TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL
DISPLAY EQUIPMENT MAINTENANCE

EXPANDED TROUBLESHOOTING
(LOGIC DIAGRAM THEORY)

GUIDED MISSILE
AIR DEFENSE SYSTEM
AN/TSQ-73

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ORGANIZATIONAL MAINTENANCE MANUAL: DISPLAY EQUIPMENT MAINTENANCE EXPANDED TROUBLESHOOTING (LOGIC DIAGRAM THEORY) GUIDED MISSILE AIR DEFENSE SYSTEM AN/TSQ-73

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CHAPTER 5

DISPLAY CONSOLE EXPANDED TROUBLESHOOTING

Section I. INTRODUCTION

5-1. Scope. This manual is part two TM 9-1430-655-20-4, display console organizational maintenance for Guided Missile Air Defense System AN/TSQ-73, and provides supplemental expanded troubleshooting information. This manual is published for the use and guidance of advanced personnel responsible for repair of the display console beyond the scope of organizational maintenance covered in the basic TM 9-1430-655-20 series technical manuals.

5-2. Expanded Troubleshooting Concept. The expanded troubleshooting concept and troubleshooting criteria are described in the following subparagraphs.

a. *Expanded Troubleshooting.* Expanded troubleshooting is required when existing fault isolation procedures in the basic manuals fail to isolate and correct a malfunction. It is assumed that expanded troubleshooting will be performed by personnel fully trained and experienced in the AN/TSQ-73 system and its mission.

b. *Troubleshooting Criteria.* Expanded troubleshooting covered in this manual is based on use of existing on-site equipment (tapes, tools, test equipment, spare parts, and publications). Isolation of malfunctions is based on fault analysis of normal system operating conditions and using built-in M&D software programs.

5-3. Troubleshooting Aids. Reference material contained in this manual to aid in performing troubleshooting procedures are detailed below.

a. *Contents of Manual.* This manual contains functional logic diagrams to enhance troubleshooting and fault isolation capabilities. The functional logic diagrams and the associated circuit descriptions are intended to be self-contained and minimize requirements of additional troubleshooting aids. Also, power distribution diagrams, cabling diagrams, and front-panel schematic diagrams are supplied.

b. *Input/Output Tables.* Input and output tables are provided as applicable for each figure and sheet to enable easy access to signals referenced to other diagrams.

c. *Input and Output Symbology.* Symbols used on diagrams to indicate input and input signals include the following:

▲ Indicates input from another figure.

▲ Indicates input from same figure.

■ Indicates output to another figure.

□ Indicates output to same figure.

◪ Indicates output to same and another figure.

d. *Equipment Interface.* The troubleshooting diagrams may reference inputs and outputs interfacing between other equipments. When a notation that an external equipment is involved, it is assumed that the user will refer to the applicable troubleshooting information provided for that equipment.

e. *Logic Symbology.* Logic symbology depends on card types. For discrete circuit cards containing conventional integrated circuits, conventional logic symbols are used. These symbols are used independently with card locations and card pin numbers notated with the symbol. For analog circuits, circuit card details are provided only to a functional level.

5-4. Physical Description (fig. 5-1). The display console is a free-standing assembly consisting of a cabinet assembly and three slide-mounted chassis assemblies. Two display consoles (units IA5 and IA6) are normally installed in the AN/TSQ-73 system shelter (unit 1). Provisions are provided for installing either or both display consoles in a remoted position external to the system shelter. Refer to TM 9-1430-655-20-1 for cabling diagrams depicting the various display console installations. Refer to table 5-1 for a cross-reference of part numbers and drawing numbers for major system equipment in reference designator order; refer to table 5-2 for a detailed cross-reference of major display console assemblies and components.

a. *Cabinet Assembly.* The display console cabinet assembly is an electromechanical enclosure housing three slide-mounted electronic assemblies. Mechanically, the cabinet assembly contains a cooling system and provides mounting provisions for cables, power supplies, and mechanical components.

(1) Electronic assemblies. The electronic assemblies include the left (A1) and right hand (A3) assemblies and the center section (A2) which are mounted in the upper portion of the cabinet assembly. When installed, the front panels of the electronic assemblies provide an overall operating surface of approximately 24 by 29 inches; the operating surface is tilted 15 degrees from the vertical for operating convenience. A bullnose, or writing shelf, is externally mounted on the cabinet for use by the operator.

(2) *Cabinet cooling system*. Cooling air circulation within the display console is accomplished by an internally mounted blower (A4) which draws in ducted air for distribution to electronic components by an air plenum. Intake and exhaust air filters provide emi-isolation and dust filtering.

(3) *Cabinet cable set.* The cabinet cable set includes wiring harnesses and cable assemblies W251 thru W253, W255, W256, and W270 thru W272. The cable set provides electrical interconnection between internal electronic components and external interface. Tilted connector panels are mounted on both sides of the lower cabinet recess. The connector panel accommodates interconnecting cabling as well as providing facilities for two headsets and a footswitch used for voice communications.

(4) *Power supplies.* The power supplies are also mounted in the lower cabinet recess behind an access panel. The power supplies include three dc/dc converters (PS1 thru PS3) and a variable lamp power supply (PS4). A hinged door in the access panel permits MTS interface. The MTS interface card is normally installed in connector J15 (located behind the hinged door); the MTS umbilical card is installed in J15 when the MTS is used for in-system testing.

b. *Left Hand Assembly*. The left hand assembly consists primarily of the left hand front panel and the left hand card cage containing three bays. When the left hand assembly is extended for maintenance, circuit cards are readily accessible from the center of the console.

c. *Center Section*. The center section has a modular construction for ease of maintenance. Major assemblies include crt assembly (A2A1), center section card cage (A2A2), deflection amplifier (A2AR1), high voltage power supply (A2PS1), and deflection amplifier power supply (A2PS2). The crt assembly is modularized and contains the crt, deflection coils, and tube shield. The center section card cage is hinged for access from the top when the center section is extended for maintenance. The deflection amplifier, high voltage power supply, and deflection amplifier power supply are also modular and are readily accessible for maintenance.

d. *Right Hand Assembly.* The right hand assembly consists primarily of the right hand front panel (A3A1), the right hand card cage (A3A2) containing three bays, and the VCS (A3A3). When the right hand assembly is extended for maintenance, circuit cards are readily accessible from the center of the console. The VCS is a separate unit and is console mounted for front panel access by the operator.

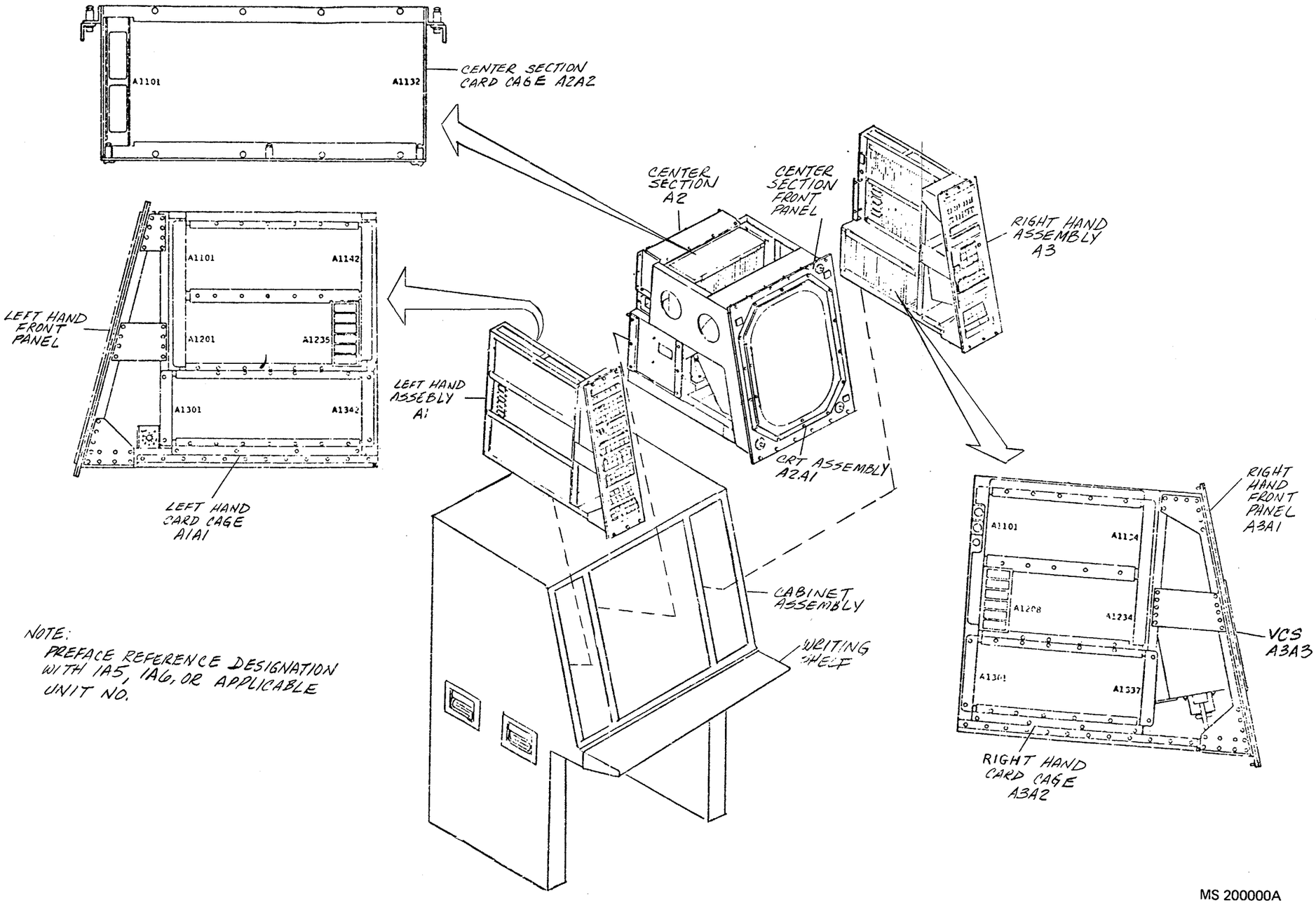

Figure 5-1. Display Console Major Units and Assemblies

Table 5-1. AN/TSQ-73 Major Equipment Cross-Reference

Ref des	Equipment	Part no.	Drawing
---	External Cable Set	10281356	10284717
1	Shelter	Multiple	---
	Intra-Shelter Cable Set	10282262	10284718
1A1	Equipment Rack	10284818	---
	Equipment Rack Cable Set	10284715	10284716
1A1A1	Rack 1 -	---	---
1A1A1A1	Radar Interface Equipment (RIE) II Panel	10282235	WL10282235
1A1A1A2	Radar Simulator Panel	10281406	WL10281406
1A1A1A3	Video Simulator Unit (VSU)	10281390	---
	VSU Wired Card Cage	10281348	WL10281348
1A1A1A4	Radar Integration Unit (RIU)	10281380	---
	RIU Bay 1 Wired Card Cage	10281387	WL10281387
	RIU Bay 2 Wired Card Cage	10281436	WL10281436
1A1A1A5	Video Processor Unit (VPU)	10281383	---
	VPU Bay 1 Wired Card Cage	10281388-13	WL10281388-2
	VPU Bay 2 Wired Card Cage	10281422	WL10281422
1A1A1A6	Radar/Simulator Unit (RSU)	10281614	---
	RSU Unit Wired Card Cage	10281615	WL10281615-2
1A1A1A7	1-Port 8K Core Memory	10281385	---
1A1A1A8	Wired Core Memory Assembly	10281386	WL10281386
1A1A2	Rack 2	---	---
1A1A2A1	Automatic Data Processor (ADP) Status and Control Panel	10284664	WL10284664
1A1A2A2	Data Comm Control Panel	10281439	WL10281439
1A1A2A3	4-Port 8K Core Memory	10281342	---
1A1A2A4	Wired Core Memory Assembly	10281397	WL10281397
1A1A2A5	Upper Modem (16/16)	10281616	---
	Upper Modem (10/16)	10284971	---
	Upper Modem Wired Card Cage	10281617-14	WL10281617-2
1A1A2A6	Data Comm Card Cage	10281619	---
	Data Comm Wired Card Cage	10281620	WL10281620
1A1A2A7	Lower Modem (4/16)	10281618	---
	Lower Modem (2/16)	10284830	---
	Lower Modem Wired Card Cage	10281650-14	WL10281650-2
1A1A2A8	4-Port 8K Core Memory	10281342	---
1A1A2A9	Wired Core Memory Assembly	10281397	WL10281397

Table 5-1. AN/TSQ-73 Major Equipment Cross-Reference
-Continued

Ref des	Equipment	Part no.	Drawing
1A1A3	Rack 3	---	---
1A1A3A1	Input/Output Unit (IOU)	10281344	
	IOU Wired Card Cage	10281394	WL10281394
1A1A3A2	Buffer Unit	10281437	---
	Buffer Unit Wired Card Cage	10281431	WL10281431
1A1A3A3	Central Processing Unit (CPU)	10281340	---
1A1A3A4	CPU Bay 1 Wired Card Cage	10281396	WL10281396
	CPU Bay 2 Wired Card Cage	10281430	WL10281430
1A1A3A5	4-Port 8K Core Memory	10281342	---
thru	Wired Core Memory Assembly	10281397	WL10281397
1A1A3			
1A1A4	RIE I Panel	10281406	WL10281409
1A1A5	ADP Interface Panel	10285182	WL10284551
1A1A6	Radar Interface Panel	10284817	WL10281445
1A2	Power Cabinet	10285434	WL10285257 10284916
1A3	Voice Communications Central (VCC)	10284822	---
1A3A1	RFI Filter Assembly	MIS-19560	---
thru			
1A3A39			
1A3A36	RFI Filter Assembly	MIS-19561	
thru			
1A3A39			
1A3A40	Communications Patching Panel	10281341	WL10281331
1A3A41	VCC Unit	10281355	WL10282276
1A3A41A1	VCC Control Panel	10281623	WL10281889
1A3A41A2	VCC Wired Card Cage	10281334-2	WL10281334-2
1A4	Maintenance Bench	10284823	---
1A5, 1A6	Display Console	10284960	10282130
1A7, 1A17	Data Display Group	10281361	10282122
1A8, 1A13	Magnetic Tape Unit (MTU)	10285127	---
	Wired MTU Assembly	10285128	WL10285128
	MTU Subassembly	10285138-2	WL10285138
1A9, 1A10	Voice Communications Station (VCS)	10281399-2	---
	Wired VCS Unit	10281625	WL10282287
	VCS Front Panel	10281630-2	WL10281630-2
	VCS Wired Card Cage	10282277	WL10282277

Table 5-1. AN/TSQ-73 Major Equipment Cross-Reference —Continued

Ref des	Equipment	Part no.	Drawing
1A11	Modular Collective Protection Equipment (MCPE) (when supplied)	10284806	
1A12	Keyboard Printer Unit (KPU)	10281464	
1A14	Module Test Set (MTS)	10281395	
	Wired MTS Assembly	10281449	WL10281449
	Test Set Probe Assembly	10285061	WL10281447
1A15	Environmental Control Panel (ECP)	10281477-2	WL10281477 10281565
2	Radar Junction Box (RJB)	10285092-1	WL10285092-3
3	Display Junction Box (DJB)	10284920	WL10284920
4	Motor Generator Set	10285058	
5	Diesel Engine Generator		

Table 5-2. Display Console Mayor Assembly Cross-Reference

Ref des	Equipment	Part no.	Drawing
1A5, 1A6	Display Console	10284960-7	10282130
	Cabinet Assembly	10284961-2	WL10284961-2
A1	Left-Hand Assembly	10284962-3	WL10281337
A1A1	Left Hand Card Cage	10281338-4	WL10281338-4
	Left Hand Front Panel	10281815-4	WL10281926
A2	Center Section	10284962	WL10281351
	Center Section Front-Panel/Chassis		WL10281351
A2A1	CRT Assembly	10281352	
A2A2	Center Section Card Cage	10281367-2	WL10281367-2
A2AR1	Deflection Amplifier	10281377-3	WL10281377-3
A2PS1	High Voltage Power Supply	10281379	WL10281379
A2PS2	Deflection Amplifier Power Supply	10281378	WL10281378
A3	Right Hand Assembly	10284964	WL10281389
A3A1	Right Hand Front Panel	10281813	WL10281927
A3A2	Right Hand Card Cage	10284595-4	WL10284595-4
A3A3	VCS	10281399	WL10281334-2
A4	Fan Assembly	10285005	
PS1, PS2	DC/DC Converter	126649-102	126649-300
PS3	DC/DC Converter	126650-103	126650-300
PS4	Variable Lamp Power Supply	10281467-3	10281469