UMTA-MA-06-0048-82-3
DOT-TSC-UMTA-82-46

System Operations Studies
Feeder System Model User's Manual

Li Shin Yuan

Transportation Systems Center
Cambridge MA 02142

November 1982
Final Report

U.S. Department of Transportation
Urban Mass Transportation Administration

Office of Technical Assistance
Office of Systems Engineering
Washington DC 20590

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
UMTA-MA-06-0048-82-3		

4. Title and Subtitle	5. Report Date
SYSTEM OPERATIONS STUDIES-- Feeder System Model User's Manual	November 1982
	6. Performing Organization Code DTS-66
7. Author(s) Li Shin Yuan	8. Performing Organization Report No. DOT-TSC-UMTA-82-46
9. Performing Organization Name and Address U.S. Department of Transportation Research and Special Programs Administration Transportation Systems Center Cambridge, MA 02142	10. Work Unit No. (TRAIS) UM168/R1608
	11. Contract or Grant No. DOT-TSC-1220
	13. Type of Report and Period Covered Final Report June 1981
12. Sponsoring Agency Name and Address U.S. Department of Transportation Urban Mass Transportation Administration Office of Technical Assistance Office of Systems Engineering Washington, DC 20590	14. Sponsoring Agency Code URT-10

15. Supplementary Notes

16. Abstract

The Feeder System Model (FSM) is one of the analytic models included in System Operations Studies (SOS) software package developed for urban transit systems analysis. The primary function of the Feeder System Model (FSM) is to assign zone-to-zone transit patronage demand to the station pairs of a planned guideway transit system. The assignment is based on the trip time ratio between using the existing transit system (the so-called Feeder System) and the planned guideway transit system. The model output may be used as part of the data to compare different new systems operating in the same demand environment. Because of its generic nature, the model is recommended for comparison of representative deployments only.

This manual provides user instructions for data input and operating procedures for the FSM.

17. Key Words	18. Distribution Statement
Zones, Origin to Destination Demand, Feeder, Model, Submodal Split, Fixed Route Service, Demand Responsive Service, Transportation System Simulation, Automated Guideway Transit	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	104	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

PREFACE

The Feeder System Model (FSM) is one of the analytic models included in the System Operations Studies (SOS) software package developed for urban transit systems analysis. The objective of the model is to assign a proportion of the zone-to-zone travel demand onto the station pairs of a planned guideway transit system. The assignment is based on the trip time ratio between using the existing transit system (the so-called Feeder system) and the planned guideway transit system. The model output may be used as part of the data to compare different new systems operating in the same demand environment. Originally, the FSM was designed to generate patronage demand data for the Automated Guideway Transit (AGT) system analysis. However, the FSM can be used for planning studies for any guideway system as long as the performance of the system under study can be estimated. The modelling approach of the FSM is generic in nature; it is recommended for comparison of representative deployments only.

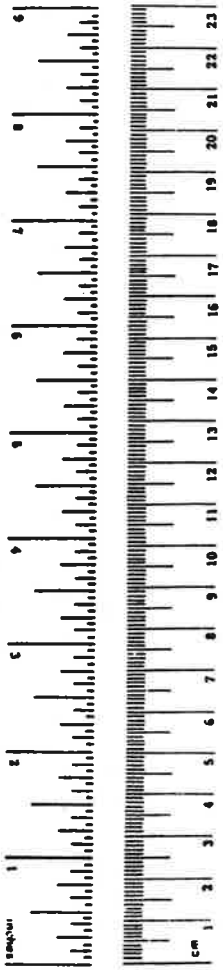
This manual provides user instructions for input data preparation and the procedure for the FSM execution.

The Feeder System Model (FSM) software was developed by the Transportation Systems Division (TSD) of General Motors Corporation based on the functional requirements specified by Transportation Systems Center, U.S. Department of Transportation. The material in this manual was prepared, in part, by Messrs. R. Oglesby and T.M. Linden of General Motors Corporation. The computer printouts which include the input data files, JCL control files, and the output listings were prepared by M. Kuang Chan of Systems Development Corporation, an on-site automated data processing support contractor.

METRIC CONVERSION FACTORS

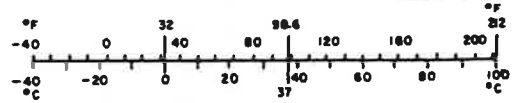
Approximate Conversions to Metric Measures

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



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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EXECUTIVE SUMMARY

The Feeder System Model (FSM) is one of the analytic models included in the System Operations Studies (SOS) software package developed for urban transit systems analysis.

The objective of the model is to assign a proportion of the zone-to-zone travel demand onto the station pairs of a planned guideway transit system. The assignment is based on the trip time ratio between using the existing transit system (the so-called Feeder system) and the planned guideway transit system. The model output may be used as part of the data to compare different new systems operating in the same demand environment.

Originally, the FSM was designed to generate patronage demand data for the automated guideway transit (AGT) system analysis. However, the FSM can be used for planning studies for any guideway system as long as the performance of the system under study can be estimated. The modeling approach of the FSM is generic in nature; it is recommended for comparison of representative deployments only.

This manual provides user instructions for input data preparation and the procedure for the FSM execution.

1. INTRODUCTION

The Feeder System Model (FSM) is one of the analytic models included in the System Operations Studies (SOS) software package developed for urban transit system analysis. The objective of the model is to assign the geometric zone-to-zone transit patronage demand onto the station pairs (origin station and destination station) of a planned guideway transit system. The patronage assignment is based on the trip time ratio between using the existing local transit system (the so-called feeder system in the current terminology) and the planned guideway transit system. Originally, the FSM was designed to generate patronage demand data for the automated guideway transit (AGT) system analysis. However, the FSM can be used for the planning studies of any guideway transit system as long as the performance of the system under study can be estimated. Because of this history, the AGT terminology was used throughout the model. In actual practice, the AGT system in the FSM is the guideway transit system under study (i.e., the new transit system and/or service to be introduced in the community), and the feeder system is the currently existing local transit system.

The FSM models the performance of both the fixed route service operating on grid networks and the demand responsive service operating on the same network. In the model it is assumed that the feeder system consists of local mass transit, private automobile and pedestrian traffic. The output of this model consists of the generated station-to-station demand data for the planned guideway transit system (the AGT system in the FSM terminology), and the feeder system performance data. These outputs can be used in conjunction with other AGT data to provide normalized comparison between different AGT systems operating in the same demand environment with both conventional feeder service/AGT operation and dual mode feeder/AGT operation. The feeder systems operations are modelled analytically. Because of the generic nature of the modelling approach, it is recommended for the comparison of representative deployments only.

This manual describes the organization of the model, the operational features, the required input, the procedure necessary for execution of the model, and the model output.

2. PROGRAM DESCRIPTION

2.1 OVERVIEW

The major function of the FSM is to assign transit patronage demand in a given area onto an AGT network operating in the same general area. For modelling simplicity, an aggregated approach is used in estimating the AGT patronage demand.

In the FSM, the area under study is represented as a set of geographical zones served by a given feeder system. A feeder system is defined, here, as a combination of public and private means of local transportation system including local transit bus, private automobile, pedestrian traffic, etc. An AGT network is superimposed onto the area, and the FSM is used to estimate the fraction of the patronage demand to be attracted to the AGT system. For each origin and destination pair of zones the transit patronage demand is assumed (i.e., user input to the model). Portions of this zone-to-zone demand is assigned onto the AGT network based on the relative performance (e.g., total trip time) of whether to take the AGT system as part of the trip.

In the model, the zonal demands are considered as point sources (for origin zones) and point sinks (for destination zones) located at the zone centroid. For the feeder system the distance between zones is computed as the sum of the x- and y- distances to reflect the grid network of the local streets. The feeder system travel performance (e.g., trip time) between a zone pair is proportional to this distance.

Once an AGT networt is superimposed on the area a fraction of the zone-to-zone demand may take the AGT network for part or the total length of the trip. The size of the fraction is estimated based on the comparison of the performance of whether to use the feeder system for the whole trip or to use the AGT system as, at least, part of the trip. This estimation process, repeated for each zone pair, yields a matrix of AGT station-to-station demand. This station-to-station matrix is the major output of the FSM.

Other outputs of the FSM include the feeder utilization estimates (in terms of feeder fleet size, fleet operating time and fleet operating mileage), station access and egress demand and zone/station demand, etc.

2.2 ORGANIZATION

The FSM consists of an Input Processor (IP), a Model Processor (MP), and an Output Processor (OP). The Input Processor acts as an interface between the user and the model. It performs the translation of the user-provided system definition and option selection data into structured data files usable by the model processor.

The Model Processor performs the actual modeling of the feeder system. It maps zone-to-zone demand onto the AGT network and computes the feeder performance, utilization and submodal split data. The Model Processor generates two output files. The station-to-station demand file (AGT.IANDD.DEMAND) which contains the AGT demand data to be used by the Discrete Event Simulation Model (DESM) for AGT system analysis. The Raw Statistics file (AGT.STATS.FSM) contains the detailed statistics of the model for input to the Output Processor.

The Output Processor translates the Raw Statistics file generated by the Model Processor into Performance Summary files. The Output Processor also generates formatted reports and prints the AGT station-to-station demand matrix.

The relationship between these three processors and the data base is illustrated in Figure 2-1. The processors can be executed individually or as a group.

2.3 FUNCTIONS

The fundamental function of the FSM is to map zone-to-zone patronage demand onto an AGT network. This mapping includes generation of station-to-station demand rate data, station access and egress data, and feeder system utilization data. To assure a flexible modular design, the FSM functions are performed in the following steps:

Step 1. Find the nearest N stations for each zone in the system.

Step 2. Select, from the N stations from step 1, an origin/destination (OD) pair such that the performance measure for the zone/zone trip is optimized. Associate this zone pair with the station pair. If the performance obtained by making the OD zone pair trip by feeder system is greater by a factor K (an user input) than that obtained by using

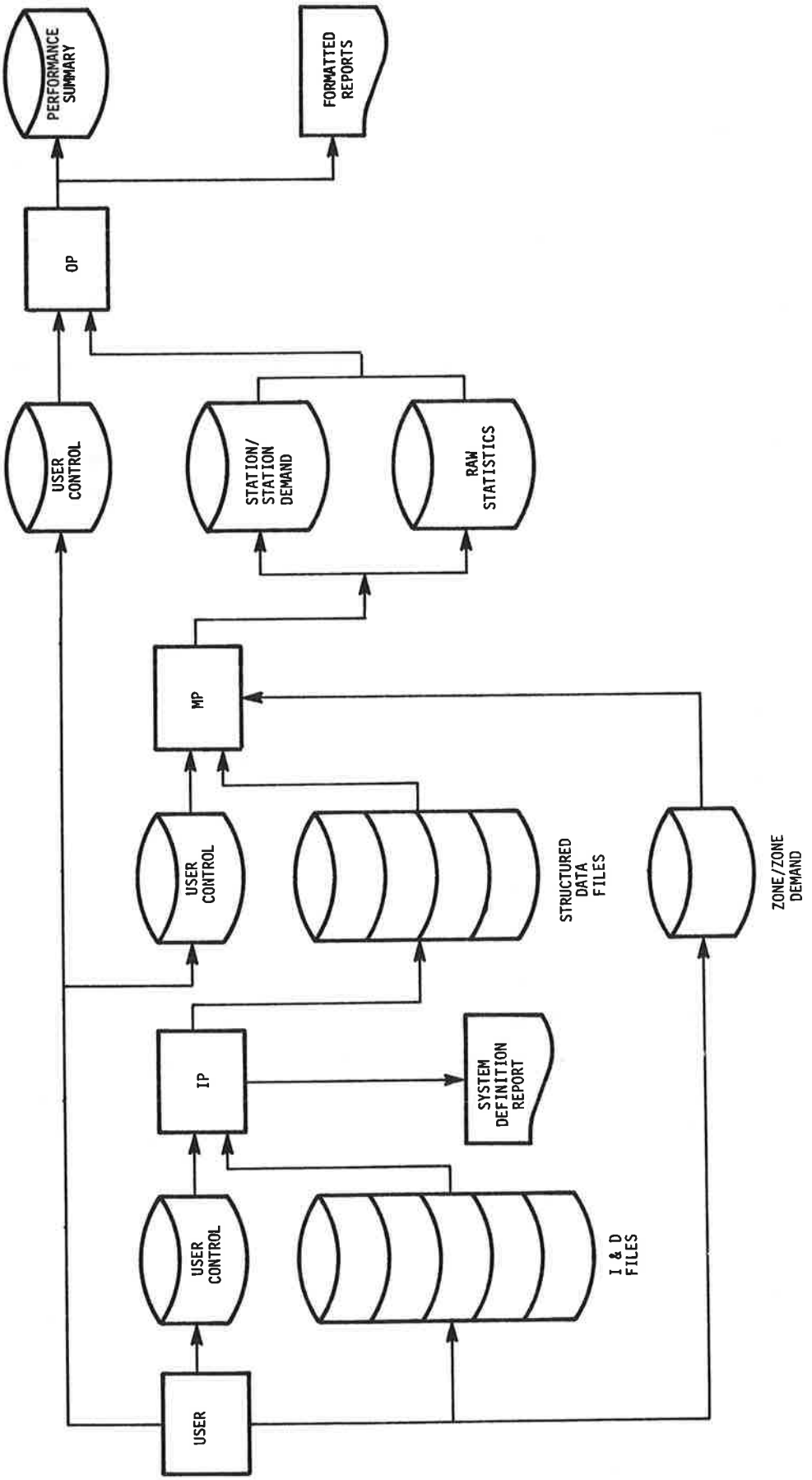

FIGURE 2-1. FSM ORGANIZATION

the automated guideway for one segment of the trip, then this trip is counted are unserviceable by the AGT system.

Step 3. For those trips which are serviceable by the AGT system, divert an additional amount of demand to "feeder only" service by a comparison of the "feeder/AGT time" to the sum of that and the "feeder only" time. After this diversion, associate the zone pair and the zone pair demand for each OD zone pair with the selected OD station pair. Then, for each time interval, generate OD station demand by summing the zone pair demands associated with each station pair. Similarly, generate the station egress demand for each station.

Step 4. Perform a submodal split on demand for each zone/station demand pair (i.e., allocate the demand to local modes of transportation).

Step 5. Calculate the average on-vehicle and off-vehicle access and egress times for each of the stations.

Step 6. Calculate the total system utilization measures, including total vehicle mileage, vehicle operating hours, and fleet size.

2.3.1 Preliminary Zone/Station Association Function Module

This function module is used for major processing Step 1. Given a zone, it associates a set of N stations with that zone. The association is made on the basis of the X, Y distance (as opposed to straight line distance) between the zone centroid and the station.

Mapping of an OD zone demand onto a network involves determination of zone/station assignments which yield the highest performance path running from origin zone to origin station to destination station to destination zone for each OD zone pair. This function selects a subset of stations which have a serious chance of being on the highest performance paths for each zone.

Inputs to the Preliminary Zone/Station Association module include zone centroid locations, station locations, and the user variable specifying the number of stations to be associated with each zone. The output is the association of N stations with each zone and the X, Y zone centroid/station location distance for each zone/station association.

2.3.2 Final Zone/Station Association Function Module

This function module is used for major processing Step 2. Given an OD zone pair, a set of N associated stations for both the origin and destination zones, a performance measure for each of the 2N zone/station pairs, and a performance measure for each OD station pair, this function selects the OD station pair which maximizes the performance measure for each OD zone pair trip. This involves comparison of the N^2 combinations of OD station pairs for each zone pair. Selection of stations is performed for every zone "pair" because it is possible that trips with common zone origins and different zone destinations will pass through different origin stations. This module also screens out trips which are not best served by the AGT system, the so-called unserviceable demand).

2.3.3 OD Station Demand Generation Function Module

This function module is used for major processing Step 3. Given OD zone pair data, zone pair/station pair associations, and zone centroid locations, this function sums OD zone demand data to generate OD station demand data. Several zones contribute to demand for each OD station pair, but the network demand data specifies demand as seen as the station. Therefore, the demand for the several zones is summed so as to define as single demand as seen at the station for each OD station pair for each time interval. The OD station demand is used to generate station egress demand data for each station for each time interval.

2.3.4 Submodal Split Module

This function module is used for major processing Step 4. Total trip demand for the zone/station pair is allocated to 3 submodes: auto (private automobile), feeder (mass transit), and walk. The walk mode demand for a zone/station pair is modeled as a function of:

- Total trip demand for the zone/station pair
- Walk factor: a measure of how receptive the demand is to walking
- Zone area
- Walk area: the area around AGT stations which is sufficiently convenient to warrant consideration of walking
- Walk proportioning factor: the proportion of walk area which is

applicable for the particular zone when the walk area is not totally within the zone.

Except for AM peak period egress and PM peak period access, after walk demand has been subtracted from total demand the remaining demand for a zone/station pair is modeled as a function of:

- Feeder factor: a measure of how receptive the demand is to feeder use
- Maximum acceptable walk distance (fixed route only): the maximum acceptable walk distance to access a fixed route
- Effective route spacing (fixed route only)
- Maximum tolerable availability: headway for fixed route systems; wait time for demand responsive systems
- Actual availability

AM peak period egress from and PM peak period access to an AGT station are modeled as work oriented trips for which there is no auto available. Hence, the feeder demand is the non-walk demand, since the walk demand has been subtracted.

Auto mode demand is modeled as that part of total demand which neither walks nor uses the feeder system.

The aforementioned submodal split parameters are defined, as appropriate, for each service interval, for each service region, and for access and egress modes. The model utilizes default parameters which can be overridden by the user. For example, sets of default parameters are provided for three generic service intervals: AM and PM peak, mid-day, and evening.

2.3.5 Performance Modeling Function

This function is used for major processing Step 5 and models feeder system performance as a function of:

- Feeder service type
  - Fixed route grid, passengers transfer at stations
  - Fixed route grid, dual mode
  - Demand responsive, passengers transfer at stations
  - Demand responsive, dual mode
- Feeder characteristics (assignable for each service area)

- Average speed
- Route spacing (for fixed route grid)
- Headway (for fixed route grid)
- Wait time (for demand responsive systems)
- Fleet size
- Transfer time

- Feeder service level
  - Peak
  - Mid-day
  - Evening

- Submodal split
  - Percent walking
  - Percent using mass transit feeder
  - Percent using private automobile

- Demand characteristics
  - Magnitude
  - Service region area
  - Zone/station distance
  - Walk access distance

On vehicle, off vehicle, and total travel times are modeled for each submode as well as the average of the submodes. These travel times are modeled for each service interval and for the set of all service intervals (i.e., the entire time modeled); this is done for each station and for the entire system.

2.3.6 Utilization Modeling Function

This function is used for major processing Step 6 and models utilization for both fixed route and demand responsive service. The FSM utilization modeling function generates the following utilization measures:

- Feeder vehicle mileage
- Feeder vehicle operating time
- Fleet size

Operating fleet sizes are computed for each service region for each service interval. The operating fleet size is the maximum of the sums of regional fleet sizes for each interval.

Operating fleet size for fixed route region is modeled as a function of route mileage, feeder average speed, and route headway. Demand responsive regional operating fleet size is modeled as a function of feeder average speed, wait time, service region area, and service region demand. The total system fleet size is modeled as a function of the operating fleet size and a reliability factor which models the effect of having a portion of the fleet out of service for repairs.

The regional vehicle operating time for a service interval is modeled as the product of the regional operating fleet size and the service interval length. The total regional vehicle operating time is the sum of the regional interval vehicle operating times; the total system vehicle operating time is the sum of the total regional times. Similarly, the regional vehicle operating mileage for a service interval is modeled as the product of regional operating time for the service interval and the average feeder speed, the total regional mileage is the sum of the regional interval mileages, and the total system mileage is the sum of the total regional mileages.

3. INPUT DATA

User input specifications to the FSM are accomplished by a set of run time inputs and the following data base files:

- AGT.IANDD.CHAR -- Feeder characteristics data in FORTRAN NAMELIST format.
- AFT.IANDD.ZN -- Zone characteristics data in fixed card image format.
- AGT.IANDD.DZZ -- Zone-to-zone demand data in UTPS compressed format.
- AGT.IANDD.STATION -- Region and station description data in fixed card image format.
- AGT.IANDD.SSP -- AGT station-to-station performance data in fixed card image format.

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 modifications 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.

3.1 RUNTIME INPUTS

The runtime input is a set of control inputs (called control cards in card image format) for the user to write an index for the model simulation run and to specify options and controls of the simulation run. The control inputs are in the form of a sequence of header cards with any required follower cards. The last control card must be an EOD card. The control card type must start in Column 7; the remainder of the card is ignored. The control cards are described individually in the following sections.

An example of a run time input file follows:

```
      INDEX                                                              00000010
TEST   BRIEF TEST TO VERIFY THE INSTALLATION  2/27/1981                  00000020
          THIS SYSTEM CONTAINS 16 ZONES, ARRANGED IN A 4 BY 4 PATTERN,   00000030
          THERE ARE SEVEN STATIONS, FIVE OF WHICH ARE DUAL PLATFORM,     00000040
          THE FIFTEEN OF THE ZONES ARE IN ONE REGION AND THE REMAINING   00000050
          ZONE IS IN A SECOND REGION. THIS TEST USES FIXED ROUTE,        00000060
          DEMAND RESPONSIVE, AND SUBSCRIPTION SERVICE.                   00000070
END                                                                      00000080
      TEXT                                                               00000090
          THIS RUN PRODUCES ALL THE REPORTS.                             00000100
END                                                                      00000110
      SELECT                                                             00000120
PFMPRT   111                                                             00000130
   6                                                                     00000140
END                                                                      00000150
      EOD                                                                00000160
```

3.1.1 EOD Card

The EOD card is used to indicate the End of Data. The last card of each dataset must be an EOD card. It has no followers.

3.1.2 INDEX Card

The INDEX control card is used to initialize the run index file. It is required for the Input Processor and not recognized by the Model and Output Processors. The next card has the following format:

1-6	Index file name. Same as INDEX = parameter used in the JCL.
8-47	Analysis Description
49-63	User Name
65-72	Date

The user may include additional text on the following cards.

The card following the description has END in the first three columns with the rest of the card blank.

3.1.3 TEXT Card

The text control card is used to include comments in the data set. The

cards following the TEXT card are listed and ignored. The text is followed by a card with the following format:

1-3 END
4-72 Blank
73-80 Ignored

3.1.4 PARAM, DATA, OPTION, and SELECT Control Cards

These control cards are used to input data variables. All four cards perform the same action and are interchangeable.

The control card is followed by one or more groups of cards each initializing one variable. The first card of each group has the format:

1-6 Variable name
8-9 Number of items per card
10 Format
- F for Reals
- I for Integers
- L for Logical Variables
- A for Character

11-15 Field width except for F which has the format field width.0, e.g., F10.0
16-20 Lower bound for first subscript
21-25 Upper bound for first subscript
26-35 Lower & upper bounds for 2nd subscript
36-45 Lower & upper bounds for 3rd subscript
46-55 Lower & upper bounds for 4th subscript

For those familiar with FORTRAN, Columns 8-15 contain an element of a format statement.

The remaining cards of the group have the format:

1-2 Repetition count. This has the same effect as including the same number of copies of this card. If omitted, 1 is assumed.
3-72 The data fields described in the header in the format specified and of the specified width.

There must be exactly enough data to satisfy the header card.

The last data group must be followed by a card with the following format.

1-3 END
4-72 Blank
73-80 Ignored

3.1.4.1 Input Processor Control Variables

RGNPRT: A value of zero will suppress the region description report.
FORMAT: I

STNPRT: A value of zero will suppress the station description report.
FORMAT: I

ZNPRT: A value of zero will suppress the zone description report.
FORMAT: I

PFMPRT: A value of 6 will generate the station-to-station performance report.
FORMAT: I

STBNIN: A value of zero will suppress writing of the station description binary file.
FORMAT: I

ZONEBN: A value of zero will suppress writing of the zone description binary file.
FORMAT: I

PRFMBN: A value of zero will suppress writing of the station-to-station performance description binary file.
FORMAT: I

COLS: Sets the number of columns for output reports. It is the number of characters that can be printed on a line. Caution: not all reports are reformatted and most titles will not be shortened. Lines longer than 132 characters will require JLC changes.
DEFAULT: 132 FORMAT: I

LINES: Sets the number of lines per printed page.

3.1.4.2 Model Processor Control Variables

NPZSA: Number of preliminary zone-station association per zone. The cost of the run is roughly proportional to NPZSA squared.

RANGE: 1-5 DEFAULT: 5 FORMAT: I

PERSTH: Threshold for Serviceable Demand.
RANGE: $\geq$ 0 DEFAULT: 0.0 FORMAT: F

3.1.4.3 Output Processor Control Variables

RGNPRT: A value of zero will suppress the region description report.
FORMAT: I

STNPRT: A value of zero will suppress the station description report.
FORMAT: I

ZNPRT: A value of zero will suppress the zone description report.
FORMAT: I

PFMPRT: A value of 6 will generate the station-station performance report.

COLS: Sets the numbers of columns for output reports. It is the number of characters that can be printed on a line.
Caution: Not all reports are reformatted and most titles will not be shortened. Lines longer than 132 characters will require JCL changes.
DEFAULT: 132 FORMAT: I

LINES: Sets the number of lines per printed page.
DEFAULT: 60 FORMAT: I

DSSPRT: A value of zero will suppress printing the station-to-station demand report.
FORMAT: I

CZSDPT: A value of 6 will select the zone-to-station demand report.
FORMAT: I

3.2 FEEDER CHARACTERISTICS FILE

The format for this file is almost free form. The first card must contain εFEEDER starting in Column 2. Column 1 of all cards must be blank. Line numbers are not permissible because they are treated as data. The data are input by specifying a variable name, an equal sign, and a value (or values separated by commas) followed by a comma. After the last input parameter, enter εEND.

The permissible variable names are:

HM Maximum tolerable effective headway (one for each service interval); minutes

SSFF The fraction of trips which use the feeder system if it is sufficiently convenient. (One for each service interval.)

QSSIC The number of service intervals

QSDIC The number of demand intervals

DITIM The length of each demand interval in minutes. (One value for each demand interval.)

DISF The scale factor to be applied to the zone-to-zone demand matrix. (One value for each demand interval.)

DIDM The number of the demand matrix to be used for the demand interval. (One for each demand interval.)

DISI Service interval (One for each demand interval).

SIID Service interval ID. (One for each service interval.) The ID can be 1-4 characters and must be enclosed in quotes. Two IDs cause a modification in the sub-model split algorithm:

AMPK

PMPK

AW The area around the station which is close enough to allow AGT walk access (km squared)

WFT Feeder transfer time (minutes)

WAA Walk distance to access an auto for the auto mode (km)

WAF The maximum acceptable walking distance to access a feeder route (km)

WAW The maximum acceptable walking distance to access a station (walk mode distance) (km)

SSWF The fraction of trips which will walk to the AGT system if it is sufficiently convenient

FRF Fleet Reliability Factor - between zero and one

PERSFA Performance scale factor for the AGT portion of a trip. (Units con-

sistent with station-to-station performance file.)

PERSFF Performance scale factor for a feeder-only trip (min/km)

PERSFZ Performance scale factor for the feeder portion of a trip using the AGT system (min/km)

PFWAIT Initial wait time - constant added to all elements of the station-to-station performance matrix

An example of the feeder characteristics file follows:

```
&FEEDER WAA = 0.0, WAF = 0.4, WAW = 0.8,
        AW = 2.0, SSWF = 0.80, WFT = 2.5,
        FRF = 0.80,
        PFWAIT = 0.0, PERSFA = 0.1 PERSFF = 3.0, PERSFZ = 3.0,
        QSDIC = 10, DITIM = 60, 60, 60, 180, 240, 60, 60, 60, 240, 420,
                    DIDM  =  1,  1,  1,   2,  2,  3,  3,  3,  2,   2,
                    DISF  = 1.0,2.0,1.0,1.0,1.5,1.0,2.0,1.0,0.5,0.25,
                    DISI  =  1,  1,  1,  2,  2,  3,  3,  3,  4,   5,
        QSSIC = 5,  SIID  = 'AMPK', 'MID ', 'PMPK', 'EVE ', 'NITE',
                    HM    =    60,    120,    60,    120,    120,
                    SSFF  =  0.85,  0.95,  0.85,  0.90,  0.90, &END
```

3.3 ZONE DESCRIPTION FILE

One record is used for each zone. The zone numbers must correspond to the zone numbers in the zone-to-zone demand data. There must be a zone description for each zone used in the zone-to-zone demand and all zone members must be accounted for (i.e., no gaps are allowed). It is not necessary for the zone descriptions to be read in sequence. The format is:

1-4 Zone number

5-8 Zone ID - any 4 characters used only for the listing

9-14 X coordinate - if no decimal is punched, it is assumed between columns 13 & 14 (km)

15-20 Y coordinate - if no decimal is punched, it is assumed between columns 19 & 20 (km)

21-26 Area of zone (km squared), if no decimal point is punched, it is assumed to be between columns 25 and 26

An example of the zone description file follows:

```
 1  A1  1.0  1.0  4.0
 2  A2  3.0  1.0  4.0
 3  A3  5.0  1.0  4.0
 4  A4  7.0  1.0  4.0
 5  B1  1.0  3.0  4.0
 6  B2  3.0  3.0  4.0
 7  B3  5.0  3.0  4.0
 8  B4  7.0  3.0  4.0
 9  C1  1.0  5.0  4.0
10  C2  3.0  5.0  4.0
11  C3  5.0  5.0  4.0
12  C4  7.0  5.0  4.0
13  D1  1.0  7.0  4.0
14  D2  3.0  7.0  4.0
15  D3  5.0  7.0  4.0
16  D4  7.0  7.0  4.0
```

3.4 ZONE-TO-ZONE DEMAND FILE

The zone-to-zone demand file specifies the geographical zone-to-zone demand data. This file is in the UTPS (Urban Transportation Planning System) compressed matrix format. Within a single matrix file of the UTPS format, each record contains the patronage demand from one origin zone to its associated destination zones. The matrix continues until all the origin zones are recorded. Each record in the UTPS format is made of three types of computer words. The format of these words is illustrated in Table 3-1. The first two words define the time interval and origin zone of the data to follow. The remainder of the record defines the associated destination zones and demand magnitudes. The word count in the first word defines the length of the record for one origin station and its associated destination stations. The table number in the second word defines the time interval ID. Each of the third type of words explicitly defines a column number (i.e., destination zone number) and an element value (i.e., the demand magnitude). Matrix element values (i.e., the demand magnitudes) larger than the largest number (262, 143) that can be represented by 18 bits, are defined by multiple words. The matrix

TABLE 3-1. UTPS COMPRESSED MATRIX FORMAT - WORDS 1 & 2

WORD	BITS	FIELD NAME	CONTENTS
1	0-31	Word Count	Number of 4-byte words to follow in this physical record (in binary)
2	0	Continuation	0, if this is the last physical record for the current logical record; 1, if more physical records for the current logical record are to follow.
2	1-7	Format Code	0 or 127, if compressed format. 1, if 1-byte format 2, if 2-byte format 4, if 4-byte format 92, if comment record
2	8-15	Table number	Table number, in binary
2	16-31	Row number	Origin zone (row number), in binary.
3	0-13	Column Number	Destination, zone (column number.)
3	14-31	Value	Value of the matrix element in the position given by the row number in word 2, bits 16-31, and the column number in word 3, bits 0-13.
•	•	•	•
•	•	•	•
•	•	•	•
1	0-13	Column Number	Destination zone (column number)
1	14-31	Value	Value of the matrix element in the position given by the row number in word 2, bits 16-31, and the column number in word, bits 0-13

element value is obtained by adding the values in words with the same column number.

The UTPS compressed format was adapted so that the zone-to-zone demand data generated by the UTPS package can be used directly in the FSM. The zone-to-zone demand data in UTPS format is in binary form which is not human readible. Stand alone programs to translate zone-to-zone demand data from human readible format to UPTS compressed format and vice versa are included in Appendix 1.

3.5 REGION AND STATION DESCRIPTION FILE

This file consists of region descriptions followed by station descriptions and separated by an END card.

The END card format is:

1-3	END
4-72	Blank
73-80	Ignored

The description of each region consists of one card for each service interval. The first two fields are blank except for the first card of each region.

The region descriptions must be in sequence by region number and contain no explicit region number. The format is:

1.3	Blank
4-9	Route length in kilometres
10-14	Route spacing in kilometres
15-17	Service type 0 Fixed route 1 Demand responsive 2 Subscription
18-22	Feeder wait time in minutes
23-27	Effective headway in minutes
28-32	Automobile speed(km/hr)
33-37	Feeder speed (km/hr)
38-42	Walk speed (km/hr)

The station descriptions must be ordered by platform. The station descriptions, the station-to-station demand data, and the station-to-station performance data all use the same numbers. These files do not include explicit station numbers, but rather rely on the ordering of the data. Dual platform stations are identified by the station location; it is not necessary to have them adjacent in the data file. The format is:

1-8	Blank
9-12	X coordinate - (km). If no decimal point is punched, it is assumed to be between Columns 11 and 12
13-16	Y coordinate - (im). If no decimal point is punched, it is assumed to be between Columns 15 and 16
17-20	Proportion of the walk area of the station that is in the first zone (%) (do not punch a decimal point)
21-24	The zone that contains the station's walk area (zone number)
25-28	The zone that contains the remaining walk area (ignore if Columns 17-20 contain 100)
29-31	Ten fields containing the region in which
32-34	the station is located. There is one for
35-37	each service interval. When there are less
38-40	than 10 service intervals, the unused fields are ignored.
41-43	
44-46	
47-49	
50-52	
53-55	
56-58	

An example of the region and station description file follows:

```
  16.0 0.25  0  5.0 10.0 45.0 20.0  3.2                              00010000
             0 10.5 21.0 45.0 30.0  3.2                              00020000
             0  5.0 10.0 45.0 20.0  3.2                              00030000
             0 10.5 21.0 45.0 30.0  3.2                              00040000
             1 15.0 30.0 45.0 30.0  3.2                              00050000
  90.0  0.7  2  4.0 16.0 45.0 20.0  3.2                              00060000
             0 15.0 30.0 45.0 30.0  3.2                              00070000
             2  4.0 16.0 45.0 20.0  3.2                              00080000
             1 15.0 30.0 45.0 30.0  3.2                              00090000
             1 15.0 30.0 45.0 30.0  3.2                              00100000
END                                                                  00110000
```

```
2.0 2.0  50   5   6   1   1   1   1   1   1   1   1   1   1   00120000
2.0 3.5  50   5   6   1   1   1   1   1   1   1   1   1   1   00130000
2.0 5.0  50   9  10   1   1   1   1   1   1   1   1   1   1   00140000
2.5 5.5 100  10       1   1   1   1   1   1   1   1   1   1   00150000
3.0 6.0  50  10  14   1   1   1   1   1   1   1   1   1   1   00160000
4.0 6.0  75  10  11   1   1   1   1   1   1   1   1   1   1   00170000
6.0 6.0  50  11  15   2   2   2   2   2   2   2   2   2   2   00180000
4.0 6.0  75  10  11   1   1   1   1   1   1   1   1   1   1   00190000
3.0 6.0  50  10  14   1   1   1   1   1   1   1   1   1   1   00200000
2.5 5.5 100  10       1   1   1   1   1   1   1   1   1   1   00210000
2.0 5.0  50   7  10   1   1   1   1   1   1   1   1   1   1   00220000
2.0 3.5  50   5   6   1   1   1   1   1   1   1   1   1   1   00230000
2.0 2.0  50   5   6   1   1   1   1   1   1   1   1   1   1   00240000
```

3.6 STATION-TO-STATION PERFORMANCE FILE

This file contains as many cards as necessary to contain the performance between each station pair (for dual platform systems, between each platform pair) at 14 items per card. Each card contains 14 fields of five characters.

Since the numbers are adjusted by a scale factor (PERSFA) the units are user selectable. If the performance numbers are minutes, the scale factor is unity.

All the values for a single destination are input before the values for the next destination. The sequence of values must be consistent with the sequence of station descriptions. An example of the station-to-station performance file for a 13-station AGT network is shown as follows. Note that the performance from a station to itself is zero:

```
0   3   6   7   8  10  14  18  20  21  22  24  25  25  00010000
0   3   4   5   7  11  15  17  18  19  22  24  22  25  00020000
0   1   2   4   8  12  14  15  16  19  20  21  24  27  00021000
0   1   3   7  11  13  14  15  18  19  20  23  26  27  00022000
0   2   6  10  12  13  14  17  18  18  21  24  25  26  00023000
0   4   8  10  11  12  15  17  14  17  20  21  22  24  00024000
0   4   6   7   8  11  12  10  13  16  17  18  20  24  00025000
0   2   3   4   7   8   8  11  14  15  16  18  22  26  00026000
0   1   2   5   6   7  10  13  14  15  17  21  25  27  00027000
0   1   4   5   6   9  12  13  14  16  20  24  26  27  00028000
0   3   4   3   6   9  10  11  13  17  21  23  24  25  00029000
0   1   2   5   7   8  10  14  17  20  21  22  24  25  00030000
0                                                      00031000
```

4. OUTPUT DATA

Output data of the FSM includes a set of output data files and printed reports. The major output data file can be used directly by other SOS models in system deployment analyses. The printed reports are for user investigations of the feeder system performance.

4.1 DATA FILES

4.1.1 Station-to-Station Demand File (IANDD.DEMAND):

This is the major output of the FSM. It contains the AGT station-to-station demand matrices generated by mapping the zone-to-zone demand onto the AGT network. The format for this file is defined in Table 4.1. Up to 10 demand matrices may be included in this file. Each matrix covers a certain time period of the demand. The data may be used directly by the Discrete Event Simulation Model (DESM) for deployment analyses.

4.1.2 Run Index File (IANDD.INDEX)

The run index file is a sequential data file used to log the user of the FSM processors. For each run, the index card input description, the date and time as well as the referenced files are recorded. An example of the Run Index file is as follows:

```
TEST   BRIEF TEST TO VERIFY THE INSTALLATION  2/27/1991              00000020
          THIS SYSTEM CONTAINS 16 ZONES, ARRANGED IN A 4 BY 4 PATTERN  00000030
          THERE ARE SEVEN STATIONS, FIVE OF WHICH ARE DUAL PLATFORM.   00000040
          THE FIFTEEN OF THE ZONES ARE IN ONE REGION AND THE REMAIN-   00000050
          ING ZONE IS IN A SECOND REGION.  THIS TEST USES FIXED        00000060
          ROUTE DEMAND RESPONSIVE, AND SUBSCRIPTION SERVICE.           00000070

DATE AND TIME FILES USED                              ARCHIVED
05/14/81 13:08 AGT.FSM.LOAD(FIMAIN03)
               TS0581.IANDD.CHAR(FMMAIN10)
               TS0581.IANDD.ZN(FMMAIN10)
               TS0581.IANDD.STATION(FMMAIN10)
               TS0581.IANDD,SSP(FMMAIN10)
               TS0581.STRUC.CHAR(FMMAIN10)
               TS0581.STRUC.ZN(FMMAIN10)
               TS0581.STRUC.STATION(FMMAIN10)
               TS0581.STRUC,SSP(FMMAIN10)
05/14/81 13:08 AGT.FSM.LOAD(FMMAIN03)
               TS0581.STRUC.CHAR(FMMAIN10)
               TS0581.STRUC.ZN(FMMAIN10)
               TS0581.STRUC.STATION(FMMAIN10)
               TS0581.STRUC.SSP(FMMAIN10)
               TS0581.IANDD.DZZ(FMMAIN1)
               TS0581.STATS.FSM(FMMAIN10)
               TS0581.IANDD.DEMAND(FMMAIN1)
05/14/81 13:09 AGT.FSM.LOAD(FOMAIN04)
               TS0581.IANDD.DEMAND(FMMAIN1)
               TS0581.STATS.FSM(FMMAIN10)
               TS0581.STATS.FSMZSAM(FMMAIN10)
               TS0581.PERSUM.FSM(FMMAIN10)
```

TABLE 4-1. STATION/STATION DEMAND FILE DEFINITION

DATA	FORMAT
NSTA TIMEBASE	215
D(1,1) D(2,1) D(3,1).....D(14,1)	1415
D(15,1) D(16,1).....D(NSTA,1)D(1,2)D(2,2)	1415
D(3,2).....	1415
.....	1415
.....D(NSTA,NSTA)	1415

Where:

NSTA - Number of stations in the network

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

D(i,j) - The total number of patrons traveling from Station i to Station j during the interval TIMEBASE

4.1.3 Performance Summary File (PERSUM.FSM)

This file contains the FSM performance summary data. The file is written in card image format. Table 4.2 defines the specifications.

4.1.4 Internal Binary Files

There are a set of binary files which are used to transfer data internally in the FSM. These files are:

STRUC.CHAR, the structured equivalent of IANDD.CHAR in binary form,
STRUC.ZN, the structured equivalent of IANDD.ZN in binary form,
STRUC.STATION, the structured equivalent of IANDD.STATION in binary form,
STRUC.SSP, the structured equivalent of IANDD.SSP in binary form.
STATS.FSM, which transfers raw statistics from Model Processor (MP) to Output Processor (OP).

4.2 OUTPUT REPORTS

In addition to data files the FSM also generates printed reports to describe the problem under study by the FSM, and the modelling results. The Control Options and Index Reports for all three processors (IP, MP and OP) and the Unserviceable Demand Report are generated automatically by the program. All other reports can either be selected or suppressed by the user using the Control Cards defined in Section 3.1.4.

The Control Option and Index Reports contain the user option specifications, the index card description, the date and time, and the files referenced. The Control Option and Index Reports are printed as the first reports of the respective processors. For the Output Processor (OP), in particular, the date and time, and the files referenced are printed out as the last report of the run. Examples of the Control Option and Index Reports are shown in Figures 4-1, 4-2, and 4-3, respectively.

The Unserviceable Demand Report contains those O/D zone pairs which are not reasonably serviceable by the AGT system and the associated demand. An annotated example of the Unserviceable Demand Report is shown in Figure 4-4.

The rest of the reports can be selected or suppressed by the user. The annotated examples of these reports are shown in Figures 4-5 through 4-11.

TABLE 4-2. PERFORMANCE SUMMARY FILE DEFINITION

Record Definition	
Record Length	80 characters
Character Format	7F10.2, 10X
Parameter Sequence	A fixed sequence is required:
Record 1	QSSRC, QSSTC, NZONES, WAA, WAF, WAW, SSWF
Record 2	FRF, PERSFA, PERSFF, PERSFZ, PERSTH, AW, WFT
RECORD 3	FMI, FST, FSOP, FTIM, NPZSA, DUSED, DDIVRT
RECORD 4	DUNSRV

The parameters are defined in Section 5.0 Variable Glossary, of this report.

```
      INDEX                                                              00000010
TEST   BRIEF TEST TO VERIFY THE INSTALLATION  2/27/1981                  00000020
          THIS SYSTEM CONTAINS 16 ZONES, ARRANGED IN A 4 BY 4 PATTERN.   00000030
          THERE ARE SEVEN STATIONS, FIVE OF WHICH ARE DUAL PLATFORM.     00000040
          THE FIFTEEN OF THE ZONES ARE IN ONE REGION AND THE REMAINING   00000050
          ZONE IS IN A SECOND REGION.  THIS TEST USES FIXED ROUTE,       00000060
          DEMAND RESPONSIVE, AND SUBSCRIPTION SERVICE                    00000070
END                                                                      00000080
      TEXT                                                               00000090
          THIS RUN PRODUCES ALL THE REPORTS.                             00000100
END                                                                      00000110
      SELECT                                                             00000120
PFMPRT  111         0    0    0    0    0    0    0    0
 06                                                                      00000140
END                 0    0    0    0    0    0    0    0
      EOD                                                                00000160
*** FIP0021 - RUN INDEX FILE ENTRIES FOLLOW ***

DATE AND TIME  FILES REFERENCED
05/14/81 13:00 AGT.FSM.LOAD(FIMAIN03)
         TS0581.IANDD.CHAR(FMMAIN10)
         TS0581.IANDD.ZN(FMMAIN10)
         TS0581.IANDD.STATION(FMMAIN10)
         TS0581.IANDD.SSP(FMMAIN10)
         TS0581.STRUC.CHAR(FMMAIN10)
         TS0581.STRUC.ZN(FMMAIN10)
         TS0581.STRUC.STATION(FMMAIN10)
         TS0581.STRUC.SSP(FMMAIN10)

*** FIP0071 - BINARY FILES SUCCESSFULLY WRITTEN ***
```

FIGURE 4-1. INPUT PROCESSOR CONTROL OPTIONS AND INDEX FILE REPORT

```
      TEST                                                              00000210
          THIS IS A BRIEF TEST OF THE FEEDER SYSTEM FEATURES, IT        00000220
          SMALL ENOUGH THAT THE PROGRAM OPERATION CAN BE VERIFIED       00000230
          BY HAND.                                                      00000240
          THIS SYSTEM CONTAINS 16 ZONES, ARRANGE IN A 4 BY 4 PATTERN,   00000250
          THERE ARE SEVEN STATIONS, FIVE OF WHICH ARE DUAL PLATFORM.    00000260
          THE FIFTEEN OF THE ZONES ARE IN ONE REGION AND THE REMAINING  00000270
          ZONE IS IN A SECOND REGION.  THIS TEST USES FIXED ROUTE.      00000280
          DEMAND RESPONSIVE, SUBSCRIPTION SERVICE                       00000290
END                                                                     00000300
      SELECT                                                            00000310
NPZSA   111         0    0    0    0    0    0    0    0
 05                                                                     00000330
END                 0    0    0    0    0    0    0    0
      EOD                                                               00000350

DATE AND TIME  FILES REFERENCED
05/14/81 13:08 AGT.FSM.LOAD(FMMAIN03)
               TS0581.STRUC.CHAR(FMMAIN10)
               TS0581.STRUC.ZN(FMMAIN10)
               TS0581.STRUC.STATION(FMMAIN10)
               TS0581.STRUC.SSP(FMMAIN10)
               TS0581.IANDD.DZZ(FMMAIN1)
               TS0581.STATS.FSM (FMMAIN10)
               TS0581.IANDD.DEMAND(FMMAIN1)
```

FIGURE 4-2. MODEL PROCESSOR CONTROL OPTIONS AND INDEX FILE REPORT

```
      TEXT                                                              00000440
          THIS IS A BRIEF TEST OF THE FEEDER SYSTEM FEATURES, IT        00000450
          SMALL ENOUGH THAT THE PROGRAM OPERATION CAN BE VERIFIED       00000460
          BY HAND.                                                      00000470
          THIS SYSTEM CONTAINS 16 ZONES, ARRANGE IN A 4 BY 4 PATTERN.   00000480
          THERE ARE SEVEN STATIONS, FIVE OF WHICH ARE DUAL PLATFORM.    00000490
          THE FIFTEEN OF THE ZONES ARE IN ONE REGION AND THE REMAINING  00000500
          ZONE IS IN A SECOND REGION.  THIS TEST USES FIXED ROUTE,      00000510
          DEMAND RESPONSIVE, AND SUBSCRIPTION SERVICE.                  00000520
END                                                                     00000530
      SELECT                                                            00000540
PFMPRT  111          0    0    0    0    0    0    0    0
  06                                                                    00000560
CZSDPT  111          0    0    0    0    0    0    0    0
  06                                                                    00000580
END                  0    0    0    0    0    0    0    0
      EOD                                                               00000600

*** FOP0021 - PERFORMANCE SUMMARY FILE WRITTEN ***

DATE AND TIME  FILES REFERENCED
05/14/81 13:09 AGT.FSM.LOAD(FOMAIN04)
               TS0581.IANDD.DEMAND(FMMAIN1)
               TS0581.STATS. FSM(FMMAIN10)
               TS0581.STATS. FSMZSAM(FMMAIN10)
               TS0581.PERSUM.FSM(FMMAIN10)
```

FIGURE 4-3. OUTPUT PROCESSOR CONTROL OPTIONS AND INDEX FILE REPORT

UNSERVICEABLE DEMAND

(1,	2)	23.3,												
(2,	1)	33.0,	(2,	3)	72.3									
(3,	2)	85.3												
(5,	6)	30.5,												
(6,	5)	37.0,	(6,	7)	68.3									
(7,	6)	78.0												
(8,	11)	39.3,	(8,	12)	27.3									
(9,	10)	3283.0,	(9,	13)	33.0									
(10,	9)	3289.5,	(10,	13)	8797.7,	(10,	14)	8809.0						
(11,	8)	62.0,	(11,	12)	81.3,	(11,	15)	82.0,	(11,	16)	86.8			
(12,	8)	40.3,	(12,	11)	65.0,	(12,	15)	49.8,	(12,	16)	46.5			
(13,	9)	23.3,	(13,	10)	8775.0,	(13,	14)	23.3						
(14,	10)	8786.2,	(14,	13)	33.0									
(15,	11)	75.5,	(15,	12)	62.8,	(15,	16)	93.3						
(16,	11)	93.3,	(16,	12)	66.0,	(16,	15)	86.8						

O/D PAIRS

DEMAND

FIGURE 4-4. UNSERVICEABLE DEMAND REPORT

FEEDER CHARACTERISTICS AND PROGRAM OPTIONS 05/14/81

NUMBER OF REGIONS	NUMBER OF STATIONS	NUMBER OF ZONES	WALK ACCESS DISTANCE AUTO	WALK ACCESS DISTANCE FEEDER	WALK ACCESS DISTANCE WALK	WALK AREA	WALK FACTOR	TRANSFER TIME	FLEET RELIABILITY	AGT INITIAL WAIT TIME	PERFORMANCE SCALE FACTOR FEEDER ONLY	PERFORMANCE SCALE FACTOR ZONE PORTION	PERFORMANCE SCALE FACTOR AGT PORTION
2	7	16	0.0	0.40	0.80	2.00	80.00%	2.5	80.0%	0.0	3.00	3.00	0.10

I/O OPTIONS

FORTRAN I_O_UNITS

SYSIN	4	SYSPRT	6	SYSNDX	11
		ERRPRT	6		
FDRIN	14	FDRPRT	6	FDRBIN	24
STNIN	10	STNPRT	6	STNBIN	20
PRFMIN	13	PFMPRT	6	PRFMBN	23
ZONEIN	12	ZNPRT	6	ZONEBN	22

	1	2	3	4	5	6	7	8	9	10
DEMAND INTERVAL(MIN)	60	60	60	180	240	60	60	60	240	420
DEMAND MATRIX	1	1	1	2	2	3	3	3	2	2
DEMAND SCALE FACTOR IN SERVICE INTERVAL	1.00	2.00	1.00	1.00	1.50	1.00	2.00	1.00	0.50	0.25
	1	1	1	2	2	3	3	3	4	5

SERVICE INTERVAL ID	AMPK	MID	PMPK	EVE	NITE
SERVICE INTERVAL(MIN)	180.	420.	180.	240.	420.
MAXIMUM HEADWAY	60.	120.	60.	120.	120.
TRIPS USING FEEDER	85.%	95.%	85.%	90.%	90.%

REGIONS

NO.	RM	RS	SRSV	WFW	HE	V			NO.	RM	RS	SRSV	WFW	HE	V			NO.	RM	RS	SRSV	WFW	HE	V
1	16.0	0.25	0	5.0	10.0	45.0	20.0	3.2	2	90.0	0.70	2	4.0	16.0	45.0	20.0	3.2							
			0	10.5	21.0	45.0	30.0	3.2				0	15.0	30.0	45.0	30.0	3.2							
			0	5.0	10.0	45.0	20.0	3.2				2	4.0	16.0	45.0	20.0	3.2							
			0	10.5	21.0	45.0	30.0	3.2				1	15.0	30.0	45.0	30.0	3.2							
			1	15.0	30.0	45.0	30.0	3.2				1	15.0	30.0	45.0	30.0	3.2							

ONE ROW FOR EACH SERVICE INTERVAL

AUTO SPEED

FEEDER SPEED

WALK SPEED

*The parameter are defined in the Variable Glossary

FIGURE 4-5. FEEDER CHARACTERISTICS/REGIONS REPORT*

STATION SUMMARY 05/14/81 PAGE 1

LOCATION		ZONES_IN_WALK_AREA		PLATFORMS		SERVICE_REGIONS 1	2	3	4	5
2.0	2.0	5(50.0%)	6(50.0%)	13	1	1	1	1	1	1
2.0	3.5	5(50.0%)	6(50.0%)	12	2	1	1	1	1	1
2.0	5.0	9(50.0%)	10(50.0%)	11	3	1	1	1	1	1
2.5	5.5	10		10	4	1	1	1	1	1
3.0	6.0	10(50.0%)	14(50.0%)	9	5	1	1	1	1	1
4.0	6.0	10(75.0%)	11(25.0%)	8	6	1	1	1	1	1
6.0	6.0	11(50.0%)	15(50.0%)	7		2	2	2	2	2

SERVICE INTERVAL NUMBERS

FIGURE 4-6. STATION SUMMARY REPORT

ZONE DESCRIPTIONS

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ZONE		LOCATION		AREA	ZONE		LOCATION		AREA	ZONE		LOCATION		AREA
1	1	1.0	1.0	4.00	7	7	5.0	3.0	4.00	13	13	1.0	7.0	4.00
2	2	3.0	1.0	4.00	8	8	7.0	3.0	4.00	14	14	3.0	7.0	4.00
3	3	5.0	1.0	4.00	9	9	1.0	5.0	4.00	15	15	5.0	7.0	4.00
4	4	7.0	1.0	4.00	10	10	3.0	5.0	4.00	16	16	7.0	7.0	4.00
5	5	1.0	3.0	4.00	11	11	5.0	5.0	4.00					
6	6	3.0	3.0	4.00	12	12	7.0	5.0	4.00					

x,y COORDINATES
OF ZONE CENTROIDS

FIGURE 4-7. ZONE DESCRIPTIONS REPORT

STATION TO STATION PERFORMANCE

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0	3	6	7	8	10	14	18	20	21	22	24	25
2	25	0	3	4	5	7	11	15	17	18	19	22	24
3	22	25	0	1	2	4	8	12	14	15	16	19	20
4	21	24	27	0	1	3	7	11	13	14	15	18	19
5	20	23	26	27	0	2	6	10	12	13	14	17	18
6	18	21	24	25	26	0	4	8	10	11	12	15	17
7	14	17	20	21	22	24	0	4	6	7	8	11	12
8	10	13	16	17	18	20	24	0	2	3	4	7	8
9	8	11	14	15	16	18	22	26	0	1	2	5	6
10	7	10	13	14	15	17	21	25	27	0	1	4	5
11	6	9	12	13	14	16	20	24	26	27	0	3	4
12	3	6	9	10	11	13	17	21	23	24	25	0	1
13	2	5	7	8	10	14	17	20	21	22	24	25	0

FIGURE 4-8. STATION-TO-STATION PERFORMANCE REPORT

FEEDER CHARACTERISTICS AND PROGRAM OPTIONS 05/14/81

NUMBER OF REGIONS	NUMBER OF STATIONS	NUMBER OF ZONES	WALK ACCESS DISTANCE AUTO	WALK ACCESS DISTANCE FEEDER	WALK ACCESS DISTANCE WALK	WALK AREA	WALK FACTOR	TRANSFER TIME	FLEET RELIABILITY	AGT INITIAL WAIT TIME	PERFORMANCE SCALE FACTOR FEEDER ONLY	PERFORMANCE SCALE FACTOR ZONE PORTION	PERFORMANCE SCALE FACTOR AGT PORTION
2	7	16	0.0	0.40	0.80	2.00	80.00%	2.5	80.0%	0.0	3.00	3.00	0.10

UNSERVICABLE DEMAND THRESHOLD	STATIONS ANALYZED FOR EACH ZONE	FLEET VEHICLE-KILOMETERS	FLEET VEHICLE-HOURS	FLEET OPERATING	FLEET TOTAL SIZE	DEMAND USING AGT	DEMAND DIVERTED	DEMAND UNSERVICABLE
0.0	5	9419.	416.6	66.	82.	73547.	66541.	43338.

	1	2	3	4	5	6	7	8	9	10
DEMAND INTERVAL(MIN)	60	60	60	180	240	60	60	60	240	420
DEMAND MATRIX	1	1	1	2	2	3	3	3	2	2
DEMAND SCALE FACTOR	1.00	2.00	1.00	1.00	1.50	1.00	2.00	1.00	0.50	0.25
IN SERVICE INTERVAL	1	1	1	2	2	3	3	3	4	5
SERVICE INTERVAL ID	AMPK	MID	PMPK	EVE	NITE					
SERVICE INTERVAL(MIN)	180.	420.	180.	240.	420.					
MAXIMUM HEADWAY	60.	120.	60.	120.	120.					
TRIPS USING FEEDER	85.%	95.%	85.%	90.%	90.%					

REGIONS

NO.	RM	RS	SRSV	WFW	HE	V A	V F	V W	FROP	FMIR	DSR AA	DSR AF	DSR AW	DSR AT	DSR EA	DSR EF	DSR EW	DSR ET
1	16.	0.25	0	5.	10.	45.0	20.0	3.2	5.	288.	7235.	17571.	2081.	26887.	0.	27085.	6699.	33784.
			0	11.	21.	45.0	30.0	3.2	2.	320.	741.	2686.	576.	4003.	737.	2672.	568.	3977.
			0	5.	10.	45.0	20.0	3.2	5.	288.	0.	27046.	6689.	33735.	7221.	17536.	2081.	26838.
			0	11.	21.	45.0	30.0	3.2	2.	183.	176.	509.	115.	801.	176.	506.	114.	795.
			1	15.	30.	45.0	30.0	3.2	0.	0.	111.	231.	58.	400.	111.	230.	57.	398.
2	90.	0.70	2	4.	16.	45.0	20.0	3.2	0.	0.	2641.	4371.	0.	7012.	0.	114.	0.	114.
			0	15.	30.	45.0	30.0	3.2	6.	1260.	132.	327.	0.	460.	140.	346.	0.	485.
			2	4.	16.	45.0	20.0	3.2	0.	0.	0.	114.	0.	114.	2641.	4371.	0.	7012.
			1	15.	30.	45.0	30.0	3.2	0.	0.	30.	62.	0.	92.	32.	66.	0.	97.
			1	15.	30.	45.0	30.0	3.2	0.	0.	15.	31.	0.	46.	16.	33.	0.	49.

ONE ROW PER SERVICE INTERVAL

SERVICE TYPE:
0 = FIXED ROUTE
1 = DEMAND RESPONSIVE
2 = SUBSCRIPTION SERVICE

ACCESS BY AUTO
ACCESS BY FEEDER
ACCESS BY WALK
TOTAL ACCESS DEMAND
EGRESS BY AUTO
EGRESS BY FEEDER
EGRESS BY WALK
TOTAL EGRESS DEMAND

FIGURE 4-9. FEEDER CHARACTERISTICS/REGION REPORT

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LOCATION X	LOCATION Y	ZONES_IN_WALK_AREA		SERVICE REGION	STATION_DEMAND ACCESS	STATION_DEMAND EGRESS	FLEET REQUIRED	VEHICLE-KILOMETERS	OFF-VEHICLE TRAVEL_TIME ACCESS	OFF-VEHICLE TRAVEL_TIME EGRESS	ON-VEHICLE TRAVEL_TIME ACCESS	ON-VEHICLE TRAVEL_TIME EGRESS
2.0	2.0	5(50.0%)	6(50.0%)	1	6561.	113.	0.	0.	8.0	11.2	9.8	12.7
				1	452.	452.	0.	0.	13.1	13.1	12.9	12.9
				1	114.	3511.	0.	0	11.2	8.0	12.7	9.8
				1	90.	90.	0.	0.	12.4	12.4	12.4	12.4
				1	45.	45.	1.	210.	11.8	11.8	8.4	8.3
2.0	3.5	5(50.0%)	6(50.0%)	1	12147.	230.	0.	0.	8.2	11.1	7.9	10.3
				1	815.	848.	0.	0.	12.7	12.7	10.7	10.7
				1	229.	12147.	0.	0.	11.1	8.2	10.3	7.9
				1	163.	170.	0.	0.	12.1	12.1	10.3	10.2
				1	81.	85.	1.	210.	11.6	11.6	6.5	6.5
2.0	5.0	9(50.0%)	10(50.0%)	1	215.	18564.	0.	0.	8.4	11.0	4.8	6.4
				1	1219.	1177.	0.	0.	12.5	12.5	8.1	8.1
				1	18515.	216.	0.	0.	11.0	8.4	6.4	4.8
				1	244.	235.	0.	0.	11.9	11.9	7.7	7.7
				1	122.	118.	1.	210.	11.4	11.4	2.3	2.3
2.5	5.5	10		1	0.	0.	0.	0.	0.0	0.0	0.0	0.0
				1	0.	0.	0.	0.	0.0	0.0	0.0	0.0
				1	0.	0.	0.	0.	0.0	0.0	0.0	0.0
				1	0.	0.	0.	0.	0.0	0.0	0.0	0.0
				1	0.	0.	0.	0.	0.0	0.0	0.0	0.0
3.0	6.0	10(50.0%)	14(50.0%)	1	206.	14746.	0.	0.	8.4	11.0	4.8	6.4
				1	992.	970.	0.	0.	12.5	12.5	8.1	8.1
				1	14746.	206.	0.	0.	11.0	8.4	6.4	4.8
				1	198.	194.	0.	0.	11.9	11.9	7.7	7.7
				1	99.	97.	1.	210.	11.4	11.4	2.3	2.3
4.0	6.0	10(75.0%)	11(25.0%)	1	7757.	131.	0.	0.	8.1	11.2	8.2	10.5
				1	525.	531.	0.	0.	13.0	13.0	11.4	11.4
				1	131.	7757.	0.	0.	11.2	8.1	10.5	8.2
				1	105.	106.	0.	0.	12.3	12.3	11.0	11.0
				1	52.	53.	1.	210.	11.7	11.7	5.5	5.5
6.0	6.0	11(50.0%)	15(50 0%)	2	7012.	114.	61.	3600.	4.1	6.5	6.2	8.0
				2	460.	485.	0.	0.	15.1	15.1	15.4	15.4
				2	114.	7012.	32.	1920.	6.5	4.1	8.0	6.2
				2	92.	97.	2.	240.	11.8	11.8	7.0	7.0
				2	46.	49.	1.	210.	11.8	11.8	8.7	8.7

FOR DEMAND RESPONSIVE END SUBSCRIPTION SERVICE ONLY

FIGURE 4-10 STATION REPORT

STATION TO STATION DEMAND (INTERVAL 1)

ORIGIN	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0	0	0	0	0	0	0	0	0	0	0	0	0
2	11	0	0	0	0	0	0	0	0	0	0	0	0
3	16	34	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	1	0	0	0	0	0	0	0	0	0	0
6	0	5	0	0	1934	0	0	0	0	0	0	0	0
7	1	3	0	0	1749	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	23	27	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	3	0	0	0	0
12	0	0	0	0	0	0	3	5	0	0	3017	0	0
13	0	0	0	0	0	0	2	0	0	0	1622	16	0

FIGURE 4-11. AGT STATION-TO-STATION DEMAND REPORT

5. THE FSM VARIABLE DEFINITIONS

This section presents the alphabetical list of the global variables used in the FSM.

ADRST (qssi, qsst)	Area for a demand responsive station for service interval qssi and station qsst (km^2)
AW	Walk area: the area around the station which is close enough to allow AGT walk access (km^2)
AZ (qszn)	Zone qszn area (km^2)
CZSAM	The unit number of zone/station association matrix.
DIDM (qsdi)	Demand matrix to use for demand interval qsdi (trips)
DISF (qsdi)	Demand scale factor for demand interval qsdi (trips/trip)
DISI (qsdi)	Service interval which includes the demand interval qsdi
DITIM (qsdi)	Demand interval length for demand interval qsdi (min.)
DSR (qsae, qssi, qssr, qstm)	Service region demand for access/egress mode qsae, service interval qssi, service region qssr, and travel mode qstm (trips)
DSS (qsso, qssd, qssi)	Station/station demand for origin station qsso, destination station qssd, and service interval qssi (trips)
DST (qsae, qssi, qsst, qstm)	Station demand for access/egress mode qsae, service interval qssi, station qsst, and travel mode qstm (trips)

DUN	Demand unserviceable flag
@DWP (qsst, qszn)	Walk demand proportion for zone qszn/ station qsst: the fraction of the walk area which is applicable for zone qszn and station qsst when the walk area is not totally within zone qszn
DWPSF (qsst)	Walk demand proportion scale factor for station qsst (km^2/km^2)
DWPZ1 (qsst)	Walk demand proportion zone 1 for station qsst
DWPZ2 (qsst)	Walk demand proportion zone 2 for station qsst
DZS (qsst, qszn)	Demand to or from zone qszn that uses station qsst (trips)
DZZ (qazo, qszd, qsdi)	Zone/zone demand for origin zone qszo, destination zone qszd, and demand interval qsdi (trips)
DZZSI (qszo, qszd, qssi)	Zone/zone demand (serviceable by AGT network) for origin zone qszo, destination zone qszd, and service interval qssi (trips)
FDOP (qssi, qsst)	Operating fleet size for service interval qssi and demand responsive station qsst
FMI	Fleet operating distance (vehicle km's)
FMID (qssi, qsst)	Fleet vehicle distance for each station qsst providing demand responsive service during service interval qssi (vehicle km's)
FMIR (qssi, qssr)	Fleet vehicle distance for each service region qssr providing demand responsive service during service interval qssi (vehicle km's)

FRF	Reliability factor to account for vehicles out of service for repairs
FROP (qssi, qssr)	Operating fleet size for service interval qssi and service region qssr (vehicles)
FSOP	Operating system fleet size (vehicles)
FST	Total system fleet size (vehicles)
FTIM	Fleet operating time (vehicle hours)
HE (qssi, qssr)	Effective headway for service interval qssi and service region qssr (min)
HM (qssi)	Maximum tolerable effective headway for service interval qssi (min)
NPZSA	Number of preliminary zone/station associations
PERSFA	Performance scale factor for the AGT portion of a trip (min/km)
PERSFF	Performance scale factor for a feeder only trip (min/km)
PERSFZ	Performance scale factor for the zone (feeder) portion of a trip (min/km)
PERSS (qsso, qssd)	Station-to-station performance for origin station qsso and destination station qssd (km)
@PERZZA	Zone/zone performance for a feeder/ AGT trip (min)
@PERZZF	Zone/zone performance for a feeder only trip (min)
qsae	Access/egress mode subscript A =) Access E =) Egress T =) Access/egress total

QSDIC	Number (count) of demand intervals
qssd	Destination station subscript
qssi	Service interval subscript x =) Interval x T =) All intervals
QSSIC	Number (count) of service intervals
qsso	Origin station subscript
qssr	Service region subscript
QSSRC	Number (count) of service regions
qsst	Station subscript
QSSTC	Number (count) of stations
qstm	Travel mode subscript A =) Auto F =) Feeder W =) Walk T =) Average or sum for A, F, & W modes
qszd	Destination zone subscript
qszn	Zone subscript
qszo	Origin zone subscript
RM (qssr)	Route km's for service region qssr (km's)
RS (qssr)	Route spacing for service region qssr (km's)
SIID (qssi)	Alphanumeric service interval indentifier for service interval qssi
SITIM (qssi)	Length of service interval qssi (minutes)
SRSV (qssi, qssr)	Service region service type for service interval qssi and service region qssr
@SSF (qsae, qstm)	Submodal split factor for access/egress mode qsae, and travel mode qstm

SSFF (qssi)	Feeder factor: the fraction of trips which use the feeder system if it is sufficiently convenient for service interval qssi
@SSRW (qsst, qszn)	Submodal split walk ratio for station qsst and zone qszn
@SSRF (qssi, qssr)	Submodal split feeder ratio for service interval qssi and service region qssr
SSWF	Walk factor: the fraction of trips which will walk to the AGT system if it is sufficiently convenient
STCNX (qsst)	X coordinate of station qsst location
STCNY (qsst)	Y coordinate of station qsst location
STSR (qssi, qsst)	Station service region assignments for service interval qssi and station qsst
TOF @ qsae qstm (qszn, qsst, qssi)	Incremental off-vehicle travel time of demand between zone pairs for zone qazn, station qsst, service interval qssi, access/egress mode qsae, and travel mode qstm (min)
TOFA (qsae, qssi, qsst, qstm)	Average off-vehicle travel time for access/egress mode qsae, service interval qssi, station qsst, and travel mode qstm (min)
TOFAT (qssi, qsst)	Total off-vehicle travel time for station qsst access, service interval qssi (min)
TOFET (qssi, qsst)	Total off-vehicle travel time for station qsst egress, service interval qssi (min)

TON @ qsae qstm (qszn, qsst, qssi)	Incremental on-vehicle travel time of demand between zone pairs for zone qszn, station qsst, service interval qssi, access/egress mode qsae, and travel mode qstm (min)
TON qsae F (qssi, qsst)	Total on-vehicle travel time for access/ egress mode qsae, service interval qssi, and station qsst for feeder travel mode (min)
TON qsae T (qssi, qsst)	Total on-vehicle travel time for access/ egress mode qsae, service interval qssi, and station qsst in all travel modes (min)
TONA (qsae, qssi, qsst, qstm)	Average on-vehicle travel time for access/egress mode qsae, service interval qssi, station qsst, and travel mode qstm (min)
TOFZS (qsae, qssi, qsst, qstm, qszn)	Zone/station off-vehicle travel time for access/egress mode qsae, service interval qssi, station qsst, travel mode qstm, and zone qszn (min)
TONZS (qsae, qssi, qsst, qstm, qszn)	Zone/station on-vehicle travel time for access/egress mode qsae, service interval qssi, station qsst, travel mode qstm, and zone qszn (min)
V (qssi, qssr, qstm)	Mode velocity for service interval qssi, service region qssr, and travel mode qstm (km/hr.)
WAA	Walk access for auto: walk distance to access on auto for the auto mode (km's)
WAF	Walk access for feeder: the maximum acceptable walking distance to access a feeder route (km's)

WAW	Walk access time for walk: the maximum acceptable walking distance to access a station (walk mode distance) (km's)
WFT	Feeder transfer time (0 for dual mode) (min)
WFW (qssi, qssr)	Feeder wait time for service interval qssi and service region qssr (min)
ZNCNX (qszn)	X coordinate of zone qszn centroid
ZNCNY (qszn)	Y coordinate of zone qszn centroid
ZNID (qazn)	Zone identifier for zone qszn
ZNSR (qssi, qszn)	Zone service region assignment
@ZNSV (qssi, qszn)	Working variable identifying zone service type for service interval qssi and zone qszn
ZSAMD (qszo, qszd)	Destination station zone/station association matrix for origin zone qszo and destination zone qszd
ZSAMO (qszo, qszd)	Origin station zone/station association matrix for origin zone qszo and destination zone qszd
ZSASN (qzsa, qszn)	Preliminary zone/station association list for zone qszn, and list index qzsa
@ ZSD (qszn, qsst)	Zone (qszn) to station (qsst) distance for zone qszn and station qssd (km's)
ZSDD @ (qszd, qssd)	Zone/station distance for destination zone, qszd, and station qssd (km's)
ZSDO @ (qszo, qsso)	Zone/station distance for origin zone qszo, and station qsso (km's)

6. OPERATING PROCEDURES

Executing the FSM involves the following steps:

- Prepare the input files (see Section 3) to specify the feeder system to be modelled.
- Verify the accuracy of the input files.
- Set up control file in Job Control Language (JCL) to invoke the catalogued procedure for model execution.
- Submit the JCL control file for execution.

It is suggested that the FSM should be executed one processor (IP, and OPO) at a time. At the completion of each processor, a check should be made to verify that the feeder system is modelled as requested by the user. If errors are found, correct the input and re-run the affected areas.

The FSM is executed in batch mode, normally, through a terminal (remote batch mode operation). It involves performing the above procedural steps via the use of standard system utilities and remote batch job submission procedures with the aid of the control files written in Job Control Language (JCL) and the catalogued procedures. The user input files for feeder systems specification, the JCL control files, and the catalogued procedures can be created and/or modified via the TSO supported editing capability (see IBM Publication GC-28-0645).

6.1 JOB CONTROL LANGUAGE (JCL)

The use of the model has been simplified by JCL control files and three catalogued procedures that have been written for the FSM. The use of catalogued procedures avoids the necessity of the user preparing the individual JCL statements. The JCL procedure generates the individual statements from the parameters specified by the user. This section elucidates the use of JCL and the catalogued procedures. A basic understanding of JCL is assumed.

Basic Format

A job consists of JCL statements combined with data lines which are read by the program. They are distinguished by Columns 1 and 2. If Columns 1 and 2

contain slashes (//), then it is a JCL statement; if Columns 1 and 2 do not contain slashes (//) or slash asterisk (/*), then it is data, and it will be passed to the program. JCL lines with an asterisk in Column 3 are comments (//*) and are ignored by the system. Each JCL statement consists of four fields separated by blanks (embedded blanks are not permitted except in comments). The fields are label, operation, operand, and comment. The operand may be continued by ending the statement with a comma and continuing it on the next line. For continuation lines, Columns 1 and 2 must contain slashes, and the continuation must start in Columns 4-16, inclusive. As many continuations as necessary may be used. The operation field determines the statement type and is described below.

JOB Card

The first card of each job must a job card. The format will vary between installations. Coding the following parameters is not recommended: ADDRSPC, PERFORM, RD, REGION.

It is advisable to include MSGLEVEL=(2,0) on the JOB statement to reduce the length of system message output.

DD Card

The DD statement is used to define the data sets to be used during a program execution. They are always associated with the preceding EXEC statement. The only DD statement that the feeder model user may need to code is SYSIN. It is used when the data are in a data set rather than included in the job. The required parameters are DSNAME=(followed by data set name), and DISP=SHR (for input data sets).

This is an example of a DD statement:

```
//SYSIN DD    DSNAME=AGT.IANDD.RNTIM(NULL),DISP=SHR
```

EXEC Statement

The main function of the EXEC statement is to identify the program to be executed or the catalogued procedure to be used. It is the first JCL statement of each job step.

Member names

Member names consist of one to eight characters the first of which is a letter and the remaining characters can be either letters or digits. Some

parameters further restrict the length.

6.2 THE CATALOGUED PROCEDURES

The catalogued procedures are used to invoke the Input Processor, Model Processor and Output Processor of the Feeder System Model. These procedures are installed in the system procedure library on an installation dependent basis. Overrides for any of the data basis input referenced by the procedure may be included as part of the JCL job input stream.

6.2.1 Input Processor

Input Processor execution is requested by including:

//stepname EXEC AGTFIP, additional-parameters

in the job. It is followed by the control card input. If the control card inputs are in a separate file, include a SYSIN DD statement. Replace stepname with an identifier which can be referenced from other steps. It also is included in certain system error messages. The additional parameters that may be specified are:

CHAR=member.
This parameter is required and specifies the member of the feeder characteristics file to be used for this run.

ZN=member
Specifies the member of the zone description file for this run. If omitted, no zone description is processed.

STATION=member
Specifies the member of the station and region description file to be processed. If omitted, no station or region description is processed.

SSP=member
Specifies the member of the station-to-station performance file to be processed. If omitted, none is processed.

INDEX=
Specifies the run index file name (seven characters maximum).
This parameter is required. If the file does not already exist, it will be created.

PROJECT=
Specifies the data library that contains the files to be processed. The default is AGT. Refer to the installation instructions for establishing new data libraries.

STEPLIB=
Specifies the program library that contains the program. Default is AGT.

VERSION=
Specifies the program version to be used. The default is the current version.

SYSOUT=
Specifies the output class for printed output. The default is the same as the MSGCLASS= parameter of the JOB statement.

OUTLIM=
Specifies the maximum number of lines of printed output that is permitted. The default is 1300.

COND=
Specifies the conditions for bypassing execution of this step. (Bypassed steps have a completion code of 0.) If omitted, it is executed unless a previous step has ABENDed.

ACCT=
Specifies accounting information for this step. This parameter is installation dependent; however, usually it overrides the accounting information specified on the JOB card.

6.2.2 Model Processor

Model Processor execution is requested by including:

//stepname EXEC AGTFMP, additional-parameters

in the job. It is followed by the control card input. If the control card inputs are in a separate file, include a SYSIN DD statement. Replace stepname with an identifier which can be referenced from other steps. It also is included in certain system error messages. The additional parameters that may be specified are:

CHAR=member

This parameter is required. Use the same parameter as you did for the Input Processor.

ZN=member

This parameter is required. Specify the same name as you did for the Input Processor.

STATION=member

This parameter is required. Specify the same name as you did for the Input Porcessor.

SSP= member

This parameter is required. Specify the same name as you did for the Input Processor

DZZ=member

Specifies the member of the zone-to-zone demand dataset that will be used in this run. This is a binary file in UTPS O/D matrix compressed format (pp. 19-20, UPTS Reference Manual, April 1, 1974). Specify the same name as that used to create it. This parameter is required. Seven characters maximum.

INDEX=

This parameter is required. Specify the same name as you did for the Input Processor.

STATS=member

Specifies the name under which to store the raw statistics from the Model Processor for later use by the Output Processor.

DEMAND=member

Specifies the name under which you want the set of demand matrices stored. This parameters is required. The maximum length is seven characters.

PROJECT=

Specifies the data library that contains the files to be processed. The default is AGT. Refer to the installation instructions for establishing new data libraries.

STEPLIB=

Specifies the program library that contains the program. Default is AGT.

VERSION=

Specifies the program version to be used. The default is the current version.

SYSOUT=

Specifies the output class for printed output. The default is the same as the MSGCLASS= parameter of the JOB statement.

OUTLIM=

Specifies the maximum number of lines of printed output that is permitted. The default is 250.

TIME=minutes

This parameter is optional. It specifies the maximum amount of CPU time allowed for this step. The default is 2 minutes. It can also be coded as TIME=(minutes,,seconds).

COND=

Specifies the conditions for bypassing execution of this step. (Bypassed steps have a completion code of 0.) If omitted, it is executed unless a previous step has ABENDed. If you are running the Input Processor and the Model Processor in the same job, it is recommended that you use:

```
COND=((0,NE,stepname.FIMAIN))
```

where stepname is the stepname you used for the Input Processor EXEC statement. This will bypass the Model Processor execution if there were Input Processor errors.

ACCT=

Specifies accounting information for this step. This parameter is installation dependent; however, usually it overrides the accounting information specified on the JOB card.

6.2.3 Output Processor

Output Processor execution is requested by including:

//stepname EXEC AGTFOP, additional-parameters

in the job. It is followed by the control card input. If the control card inputs are in a separate file, include a SYSIN DD statement. Replace stepname with an identifier which can be referenced from other steps. It also is included in certain system error messages. The additional parameters that may be specified are:

STATS=member
Specify the same name as used for the Model Processor. This parameter is required.

DEMAND=member
Specify the same name as used for the Model Processor. This parameter is required if a station-to-station demand report is requested.

PERSUM=member
Specify the name under which the performance summary is to be stored. This parameter is required.

INDEX =
This parameter is required. Specify the same name as you did for the Input Processor and Model Processor.

PROJECT=
Specifies the data library that contains the files to be processed. The default is AGT. Refer to the installation instructions for establishing new data libraries.

STEPLIB=
Specifies the program library that contains the program. Default is AGT.

VERSION=
Specifies the program version to be used. The default is the current version.

SYSOUT=
Specifies the output class for printed output. The default is the same as the MSGCLASS= parameter of the job statement.

OUTLIM=

Specifies the maximum number of lines of printed output that is permitted. The default is 1300.

COND=

Specifies the conditions for bypassing execution of this step. (Bypassed steps have a completion code of 0.) If omitted, it is executed unless a previous step has ABENDed. If you are running the Input Processor, the Model Processor, and the Output Processor in the same job, it is recommended that you use:

```
COND=((0.NE,stepname.FIMAIN),(0.NE,stepname.FMMAIN))
```

where the stepnames are the stepnames you used for the Input Processor EXEC statement and the Model Processor EXEC statement. This will bypass the Output Processor execution if there were Input or Model Processor errors.

ACCT=

Specifies accounting information for this step. This parameter is installation dependent; however, usually it overrides the accounting information specified on the JOB card.

6.3 SYSTEM GENERATION

System generation of the FSM must be performed for the initial model installation and for the model modifications. The system generation includes the normal procedure for compilation and link editing to generate the load module for execution.

6.4 EXAMPLE

Figure 6-1 illustrates the procedure for model submission using a remote terminal (the normal mode of operation). The user responses during a submission are in lower case prints. The JCL control files and the catalogued procedures for the model execution are shown in Figures 6-2 and 6-3 respectively. The input files which specify the feeder system to be modelled, and the control files written in JCL have to prepared by the user. The catalogued procedures are invoked by the control files from the procedure library.

```
submit fsmop.test.cntl
ENTER JOBNAME CHARACTER+ -
a
JOB TS0581A(JOB08146) SUBMITTED
READY
status
JOB TS0581A(JOB08146) WAITING FOR EXECUTION
READY
```

FIGURE 6-1. EXAMPLE OF THE JOB SUBMISSION PROCEDURE AT A TERMINAL

```
1 fsm.test.cntl nonum
DSNAME='TS0581.FSM.TEST.CNTL'
//TS0581 JOB (023D,D72,DOT,999,,,3),'KWANG CHAN',TIME=(3,0),          00000010
//       REGION=3000K,NOTIFY=TS0581,CLASS=F                          00000020
/*MESSAGE PLEASE MOUNT PRIVATE PACK DP5001                           00000030
//INPUT EXEC AGTFIP,                                                 00000040
//           CHAR=FMMAIN10,                                          00000050
//           ZN=FMMAIN10,                                            00000060
//           STATION=FMMAIN10,                                       00000070
//           SSP=FMMAIN10,                                           00000080
//           INDEX=TEST                                              00000090
//SYSIN DD DSN=TS0581.IANDD.RNTIMF(FMMAIN10),DISP=SHR                00000100
//MODEL EXEC AGTFMP,                                                 00000110
//         CHAR=FMMAIN10,                                           00000120
//         ZN=FMMAIN10,                                             00000130
//         DZZ=FMMAIN1,                                             00000140
//         STATION=FMMAIN10,                                        00000150
//         SSP=FMMAIN10,                                            00000160
//         INDEX=TEST,                                              00000170
//         STATS=FMMAIN10,                                          00000180
//         DEMAND=FMMAIN1                                           00000190
//SYSIN DD *                                                         00000200
      TEXT                                                         00000210
           THIS IS A BRIEF TEST OF THE FEEDER SYSTEM FEATURES, IT   00000220
           SMALL ENOUGH THAT THE PROGRAM OPERATION CAN BE VERIFIED  00000230
           BY HAND.                                                00000240
           THIS SYSTEM CONTAINS 16 ZONES, ARRANGE IN A 4 BY 4 PATTERN. 00000250
           THERE ARE SEVEN STATIONS, FIVE OF WHICH ARE DUAL PLATFORM. 00000260
           THE FIFTEEN OF THE ZONES ARE IN ONE REGION AND THE REMAINING 00000270
           ZONE IS IN A SECOND REGION.  THIS TEST USES FIXED ROUTE,  00000280
           DEMAND RESPONSIVE, AND SUBSCRIPTION SERVICE.             00000290
END                                                                00000300
      SELECT                                                       00000310
NPZSA   111                                                        00000320
  5                                                                00000330
END                                                                00000340
      EOD                                                          00000350
/*                                                                 00000360
//OUTPUT EXEC AGTFOP,                                              00000370
//          VERSION=05,                                            00000380
//          STATS=FMMAIN10,                                        00000390
//          DEMAND=FMMAIN1,                                        00000400
//          PERSUM=FMMAIN10,                                       00000410
//          INDEX=TEST                                             00000420
//SYSIN DD *                                                       00000430
      TEXT                                                         00000440
         THIS IS A BRIEF TEST OF THE FEEDER SYSTEM FEATURES, IT    00000450
         SMALL ENOUGH THAT THE PROGRAM OPERATION CAN BE VERIFIED   00000460
         BY HAND.                                                  00000470
         THIS SYSTEM CONTAINS 16 ZONES, ARRANGE IN A 4 BY 4 PATTERN. 00000480
         THERE ARE SEVEN STATIONS, FIVE OF WHICH ARE DUAL PLATFORM. 00000490
         THE FIFTEEN OF THE ZONES ARE IN ONE REGION AND THE REMAINING 00000500
         ZONE IS IN A SECOND REGION.  THIS TEST USES FIXED ROUTE,  00000510
         DEMAND RESPONSIVE, AND SUBSCRIPTION SERVICE.              00000520
END                                                                00000530
      SELECT                                                       00000540
PFMPRT  111                                                        00000550
  6                                                                00000560
CZSDPT  111                                                        00000570
  6                                                                00000580
END                                                                00000590
      EOD                                                          00000600
/*                                                                 00000610
END OF DATA
READY
```

FIGURE 6-2. EXAMPLE OF THE JCL FILES FOR JOB SUBMISSION

```
1 'sys1.userproc(agtfip)' nonum
DSNAME='SYS1.USERPROC(AGTFIP)'
//*AGTFIP,CHAN KWANG,023D,D72,2/24/1981                                  00010004
//*AGTFIP----------JOB CONTROL LANGUAGE PROCEDURE                        00010014
//*                        TO EXECUTE THE                                00020004
//*                  AUTOMATED GUIDEWAY TRANSIT                          00030004
//*                     FEEDER SYSTEMS MODEL                             00040004
//*                        INPUT PROCESSOR                               00050004
//*                                                                      00060004
//*      1)  THE LOAD MODULE MUST BE LOCATED IN THE PROGRAM LIBRARY:      00070004
//*          TS0581.&STEPLIB..LOAD(FIMAIN&VERSION), THE DEFAULT IS:      00080004
//*          'TS0581.AGT.LOAD(FIMAIN03)'.                                00090004
//*                                                                      00100004
//*      2)  THE DATA LIBRARIES MUST BE CREATED AND CATALOGUED.  SOME    00110004
//*          THE 'IANDD' FILES MUST HAVE DEFAULT MEMBERS.  (SEE          00120004
//*          PROGRAMMER'S MANUAL).  THE REQUIRED FILES ARE:              00130004
//*               &PROJECT..IANDD.CHAR                                   00140004
//*               &PROJECT..IANDD.ZN                                     00150004
//*               &PROJECT..IANDD.STATION                                00160004
//*               &PROJECT..IANDD.SSP                                    00170004
//*               &PROJECT..INDEX.F&'*'                                  00170014
//*               &PROJECT..STRUC.CHAR                                   00180004
//*               &PROJECT..STRUC.ZN                                     00190004
//*               &PROJECT..STRUC.STATION                                00200004
//*               &PROJECT..STRUC.SSP                                    00210004
//*                                                                      00220004
//FSMIP  PROC  CHAR=,                    FEEDER CHARACTERISTICS (REQ'D)  00230006
//             ZN=NULL,                  ZONE DATA MEMBER NAME           00240000
//             STATION=NULL,             STATION/REGION DATA MEMBER NAME 00250001
//             SSP=NULL,                 PERFORMANCE MEMBER              00260000
//             INDEX='*',                INDEX FILE IDENTIFIER           00270002
//             PROJECT=TS0581,              DATA LIBRARY                 00280004
//             STEPLIB=FSM,              PROGRAM LIBRARY FOR LOAD MODULE 00290001
//             VERSION=03,               VERSION OF PROGRAM TO USE       00300001
//             SYSOUT=A,                 OUTPUT CLASS FOR PRINTED OUTPUT 00310003
//             OUTLIM=1300,              LINES OF OUTPUT ALLOWED         00320003
//*            COND=,                    CONDITION TO BYPASS EXECUTION   00330007
//*            ACCT=,                    (IF DIFFERENT FROM JOB CARD)    00340007
//*            THE FOLLOWING CARDS CONTAIN INSTALLATION PARAMETERS,      00350001
//*            THEY SHOULD NOT BE USED ON THE 'EXEC' CARD                00360003
//             SYSDA=PACK,              PERMANENT DISK DEVICE GROUP      00370001
//             SYSSQ=SYSDA               TEMPORARY FILE DEVICE GROUP     00380001
//FIMAIN EXEC  PGM=FIMAIN&VERSION,       LOAD MODULE NAME                00390001
//             PARM=(FIMAIN&VERSION,&INDEX,&STEPLIB,AGT,&PROJECT,        00400001
//             &CHAR,&ZN,&STATION,&SSP), PARAMETERS FOR INDEX FILE       00410001
//             TIME=(,10)                                                00420009
//STEPLIB DD   DSNAME=TS0581.&STEPLIB..LOAD, PROGRAM LIBRARY CONTAINING  00430005
//             DISP=SHR,UNIT=PUBLIC      THE LOAD MODULE                 00440005
//SYSUDUMP DD  SYSOUT=&SYSOUT,           REQUEST DUMP IN EVENT OF ABEND  00450012
//             CHARS=DUMP                3800 PRINTER COMPRESSED DUMP    00460013
//FT04F001 DD  DDNAME=SYSIN              DEFAULTS TO INPUT STREAM        00470001
//FT05F001 DD  UNIT=&SYSSQ,SPACE=(CYL,(1,1)), TEMPORARY FILE            00480001
//             DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)                      00490001
//FT06F001 DD  SYSOUT=&SYSOUT,OUTLIM=&OUTLIM,                           00500001
//             DCB=BLKSIZE=154           REPORTS AND ERROR MESSAGES      00510000
//FT10F001 DD  DSNAME=&PROJECT..IANDD.STATION(&STATION),                 00520004
//             DISP=SHR,VOL=SER=DP5001,  STATION AND REGION DESCRIPTIONS00530007
//             LABEL=(,,,IN),UNIT=&SYSDA                                 00540007
//FT10F002 DD  DUMMY,DCB=*.FT10F001      PROVIDE EXTRA EOF IF END ERROR  00550000
//FT11F001 DD  DSNAME=&PROJECT..INDEX.F&INDEX, INDEX FILE                00560004
//             DISP=(MOD,CATLG),                                         00570000
//             DCB=(RECFM=FB,LRECL=80,  IN CASE WE ABEND WITHOUT         00580000
//             BLKSIZE=3120),               OPENING THE FILE             00590000
//             UNIT=&SYSDA,              ALLOCATION PARAMETERS IF NEW    00600001
//             SPACE=(TRK,(1,1)),VOL=SER=DP5001                          00610000
//FT12F001 DD  DSNAME=&PROJECT..IANDD.ZN(&ZN),                           00620004
```

FIGURE 6-3. EXAMPLE OF THE CATALOGUED PROCEDURE FILES FOR JOB SUBMISSION

```
//             DISP=SHR,                    ZONE DESCRIPTIONS(CARD IMAGE)   00630007
//             LABEL=(,,,IN),UNIT=&SYSDA,VOL=SER=DP5001                     00640007
//FT13F001 DD  DSNAME=&PROJECT..IANDD.SSP(&SSP),                            00650004
//             DISP=SHR,                    STATION/STATION PERFORMANCE     00660007
//             LABEL=(,,,IN),UNIT=&SYSDA,VOL=SER=DP5001                     00670007
//FT14F001 DD  DSNAME=&PROJECT..IANDD.CHAR(&CHAR),                          00680004
//             DISP=SHR,                    FEEDER CHARACTERISTICS          00690007
//             LABEL=(,,,IN),UNIT=&SYSDA,VOL=SER=DP5001                     00700007
//FT20F001 DD  DSNAME=&PROJECT..STRUC.STATION(&STATION),                    00710004
//             DISP=OLD,                    STATION & REGION DATA(BINARY)   00720007
//             LABEL=(,,,OUT),UNIT=&SYSDA,VOL=SER=DP5001                    00730007
//FT22F001 DD  DSNAME=&PROJECT..STRUC.ZN(&ZN),                              00740004
//             DISP=OLD,                    ZONE DATA(BINARY)               00750007
//             LABEL=(,,,OUT),UNIT=&SYSDA,VOL=SER=DP5001                    00760007
//FT23F001 DD  DSNAME=&PROJECT..STRUC.SSP(&SSP),                            00770004
//             DISP=OLD,                    S/S PERFORMANCE(BINARY)         00780007
//             LABEL=(,,,OUT),UNIT=&SYSDA,VOL=SER=DP5001                    00790007
//FT24F001 DD  DSNAME=&PROJECT..STRUC.CHAR(&CHAR),                          00800004
//             DISP=OLD,                    FEEDER CHARACTERISTICS(BINARY)  00810007
//             LABEL=(,,,OUT),UNIT=&SYSDA,VOL=SER=DP5001                    00820007
END OF DATA
READY
```

```
1 'sys1.userproc(agtfmp)' nonum
DSNAME='SYS1.USERPROC(AGTFMP)'
//*AGTFMP,CHAN KWANG,023D,D72,2/24/1981                                     00010004
//*AGTFMP---------------JOB CONTROL LANGUAGE PROCEDURE                     00010014
//*                           TO EXECUTE THE                                00020003
//*                      AUTOMATED GUIDEWAY TRANSIT                         00030003
//*                         FEEDER SYSTEMS MODEL                            00040003
//*                            MODEL PROCESSOR                              00050003
//*                                                                         00060003
//*      1)  THE LOAD MODULE MUST BE LOCATED IN THE PROGRAM LIBRARY:         00070003
//*          TS0581.&STEPLIB..LOAD(FMMAIN&VERSION), THE DEFAULT IS:         00080003
//*          'TS0581.AGT.LOAD(FMMAIN03)'.                                   00090003
//*                                                                         00100003
//*      2)  THE DATA LIBRARIES MUST BE CREATED AND CATALOGUED.  SOME       00110003
//*          'IANDD' FILES MUST HAVE DEFAULT MEMBERS.  (SEE                 00120003
//*          PROGRAMMER'S MANUAL).  THE REQUIRED FILES ARE:                 00130003
//*               &PROJECT..IANDD.DEMAND                                    00140003
//*               &PROJECT..IANDD.DZZ                                       00150003
//*               &PROJECT..INDEX.F&'*'                                     00150013
//*               &PROJECT..STRUC.CHAR                                      00160003
//*               &PROJECT..STRUC.ZN                                        00170003
//*               &PROJECT..STRUC.STATION                                   00180003
//*               &PROJECT..STRUC.SSP                                       00190003
//*               &PROJECT..STATS.FSM                                       00200003
//*               &PROJECT..STATS.FSMZSAM                                   00210003
//*                                                                         00220003
//FSMMP  PROC  CHAR=,                  FEEDER CHARACTERISTICS(BINARY)       00230004
//             ZN=,                    ZONE DESCRIPTION(BINARY)(REQ'D)      00240001
//             STATION=,               REGION & STATION(BINARY)(REQ'D)      00250001
//             SSP=,                   STATION/STATION PERFORMANCE          00260001
//             DZZ=,                   ZONE/ZONE DEMAND(UTPS) (REQ'D)       00270001
//             INDEX='*',              RUN INDEX FILE (REQ'D)               00280001
//             STATS=,                 RAW STATISTICS FILE (REQ'D)          00290001
//             DEMAND=,                STATION/STATION DEMAND (REQ'D)       00300001
//             PROJECT=TS0581,            DATA LIBRARY                      00310003
```

FIGURE 6-3. EXAMPLE OF THE CATALOGUED PROCEDURE FILES FOR JOB SUBMISSION (Continued)

```
//             STEPLIB=FSM,                PROGRAM LIBRARY FOR LOAD MODULE 00320001
//             VERSION=03,                 VERSION OF PROGRAM FOR THIS RUN 00330001
//             SYSOUT=A,                   OUTPUT CLASS FOR PRINTED OUTPUT 00340001
//             OUTLIM=250,                 MAX LINES ALLOWED TO SYSOUT     00350001
//*            TIME=2,                     EXECUTION TIME LIMIT            00360005
//*            COND=,                      CONDITION TO BYPASS EXECUTION   00370005
//*            ACCT=,                      (IF DIFFERENT FROM JOB CARD)    00380005
//*            THE FOLLOWING PARAMETER IS AN INSTALLATION PARAMETER.       00390001
//*            IT SHOULD NOT BE USED ON THE EXECUTE CARD.                  00400001
//             SYSSQ=SYSDA                 TEMPORARY FILE DEVICE CLASS     00410001
//FMMAIN EXEC  PGM=FMMAIN&VERSION,         LOAD MODULE NAME                00420001
//             PARM=(FMMAIN&VERSION,&INDEX,&STEPLIB,AGT,&PROJECT,          00430001
//             &CHAR,&ZN,&STATION,&SSP,&DZZ,&STATS,&STATS,&DEMAND),        00440011
//*                 THESE ARE USED TO GENERATE THE RUN INDEX ENTRIES       00450001
//             TIME=2                                                      00460007
//STEPLIB DD   DSNAME=TS0581.&STEPLIB..LOAD, PROGRAM LIBRARY CONTAINING    00470003
//             DISP=SHR,UNIT=PUBLIC                                        00480003
//SYSUDUMP DD  SYSOUT=&SYSOUT,             REQUEST DUMP ON ABEND           00490012
//             CHARS=DUMP                  3800 PRINTER COMPRESSED DUMP    00500013
//FT01F001 DD  DSNAME=&PROJECT..STRUC.ZN(&ZN), ZONE DESCRIPTIONS           00510003
//             DISP=SHR,                  (BINARY)                        00520005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                      00530005
//FT02F001 DD  DSNAME=&PROJECT..STRUC.STATION(&STATION), STATION &         00540003
//             DISP=SHR,                  REGION DESCRIPTIONS (BINARY)    00550005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                      00560005
//FT03F001 DD  DSNAME=&PROJECT..STRUC.SSP(&SSP), STATION/STATION           00570003
//             DISP=SHR,                  PERFORMANCE (BINARY)            00580005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                      00590005
//FT04F001 DD  DDNAME=SYSIN               RUN TIME INPUTS -               00600001
//*                                         DEFAULTS TO SOURCE STREAM     00610001
//FT05F001 DD  UNIT=&SYSSQ,SPACE=(CYL,(1,1)), TEMPORARY FILE              00620001
//             DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)                        00630001
//FT06F001 DD  SYSOUT=&SYSOUT,OUTLIM=&OUTLIM PRINTED OUTPUT               00640002
//FT07F001 DD  DSNAME=&PROJECT..INDEX.F&INDEX, RUN INDEX FILE             00650003
//             DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120),                       00651000
//             DISP=MOD,UNIT=PACK,VOL=SER=DP5001                           00660000
//FT08F001 DD  DSNAME=&PROJECT..STRUC.CHAR(&CHAR), FEEDER                  00670003
//             DISP=SHR,                  CHARACTERISTICS (BINARY)        00680005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                      00690005
//FT09F001 DD  DSNAME=&PROJECT..STATS.FSM(&STATS), RAW STATISTICS FILE     00700003
//             DISP=OLD,                  (BINARY)                        00710005
//             LABEL=(,,,OUT),UNIT=PACK,VOL=SER=DP5001                     00720005
//FT10F001 DD  DSNAME=&PROJECT..STATS.FSMZSAM(&STATS), ZONE/STATION        00730003
//             DISP=OLD,                  ASSOCIATIONS (BINARY)(OPTIONAL) 00740005
//             LABEL=(,,,OUT),UNIT=PACK,VOL=SER=DP5001                     00750005
//FT11F001 DD  DSNAME=&PROJECT..IANDD.DZZ(&DZZ.0), ZONE/ZONE DEMAND        00760003
//             DISP=SHR,                  MATRICES                        00770005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                      00780005
//FT12F001 DD  DSNAME=&PROJECT..IANDD.DZZ(&DZZ.1),                         00790003
//             DISP=SHR,                                                   00800005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                      00810005
//FT13F001 DD  DSNAME=&PROJECT..IANDD.DZZ(&DZZ.2),                         00820003
//             DISP=SHR,                                                   00830005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                      00840005
//FT14F001 DD  DSNAME=&PROJECT..IANDD.DZZ(&DZZ.3),                         00850003
//             DISP=SHR,                                                   00860005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                      00870005
//FT15F001 DD  DSNAME=&PROJECT..IANDD.DZZ(&DZZ.4),                         00880003
//             DISP=SHR,                                                   00890005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                      00900005
//FT16F001 DD  DSNAME=&PROJECT..IANDD.DZZ(&DZZ.5),                         00910003
//             DISP=SHR,                                                   00920005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                      00930005
//FT17F001 DD  DSNAME=&PROJECT..IANDD.DZZ(&DZZ.6),                         00940003
//             DISP=SHR,                                                   00950005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                      00960005
```

FIGURE 6-3. EXAMPLE OF THE CATALOGUED PROCEDURE FILES FOR JOB SUBMISSION (Continued)

```
//FT18F001 DD  DSNAME=&PROJECT..IANDD.DZZ(&DZZ.7),                        00970003
//             DISP=SHR,                                                  00980005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                     00990005
//FT19F001 DD  DSNAME=&PROJECT..IANDD.DZZ(&DZZ.8),                        01000003
//             DISP=SHR,                                                  01010005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                     01020005
//FT20F001 DD  DSNAME=&PROJECT..IANDD.DZZ(&DZZ.9),                        01030003
//             DISP=SHR,                                                  01040005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                     01050005
//FT21F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.0),                  01060003
//             DISP=OLD,         STATION/STATION DEMAND MATRICES          01070005
//             LABEL=(,,,OUT),UNIT=PUBLIC                                01080005
//FT22F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.1),                  01090003
//             DISP=OLD,UNIT=PUBLIC,                                      01100005
//             LABEL=(,,,OUT)                                             01110005
//FT23F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.2),                  01120003
//             DISP=OLD,UNIT=PUBLIC,                                      01130005
//             LABEL=(,,,OUT)                                             01140005
//FT24F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.3),                  01150003
//             DISP=OLD,UNIT=PUBLIC,                                      01160005
//             LABEL=(,,,OUT)                                             01170005
//FT25F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.4),                  01180003
//             DISP=OLD,UNIT=PUBLIC,                                      01190005
//             LABEL=(,,,OUT)                                             01200005
//FT26F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.5),                  01210003
//             DISP=OLD,UNIT=PUBLIC,                                      01220005
//             LABEL=(,,,OUT)                                             01230005
//FT27F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.6),                  01240003
//             DISP=OLD,UNIT=PUBLIC,                                      01250005
//             LABEL=(,,,OUT)                                             01260005
//FT28F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.7),                  01270003
//             DISP=OLD,UNIT=PUBLIC,                                      01280005
//             LABEL=(,,,OUT)                                             01290005
//FT29F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.8),                  01300003
//             DISP=OLD,UNIT=PUBLIC,                                      01310005
//             LABEL=(,,,OUT)                                             01320005
//FT30F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.9),                  01330003
//             DISP=OLD,UNIT=PUBLIC,                                      01340005
//             LABEL=(,,,OUT)                                             01350005
END OF DATA
READY


1 'sys1.userproc(agtfop)' nonum
DSNAME='SYS1.USERPROC(AGTFOP)'
//*AGTFOP,CHAN KWANG,023D,D72,4/15/1981                                  00010000
//*AGTFOP----------------JOB CONTROL LANGUAGE PROCEDURE                  00010012
//*                              TO EXECUTE THE                          00020003
//*                         AUTOMATED GUIDEWAY TRANSIT                   00030003
//*                            FEEDER SYSTEMS MODEL                      00040003
//*                              OUTPUT PROCESSOR                        00050003
//*                                                                      00060003
//*       1)  THE LOAD MODULE MUST BE LOCATED IN THE PROGRAM LIBRARY:    00070003
//*           TS0581.&STEPLIB..LOAD(FOMAIN&VERSION), THE DEFAULT IS:     00080003
//*           'TS0581.AGT.LOAD(FOMAIN03)'.                               00090003
//*                                                                      00100003
//*       2)  THE DATA LIBRARIES MUST BE CREATED AND CATALOGUED.  THE    00110003
//*           REQUIRED FILES ARE:                                        00120003
//*                &PROJECT..IANDD.DEMAND                                00130003
//*                &PROJECT..STATS.FSM                                   00140003
//*                &PROJECT..STATS.FSMZSAM                               00150003
//*                &PROJECT..PERSUM.FSM                                  00160003
//*                &PROJECT..INDEX.F&'*'                                 00160014
//*                                                                      00170003
```

FIGURE 6-3. EXAMPLE OF THE CATALOGUED PROCEDURE FILES FOR JOB SUBMISSION (Continued)

```
//FSMOP  PROC  STATS=,                    RAW STATISTICS FILE (REQ'D)      00180004
//             DEMAND=NULL,               STATION/STATION DEMAND           00190003
//             PERSUM=,                   PERFORMANCE SUMMARY FILE(REQ'D)  00200001
//             INDEX='*',                 RUN INDEX FILE (REQ'D)           00210001
//             PROJECT=TS0581,            DATA LIBRARY                     00220003
//             STEPLIB=FSM,               PROGRAM LIBRARY FOR LOAD MODULE  00230003
//             VERSION=03,                DEFAULT IS CURRENT VERSION       00240001
//             SYSOUT=A,                  OUTPUT CLASS FOR PRINTED OUTPUT  00250001
//             OUTLIM=1300,               LINES ALLOWED FOR OUTPUT         00260001-
//*            COND=,                     CONDITION TO BYPASS EXECUTION    00270005
//*            ACCT=,                     (IF DIFFERENT THAN JOB CARD)     00280005
//*            THE FOLLOWING CARD CONTAINS AN INSTALLATION PARAMETER       00290001
//*            IT SHOULD NOT BE USED ON THE 'EXEC' CARD                    00300001
//             SYSSQ=SYSDA                TEMPORARY FILE DEVICE CLASS      00310001
//FOMAIN EXEC  PGM=FOMAIN&VERSION,        LOAD MODULE                      00320001
//             PARM=(FOMAIN&VERSION,&INDEX,&STEPLIB,AGT,&PROJECT,         00330001
//             &DEMAND,&STATS,&STATS,&PERSUM), RUN INDEX PARAMETERS       00340006
//             TIME=(,10)                                                 00350008
//STEPLIB DD   DSNAME=TS0581.&STEPLIB..LOAD, PROGRAM LIBRARY CONTAINING   00360001
//             DISP=SHR,UNIT=PUBLIC                  THE LOAD MODULE      00370001
//SYSUDUMP DD  SYSOUT=&SYSOUT,            REQUEST DUMP ON ABEND            00380010
//             CHARS=DUMP                 3800 PRINTER COMPRESSED FORMAT   00390011
//FT03F001 DD  DSNAME=&PROJECT..STATS.FSM(&STATS), RAW STATISTICS FILE     00400003
//             DISP=SHR,                                                  00410005
//             LABEL=(,,,IN),UNIT=PACK,VOL=SER=DP5001                     00420005
//FT04F001 DD  DDNAME=SYSIN               RUN TIME INPUTS -                00430001
//*                                          DEFAULTS IS THE JOB STREAM   00440001
//FT05F001 DD  UNIT=&SYSSQ,SPACE=(CYL,(1,1)), TEMPORARY FILE              00450001
//             DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)                       00460001
//FT06F001 DD  SYSOUT=&SYSOUT,OUTLIM=&OUTLIM PRINTED OUTPUT               00470001
//FT08F001 DD  DSNAME=&PROJECT..PERSUM.FSM(&PERSUM), PERFORMANCE          00480003
//             DISP=OLD,                  SUMMARY FILE                     00490005
//             LABEL=(,,,OUT),UNIT=PACK,VOL=SER=DP5001                    00500005
//FT09F001 DD  DSNAME=&PROJECT..INDEX.F&INDEX, RUN INDEX FILE             00510003
//             DISP=MOD,UNIT=PACK,VOL=SER=DP5001                          00520000
//FT10F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.0),                  00530003
//             DISP=SHR,                  STATION/STATION DEMAND MATRICES  00540005
//             LABEL=(,,,IN)                                              00550005
//FT11F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.1),                  00560003
//             DISP=SHR,                  ONLY NEEDED IF                   00570005
//             LABEL=(,,,IN)                                              00580005
//FT12F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.2),                  00590003
//             DISP=SHR,                  STATION/STATION DEMAND REPORT    00600005
//             LABEL=(,,,IN)                                              00610005
//FT13F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.3),                  00620003
//             DISP=SHR,                  HAS BEEN REQUESTED               00630005
//             LABEL=(,,,IN)                                              00640005
//FT14F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.4),                  00650003
//             DISP=SHR,                                                  00660005
//             LABEL=(,,,IN)                                              00670005
//FT15F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.5),                  00680003
//             DISP=SHR,                                                  00690005
//             LABEL=(,,,IN)                                              00700005
//FT16F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.6),                  00710003
//             DISP=SHR,                                                  00720005
//             LABEL=(,,,IN)                                              00730005
//FT17F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.7),                  00740003
//             DISP=SHR,                                                  00750005
//             LABEL=(,,,IN)                                              00760005
//FT18F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.8),                  00770003
//             DISP=SHR,                                                  00780005
//             LABEL=(,,,IN)                                              00790005
//FT19F001 DD  DSNAME=&PROJECT..IANDD.DEMAND(&DEMAND.9),                  00800003
//             DISP=SHR,                                                  00810005
//             LABEL=(,,,IN)                                              00820005
END OF DATA
READY
```

FIGURE 6-3. EXAMPLE OF THE CATALOGUED PROCEDURE FILES FOR JOB SUBMISSION (Continued)

7. ERROR MESSAGES

The error messages generated are separated by program (i.e., Input Processor, Model Processor, and Output Processor). Within a section the messages are ordered by the three-digit error number.

In addition to the errors generated by the program, FORTRAN and the system also issue messages. They are listed in Fortran IV Compiler and Library messages and OS Message Library (see references).

7.1 INPUT PROCESSOR

*** FIP001W - NO INDEX CARD ***

CAUSE: The control card input did not include an INDEX control card to initialize the run index file.

ACTION TAKEN: The remaining inputs are checked. COMPLETION CODE: 4

CORRECTION: Include an INDEX control card in the control card inputs. Also check that the EOD card is the last control card and that all headers are terminated with END cards.

SOURCE: FIMAIN

*** FIP002I - RUN INDEX FILE ENTRIES FOLLOW ***

CAUSE: The run index file has been written.

SOURCE: FIMAIN

*** FIP004I - STATION DESCRIPTION AND STATION PERFORMANCE HAVE CONFLICTING DIMENSIONS

CAUSE: The number of stations described in the STATION description is different than the number of stations described in the SSP file.

ACTION TAKEN: Execution continues; the output files will contain the same conflict.

CORRECTION: If this conflict was not intentional, correct the incorrect file.

SOURCE: FIMAIN COMPLETION CODE: 0

*** FIP005W - INVALID REGION NUMBER: ##, FOR STATION: ## ***

CAUSE: The region associated with specified station is less

than or equal to zero or greater than the number of regions described in the region description.

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FICSTN COMPLETION CODE: 4

*** FIP007I - BINARY FILES SUCCESSFULLY WRITTEN ***

CAUSE: Normal end of program

SOURCE: FIMAIN COMPLETION CODE: 0

*** FIP008I - BINARY OUTPUT OMITTED ***

CAUSE: Errors have been detected during the execution of the program.

ACTION TAKEN: The binary files have not been written because of errors.

CORRECTION: There should be other error messages which describe the errors. Correct the errors.

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP009W - TOO MUCH PERFORMANCE DATA ***

CAUSE: The STATION-TO-STATION PERFORMANCE file specifies too many platforms. The number of stations specified exceeds the internal tables (array sizes).

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: If data is specified for non-existent stations or if there are unused stations, eliminate the excess stations. If there is a version of the program that has larger table sizes, use the larger program. Otherwise, the program must be recompiled.

SOURCE: FIRPFM COMPLETION CODE: 4

*** FIP010W - INVALID FORMAT IN PRFMIN FILE***

CAUSE: The STATION-TO-STATION PERFORMANCE file contains data for less than seven stations.

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Specify the SSP data for seven or more stations; Supply zeros for the non-existent stations.

SOURCE: FIRPFM COMPLETION CODE: 4

*** FIP011W - PERFORMANCE ARRAY NOT SQUARE ***

CAUSE: The STATION-TO-STATION PERFORMANCE file does not contain data that forms a square array. If N is the number of stations, the SSP file must contain X**2/14 lines.

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Check the SSP file and correct any errors.

SOURCE: FIRPFM COMPLETION CODE: 4

*** FIP012W - WAW IS INVALID ***

CAUSE: The walk distance is invalid. It is not greater than zero.

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP013W - WAA IS INVALID ***

CAUSE: The walk area is invalid. It is not greater than zero.

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP014W - INVALID SERVICE TYPE FOR REGION: #, AND SERVICE INTERVAL: # ***

CAUSE: The service type for the region printed is not 0, 1, or 2.

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FICRGN COMPLETION CODE: 4

*** FIP015W - INVALID VELOCITY FOR REGION: # AND SERVICE INTERVAL: # ***

CAUSE: The velocity is not greater than 0.

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FICRGN COMPLETION CODE: 4

*** FIP016W - WALK PARAMETERS FOR STATION: ## INVALID ***

CAUSE: The zone number is not valid or the split between zones

is not between zero and 1.00 (100%).

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FICSTN COMPLETION CODE: 4

*** FIPO17W - AW IS INVALID ***

CAUSE: The walk area is not greater than zero.

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIPO18W - WFT IS INVALID ***

CAUSE: The transfer time is less than zero.

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIPO19W - AREA OF ZONE: ### TOO SMALL ***

CAUSE: The area of the zone is less than the walk area.

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FICZN COMPLETION CODE: 4

*** FIPO21W - WAF INVALID ***

CAUSE: The auto mode access distance is less than zero.

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FICRGN COMPLETION CODE: 4

*** FIPO22W - SSFF INVALID ***

CAUSE: The feeder factor is not greater than zero or it is greater than 1.0 (100%)

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP023W - SSWF INVALID ***

CAUSE: The walk factor is not greater than zero or it is greater than 1.0 (100%).

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP024W - FRF INVALID ***

CAUSE: The fleet reliability factor is not greater than zero or it is greater than 1.0 (100%)

ACTION TAKEN: Error checking continues, however, execution will terminate with an error.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP025I - PROGRAM UNABLE TO CONTINUE ***

CAUSE: Program execution is being terminated immediately because of the errors noted above.

ACTION TAKEN: Execution terminates with a completion code of eight or higher.

CORRECTION: Correct the previous error conditions.

SOURCE: FIMAIN COMPLETION CODE: 8

*** FIP026S - TOO MANY DEMAND INTERVALS ***

CAUSE: The number of demand intervals is greater than the maximum allowed by the program.

ACTION TAKEN: Execution terminates immediately.

CORRECTION: If a program with larger array sizes exists, re-run using the larger program. Otherwise, it will be necessary to recompile the program to process the data.

SOURCE: FIMAIN COMPLETION CODE: 8

*** FIP027S - TOO MANY SERVICE INTERVALS ***

CAUSE: The number of service intervals is greater than the maximum allowed by the program.

ACTION TAKEN: Execution terminates immediately.

CORRECTION: If a program with larger array sizes exists, re-run using the larger program. Otherwise, it will be necessary to recompile the program to process the data.

SOURCE: FIMAIN COMPLETION CODE: 8

*** FIP028W - INCONSISTENT HEADWAY PARAMETERS FOR REGION: #, AND SERVICE INTERVAL: # ***

CAUSE: The effective headway in this region exceeds the maximum headway specified for the region.

ACTION TAKEN: Error checking continues, however, the program will terminate after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FICRGN COMPLETION CODE: 4

*** FIP029W - ZERO LENGTH SERVICE INTERVAL: # ***

CAUSE: The specified service interval either does not include any demand intervals or includes only zero length demand intervals.

ACTION TAKEN: Error checking continues, however, the program will terminate after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP030W - TOO MANY REGION DEFINED ***

CAUSE: The number of regions exceeds the maximum number permitted by this version of the program.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: If there is a larger version of the program, re-run with the larger version. Otherwise, it will be necessary to recompile to increase the number of regions.

SOURCE: FIRRGN COMPLETION CODE: 4

*** FIP032W - END CARD MISSING FROM REGION DESCRIPTION ***

CAUSE: The END card is missing or incorrectly formated. An END card must be used to separate the region and station data.

ACTION TAKEN: Execution terminates after error checking is

completed. This error may cause other error messages as a result of station data being read as region data.

CORRECTION: Correct the input data.

SOURCE: FIRRGN COMPLETION CODE: 4

*** FIP033W - UNSYNCHRONIZED CARD COUNT ***

CAUSE: The region data does not contain data for enough service intervals. This may also be caused by incorrectly region follower cards being interpreted as headers.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FIRRGN COMPLETION CODE: 4

*** FIP040W - PLATFORMS OF STATION ### HAVE DIFFERING ATTRIBUTES ***

CAUSE: Different platforms of the same station have differing attributes. The entire station description of all platforms must be identical. This message can also occur if different stations are given the same location.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FIRSTN COMPLETION CODE: 4

*** FIP041W - PLATFORMS OF STATION ### ARE IN DIFFERENT SERVICE REGIONS ***

CAUSE: Different platforms of the same station have differing attributes. The entire station description of all platforms must be identical. This message can also occur if different stations are given the same location.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FIRSTN COMPLETION CODE: 4

*** FIP042 - TOO MANY PLATFORMS AND STATION ***

CAUSE: The number of platforms exceeds the internal tables of this version of the program.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: If there is a larger version of the program, re-run with the larger version. Otherwise, it will be necessary to recompile the program.

SOURCE: FIRSTN COMPLETION CODE: 4

*** FIP050W - ZONE NUMBER INVALID - IGNORED ***

CAUSE: The invalid zone number is either not greater than zero or it exceeds the internal tables in this version of the program.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: If the zone number is invalid correct the input data. If there is a larger version of the program, re-run with the larger version. Otherwise, it will be necessary to recompile the program.

SOURCE: FIRZN COMPLETION CODE: 4

*** FIP051W - DUPLICATE ZONE NUMBER: #### ***

CAUSE: The zone number is included more than once in the input data.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FIRZN COMPLETION CODE: 4

***FIP052W - UNABLE TO READ THIS ZONE ***

CAUSE: A record of the zone description file cannot be read due to an I/O error. The record as read is printed.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Re-run. If the problem persists, recreate the file.

SOURCE: FIRZN COMPLETION CODE: 4

***FIP053W - MISSING ZONE (S) ***

CAUSE: The zone sequence numbers contain one or more gaps. The missing zones print as question marks. ('????')

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FIRZN COMPLETION CODE: 4

*** FIP060W - WFW IS INVALID IN REGION: #, AND SERVICE INTERVAL: # ***

Cause: The feeder wait time is less than zero.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data

SOURCE: FICRGN COMPLETION CODE: 4

*** FIP061W - PERIOD OF DEMAND INTERVAL: # IS INVALID ***

CAUSE: The length of the demand period is not greater than zero or greater than 24 hours.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP062W - SCALE FACTOR FOR DEMAND INTERVAL: # IS INVALID ***

CAUSE: The scale factor is not greater than zero.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

***FIP063W - DEMAND INTERVAL: # IS NOT ASSIGNED A SERVICE INTERVAL ***

CAUSE: DISI is not greater than zero or is greater than the number of service intervals.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

III FIP064W - DEMAND INTERVAL TOTAL EXCEEDS 24 HRS ***

CAUSE: The total of periods of all the service intervals exceeds 1440 minutes.

ACTION TAKEN: Execution terminates after error checking is completed

CORRECTION: correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

***FIP065I - ERROR CHECKING BYPASSED FOR STATION DATA ***

CAUSE: The station description is omitted.

ACTION TAKEN: The checks relating to the station are bypassed:

SOURCE: FICSTN COMPLETION CODE: 0

*** FIP066I - DWPZI AND DWPZ2 NOT CHECKED FOR VALIDITY ***

CAUSE: The zone description is omitted.

ACTION TAKEN: The error checking of the zone numbers containing the stations is bypassed.

SOURCE: FICSTN COMPLETION CODE: 0

***FIP067W - PERSFF INVALID ***

CAUSE: The feeder only performance scale factor is not greater than zero.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP068W - PERSFZ INVALID ***

CAUSE: The zone to AGT performance scale factor is not greater than zero.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data.

SOURCE: FIMAIN COMPLETION CODE: 4

***FIP069W - HM INVALID FOR SERVICE INTERVAL ## ***

CAUSE: The maximum headway allowed is not greater than zero.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data

SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP070W - STATION/STATION PERFORMANCE DATA IS INVALID ***

CAUSE: Either the diagonal is not zero or a negative performance value was found.

ACTION TAKEN: Execution terminates after error checking is completed.

CORRECTION: Correct the input data.
SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP071W - PERSFA INVALID ***
CAUSE: The AGT performance scale factor is not greater than zero.
ACTION TAKEN: Execution terminates after error checking is completed.
CORRECTION: Correct the input data.
SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP072W - INITIAL WAIT TIME IS INVALID (PFINIT) ***
CAUSE: The initial wait time is less than zero.
ACTION TAKEN: Execution terminates after error checking is completed.
CORRECTION: Correct the input data.
SOURCE: FIMAIN COMPLETION CODE: 4

*** FIP080S - PROGRAM ERROR (FIPSTN): PLATFORM LINKS ARE INVALID OR CIRCULAR ***
CAUSE: A program error.
ACTION TAKEN: Execution terminates immediately.
CORRECTION: Correct the input data.
SOURCE: FIPSTN COMPLETION CODE: 24

*** FIP098I - PURGED ***
CAUSE: A previous error.
ACTION TAKEN: The indicated card in the control card data is ignored.
CORRECTION: Correct previous error.
SOURCE: FIERR COMPLETION CODE: 0

*** FIP099W - UNDEFINED PARAMETER - ???????? ***
CAUSE: While reading the control card dataset an unrecognizable parameter name was encountered.
ACTION TAKEN: The parameter is ignored, and cards are skipped until the next parameter is encountered. Error checking continues, however, and will terminate with an error.
CORRECTION: Correct input data. COMPLETION CODE: 4
SOURCE: FIERR

*** FIP100W - UNRECOGNIZED CONTROL CARD ***

CAUSE: An invalid control card.

ACTION TAKEN: The control card is ignored and error checking continues.

CORRECTION: Correct the data. Check the spelling and the column location of the control card.

SOURCE: AACCR COMPLETION CODE: 4

*** FIP101W - EOD CARD MISSING ***

CAUSE: No EOD card is present in the run time input.

ACTION TAKEN: One is assumed and error checking continues.

CORRECTION: Include an EOD card as the last card of the run time input.

SOURCE: AACCRD COMPLETION CODE: 4

*** FIP102W - INDEX CARD PREVIOUSLY ENCOUNTERED ***

CAUSE: The run time input contained more than one INDEX card.

ACTION TAKEN: Error checking continues, but execution will terminate with an error code.

CORRECTION: Delete the excess INDEX card.

SOURCE: AACCRD COMPLETION CODE: 4

7.2 MODEL PROCESSOR

*** FMP001W - UNABLE TO CALCULATE DEMAND RESPONSIVE FLEET SIZE FOR STATION ###, AND ???? SERVICE INTERVAL ***

CAUSE: The algorithm used to calculate the fleet size did not converge.

ACTION TAKEN: The value from the last iteration is used.

CORRECTION: The user cannot modify the approximation algorithm.

SOURCE: FMUTIL COMPLETION CODE: 4

*** FMP002I - FDOP DEBUG: STATION ###, SI ????, HEADWAY #.##, AREA #.##, FEEDER SPEED #.##, ***

*** FMP002I - AUTO SPEED #.##, FEEDER DEMAND ###., AVERAGE TRIP LENGTH #.##, FDOP ##.## ***

CAUSE: The FDOP debug flag is set.

ACTION TAKEN: The message is printed.

CORRECTION: Omit the DEBUG card from the control card input.
SOURCE: FMUTIL COMPLETION CODE: 0

*** FMP003S - INVALID SERVICE TYPE ***
CAUSE: Program error. An undefined service type was encountered. (SRSV)
ACTION TAKEN: Execution terminates immediately.
CORRECTION: Correct the program. The FDOP debug flag may be useful.
SOURCE: FMUTIL COMPLETION CODE: 20

*** FM010S - INVALID RECORD TYPE IN DEMAND FILE ***
CAUSE: The zone-to-zone demand file does not contain UTPS compressed records.
ACTION TAKEN: Execution terminates.
CORRECTION: Correct the file format. Generally this will require regenerating the data.
SOURCE: FMGDZZ COMPLETION CODE: 12

*** FMP011S - DEMAND FILE RECORD IS TOO LONG ***
CAUSE: The zone-to-zone demand file contains a record longer than its buffers.
ACTION TAKEN: Execution terminates.
CORRECTION: Regenerate the demand file with a shorter record length.
SOURCE: FMGDZZ COMPLETION CODE: 16

*** FMP012S - DZZ: INVALID LENGTH ***
CAUSE: The zone-to-zone demand file contains an incorrectly formatted record.
ACTION TAKEN: Execution terminates.
CORRECTION: Correct the program generating the data.
SOURCE: FMGDZZ COMPLETION CODE: 16

*** FMP022S - SERVICE INTERVALS INCONSISTENT: CHAR ##, STATION ## ***
CAUSE: The number of service intervals specified in the feeder characteristics is incompatible with the number specified in the station description file.
ACTION TAKEN: Execution terminates.

CORRECTION: Re-run the input processor using consistent inputs.
This error should not occur if both files are generated
in the same input processor run.
SOURCE: FMMIAN COMPLETION CODE: 8

*** FMP023S - PERFORMANCE DATA UNSUITABLE: QSSTC = ## ***
CAUSE: There is insufficient station-to-station performance data
for the number of platforms specified.
ACTION TAKEN: Execution terminates.
CORRECTION: Correct the input data.
This error should not occur if both files are generated
in the same input processor run.
SOURCE: FMMIAN COMPLETION CODE: 8

*** FMP024I - RUN TERMINATED DUE TO ERRORS ***
CAUSE: Previous errors.
ACTION TAKEN: Execution terminates.
CORRECTION: Correct the previous errors.
SOURCE: FMMIAN COMPLETION CODE: 8

*** FMP025S - NPZSA = # OUT OF RANGE ***
CAUSE: The number of preliminary zone station associations
specified is not greater than zero or is greater than five.
ACTION TAKEN: Execution terminates.
CORRECTION: Specify a valid number.
SOURCE: FMMAIN COMPLETION CODE: 8

*** FMP026S - PERSTH OUT OF RANGE ***
CAUSE: The threshold for unserviceable demand is less than zero.
ACTION TAKEN: Execution terminates.
CORRECTION: Specify a valid number.
SOURCE: FMMAIN COMPLETION CODE: 8

*** FMP040S - SYSTEM ERROR (INCOMPATIBLE OBJECT MODULES - FMPASN) ***
CAUSE: A system generation error.
ACTION TAKEN: Execution terminates.
CORRECTION: Recompile the offending modules (or all modules).
SOURCE: FMPASN COMPLETION CODE: 20

*** FMP041I - Z/S ASSN:
CAUSE: The appropriate debug flag is turned on.
ACTION TAKEN: A message is printed.
CORRECTION: Omit the DEBUG control card(s) from the run time input.
SOURCE: FMPASN COMPLETION CODE: 0

*** FMP050S - INVALID DZZ: ROW, COL = (####, ####) ***
CAUSE: The zone-to-zone demand contains demand for an undefined zone.
ACTION TAKEN: Execution terminates.
CORRECTION: Define a zone (in the zone description file) for each zone in the demand file (the zone numbers must correspond).
SOURCE: FMRDMD COMPLETION CODE: 16

*** FMP051S - DZZ: SEQUENCE ERROR ***
CAUSE: The demand data in the zone-to-zone demand is not in sequence.
ACTION TAKEN: Execution terminates.
CORRECTION: The most probable cause is a program error in the program that generates the zone-to-zone demand file, or possible its input data. The file must be corrected.
SOURCE: FMRDMD COMPLETION CODE: 16

*** FMP060I - STATIONS: (###,###); PLATFORMS: (###,###); DI ##; USED ##.##, DIVERTED ##.## ***
CAUSE: The debug flag is turned on.
ACTION TAKEN: Debug info is printed
CORRECTION: Omit DEBUG control card from input data.
SOURCE: FMODSD COMPLETION CODE: 0

*** FMP098I - PURGED ***
CAUSE: A previous error.
ACTION TAKEN: The indicated card is ignored.
CORRECTION: Correct the previous error.
SOURCE: FIERR COMPLETION CODE: 0

*** FMP099W - UNDEFINED PARAMETER - ???????? ***

CAUSE: The indicated parameter is undefined.

ACTION TAKEN: It is ignored and error checking continues.

CORRECTION: Check the spelling of the variable name. If it looks like data, check the previous variable to make sure that is has exactly the number of data cards that is expects.

SOURCE: FIERR COMPLETION CODE: 4

*** FMF100S - INVALID FORMAT FOR FEEDER CHARACTERISTICS FILE ***

CAUSE: The feeder characteristics file was not generated by the proper version of the input processor.

ACTION TAKEN: Execution terminates.

CORRECTION: Re-run the proper input processor.

SOURCE: file macros COMPLETION CODE: 16

***FMF100S - INVALID FORMAT FOR PERFORMANCE FILE ***

CAUSE: The station-to-station performance file was not generated by the proper version of the input processor.

ACTION TAKEN: Execution terminates.

CORRECTION: Re-run the input processor with the proper version of the input processor.

SOURCE: file macros COMPLETION CODE: 16

*** FMF100S - INVALID FORMAT FOR STATION FILE ***

CAUSE: The station description file was not generated by the proper version of the input processor.

ACTION TAKEN: Execution terminates.

CORRECTION: Re-run the input processor with the proper version of the input processor.

SOURCE: file macros COMPLETION CODE: 16

*** FMF100S - INVALID FORMAT FOR ZONE DESCRIPTION FILE ***

CAUSE: The zone description file was not generated by the proper version of the input processor.

ACTION TAKEN: Execution terminates.

CORRECTION: Re-run the input processor with the proper version of the input processor.

SOURCE: file macros COMPLETION CODE: 16

*** FMP100W - UNRECOGNIZED CONTROL CARD ***

CAUSE: An invalid control card.

ACTION TAKEN: The control card is ignored and error checking continues.

CORRECTION: Correct the data. Check the spelling and the column location of the control card.

SOURCE: AACCRD COMPLETION CODE: 4

*** FMP101S - ARRAY OVERFLOW: UNABLE TO PROCESS THIS FEEDER CHARACTERISTICS FILE

CAUSE: The feeder characteristic file exceeds the internal tables (arrays).

ACTION TAKEN: Execution terminates.

CORRECTION TAKEN: If a larger version of the input processor exists, re-run the model processor using the larger version. Otherwise, it will be necessary to recompile to process the system. (See Programmer's Manual)

SOURCE: file macros COMPLETION CODE: 12

*** FMP101W - EOD CARD MISSING ***

CAUSE: No EOD card is present in the run time input.

ACTION TAKEN: One is assumed and error checking continues.

CORRECTION: Include an EOD card as the last card of the run time input.

SOURCE: AACCRD COMPLETION CODE: 4

*** FMF102S - ARRAY OVERFLOW: UNABLE TO PROCESS THIS PERFORMANCE FILE ***

CAUSE: The station-to-station performance file exceeds the tables of the model (arrays).

ACTION TAKEN: Execution terminates.

CORRECTION: If a larger version of the input processor exists, re-run the model processor using the larger version. Otherwise, it will be necessary to recompile to process the system. (See Programmer's Manual.)

SOURCE: file macros COMPLETION CODE: 12

*** FMP102W - INDEX CARD PREVIOUSLY ENCOUNTERED ***

CAUSE: The run time input contained more than one INDEX card.

ACTION TAKEN: Error checking continues, but execution will terminate with an error code.

CORRECTION: Delete the excess INDEX card.

SOURCE: AACCRD COMPLETION CODE: 4

*** FMF103S - ARRAY OVERVIEW: UNABLE TO PROCESS THIS STATION FILE ***

CAUSE: The station description file exceeds the tables of the model (arrays).

ACTION TAKEN: Execution terminates.

CORRECTION: If a larger version of the input processor exists, re-run the model processor using the larger version. Otherwise, it will be necessary to recompile to process the system. (See Programmer's Manual).

SOURCE: file macros COMPLETION CODE: 12

*** FMF104S - ARRAY OVERFLOW: UNABLE TO PROCESS THIS ZONE DESCRIPTION FILE ***

CAUSE: The zone description file exceeds the tables of the model (arrays).

ACTION TAKEN: Execution terminates.

CORRECTION: If a larger version of the input processor exists, re-run the model processor using the larger version. Otherwise, it will be necessary to recompile to process the system. (See Programmer's Manual.)

SOURCE: file macros COMPLETION CODE: 12

7.3 OUTPUT PROCESSOR

*** FOP001I - PERFORMANCE SUMMARY NOT WRITTEN DUE TO ERRORS ***

CAUSE: A previous error.

ACTION TAKEN: No performance summary file is written.

CORRECTION: Correct the previous errors.

SOURCE: FOMAIN COMPLETION CODE: 0

*** FOP002I - PERFORMANCE SUMMARY FILE WRITTEN ***

CAUSE: Successful completion.

ACTION TAKEN: The performance summary file is written.

SOURCE: FOMAIN COMPLETION CODE: 0

*** FOP003S - INSUFFICIENT ARRAY SPACE ***

CAUSE: The input data exceeds the program's internal tables.

ACTION TAKEN: Execution terminates.

CORRECTION: If a larger version of the input processor exists, re-run using the larger version.
Otherwise, it will be necessary to recompile to process the system. (See Programmer's Manual).

SOURCE: FOMAIN COMPLETION CODE: 12

*** FOP004S - INSUFFICIENT ARRAY SPACE ***

CAUSE: The input data exceeds the program's internal tables.

ACTION TAKEN: Execution terminates.

CORRECTION: If a larger version of the input processor exists, re-run using the larger version.
Otherwise, it will be necessary to recompile to process the system. (See Programmer's Manual.)

SOURCE: FOMAIN COMPLETION CODE: 12

*** FOP010W - TOO MANY STATIONS ***

CAUSE: The station-to-station demand file has more station than this version of the program can process.

ACTION TAKEN: The station-to-station demand report is not produced.

CORRECTION: If a larger version of the input processor exists, re-run using the larger version.
Otherwise, it will be necessary to recompile to process the system. (See Programmer's Manual).
This error will occur only if the output processor is incorrectly configured, or if the demand input file was not generated in the same run as the raw statistics file.

SOURCE: FODSS COMPLETION CODE: 4

*** FOP098I - PURGED ***

CAUSE: A previous error.

ACTION TAKEN: The indicated card is ignored.

CORRECTION: Correct the previous error.

SOURCE: FIERR COMPLETION CODE: 0

*** FOP099W - UNDEFINED PARAMETER - ???????? ***

CAUSE: The indicated parameter is undefined.

ACTION TAKEN: It is ignored and error checking continues.

CORRECTION: Check the spelling of the variable name. If it looks like data, check the previous variable to make sure that it has exactly the number of data cards that it expects.

SOURCE: FIERR COMPLETION CODE: 4

*** FOF100S - INVALID FORMAT FOR RAW STATISTICS FILE ***

CAUSE: The raw statistics file was not generated by the version of the model processor that corresponds to this processor.

ACTION TAKEN: Execution terminates.

CORRECTION: Re-run the proper model processor.

SOURCE: file macros COMPLETION CODE: 16

*** FOP100W - UNRECOGNIZED CONTROL CARD ***

CAUSE: An invalid control card.

ACTION TAKEN: The control card is ignored and error checking continues.

CORRECTION: Correct the data. Check the spelling and the column location of the control card.

SOURCE: AACCRD COMPLETION CODE: 4

*** FOF101S - ARRAY OVERFLOW: UNABLE TO PROCESS THIS RAW STATISTICS FILE ***

CAUSE: The raw statistics file contains data that exceeds the internal tables of this program.

ACTION TAKEN: Execution terminates.

CORRECTION: If a larger version of the output processor exists, re-run using the larger version.
Otherwise, it will be necessary to recompile to process the system. (See Programmer's Manual).

SOURCE: file macros COMPLETION CODE: 12

*** FOP101W - EOD CARD MISSING ***

CAUSE: No EOD card is present in the run time input.

ACTION TAKEN: One is assumed and error checking continues.

CORRECTION: Include an EOD card as the last card of the run time input.

SOURCE: AACCRD COMPLETION CODE: 4

*** FOP102W - INDEX CARD PREVIOUSLY ENCOUNTERED ***

CAUSE: The run time input contained more than one INDEX card.

ACTION TAKEN: Error checking continues, but execution will terminate with an error code.

CORRECTION: Delete the excess INDEX card.

SOURCE: AACCRD COMPLETION CODE: 4

8. REFERENCES

1. IBM OS FORTRAN IV (H Extended) Compiler and Library (Mod II) Messages SC28-6865-1

2. IBM System/360 Operating System Messages & Codes (GC28-6631) OR

   OS/VS Message Library: VS1 System Messages (GC38-1001) AND VS1 System Codes (GC38-1003) OR

   OS/VS Message Library: VS2 System Messages (GC38-1002) AND VS2 System Codes (GC38-1008)

3. OS/MFT and OS/MVT Job Control Language Reference (GC28-6704) OR OS/VS Job Control Language Reference (GC28-0618)

4. OS/MFT and OS/MVT Utilities (GC28-67586), OS/VS Utilities (GC35-0005)

5. OS/VS2 TSO Terminal User's Guide (GC28-0645) AND OS/VS2 TSO Command Language Reference (GC28-0646)

APPENDIX A

ZONE-TO-ZONE DEMAND DATA ENCODE/DECODE PROGRAM

PROGRAM FOR DATA DECODING

```
1 fsmpro1.fort nonum
DSNAME='TS0581.FSMPRO1.FORT'
C PROGRAM TO DECODE UTPS ZONE DEMAND MATRIX
      DIMENSION IDATA(1000),IW2(1)
      INTEGER*2 IHW2(2)
      EQUIVALENCE (IHW2,IW2)
   5  READ (5,END=300) IW1,IW2,(IDATA(I-1),I=2,IW1)
      IROW=IHW2(2)
      IW1M=IW1-1
      DO 100 K=1,IW1M
      ICOL=IDATA(K)/262144
      IDAT=IDATA(K)-262144*ICOL
      IF (K.EQ.1) GO TO 7
      WRITE (6,20) ICOL,IDAT
      WRITE (8,20) ICOL,IDAT
      GO TO 100
   7  WRITE (6,30) IROW,ICOL,IDAT
      WRITE (8,30) IROW,ICOL,IDAT
  20  FORMAT (10X,2I10)
  30  FORMAT (3I10)
 100  CONTINUE
      GO TO 5
 300  STOP
      END
END OF DATA
READY
```

PROGRAM FOR DATA ENCODING

```
1 fsmpro6.fort nonum
DSNAME='TS0581.FSMPRO6.FORT'
C PROGRAM TO ENCODE UTPS ZONE DEMAND MATRIX
      INTEGER*4 IVALUE(1000),ICOLUM(1000),IDATAS(1000),IROW1
      INTEGER*4 ICOL(1000),IDATA(1000),IROW(1000),KCOUNT
      I=1
   10 READ (5,20,END=100) IROW(I),ICOL(I),IDATA(I)
   20 FORMAT (3I10)
   30 ICOLUM(I)=ICOL(I)
      IDATAS(I)=IDATA(I)
      IVALUE(I)=ICOLUM(I)*262144+IDATAS(I)
      IF (I.GT.1.AND.IROW(I).GT.0) GO TO 80
      I=I+1
      GO TO 10
   80 K=I-1
      KCOUNT=I
      IROW1=IROW(1)
      WRITE (8) KCOUNT,IROW1,(IVALUE(J),J=1,K)
      ICOL(1)=ICOL(I)
      IDATA(1)=IDATA(I)
      IROW(1)=IROW(I)
      I=1
      GO TO 30
  100 K=I-1
      KCOUNT=I
      IROW1=IROW(1)
      WRITE (8) KCOUNT,IROW1,(IVALUE(J),J=1,K)
      STOP
      END
END OF DATA
READY
```

110 copies