AVERAGES SUMMED
   5.  AVERAGE NUMBER OF PASSENGERS/REVNUE SERVICE VEH            PASS/VEH
          (AVERAGE OF AVERAGES---AVERAGE TAKEN WHEN
             (1) NOT EQUAL TO 0)
        SUM ((5) / (1))/ # OF AVERAGES SUMMED
   6.  MAXIMUM AVERAGE OF THE NUMBER OF PASSENGERS/
               REVENUE SERVICE VEH                                PASS
        MAX ((5) / (1))
   7.  AVERAGE PROPORTION OF VEHICLES IN REVENUE SERVICE          -
        SUM (1) / (SUM (1) + SUM (2) + SUM (3))
   8.  AVERAGE PROPORTION OF VEHICLES DEADHEADING                 -
        SUM (2) / (SUM (1) + SUM (2) + SUM (3))
   9.  AVERAGE PROPOPTION OF VEHICLES IN STORAGE                  -
        SUM (3) / (SUM (1) + SUM (2) + SUM (3))
  10.  PASSENGERS SERVED / VEHICLE HOUR                           PASS/HR
        SUM (105) * CONV2 / (SUM (1) + SUM (2))

     GUIDEWAY RELATED

   1.  AVERAGE PROPORTION OF VEHICLES ON GUIDEWAY                 -
        SUM (162) / (SUM (37) + SUM (162))
   2.  AVERAGE DISTANCE TRAVELLED/VEHICLE                         KM/VEH
        ((SUM (11) + SUM (12))/1000.) / ((SUM(1)+SUM(2)+SUM(3))/
               (NSAMP * CSAMPL))
```

| | | |
|---|---|---|
| 3. | TOTAL VEHICLE DISTANCE TRAVELLED/HOUR<br>((SUM (11) + SUM (12))/1000.) * CONV1 | |
| 4. | TOTAL VEHICLE REVENUE SERVICE DISTANCE/HR<br>(SUM (12) /1000.) * CONV1 | KM/HR |
| 5. | TOTAL PASSENGER DISTANCE TRAVELLED/HR<br>(SUM (10) / 1000.) * CONV1 | KM/HR |
| 6. | AVG NUMBER OF VEH LEAVING GUIDEWAY LINKS/HR<br>SUM (175) * CONV1 | VEH/HR |
| 7. | MAX NUMBER OF VEH LEAVING GUIDEWAY LINKS/HR<br>MAX (175) * (CONV2/CSAMPL) | VEH/HR |
| 8. | TOTAL REVENUE SERVICE VEHICLE HOURS<br>SUM (1) / CONV2 | VEHHRS |
| 9. | TOTAL DEADHEADING VEHICLE HOURS<br>SUM (2) / CONV2 | VEHHRS |

STATION RELATED

| | | |
|---|---|---|
| 1. | TOTAL NUMBER OF VEHICLES DISPATCHED<br>SUM (87) | VEH |
| 2. | AVERAGE NUMBER OF PASS WAITING/STN<br>SUM (39) / (NSAMP * CSAMPL * (2)) | PASS/STN |
| 3. | MAXIMUM NUMBER OF PASS WAITING IN STATIONS<br>MAX (117) | PASS |

ROUTE RELATED

| | | |
|---|---|---|
| 1. | AVERAGE NUMBER OF VEHICLES/ROUTE<br>(SUM(1) + SUM(2) + SUM(3)) / (NUMR * NSAMP * CSAMPL) | VEH |

B. PERFORMANCE

SYSTEM RELATED

| | | |
|---|---|---|
| 1. | AVERAGE DISTANCE/COMPLETED TRIP<br>(SUM (79) /1000.)/ SUM (107) | KM/TRP |
| 2. | AVERAGE VEHICLE SPEED<br>(AVERAGE OF NON-ZERO AVERAGES)<br>(SUM (((166) / (165)) * (CSIZE / 60.0))) / # OF NON-ZERO AVERAGES SUMMED | M/SEC |
| 3. | AVERAGE TRIP TRAVEL SPEED<br>(AVERAGE OF NON-ZERO AVERAGES)<br>(SUM (((79) / (59)) * (CSIZE / 60.0))) / # OF NON-ZERO AVERAGES SUMMED | M/SEC |
| 4. | AVERAGE PASS DISTANCE/VEHICLE HR<br>(SUM (10) * CONV2 / (SUM (1) + SUM (2)))/ 1000. | KM/VHR |
| 5. | AVERAGE PASS DISTANCE/VEHICLE UNIT DISTANCE<br>SUM (10) / (SUM (11) + SUM (12)) | - |

GUIDEWAY RELATED

| | | |
|---|---|---|
| 1. | MAXIMUM NUMBER OF VEHICLES QUEUED ON GUIDEWAY<br>MAX (178) | VEH |
| 2. | AVERAGE NUMBER OF VEHICLES QUEUED ON GUIDEWAY<br>SUM (163) / (NSAMP * CSAMPL) | VEH |
| 3. | AVERAGE QUEUE DELAY/QUEUED VEHICLE<br>SUM (181) * 60. / (SUM (179) * CSIZE) | SEC/V |
| 4. | AVERAGE QUEUE DELAY/VEHICLE<br>SUM (181) * 60. / (SUM (175) * CSIZE) | SEC/V |
| 5. | MAXIMUM QUEUE DELAY/QUEUED VEHICLE<br>MAX (160) * 60. / CSIZE | SEC |
| 6. | MAXIMUM QUEUE DELAY/VEHICLE<br>MAX (159) * 60. / CSIZE | SEC |

TABLE B-2. DERIVATIONS OF PERFORMANCE SUMMARY MEASURES (Page 3 of 4)

STATION RELATED

| | | |
|---|---|---|
| 1. | AVERAGE NUMBER OF VEHICLES QUEUED ON INPUT RAMPS<br>SUM (46) / (NSAMP * CSAMPL) | VEH |
| 2. | AVERAGE NUMBER OF VEHICLES QUEUED ON INPUT QUEUES<br>SUM (47) / (NSAMP * CSAMPL) | VEH |
| 3. | AVERAGE NUMBER OF VEHICLES QUEUED AT DOCK AREAS<br>SUM (48) / (NSAMP * CSAMPL) | VEH |
| 4. | AVERAGE NUMBER OF VEHICLES QUEUED ON OUTPUT QUEUES<br>SUM (49) / (NSAMP * CSAMPL) | VEH |
| 5. | AVERAGE NUMBER OF VEHICLES QUEUED ON OUTPUT RAMPS<br>SUM (50) / (NSAMP * CSAMPL) | VEH |
| 6. | AVERAGE NUMBER OF VEHICLES QUEUED IN STORAGE AREAS<br>SUM (51) / (NSAMP * CSAMPL) | VEH |
| 7. | MAXIMUM NUMBER OF VEHICLES QUEUED ON INPUT RAMPS<br>MAX (127) | VEH |
| 8. | MAXIMUM NUMBER OF VEHICLES QUEUED ON INPUT QUEUES<br>MAX (128) | VEH |
| 9. | MAXIMUM NUMBER OF VEHICLES QUEUED AT DOCK AREAS<br>MAX (129) | VEH |
| 10. | MAXIMUM NUMBER OF VEHICLES QUEUED ON OUTPUT QUEUES<br>MAX (130) | VEH |
| 11. | MAXIMUM NUMBER OF VEHICLES QUEUED ON OUTPUT RAMPS<br>MAX (131) | VEH |
| 12. | MAXIMUM NUMBER OF VEHICLES QUEUED IN STORAGE AREAS<br>MAX (132) | VEH |
| 13. | AVERAGE QUEUE DELAY ON INPUT RAMPS<br>SUM (64) * 60. / (SUM (133) * CSIZE) | SEC/V |
| 14. | AVERAGE QUEUE DELAY ON INPUT QUEUES<br>SUM (65) * 60. / (SUM (134) * CSIZE) | SEC/V |
| 15. | AVERAGE QUEUE DELAY AT DOCK AREAS<br>SUM (66) * 60. / (SUM (135) * CSIZE) | SEC/V |
| 16. | AVERAGE QUEUE DELAY ON OUTPUT QUEUES<br>SUM (67) * 60. / (SUM (136) * CSIZE) | SEC/V |
| 17. | AVERAGE QUEUE DELAY ON OUTPUT RAMPS<br>SUM (68) * 60. / (SUM (137) * CSIZE) | SEC/V |
| 18. | AVERAGE QUEUE DELAY IN STORAGE AREAS<br>SUM (69) * 60. / (SUM (138) * CSIZE) | SEC/V |
| 19. | MAXIMUM QUEUE DELAY ON INPUT RAMPS<br>MAX (73) * 60. / CSIZE | SEC |
| 20. | MAXIMUM QUEUE DELAY ON INPUT QUEUES<br>MAX (74) * 60. / CSIZE | SEC |
| 21. | MAXIMUM QUEUE DELAY AT DOCK AREAS<br>MAX (75) * 60. / CSIZE | SEC |
| 22. | MAXIMUM QUEUE DELAY ON OUTPUT QUEUES<br>MAX (76) * 60. / CSIZE | SEC |
| 23. | MAXIMUM QUEUE DELAY ON OUTPUT RAMPS<br>MAX (77) * 60. / CSIZE | SEC |
| 24. | MAXIMUM QUEUE DELAY IN STORAGE AREAS<br>MAX (78) * 60. / CSIZE | SEC |
| 25. | AVERAGE FLOW RATE FROM BERTHING AREA<br>SUM (135) * CONV1 | V/HR |
| 26. | PROPORTION OF VEHICLES DENIED TIMELY ENTRY<br>SUM (86) / (SUM (83) + SUM(86)) | - |
| 27. | NUMBER OF EMPTIES REQUESTED FROM LOCAL STORAGE<br>SUM (146) | VEH |
| 28. | NUMBER OF EMPTIES REQUESTED FROM ELSEWHERE IN NETWRK<br>SUM (145) | VEH |
| 29. | AVERAGE STN DELAY DUE TO MERGE CONFLICT RESOLUTION<br>SUM (54) * 60. / (SUM (87) * CSIZE) | SEC/V |

TABLE B-2. DERIVATIONS OF PERFORMANCE SUMMARY MEASURES (Page 4 of 4)

ROUTE RELATED

| | | |
|---|---|---|
| 1. | AVERAGE SCHEDULE DEVIATION<br>SUM (192) * 60. / (SUM (204) * CSIZE) | SEC/V |
| 2. | MAXIMUM SCHEDULE DEVIATION<br>MAX (191) * 60. / CSIZE | SEC |
| 3. | MINIMUM SCHEDULE DEVIATION<br>(OF THOSE SAMPLES WHERE (87) > 0)<br>MIN (196) * 60. / CSIZE | SEC |
| 4. | AVERAGE INTER-DISPATCH TIME<br>SUM (193) * 60. / (SUM (204) * CSIZE) | SEC/V |
| 5. | MAXIMUM INTER-DISPATCH TIME<br>MAX (194) * 60. / CSIZE | SEC |
| 6. | MINIMUM INTER-DISPATCH TIME<br>(OF THOSE SAMPLES WHERE (87) > 0)<br>MIN (195) * 60. / CSIZE | SEC |

C. LEVEL OF SERVICE

| | | |
|---|---|---|
| 1. | TOTAL NUMBER OF ARRIVING PASSENGERS<br>SUM (113) | PASS |
| 2. | TOTAL NUMBER OF PASSENGERS SERVED<br>SUM (105) | PASS |
| 3. | TOTAL NUMBER OF PASSENGERS COMPLETING TRIPS<br>SUM (108) | PASS |
| 4. | AVERAGE PASSENGER DELAY DEMAND TO DISPATCH<br>SUM (58) * 60. / (SUM (94) * CSIZE) | SEC/P |
| 5. | MAXIMUM PASSENGER DELAY DEMAND TO DISPATCH<br>MAX (57) * 60. / CSIZE | SEC |
| 6. | AVERAGE ACTUAL TRAVEL TIME/COMPLETED TRIP<br>SUM (59) * 60. / (SUM (107) * CSIZE) | SEC/T |
| 7. | AVERAGE EXCESS TRAVEL TIME/COMPLETED TRIP<br>(SUM (59) - SUM (60)) * 60. / (SUM (107) * CSIZE) | SEC/T |
| 8. | MAXIMUM EXCESS TRAVEL TIME/COMPLETED TRIP<br>MAX (61) * 60. / CSIZE | SEC |
| 9. | NUMBER OF COMPLETED PASS WITH EXCESS TRAVEL TIME <= T1<br>SUM (24) | PASS |
| 10. | NUMBER OF COMPLETED PASS WITH EXCESS TRAVEL TIME > T1 & <= T2<br>SUM (25) | PASS |
| 11. | NUMBER OF COMPLETED PASS WITH EXCESS TRAVEL TIME > T2<br>SUM (26) | PASS |
| 12. | NUMBER OF COMPLETED TRIPS WITH EXCESS TRAVEL TIME <= T1<br>SUM (21) | TRIPS |
| 13. | NUMBER OF COMPLETED TRIPS WITH EXCESS TRAVEL TIME > T1 & <= T2<br>SUM (22) | TRIPS |
| 14. | NUMBER OF COMPLETED TRIPS WITH EXCESS TRAVEL TIME > T2<br>SUM (23) | TRIPS |
| 15. | AVERAGE NUMBER OF TRANSFERS/COMPLETED TRIPS<br>SUM (147) / SUM (107) | XFER/T |
| 16. | RATIO OF COMPLETED PASS TRANSFERS TO TOTAL COMPLETED PASSENGERS<br>SUM (148) / SUM (108) | - |
| 17. | AVERAGE TRIP TIME DEMAND TO TRIP COMPLETION<br>SUM (7) * 60. / (SUM (107) * CSIZE) | SEC/T |

TABLE B-3. DERIVATIONS OF SYSTEM MEASURES (Page 1 of 8)

| DEFINITION | OUTPUT MEASURES IN DPM REPORT | | | |
|---|---|---|---|---|
| | TOTAL | AVERAGE | MINIMUM | MAXIMUM |
| **SYSTEM WIDE** | | | | |
| VEHICLE FLEET SIZE | - | X | M | M |
| SEAT CAPACITY | - | X | S | S |
| SEAT AVAILABILITY | - | X | S | S |
| VEHICLE METERS TRAVELLED | X | - | S | S |
| VEHICLE LOAD FACTOR | - | X | M | M |
| # PASSENGERS IN SYSTEM | X | - | S | S |
| PASSENGER METERS TRAVELLED | X | - | S | S |
| PASSENGER WAIT TIME | - | X | M | M |
| # PASSENGERS WAITING | - | X | M | M |
| % COMPLETED TRANSFERS | X | - | S | S |
| NOMINAL TT / ACTUAL TT | X | - | M | M |
| VEHICLE SPEED IN NETWORK (INCLUDING STATION TIME) | X | - | S | S |
| VEHICLE SPEED ON GUIDEWAY (EXCLUDING STATION TIME) | X | - | S | S |
| **INDIVIDUAL STATION MEASUREMENTS** | | | | |
| NUMBER OF VEHICLES | - | X | M | M |
| # VEHICLE QUEUED INPUT RAMP | - | X | M | M |
| # VEHICLE QUEUED INPUT QUEUES | - | X | M | M |
| # VEHICLE QUEUED DOCKS | - | X | M | M |
| # VEHICLE QUEUED OUTPUT QUEUES | - | X | M | M |
| # VEHICLE QUEUED OUTPUT RAMP | - | X | M | M |
| # VEHICLE QUEUED STORAGE | - | X | M | M |
| VEHICLE TIME IN STATION | - | X | M | M |
| # PASSENGERS ENTERING | X | - | S | S |
| # PASSENGERS EXITING STATION | X | - | S | S |
| # PASSENGERS TRANSFERRING | X | - | S | S |
| # PASSENGERS WAITING | - | X | M | M |
| PASSENGER WAIT TIME | - | X | M | M |
| VEHICLE LOAD FACTOR--IN | - | X | S | S |
| VEHICLE LOAD FACTOR--OUT | - | X | S | S |
| **INDIVIDUAL GUIDEWAY LINK MEASUREMENTS** | | | | |
| NUMBER OF VEHICLES | - | X | M | M |
| NUMBER OF VEHICLES QUEUED | - | X | S | S |
| LINK LOAD FACTOR | - | X | M | M |
| NUMBER OF PASSENGERS | - | X | M | M |
| VEHICLE SPEED | X | - | S | S |
| VEHICLE LOAD FACTOR-OVERALL | - | X | S | S |
| VEHICLE LOAD FACTOR-BY RTE | - | X | S | S |

TABLE B-3. DERIVATIONS OF SYSTEM MEASURES (Page 2 of 8)

| DEFINITION | OUTPUT MEASURES IN DPM REPORT | | | |
|---|---|---|---|---|
| | TOTAL | AVERAGE | MINIMUM | MAXIMUM |
| INDIVIDUAL ROUTE MEASUREMENTS | | | | |
| VEHICLE FLEET SIZE | - | X | H | H |
| SEAT CAPACITY | - | X | S | S |
| SEAT AVAILABILITY | - | X | S | S |
| VEHICLE METERS TRAVELLED | X | - | S | S |
| VEHICLE LOAD FACTOR | - | X | H | H |
| NUMBER OF PASSENGERS | - | X | S | S |
| PASSENGER METERS TRAVELLED | X | - | S | S |
| PASSENGER WAIT TIME | - | X | H | H |
| # PASSENGERS WAITING | - | X | H | H |
| % ARRIVING TRANSFERS | X | - | S | S |
| NOMINAL TT / ACTUAL TT | X | - | H | H |
| VEHICLE SPEED IN NETWORK (INCLUDING STATION TIME) | X | - | S | S |
| VEHICLE SPEED ON GUIDEWAY (EXCLUDING STATION TIME) | X | - | S | S |

```
*****************************************************************************
*           ---DESM SYSTEM SUMMARY STATISTICS DERIVATIONS---                *
*    EACH SYSTEM SUMMARY STATISTIC COMPUTED IS IDENTIFIED AND THEN          *
*    FOLLOWED BY THE DERIVATION OF THAT MEASURE IN TERMS OF THE RE-         *
*    QUIRED RAW STATISTICS. THE APPRIOPRIATE STATISTIC(S) USED IN           *
*    EACH DERIVATION CAN BE DETERMINED BY USING THE NUMBERS IN ( )          *
*    AS A CROSS REFERENCE TO THE MEASURES IDENTIFIED IN THE LIST OF         *
*    RAW STATISTICS. THE INDICATION OF A SUM IN A PARTICULAR DERIVA-        *
*    TION IMPLIES THAT THE APPROPRIATE SYSTEM STATISTIC IS SUMMED           *
*    ACROSS ALL INDIVIDUAL SAMPLE RECORDS IN THE REQUESTED SUMMARY          *
*    INTERVAL. THE MAX/MIN IN A DERIVATION IMPLIES THE MAXIMUM/MINI-        *
*    MUM OF THE SPECIFIED MEASURE IS DETERMINED ACROSS ALL SAMPLES.         *
*                                                                           *
*  *** NOTE:                                                                *
*          NSAMP= NUMBER OF SAMPLES OVER WHICH VALUES ARE SUMMED            *
*          CONV1= 60. * CSIZE / (NSAMP * CSAMPL)   FOR CONVERSION           *
*                                       TO /HR OF NON T.I. DATA             *
*                WHERE CSIZE = C.U./MIN.   CSAMPL = C.U./SAMPLE             *
*          CONV2= 60. * CSIZE      FOR CONVERSION TO /HR OF T.I. DATA       *
*                WHERE CSIZE = C.U./MIN                                     *
*****************************************************************************

  A. SYSTEM-WIDE MEASURES

     1.  VEHICLE FLEET SIZE
           AVERAGE = (SUM(1) + SUM(2) + SUM(3)) / (CSAMPL * NSAMP)
           MINIMUM = MIN(32)
           MAXIMUM = MAX(31)

     2.  SEAT CAPACITY
           AVERAGE = (SUM(1) + SUM(2) + SUM(3)) * VSEAT /
                        (CSAMPL * NSAMP)
           MINIMUM = MIN(((1) + (2) + (3)) * VSEAT / CSAMPL)
           MAXIMUM = MAX(((1) + (2) + (3)) * VSEAT / CSAMPL)

     3.  SEAT AVAILABILITY
           AVERAGE = ((SUM(1) + SUM(2) + SUM(3)) * VSEAT - SUM(6)) /
                        (CSAMPL * NSAMP)
           MINIMUM = MIN((((1) + (2) + (3)) * VSEAT - (6)) / CSAMPL)
           MAXIMUM = MAX((((1) + (2) + (3)) * VSEAT - (6)) / CSAMPL)

     4.  VEHICLE METERS TRAVELLED
           TOTAL = SUM(11) + SUM(12)
           MINIMUM = MIN((11) + (12))
           MAXIMUM = MAX((11) + (12))

     5.  VEHICLE LOAD FACTOR
           FOR SCHEDULED SERVICE:
             AVERAGE = SUM(5) / (VCAP * (SUM(1) + SUM(2)))
           FOR DEMAND RESPONSIVE SERVICE:
             AVERAGE = SUM(5) / (VCAP * SUM(1))
           MINIMUM = MIN(34)
           MAXIMUM = MAX(35)

     6.  NUMBER OF PASSENGERS IN SYSTEM
           TOTAL (CURRENT) = (92) + (186)
           MINIMUM = MIN((92) + (186))
           MAXIMUM = MAX((92) + (186))
```

```
   7.  PASSENGER METERS TRAVELLED
         TOTAL = SUM(10)
         MINIMUM = MIN(10)
         MAXIMUM = MAX(10)

   8.  PASSENGER WAIT TIME    (SEC)
         AVERAGE = (SUM(58) / SUM(94)) * (60 / CSIZE)
         MINIMUM = MIN(71) * (60 / CSIZE)
            (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (94) > 0)
         MAXIMUM = MAX(57) * (60 / CSIZE)

   9.  NUMBER OF PASSENGERS WAITING
         AVERAGE = SUM(39) / (CSAMPL * NSAMP)
         MINIMUM = MIN(149)
         MAXIMUM = MAX(117)

  10.  PERCENT OF COMPLETED TRANSFERS
         TOTAL = (SUM(156) * 100) / SUM(108)
         MINIMUM = MIN(((156) * 100) / (108))
         MAXIMUM = MAX(((156) * 100) / (108))

  11.  NOMINAL TRAVEL TIME / ACTUAL TRAVEL TIME
         TOTAL = SUM(60) / SUM(59)
         MINIMUM = MIN(9)
            (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (107) > 0)
         MAXIMUM = MAX(8)

  12.  VEHICLE SPEED IN NETWORK (INCLUDING STATION DWELL TIME)
            (M/SEC)
         TOTAL = ((SUM(166) + SUM(80)) / (SUM(165) + SUM(52))) *
                    (CSIZE / 60)
         MINIMUM = MIN(((166) + (80)) / ((165) + (52))) *
                    (CSIZE / 60)
            (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (166) OR (80) > 0)
         MAXIMUM = MAX(((166) + (80)) / ((165) + (52))) *
                    (CSIZE / 60)

  13.  VEHICLE SPEED ON GUIDEWAY (EXCLUDING STATION DWELL TME)
            (M/SEC)
         TOTAL = (SUM(166) / (SUM(165)) * (CSIZE / 60)
         MINIMUM = MIN((166) / (165)) * (CSIZE / 60)
            (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (165) > 0)
         MAXIMUM = MAX((166) / (165)) * (CSIZE / 60)

B. STATION MEASURES (BY STATION)

   1.  NUMBER OF VEHICLES
        AVERAGE = SUM(208) / (CSAMPL * NSAMP)
        MINIMUM = MIN(275)
        MAXIMUM = MAX(235)

   2.  NUMBER OF VEHICLES QUEUED ON INPUT RAMPS   (FOR KTYPE=1)
         AVERAGE = SUM(287) / (CSAMPL * NSAMP)
         MINIMUM = MIN(295)
         MAXIMUM = MAX(293)

   3.  NUMBER OF VEHICLES QUEUED ON INPUT QUEUES   (FOR KTYPE=2)
         AVERAGE = SUM(287) / (CSAMPL * NSAMP)
         MINIMUM = MIN(295)
         MAXIMUM = MAX(293)
```

TABLE B-3. DERIVATIONS OF SYSTEM MEASURES (Page 5 of 8)

```
 4.   NUMBER OF VEHICLES QUEUED AT DOCKS    (FOR KTYPE=3)
        AVERAGE = SUM(287) / (CSAMPL * NSAMP)
        MINIMUM = MIN(295)
        MAXIMUM = MAX(293)

 5.   NUMBER OF VEHICLES QUEUED ON OUTPUT QUEUES     (FOR KTYPE=4)
        AVERAGE = SUM(287) / (CSAMPL * NSAMP)
        MINIMUM = MIN(295)
        MAXIMUM = MAX(293)

 6.   NUMBER OF VEHICLES QUEUED ON OUTPUT RAMPS     (FOR KTYPE=5)
        AVERAGE = SUM(287) / (CSAMPL * NSAMP)
        MINIMUM = MIN(295)
        MAXIMUM = MAX(293)

 7.   NUMBER OF VEHICLES QUEUED IN STORAGE AREAS    (FOR KTYPE=6)
        AVERAGE = SUM(287) / (CSAMPL * NSAMP)
        MINIMUM = MIN(295)
        MAXIMUM = MAX(293)

 8.   VEHICLE TIME IN STATION     (SEC)
        AVERAGE = (SUM(211) / SUM(231)) * (60 / CSIZE)
           (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (231) > 0)
        MINIMUM = MIN(224) * (60 / CSIZE)
        MAXIMUM = MAX(212) * (60 / CSIZE)

 9.   NUMBER OF PASSENGERS ENTERING
        TOTAL = SUM(260)
        MINIMUM = MIN(260)
        MAXIMUM = MAX(260)

10.   NUMBER OF PASSENGERS EXITING
        TOTAL = SUM(255)
        MINIMUM = MIN(255)
        MAXIMUM = MAX(255)

11.   NUMBER OF PASSENGERS TRANSFERRING
        TOTAL = SUM(257)
        MINIMUM = MIN(257)
        MAXIMUM = MAX(257)

12.   NUMBER OF PASSENGERS WAITING
        AVERAGE = SUM(210) / (CSAMPL * NSAMP)
        MINIMUM = MIN(272)
        MAXIMUM = MAX(264)

13.   PASSENGER WAIT TIME      (SEC)
        AVERAGE = (SUM(217) / SUM(241)) * (60 / CSIZE)
        MINIMUM = MIN(225) * (60 / CSIZE)
           (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (241) > 0)
        MAXIMUM = MAX(216) * (60 / CSIZE)

14.   VEHICLE LOAD FACTOR--IN
        AVERAGE = SUM(273) / (VCAP * SUM(230))
        MINIMUM = MIN((273) / (VCAP * (230)))
           (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (230) > 0)
        MAXIMUM = MAX((273) / (VCAP * (230)))
```

TABLE B-3. DERIVATIONS OF SYSTEM MEASURES (Page 6 of 8)

```
   15.  VEHICLE LOAD FACTOR--OUT
          AVERAGE = SUM(274) / (VCAP * SUM(231))
          MINIMUM = MIN((274) / (VCAP * (231)))
            (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (231) > 0)
          MAXIMUM = MAX((274) / (VCAP * (231)))

C. LINK MEASURES (BY LINK)

    1.  NUMBER OF VEHICLES
          AVERAGE = SUM(297) / (CSAMPL * NSAMP)
          MINIMUM = MIN(319)
          MAXIMUM = MAX(308)

    2.  NUMBER OF VEHICLES QUEUED
          AVERAGE = SUM(298) / (CSAMPL * NSAMP)
          MINIMUM = MIN(306)
          MAXIMUM = MAX(306)

    3.  VEHICLE VOLUME / LINK CAPACITY
          AVERAGE = SUM(297) / SUM(318)) / CSAMPL
          MINIMUM = MIN(319) / (318)
          MAXIMUM = MAX(308) / (318)

    4.  NUMBER OF PASSENGERS
          AVERAGE = SUM(299) / (CSAMPL * NSAMP)
          MINIMUM = MIN(321)
          MAXIMUM = MAX(320)

    5.  VEHICLE SPEED        (M/SEC)
          TOTAL = (SUM(301) / SUM(300)) * (CSIZE / 60)
          MINIMUM = MIN((301) / (300)) * (CSIZE / 60)
            (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (301) > 0)
          MAXIMUM = MAX((301) / (300)) * (CSIZE / 60)

    6.  VEHICLE LOAD FACTOR
          AVERAGE = SUM(299) / (VCAP * SUM(297))
          MINIMUM = MIN((299) / (VCAP * (297)))
            (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (297) > 0)
          MAXIMUM = MAX((299) / (VCAP * (297)))

    7.  VEHICLE LOAD FACTOR FOR LINK, BY ROUTE
          AVERAGE = SUM(370) / (VCAP * SUM(369))
          MINIMUM = MIN((370) / (VCAP * (369)))
            (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (369) > 0)
          MAXIMUM = MAX((370) / (VCAP * (369)))
        (*****REPEAT COMPUTATIONS FOR EACH ROUTE ASSOCIATED WITH LINK)

D. ROUTE MEASURES  (BY ROUTE)

    1.  VEHICLE FLEET SIZE
          AVERAGE = SUM(327) / (CSAMPL * NSAMP)
          MINIMUM = MIN(356)
          MAXIMUM = MAX(355)

    2.  SEAT CAPACITY
          AVERAGE = (SUM(327) * VSEAT) / (CSAMPL * NSAMP)
          MINIMUM = MIN((327) * VSEAT / CSAMPL)
          MAXIMUM = MAX((327) * VSEAT / CSAMPL)
```

TABLE B-3. DERIVATIONS OF SYSTEM MEASURES (Page 7 of 8)

```
 3.   SEAT AVAILABILITY
        AVERAGE = ((SUM(327) * VSEAT) - SUM(328)) / (CSAMPL * NSAMP)
        MINIMUM = MIN((((327) * VSEAT) - (328)) / CSAMPL)
        MAXIMUM = MAX((((327) * VSEAT) - (328)) / CSAMPL)

 4.   VEHICLE METERS TRAVELLED
        TOTAL = SUM(345)
        MINIMUM = MIN(345)
        MAXIMUM = MAX(345)

 5.   VEHICLE LOAD FACTOR
        AVERAGE = SUM(326) / (VCAP * SUM(327))
        MINIMUM = MIN(366)
        MAXIMUM = MAX(367)

 6.   NUMBER OF PASSENGERS
        AVERAGE = SUM(326) / (CSAMPL * NSAMP)
        MINIMUM = MIN(353)
        MAXIMUM = MAX(353)

 7.   PASSENGER METERS TRAVELLED
        TOTAL = SUM(346)
        MINIMUM = MIN((346)
        MAXIMUM = MAX((346)

 8.   PASSENGER WAIT TIME    (SEC)
        AVERAGE (SUM(337) / SUM(363)) * (60 / CSIZE)
        MINIMUM = MIN(339) * (60 / CISZE)
           (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (363) > 0)
        MAXIMUM = MAX(338) * (60 / CSIZE)

 9.   NUMBER OF PASSENGERS WAITING
       (***ALSO COMPUTED FOR EACH ROUTE GROUP)
        AVERAGE = SUM(329) / (CSAMPL * NSAMP)
        MINIMUM = MIN(362)
        MAXIMUM = MAX(361)

10.   PERCENT OF ARRIVING TRANSFERS
       (***ALSO COMPUTED FOR EACH ROUTE GROUP)
        TOTAL = (SUM(357) * 100) / SUM(358)
        MINIMUM = MIN(((357) * 100) / (358))
           (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (358) > 0)
        MAXIMUM = MAX(((357) * 100) / (358))

11.   NOMINAL TRAVEL TIME / ACTUAL TRAVEL TIME
        TOTAL = SUM(332) / SUM(331)
        MINIMUM = MIN(334)
           (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (359) > 0)
        MAXIMUM = MAX(333)

12.   VEHICLE SPEED IN NETWORK (INCLUDING STATION DWELL TIME)
            (M/SEC)
        TOTAL = ((SUM(345) + SUM(347)) / (SUM(335) + SUM(336))) *
                    (CSIZE / 60)
        MINIMUM = MIN(((345) + (347)) / ((335) + (336))) *
                    (CSIZE / 60)
          (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (345) OR (347) > 0)
        MAXIMUM = MAX(((345) + (347)) / ((335) + (336))) *
                    (CSIZE / 60)
```

TABLE B-3. DERIVATIONS OF SYSTEM MEASURES (Page 8 of 8)

```
13.   VEHICLE SPEED ON GUIDEWAY (EXCLUDING STATION DWELL TIME)
           (M/SEC)
        TOTAL = (SUM(345) / SUM(335)) * (CSIZE / 60)
        MINIMUM = MIN((345) / (335)) * (CSIZE / 60)
           (MINIMUM COMPUTED FOR SAMPLE ONLY WHEN (345) > 0)
        MAXIMUM = MAX((345) / (335)) * (CSIZE / 60)
```

# APPENDIX C
# REPORT OF NEW TECHNOLOGY

The Discrete Event Simulation Model (DESM) provides the capability to model the operation of an automated guideway transit system operating over a network composed of guideway links and stations within a given time domain. While not expected to lead to any new invention, the DESM can be used to experiment, without actual implementation, various operational strategies and service policy options on overall system performance. These experiments (i.e., by running the DESM) can lead to the enhancement of system productivity and operational efficiency.

This report describes the organization, operational features, user inputs and procedures necessary for execution of the DESM.

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