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PAGE CHANGES TO

ARTS IIIA
COMPUTER PROGRAM
FUNCTIONAL SPECIFICATIONS
(CPFS)

FOR

ARTS IIIA FINAL APPROACH SPACING TOOL PHASE 1
CONFIGURATION CONTROL DECISIONS (CCD)
T15712 AND T16295
CASE FILES CD300-CPT-OO3A and CD300-AR3A-003

A3.05

MAY 4, 1993

FEDERAL AVIATION ADMINISTRATION
ATC TECHNOLOGY BRANCH, ACD-340
ATLANTIC CITY INTERNATIONAL AIRPORT, N.J., 08405

PAGE CHANGES TO

ARTS IIIA
COMPUTER PROGRAM
FUNCTIONAL SPECIFICATIONS
(CPFS)

SYSTEM DESCRIPTION
AND SPECIFICATION SERIES
NAS-MD-634

FOR

ARTS IIIA FINAL APPROACH SPACING TOOL PHASE 1
CONFIGURATION CONTROL DECISION (CCD) NXXXX
CASE FILES CD340-CPT-003A and CD300-AR3A-003

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CONSOLIDATION	Combine control positions. This entry will transfer the control of all present and future assigned flight plans from one control position (b) to another designated, surrogate, control position (a). This includes store tracks, flight plans assigned by keyboard symbol, and flight plans assigned by fix pairs. In addition, handoffs directed to a combined position (b) will be transferred to the surrogate position (a).
CONTINUOUS DATA RECORDING	Extraction of operational data on disc or tape. This function is selectable and capable of being filtered and prioritized to prevent overload.
CONTROL PANEL	The front panel of a computer containing switches and indicators that control or display the operation of the computing equipment.
CONTROLLER POSITION	A keyboard status that has full keyboard entry capability (except for supervisory) and can have tracks assigned to it.
CONVERGING RUNWAY DISPLAY AID	A function that projects alphanumeric information for an associated track on approach to one of the runways of a converging runway pair to the final approach course of the other runway of the pair.
CORRELATION	The process whereby target data are uniquely identified with a given track.
CRITICAL DATA	Operational data which is recorded periodically by the operational program for use during a system recovery.
CROSSTELL	The point at which the status of a track during handoff is indeterminate.
CYLINDER	A set of tracks on a disc pack which have in common the same track number.
DEVICE, INPUT	A unit designed to bring data to be processed into a computer; e.g., a tape reader or a keyboard.
DEVICE, OUTPUT	A unit designed to output processed data from the computer; e.g., display or MSP.
DIGITIZE	To convert an analog measurement of a physical variable into a numerical value, thereby, expressing the quantity in digital form.
DISC PACK	A storage device consisting of a stack of rotating magnetic discs which are used to store and recover digital data. The disc pack is used on a disc drive.
DISCRETE CODE	A unique train of electronic pulses transmitted by an aircraft transponder in reply to a radar beacon interrogator. A four digit code in which one or both of the last two digits is other than zero.
DISPLAY CONSOLE	A visual display unit which can display information.

DOWN TIME	The time during which a computer is malfunctioning during scheduled hours of operation; i.e., power failure.
DUMP	To transfer all or part of the contents of one section of the computer memory into another section or type of storage.
DUPLEX	Pertaining to a twin, a pair or two-in-one situation; i.e., a channel providing simultaneous transmission in both directions of a second set of equipment to be used in the event of failure of the primary or either device.
EDIT	The off-line process that can reduce and selectively filter the data that was extracted by the operational program and provide an operator usable output on a printout device.
ERROR CORRECTION CODE	A polynomial error detecting code in which the forbidden pulse combination produced by gain or loss of a bit indicates which bit is wrong.
EXECUTIVE ROUTINE	A routine which directs the execution of other routines.
EXTRACT	The recording of data from specific memory locations in the computer on magnetic tape or disc.
FAILSAFE	A system in which failure recovery is possible from single point failures without loss of system capability.
FAILSOFT	A system in which failure recovery is possible from single point failures where system operation continues in a degraded mode.
← INSERT ATTACHMENT 1	
FAULT	A condition under which a malfunction occurs causing an interruption of the processor. This malfunction may have been caused by a physical breakdown or the attempted execution of an illegal function code.
FIELD	A set of one or more characters which is treated as a whole, a unit of information.
FILTER	A computer software function which performs the task of specifying which parts of another computer word or data word that are to be operated on or interpreted.
FIRMWARE	A set of machine instructions which controls the sequences and operation of the controller portion of a processor. The instruction code is hardwired into non-destructive read only memory.
FIXED CHAIN LIST	A set of words in core storage which contains a fixed number of control words used to output data to the peripheral device.
FLAG	A bit used for indicating purposes.
FLIGHT PLAN STATUS	A track file in Central Track Store that is not yet active and has not met specified time criteria for display in the tabular list or designation of flight plans being IFR, VFR or OTP.

FAST	A sub-system of the ARTS IIIA system that processes data provided by the ARTS IIIA system. The data provided by the ARTS system will be analyzed by the FAST sub-system and the FAST sub-system will display suggested ATC commands. These commands will assist air traffic controllers in Terminal Radar Approach control (TRACON) facilities in providing safe and efficient sequencing and spacing of arrival aircraft.

CDRS	Continuous Data Recording Subsystem
CDTSO	Continuous Data Time Selected Output
CENRAP	Center Radar ARTS Presentation
CFG	Configuration
CGD	Computer Generated Data
CLS	Current Lateral Separation between two aircraft
CMA	Central Memory Access
CMC	Communication Multiplexer Controller
CNTBL	Conflict Alert Pair Table
CONS	Consolidation of Positions
CPFS	Computer Program Functional Specification
CR	Card Reader
CRIT	Critical Data Record
CRDA	Converging Runway Display Aid
CRSL	Cross-Reference Listing
CRT	Cathode-Ray Tube
C/S	Coast/Suspend
CST	Coast Status
CT	Console Typewriter
CTA	Console Typewriter Adapter
CTIP	Console TTY Input Processing
CTS	Central Track Store
CVT	Coordinate Validity Time
CX	Cancellation Message
DA	Acceptance Message
DBMM	Display Buffer Memory Module
DCON	Deconsolidation of Positions
DCU	Disc Control Unit
DDU	Disc Drive Unit
DEDS	Data Entry and Display Subsystem

DELOG	Disc Error/Usage Log
DM	Departure Message
DNP	Do Not Process
DOM	Display Output Message
DOP	Display Output Processing
DPS	Data Processing Subsystem
DR	Rejection Message
DSG	Digital Sweep Generator
DT	Data Test Message
DX	Retransmit Message
DZ	Current Altitude Separation between two aircraft
EBCDIC	Extended Binary Coded Decimal Interchange Code
ECID	En Route Computer Identification
EFA	External Function Acknowledge
EIR	External Interrupt Request
EM	Emergency
EOM	End of Message
ESR	Executive Service Request
ETA	Estimated Time of Arrival
ETG	Enhanced Target Generator
FAA	Federal Aviation Administration
FDB	Full Data Block
FDEP	Flight Data Entry and Printout Equipment
FDP	Flight Data Processing
FIX	Fix Table
FP	Flight Plan
FPDU	Flight Plan Disc Update
GDB	Ghost Data Block
GFE	Government Furnished Equipment
GI	General Information

INSERT ATTACHMENT 2

FAST FINAL APPROACH SPACING TOOL

PAM	Peripheral Adapter Module
PASS	Pack Associated Tracks
PCM	Program Control Memory
PDB	Partial Data Block
PDOP	Periodic Display Output Processing
PEC	Peripheral Equipment Cabinet
PEM	Position Entry Module
PFA	Probability of False Alarm
PI	Program Improvement
PMSR	Program Maintenance Status Report
PN	Probability of Noise
POPL	Proximity Ordinary Predictor Logic
PPI	Plan Position Indicator
PRF	Pulse Repetition Frequency
PROCON	Proximity Conflict Detector
P/S	Primary/Secondary Correlation
PSM	Peripheral Switch Module
PTD	Proposed Time of Departure
PT	Program Trouble
PTR	Program Technical Report
PUNS	Pack Unassociated Tracks
PUR	Process Unused Reports
QLOOK	Quick Look Processing
RALM	Recovery Alarm
RAT	Report Address Table
RBC	Reported Beacon Code
RBTL	Radar Beacon Tracking Level
RDAS	Radar Data Acquisition Subsystem
RDBM	Remote Display Buffer Memory
RDOP	Remote Display Output Processing

RDP	Radar Data Processing
REX	Radar Extractor
RF	Radio Failure
RFDU	Reconfiguration Fault Detection Unit
RKIP	RDBM Keyboard Input Processing
RMC	Radar Microcontroller
RML	Radar Microwave Link
RSL	Recovery System Library
RTC	Real-Time Clock
RTCC	Remote Tower Cab Controls
RTQC	Real Time Quality Control
SA	Suspect Aircraft
SCDU	Scenario Disc Update
SD	Sector Display
SED	Slew Entry Devices
SLINK	Intersubsystem Link
SP	System Parameter
SPI	Special Position Indicator (IDENT)
SRAP	Sensor Receiver and Processor
SS	Single Symbol
STAT	Status
SV	Site Variable Parameter
SWABS	Software Adaptation to Beacon System
SYNC	Synchronization
TA	Track Accept
TAB	Tabular List
TABC	Tentative Assigned Beacon Code
TALT	Altitude Tracking
TB	Beacon Terminate Message
TCID	Terminal Computer Identification

TAP	TIU ARTS Processor
TATCA	Terminal Air Traffic Control Automation

TCL	Tracked Chain List
TCROSS	Tracking Cross-Referencing
TDOP	Tabular DOP
TEDC	Tracking Early Discrete Correlation
TEXEC	Tracking Control
TI	Tracking Initial Message
TINIT	Tracking Initial/Trial Correlation
TL	Target Leading Edge
TNP	Track Number Pointer
TNT	Track Number Table
TOLV	Time of Lateral Violation
TOMA	Time of Minimum Approach
TOS	Track Oriented Smoothing
TOV	Time of Violation
TP	Transfer Primary Radar Targets
TPRED	Tracking Prediction
TPSEC	Tracking Primary/Secondary Correlation
TPUR	Tracking Process Unused Reports
TR	Test Data Message
TRACON	Terminal Radar Approach Control
TRK	Track
TROUT	Track Output
TS	Transfer Secondary Radar Targets
TT	Target Trailing Edge Threshold
TTCNT	Turning Trail Track Counter
TTI	Tabular Track Index
TU	Track Update
TUD	Thread Update
TUDCA	CA X-Thread Update
TTY	ASR-37 Teletypewriter

INSERT ATTACHMENT 4

INSERT ATTACHMENT 5

INSERT ATTACHMENT 6

INSERT ATTACHMENT 7

TU	Track Update Message
UF/CR	Upfeed/Carriage Return
Va	Mode 3/A Validity
Vc	Mode C Validity
VFR	Visual Flight Rules

TFP TIU FDADs Processor

ATTACHMENT 5

TIU TATCA Interface Unit

ATTACHMENT 6

TOP TIU Operational local area network Processor

ATTACHMENT 7

TSP TIU Support Processor

PAGE CHANGES TO

ARTS IIIA
COMPUTER PROGRAM
FUNCTIONAL SPECIFICATIONS
(CPFS)

TARGET PROCESSING (TRACK)
AND ISL
NAS-MD-637

FOR

ARTS IIIA FINAL APPROACH SPACING TOOL PHASE 1
CONFIGURATION CONTROL DECISION (CCD) NXXXX
CASE FILES CD340-CPT-003A and CD300-AR3A-003

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3.1.14 Automatic Acquisition

Automatic Acquisition is an attempt to correlate a discrete coded unassociated track with an associated track for the purpose of auto-acquiring discrete coast (tabular and handoff) and store tracks. Acquisition normally occurs on an RBC = ABC match. If RBC does not equal ABC, a check is made for RBC equals TI beacon code. If they equal, acquisition occurs as RBC = ABC. Auto-acquisition results in the transferring of the associated track's data to the unassociated track's CTS file, changing its status to active, and terminating the associated track slot. In order for auto-acquisition to occur, the following criteria must be met:

a. Time and distance criteria must be met. If the unassociated position is not within DISQ (SP) of the last unassociated position as saved in CTS, or if the time criteria between code matches is exceeded, the new position and time shall be stored in the associated track's CTS. This eliminates the possibility of acquiring a reflection.

b. If the track is an NAT track and a TI with a beacon code was received, the unassociated position must be within DISQ (if acquiring on an ABC) or within AIHOQ (if acquiring on a TI beacon code) of the last ARTCC coordinate data.

c. The files must associate for a ACNTQ (SP) number of consecutive scans.

d. The track's coordinates are translated with respect to a site variable (APXDIFFasQ and APYDIF-FasQ) location which is on or near each airport and automatic acquisition will be performed based on this location. The unassociated track must fall in the automatic acquisition area as defined by the arrival/departure information of the associated track.

INSERT ATTACHMENT 1

3.1.15 Store Conflict Alert Data

Each time the XY tracker (in correction and correlation) determines that new positional data for a Mode C track has been received, certain additional processing is done for the Conflict Alert function.

Three major tasks are performed:

1. Based on the new reported range and azimuth and the latest altitude, new values for the conflict alert state vector (X, Y, X, Y) are calculated. Here the same smoothing equations (and alpha beta values) as for tracking are used, but all coordinates are converted to a ground plane system. In addition, in a dual beacon system, radar system 1's ground coordinates are translated to system 0.

2. Given the new position data, it is determined whether the track is in the process of making a lateral turn. (This information is used by the MFMAMS conflict alert algorithms to detect a turning conflict, and by the Proximity conflict alert algorithm for determining the stability of a track.)

Turn detection is done by calculating the cross track deviation, CR, which is the perpendicular distance from the reported position R to the track's velocity vector V. If CR is greater than a parameter CROSSQ, the track is considered turning and the appropriate turn bit is set to designate a right or a left turn. Figure 3–3 depicts this logic.

b. More than one report with the best score in secondary bin, and no reports in primary b...

c. Two reports in a track's bin with the same quality score, and are same distance from track predicted position.

Tracks are processed during second pass processing in sector n-6 exactly as they are processed during the first pass in sector n-5 with the exception that tracks that fail to correlate during second pass processing are coasted.

3.1.11 Initial Correlation

Initial correlation is performed in sector n-8. Initial correlation processes those tracks whose firmness is below a certain level and are not Parent, or Parent Trial. The following tracks will be processed by initial correlation:

a. Initial Tracks (Normal track with firmness below 10)

b. Deviation Tracks

Starting of an Initial Track can be performed automatically by Process Unused Report Task, or by a manual keyboard entry.

The firmness of all initial tracks is at first set to three prior to being processed by initial correlation. The first task of initial correlation is to build a bin for tracks which do not have the processed flag set.

All reports are quality scored by Target Selection routing (section 3.1.5). The report with the best score is then correlated to the initial track. If there is more than one report with the best score, the track is coasted.

3.1.12 Deviation Track Correlation

Deviation Correlation processes deviation and deviation trial tracks 9 sectors behind the antenna. It is performed in the Initial Correlation Task.

In P/S Correlation, if a parent track had just one target report in its secondary bin, whether or not a target report exists in the primary bin with a lesser score, then one deviation track is created. Deviation Correlation processes the deviation track created by the P/S Correlation. If deviation track correlates, it becomes a deviation trial track. If deviation track correlates, the information is transferred to the parent track and the deviation track is terminated.

If a deviation trial track fails to correlate at any time, it is terminated.

Deviation Correlation determines its best report in the same manner as Initial Correlation. If one best report exists, it is used to correct the track's position.

3.1.13 Track Correction

Track Correction shall be performed only on tracks (associated or unassociated) that have successfully correlated. In correcting the position and velocity of a track, its predicted position and the associated position of the target (beacon, radar, or combined beacon/radar) shall be smoothed using longitudinal and transverse parameters. (The smoothing parameters are listed in table 3-2.) The smoothing technique used — track-oriented smoothing — to compute the track's corrected position involves orienting the smoothing operations to the estimated track direction. The reason for doing this is that aircraft normally maneuver in such a way that transverse accelerations are larger than longitudinal accelerations.

The sector time of the last correlation shall be used to update the track's time field. Sliding window ... be updated for both radar and beacon replies.

If the track qualifies for automatic acquisition and the FAST function is enabled, ARTS will build and forward to FAST a CTS data packet ((tracking data) see NAS-MD-648) for this track.

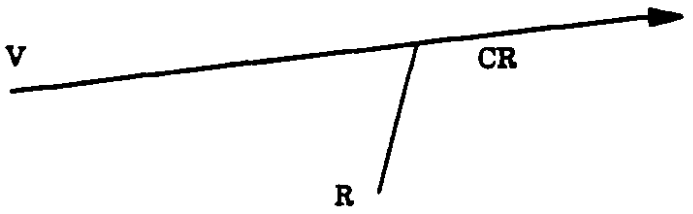

FIGURE 3-3. CROSS TRACK DEVIATION

3.2 PREDICTION

Prediction provides for whole or partial scan updates of track position. Additionally, Prediction performs Automatic Drop and Automatic Handoff functions for associated tracks, and updates output tables for active coast tracks.

If sectors have been assigned by Tracking Control to be processed, track prediction shall be performed on all tracks in sector n-13. Three major tasks will be handled by this subprogram. These tasks are as follows:

1. Updating output tables for active coast tracks
2. Positional next scan prediction
3. Determination if active or active coast track's predicted position falls in an automatic drop area.

All normal, parent, parent trial, and deviation trial tracks that fall in the sector being processed shall be considered. All active tracks shall have their predicted X, Y coordinates placed in Track File. It should be noted that the predicted X, Y coordinates used for an active track are for the next scan.

All normal, parent, parent trial, and deviation trial tracks that fall in the sector being processed shall be straight-line predicted from their current position to their expected position at the time of the next radar scan.

After prediction of a track (normal, parent or parent trial track), a check shall be performed to determine if the new predicted position falls within an Automatic Drop area.

3.2.1 Auto Drop Area Predictions

The track's coordinates are translated with respect to a site variable (APXDIFFasQ and APYDIFFasQ) location which is on or near each airport and automatic drop will be performed based on this location. After each straight line prediction, a check is made to determine if the predicted track position falls in the Automatic Drop area.

A track will not be terminated if any of the following conditions is satisfied:

a. The arrival tracks ground speed is equal to or greater than Auto Termination Velocity VELQ (SV).

b. The arrival tracks Mode C altitude is equal to or greater than Arrival Automatic Track Retention Altitude value OVALTQ (SV).

c. A "C" is displayed as the controlling position symbol.

If a track does not meet the above criteria for continued tracking, it will be forced into tabular coast status for airports U through Z for Tabular List Retention Interval, TCFC1Q (SV), to insure landing before the track information is cleared from memory.

INSERT ATTACHMENT 2

For discrete beacon code aircraft that execute a missed approach and exit the track drop geography prior to expiration of Tabular List Retention Interval for arrival track files at airports U through Z parameter TCFC1Q (SV), a reacquisition will take place whereby the aircraft track is started on the same display where the forced coast was initiated. For nondiscrete beacon code aircraft, a manual track start can be initiated prior to expiration of parameter, TCFC1Q (SV).

INSERT ATTACHMENT 3

If the parameter TCFC1Q (SV) time has expired, the track file will be terminated immediately, provided the track file is not interfacility origin.

If the track file is of interfacility origin, and interfacility capability is enabled, the track file is retained internally until all ARTS/ARTCC or ARTS to ARTS communications pertaining to the track file are completed. A beacon terminate (TB) message is sent to the ARTCC (see NAS–MD–640). Any track set up for termination has all associated trial tracks terminated.

An interfacility arrival track that has auto-acquired and subsequently exits the beacon radar coverage (55 nm) will be placed in tabular coast status when a "C" is being displayed as the controller position symbol. This track file will be retained indefinitely in the tabular coast list.

An interfacility overflight that has auto-acquired and subsequently enters the overflight drop area will be placed in tabular coast status if a "C" is being displayed as the controller position symbol in the full data block or if a Multifunction Modify entry has been executed, changing the "C" to an ARTS controller position symbol but the ARTCC to ARTS or ARTS to ARTS handoff has not been accomplished.

An interfacility arrival track that has auto-acquired and subsequently exits the beacon radar coverage (55 nm) will remain in tabular coast if the track file satisfies the following:

- Interfacility RDP enabled
- ARTCC handoff to ARTS or ARTS to ARTS has not been accomplished
- A keyboard forced accept has not been executed

An interfacility overflight track that has auto-acquired and subsequently enters the overflight drop area will be changed to tabular coast status if the track file satisfies the following:

- Interfacility RDP enabled
- ARTCC handoff to ARTS or ARTS to ARTS has not been accomplished
- A keyboard forced accept has not been executed
- The implied position symbol modify action has not been executed

If a track is in the auto drop area and the track status is departure or overflight, the track file will not be terminated if the track is in a crosstell condition until one of the following conditions is satisfied.

- ARTS keyboard entered track recall action has occurred and the Recall Message (TA) has been accepted by ARTCC or ARTS (see NAS–MD–638).
- ARTS keyboard entered track force recall action has occurred (see NAS–MD–638).
- ARTS maximum radar range (approximately 60 nm) has been reached.

If the FAST function is enabled, a tread drop data packet (see NAS-MD-648) will be built and sent to FAST for tracks that are forced in tabular coast status.

ATTACHMENT 3

When reacquisition occurs and the FAST function is enabled, ARTS will build and forward to FAST a CTS data packet ((tracking data) see NAS-MD-648) for the track that has reacquired.

- ARTCC or ARSA handoff accept (TA) TN message has been received/accepted (see NAS-MD-640) and the FDB has blinked for Parameter CNTDNQ (SV) number of scans.

Any track set up for termination has all associated turning tracks terminated. If the track file flight plan was of ARTCC interfacility origin, a beacon terminate (TB) message is sent to the ARTCC (see NAS-MD-640).

All auto drop area ranges and azimuths are defined by site adaptation for each ARTS III facility (see NAS-MD-643).

3.2.2 Auto Transfer of FDB

If after each straight line prediction check it is determined that an Arrival predicted track position is not within the automatic drop area, another check is made to determine if the Arrival predicted track position is within automatic Display Range Parameter TADRNGiQ, (SV) for display on BRITE. If the Arrival track is within automatic Display Range Parameter TADRNGiQ, (SV) another check is made to see if the tracks controlling position is enabled/disabled for presentation of the FDB in the BRITE or DEDS display (TADAQiQ). If the arrival track qualifies after the above checks, the FDB will be displayed on the BRITE or DEDS display.

3.2.3 Auto Activation of Aircraft Type Time Share in Field 4 of the FDB

The tracks will display aircraft type in field 4 of the FDB on a time share basis with ground speed, "DM", "IF", and "V", site adapted alpha character, or "E" and aircraft category and/or flight plan status if they satisfy the following conditions:

- they have arrival or overflight status, and
- they are not within an area bounded by the range parameter TYPDISLiQ (SV) and TYPDISFiQ (SV), and
- if they are in an area outside of the range parameter TYPDISLiQ (SV), the interfacility handoff has not been completed, and
- the keyboard entry inhibiting the display has not been made in the range area which the track is occupying, and
- the beacon replies do not qualify the FDB to display "EM", "RF", "HJ" or "ID".

3.2.4 Auto Transfer of AIRCRAFT Type to BRITE Tabular List

At adapted keyboard positions, the ACID and aircraft type for tracks that are predicted to fall within the automatic drop area and qualify for the Tabular List Retention Interval for Arrival Track files (section 3.2.1) will be forced into the BRITE tabular list.

3.2.5 Store Conflict Alert Altitude

Whenever altitude correction occurs, the corrected altitude (and a validity time) is stored for use by the Conflict Alert algorithms. The smoothed altitude coordinate is stored in Table CAALT. The altitude validity time is stored in Table CAAVT. All these tables are indexed by track number.

3.2.6 Pass Associated Track to Converging Runway Display Aid (CRDA)

When prediction is processing an associated track it will pass the track number/address to the CRDA function if the following are true:

CRDA is included in the subject site operational software.

The track is live and CRDA is active for live operations or the track is training and CRDA is active for training operations.

The track is not out of range.

The track correlated this scan or did not correlate but has a Ghost track link.

If any of the above are not true and the associated track has a Ghost track link, the Ghost track will set up to be terminated.

and if the FAST function is enabled, a track drop data packet (see NAS-MD-648) will be built and sent to FAST for tracks that are terminated.

PAGE CHANGES TO

ARTS IIIA
COMPUTER PROGRAM
FUNCTIONAL SPECIFICATIONS
(CPFS)

KEYBOARD

NAS-MD-638

FOR

ARTS IIIA FINAL APPROACH SPACING TOOL PHASE 1
CONFIGURATION CONTROL DECISION (CCD) NXXXX
CASE FILES CD340-CPT-003A and CD300-AR3A-003

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8.0 FINAL APPROACH SPACING TOOL (FAST).....

8.1 ENABLE/INHIBIT FAST PROCESSING.....

TERM CNTRL (Terminate Control)

HND OFF (Handoff)

FLT DATA (Flight Data)

MULTI FUNC (Multifunction)

VFR FLT PLAN (VFR Flight Plan — F9)

INPRINT (Interfacility Message Print — F10)

CONFLICT ALERT (F11)

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INTERFACILITY TEST (F14)

ETG (Enhanced Target Generator — F15)

TRACK AMPLIFY (F16)

The keys designated F8, F12 and F13 are function keys which are not presently being used in the ARTS IIIA program.

The preview display corresponding to each of the operational functions is as follows:

Function	Preview Display
INITIATE CONTROL	IC
TRK RPOS	RP
TRK SUSP	SU
TERM CNTRL	TC
HND OFF	HD
FLT DATA	DA
MULTI FUNC	F
MULTIPLE	M*
F9	VP
F10	IP
CONFLICT ALERT	CA
F14	IF
F15	TG
F16	AM

*M will precede the preview character for the operational function selected.

Selection of one of these operational function keys usually comprises the first step in forming a keyboard message (except for certain implied functions which are discussed in section 4.0). The function and data characters forming a keyboard message are formatted and presented to the DPS by data entry logic. The DPS provides the appropriate display output data. Depressing any new function key causes the preview area to be cleared and the old function is replaced with the new. The ARTS IIIA keyboard entries using the operational function keys are discussed in sections 2.0 and 3.0.

1.1.2 Slew Entry Device (SED)

A SED is located at each control position and contains an x. y position entry device (the slewball or Position Entry Module (PEM)) together with an associated ENTER button. This ENTER button is used to initiate

message processing by the DPS when the SED is used in composing the message. The SED itself controls the position of a software controlled, electronically generated position marker on the radar display and is free to rotate in any direction. The position marker moves in a direction corresponding to the direction of movement of the SED and follows the movement of the SED with no perceptible lag. The SED symbol is returned to display or radar "home" position after the ENTER button has been depressed.* The display of the SED symbol is inhibited until it is moved from the home position.

1.1.3 Quick Look Selector Switches

The quick look unit contains six interlocked pushbutton or toggle switches. By means of this unit, a controller may select for display on his console the full data blocks of active track files of any one or more of five other control positions. The sixth pushbutton (labeled OFF) returns the presentation of data on the display to its normal condition. The five toggle switches associated with the Brite Alphanumeric Display, have three (3) positions: off, on and momentary quick look.

1.2 CLASSIFICATION AND VALIDATION OF MESSAGES

1.2.1 Message Categories

Message categories are usually dependent upon the operational function key used in a message entry**. Track control and flight data messages are discussed in section 2.0 and relate to all messages containing the following operational functions:

INITIATE CONTROL

TRACK REPOSITION

TRACK SUSPEND

TERMINATE CONTROL

HANDOFF

FLIGHT DATA.

Display control and system configuration messages are presented in section 3.0 and relate to the MULTIFUNCTION operational function. A large number of different types of messages can be entered using this function.

1.2.2 General Message Validation Criteria

The information entered in the keyboard messages is checked for format and validity. Program logic checks insure that messages contain proper fields of data in the proper sequence and that there is no conflict with the stored data base. Each of the data items presented below must satisfy the criteria associated with it in order to validate a message.

a. Aircraft Identification (ACID) must contain from two to seven characters, the first of which must be an alphabetic character "ALL" is not permitted nor are exactly two alphabetic characters permitted. A discrete beacon code or SED coordinates or tabular line identifier may be used for aircraft identification in lieu of the ACID provided format, validity and criteria are satisfied.

b. Beacon Code must contain four numeric characters ranging between 0000 and 7777 with no single numeric character greater than 7. (Code 1236 is an illegal code and will not be accepted.) When using the beacon code to identify the desired Track File and another Track File has an identical beacon code or the RBC displayed in line two is identical, DUP BCN will be presented in the display's readout area.

---

* Except in the case where the message entered contains character M prior to the operational function entered and the function is either INITIATE CONTROL (IC) or HANDOFF (HDL) (see section 2.2).

** Except for certain implied functions (section 4.0).

FAST (FINAL APPROACH SPACING TOOL - F12)

ATTACHMENT 4

Function	Preview Display
FAST	QK

TABLE 2-1. KEYBOARD INPUT MESSAGES (NORMAL) (Continued)

Function	Message Format [1]	Purpose
Beacon Code Filter	F7, 1, FB, xxxx, y, Sn(OP), Enter [8]	Inhibit/enable extraction of data pertaining to beacon code xxxx. y = "I" for inhibit, "E" for enable. Sn is an optional subsystem indicator. Disable filter if xxxx and y not entered.
Display Filter	F7, 1, FD, xx, y, Enter [8]	Inhibit/enable extraction of data pertaining to display xx. y = "I" for inhibit, "E" for enable. Disable filter if xx and y not entered.
Subsystem Filter	F7, 1, FS, n, y, Enter [8]	Inhibit/enable extraction in subsystem n. Y = "I" for inhibit, "E" for enable.
Association Status Filter	F7, 1, FC, X(OP), ENTER [8]	Inhibit extraction of data relating to associated tracks if X = "U". Inhibit extraction of data relating to unassociated tracks if X = "A". Delete filter if X is omitted.
Manual Reconfiguration	F7, 2, RCF, Δ, nn, Enter [8]	Provide manual control of switching from full operational program to a backup program or vice versa (where nn is a two-alphanumeric character program ID).
DELETE ATTACHMENT 3 →	F7, 2, D, nn, E/I, Enter [8]	Enable/inhibit display (where nn is a two-digit decimal display number).
	F7, 2, K, nn, E/I, Enter [8]	Enable/inhibit keyboard (where nn is a two-digit decimal keyboard number).
	F7, 2, T/M, Enter [8]	Select TTY/MSP as destination for failure, error or status messages (T for TTY, M for MSP).
	F7, 2, M, nn, E/I, Enter [8]	Enable/inhibit MDBM (where nn is a two-digit decimal MDBM number).
	F7, 2, S, n, R, r, Enter [8]	Enables only SRAP r (see Note).
	F7, 2, S, n, R, r, r, Enter [8]	Enables automatic switching (see Note).
		Note: n = sensor#, R = SRAP separator; r = designate SRAP as input and disable auto switching; r, r = enable auto switching.
	F7, 2, L, Enter [8]	Enable/inhibit overload sensing and protection.
	F7, 2, TST, E/I, Enter [8]	Enable/inhibit Test Targets for this display.
	F7, 2, n, E/I, Enter [8]	1. Enable/inhibit TTY/MSP printouts for a specific task indicated by the alpha character entered (where n is an alpha character entered: D (DISPLAY), K (KIP), S (SRAP) and M (MSAW).
		2. Enable/inhibit specific functions indicated by the alpha character entered where n is an alpha character entered: R (Memory Readout), T (Test Mode), and V (Supervisory Control).

TABLE 2-1. KEYBOARD INPUT MESSAGES (NORMAL) (Continued)

Function	Message Format [1]	Purpose
	F7, 2, C, P, E/I, Enter [8]	Enable/inhibit Center Radar Arts Presentation (CENRAP)
	F7, 2, T, P, E/I, Enter [8]	Enable/inhibit processing of Transfer Primary Radar Target (TP) messages.
	F7, 2, U, n, Enter [8]	Declare the I/O device specified by the character entered up for normal operation (where n is a device identifier entered: T (TTY), 0 (D0), 1 (D1), M (MSP), or I (IMT).
	F7, 2, B, D/S, Enter [8]	Select sensor mode of operation where 'D' = Dual and 'S' = Single (Dual Sites Only)
Performance Monitor (PM)	F7, 3, A or B or C or D, Time (up to 6 digits) (OP), M (OP), d (1 digit) (OP), Enter [8]	Activate, Deactivate, or Modify PM Report Types (A=CTS; B=RTR; C=LAT; D=COR; M=MAX; d=number of reports printed before a MAX report is output).
	F7, 3, S, A or C or L or U (OP), Time (3 to 6 digits) (OP), Enter [8]	Activate, Deactivate, or Modify SUMMARY Report output interval. Change data collection synchronization parameter (A=Peak Associated Tracks; C=Peak CTS in use; L=Peak Lattice; U=Peak Unassociated Tracks).
	F7, 3, S, P, Enter [8]	Request SUMMARY Report Printout.
	F7, 3, MSP or TTY or MSPTTY, Enter [8]	Select PM output device(s).
VFR FLT PLAN	F9, ACID, Δ, Entry/Exit Fix Data, Δ, ACT, Δ, ALT (OP) [28], Δ, CID (OP) [23], Enter	Enter an ARTS/NAS VFR Flight Plan Message.
	F9, ACID, Δ, Entry/Exit Fix Data, Δ, ACT, Δ, ALT (OP) [28], Δ, CID (OP) [23], Enter	Retransmit the VFR Flight Plan Message (IFP).
	F9, ACID or VFR Flight Plan List Identifier [29], Δ, Exit Fix Data [28], Enter	Retransmit the VFR Flight Plan Message (FIX).
	F9, ACID or VFR Flight Plan List Identifier [29], Enter	Drop the VFR Flight Plan from the VFR List.
INPRNT	F10, Message Type [20] Enter	Select/inhibit printout of selected ARTCC interfacility messages.
CONFLICT ALERT	F11, A, E/I, Enter [8]	Enable/inhibit Conflict Alert processing.
	F11, K, Identity (ADST), Enter	Enable/inhibit specified track.
	F11, C, Enter	Enable/inhibit controller.
	F11, SED Enter	Enable/inhibit specified track pair in conflict.
	F11, G, E/I, Enter [8]	Enable/inhibit consolidation of MSAW/CA aural alarm.

Function	Message Format[1]	Purpose
	F7,2,F,Enter	Enables the selection of the primary or alternate FAST channel

TABLE 2-1. KEYBOARD INPUT MESSAGES (NORMAL) (Continued)

Function	Message Format [1]	Purpose
	F11, P, ACID (optional) SED (optional), Enter	Enable/inhibit specified track pair (for specifying track pairs which are currently in conflict status or are in the conflict pairwise inhibit table). Note: ACID or SED must be entered or both may be entered.
	F11, P, ACID, SED Enter	Enable/inhibit specified track pair (for specifying any track pair that is **not** in conflict status or is in the conflict pairwise inhibit table).
	F11, [Q, Type I number (numeric), Δ, Type II number (numeric)*, S (suppress)/ C(clear)] /Z(master clear), Enter	Suppress/clear Conflict Alert processing in specified Type I and Type II Areas. Type I numeric = 1 to MAXIQ (SV) (See NAS-MD-643) Type II numeric = 1 to IijQ (SV) (See NAS-MD-643) *If Type II is to be suppressed/cleared.
← INSERT ATTACHMENT 2		
IF	F14,0	Enable/disable Interfacility Test Program. May be entered at any time.
	F14,1 message-contents	Simulate an ARTCC-to-ARTS IIIA interfacility message. Translate message to simulate ICA format, and transmit the accumulated buffer when a '+' is detected. Multiple F14,1's may be entered to transmit messages of length greater than would be allowed by a single F14,1. There are several special conversions made from what the interfacility input processor (IFI) will process them as: User Types → Character Definition * → space / (virgule) → LRC prepare character + → EOM . → / (virgule)
	F14,2	Disable, enable track update messages from being sent to ARTCC or another ARTS facility.
	F14,3	Disable, enable time check for outputting of messages, and for displaying old on tracks in H/O from ARTCC or another ARTS facility.

TABLE 2-1. KEYBOARD INPUT MESSAGES (NORMAL) (Continued)

Function	Message Format [1]	Purpose
	F14,4	Enable, disable the time check for sending test messages to the center. The effect is to disable/enable test-message transmissions to the ARTCC.
	F14, 5, fix*fix, status, ENTER	Generate a simulated ARTCC-ARTS IIIA FP message with fix and status data as entered.
TG	F15	See Target Generator description.
TRACK AMPLIFY	F16, Enter [27]	Inhibit amplify data for entering keyboard.
	F16, Identity, (AS) [2] Enter [5 27]	Display amplify data on identified track.
	F16, P, Δ, Identity (AS) [2], Enter [5 27]	Request CTS printout on identified track.

NOTES:

[1] Message Format:

F1-F16 indicates function selection;

commas (not entered) indicate the separation of fields;

Δ represents a space (entered only as a field separator, i.e., not needed after last entered field).

[2] Identity (ADST):

A = Aircraft identity (ACID)

D = Discrete assigned beacon code (discrete ABC)

S = Slew (i.e., trackball)

T = Tabular line identifier (may include controller symbol and subset identifier with an asterisk '*' separating tab line and controller data) — No T for Implied

[3] "Enter" may be used only if a discrete ABC or / or + is included in the message.

[4] Slew may be used only if the track file is to be given active status; otherwise, "Enter" must be used.

[5] "Enter" will not be used if Slew (S) identity is used.

[6] Upon receipt of Slew (S) identity, the trackball will not be homed if either Multiple Function Mode or F2 (Reposition) is selected.

[7] If the function (Fx) is omitted, then see table 2-2 for detailed implied function format.

[8] Position making entry must be designated as supervisory position.

[9] Data is defined:

ACID — 2-7 alphanumerics of which the 1st is alphabetic; not "ALL"; not exactly 2 alphabetics;

ABC — 4 octal digits or /, +, /1, /2, /3, or /4

Function	Message Format[1]	Purpose
QK	F12,E/I,Enter	Enables/Inhibits FAST
	F12,T,1n/2n/3n, Enter	Enables Test pattern 1,2 or 3 messages to FAST
	F12,T,4, Enter	Enables Test pattern 4 message to FAST

When FAST is enabled tracks that are terminated by the terminate control ALL entry or terminated by a single terminate control entry shall have a track drop data packet relayed to FAST.

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- If the controllers position symbols entered are identical, verify that a plus or virgule have not been entered.
- Verify that the position making the entry is not a maintenance position.
- Verify that a virgule only entry has been made from a consolidated position.
- Verify that either control position specified in the message is not already paired.
- Check that no extraneous data has been entered.
- Verify that the position entering message and entered controlling positions are in operational status.
- If a character succeeds the controller position symbol(s), verify it is a virgule or a plus.

OUTPUT

If the message has been accepted for processing, the results are as follows.

PLUS (+) ENTERED: (FULL CONSOLIDATION)

Control of all tracks (active, inactive and all future tracks) shall be transferred from the primary or active control position entered second (KB b) in the message, to the control position entered first (KB a). The position identified (KB b) will be fully consolidated (FCON) with the position specified (KB a). Handoffs directed to KB b will be assigned to KB a. Full data blocks forced to KB b will be directed to KB a.

Any tracks displayed in the VFR flight plan list on the display associated with the position (KB b), will continue to be displayed on that display after any consolidation entry is made. If a VFR flight plan keyboard entry (F9) is made at a consolidated position the VFR flight plan will be displayed in the VFR list on the enterer's display, regardless of any previous consolidation entry.

An ASR–37 printout (FCON) of each full consolidation is requested of the Error and Status Messages function. The FCON entry has highest priority of the three. If a position is in a LCON or CONS condition and an FCON entry is made, that position will revert to a full consolidation (FCON). Keyboard Quicklook selections are not transferred.

VIRGULE ENTERED: (LIMITED CONSOLIDATION)

Control of all store tracks and flight plans resident in CTS at time of entry is transferred from the primary or active control position entered second (KB b) in the message to the control position entered first (KB a).

Future tracks assigned by reference to fixed pairs are also transferred, but, flight plans assigned by controller position symbol, or flight plans entered at KB b without a controller symbol or fix pair shall be assigned to KB b. Handoffs entered with a virgule immediately following the controller position symbol shall be assigned to the position entered (KB b), if no virgule is entered, the handoff shall be reassigned to KB a. Full data blocks forced to KB b will be directed to KB a.

If no discrete controller position symbol is entered (virgule only) and the entry is made from a previously consolidated position (KB b), then future flight plans and handoffs directed to KB b and flight plans entered at KB b shall be assigned to KB b.

An ASR–37 or MSP printout (LCON) of each limited consolidation, is requested of the Error and Status Messages function. Keyboard Quicklook selections are not transferred.

ONE OR TWO ALPHANUMERIC CHARACTERS OR NO DATA ENTERED: CONSOLIDATION/DE-CONSOLIDATION?

- Verify that a FAST initialization message is not in the process of being composed

Control of all store tracks and flight plans (including all flight plans which would be subsequently assigned) shall be transferred from the primary or active control position entered second (KB b) in the message to the control position entered first (KB a). Handoffs directed to KB b will be assigned to KB a. Full data blocks forced to KB b will be assigned to KB a. An ASR–37 or MSP printout (CONS) of each consolidation is requested of the error and status message function.

If the control position entered second (KB b) is identical to the control position entered first (KB a), control of all store tracks, flight plans and subsequently assigned flight plans shall be returned to the control position specified in the keyboard entry. This entry negates a previous consolidation entry. Keyboard Quicklook selections are not affected.

If no discrete control position is entered and the entry is made from a previously consolidated or limited consolidated position then control of all store tracks, flight plans and subsequently assigned flight plans shall be returned to the position entering the message. This entry negates a previous consolidation or limited consolidation entry. An ASR–37 or MSP printout (DCON) of each deconsolidation is requested of the error and status message function. If a character succeeds the controller position symbol(s), verify it is a virgule or a plus.

ERROR CONDITIONS

If the entered message has not been accepted for processing, the applicable error conditions and error messages are:

Error Condition	Error Message Presented In Display Readout Area
Position entering message is paired.	ILL FNCT
Position entering message is a maintenance position.	ILL FNCT
Position entering virgule for LCONS not CONS.	ILL FNCT
Illegal control position symbol has been entered.	FORMAT
Extraneous data or SED has been entered.	FORMAT
Position entering message or entered control position is not in operational status.	ILL POS
Both controller symbols entered are identical and a plus or virgule has been entered.	ILL FNCT
The character succeeding the controller position symbol(s) is not a virgule or a plus.	FORMAT

← INSERT ATTACHMENT 2

3.3.2 Modify Keyboard Status

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress MULTIFUNC key
2. Depress C
3. Enter discrete controller subset and symbol
4. Enter asterisk
5. Enter new status using

   P — at least one of the optional entries must be entered.

Error Condition	Error Message Presented In Display Readout area
FAST initialization message is in the process of being composed	ILL FNCT

C

M

6. Enter discrete controller subset and symbol (OPTIONAL)

7. Enter discrete controller subset and symbol (OPTIONAL)

8. ENTER

Status definitions are P = paired, C = controller, M = maintenance.

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete this entry:

- Verify that no more than 8 alphanumeric data characters have been entered, and the 3rd character is an asterisk.
- Verify that the control position symbols entered correspond to existing positions.
- If the maintenance status has been entered, verify that the control position whose status is to be changed does not actively control tracks and is not eligible to receive flight plans, and the message entry position is not a maintenance position.
- If the paired status has been requested, verify that the optional controller symbol entries are included in the message, the position to be paired does not control track files and is not eligible for active control.*
- Verify that no extraneous data has been entered.
- Verify that the position entering message and entered controlling positions are in operational status.

INSERT ATTACHMENT

OUTPUT

If the message has been successfully processed, the keyboard status of the first entered controller in the message shall be changed to paired, controller or maintenance, as appropriate. If keyboard status is to be paired, the first entered control position will become paired with any additional control positions specified. An ASR-37 or MSP message (STAT) giving the changed keyboard status is requested of the Error and Status Message function.

ERROR CONDITIONS

If the message has not been successfully processed, the following error conditions and error messages apply:

Keyboard Status	Error Condition	Error Message Presented In Display Readout Area
	Extraneous data or SED has been entered.	FORMAT
	Asterisk has not been entered.	FORMAT
	First entered control position symbol illegal.	ILL POS
	Position entering message is a maintenance position.	ILL FNCT
	Position entering message or entered control position are not in operational status.	ILL POS

* When paired status is requested for a position that was previously paired, the current entry will negate the previous pairing entry.

- Verify that a FAST initialization message is not in the process of being composed

Keyboard Status	Error Condition	Error Message Presented In Display Readout Area
Paired	No paired control positions entered.	FORMAT
	Control positions whose status is to be changed either control track files or are eligible for flight plan assignment.	ILL FNCT
Controller	Illegal control position symbol has been entered.	ILL POS
Maintenance	Illegal control position symbol has been entered.	ILL POS
	Control position whose status is to be changed either controls track files or is eligible for flight plan assignment.	ILL FNCT

← INSERT ATTACHMENT II

3.3.3 Resectorization

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress MULTIFUNC key
2. Depress C
3. Depress a single numeric character (1, 2, 3, 4, or 5) indicative of the new configuration
4. ENTER

NOTE

If one of more of the training keyboards are to be assigned track files in the new configuration, these track files will be assigned to the control position with whom the training keyboards consolidated with prior to the keyboard entry to enable training status of a display (F15, X, M, ENTER).

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete this entry:

- Verify that a single numeric data character has been entered; check that this character is either 1, 2, 3, 4, or 5.
- Verify that a configuration corresponding to the entered number exists.
- Verify that the message entering position is a supervisory position.
- Check that no extraneous data or SED has been entered.
- Verify that the position entering message is in operational status.

OUTPUT

If this message has been successfully processed, the results are as follows:

All primary control positions which are paired fully consolidated, consolidated or limited consolidated when the resectorization entry is made shall be restored, unless in the new configuration the paired position is not assigned to receive flight plans.

Error Condition	Error Message Presented In Display Readout area
FAST initialization message is in the process of being composed	ILL FNCT

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- Verify that a FAST initialization message is not in the process of being composed

A new configuration is defined, flight plan files and store tracks that were initially assigned to control positions on the basis of fix pairs shall be checked against the new configuration assignment and reassigned if required. All future flight plans assignable by fix pairs shall be directed to control positions based on the new configuration.

An ASR–37 or MSP printout (CFG) of the resectorization is requested of the Error and Status Messages function.

NOTE

If one or more of the training keyboards are to be assigned track files in the new configuration, these track files will be assigned to the control position with whom the training keyboards consolidated with prior to the keyboard entry to enable training status of a display (F15, X, M, ENTER).

ERROR CONDITIONS

If this message has not been successfully processed, the following error conditions and error messages apply:

Error Condition	Error Message Presented In Display Readout Area
Message enterer is other than a supervisory position.	ILL POS
Illegal configuration identifier has been entered.	FORMAT
Extraneous data or SED has been entered.	FORMAT
Position entering message is not in operational status.	ILL POS

← INSERT ATTACHMENT 3

3.3.4 Request for ASR–37 Printout of Current Configuration

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress MULTIFUNC key
2. Depress C
3. Depress P
4. Depress 1 or 2
5. ENTER

An entry of 1 indicates a request for printout of the status of each keyboard while an entry of 2 indicates a request for printout of entry/exit fix configurations.

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete this entry:

- Verify that exactly two data characters have been entered; check that they have been entered in the order P1 or P2.
- Verify that no extraneous data has been entered.

INSERT ATTACHMENT .2

- Enable the printout of current configuration data or keyboard status data, as appropriate.
- Verify that the position entering message is in operational status.

OUTPUT

If the message has been successfully processed the current configuration ASR–37 or MSP message (P1 or P2) shall be requested of the Error and Status Message function.

An entry of 1 indicates a request for printout of the status of each keyboard while an entry of 2 indicates a request for printout of entry/exit fix configurations.

ERROR CONDITIONS

If the message has not been successfully processed, the following error condition and error message apply:

Error Condition	Error Message Presented In Display Readout Area
Extraneous data has been entered.	FORMAT
Position entering message is not in operational status.	ILL POS

← INSERT ATTACHMENT .2

3.3.5 Select/Inhibit Interfacility

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress

   MULTIFUNC key

2. Depress

   C

3. Depress

   0

4. Depress

   1 or 2 or 3 or 4 or 5 (OPTIONAL)

5. ENTER

LOGIC REQUIREMENTS

The following verification checks will be made in order to complete this entry:

Error Condition	Error Message Presented In Display Readout area
FAST initialization message is in the process of being composed	ILL FNCT

- Verify that a FAST initialization message is not in the process of being composed

ATTACHMENT 15

Error Condition	Error Message Presented In Display Readout area
FAST initialization message is in the process of being composed	ILL FNCT

3.11 REINITIALIZE DISPLAY (KINK)

This subroutine shall be referenced by KOF whenever F_7K is detected. A summary of the input format requirements is found in table 2–1. The purpose of this message is to reinitialize, by single keyboard entry, previously inhibited display conditions.

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress MULTIFUNC key
2. Depress K
3. ENTER

LOGIC REQUIREMENT

The following verification check shall be made in order to complete this entry:

- Check that no extraneous data or SED has been entered.

OUTPUT

If the message entered has been successfully processed the following will be accomplished:

Enable automatic offset capability for this display console; display arrival/departure tabular lists for all keyboard positions at this display console.

INSERT ATTACHMENT 6

ERROR CONDITION

If the message entered has not been successfully processed the following error condition applies:

Error Condition	Error Message Presented In Display Readout Area
Extraneous data or SED has been entered.	FORMAT

3.12 LEADER MULTIFUNCTION (LDRL)

This subroutine shall be referenced by KOF whenever a F_7L is detected. A summary of the input format requirements is found in table 2–1. The purpose of this keyboard entry is to modify the offset direction of a specified full data block or to modify the initial offset assigned to all active track files at the message enterer's position.

3.12.1 Modify Offset Direction of a Single Full Data Block

FORMAT REQUIREMENTS

The proper procedure for making this entry is:

1. Depress MULTIFUNC key
2. Depress L
3. Depress one numeric character (1, 2, 3, 4, 6, 7, 8, or 9)
4. Enter aircraft identity using ACID, discrete beacon code or SED coordinates

3.10 F_7J (CURRENTLY UNDEFINED)

(This section intentionally left blank)

INSERT ATTACHMENT 2

- Enable the printout of current configuration data or keyboard status data, as appropriate.
- Verify that the position entering message is in operational status.

OUTPUT

If the message has been successfully processed the current configuration ASR-37 or MSP message (P1 or P2) shall be requested of the Error and Status Message function.

An entry of 1 indicates a request for printout of the status of each keyboard while an entry of 2 indicates a request for printout of entry/exit fix configurations.

ERROR CONDITIONS

If the message has not been successfully processed, the following error condition and error message apply:

Error Condition	Error Message Presented In Display Readout Area
Extraneous data has been entered.	FORMAT
Position entering message is not in operational status.	ILL POS

INSERT ATTACHMENT 2

3.3.5 Select/Inhibit Interfacility

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress

   MULTIFUNC key

2. Depress

   C

3. Depress

   0

4. Depress

   1
   or
   2
   or
   3
   or
   4
   or
   5

   (OPTIONAL)

5. ENTER

LOGIC REQUIREMENTS

The following verification checks will be made in order to complete this entry:

- Verify that a FAST initialization message is not in the process of being composed

ATTACHMENT 15

Error Condition	Error Message Presented In Display Readout area
FAST initialization message is in the process of being composed	ILL FNCT

When FAST is enabled tracks that have been offset shall have an offset data packet relayed to the FAST system.

3.10 F_7J (CURRENTLY UNDEFINED)

(This section intentionally left blank)

3.11 REINITIALIZE DISPLAY (KINK)

This subroutine shall be referenced by KOF whenever F_7K is detected. A summary of the input format requirements is found in table 2-1. The purpose of this message is to reinitialize, by single keyboard entry, previously inhibited display conditions.

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress MULTIFUNC key
2. Depress K
3. ENTER

LOGIC REQUIREMENT

The following verification check shall be made in order to complete this entry:

- Check that no extraneous data or SED has been entered.

OUTPUT

If the message entered has been successfully processed the following will be accomplished:

Enable automatic offset capability for this display console; display arrival/departure tabular lists for all keyboard positions at this display console.

INSERT ASSIGNMENT

ERROR CONDITION

If the message entered has not been successfully processed the following error condition applies:

Error Condition	Error Message Presented In Display Readout Area
Extraneous data or SED has been entered.	FORMAT

3.12 LEADER MULTIFUNCTION (LDRL)

This subroutine shall be referenced by KOF whenever a F_7L is detected. A summary of the input format requirements is found in table 2-1. The purpose of this keyboard entry is to modify the offset direction of a specified full data block or to modify the initial offset assigned to all active track files at the message enterer's position.

3.12.1 Modify Offset Direction of a Single Full Data Block

FORMAT REQUIREMENTS

The proper procedure for making this entry is:

1. Depress MULTIFUNC key
2. Depress L
3. Depress one numeric character (1, 2, 3, 4, 6, 7, 8, or 9)
4. Enter aircraft identity using ACID, discrete beacon code or SED coordinates

5. Depress ENTER button or SED ENTER button, as appropriate

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete this entry:

- Verify that a single numeric character has been entered; check that it is not 0 or 5.
- Verify that valid identity data has been entered.
- Check that the identity data entered corresponds to an existing track file.
- Verify that the message enterer is the tracks controlling position or is paired with the controlling position and that the identified track is in active status.
- Verify that no extraneous data has been entered.
- If a discrete beacon code is used as a means of track file identification, verify that this code is unique in the CTS.

OUTPUT

If the entered message has been successfully processed, the offset direction of the full data block for the specified track shall be modified, depending on the single numeric character entered. Although one of eight numerics may be entered, each console has only four possible offset directions available at a given time. A maintenance adjustment on each console sets either one of two groups of four directions each:

1. Group 1 (North, East, South, West)
2. Group 2 (Northwest, Northeast, Southeast, Southwest).

Table 3-1 shows the correspondence between the group selected on the console and the resulting offset direction obtained.

TABLE 3-1. OFFSET DIRECTION SPECIFICATION AS A FUNCTION OF MAINTENANCE

ADJUSTMENT SELECTION AND NUMERIC DIRECTION INDICATOR
Single Numeric Entry Required to Select Desired Offset Direction

	Maintenance Adjustment Selection	
Desired Offset Direction	N.S.E.W	NW.NE.SE.SW
N (2)	2 or 3	———
NE (3)	———	2 or 3
E (6)	6 or 9	———
SE (9)	———	6 or 9
S (8)	7 or 8	———
SW (7)	———	7 or 8
W (4)	1 or 4	———

TABLE 3-1. OFFSET DIRECTION SPECIFICATION AS A FUNCTION OF MAINTENANCE (Continued)

ADJUSTMENT SELECTION AND NUMERIC DIRECTION INDICATOR
Single Numeric Entry Required to Select Desired Offset Direction

	Maintenance Adjustment Selection	
Desired Offset Direction	N.S.E.W	NW.NE.SE.SW
NW (1)	———	1 or 4

ERROR CONDITIONS

If the entered message has not been successfully processed, the error conditions and corresponding error messages are as follows:

Error Condition	Error Message Presented In Display Readout Area
No numeric has been entered specifying offset direction.	FORMAT
An improper numeric has been entered to specify offset direction.	FORMAT
Invalid identity data entered.	FORMAT
No track file exists with specified identity.	ILL TRK
Message entry position is not the tracks controlling position and is not paired with the control position.	ILL TRK
Identified track file not in active status.	ILL TRK
Extraneous data has been entered.	FORMAT
Discrete beacon code identity assigned more than one track file.	DUP BCN

3.12.2 Change Initial Offset Direction for All Tracks

FORMAT REQUIREMENTS

The proper procedure for making this entry is:

1. Depress MULTIFUNC key
2. Depress L
3. Depress one numeric character (1, 2, 3, 4, 6, 7, 8, or 9)
4. ENTER

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete this entry:

- Verify that a single numeric character has been entered; check that it is not 0 or 5.
- Check that SED coordinates have not been entered.

When FAST is enabled tracks that have been offset shall have an offset data packet relayed to the FAST system.

5. Depress ENTER button or SED ENTER button, as appropriate

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete this entry:

- Verify that a single numeric character has been entered; check that it is not 0 or 5.
- Verify that valid identity data has been entered.
- Check that the identity data entered corresponds to an existing track file.
- Verify that the message enterer is the tracks controlling position or is paired with the controlling position and that the identified track is in active status.
- Verify that no extraneous data has been entered.
- If a discrete beacon code is used as a means of track file identification, verify that this code is unique in the CTS.

OUTPUT

If the entered message has been successfully processed, the offset direction of the full data block for the specified track shall be modified, depending on the single numeric character entered. Although one of eight numerics may be entered, each console has only four possible offset directions available at a given time. A maintenance adjustment on each console sets either one of two groups of four directions each:

1. Group 1 (North, East, South, West)
2. Group 2 (Northwest, Northeast, Southeast, Southwest).

Table 3-1 shows the correspondence between the group selected on the console and the resulting offset direction obtained.

TABLE 3-1. OFFSET DIRECTION SPECIFICATION AS A FUNCTION OF MAINTENANCE

ADJUSTMENT SELECTION AND NUMERIC DIRECTION INDICATOR
Single Numeric Entry Required to Select Desired Offset Direction

	Maintenance Adjustment Selection	
Desired Offset Direction	N.S.E.W	NW.NE.SE.SW
N (2)	2 or 3	———
NE (3)	———	2 or 3
E (6)	6 or 9	———
SE (9)	———	6 or 9
S (8)	7 or 8	———
SW (7)	———	7 or 8
W (4)	1 or 4	———

TABLE 3-1. OFFSET DIRECTION SPECIFICATION AS A FUNCTION OF MAINTENANCE (Continued)

ADJUSTMENT SELECTION AND NUMERIC DIRECTION INDICATOR

Single Numeric Entry Required to Select Desired Offset Direction

	Maintenance Adjustment Selection	
Desired Offset Direction	N.S.E.W	NW.NE.SE.SW
NW (1)	———	1 or 4

ERROR CONDITIONS

If the entered message has not been successfully processed, the error conditions and corresponding error messages are as follows:

Error Condition	Error Message Presented In Display Readout Area
No numeric has been entered specifying offset direction.	FORMAT
An improper numeric has been entered to specify offset direction.	FORMAT
Invalid identity data entered.	FORMAT
No track file exists with specified identity.	ILL TRK
Message entry position is not the tracks controlling position and is not paired with the control position.	ILL TRK
Identified track file not in active status.	ILL TRK
Extraneous data has been entered.	FORMAT
Discrete beacon code identity assigned more than one track file.	DUP BCN

3.12.2 Change Initial Offset Direction for All Tracks

FORMAT REQUIREMENTS

The proper procedure for making this entry is:

1. Depress MULTIFUNC key
2. Depress L
3. Depress one numeric character (1, 2, 3, 4, 6, 7, 8, or 9)
4. ENTER

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete this entry:

- Verify that a single numeric character has been entered; check that it is not 0 or 5.
- Check that SED coordinates have not been entered.

TABLE 2-3. FUNCTION JUMP TABLE

29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
I						C						STL																	
R						P						RPL																	
S						U						SUL																	
T						C						DPL																	
H						D						HDL																	
D						A						FDL																	
F						PAD						KFK																	
I						L						KILFK																	
V						P						VFRFP																	
I						P						INPRNT																	
C						A						CAOF																	
+Q						+K						~~KILFK~~ FAST																	
I						L						KILFK																	
I						F						TKOF14																	
T						G						TGENKOFK																	
A						M						KAMP																	

Bits 18–23 and 24–29 contain display characters which are displayed in preview area when respective function is entered.

Bits 0–17 contain the address of the function processing subroutines.

as the first preview character of a message, multiple entries using the same operational function can be made without reselecting this function.

The automatic reselection of the entered function occurs upon the completion of processing a previewed message. Instead of erasing all message characters in the preview area, all but the first four characters shall be erased*. For the Initiate Control (IC) and Handoff (HD) functions only, the trackball symbol will not home between SED entries made in the multiple mode. The automatic reselection of a multiple function shall be disabled upon receipt of a new function.

The previously described message entries are performed at the control position having control of the track. The entry of "OK" space immediately after the selection of a function permits the computer to accept a message from a different control position, and allows the computer to perform the selected function at the display having control of the track. The entry of "OK" space cannot be entered from a keyboard with maintenance status.

The processing subprograms are referenced by means of two jump tables (see tables 2–3 and 2–4). The actual subprogram processing is described in the following sections.

* These four characters consist of M, the two characters associated with any of the functions selected and a space automatically inserted by the program after a receipt of a function key input.

2.2.4 Terminate Control Operational Function (DPL)

This subroutine shall be referenced by KOF whenever F4 is detected. A summary of the input format requirements are in table 2-1. The purpose of the TERMINATE CONTROL entry is to disassociate the flight plan data from the identified active track file or terminate the identified tabular track file.

2.2.4.1 Terminate a Single Track

FORMAT REQUIREMENTS

The proper procedure for the termination of a single track is as follows:

1. Depress TRK DROP
2. Enter OK
3. Depress SPACE BAR

(OPTIONAL)

4. Enter aircraft identity using one of the following: ACID, discrete beacon code, tabular line idantifier or SED coordinates
5. Depress ENTER button or SED ENTER button as appropriate

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete the terminate control entry:

- Check to see thet valid identity data has been entered.
- Verify that there is a track file in the CTS with an identity corresponding to the entered aircraft identity.
- Check that no extraneous data has been entered.
- Verify that the identified track file is controlled by the position entering the message or the enterer's paired position or that OK has been entered.
- If "OK" has been entered, verify that the entering keyboard position does not have maintenance status.
- Check that the identified track is not in flight plan or handoff status.
- Verify that the entered ACID is not a duplicate.
- If a discrete beacon code is used as a means of track file identification, verify that this code is unique in the CTS.

2.2.4.2 Terminate All Tracks

FORMAT REQUIREMENTS

The proper procedure for the termination of all tracks under the control of a given position is:

1. Depress TRK DROP

2. Enter ALL

3. Depress Enter

LOGIC REQUIREMENTS

- Verify that "ALL" has been entered in lieu of aircraft identity.
- Verify that the entering position is not paired with more than one controlling position.
- Verify that no extraneous data has been entered.

OUTPUT

If the Terminate Control All message has been entered properly, a search of all the tracks in the CTS shall be made. All of the track files which are not of interfacility origin and are controlled by the entering position or by the controlling position paired with the enterer will be disassociated immediately except those in flight plan or handoff status. All of the flight plan data associated with these tracks shall be deleted from the system.

If interface capability is enabled, all of the track files of interfacility origin except those in flight plan or handoff status which are controlled by the entering position or by the controlling position paired with the enterer, shall be retained internally until all ARTS/ARTCC interfacility communications pertaining to the track files are completed. If the interface capability is disabled, the track files shall be disassociated immediately. All flight plan data associated with these tracks are deleted from the system.

If the message has been entered properly to terminate control a single track, identified in the message shall be disassociated immediately and all flight plan data associated with the track shall be deleted from the system if the message is not of interfacility origin. The associated track status is changed to unassociated, and the appropriate symbol shall be immediately displayed for that track. If the single track identified in the message is of interfacility origin and the interface capability is enabled, the track file will be retained internally until all ARTS/ARTCC communications pertaining to the track file are completed. If the interface capability is disabled, the single track identified will be disassociated immediately and all flight plan data associated with that track is deleted from the system.

If the single track identified in the message is a track created via the VFR flight plan entry (F9) and is in store status, the identified track will be deleted from the VFR list.

ERROR CONDITIONS

If the terminate control message has been entered incorrectly, the possible error conditions and corresponding error messages are as follows:

Error Condition	Error Message Presented In Display Readout Area
Invalid tab-line identification entered.	ILL LINE
No track file identity corresponds to the entered aircraft identity.	ILL TRK
Identified track is not controlled by entering position or position paired with the enterer or OK has not been entered.	ILL TRK
"OK" has been entered from a keyboard position which is designated maintenance.	ILL FNCT
The entered ACID is a duplicate.	DUP ID
Identified track is in flight plan or handoff status.	ILL TRK

When FAST is enabled tracks that have a leader direction change shall have an leader direction change data packet relayed to the FAST system.

- Verify that extraneous data has not been entered.

OUTPUT

If the entered message has been successfully processed, the offset direction of all current tracks at the entering position shall be modified, depending on the single numeric entered. Although there are eight such numerics, each console has only four possible offset directions available at a given time. A maintenance adjustment on each console sets either one of two groups of four directions each:

1. Group 1 (North, East, South, West)
2. Group 2 (Northwest, Northeast, Southeast, Southwest).

Table 3−1 shows the correspondence between the group selected on the console and the resulting offset direction obtained.

ERROR CONDITIONS

If the entered message has not been successfully processed, the error conditions and corresponding error messages are as follows:

Error Condition	Error Message Presented In Display Readout Area
No numeric has been entered specifying offset direction.	FORMAT
An improper numeric has been entered to specify offset.	FORMAT
Extraneous data or SED has been entered.	FORMAT

3.13 MODIFY MULTIFUNCTION (MODL)

This subroutine shall be referenced by KOF whenever a F_7M is detected. A summary of the input requirements is found in table 2−1. The purpose of this entry is to modify the specified data field for the identified track, or to erase the assigned beacon code for the identified track, or to select/inhibit the display of Mode C altitude for the identified track; also to generate a blinking "DM" on specified aircraft. The interfacility status of the track file will not be changed.

3.13.1 Modify Specified Data

FORMAT REQUIREMENTS

The proper procedure for making this entry is:

1. Depress MULTIFUNC key
2. Depress M
3. Enter OK

(OPTIONAL)

4. Depress SPACE BAR
5. Enter identity of aircraft using one of the following: ACID, discrete beacon code, SED coordinates or tabular line identifier
6. Depress SPACE BAR (OPTIONAL)

7. Enter change data using
   or
   beacon code (except code 1236), or plus, virgule, virgule 1, virgule 2, virgule 3, or virgule 4
   or
   controller position
   or
   entry/exit fix
   or
   ETA/PTD and E
   or
   DELTA Δ symbol
   or
   DELTA (Δ) symbol and enter Scratch Pad data (up to three alphanumeric or special characters*)
   or
   — For Active Tracks Only — enter Assigned Altitude data (three numerics**)

   (OPTIONAL)

8. Depress ENTER button or SED ENTER button, as appropriate

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete the entry:

- Verify that valid identity data has been entered.
- Verify that a track file has an identity corresponding to that entered.
- Verify that the entered ACID is not a duplicate.
- Verify that the identified track is controlled by the position entering the message, the position paired with the message entered or that "OK" has been entered.
- If "OK" has been entered, verify that the entering keyboard position does not have maintenance status.
- If a discrete beacon code is used as a means of track file identification, verify that this code is unique in the CTS.
- If the identified CTS track file is a track created via the VFR flight plan entry (F9), verify that an interfacility ARTCC flight plan was received for the track.

If data has been entered, check for a valid field in the following order:

- ACID
- Beacon code (except code 1236), plus, virgule, virgule 1, virgule 2, virgule 3, virgule 4 or DELTA (Δ) indicating radar only status
- Controller position symbol
- Entry/exit fix

* Existing data field two track condition indicators (NAT, CST, AMB, XXX, RDR) are not allowed as entered scratch pad data.
** Any three numerics entered will be interpreted as assigned altitude and may be entered for active tracks only. This track is eligible for display as a PDB on any other display if the entered altitude is within altitude filter limits.

A new configuration is defined, flight plan files and store tracks that were initially assigned to control positions on the basis of fix pairs shall be checked against the new configuration assignment and reassigned if required. All future flight plans assignable by fix pairs shall be directed to control positions based on the new configuration.

An ASR–37 or MSP printout (CFG) of the resectorization is requested of the Error and Status Messages function.

NOTE

If one or more of the training keyboards are to be assigned track files in the new configuration, these track files will be assigned to the control position with whom the training keyboards consolidated with prior to the keyboard entry to enable training status of a display (F15, X, M, ENTER).

ERROR CONDITIONS

If this message has not been successfully processed, the following error conditions and error messages apply:

Error Condition	Error Message Presented In Display Readout Area
Message enterer is other than a supervisory position.	ILL POS
Illegal configuration identifier has been entered.	FORMAT
Extraneous data or SED has been entered.	FORMAT
Position entering message is not in operational status.	ILL POS

← INSERT ATTACHMENT 3

3.3.4 Request for ASR–37 Printout of Current Configuration

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress MULTIFUNC key
2. Depress C
3. Depress P
4. Depress 1 or 2
5. ENTER

An entry of 1 indicates a request for printout of the status of each keyboard while an entry of 2 indicates a request for printout of entry/exit fix configurations.

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete this entry:

- Verify that exactly two data characters have been entered; check that they have been entered in the order P1 or P2.
- Verify that no extraneous data has been entered.

When FAST is enabled tracks that have a leader direction change shall have an leader direction change data packet relayed to the FAST system.

- Verify that extraneous data has not been entered.

OUTPUT

If the entered message has been successfully processed, the offset direction of all current tracks at the entering position shall be modified, depending on the single numeric entered. Although there are eight such numerics, each console has only four possible offset directions available at a given time. A maintenance adjustment on each console sets either one of two groups of four directions each:

1. Group 1 (North, East, South, West)
2. Group 2 (Northwest, Northeast, Southeast, Southwest).

Table 3−1 shows the correspondence between the group selected on the console and the resulting offset direction obtained.

ERROR CONDITIONS

If the entered message has not been successfully processed, the error conditions and corresponding error messages are as follows:

Error Condition	Error Message Presented In Display Readout Area
No numeric has been entered specifying offset direction.	FORMAT
An improper numeric has been entered to specify offset.	FORMAT
Extraneous data or SED has been entered.	FORMAT

3.13 MODIFY MULTIFUNCTION (MODL)

This subroutine shall be referenced by KOF whenever a F_7M is detected. A summary of the input requirements is found in table 2−1. The purpose of this entry is to modify the specified data field for the identified track, or to erase the assigned beacon code for the identified track, or to select/inhibit the display of Mode C altitude for the identified track; also to generate a blinking "DM" on specified aircraft. The interfacility status of the track file will not be changed.

3.13.1 Modify Specified Data

FORMAT REQUIREMENTS

The proper procedure for making this entry is:

1. Depress MULTIFUNC key
2. Depress M
3. Enter OK

(OPTIONAL)

4. Depress SPACE BAR
5. Enter identity of aircraft using one of the following: ACID, discrete beacon code, SED coordinates or tabular line identifier
6. Depress SPACE BAR (OPTIONAL)

7. Enter change data using
   or
   beacon code (except code 1236), or plus, virgule, virgule 1, virgule 2, virgule 3, or virgule 4
   or
   controller position
   or
   entry/exit fix
   or
   ETA/PTD and E
   or
   DELTA Δ symbol
   or
   DELTA (Δ) symbol and enter Scratch Pad data (up to three alphanumeric or special characters*)
   or
   — For Active Tracks Only — enter Assigned Altitude data (three numerics**)

   (OPTIONAL)

8. Depress ENTER button or SED ENTER button, as appropriate

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete the entry:

- Verify that valid identity data has been entered.
- Verify that a track file has an identity corresponding to that entered.
- Verify that the entered ACID is not a duplicate.
- Verify that the identified track is controlled by the position entering the message, the position paired with the message entered or that "OK" has been entered.
- If "OK" has been entered, verify that the entering keyboard position does not have maintenance status.
- If a discrete beacon code is used as a means of track file identification, verify that this code is unique in the CTS.
- If the identified CTS track file is a track created via the VFR flight plan entry (F9), verify that an interfacility ARTCC flight plan was received for the track.

If data has been entered, check for a valid field in the following order:

- ACID
- Beacon code (except code 1236), plus, virgule, virgule 1, virgule 2, virgule 3, virgule 4 or DELTA (Δ) indicating radar only status
- Controller position symbol
- Entry/exit fix

* Existing data field two track condition indicators (NAT, CST, AMB, XXX, RDR) are not allowed as entered scratch pad data.
** Any three numerics entered will be interpreted as assigned altitude and may be entered for active tracks only. This track is eligible for display as a PDB on any other display if the entered altitude is within altitude filter limits.

When FAST is enabled tracks that have a leader direction change shall have an leader direction change data packet relayed to the FAST system.

Error Condition	Error Message Displayed In Display Readout Area
The CENRAP function is currently enabled.	ILL FNCT
There are no CRDA paired runway configurations currently enabled.	ILL FNCT
The runway requested is not part of a CRDA paired runway configuration currently enabled.	ILL FNCT
Extraneous data has been entered.	FORMAT
SED coordinates do not refer to an associated track.	ILL TRK
The identified associated track does not lie within the geographical area corresponding to the runway requested.	ILL TRK

3.15 AUTO-OFFSET MULTIFUNCTION (OFFK)

This routine shall be referenced by KOF whenever F_70 is detected. A summary of the input format requirement is found in table 2-1. The purpose of this entry is to enable or disable the automatic offset function for the display making the entry.

FORMAT REQUIREMENTS

The proper procedure for making this entry is:

1. Depress MULTIFUNC key
2. Depress 0
3. ENTER

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete this entry:

- Verify that SED coordinates have not been entered.
- Verify that data has not been entered.

OUTPUT

If the entry has been successfully processed, the automatic offset function shall be inhibited at the entering console (if it had been enabled prior to message entry) or enabled (if it had been disabled prior to message entry).

ERROR CONDITIONS

If the message had not been successfully processed, the following error conditions and corresponding error messages apply:

Error Condition	Error Message Presented In Display Readout Area
SED coordinates have been entered.	FORMAT
Extraneous data has been entered.	FORMAT

When FAST is enabled tracks that have been offset shall have an offset data packet relayed to the FAST system.

OUTPUT

If this message is successfully processed, the specified peripheral will be declared up for normal operation. If the specified device is not connected to any operational processor, the error exit will be taken from the E$UP, which is Illegal Function.

ERROR CONDITIONS

If this message is not successfully processed, the following error conditions and error messages will apply:

Error Condition	Error Message Presented In Display Readout Area
Extraneous data or SED entered.	FORMAT
Entering position is not a supervisory position.	ILL POS
Invalid data entered.	FORMAT
TTY/MSP printout active.	ILL FNCT
Device not connected to any operational processor.	ILL FNCT

3.28.12 Single/Dual Sensor Mode of Operation (Dual Sites Only)

This message shall allow dual beacon sites to select either a single or dual mode of operation when the system is in a single configuration. A TTY/MSP message indicating the mode selected shall be requested of the Error and Status message function.

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress MULTIFUNC key
2. Depress 2
3. Depress B
4. Enter either of the following alpha-characters; S to indicate only single sensor operations, or D to denote dual operations.
5. Depress ENTER

LOGIC REQUIREMENTS

The following verification checks shall be made in order to complete this entry:

- Verify that the message enterer is a supervisory position.
- Verify that no extraneous data or SED has been entered.
- Verify that either the character "D" or the character "S" has been entered.
- Verify that the entry has not been made from a training position.
- Verify that SWABS has defined a single sensor configuration. (0 or 1).
- Verify that a SWABS reconfiguration entry is not still being processed.

3.28.13 Select Redundant Channel for FAST

This section presents the purpose, format requirements and the output associated with the assignment of I/O to the primary or alternate FAST channel.

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress MULTIFUNC key
2. Depress 2
3. Depress F
4. Depress ENTER

LOGIC REQUIREMENTS

- Verify that extraneous data has not been entered
- Verify that an active printout does not exist for the function
- Verify that FAST is disabled
- Verify that the enterer is a supervisory position
- Verify that the enterer is a valid FAST position

OUTPUT

If the message has been successfully processed, a channel change will occur. If the primary FAST channel is active it will be disabled and the inactive alternate FAST channel will be enabled, or if the alternate FAST channel is active it will be disabled and the inactive primary FAST channel will be enabled. An ASR-37 or MSP printout will be requested of the error and status message function (see NAS-MD-642).

Error Condition	Error Message Presented In Display Readout area
Extraneous data has been entered	FORMAT
Printout is active on entered function	ILL FNCT
Entering position is not a FAST position	ILL FNCT
FAST is enabled	ILL FNCT
Entering position is not supervisory	ILL POS

- Verify that active tracks are not controlled by the keyboards associated with this display.
- Verify that keyboards associated with this display are not paired with keyboards on another display.
- Verify that no extraneous data has been entered.
- Verify that this display's VFR Flight Plan list does not contain any tracks.

DISABLE

- Verify that more than one display is in training status or the target generator is disabled.
- Verify that no extraneous data has been entered.
- Verify that future track files are not assigned the keyboards associated with this display.
- Verify that active tracks are not controlled by the keyboards associated with this display.

OUTPUT

ENABLE

If the message enterer is in operational status and the message has been successfully processed, the display and keyboards associated with the message enterer will be placed in a training status. A complete lockout of all keyboard entries, full data block, limited data block, single symbols, quick looks and abnormal condition characters (EM, RF, HJ, SA and IF), display and processing functions between operational and training displays will occur. The system data presented on the displays in training status will be unique and only associated with the training displays. If keyboard action Multifunction system, time, or altimeter is initiated from a keyboard in training status, the keyboard action will affect the unique system data associated with the training mode. Alphanumeric keyboard request messages will not be directed to the ASR-37.

An ASR-37 printout (TNG) giving the changed display status is requested of the error and status messages function (see NAS-MD-642).

DUAL BEACON SYSTEMS

Displays associated with either beacon system may be placed in training status simultaneously. The training target generator runs in each subsystem if there is at least one training display active in each subsystem. Training target identifiers and tracked data is presented on all displays in training status. TTG keyboard entries can be made from all keyboards with training status.

Keyboards and displays in either beacon system can be defined by site adaptation as training displays. On program start up the TTG program will be assigned to all subsystems which have associated displays in training status.

DISABLE

If the message enterer is in training status and the message has been successfully processed, the display and the keyboards associated with the enterer will be placed in operational status. The training system data except selected beacon codes is replaced by the operational system data, a deconsolidation will not occur and the paired status will remain identical to the training mode.

An ASR-37 printout (ACT) giving the changed display status is requested of the error and status messages function (see NAS-MD-642).

If the procedures have not been followed or the message is entered incorrectly, the possible error conditions and corresponding error messages are as follows:

- Verify that FAST is not enabled for training

Error Condition	Error Message Presented In Display Readout Area
A keyboard associated with the training display has future track files assigned.	ILL FNCT
A keyboard associated with the training display has active track files.	ILL FNCT
The display is not associated with the Beacon Subsystem entered.	ILL FNCT
Extraneous Data has been entered.	FORMAT
Target Generator is not disabled.	ILL FNCT
TTG is active in test mode.	ILL FNCT
Entry is from scenario.	ILL FNCT
ASR–37 printout still active.	ILL FNCT
Already maximum number of training displays.	ILL FNCT
Keyboard status is maintenance.	ILL FNCT
Keyboard is not consolidated.	ILL FNCT
Keyboard is paired with another display.	ILL FNCT
The display's VFR flight plan list contains tracks.	ILL FNCT

← INSERT ATTACHMENT 22

5.2 ENABLE/DISABLE TARGET GENERATOR

PROCEDURE REQUIREMENTS

If test mode is desired an F7,2, TE entry must be entered prior to activation of TTG in test mode.

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress F15 key (OPTIONAL if TTG is in training mode)
2. Depress X (enable)

   or

   Z (disable)
3. Depress T
4. Depress S (OPTIONAL — activate TTG in test mode)
5. Depress ENTER

LOGIC REQUIREMENTS

- Verify that extraneous data has not been entered.
- Verify that the position entering the message is in training status if TTG is in training mode.
- Verify that the training set input is disabled.

Error Condition	Error Message Presented In Display Readout area
FAST is enabled for training	ILL FNCT

- Verify that the first character is a P.
- Verify that extraneous data has not been entered.
- Verify that a valid ACID or SED coordinates have been entered.
- Verify that a previous memory readout or CTS file printout request has completed.

OUTPUT

If this entry has been successfully processed, all of the CTS and CACTS words associated with the identified track including the ECIDT, BCIDT and TCIDT words will be output to the active printer with descriptive label names to identify each word. (See NAS-MD-642, Section 3.11.)

ERROR CONDITIONS

If the message has not been accepted for processing, the following error conditions and corresponding error messages apply:

Error Condition	Error Message Presented In Display Readout Area
Extraneous data has been entered.	FORMAT
Invalid ACID has been entered.	ILL TRK
No slew entry to legitimate target.	ILL TRK
Previous memory readout or CTS file print request not complete.	ILL FNCT

8.0 Final Approach Spacing Tool Messages

This section presents the purpose, format requirements and the output associated with the Final Approach Spacing Tool (FAST)

8.1 Enable/Inhibit FAST Processing

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress F12 key

2. Depress E (enable)

   or

   I (inhibit)

3. Depress ENTER

LOGIC REQUIREMENTS

- Verify that extraneous data has not been entered
- If FAST is disabled verify that an E is entered
- Verify that an active printout does not exist for the function
- Verify that FAST is not in the requested state
- Verify that the enterer is a supervisory position
- Verify that the position entering the message is not a maintenance position
- Verify that the position entering the message is a valid FAST position

OUTPUT

If the message has been successfully processed, the FAST program will be enabled or inhibited and an ASR-37 or MSP printout will be

requested (see NAS-MD-642). If the position entering the message has training status FAST will be enabled for training. During Phase 1 development FAST will only operate in the training mode.

When FAST is enabled, all pertinent ARTS IIIA data required for FAST initialization will be transmitted (see NAS-MD-648) to the FAST program. ARTS will continue to transmit the required data to the FAST program until the FAST program is inhibited.

When inhibited all FAST display data will be erased and all FAST keyboard entries (except F12 E) will be inhibited. Attempts to enter FAST keyboard entries (except F12 E) will result in the error condition of "ILL FNCT" in the ARTS preview area.

Error Condition	Error Message Presented In Display Readout area
Extraneous data has been entered	FORMAT
FAST is disabled and the character entered is not an E	FORMAT
Printout is active on entered function	ILL FNCT
FAST is in the requested state	ILL FNCT
Position entering the message is not a valid FAST position	ILL FNCT
Entering position is not supervisory	ILL POS
Position entering the message is a maintenance position	ILL POS

8.2 All ARTS Keyboard Entries for FAST Processing

All remaining FAST keyboard entries entered through the ARTS keyboard will be defined in the Detail Design Data (DDD) Document for the FAST program. When the FAST program is enabled and the ARTS program detects an F12 entry, it will be directed to the FAST program for processing. All of the FAST keyboard entries (F12) will be processed by the FAST program. All error conditions that are detected in the FAST keyboard entries (F12) will be displayed in the FAST Information List (FIL).

8.3 Test Patterns for FAST

FORMAT REQUIREMENTS

The proper procedure for entering this message is:

1. Depress F12 key
2. Depress T
3. Depress 1 or 2 or 3 or 4
4. Depress n (optional for test patterns 1 ,2 or 3)
5. Depress Enter

Where n = the number of words that will contain the test pattern sent to FAST. This option is for test patterns 1, 2 and 3 only. If the optional field is missing 10 words will be sent to FAST containing the specified test pattern.

LOGIC REQUIREMENTS

- Verify that extraneous data has not been entered
- Verify that a T has been entered
- Verify that the valid numeric character is entered
- Verify that the position entering the message is a valid FAST position
- Verify that FAST is enabled

OUTPUT

If the message has been successfully processed, the specified TEST pattern will be Transmitted to FAST. When TEST pattern one is selected, a word/s containing 7777777777 will be sent to FAST. When TEST pattern two is selected, a word/s containing 5252525252 will be sent to FAST. When TEST pattern three is selected, a word/s containing 7700770077 will be sent to FAST.

If TEST pattern four was requested, 10 words of 5252525252 will be sent to FAST. After the initial 10 words there will be a break in data transmissions followed by 10 words containing 2525252525. For the test pattern formats see NAS-MD-648.

Error Condition	Error Message Presented In Display Readout area
Extraneous data has been entered	FORMAT
Character entered is not an T	FORMAT
Illegal test pattern specified	ILL FNCT
Position entering the message is not a valid FAST position	ILL FNCT
FAST is not enabled	ILL FNCT

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ARTS IIIA
COMPUTER PROGRAM
FUNCTIONAL SPECIFICATIONS
(CPFS)

ASR-37 NON-EXECUTIVE ERROR
AND STATUS MESSAGES

NAS-MD-642

FOR

ARTS IIIA FINAL APPROACH SPACING TOOL PHASE 1
CONFIGURATION CONTROL DECISION (CCD) NXXXX
CASE FILES CD340-CPT-003A and CD300-AR3A-003

A3.05

MAY 4, 1993

FEDERAL AVIATION ADMINISTRATION
ATC TECHNOLOGY BRANCH, ACD-340
ATLANTIC CITY INTERNATIONAL AIRPORT, N.J., 08405

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3.15 FAST INTERNAL ALARM MESSAGES.....

TABLE 2-1. ALPHANUMERIC KEYBOARD REQUEST MESSAGES (Continued)

Format			Description
(TIME) IF	(S)(K)	SEL 3	Enable IF and clear all tracks with flight plan/store status in CTS originated from MT or Disc or ARTCC immediately.
(TIME) MTU	(S)(K)	FRC	Flight plans forced from mag tape into system.
(TIME) DISU	(S)(K)	FRC	Flight plans forced from disc into system.
(TIME) IF	(S)(K)	RDP	The interfacility capability has been changed to radar data processing.
(TIME) DISU	(S)(K)	(SEL/INH)	The processing of the flight plan disc has been selected/inhibited.
Note that 'RCFG' is used for all manual reconfiguration functions:			
(TIME) RCFG	(S)(K)	OP LVL (Program Level)	Select program level to be executed after recovery.
(TIME) RCFG	(S)(K)	DISPLY (D) (SEL/INH)	Enable/inhibit specified display.
(TIME) RCFG	(S)(K)	KEYBRD (N) (SEL/INH)	Enable/inhibit specified keyboard.
(TIME) RCFG	(S)(K)	MDBM (MM) (SEL/INH)	Enable/inhibit specified Multiplexed Display Buffer Memory (MDBM).
(TIME) RCFG	(S)(K)	SELEC SRAP (R,R) SEN(E)	Enable/inhibit automatic switching of SRAPs.
(TIME) RCFG	(S)(K)	OVRLD SEN (SEL/INH)	Enable/inhibit overload sensing and protection.
← INSERT ATTACHMENT 2			
(TIME) RCFG	(S)(K)	TEST TRGT (SEL/INH)	Enable/inhibit Test Targets.
(TIME) RCFG	(S)(K)	(Message Type *) (SEL/INH)	Function as defined below.
		DSPL PRNT	Display Printouts
		KIP PRNT	Keyboard Interrupt Processing (KIP) Printouts
		MEM RDRT	Memory Readout Function
		MSAW CNTR	MSAW Function
		RTQ TERM	RTQC Terms Printouts
		SRAP PRNT	Sensor Receiver and Processor (SRAP) Printouts

(TIME) RCFG (S)(K) FAST CHAN SELEC PRIM/ALT	The Primary or alternate channel for the Final Approach Spacing Tool program has been enabled.

TABLE 2-1. ALPHANUMERIC KEYBOARD REQUEST MESSAGES (Continued)

Format			Description
(TIME) CRDA	(S)(K)	SEL or INH (xxx/xxx) T or S	CRDA selected/inhibited for specified runway pair where: xxx/xxx = Actual adapted runway pair, e.g., 13L/17R T = TIE mode S = STAGGER mode
(TIME) pmr ENABLE T = hh:mm:ss M=En SK			Performance Monitor report (pmr = CTS, RTR, LAT, or COR) was activated with an interval time of T. Maximum reporting was activated for every nth report. (M=I for Inhibited). Entered by SK at TIME.
(TIME) SUM ENABLE T = hh:mm:ss s SK			Summary Performance Monitor report was activated with an interval time of T and synchronized on s (s = C, A, U & L, for CTS, Associated, Unassociated or Lattice). Entered by SK at TIME.
(TIME) SUM ENABLE T = hh:mm:ss P SK			An immediate Summary Performance Monitor report was requested. Entered by SK at TIME.
(TIME) pmr DISABLE		SK	Performance Monitor report (pmr = CTS, RTR, LAT, COR, or SUM) was deactivated by SK at TIME.
(TIME) PM REPORT OUTPUT TO dev SK ——— INSERT ATTACHMENT 3			Performance Monitor reports will be directed to dev (= TTY or MSP or BOTH). Entered by SK at TIME.

LEGEND

D = Display number

K = Identifier of keyboard that initiated the action.

T = The time that the action was made.

U = Identifier of unique altimeter setting or unique general information

S = Subset number

N = Keyboard number of which action was taken.

M = MDBM number of which action was taken.

R = SRAP number(s) of which action was taken.

(TIME) FAST (S)(K) ENABLED !! OPNL/ TRNG	The Final Approach Spacing Tool program has been enabled (Initial selection)
(TIME) FAST (S)(K) DISABLED **	The Final Approach Spacing Tool program has been disabled (last selection)
(TIME) FAST (S)(K) ON OPNL/TRNG	The Final Approach Spacing Tool program has been enabled (Intermediate selection)
(TIME) FAST (S)(K) OFF OPNL/TRNG	The Final Approach Spacing Tool program has been disabled (Intermediate selection)

CA = Conflict Alert — conflict data

NC = Conflict Alert — nonconflict data

P: TTY = the teletype

D0 = disc drive 0

D1 = disc drive 1

MSP = the medium speed printer

IMT = the integrated magnetic tape unit

← INSERT ATTACHMENT 4

LEGEND

PRIM = Primary Fast Channel

ALT = Alternate FAST Channel

TABLE 3-22. CENRAP MESSAGES

Format	Description
(TIME) CENRAP TARTET OVERFLOW — (ss)	CENRAP target(s) lost due to insufficient room in CENRAP target report store. ss = number of targets lost, 'MANY' if more than 99.
(TIME) CENRAP TARGET CAPACITY (+/−)	CENRAP target report store usage has climbed above (+) or descended below (−) a parameter percentage.
(TIME) CENRAP READY	TS/TP message received from the ARTCC when CENRAP is not active.

INSERT ATTACHMENT 5

3.15 FAST INTERNAL ALARM MESSAGES

There are twelve types of FAST internal alarm messages that are generated by the ARTS system. These messages are shown in Table 3-23 with a description of the cause of each type.

TABLE 3-23 FAST INTERNAL ALARM MESSAGES

Format	Description
(TIME) TIU SYSTEM FAILURE	The FAST function has been automatically disable.
(TIME) TIU INPUT BUFFER PARITY XXXX	TIU input parity error
(TIME) TIU ILLEGAL INTERRUPT XXXX	TIU is sending illegal interrupts
(TIME) TIU HEARTBEAT FAILURE XXXX	TIU heartbeat messages are not received
(TIME) TIU HEARTBEAT SEQUENCE FAIL XXXX	TIU heartbeat messages are out of sequence
(TIME) TIU RECEIVED DATA WITH BAD PARITY XXXX	FAST system detected a input parity error
(TIME) TIU DETECTED BAD MESSAGE CODE XXXX	FAST has detected a bad message code
(TIME) TIU ILLEGAL INPUT MESSAGE CODE XXXX	ARTS has detected a bad message code
(TIME) TIU OUTPUT CHANNEL TIMEOUT XXXX	The ARTS output channel to the TIU has timed out.
(TIME) TIU LOW PRIORITY OUTPUT STACK OVERFLOW XXXX	Low priority buffer overflow

(TIME) TIU HIGH PRIORITY OUTPUT STACK OVERFLOW XXXX	High priority buffer overflow
TIU AUTO DISABLE SECTORS BEHIND XXXX	Tracking is five sectors behind

NOTE: Where XXXX = 1 to 99 or MANY

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SITE ADAPTATION

NAS-MD-643

FOR

ARTS IIIA FINAL APPROACH SPACING TOOL PHASE 1
CONFIGURATION CONTROL DECISION (CCD) NXXXX
CASE FILES CD340-CPT-003A and CD300-AR3A-003

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3.26 FINAL APPROACH SPACING TOOL (FAST) DEFINITIONS

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3.26.2 Displays eligible for FAST (FDnQ)
3.26.3 Total number of keyboards eligible for FAST (TFASTKQ)
3.26.4 Keyboards eligible for FAST (FKnQ)

3.25 PERFORMANCE MONITOR

3.25.1 Default Output Time Intervals for CURRENT Reports (PMOIQ)

The following values are used to define Performance Monitor report output time intervals (in seconds). The default values are used upon system initialization, and upon keyboard report activation, if a time interval was not entered in the keyboard message:

```
PMOICTSQ  —  (4-86399,1) seconds  .  CTS Report
PMOIRTRQ  —  (4-86399,1) seconds  .  RTR Report
PMOILATQ  —  (60-86399,1) seconds .  LAT Report
PMOICORQ  —  (60-86399,1) seconds .  COR Report
PMOISUMQ  —  (60-86399,1) seconds .  SUM Report
```

Example:

```
PMOICTSQ  EQU  +60*60   .  CTS Output 60 minutes
PMOIRTRQ  EQU  +60*60   .  RTR Output 60 minutes
PMOILATQ  EQU  +60*60   .  LAT Output 60 minutes
PMOICORQ  EQU  +30*60   .  COR Output 30 minutes
PMOISUMQ  EQU  +8*60*60 .  SUM Output 8 hours
```

3.25.2 Default Value for MAXIMUM Reports (PMMAXQ)

The following value is used as a default for MAXIMUM report enabling. The value defines the number of CURRENT reports that will be printed before a MAXIMUM report is output, or disable MAXIMUM reporting as a default. The default value is used upon system initialization, and upon keyboard report activation, if the MAXIMUM enable option was not entered in the report enable keyboard message:

```
PMMAXQ — (0-10,1)   CURRENT Reports
```

Example:

```
PMMAXQ EQU 0   .  MAXIMUM Reporting disabled as default.

PMMAXQ EQU 8   .  A MAXIMUM Reporting will be enabled, and a report output after every
                  eighth CURRENT Report.
```

3.25.3 Default Output Device (PMDEVQ)

The following value will be used to select the report output device(s) upon system initialization:

```
PMDEVQ — (1-3,1)   where 1 = TTY,   2 = MSP,   3 = Both
```

3.26 THROUGH 3.100 RESERVED

3.101 SYSTEM PARAMETERS

3.101.1 Interfacility Track Update Timeout Interval (ITUIQ)

```
ITUIQ — 15 (1-30,1) seconds
```

3.101.2 Number of RDBM Output Buffers (NRBUFQ)

```
NRBUFQ = 4
```

3.101.3 Number of P-Stack Control Words (NPSWQ)

```
NPSWQ = +31+4* (NSTAGQ > 0)
```

3.101.4 Range/Azimuth Gating Auto On Capacity Percent (RAGONQ)

RAGONQ = TQ*15/100 (Percent of CTS files remaining)

3.102 CONVERGING RUNWAY DISPLAY AID (CRDA) P-STACK CONTROL WORDS

3.102.1 CRDA P-Stack Control Words for Ghosting Applications

Modifications to the DBM P-Stack are required to allow the display of a maximum of four (4) ghosting applications in the system data area. The new parameter value (DGAQ) is inserted after parameter DAHQ in the P-Stack list. Parameter DMRQ is modified and will follow the new parameter DGAQ in the P-Stack list.

Examples:

```
DGAQ*       EQU     OVRQ+4
```

Defines Ghosting Applications.

```
DMRQ*       EQU     DGAQ+13
```

Defines Memory Readout.

3.102.2 CRDA P-Stack Control Words for Ghost Data Words

Modifications to the DBM P-Stack are required to allow the display of a maximum of fifty (50) Ghost data blocks. The first two parameter values are new (DGDBQ and DGDBLQ) and are to be inserted after parameter DSSLQ in the P-Stack list. The third parameter (DTGQ) is modified and will follow the new parameter DGDBLQ in the P-Stack list.

Examples:

```
DGDBQ*          EQU     DSSLQ+1
```

Defines Ghost data blocks.

```
DGDBLQ*         EQU     DGDBG+4*GDBNQ+1
```

Defines Ghost data blocks.

```
DTGQ*           EQU     DGDBLQ+1
```

Defines Target GEN tracks.

3.26 FINAL APPROACH SPACING TOOL (FAST) DEFINITIONS

3.26.1 Total number of displays eligible for FAST (TFASTDQ)

The value declared in TFASTDQ identifies the number of displays that will be eligible to display FAST data.

Example:

```
TFASTDQ     EQU     5
```

Five displays will be eligible for FAST display data.

3.26.2 Displays eligible for FAST (FDnQ)

The value declared in FDnQ identifies the displays that are eligible for FAST display data

Where n = The first item in the table will start with a 1, all other items will be numbered sequentially.

Example:

```
FD1Q        EQU     3
```

Display number 3 will be eligible to receive FAST display data

3.26.3 Total number of keyboards (TFASTKQ) eligible for FAST

The value declared in TFASTKQ identifies the total number of keyboards that are eligible to make FAST keyboard entries.

Example:

```
TFASTKQ     EQU     15
```

Fifteen keyboards will be eligible to make FAST keyboard entries.

3.26.4 Keyboards (FKnQ) eligible to make FAST keyboard entries

The value declared in FKnQ identifies the keyboards that are eligible to make FAST keyboard entries.

Where n = The first item in the table will start with a 1, all other items will be numbered sequentially.

Example:

```
FK1Q        EQU        6
```

Keyboard 6 is eligible to make FAST keyboard entries and is associated with display three.

PAGE CHANGES TO

ARTS IIIA
COMPUTER PROGRAM
FUNCTIONAL SPECIFICATIONS
(CPFS)

CONTINUOUS DATA RECORDING
AND PERFORMANCE MONITORING

NAS-MD-648

FOR

ARTS IIIA FINAL APPROACH SPACING TOOL PHASE 1
CONFIGURATION CONTROL DECISION (CCD) NXXXX
CASE FILES CD340-CPT-003A and CD300-AR3A-003

A3.05

MAY 2, 1993

FEDERAL AVIATION ADMINISTRATION
ATC TECHNOLOGY BRANCH, ACD-340
ATLANTIC CITY INTERNATIONAL AIRPORT, N.J., 08405

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1.3 FINAL APPROACH SPACING TOOL (FAST) .....

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INSERT ATTACHMENT 1

LIST OF APPENDICES

Appendix Page

Appendix "A" .....

```
1  hh:mm:ss  mm/dd/yy  PROG aa CTS STATUS REPORT: COR MAX  C=hh:mm:ss  M=hh:mm:ss
2  S  ASSOCIATED    UNASSOCIATED   FP/STORE    CST/SUSPEND  TRAINING    AVAILABLE
3  0 C=dddd M=dddd C=dddd M=dddd C=dddd M=dddd C=ddd M=ddd C=ddd M=ddd
4  1 C=dddd M=dddd C=dddd M=dddd C=dddd M=dddd C=ddd M=ddd C=ddd M=ddd
5  T C=dddd M=dddd C=dddd M=dddd C=dddd M=dddd C=ddd M=ddd C=ddd M=ddd C=ddddM=dddd
6  SENSOR 0 TRACKING dd SECTORS BEHIND AT hh:mm:ss
7  SENSOR 1 TRACKING dd SECTORS BEHIND AT hh:mm:ss
8  CTS USED: ddd PERCENT

1  hh:mm:ss  mm/dd/yy  PROG aa RTR STATUS REPORT: COR MAX
2  S CURRENT/SCAN   CURRENT/180  CURRENT/SECTOR AVERAGE/SCAN LOST REPORTS
3  0  B=dddd R=dddd B=dddd R=dddd B=dddd R=dddd B=dddd R=dddd B=ddd R=ddd
4  1  B=dddd R=dddd B=dddd R=dddd B=dddd R=dddd B=dddd R=dddd B=ddd R=ddd
5  S MAXIMUM/SCAN   MAXIMUM/180  MAXIMUM/SECTOR AVERAGE/SCAN LOST REPORTS
6  0  B=dddd R=dddd B=dddd R=dddd B=dddd R=dddd B=dddd R=dddd B=ddd R=ddd
7  1  B=dddd R=dddd B=dddd R=dddd B=dddd R=dddd B=dddd R=dddd B=ddd R=ddd

1  hh:mm:ss  mm/dd/yy  PROG aa LAT STATUS REPORT: COR MAX
2  PERCENT OF PLANNED TIME
3  PEAK MIN: ddd   AT  hh:mm:ss   dddd MIN: ddd
4           AVERAGE LATTICE            EXCEED LAT ADV
5  PEAK MIN: ddd PREV  dddd MINS: ddd       ddd
6            HIGHEST LATTICE ddd  AT  hh:mm:ss
7         HIGHEST AVERAGE LATTICE
8   ONE MINUTE        dddd MINUTES
9  ddd  hh:mm:ss       ddd  hh:mm:ss
10       HIGHEST LATTICE ddd  AT  hh:mm:ss
```

FIGURE 4-8. OVERALL-MAXIMUM COR REPORT

```
1  hh:mm:ss  mm/dd/yy  PROG aa syn STATUS REPORT: SUM aaa  C=hh:mm:ss
2                 CTS DATA          SECT   SCAN      180DEG    SYS  HIGH
3  S  UAS   ASC FP/S  C/S  ETG AVAIL BACK BCN  RDR  BCN   RDR  UTIL  LAT
4  0 dddd  dddd dddd  ddd  ddd        dd  dddd dddd  dddd dddd
5  1 dddd  dddd dddd  ddd  ddd        dd  dddd dddd  dddd dddd
6  T dddd  dddd dddd  ddd  ddd dddd                            ddd   ddd
7  SENSOR 0 EXCEEDED dd SECTORS BEHIND ddd TIMES
8  SENSOR 1 EXCEEDED dd SECTORS BEHIND ddd TIMES
```

FIGURE 4-9. SUM REPORT

1.3 FINAL APPROACH SPACING TOOL (FAST)

The Final approach Spacing Tool (FAST) modification extracts data from the operational program data base and transfers this data to the TATCA Interface Unit. This data is used by FAST to provide the suggested ATC commands required for the metering of air traffic in the terminal environment, creating a smooth traffic flow all the way to the runway.

The FAST system will provide ATC advisories (heading and velocity) in the ARTS IIIA Full DATA Block (FDB) to the individual terminal controllers that will create a smoother, better coordinated flow of traffic to the runways. All controller advisories will be presented in the forth line of the FDB.

5.0 FINAL APPROACH SPACING TOOL (FAST)

Software is provided for the control of FAST extraction and is primary responsible for the enabling/disabling of the FAST function, selecting the primary or alternate interface channels and for the sending of test messages (see NAS-MD-638) to FAST.

5.1 FAST extraction

The FAST extractor will consist of following three parts.

1. FAST extraction
2. FAST Buffer Request (FSTRBUF)
3. FAST Buffer Transmit (FSTRSND)

The function of the FAST extractor will be the extraction of the individual FAST data types from the operational program data base or preselected data and the insertion of this data into the appropriate (High or Low priority) FAST data output buffers. FAST extraction will be embedded directly into the various modules of the operational program, each of which will be directly responsible for the extraction of a particular type of data. The following operational modules will perform FAST extraction.

MODULE NAME	MESSAGE TYPE
KOFK	INITIALIZATION
	TEST
	KEYBOARD
	LEADER
	DISABLE FAST
	TRACK DROP
COMA	TRACK DROP
MAT	TRACK DROP
TROUT	CTS
	TROUT DEMACR
	THREAD DROP

MODULE NAME	MESSAGE TYPE
AUT	OFFSET
KIP	TYP1T
IF	INTERFACILITY

The function of the FAST buffer request will be to maintain appropriate pointers to available areas of the FAST data output buffers and to set appropriate flags upon detecting buffer full situations.

The function of the FAST buffer transmit will be to monitor data buffer full flags and various error flags for the automatic disabling of FAST and to request output of the data buffers with the high priority output buffer having precedence.

5.2 Inputs required for FAST extraction

The inputs necessary for the FAST extractor are described in the following sections.

5.2.1 Initialization Data Packet

The inputs for the initialization message will be selections from the keyboard, display, configuration, airport and airport fix tables.

5.2.2 Central Track Store (CTS) Data Packet

The inputs for the CTS message will be selections from the Central Track Store (CTS) table.

5.2.3 Associated Thread Drop (CTS) Data Packet

The inputs for the Associated Thread Drop message will be data from selected CTS words.

5.2.4 Thread Drop (CTS) Data Packet

The inputs for the Thread Drop message will be data from selected CTS words.

5.2.5 TYP1T Data Packet

The inputs for the TYP1T message will be data from selected display words.

5.2.6 Keyboard Data Packet

The inputs for the Keyboard message will be the preview data and the CTS tables.

5.2.7 Test Data Packet

The inputs for the test messages will be the preselected test patterns.

5.2.8 Interfacility Data Packet

The inputs for the Interfacility message will be the interfacility input and output buffers.

5.2.9 TROUT Demarcation Data Packet

The inputs for the TROUT Demarcation message will be when the TROUT module is about to complete its Task.

5.2.10 Offset change Data Packet

The inputs for the Offset change message will be data from selected CTS words.

5.2.11 Leader direction Change Data Packet

The inputs for the Leader direction Change message will be data from selected CTS words.

5.3 ARTS operational outputs to FAST

See appendix A

Appendix "A"

KEYBOARD DATA PACKET, MESSAGE CODE 011

NUMBER OF WORDS									011
S			FN	I	B	E	T	ERROR NO.	011
ZULU TIME (LSB = 1/1024 SECOND)									
ACID 1		ACID 2		ACID 3			ACID 4		ACID 5
ACID 6		ACID 7							
P1		P2		P3			P4		P5
P6		P7		P8			P9		P10
P11		P12		P13			P14		P15
P16		P17		P18			P19		P20
P21		P22		P23			P24		P25
P26		P27		P28			P29		P30
P31		P32		P33			P34		P35
P36		P37		P38			P39		P40
P41		P42						KS	CONTR.
	TBALL YCOR. LSB=1/16						TBALL XCOR. LSB=1/16		

Appendix "A" (Cont.)

CTS DATA PACKET, MESSAGE CODE 012

	29 — 15	14 — 0
MSG HDR	NUMBER OF WORDS	012
WORD 1	CONTENTS OF CTST	
WORD 2	CONTENTS OF RGAZT	
WORD 3	CONTENTS OF XCORT	
WORD 4	CONTENTS OF YCORT	
WORD 5	CONTENTS OF XYDOT	
WORD 6	CONTENTS OF TIMET	
WORD 7	CONTENTS OF ASOCT	
WORD 8	CONTENTS OF ABEAT	
WORD 9	CONTENTS OF CFLGT	
WORD 10	CONTENTS OF RBEAT	
WORD 11	CONTENTS OF SLIDT	
WORD 12	CONTENTS OF TNT	
WORD 13	CONTENTS OF LGCT	
WORD 14	CONTENTS OF FILT	
WORD 15	CONTENTS OF CTSST	
WORD 16	CONTENTS OF RECRT	
WORD 17	CONTENTS OF TNPT	
WORD 18	CONTENTS OF LNKT	
WORD 19	CONTENTS OF ALT	

Appendix "A" (Cont.)

CTS DATA PACKET, MESSAGE CODE 012

	29	0
WORD 20	CONTENTS OF PALT	
WORD 21	CONTENTS OF SALT	
WORD 22	CONTENTS OF DALT	
WORD 23	CONTENTS OF ACTYPT	
WORD 24	CONTENTS OF CATB	
WORD 25	CONTENTS OF CATC1	
WORD 26	CONTENTS OF CATC2	

Appendix "A" (Cont.)

INTERFACILITY DATA PACKET, MESSAGE CODE 013

NUMBER OF WORDS			013
NUMBER OF WORDS	1		013
ZULU TIME (LSB = 1/1024 SECOND)			
	CHAR 1	CHAR 2	CHAR 3
	CHAR N-2	CHAR N-1	CHAR N

Appendix "A" (Cont.)

INITIALIZATION DATA PACKET, MESSAGE CODE 020

MSG HDR	NUMBER OF WORDS	020
1	LENGTH OF NUMKQ	LENGTH OF NUMDQ
2	LENGTH OF FIXCNTQ	CURRENT CONFIGURATION
3		
4	1	
5	PAIRT word for keyboard # 1	
6	PAIRT word for keyboard # 2	
. . VAR . .		. . VAR . .
	PAIRT word for last keyboard	
	QUIKT word for keyboard # 1	
	QUIKT word for keyboard # 2	
. . VAR . .		. . VAR . .
	QUIKT word for last keyboard	

Appendix "A" (Cont.)

INITIALIZATION DATA PACKET, MESSAGE CODE 020

SYMT word for keyboard # 1
SYMT word for keyboard # 2

. . VAR . . . . VAR . .

SYMT word for last keyboard
PREVT word for keyboard # 1
PREVT word for keyboard # 2

. . VAR . . . . VAR . .

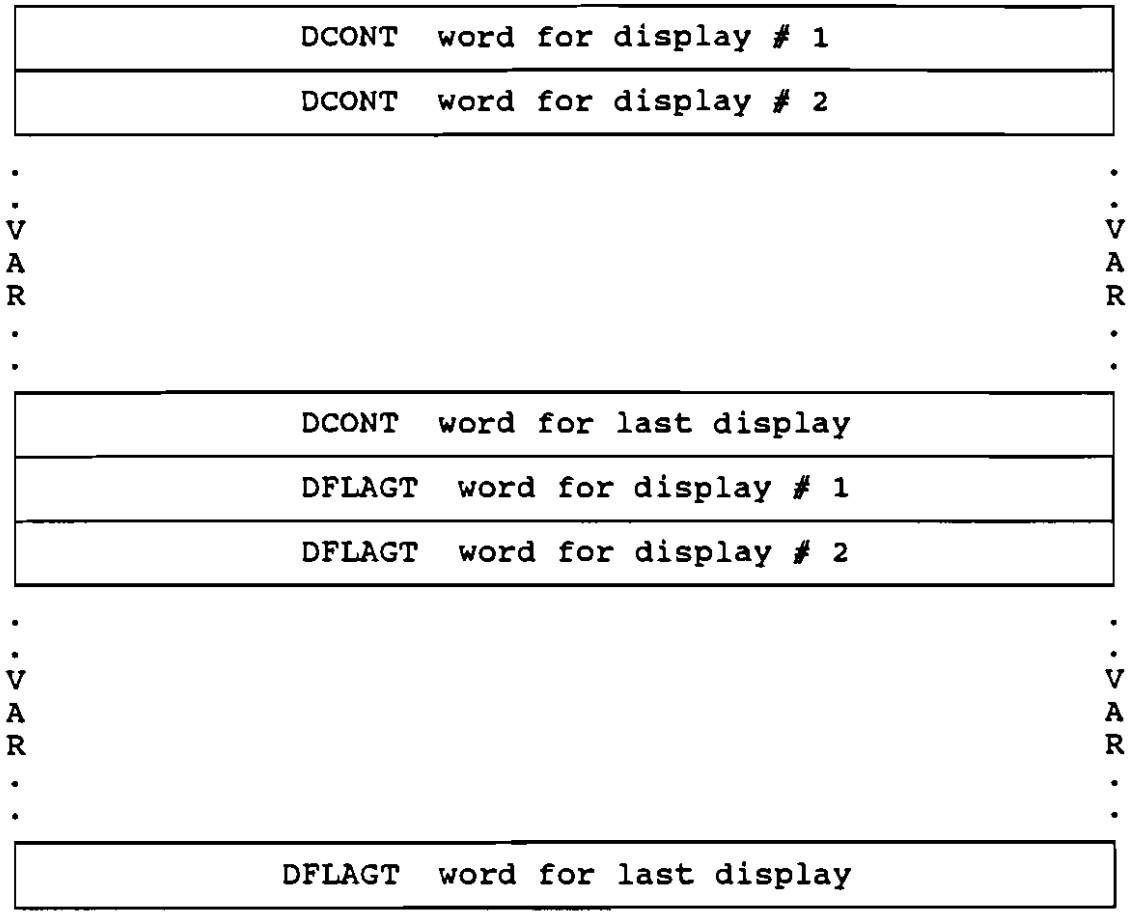
PREVT word for last keyboard
PULST word for keyboard # 1
PULST word for keyboard # 1

. . VAR . . . . VAR . .

PULST word for last keyboard
1

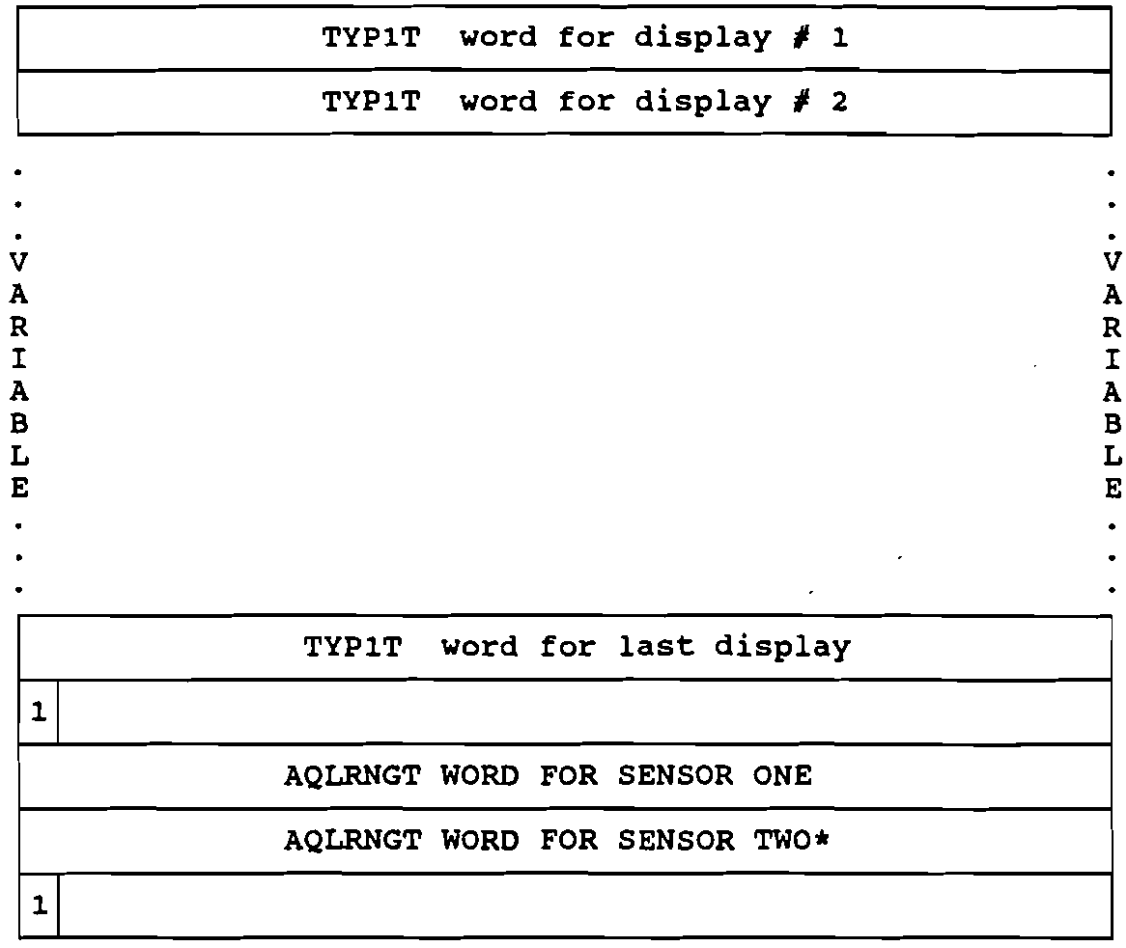
Appendix "A" (Cont.)

INITIALIZATION DATA PACKET, MESSAGE CODE 020



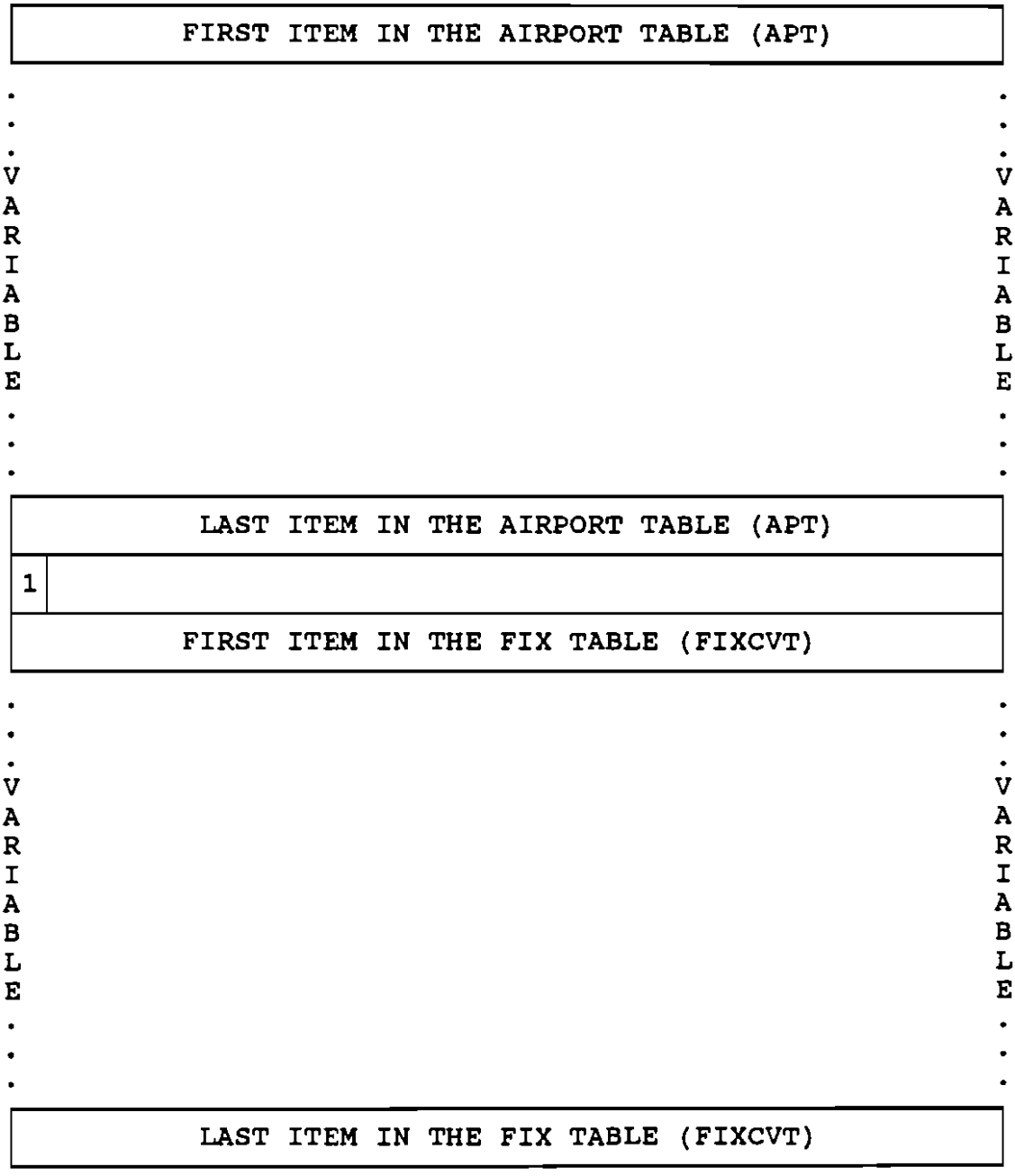
Appendix "A" (Cont.)

INITIALIZATION DATA PACKET, MESSAGE CODE 020



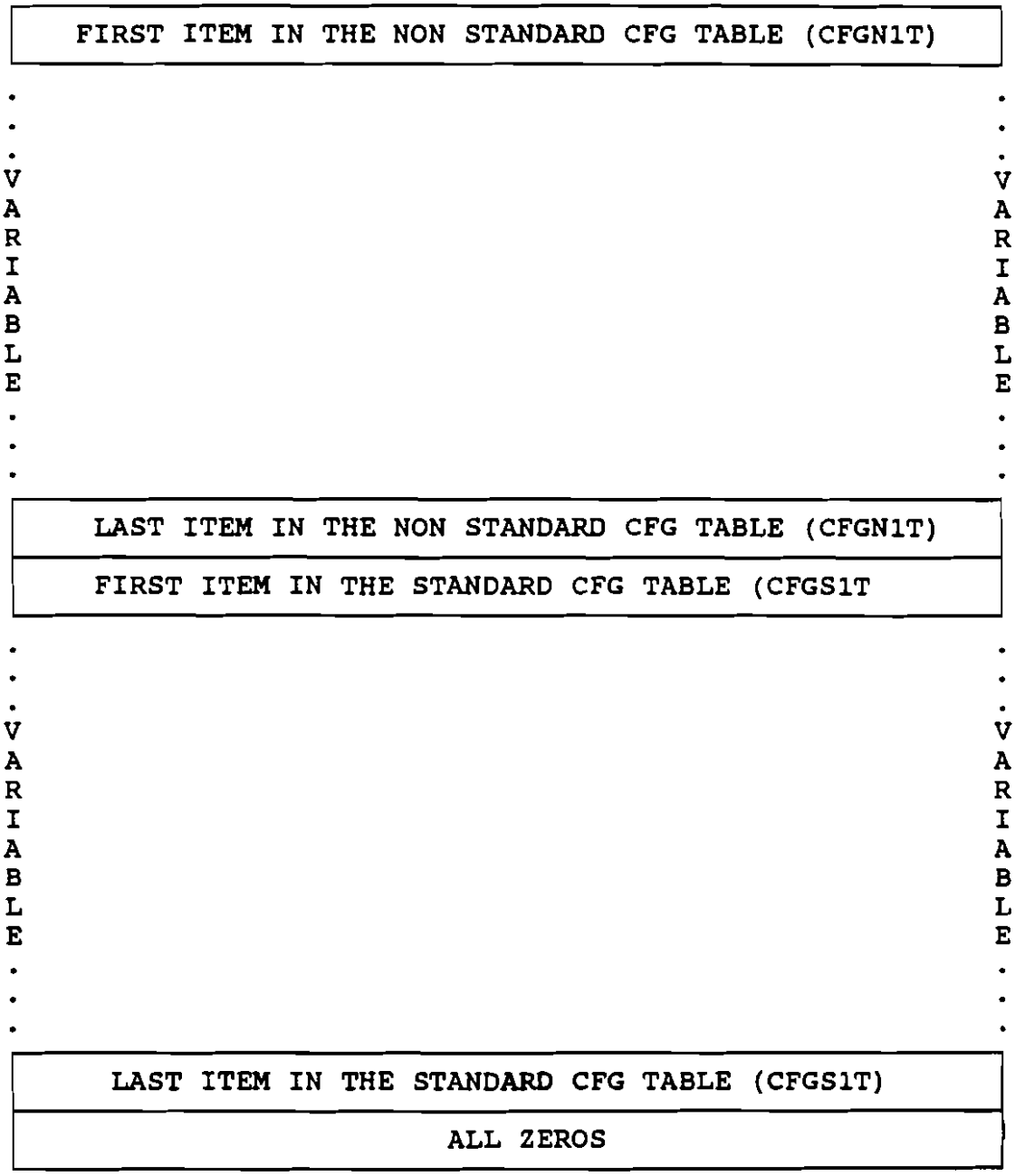
Appendix "A" (Cont.)

INITIALIZATION DATA PACKET, MESSAGE CODE 020



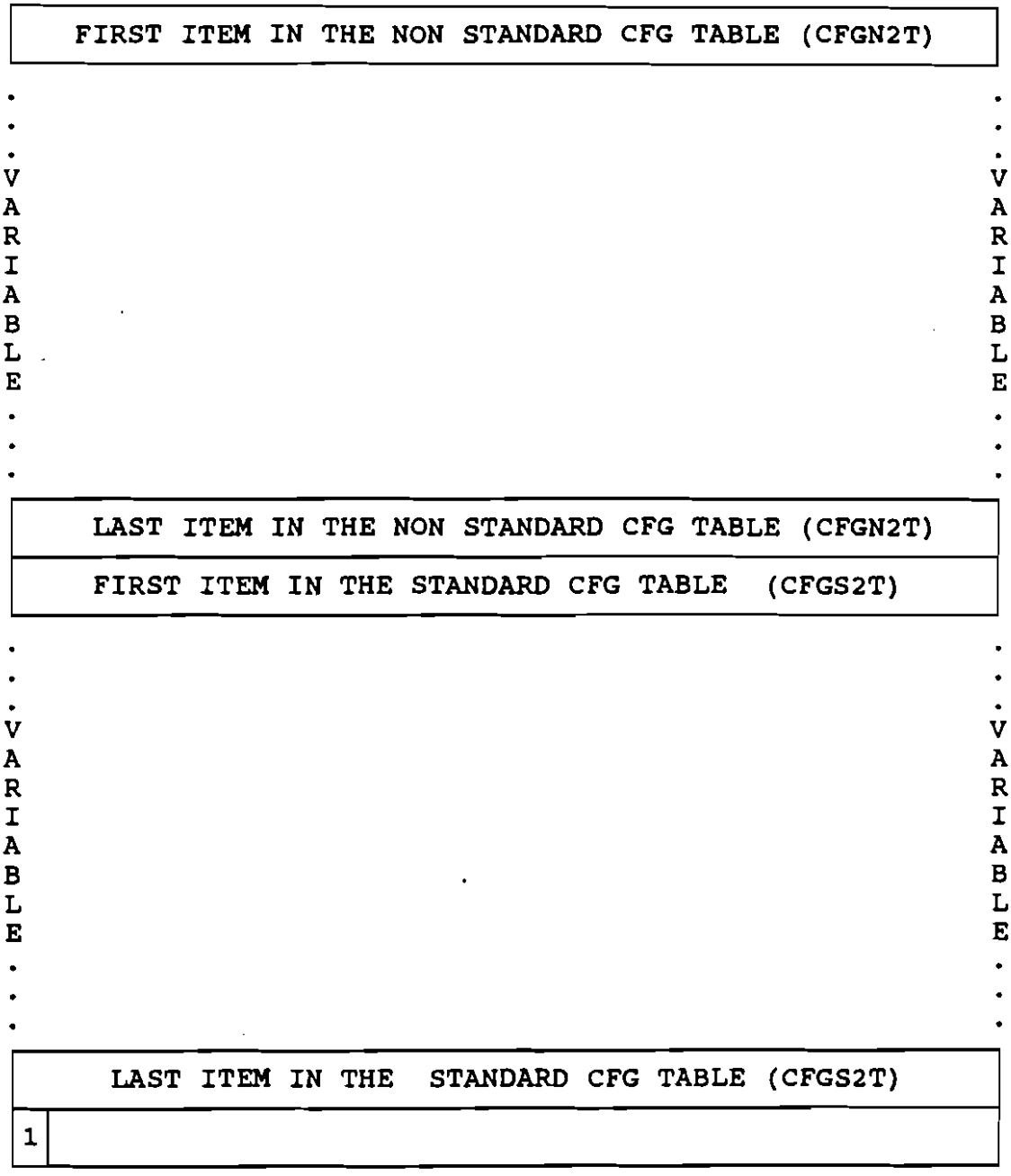
Appendix "A" (Cont.)

INITIALIZATION DATA PACKET, MESSAGE CODE 020



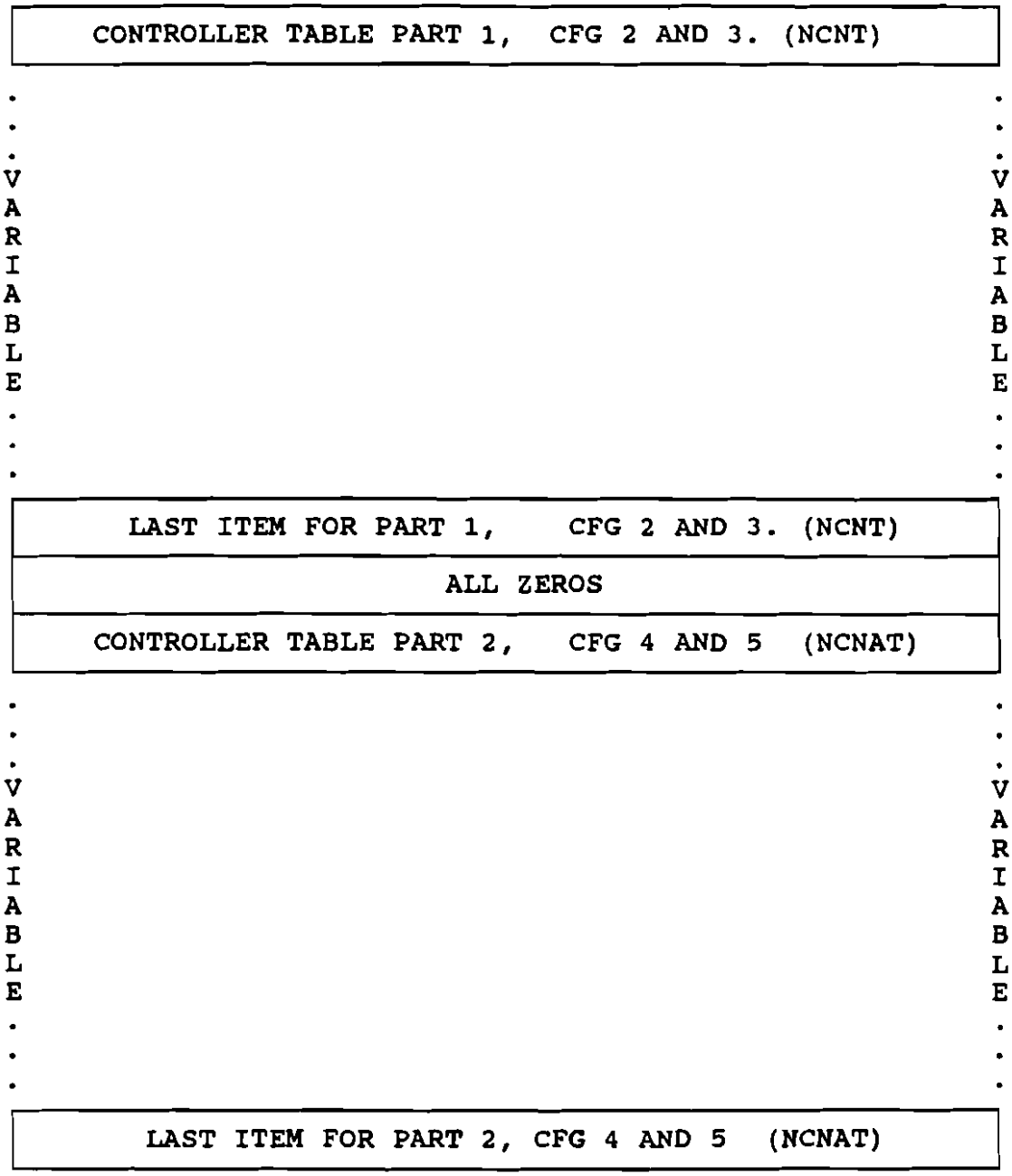
Appendix "A" (Cont.)

INITIALIZATION DATA PACKET, MESSAGE CODE 020



Appendix "A" (Cont.)

INITIALIZATION DATA PACKET, MESSAGE CODE 020



Appendix "A" (Cont.)

THREAD DROP DATA PACKET, MESSAGE CODE 021

	29 — 15	14 — 0
MSG HDR	NUMBER OF WORDS	021
WORD 1	CONTENTS OF CATC1	
WORD 2	CONTENTS OF CATC2	

Appendix "A" (Cont.)

TRACK DROP DATA PACKET, MESSAGE CODE 022

	29 — 15	14 — 0
MSG HDR	NUMBER OF WORDS	022
WORD 1	CONTENTS OF CATC1	
WORD 2	CONTENTS OF CATC2	

Appendix "A" (Cont.)

DISPLAYS TYP1T DATA PACKET, MESSAGE CODE 024

	29	1514	0
MSG HDR	NUMBER OF WORDS		024
WORD 1	CONTENTS OF TYP1T		
WORD 2			DISPLAY NUMBER

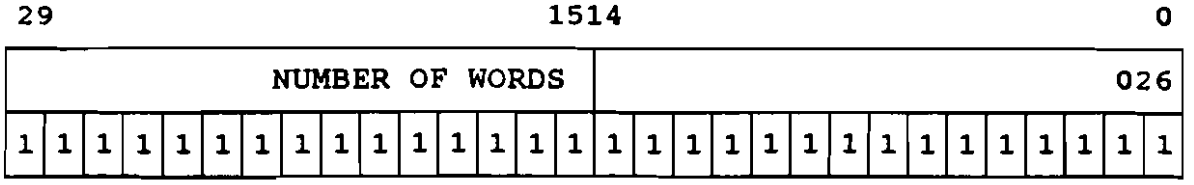
Appendix "A" (Cont.)

DISABLE FAST DATA PACKET, MESSAGE CODE 025

29	1514	0
	NUMBER OF WORDS	025

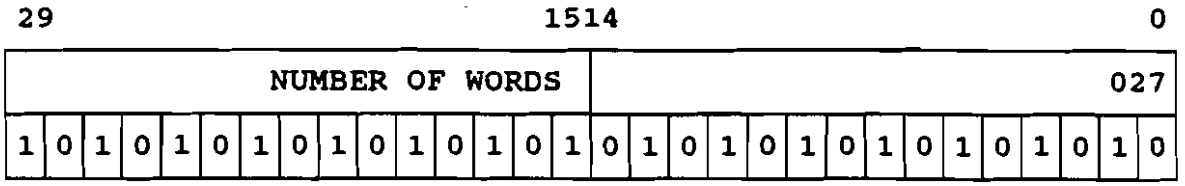
Appendix "A" (Cont.)

TEST PATTERN ONE, MESSAGE CODE 026



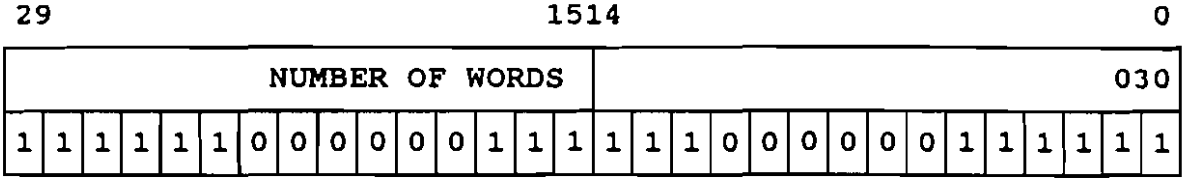
Appendix "A" (Cont.)

TEST PATTERN TWO, MESSAGE CODE 027



Appendix "A" (Cont.)

TEST PATTERN THREE, MESSAGE CODE 030



Appendix "A" (Cont.)

TEST PATTERN FOUR, MESSAGE CODE 031

29														1514																		0
NUMBER OF WORDS															031																
1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0

After the initial 10 words there shall be a break in data transmissions followed by 10 words containing the following.

29														1514																		0
0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

Appendix "A" (Cont.)

TROUT DEMARCATION DATA PACKET, MESSAGE CODE 040

Subsystem Zero

29	1514	0
	NUMBER OF WORDS	040

Appendix "A" (Cont.)

TROUT DEMARCATION DATA PACKET, MESSAGE CODE 041

Subsystem One

29	1514	0
	NUMBER OF WORDS	041

Appendix "A" (Cont.)

AUTOMATIC OFF SET DATA PACKET, MESSAGE CODE 050

	29 — 15	14 — 0
MSG HDR	NUMBER OF WORDS	050
WORD 1	CONTENTS OF CATC1	
WORD 2	CONTENTS OF CATC2	
WORD 3	CONTENTS OF CFLGT	
WORD 4	CONTENTS OF CTST	
WORD 5	CONTENTS OF RECRT	

Appendix "A" (Cont.)

LEADER DIRECTION CHANGE DATA PACKET, MESSAGE CODE 051

	29 — 15	14 — 0
MSG HDR	NUMBER OF WORDS	051
WORD 1	CONTENTS OF CATC1	
WORD 2	CONTENTS OF CATC2	
WORD 3	CONTENTS OF CFLGT	
WORD 4	CONTENTS OF CTST	
WORD 5	CONTENTS OF RECRT	

DOT/FAA/CT-ACD34094/15

PAGE CHANGES TO

ARTS IIIA
SYSTEM OPERATORS MANUAL

NASP-2501-06

ARTS IIIA FINAL APPROACH SPACING TOOL PHASE 1
CONFIGURATION CONTROL DECISIONS (CCD) NXXXX
CASE FILES CD300-CPT-OO3A and CD300-AR3A-003

MAY 4, 1993



FEDERAL AVIATION ADMINISTRATION
ATC TECHNOLOGY BRANCH, ACD-340

Function	Message Format(1)	Purpose
	F11, Q, (Type I) n, space, (Type II) n, S or C, Enter	Suppress (S) or Clear (C) Conflict Alert Processing in Specified Type I and Type II areas.
	F11, Q, Z, Enter	Master Clear all Type I and Type II Suppressions.
	F11, R, Enter	Request RTQC data printout.
← INSERT ATTACHMENT		
IF	F14,0	Enable/Disable Interfacility Test Program. May be entered at any time.
	F14,1 message-contents	Simulate an ARTCC-to-ARTS III interfacility message. Translate message to simulate ICA format, and transmit the accumulated buffer when a '+' is detected. Multiple F14,1's may be entered to transmit messages of length greater than would be allowed by a single F14,1. There are several special conversions made from what the user enters, to what the interfacility input processor (IFI) will process them as.

USER TYPES	CHARACTER TRANSLATED TO
•	space
/ (virgule)	LRC prepare character
+	EOM
.	/ (virgule)

	F14,2	Disable, Enable track update messages from being sent to ARTCC or another ARTS facility.
	F14,3	Disable, Enable time check for outputting of messages, and for displaying OLD on tracks in H/O from ARTCC or another ARTS facility.
	F14,4	Enable, Disable the time check for sending test messages to the center. The effect is to disable/enable test message transmissions to the ARTCC.
	F15	See Target Generator description.
	F16, Enter	Inhibit amplify data for the entering keyboard.

Function	Message Format(1)	Purpose
	F16, Identity (AS), Enter	Display amplify data for identified track.
	F16, P, Δ, Identity (AS), Enter	Request CTS printout for identified track.

11.2 IMPLIED KEYBOARD INPUT MESSAGES

Implied Function	Message Format	Purpose
BEACON READOUT	Slew, Enter 1. Unassociated Track	Identify an unassociated track for a limited data block readout.
HANDOFF ACCEPT/ RECALL	Slew, Enter	Track handoff accept (requires successful completion of ARTCC/ARTS IIIA communication).
	1. Associated Track 2. In Handoff Status 3. Entry made by designated receiver (Handoff Accept) 4. Entry made by control position (Handoff recall)	Track handoff recall (for handoff ARTCC, completion requires successful ARTCC/ARTS IIIA communication); for handoff via the ARTS to ARTS FP, a cancellation message is sent, (completion requires successful ARTS/ARTS communication).
HANDOFF INITIATE	Controller(23) or Delta (Δ) Facility ID or 0-9,/ (OP)(10), SED, ENTER	Initiate a track handoff (if handoff to ARTCC, completion requires successful completion of ARTCC/ARTS IIIA communication).
	1. Associated Track 2. Not in handoff status 3. Track controlled on this display	
TERMINATE CONTROL	Slew, Enter	Disassociate the flight plan data from the identified track file.
	1. Associated Track 2. Not in handoff status 3. Track's FDB is not blinking "DM" 4. FDB displayed on the entries display 5. Track controlled on the display 6. RBC displayed in FDB 7. Track not in initial correlation. 8. If track have arrival/overflight status the controller symbol can not be a "C".	

Function	Message Format[1]	Purpose
QK	F12,E/I,Enter	Enables/Inhibits FAST
	F12,T,1n/2n/3n, Enter	Enables Test pattern 1,2 or 3 messages to FAST
	F12,T,4, Enter	Enables Test pattern 4 message to FAST

Function	Message Format(1)	Purpose
BEACON CODE FILTER	F7, 1, FB, xxxx, y, Sn(OP), Enter(8)	Inhibit/enable extraction of data pertaining to beacon code xxxx. y = "I" for inhibit, "E" for enable. Sn is an optional subsystem indicator. Disable filter if xxxx and y not entered.
DISPLAY FILTER	F7, 1, FD, xx, y, Enter(8)	Inhibit/enable extraction of data pertaining to display xx. y = "I" for inhibit, "E" for enable. Disable filter if xx and y not entered.
SUBSYSTEM FILTER	F7, 1, FS, n, y, Enter(8)	Inhibit/enable extraction in subsystem n. y = "I" for inhibit, "E" for enable.
ASSOCIATION STATUS	F7, 1, FC, X(OP), Enter(8)	Inhibit extraction of data relating to associated tracks if X = "U". Inhibit extraction of data relating to unassociated tracks if X = "A". Delete filter if X is omitted.
MANUAL RECONFIGURATION	F7, 2, RCF, Space, nn, Enter(8)	Provide manual control of switching from full operational program to a backup program or vice versa (where nn is a two alphanumeric character program ID L0, L1, or L2).
INSERT ATTACHMENT 2 →	F7, 2, D, nn, E/I, Enter(8)	Enable/Inhibit display (where nn is a two digit decimal display number).
	F7, 2, K, nn, E/I, Enter(8)	Enable/Inhibit keyboard (where nn is a two digit decimal keyboard number).
	F7, 2, T/M, Enter(8)	Select TTYE/MSP as destination for failure, error or status messages (T for TTYE, M for MSP).
	F7, 2, M, nn, E/I, Enter(8)	Enable/Inhibit MDBM (where nn is a two digit decimal MDBM number).
	F7, 2, S, n, R, r, Enter(8)	Enables only SRAP r. See note *.
	F7, 2, S, n, R, r, r, Enter(8)	Enables automatic switching. *Note: n=sensor#, R=SRAP separator; r=designate SRAP as input and disable auto switching; r, r=enable auto switching.
	F7, 2, L, Enter(8)	Enable/Inhibit overload sensing and protection.

Function	Message Format(1)	Purpose
	F7, 2, TST, E/I, Enter(8)	Enable/Inhibit Test Targets for this display.
	F7, 2, n, E/I, Enter(8)	1) Enable/Inhibit TTYE/MSP printouts for a specific task indicated by the alpha character entered where n is an alpha character entered: D (DISPLAY), K (KIP), S (SRAP), and Q (RTQC TERMS). 2) Enable/Inhibit specific functions indicated by the alpha character entered where n is an alpha character entered: M (MSAW), R (Memory Readout), T (Test Mode), and V (Supervisory Control).
	F7, 2, B, S/D, Enter	Select Single/Dual system mode of operation.
	F7, 2, C, P, E/I, Enter	Enable/Inhibit CENRAP mode.
	F7, 2, T, P, E/I	Enable/Inhibit processing of Transfer Primary Radar Target TP messages.
	F7, 2, U, n, Enter	Declare the I/O device specified b, the character entered up for normal operation (where n is a device identifier entered: T (TTYE), 0 (D0), 1 (D1), M (MSP), or I (IMT)).
CONTROL PERFORMANCE MONITOR	F7, 3, A, Enter	Activate or deactivate the CTS report.
	F7, 3, A, Time (1 to 6 digits), M, n, Enter	Activate or alter the CTS report. The time entered is the interval between reports and is optional. M and the following digit indicate the number of current-maximum reports between overall-maximum reports, and are optional. If M and the digit are not entered, the default number is used. If M is entered with no digit, overall-maximum reports are not printed.
	F7, 3, B, Enter	Activate or deactivate the RTR report.
	F7, 3, B, Time (1 to 6 digits), M, n, Enter	Activate or alter the RTR report.
	F7, 3, C, Enter	Activate or deactivate the LAT report.
	F7, 3, C, Time (3 to 6 digits), M, n, Enter	Activate or alter the LAT report.

Function	Message Format[1]	Purpose
	F7,2,F,Enter	Enables the selection of the primary or alternate FAST channel