

TECHNICAL MANUAL

**ORGANIZATIONAL MAINTENANCE MANUAL
DATA COMMUNICATIONS EQUIPMENT MAINTENANCE**

**EXPANDED TROUBLESHOOTING
(LOGIC DIAGRAM THEORY)**

**GUIDED MISSILE AIR DEFENSE SYSTEM
AN/TSQ-73**

HEADQUARTERS, DEPARTMENT OF THE ARMY

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**ORGANIZATIONAL MAINTENANCE MANUAL:
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CHAPTER 5

DATA COMMUNICATIONS EXPANDED TROUBLESHOOTING

Section I. INTRODUCTION

5-1. Scope. This manual is part two TM 91430655207, communications equipment organizational maintenance for Guided Missile Air Defense System AN/TSQ73, and provides supplemental expanded troubleshooting information. This manual is published for the use and guidance of advanced personnel responsible for repair of the data communications beyond the scope of organizational maintenance covered in the basic TM 9143065520 series technical manuals.

5-2. Expanded Troubleshooting Concept. Expanded troubleshooting is required when existing fault isolation procedures in the basic manuals fail to isolate and correct a malfunction. The troubleshooting covered in this manual is based on use of existing onsite equipment (tapes, tools, test equipment, spare parts, and publications). Isolation of malfunctions is based on fault analysis of normal system operating conditions and use of built-in M&D software programs.

5-3. Troubleshooting Aids. 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 for additional troubleshooting aids. Also, power distribution diagrams, cabling diagrams, and front panel schematic diagrams are supplied.

a. *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.

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

- △ Indicates input from another figure.
- Indicates output to another figure.

c. *Equipment Interface.* The troubleshooting diagrams may reference inputs and outputs interfacing between other equipments. When there is 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.

d. *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 data communication equipment consists of a data terminal set (DTS) which includes a data communications control panel 1A1A2A2, an upper modem 1A1A2A5, a communications card cage 1A1A2A6, and a lower modem 1A1A2A7. DTS communications interface to external subscribers is accomplished through communications patching panel 1A3A40 and the communications demarkation panel.

a. *Data Terminal Set.* The DTS consists of a data communication control panel, three card cage assemblies, modems, an interim battery data link (IBDL) circuit card, a common timing circuit card, and power supplies. The data communication control panel contains all DTS controls and indicators. Two of the three card cages (upper and lower modem) provide card slots for up to 32 modems. Each modem consists of a set of eight circuit cards. Refer to table 51 for card locations of each modem. The third card cage contains the IBDL and common timing circuit cards. All power for the DTS is supplied from the system power cabinet to dc/dc converters. The number of dc/dc converters used depends on the number and location of modems.

b. *Communications Patching Panel.* The communications patching panel is located on the right side of the voice communications control unit 1A3A41 and is hinged on the right for easy access. The panel provides eight sets of jacks for each modem, with the transmit and receive pair for a specific net side by side. Each of the jacks is a bantam 2+1 set. The top jack permits entry via a patchcord to the addressee. The middle jack permits entry via a patchcord to the internal equipment and the bottom jack permits monitoring, without breaking the connection, between the internal equipment and the external addressee.

c. Communications Demarkation Panel. The communications demarkation panel is located at the back of the voice communications central unit and extends through the electrical equipment shelter wall. The panel contains 39 rfi filters to limit lightning-induced transients up to 10 kv/microsecond. Table 52 provides a

cross-reference list of part and drawing numbers for the AN/TSQ-73 system in reference designator order; this cross-reference is for identification of assembly and electrical drawings only. Refer to TM 9-1430-655-20-1 for a listing of wiring harnesses and cables and associated wire list or cable wiring diagrams.

Table 5-1. Upper and Lower Modem Card Locations

Modem no	Modem control	Modem analog	Modulator carrier generator	Modulator data formatter	Frequency discriminator LP filter	Data synchronizer	I/O control no. 2	I/O control no. 1
1, 17	A1 1102	A1103	A1104	A1105	A1106	A1 1107	A1108	A1109
2, 18	A111110	A1111	A1112	A1113	A1114	A1115	A1116	A1117
3, 19	A1118	A1119	A1120	A1121	A1122	A1123	A1124	A1125
4, 20	A1126	A1127	A1128	A1129	A1130	A1131	A1132	A1133
5, 21	A1201	A1202	A1203	A1204	A1205	A1206	A1207	A1208
6,22	A1209	A1210	A1211	A1212	A1213	A1214	A1215	A1216
7, 23	A1217	A1218	A1219	A1220	A1221	A1222	A1223	A1224
8, 24	A1225	A1226	A1227	A1228	A1229	A1230	A1231	A1232
9, 25	A1302	A1303	A1304	A1305	A1306	A1307	A1308	A1309
10, 26	A1310	A1311	A1312	A1313	A1314	A1315	A1316	A1317
11, 27	A1318	A1319	A1320	A1321	A1322	A1323	A1324	A1325
12, 28	A1326	A1327	A1328	A1329	A1330	A1331	A1332	A1333
13, 29	A1401	A1402	A1403	A1404	A1405	A1406	A1407	A1408
14,30	A1409	A1410	A1411	A1412	A1413	A1414	A1415	A1416
15, 31	A1417	A1418	A1419	A1420	A1421	A1422	A1423	A1424
16, 32	A1425	A1426	A1427	A1428	A1429	A1430	A1431	A1432