

TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL:

FAULT CATALOG

GUIDED MISSILE

AIR DEFENSE SYSTEM

AN/TSQ- 73

This copy is a reprint which includes current pages from Changes 1 through 5.

HEADQUARTERS, DEPARTMENT OF THE ARMY

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GUIDED MISSILE AIR DEFENSE SYSTEM ANTSQ-73

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*This manual supersedes TM 9-1430-655-20-2, 6 October 1978.

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CHAPTER 1

INTRODUCTION

1-1. General This manual contains the information necessary to isolate a malfunction in the AN/TSQ-73 system to replaceable circuit cards or modules when used with the procedures of TM 9-1430-655-20-1 and system fault isolation programs. The maintenance and diagnostic (M&D) fault catalog instructions are generated to subsystem and unit levels, and provide definitive directions for isolating an equipment malfunction in the system.

1-2. Forms, Records, and Reports. Refer to DA PAM 738-750 for the use and completion of all forms required for operating and maintaining the MTS.

1-3. Reporting Equipment Publications Improvements. Reporting of errors and omissions and recommendations by the individual user for improving this publication is encouraged. Reports should be submitted on DA Form 2028, Recommended Changes to Publications, and forwarded

to: Commander, U.S. Army Missile Command, ATTN: AMSMI-LC-ME-P, Redstone Arsenal, AL 35898-5238.

1-4. M&D Fault Catalog Description. The M&D fault catalog is a definitive listing of fault isolation program-generated error stop numbers, and is used to locate cards or modules which could cause the indicated malfunction. The numbers listed in the fault catalog which correspond to error stop numbers displayed on the ADP status and control panel DIAGNOSE CODE readout and printed on the KPU, are a result of the execution of a subsystem fault isolation program and are listed by equipment subsystem. Corresponding card or module locations are listed by connector number (JXXXX) and/or by name and part number. Table 1-1 lists the computer commands used to run subsystem fault isolation programs, and table 1-2 contains the fault catalog divisions of error stop number listings.

Table 1-1. Subsystem Diagnostic Program FI Codes

Subsystem	ADP status and control panel PROGRAM/TEST switch	KPU entry
ADP	Bootstrap load -66 or 76	-
RIE	50	CC50
VSU	51	CC51
DDG	52	CC52
KPU	53	CC53
MTU	54	CC54
Data Comm	55	CC55
Display Console	56	CC56

Table 1-2. Fault Catalog Equipment Subsystem Divisions

Fault isolation program	Subsystem	Fault catalog table
ADP FI	ADP error stop location matrix	2-1
	Central processor unit (CPU)	2-2
	Input/output unit (IOU)	2-3
	Buffer unit	2-4
	32K memory unit address 0	2-5
	32K memory unit address 1	2-6
	32K memory unit address 2	2-7
	32K memory unit address 3	2-8
	Display console 0 LHS (W/ADP FI)	2-13
	Display console 0 CS (W/ADP FI)	2-14
	Display console 1 LHS (W/ADP FI)	2-15
	Display console 1 CS (W/ADP FI)	2-16
	MTU FI	Magnetic tape unit (MTU)
Magnetic tape unit (MTU) (W/ADP FI)		2-17A
Display Console FI	Display console error stop location matrix	2-18
	Display console LHS	2-19
	Display console CS	2-20
	Display console RHS	2-21
DDG FI	DDG error stop location matrix	2-22
	DDG LHS	2-23
	DDG RHS	2-24
RIE FI	RIE error stop location matrix	2-25
	Radar integration unit (RIU)	2-26
	Video processor unit (VPU)	2-27
	RIE analog section	2-28
	RIE 16K memory	2-29
VSU FI	Video simulator unit (VSU)	2-31

NOTE: For data COMM FI Diagnose codes, refer to DATA COMM FI Flow Chart in TM 9-1430-655-20-7.

For KPU Fault Isolation procedures, refer to TM 9-1430-655-20-1 and TM 9-1430-656-14-1.

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CHAPTER 2

M&D FAULT CATALOG IMPLEMENTATION

2-1. General. The M&D fault catalog is used after execution of a subsystem fault isolation (FI) program and as directed by procedures in TM 9-1430-665-20-1. The FI program generates an error stop number relating to the general area of the malfunction and corresponding to an identical number listed in the subsystem's fault catalog fault location table. The following paragraphs define the use of the fault location tables when used with the procedures contained in TM 9-1430655-20-1.

2-2. Fault Determination. To determine if an actual fault exists when a TMON number is printed on the KPU or displayed in the DIAGNOSE CODE readout, or when a fault is indicated on the data display group (DDG), perform the following procedures before initiating fault isolation procedures.

a. Determine whether the indicated faulty unit is on-line. If the unit is off-line, either bring it on-line or disregard the TMON and/or fault indication.

b. Perform a system RESTART by setting the PROGRAM TEST SELECT thumbwheels to 00 and pressing the RESTART switch.

c. If the TMON is displayed again after the 00 RESTART, perform an 06 RESTART.

d. If the TMON is still displayed after the 06 RESTART, either reconfigure according to TM 9-1430652-10-3 or perform fault isolation according to TM 91430-655-20-1.

2-3. Fault Catalog Utilization. When referring to the M&D fault catalog from the FI flow charts (TM 9-1430655-20-1), five general conditions apply:

a. Determine unit being tested (reference table 1-2).

b. Refer to the appropriate fault location table.

c. Read any special notes which are located prior to the error stop number listings.

d. Locate corresponding error stop number in fault location table. The tables are divided into sections, based on the conditions of the PROG LOAD STATUS and DIAGNOSE STATUS indicators on the ADP status and control panel. The order of division within a given fault location table is as listed below:

PROGRAM LOAD STATUS	IOU	OFF	CPU	OFF
DIAGNOSE STATUS		IOU	OFF	CPU
PROGRAM LOAD STATUS	IOU	OFF	CPU	OFF
DIAGNOSE STATUS		IOU	OFF	CPU

PROGRAM LOAD STATUS	IOU	OFF	CPU	OFF
DIAGNOSE STATUS		IOU	ON	CPU

PROGRAM LOAD STATUS	IOU	OFF	CPU	OFF
DIAGNOSE STATUS		IOU	ON	CPU

PROGRAM LOAD STATUS	IOU	OFF	CPU	ON
DIAGNOSE STATUS		IOU	OFF	CPU

PROGRAM LOAD STATUS	IOU	OFF	CPU	ON
DIAGNOSE STATUS		IOU	OFF	CPU

PROGRAM LOAD STATUS	IOU	OFF	CPU	ON
DIAGNOSE STATUS		IOU	ON	CPU

PROGRAM LOAD STATUS	IOU	OFF	CPU	ON
DIAGNOSE STATUS		IOU	ON	CPU

PROGRAM LOAD STATUS	IOU	ON	CPU	OFF
DIAGNOSE STATUS		IOU	OFF	CPU

PROGRAM LOAD STATUS	IOU	ON	CPU	OFF
DIAGNOSE STATUS		IOU	OFF	CPU

PROGRAM LOAD STATUS	IOU	ON	CPU	ON
DIAGNOSE STATUS		IOU	OFF	CPU

PROGRAM LOAD STATUS	IOU	ON	CPU	ON
DIAGNOSE STATUS		IOU	OFF	CPU

PROGRAM LOAD STATUS	IOU	ON	CPU	ON
DIAGNOSE STATUS		IOU	ON	CPU

e. Perform the actions specified for the particular error stop number and appropriate program load and diagnose status conditions.

2-4. Error Stop Number Location Matrices. The ADP, display console, DDG, and RIE error stop location matrices are used with the fault isolation flow charts (TM 9-1430-655-20-1) to determine the proper fault isolation sequence for the unit-under-test. The matrices locate the error stop number, within a subsystem of the unit-under-test. Where an error stop number is located in more than one subsystem, the unit fault isolation flow chart determines which subsystem should be isolated first.

2-5. MTS Testable and Non-testable Cards. An error stop number may indicate cards testable by the MTS as well as those cards which must be substituted in order to determine whether or not they are faulty. The MTS testable cards are designated by their location only (e.g., J1118, J1128, J1209-J1210, etc.). Nontestable cards are indicated by their location, nomenclature, and part number (e.g., J1311 Read/ Write 10282702).

NOTE

If a non-testable card is listed within a group of testable cards, replace it, if necessary, after completing testing of testable cards.

2-6. Card Location Data. Card locations can be determined by the connector number as listed. This connector number corresponds to an A number as used in TM 9-1430-655-20-1 series for card location.

Example: J1234(A1234)
 J = connector (A = card)
 1 = bay number
 2 = card shelf
 34 = card slot

NOTE

MTS testable cards linked with dashes (J1109-J1110) indicate the cards are in adjacent locations on the card shelf.

2-7. Card Substitution. When substituting more than one card, the following procedure should be followed.

- a. Replace first card in group with spare of same type.
- b. If fault is not corrected, replace original card and substitute next card in group with spare of same type (first spare if second card is same).
- c. Continue above procedure until fault is corrected or last card in group has been substituted.
- d. Any failed card should be tagged and handled according to unit SOP.
- e. If the trouble was not corrected, replace spare card in storage and continue further FI procedures.

2-8. M&D Fault Catalog Entries. The following are examples of fault catalog entries and explanations of how they are implemented.

- a. Error stop number only listed once and contains the location of digital card that should be checked using the MTS. Adjacent cards are indicated by the dashes.

Example:

200745 J1102-J1103 J1106 J1109-J1110-J1111
 -J1121-J1122-J1123-J1124 J1126-J1127
 -J1210-J1211-J1212-J1213-J1214-J1215
 -J1224-J1225-J1226-J1227-J1228-J1229
 -J1320-J1321-J1322 J1324

- b. Error stop number listed twice. Perform actions indicated by its first listing. Replace a single non-MTS testable card first. If fault is not corrected, test in the MTS the digital cards listed by the second error-stop listing.

Example:

200755 1. Replace: J1311 Read/Write
 Memory 10282702.
 2. Test digital cards.

200755 J1118-J1119 J1132 J1134 J1209 J1230

- c. Error stop number listed twice. In this case, the digital card listed under the second error stop listing would be checked first and if the fault was not found, the single non-testable card would be replaced.

Example:

777007 1. Test digital cards.
 2. Replace: J1316 Clock Card 587100.

777007 J1101-J1102-J1103-J1104-J1105
 -J1114-J1115-J1116-J1117-J1118
 -J1128 J1130 J1136-J1137-J1138
 -J1202-J1203-J1204-J1205-J1206
 -J1214-J1215-J1216-J1217-J1218

- d. Double listing of same error stop number. The first action to perform would be to test the digital card and those listed under the second error stop listing. If fault is not found, the non-testable card would be replaced.

Example:

201027 1. Test digital card in J1130 and those listed below.
 2. Replace: J1311 Read/Write
 Memory 0282702.

201027 J1120-J1121 J1213-J1214-J1215-J1216

- e. Error stop number only listed once. The non MTS testable card would be replaced as the only action required under this error stop number.

Example:

202356 Replace: J1333 Category Select 1
 10281673.

- f. Error stop number only listed once. The card in A would be replaced and if the fault is not corrected, the card in B would be replaced. If the location of a card is different from the fault catalog section where the error stop number is found, its location will be indicated (see B).

Example:

505413 Substitute the following card assemblies:

- A. J1220 Video Mixer 10282719.
- B. In(RIU)J131 Quad 2 587102.

g. Error stop number listed twice. The indicated cards under the first listing and those listed under the second listing would be checked using the MTS. If the fault is not found, non-MTS testable cards would be substituted/replaced in the sequence indicated until the fault is found or all indicated cards have been substituted.

Example:

035203 1. Test digital cards in J1214, J1216 and those listed below.

2. Substitute the following card assemblies:

- A. J2345 Clock Card 587100.
- B. J1215 Adder 587130.
- C. J1217 Adder 587130.
- D. J1218 Adder 587130.
- E. J1219 Adder 587130.
- F. J1220 Adder 587130.
- G. J1221 Adder 587130.

035203 J1113 J1123-J1124-J1125-J1126-J1127-J1128
J1143 J1145-J1146 J1148-J1149-J1150-J1151

2-9. Fault Isolation Tables. Tables 2-1 through 2-31 list the possible error stop numbers for each subsystem in the system.

TABLE 2-1. ADP ERROR STOP LOCATION MATRIX

NOTE:

"Y" INDICATES ERROR STOP IS LOCATED IN INDICATED FAULT CATALOG SECTION.

"-" INDICATES ERROR STOP IS NOT LOCATED IN INDICATED FAULT CATALOG SECTION.

PROGRAM LOAD STATUS DIAGNOSE STATUS	IOU OFF		CPU OFF				CNSL-0		CNSL-1		MTU	
	IOU OFF	IOU OFF	CPU OFF	CPU OFF	CPU OFF	CPU OFF	LHS	CS	LHS	CS		
ERROR STOP NUMBER	CPU	IOU	BUFFER	32K—MEMORY—ADDRESS				LHS	CS	LHS	CS	
				0	1	2	3					
000000	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	-	-
000001	Y	-	-	Y	-	-	-	-	-	-	-	-
000002	Y	Y	-	Y	-	-	Y	-	-	-	-	-
000003	Y	Y	-	Y	Y	Y	Y	-	-	-	-	Y
000004	Y	Y	-	Y	-	-	-	-	-	-	-	-
000005	Y	Y	-	Y	-	-	-	-	-	-	-	-
000006	Y	Y	-	Y	-	-	-	-	-	-	-	Y
000007	Y	Y	-	-	-	-	-	-	-	-	-	-
000010	Y	Y	-	Y	-	-	-	-	-	-	-	Y
000011	Y	Y	-	-	-	-	-	-	-	-	-	-
000012	Y	Y	-	-	-	-	-	-	-	-	-	-
000013	Y	-	-	-	-	-	-	-	-	-	-	-
000014	Y	Y	-	-	-	-	-	-	-	-	-	-
000015	Y	-	-	Y	-	-	-	-	-	-	-	-
000016	Y	Y	-	Y	-	-	-	-	-	-	-	Y
000017	Y	Y	-	Y	-	-	-	-	-	-	-	-
000020	Y	-	-	-	-	-	-	-	-	-	-	-
000021	Y	-	-	-	Y	-	-	-	-	-	-	-
000022	Y	Y	-	-	-	-	-	-	-	-	-	-
000023	Y	Y	-	Y	-	Y	-	-	-	-	-	-
000024	Y	Y	-	Y	-	-	-	-	-	-	-	-
000025	Y	Y	-	Y	-	Y	-	-	-	-	-	-
000026	Y	-	-	-	-	-	-	-	-	-	-	-
000027	Y	Y	-	Y	-	-	-	-	-	-	-	-
000030	Y	-	-	-	-	-	-	-	-	-	-	-
000031	Y	-	-	Y	-	-	-	-	-	-	-	-
000032	Y	Y	-	Y	-	-	-	-	-	-	-	-
000033	Y	-	-	-	-	-	-	-	-	-	-	-
000034	Y	-	-	-	-	-	-	-	-	-	-	-
000035	Y	Y	-	Y	-	-	-	-	-	-	-	-
000036	Y	-	-	-	-	Y	-	-	-	-	-	-
000037	Y	Y	-	-	-	-	-	-	-	-	-	-
000040	Y	Y	-	Y	-	-	-	-	-	-	-	-
000041	Y	-	-	-	-	-	-	-	-	-	-	-
000042	Y	Y	-	-	-	-	-	-	-	-	-	-
000043	Y	Y	-	-	-	-	-	-	-	-	-	-
000044	Y	Y	-	Y	Y	-	-	-	-	-	-	-
000045	Y	Y	-	Y	Y	-	-	-	-	-	-	-
000046	Y	-	-	-	-	-	-	-	-	-	-	-
000047	Y	Y	-	-	-	-	-	-	-	-	-	-
000050	Y	Y	-	-	-	-	-	-	-	-	-	-