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TM 11-5895-532-12

TECHNICAL MANUAL

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OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

INTERROGATOR SET AN/TPX-46(V)1 (FSN 5895-423-1693)

INTERROGATOR SET AN/TPX-46(V)2 (FSN 5895-423-1694)

INTERROGATOR SET AN/TPX-46(V)3 (FSN 5895-423-1696)

INTERROGATOR SET AN/TPX-46(V)4 (FSN 5895-423-1700)

INTERROGATOR SET AN/TPX-46(V)6 (FSN 5895-423-1702)

This copy is a reprint which includes current pages from Changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY
DECEMBER 1973

WARNING

Dangerous Voltage Exists in this Equipment

DON'T TAKE CHANCES!

Extremely Dangerous Voltages Exist in the Following Unit:
Receiver-Transmitter, Radio RT-1026/TPX-46(V) 5,000 Volts

CAUTION

Do not remove or replace lamps, components, cards, or modules unless associated POWER circuit breaker is set to OFF.

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *10 February 1976*

Operator's and Organizational Maintenance Manual

INTERROGATOR SET AN / TPX-46(V)1 (NSN 5895-00-423-1693)

INTERROGATOR SET AN / TPX-46(V)2 (NSN 5895-00-423-1694)

INTERROGATOR SET AN / TPX-46(V)3 (NSN 5895-00-423-1696)

INTERROGATOR SET AN / TPX-46(V)4 (NSN 5895-00-423-1700)

INTERROGATOR SET AN / TPX-46(V)6 (NSN 5895-00-423-1702)

TM 11-5895-532-12, 28 December 1973, is changed as follows:

1. This change incorporates Receiver-Transmitter Modification MWO 11-5895-532-50-1, retrofit improvements, addition of an isolation transformer, and corrects errors and omissions.
2. New or changed material is indicated by a vertical bar in the margin.
3. Remove and insert pages as indicated below.

Remove pages	*Insert pages*
i through iv	i through iv
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1-15 through 1-20	1-15 through 1-20
2-1 and 2-2	2-1 and 2-2
2-7 through 2-12	2-7 through 2-12.1
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B-25 and B-26	B-25 and B-26
B-27	B-27
Figure FO-3	Figure FO-3
Figure FO-4	Figure FO-4
Figure FO-5	None

4. File this change sheet in the front of the manual for reference purposes.

By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Chief of Staff

Official:

PAUL T. SMITH
Major General, United States Army
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MICOM (5)
TECOM (2)
ARMCOM (2)
ARADCOM (3)
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Armies (1) except
  7th USA (5)
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ARNG & USAR: None.
For explanation of abbreviations used, see AR 310-50.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1976—603-770 177

TECHNICAL MANUAL
NO. 11-5895-532-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *28 December 1973*

Operator's and Organizational Maintenance Manual

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CHANGE
NO. 4

HEADQUARTERS
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WASHINGTON, DC, *19 June 1978*

Operator's and Organizational Maintenance Manual

INTERROGATOR SET AN/TPX-46(V)1 (NSN 5895-00-423-1693)

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INTERROGATOR SET AN/TPX-46(V)3 (NSN 5895-00-423-1696)

INTERROGATOR SET AN/TPX-46(V)4 (NSN 5895-00-423-1700)

INTERROGATOR SET AN/TPX-46(V)6 (NSN 5895-00-423-1702)

This Change is current as of 11 January 1978

TM 11-5895-532-12, 28 December 1973, is changed as follows:

1. New or changed material is indicated by a vertical bar in the margin.
2. Remove and insert pages as indicated below.

Remove	*Insert*
i and ii	i and ii
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4-1	4-1 through 4-6
5-1 and 5-2	5-1 and 5-2
Appendix C-1 through C-3	Appendix C-1 through C-5
None	Appendix D-1 through D-2
None	Appendix E-1 through E-2
Index 1 through Index 3	Index 1 through Index 3/(Index 4 blank)

3. File this change sheet in front of the manual for reference purposes.

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

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J.C. PENNINGTON
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CINCUSAREUR (3)
USAREUR (10)
7th USA (5)
COMUSKOREA (2)
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LBAD (7)
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*This manual supersedes TM 11-5895-532-12, 25 February 1972.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes interrogator Set AN/TPX-46(V) in each of five configurations and provides instructions for installation, operation, operator's maintenance, organizational maintenance, functional operation, preparation for shipment, and destruction of the equipment to prevent enemy use. Operator's instruction includes operation of the equipment under usual and unusual conditions. Also included are procedures for cleaning and inspecting the equipment, and replacement of parts by the operator and organizational personnel. Common names of components are provided in paragraph 1-13.

b. The interrogator set is used in the various radar systems given in paragraph 1-6. If a conflict exists for the information or instructions provided in this manual, and the specific information or instructions in the associated radar system manuals, the instructions in the associated radar system manuals shall prevail.

c. The equipment serviceability criteria for Interrogator Set AN/TPX-46(V) is TM 11-5895-532-ESC.

d. Federal Stock Numbers (FSN's) given in this manual may be converted to National Stock Number (NSN) notation by inserting -00- as follows: FSN 5895-423-1693 becomes NSN 5895-00-423-1693.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DSAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33A/AFR 73-18/MCO P4610.19B, and DSAR 4500.15.

1-4. Administrative Storage

Performance of preventive maintenance checks and services (PMCS) (para 4-5) is required prior to placing the equipment into administrative storage. The packing materials described in paragraph 2-5, should be saved and used to repack the equipment when placed in administrative storage.

1-5. Destruction of Army Materiel

Demolition and destruction of electronic equipment will be under the direction of the commander and in accordance with TM 750-244-2.

1-5.1. Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-MA-Q, Fort Monmouth, New Jersey 07703.

1-5.2. Reporting Equipment Improvement Recommendations (EIR)

EIR's will be prepared using DA Form 2407, Maintenance Request. Instructions for preparing EIR's are provided in TM 38-750, the Army Maintenance Management System. EIR's should be mailed direct to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

Section II. DESCRIPTION AND DATA

1-6. Purpose and Use

Interrogator Set AN/TPX-46(V) is an easily transportable identification friend or foe (iff) set, in five configurations. The AN/TPX-46(V)1 is designed for use at improved HAWK sites, the AN/TPX-46(V)2, for use at NIKE-HERCULES sites, the AN/TPX-46(V)3 for use at Defense Acquisition Radar (DAR) sites, the AN/TPX-46(V)4 at AN/GSS-1 or AN/GSS-7 sites with the AN/TSQ-38 or AN/MSQ-18 systems, and Interrogator Set AN/TPX-46(V)6 as a training set. The function of the iff set is to provide the operator with a rapid, secure means of identifying friendly aircraft, and to provide the associated radar with indications of identity to be displayed on the radar plan position indicator (ppi).

a. Interrogations. To establish the identity of friendly aircraft, the iff set transmits coded radio frequency (rf) interrogations to the radar target aircraft. Interrogations may be accomplished in any one of four modes (modes 1,2,3/A and 4) of operation which are initiated manually by the operator or automatically from the associated radar. A fifth mode (mode C) which is provided to establish the altitude of the target aircraft, is initiated and processed by the associated radar, is pulse decoded in the synchronizer.

b. Replies. If the radar target aircraft is equipped with the appropriate equipment and mode settings, it will recognize the mode in which it is being interrogated and will encode and transmit a reply in that same mode. The replies will be received, processed, and evaluted by the iff set. When it is determined that the aircraft has replied properly to interrogations, an identification indication will be presented to the associated radar for display on the radar ppi. Replies received in mode C operation are delivered to the associated radar for decoding of the altitude information.

1-7. Items Comprising an Operable Interrogator Set AN/TPX-46(V)1 (fig. FO-1 and FO-2)

Interrogator Set AN/TPX-46(V)1 is designed for use with improved HAWK sites to provide the battery control center (BCC) of the site with a rapid secure means of identifying friendly aircraft. The installation of the iff set at the HAWK site may be in either of two different setups. In one setup the coder-decoder (c-d) and receiver-transmitter (r-t) groups and the control box are installed in the ICC, and the antenna and pedestal are mounted on a HAWK pedestal adapter on the top of the van (fig. FO-2). In the other setup, the c-d group case and the control box are installed in the van. The antenna and pedestal are mounted on a HAWK tripod and pedestal adapter which may be located up to 375 feet from the van (fig. FO-1). The r-t group is located at the base of the tripod. Components of the AN/TPX-46(V)1, as well as the quantity, size, weight, and federal stock number of each component are listed below.

	Quantity	*Height (in.)*	*Depth (in.)*	*Width (in.)*	*Unit Weight (lbs.)*	*Federal Stock No.*
Interrogator Set AN/TPX-46(V)1 consisting of:						5895-423-1693
Coder Decoder Group OX-7(V)1/TPX-46(V), composed of:						5895-163-4980
Case, Coder Decoder Group						
CY-6409/TPX-46(V), which contains:	1	28.86	25.72	25.06	245	5895-011-3632
Synchronizer, Electrical SN-420/TPX-46(V)	1	8.82	17.70	15.30	33	5895-350-5346
Control, Antenna C-8738/TPX-46(V)	1	8.82	20.10	15.30	44	5895-111-3631
Signal Processor CP-925/TPX-46(V)	1	8.82	20.48	21.82	53	5895-167-7939
Switching Unit, Computer, Circuits SA-1836/TPX-46(V)	1	4.12	1.75	4.75		5895-350-5343
Receiver-Transmitter Group OR-85/TPX-46(V), composed of:						5895-165-1184
Case, Receiver-Transmitter, Radio CY-7050/TPM-46(V) which contains:	1	14.10	25.10	20.96	115	5895-165-1183
Receiver-Transmitter Radio RT-1026/TPX-46(V)	1	9.47	20.72	16.29	65	5895-165-1185
Control, Interrogator Set C-7570/TPX-46(V)	1	9.60	9.58	8.10	12	5895-141-3607
Antenna-Radome AS-2167A/TPX-46(V)	1	25.39	15.0	88.04	50	5985-106-2677
Pedestal, Antenna AB-1076/TPX-46(V)	1	23.80	10.10	18.72	104	5985-166-0222
Cable Assembly, Radio Frequency, CG-3460/U (2 ft)	2				1	5995-224-3274
Cable Assembly, Radio Frequency, CG-3460/U (13 ft 6 in.)	2				3	5995-224-3271
Cable Assembly, Special Purpose, Electrical CX-10773/U (2 ft)	1				1.5	5995-238-4666
Cable Assembly, Special Purpose, Electrical CX-10774/U (13 ft 6 in)	1				14.5	5995-008-3248
Cable Assembly, Special Purpose, Electrical CX-12892/U (75 ft)	1				80	5995-764-8873
Cable Assembly, Special Purpose, Electrical CX-10775/U (300 ft)	1				290	5995-565-6134

	Quantity	Height (in.)	Depth (in.)	Width (in.)	Unit Weight (lbs.)	Federal Stock No.
Cable Assembly, Special Purpose, Electrical, Branched CX-12810/TPX-46(V)	1			144	16.5	5995-230-8386
Reel, Cable DR-7 with Adapter, Reel MX-9300/TPX-46(V)	2	27.75	27.75	16.75	98	8130-881-6885
Installation Kit, Program Connectors MK-1573/TPX-46(V)	1				1	5895-164-3761
Tool Kit, Interrogator Set TK-228/TPX-46(V)	1				2.5	5180-150-1842

1-8. Items Comprising an Operable Interrogator Set AN/TPX-46(V)2 (fig. FO-3, FO-4, and FO-5)

Interrogator Set AN/TPX-46(V)2 is designed for use at NIKE-HERCULES (TYPE I) site to provide either the Battery Control officer (BCO) or the operators with a rapid, secure means of identifying friendly aircraft. The c-d group is located in the radar building and the r-t group is located at the base of Mast AB-621/B, which may be located up to 375 feet from the radar building. Installed on the mast are the antenna, antenna pedestal and pedestal adapter assemby. The control box and monitor alarm functions are performed in the Nike-HERCULES BC van. Components of the AN/TPX-46(V)2, as well as the quantity, size, weight, and federal stock number of each component are listed below.

	Quantity	Height (in.)	Depth (in.)	Width (in.)	Unit Weight (lbs.)	Federal Stock No.
Interrogator Set AN/TPX-46(V)2, fixed site						5895-423-1694
TYPES I, II, consisting of:						
Coder Decoder Group OX-7(V)1/TPX-46(V), composed of:						5895-163-4980
Cases, Coder Decoder Group CY-6409/TPX-46(V), which contains:	1	28.86	25.72	25.06	245	5895-011-3632
Synchronizer, Electrical SN-420/TPX-46(V)	1	8.82	17.70	15.30	33	5895-350-5346
Control, Antenna C-8738/TPX-46(V)	1	8.82	20.10	15.30	44	5895-111-3631
Signal Processor CP-925/TPX-46(V)	1		20.48	21.82	53	5895-167-7939
Switching Unit, Computer Circuits SA-1836/TPX-46(V)	1	4.12	1.75	4.75	1	5895-350-5343
Transformer, power, isolation TF-578/TPX-46(V)	1	16.00	23.62	14.80	39.5	5950-617-7703
Receiver-Transmitter Group OR-85/TPX-46(V), composed of:						5895-165-1184
Case, Receiver-Transmitter, Radio CY-7050/TPX-46(V) which contains:	1	14.10	25.10	20.96	115	5895-165-1183
Receiver-Transmitter Radio RT-1026/TPX-46(V)	1	9.47	20.72	16.29	65	5895-165-1185
Control Interrogator set C-7571/TPX-46(V)	1	14.04	9.30	5.42	10.5	5895-011-3629
Antenna-Radome AS-2167/TPX-46(V)	1	25.39	15.0	88.04	50	5985-166-0223
Pedestal, Antenna AB-1076/TPX-46(V)	1	23.80	10.10	18.72	104	5985-166-0222
Cable Assembly, Radio Frequency, CG-3460/U(2 ft)	2				3	5995-224-3274
Cable Assembly, Radio Frequency, CG-3460/U(35 ft)	2				10	5995-257-2836
Cable Assembly, Special Purpose, Electrical CX-10773/U(2 ft)	2				1.5	5995-238-4666
Cable Assembly, Special Purpose, Electrical CX-10775/U(375 ft)	1				353	5995-101-9828
Cable Assembly, Special Purpose, Electrical, Branches CX-12810/TPX-46(V)	1			144 length	16.5	5995-230-8386
Cable assembly, Power, Electrical CX-13013/TPX-46(V)	1			36 length		5995-619-9736
Cable Assembly, Special Purpose, Electrical CX-10779/U(50 ft)	1				42	5995-249-4909
Reel. Cable RC-473/G	1	36	36	26	145	8130-075-6179
Installation Kit, Program Connectors MK-1574/TPX-46(V)	1				1	5895-350-5347
Tool Kit, Interrogator Set TK-228/TPX-46(V)	1				2.5	5180-150-1842
Pedestal Adapter Assembly MX-9157/TPX-46(V)	1				34	5985-155-4205

1-9. Items Comprising an Operable Interrogator Set AN/TPX-46(V)3 (fig. FO-6 through FO-11)

Interrogator Set AN/TPX-46(V)3 is designed for use at Defense Acquisition Radar (DAR) sites to provide the operators with a rapid and secure means of identifying friendly aircraft. Six types of setups are possible: TYPES III, IV and V, each having two configurations. In all types, the C-d group is located in the radar building, with the control box and monitor alarm situated in the operations center. In the TYPE III setup, the r-t group is located in either the radar building or at the base of the iff antenna mast, with the 14-foot iff antenna mounted atop the radar antenna. In the TYPE IV setup, the r-t group is again located in the radar building but the 14-foot iff antenna is mounted on its own tower. The difference in the two TYPE IV configurations is

that one has an interface box. In the TYPE V setup, the r-t group is located at the base of the iff antenna mast, on which are mounted the 7-foot iff antenna and the antenna pedestal. The difference in the two TYPE V configurations is that one has an interface box. Components of the AN/TPX-46(V)3, is fixed site TYPES III, IV and V installation, as well as the quantity, size, weight, and federal stock number of each component are listed below:

	Quantity	Height (in.)	Depth (in.)	Width (in.)	Unit Weight (lbs.)	Federal Stock No.
Interrogator Set AN/TPX-46(V)3, fixed sites TYPES III, IV and V consisting of:						5895-423-1696
Coder Decoder Group OX-7(V)2/TPX-46(V), composed of:						5895-011-3634
Case, Coder Decoder Group CY-6409/TPX-46(V), which contains:	1	28.86	25.72	25.06	245	5895-011-3632
Synchronizer, Electrical SN-420/TPX-46(V)	1	8.82	17.70	15.30	33	5895-350-5346
Panel	1	8.8		15.3	3	
Signal Processor CP-925/TRX-46(V)	1	8.82	20.48	21.82	53	5895-167-7939
Switching Unit, Computer Circuits SA-1836/TPX-47(V)	1	4.12	1.75	4.75	1	5895-350-5343
Receiver-Transmitter Group OR-85/TPX-46(V) composed of:						5895-165-1184
Case, Receiver-Transmitter, Radio CY-7050/TPX-46(V), which contains:	1	14.10	25.10	20.96	115	5895-165-1183
Receiver-Transmitter Radio RT-1026/TPX-46(V)	1	9.47	20.72	16.29	65	5895-165-1185
Control, Interrogator Set C-7570/TPX-46(V)	1	9.60	9.58	8.10	12	5895-141-3607
Alarm-Monitor BZ-162/TRX-46(V)	1	9.2	4.54	10.10	9	5840-110-8176
Antenna-Radome AS-2740/TPX-46(V)	1	15.10	15.10	168.12	110	5985-166-0221
Installation Kit, Program Connectors MK-1574/TPX-46(V)	1				1	5895-350-5347
Tool Kit, Interrogator Set TK-228/TPX-46(V)	1				2.5	5180-150-1842
The following component is included as part of AN/TPX-46(V)3, fixed sit TYPE V installations only.						
Pedestal, Antenna AB-1076/TPX-46(V)	1	23.80	10.10	18.72	104	5985-166-0222

1-10. Items Comprising an Operable Interrogator Set AN/TPX-46(V)4 (fig. FO-12)

Interrogator St AN/TPX-46(V)4 is designed for use at AN/GSS-1 or AN/GSS-7 sites with the AN/TSQ-38 or AN/MSQ-18 to provide the operators with a rapid, secure means of identifying friendly aircraft. At these sites the c-d group and the control box are located in the AN/GSS-1 or AN/GSS-7 van. Control panel 2 and the monitor alarm are located in the AN/TSQ-38 or AN/MSQ-18 van. The antenna, pedestal, and pedestal adapter are mounted on Mast AB-621/U (mast) which may be located up to 375 feet from the van. The r-t group is located at the base of the mast. Components of the AN/TPS-46(V)4, as well as the quantity, size, weight, and federal stock number of each component are listed below.

	Quantity	Height (in.)	Depth (in.)	Width (in.)	Unit Weight (lbs.)	Federal Stock No.
Interrogator Set AN/TPX-46(V)4 consisting of:						5895-423-1700
Coder Decoder Group OX-7(V)1/TPX-46(V), composed of:						5895-163-4980
Case, Coder Decoder Group CY-6409/TPX-46(V), which contains:	1	28.86	25.72	25.06	245	5895-011-3632
Synchronizer, Electrical SN-420/TPX-46(V)	1	8.82	17.70	15.30	33	5895-350-5346
Control, Antenna C-8738/TPX-46(V)	1	8.82	20.10	15.30	44	5895-111-3631
Signal Processor CP-925/TPX-46(V)	1	8.82	20.48	21.82	53	5895-167-7939
Switching Unit, Computer Circuits SA-1836/TPX-46(V)	1	4.12	1.75	4.75	1	5895-350-5343
Receiver-Transmitter Group OR-85/TPX-46(V) composed of:						5895-165-1184
Case, Receiver-Transmitter, Ratio CY-7050/TPX-46(V) which contains:	1	14.10	25.10	20.96	115	5895-165-1183
Receiver-Transmitter Radio RT-1026/TPX-46(v)	1	9.47	20.72	16.29	65	5895-165-1185
Control, Interrogator Set C7570/TPX-46(V)	1	9.60	9.58	8.10	12	5895-141-3607
Control, Interrogator Set C-7572/TPX-46(V)	1	7.69	7.44	8.10	10	5895-164-3718
Alarm, Monitor BZ-162/TPX-46(V)	1	9.2	4.54	10.10	10	5840-110-8176
Antenna-Radome AS-2167/TPX-46(V)	1	25.39	15.0	88.04	50	5985-166-0223
Pedestal, Antenna AB-1076/TPX-46(V)	1	23.80	10.10	18.72	104	5985-166-0222
Adapter, Pedestal MX-9157/TPX-46(V)	1	16.76	7.00	48.00	34	5985-115-4205
Cable Assembly Radio Frequency CG-3460/U (2 ft)	2				1	5995-224-3274
Cable Assembly, Radio Frequency CG-3460/U (35 ft)	2				10	5995-257-2836

	Quantity	Height (in.)	Depth (in.)	Width (in.)	Unit Weight (lbs.)	Federal Stock No.
Cable Assembly, Radio Frequency CG-3461/U (375 ft)	1				36	5995-405-9182
Cable Assembly, Special Purpose, Electrical CX-10772/U (2 ft)	1				1.5	5995-238-4666
Cable Assembly, Special Purpose, Electrical CX-10775/U (375 ft)	1				365	5995-101-9828
Cable Assembly, Special Purpose, Branched CX-12810/TPX-46(V)	1			144 (length)	16.5	5995-230-8386
Cable Assembly Special Purpose, Electrical CX-10777/U (375 ft)	1				208	5995-003-8506
Cable Assembly, Special Purpose, Electrical CX-10779/U (50 ft)	1				42	5995-249-4909
Reel, Cable RC-473/G	2	36	36	26	145	8130-075-6179
Installation Kit PRogram Connectors MK-1574/TPX-46(V)	1				1	5895-350-5347
Tool Kit, Interrogator Set TK-228/TPX-46(V)	1				2.5	5180-150-1842

1-11. Items Comprising an Operable Interrogator Set AN/TPX-46(V)6 (fig. FO-13)

Interrogator Set AN/TPX-46(V)6 is designed as a training unit for the purpose of providing operating and maintenance training for Army personnel who will be using the AN/TPX-46(V) in its various configurations. Components of the AN/TPX-46(V)6, as well as the quantity, size, weight, and federal stock number of each component are listed below.

	Quantity	Height (in.)	Depth (in.)	Width (in.)	Unit Weight (lbs.)	Federal Stock No.
Interrogator Set AN/TPX-46(V)6 consisting of						5895-423-1702
Coder Decoder Group OX-7(V)1/TPX-46(V), composed of:						5895-163-4980
Case, Coder Decoder Group CY-6409/TPX-46(V), which contains:	1	28.86	25.72	25.06	245	5895-011-3532
Synchronizer, Electrical SN-420/TPX-46(V)	1	8.82	17.70	15.30	33	5895-350-5346
Control, Antenna C-8737/TPX-46(V)	1	8.82	20.10	15.30	44	5895-111-3631
Signal Processor CP925/TPX-46(V)	1	8.82	20.48	21.82	53	5895-167-7939
Switching Unit, Computer Circuits SA-1836/TPX-46(V)	1	4.12	1.75	4.75	1	5895-350-5343
Receiver-Transmitter Group OR-85/TPX-46(V), composed of:						5895-165-1184
Case, Receiver-Transmitter Radio CY-7050/TPX-46(V), which contains:	1	14.10	25.10	20.96	115	5895-165-1183
Receiver-Transmitter Radio RT-1026/TPX-46(V)	1	9.47	20.75	16.29	65	5895-165-1185
Control, Interrogator Set C-7570/TPX-46(V)	1	9.60	9.58	8.10	12	5895-141-3607
Alarm, Monitor BZ-162/TPX-46(V)	1	9.2	4.54	10.10	10	5840-110-8176
Antenna-Radome AS-2167/TPX-46(V)	1	25.39	15.0	88.04	50	5985-166-0223
Pedestal, Antenna AB-1076/TPX-46(V)	1	23.80	10.10	18.72	96	5985-166-0222
Adapter, Pedestal MX-9157/TPX-46(V)	1	16.76	7.00	48.00	27	5985-155-4205
Cable Assembly, Radio Frequency CG-3460/U(2 ft.)	2				1	5995-224-3274
Cable Assembly, Special Purpose, Electrical CX-10773/U(2 ft.)	1				1.5	5995-238-4666
Cable Assembly, Special Purpose, Electrical CX-10778/U(100 ft.)	1				79	5995-008-3247
Reel, Cable RC-473/G	1	36	36	26	145	8130-075-6179
Installation Kit, Program Connectors MK-1630/TPX-46(V)	1				2	5895-013-9312
Tool Kit, Interrogator Set TK-228/TPX-46(V)	1				2.5	5180-150-1842
Cable Assembly, Radio Frequency CG-3460/U(100 ft.)	2				50	5995-405-9183

1-12. Expendable Consumable Items

A list of expendable consumable items required for operation appears in table 1-1. The supplies and materials listed in this table are required for the operation of this equipment and are authorized to be requisitioned by SB 700-50.

Table 1-1. Expendable Consumable Supplies and Materials.

Item	Description	NSN
Grease Cartridge	4-in. od, 2½-in. id, 2½-in. lg, 1 ea.	5895-00-282-8389
Grease Aircraft and Instrument	For bearings, gears, and sliding and rolling surfaces, 1 lb.	9150-00-985-7246
Lubricating Oil, Engine	For air filters, grade 30, 1 qt.	9150-00-265-9433
Paint, Rubber, Olive Drab	For antenna-rodome, 1 gal.	8010-00-923-4150
Enamel, Semigloss, Olive Drab	Touchup paint, 1 qt.	8010-00-081-0809
Enamel, Semigloss, Black	Touchup paint, 1 qt.	8010-00-844-4792
Methyl-Ethyl-Keytone	Cleaner, 1 pt.	6810-00-281-6929
Cleaning Compound	Cleaning compound, 1 gal.	6850-00-597-9765
Antistatic Cleaner Compound	For meter face glass, 1 pt.	6850-00-086-7123

u. On control panel 2 (fig. 3-3), set the controls as follows:

Control	Setting
PANEL switch	DIM
MODE 4 switch	A
CONSOLE SELECT switch	As required
CODE SELECT Subpanel	
MODE 1 switches	Code of the day
MODE 2 switches	Code of the day
MODE 3/A switches	Code of the day

2-44. Program Connectors
(fig. 1-12)

Program connectors are supplied in three different kits. Kit No. 1 is issued with the AN/TPX-46(V)1 configuration, kit No. 2 is issued to all configurations except the AN/TPX-46(V)1 and the AN/TPX-46(V)6. Kit No. 3 is issued to the AN/TPX-46(V)6. The processor program connectors provide the capability to program the iff set to meet established friend admission and enemy rejection criteria. Kit No. 1 and Kit No. 2 each consist of 16 program connectors, of which four have no color code and are never changed. The remaining twelve are divided into three groups of four each. Kit No. 3 contains all unique program connectors of kits No. 1 and No. 2 and are used for form kits No. 1 or No. 2 as required. The individual groups are color-coded green, yellow, and red. Only one color-coded set is installed at a time. The green set programs the iff set with the most secure program by establishing the highest enemy rejection. The red set provides a higher probability for recognition of friends and, correspondingly, fewer enemy rejections. The yellow set provides a median between the red and the green. The set to be installed shall be determined by the unit commanding officer who also shall store unused sets of program connectors in accordance with applicable security regulations. Refer to the following charts for reference designations of the program connectors and the reference designations of the cards to which the program connectors are to be mounted. Figures 2-30 and 2-34 illustrate the locations of mounted program connectors in the synchronizer and processor.

NOTE

All program connectors used in conjunction with the processor are **UNCLASSIFIED.**

When the connectors are mated with their respective printed circuit card assemblies, the connectors and assemblies become CONFIDENTIAL. When a mated program connector/printed circuit card assembly is installed in the processor, the entire processor assembly also becomes CONFIDENTIAL.

PROGRAM CONNECTOR KIT NO. 1

CARD	PROGRAM CONNECTOR	KEY	COLOR
1A3A5	1A3A5U17	A10	GREEN
1A3A5	1A3A5U17	A10	YELLOW
1A3A5	1A3A5U17	A10	RED
1A3A7	1A3A7U17	NOTCH	GREEN
1A3A7	1A3A7U17	NOTCH	YELLOW
1A3A7	1A3A7U17	NOTCH	RED
1A3A8	1A3A8U17	B11	GREEN
1A3A8	1A3A8U17	B11	YELLOW
1A3A8	1A3A8U17	B11	RED
1A3A13	1A3A13U17	B20	GREEN
1A3A13	1A3A13U17	B20	YELLOW
1A3A13	1A3A13U17	B20	RED
1A3A1	1A3A1U17	B13	—
1A3A3	1A3A3U17	A26	—
1A1A3	1A1A3U17	A7	—
1A1A21	1A1A21U17	B3	—
			—

PROGRAM CONNECTOR KIT NO. 2

CARD	PROGRAM CONNECTOR	KEY	COLOR
1A3A5	1A3A5U17	A10	GREEN
1A3A5	1A3A5U17	A10	YELLOW
1A3A5	1A3A5U17	A10	RED
1A3A7	1A3A7U17	NOTCH	GREEN
1A3A7	1A3A7U17	NOTCH	YELLOW
1A3A7	1A3A7U17	NOTCH	RED
1A3A8	1A3A8U17	B11	GREEN
1A3A8	1A3A8U17	B11	YELLOW
1A3A8	1A3A8U17	B11	RED
1A3A13	1A3A13U17	B20	GREEN
1A3A13	1A3A13U17	B20	YELLOW
1A3A13	1A3A13U17	B20	RED
1A3A1	1A3A1U17	B13	—
1A3A3	1A3A3U17	A26	—
1A1A3	1A1A3U17	A7	—
1A1A21	1A1A21U17	B3	—

PROGRAM CONNECTOR KIT NO. 3

CARD	PROGRAM CONNECTOR	KEY	COLOR
1A3A5	1A3A5U17	A10	GREEN
1A3A5	1A3A5U17	A10	GREEN
1A3A5	1A3A5U17	A10	YELLOW
1A3A5	1A3A5U17	A10	RED
1A3A7	1A3A7U17	NOTCH	GREEN
1A3A7	1A3A7U17	NOTCH	GREEN
1A3A7	1A3A7U17	NOTCH	YELLOW
1A3A7	1A3A7U17	NOTCH	YELLOW
1A3A7	1A3A7U17	NOTCH	RED
1A3A7	1A3A7U17	NOTCH	RED
1A3A8	1A3A8U17	B11	GREEN
1A3A8	1A3A8U17	B11	GREEN
1A3A8	1A3A8U17	B11	YELLOW
1A3A8	1A3A8U17	B11	RED
1A3A13	1A3A13U17	B20	GREEN
1A3A13	1A3A13U17	B20	YELLOW
1A3A13	1A3A13U17	B20	RED
1A3A1	1A3A1U17	B13	—
1A3A3	1A3A3U17	A26	—
1A1A3	1A1A3U17	A7	—
1A1A21	1A1A21U17	B3	—

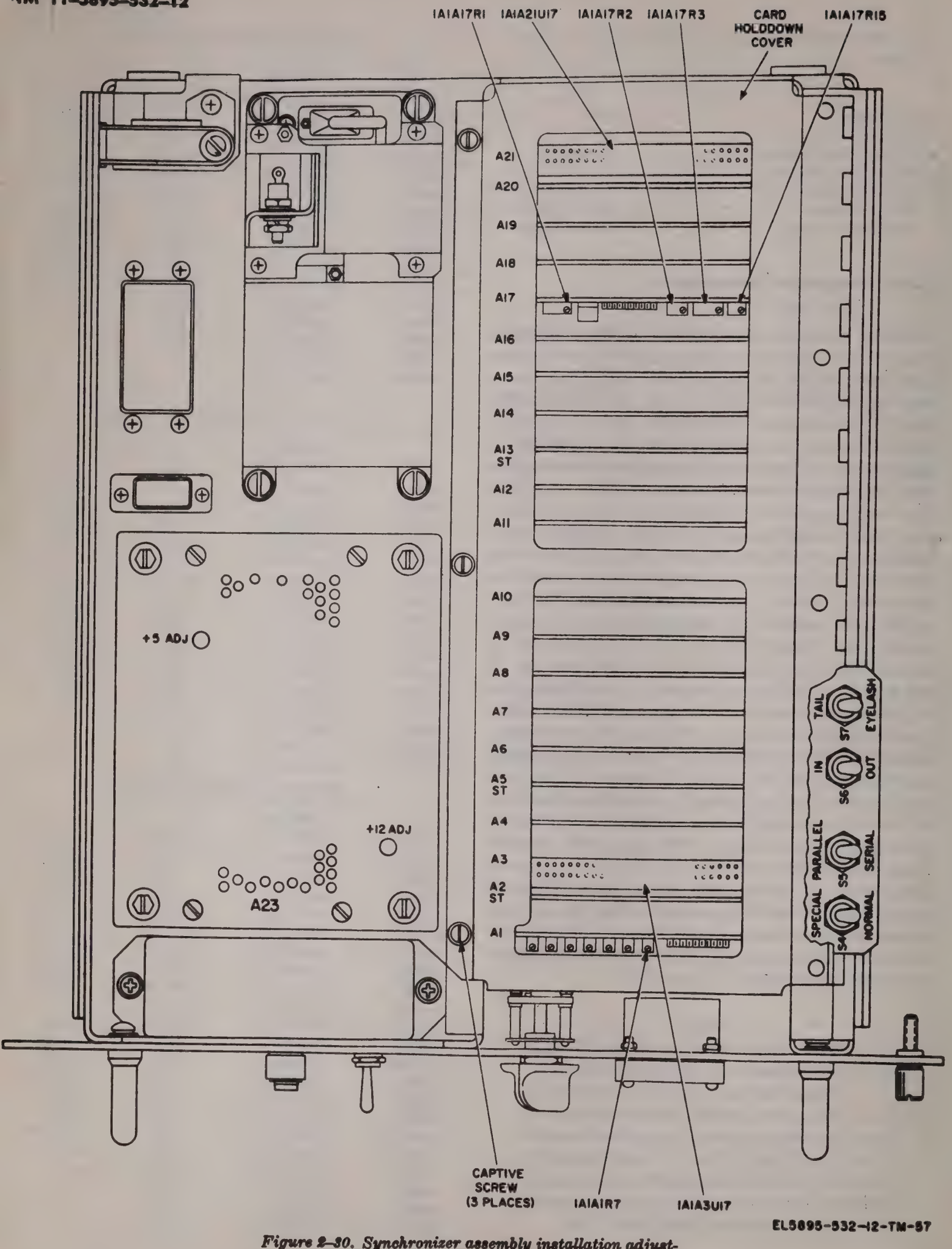


Figure 2-30. Synchronizer assembly installation adjustments and program connector location.

CHAPTER 4

OPERATOR'S MAINTENANCE

NOTE

Preventive maintenance for commanders is contained in DA Pam 750-1.

4-1. Scope of Maintenance

The maintenance duties of the operator are to perform a prescribed sequence of preventive maintenance checks and services. The preventive maintenance procedures are the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble and to reduce downtime by detecting and correcting the onset of trouble. These checks and services are to maintain Army electronic equipment in a combat serviceable and mission ready condition.

a. Routine services (para 4-3).

b. Preventive maintenance checks and services (para 4-5).

c. Operator's weekly checks (para 4-6).

d. Cleaning (para 4-7).

4-2. Tools, Materials, and Equipment Required for Maintenance

No tools or equipment are required for operator's maintenance. The following cleaning materials will be useful to the operator.

a. Lint free cloth.

b. Dishwashing compound or detergent.

c. Trichloroethane.

4-3. Routine Services

Routine services are a collection of checks and observations performed by the operator at all times. Routine services are not listed in the preventive maintenance checks and services (table 4-1), in order to separate the non-operational from the operational services.

a. Routines. The operator should perform the following routines as necessary.

(1) Cleaning.

(2) Dusting.

(3) Check for cut or frayed cables.

(4) Check for dented, bent, or broken components.

(5) Check to see that items not in use are properly stored.

(6) Check for rusting.

(7) Check controls for smooth operation.

(8) Cover unused receptacles.

(9) Check for loose nuts, bolts, and connectors.

(10) Check to see that all nameplates are clean and legible.

(11) Check antenna guy wires for proper tension.

(12) Check to see that antenna mast is vertical.

(13) Check holddown straps for excessive wear or fraying.

(14) Check radome for cracks or breaks.

(15) Check for completeness of equipment.

b. Items Requiring Routine Services.

(1) Coder-decoder group.

(2) Receiver-transmitter group.

(3) Control box.

(4) Cable Assemblies, RF and electrical.

(5) Alarm monitor.

(6) Ground wires and connections.

(7) Coder-decoder group case.

(8) Receiver-transmitter group case.

(9) Antenna components.

4-4. Preventive Maintenance Checks and Services Periods

Complete preventive maintenance is the performance of routine services (para 4-3) and preventive maintenance checks and services (PMCS) (para 4-5), to insure that the equipment is available and ready for a mission. The equipment should be checked and serviced just before going on a mission and as soon as possible after completion of the mission.

4-5. Preventive Maintenance Checks and Services (PMCS)

a. PMCS procedures, covering operational services of the interrogator set, are given in table 4-1. The PMCS are normally performed by the operator/crew.

b. Before starting PMCS, check to see that all cables and accessories are in usable condition, and major assemblies fit properly.

NOTE

Within the designated interval, these checks are to be performed in the order listed. The designated intervals are as follows:

B—Before D—During W—Weekly

Table 4-1. Operator/Crew Preventive Maintenance Checks and Services

ITEM NO.	INTERVAL B	D	W	ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/ AVAILABLE IF:
1	X			Interrogator Set AN/TPX-46(V)1, 2, 3, 4, and 6.	*a.* Install interrogator set (chap 2). *b.* Set controls as indicated in paragraph 3-13.	
2		X	X	Power control panel SYSTEM POWER circuit breaker and indicator lamp.	Check for the following: *a.* SYSTEM POWER circuit breaker remains on. *b.* SYSTEM POWER indicator lamp is on. **WARNING** Check to see that all personnel are clear of antenna rotation path before performing step 3. **NOTES** SELF TEST FAULT indicator lamps will light if POWER circuit breakers on the associated assemblies are not set to ON. For the following steps, the associated radar must be operating and supplying IFF triggers to the IFF set.	*a.* SYSTEM POWER circuit breaker does not remain on. *b.* SYSTEM POWER indicator lamp is off.
3		X	X	Control box POWER circuit breaker and indicator lamp.	Set POWER circuit breaker to ON and check for the following: *a.* POWER circuit breaker stays on. *b.* POWER indicator lamp is on.	*a.* POWER circuit breaker does not stay on. *b.* POWER indicator lamp is off.
4		X	X	C-d group case blower motor.	Check to see that c-d group case blower motor is operating.	C-d group case blower motor does not operate.
5		X	X	Power control panel TOTAL HOURS meter.	Check to see that TOTAL HOURS meter is operating.	TOTAL HOURS meter does not operate.
6		X	X	Antenna rotation	Check to see that the antenna rotates smoothly.	Antenna does not rotate or rotate smoothly.
7		X	X	Control box SELF TEST fault indicator lamps.	*a.* Check to see that after 80 seconds all SELF TEST fault indicator lamps are off and monitor alarm is silent. **NOTE** If any SELF TEST fault indicator lamp is lighted on the control box and the corresponding assembly has no fault indicator lamp lighted, check each press-to-test fault lamp to check lamps. *b.* Check for following lamp indications: R/T lamp off. SYNC lamp off. PROC lamp off. ANT LAG off and antenna rotates smoothly. KIR lamp off.	*a.* After 80 seconds, all SELF TEST fault indicator lamps do not go off. Monitor alarm does not remain silent. *b.* Following lamp indications as follows: R/T lamp on. SYNC lamp on. PROC lamp on. ANT LAG lamp is on and antenna does not rotate or rotate smoothly. KIR lamp on.
8		X	X	Control box CODE SELECT switch lamps.	Check to see that selected CODE SELECT switch lamps are lighted. (On control panel 1, all CODE SELECT switch lamps are lighted.)	Selected CODE SELECT switch lamps are not lighted. (On control panel 1, all CODE SELECT switch lamps are not lighted.)

ITEM NO.	INTERVAL B	D	W	ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/ AVAILABLE IF:
9		X	X	Control box LAMP TEST switch.	Momentarily hold LAMP TEST switch to the on (down) position and check for the following:	
					a. All SELF TEST fault indicator lamps and CHALLENGE indicator lamps are on.	*a.* All SELF TEST fault indicator lamps and CHALLENGE indicator lamps do not light.
					b. Monitor alarm sounds	*b.* Monitor alarm does not sound.
10		X	X	Control box PANEL switch.	Set PANEL switch to BRIGHT. Check to see that control box lamps are brightly lighted.	Control box lamps do not become brightly lighted when PANEL switch is set to BRIGHT.
11		X	X	Control box MODE SELECT switch.	Rotate MODE SELECT switch through positions 1, 2, 3/A, and 4, and check for the following:	
					a. In positions, 1, 2, and 3/A selected CODE SELECT switch lamps light.	*a.* All or some lamps in selected mode do not light.
					b. On control panel 1, all CODE SELECT switch lamps go on whenever power is applied.	*b.* All CODE SELECT switch lamps do not light whenever power is applied.
					c. In position 4, no CODE SELECT switch lamps light (except on control panel 1, as above).	*c.* One or more CODE SELECT switch lamps light (except on control panel 1) when power is applied.
12		X	X	Control Box PROCESSOR and CHALLENGE switches.	Set PROCESSOR switch to BYPASS and hold CHALLENGE switch to TEST and check for following:	
					a. Pattern on ppi scope is as shown in figure 3-12, except that target indications do not have friend tails.	*a.* Pattern on ppi scope does not appear as shown in fig. 3-12. (Targets do not have friend tails).
					b. Hold CHALLENGE switch to TEST and set PROCESSOR switch to IN. Pattern on ppi scope is as shown in fig. 3-12.	*b.* Pattern on ppi scope does not appear as shown in fig. 3-12.
13		X	X	Control box CHALLENGE switch.	Rotate MODE SELECT switch through positions 1, 2, 3/A, and 4. At each position hold CHALLENGE switch to ON and check for following:	
					a. CHALLENGE indicator lamp lights at each position.	*a.* CHALLENGE indicator lamp lights in some modes but not in all modes, or does not light in any mode.
					b. R/T lamp is off.	*b.* R/T lamp is on.
					c. SYNC lamp is off.	*c.* SYNC lamp is on.
14		X	X	Control box CHALLENGE and MODE SELECT switches.	Set MODE SELECT switch to TEST, hold CHALLENGE switch to TEST, and check for following:	
					a. Pattern on ppi scope is as shown in figure 3-12, except that target indications do not have friend tails.	*a.* Pattern on ppi scope does not appear as shown in figure 3-12. (Targets do not have friend tails).
					b. R/T lamp is off.	*b.* R/T lamp is on.
15		X	X	Control box STROBE switch	Hold STROBE switch to ON. Check to see that azimuth line (strobe) appears on the radar ppi scope at 0° azimuth coincident with radar sweep.	Strobe line and iff returns do not appear on radar ppi scope at 0° azimuth coincident with radar sweep or strobe line is missing.
16		X	X	Synchronizer METER switch.	On the synchronizer, rotate METER switch through positions -12V, +5V, and +12V. Check to see that PWR SUP TEST meter indicates in green area at each position.	PWR SUP TEST meter does not indicate in green area in each position.

ITEM NO.	INTERVAL B	D	W	ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/ AVAILABLE IF:
17		X	X	Synchronizer METER switch and indicator lamps.	On the synchronizer, set METER switch to OFF and check for following:	
					a. POWER indicator lamp is on.	*a.* POWER indicator lamp is off.
					b. IFF TRIG FAULT lamp is off.	*b.* IFF TRIG FAULT lamp is on.
					c. TIMING FAULT lamp is off.	*c.* TIMING FAULT LAMP is on.
					d. CODER-DECODER FAULT indicator lamp is off.	*d.* CODER-DECODER FAULT indicator lamp is on.
					e. INTERFACE FAULT indicator lamp is off.	*e.* INTERFACE FAULT indicator is on.
18		X	X	Antenna control assembly METER switch.	Rotate METER switch to the -12V and +12V positions. Check to see that PWR SUP TEST/NULL meter indicates in green area at each position.	PWR SUP TEST/NULL meter does not indicate in green area in each position.
19		X	X	Antenna control assembly indicator lamps.	On antenna control assembly front panel, check for following:	
					a. POWER indicator lamp is on.	*a.* POWER indicator lamp is off.
					b. POWER ECA indicator lamp is on.	*b.* POWER ECA indicator lamp is off.
					c. ANT LAG FAULT indicator lamp is off and antenna rotates smoothly.	*c.* ANT LAG FAULT indicator lamp is on; antenna does not rotate or rotate smoothly.
20		X	X	Processor assembly METER switch.	Rotate METER switch through positions -5V, +5V, +12V and MEMORY. Check to see that PWR SUP TEST meter indicates in green area for each position.	PWR SUP TEST meter does not indicate in green area in each position.
					NOTE If MEMORY INHIBIT FAULT indicator lamp is on, set processor POWER switch to OFF and then back to ON.	
21		X	X	Processor assembly indicator lamps.	On processor assembly front panel check for following:	
					a. POWER indicator lamp is on.	*a.* POWER indicator lamp is off.
					b. TIMING FAULT indicator lamp is off.	*b.* TIMING FAULT indicator lamp is on.
					c. TARGET FAULT indicator lamp is off.	*c.* TARGET FAULT indicator lamp is on.
					d. FRIEND FAULT indicator lamp is off.	*d.* FRIEND FAULT indicator lamp is on.
					e. MEMORY INHIBIT FAULT indicator lamp is off.	*e.* MEMORY INHIBIT FAULT indicator is on.
					f. MEMORY SENSE FAULT indicator lamp is off.	*f.* MEMORY SENSE FAULT indicator lamp is on.
22		X	X	Receiver-transmitter indicator lamps.	On receiver-transmitter front panel, check for following:	
					a. POWER indicator lamp is on.	*a.* POWER indicator lamp is off.
					b. RF SWITCH FAULT indicator lamp is off	*b.* RF SWITCH FAULT indicator lamp is on.
					c. XMTR FAULT indicator lamp is off.	*c.* XMTR FAULT indicator lamp is on.
					d. RCVR FAULT indicator lamp is off.	*d.* RCVR FAULT indicator lamp is on.
					e. VIDEO FAULT indicator lamp is off.	*e.* VIDEO FAULT indicator lamp is on.
					f. LVPS FAULT indicator lamp is off.	*f.* LVPS FAULT indicator lamp is on.
					g. TOTAL HOURS meter is operating.	*g.* TOTAL HOURS meter is not operating.

ITEM NO.	INTERVAL B	D	W	ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING EQUIPMENT IS NOT READY/ AVAILABLE IF:
23		X	X	Receiver-transmitter CHAL and SELF TEST switches.	Momentarily hold CHAL and SELF TEST switches to on (up) position and check for following: *a.* All FAULT indicator lamps with the exception of LVPS lamp are on. **NOTE** In system application where CHAL switch is disabled, use the CHALLENGE switch at the operator's location. *b.* On control panel 1, check to see that R/T SELF TEST indicator lamp is on. Monitor alarm is sounded.	*a.* All FAULT indicator lamps with exception of LVPS lamp are off. *b.* R/T SELF TEST indicator lamp is off or monitor alarm is not heard.
24		X	X	Receiver-transmitter LVPS push-to-test switch.	Depress LVPS push-to-test switch. Check to see that LVPS lamp is on.	LVPS lamp is off.
25		X	X	Receiver-transmitter CHAL switch.	Momentarily hold CHAL switch to on (up) position. Check to see that FAULT indicator lamps are off.	All fault indicator lamps are not off.
26		X	X	Control box MODE 4 switch.	Set MODE 4 switch to ZERO. Check to see that KIR SELF TEST fault indicator lamp is on.	KIR SELF TEST fault indicator lamp is off.

4-6. Operator's Weekly Checks

Check for completeness of the interrogator set by referring to the items comprising an operable equipment (para 1-7 through 1-11). Be sure that all items relating to your model are complete and accounted for.

4-7. Cleaning

The exterior surfaces of the components of the interrogator set should be kept clean and free of dirt, grease, and fungus. When necessary, clean the surface as follows:

a. Dust and Loose Dirt. Remove dust and loose dirt by wiping with a clean, soft cloth.

b. Grease, Fungus, and Ground-In Dirt. Remove grease, fungus, and ground-in dirt as follows:

WARNING

The fumes of TRICHLOROETHANE are toxic. Provide through ventilation whenever it is used; avoid prolonged or repeated breathing of vapor. Do not use near an open flame or hot surface; trichloroethane is nonflammable but heat converts the fumes to a highly toxic phosgene gas the inhalation of which could result in serious injury or death. Prolonged or repeated skin contact with trichloroethane can cause skin inflammation. When necessary, use gloves, sleeves and aprons which the solvent cannot penetrate.

(1) Dampen (do not soak) cloth with trichloroethane.

(2) Wipe off grease, fungus, or ground-in dirt with the cloth.

(3) Wipe the component dry with a clean cloth.

c. Plugs and Jacks. Remove dirt from plugs and jacks with a brush.

d. Meters, Counters, Switches, and Control Knobs. Clean switches, control knobs, and glass windows of meters and counters of follows:

CAUTION

Do not press on glass windows of meters and counters. Excessive pressure may dislodge the glass meter face.

(1) Dampen a cloth with water. (Use dish-

washing compound or detergent or mild soap, if available).

(2) Gently wipe off all windows, switches, and control knobs with a damp cloth.

(3) Dry with a clean cloth.

(4) Clean the CODE SELECT switches and indicator faces with a soft, dry brush or soft, dry cloth.

CHAPTER 5

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. TOOLS AND EQUIPMENT

5-1. Tools and Equipment Required

a. Tools. Tools required by organizational maintenance are listed below:

(1) Tool Kit, Electronic Equipment TK-101/G.

(2) Tool Kit, Interrogator Set TK-228/TPX-46(V) (fig. 2-5).

(3) Grease Gun, NSN 4930-00-250-8038.

b. Test Equipment. Test equipment required for organizational maintenance is listed below:

(1) Multimeter AN/PSM-6 (HAWK).

(2) Multimeter TS-352B/U (HERCULES).

(3) Oscilloscope AN/USM-281A, or Oscilloscope, Dumont Fairchild Model 765 MHF.

Section II. REPAINTING AND REFINISHING INSTRUCTIONS

5-2. Repainting

When repainting or touching up bare spots on the components of the iff set, proceed as follows:

a. Lightly sand surface to be painted to insure that all loose paints, corrosion, dirt, or fungus are removed.

b. Refer to table 1-1 for paints required. Paints are also listed in SB 11-573, Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment, and AR 746-1, Color, Marking, and Preparation of Equipment for Shipment.

c. For instructions on painting and refinishing, refer to TB 43-0118, Field Instructions for Painting and Preserving Electronic Command Equipment.

Section III. LUBRICATION INSTRUCTIONS

5-3. Harmonic Drive Lubrication

Lubrication of the harmonic drive, which is located in the pedestal, is required periodically and is in two phases. The first phase is at organizational level which requires periodic greasing with a grease gun. The second phase, to be performed by direct support maintenance personnel, requires periodic replacement of the grease cartridge. The periods between greasing and replacement of cartridges are based upon the average rpm of the antenna.

a. Refer to the following chart to determine the periods between greasing and grease cartridge replacement.

Average Antenna rpm	*Period for Greasing*	*Period for Cartridge Replacement*
Up to 6	6 months	12 months
7 to 13	5 months	10 months
14 to 20	4 months	8 months
21 to 25	3 months	6 months

b. Following is a list of bulk quantities of grease that may be ordered for lubricating the harmonic drive.

NSN	*Amount*
9150-00-935-4017	14-oz. cartridge
9150-00-985-7246	1-lb can
9150-00-985-7247	5-lb can

c. To lubricate the harmonic drive, proceed as follows:

(1) Check that grease fitting on the pedestal assembly (fig. 5-1) is clean and that grease duct is not blocked.

(2) Using a grease gun, insert approximately 3 fluid ounces of grease into the harmonic drive.

(3) Using a clean, lint free cloth, clean grease grease fitting and surrounding pedestal area.

5-4. Chassis Slide Lubrication

Do not lubricate chassis slides. Lubrication will only tend to cause contamination buildup.

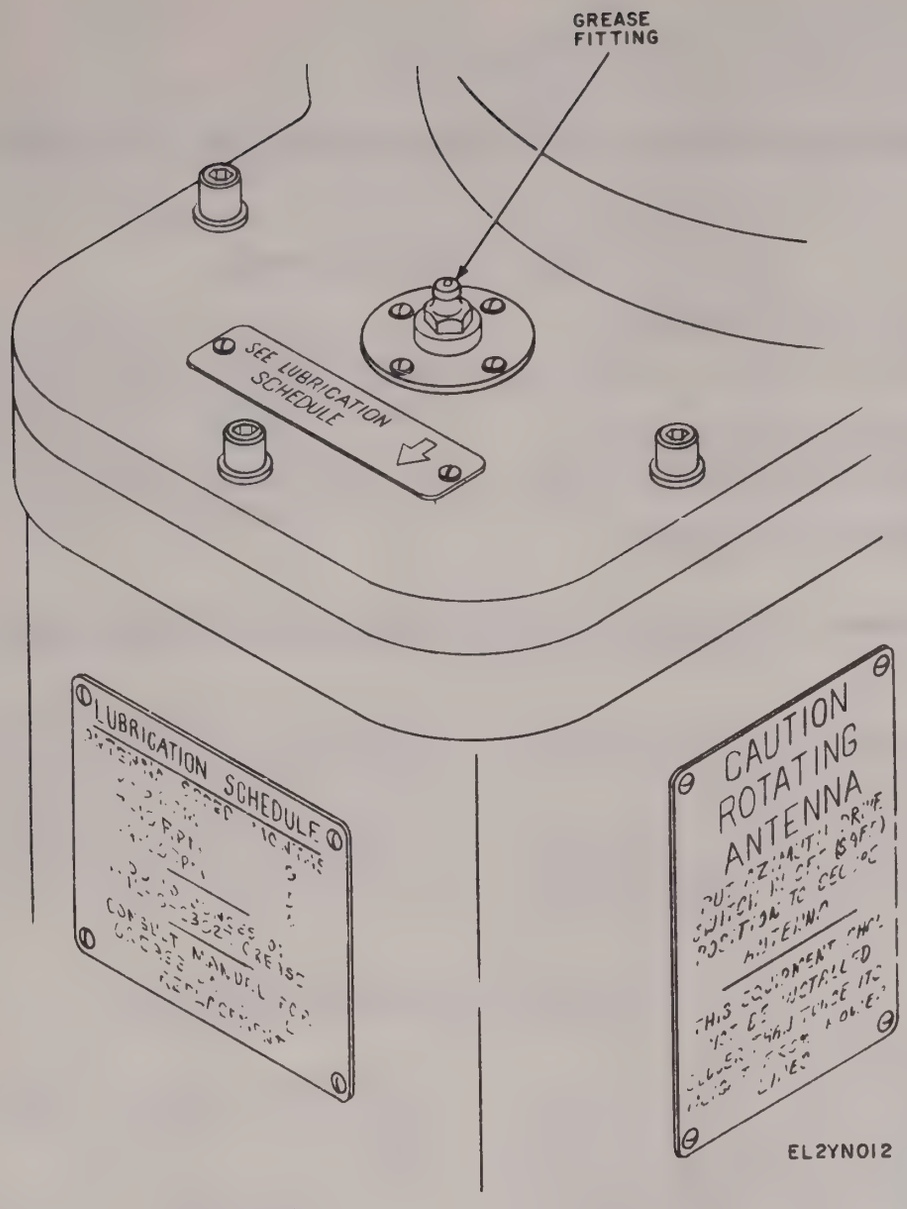


Figure 5-1. Pedestal assembly, grease fitting locations.

Section IV. ORGANIZATIONAL MAINTENANCE

5-5. General

To insure that Interrogator Set AN/TPX-46(V) is ready for operation, it must be inspected systematically on a monthly basis so that defects may be discovered and corrected before they result in serious damage or failure. The maintenance checks to be performed are listed and described in paragraph 5-6. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the equipment will be noted for corrections to be made as soon as operation has ceased. Stop equipment operation immediately if a deficiency is noted. Record all deficiencies together with the corrective action taken on the appropriate maintenance forms (para 1-3*a*).

5-6. Organizational Maintenance Checks and Services

Sequence No.	*Item*	*Procedure*	*Reference*
		NOTE Lubricate the equipment in accordance with the instructions given in paragraph 5-3.	
1	Exterior surfaces	Inspect exterior surfaces of all components of the iif set for damage, dust, dirt or corrosion.	Clean the equipment as required (para 4-7). Apply touch-up paint as required (para 5-2).

APPENDIX C

COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

C-1. Scope

This appendix lists integral components of and basic issue items for the AN/TPX-46(V)1, AN/TPX-46(V)2, AN/TPX-46(V)3, AN/TPX-46(V)4, and AN/TPX-46(V)5 to help you inventory items required for safe and efficient operation.

C-2. General

This Components of End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item. These items, when assembled, comprise the AN/TPX-46(V)1, AN/TPX-46(V)2, AN/TPX-46(V)3, AN/TPX-46(V)4, AN/TPX-46(V)5 and must accompany it whenever it is transferred or turned in. The illustrations will help you identify the items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the AN/TPX-46(V)1, AN/TPX-46(V)2, AN/TPX-46(V)3, AN/TPX-46(V)4 and AN/TPX-46(V)5 in operation, to operate it and to perform emergency repairs. Although shipped separately packed they must accompany the AN/TPX-46(V)1, AN/TPX-46(V)2, AN/TPX-46(V)3, AN/TPX-46(V)4 and AN/TPX-46(V)5 during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard to identify items. This manual is your authority to requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. Explanation of Columns

a. Illustration. This column is divided as follows:

(1) *Figure Number.* Indicates the figure number of the illustration on which the item is shown.

(2) *Item Number.* Not applicable.

b. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. Part Number. Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards and inspection requirements to identify an end item or range of items.

d. Description. Indicates the Federal item name and if required, a minimum description to identify the end item.

e. Location. The physical location of each item listed in given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent item.

f. Usable on Code. "USABLE ON" codes are included to help identify which component items are used on the different models. When there is no Usable On Code the item is used on all models. Identification of the codes used in these lists are:

Code	*Used On*
CUE	AN/TPX-46(V)1
CLD	AN/TPX-46(V)2
CLE	AN/TPX-46(V)3
CLF	AN/TPX-46(V)4
CLG	AN/TPX-46(V)5

g. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

h. Quantity. This column is left blank for use during an inventory. Under the Rcv'd column, list the quantity you actually receive on your major item. The Date columns are for use when you inventory the major item at a later date, such as for shipment to another site.

(Next printed page is C-3.)

SECTION II INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) PART NUMBER FSCM	(4) DESCRIPTION	(5) LOCATION	(6) USABLE ON CODE	(7) QTY REQD	(8) QUANTITY RCVD	DATE	DATE	DATE
1-4		5895-00-165-1184	OR-85/TPX-46(V) (80058)	Receiver-Transmitter Group Consisting of:			1				
1-4		5895-00-165-1185	RT-1026/TPX-46(V) (80058)	Receiver-Transmitter Radio			1				
1-8		5895-00-141-3607	C-7570/TPX-46(V) (80058)	Control, Interogator Set		CUE CLE CLF CLG	1				
1-8		5895-00-011-3629	C-7571/TPX-46(V) (80058)	Control, Interogator Set		CLD	1				
1-8		5895-00-164-3718	C-7572/TPX-46(V) (80058)	Control, Interogrator Set		CLF	1				
1-8		5840-00-110-8176	BZ-162/TPX-46(V) (80058)	Alarm-Monitor		CLE CLF CLG	1				
1-5		5985-00-106-2677	AS-2167A/TPX-46(V) (80058)	Antenna, Radome		CUE	1				
1-5		5985-00-166-0223	AS-2167/TPX-46(V) (80058)	Antenna, Radome		CLD CLF CLG	1				
1-5		5985-00-166-0221	AS-2740/TPX-46(V) (80058)	Antenna, Radome		CLE	1				
1-6		5985-00-166-0222	AB-1076/TPX-46(V) (80058)	Pedestal, Antenna			1				
1-1		5895-00-163-4980	OX-7(V)1/TPX-46(V) (80058)	Coder Decoder (C-D) Group		CUE CLD CLF CLG	1				
2-30		5895-00-350-5346	SN-420/TPX-46(V) (80058)	Synchronizer, Electrical			1				
3-7		5895-00-141-3606	C-8738/TPX-46(V) (80058)	Control, Antenna		CUE CLD CLF CLG	1				
5-5		5895-00-167-7939	CP-925/TPX-46(V) (80058)	Signal Processor			1				
1-9		5895-00-350-5343	SA-1836/TPX-46(V) (80058)	Switching Unit, Computer Circuit			1				
1-2		5895-00-011-3634	OX-7(V)2/TPX-46(V) (80058)	Coder-Decoder		CLE	1				
1-10		8130-00-634-7984	DR-7 (80058)	Reel, Cable		CUE	2				
1-10		8130-00-881-6885	MX-9300/TPX-46(V)	Adapter, Reel		CUE	2				
1-10		8130-00-075-6179	RC-473/G	Reel, Cable		CLD CLG CLF	1 2				
FO-1 thru 4		5995-00-224-3274	CG-3460/U (80058)	Cable Assembly, Radio Frequency (2 FT)		CUE CLD CLF CLG	2				
FO-1 & 2		5995-00-224-3271	CG-3460/U (80058)	Cable Assembly Radio Frequency (13 FT 6")		CUE	2				
FO-3 & 4		5995-00-257-2836	CG-3460/U (80058)	Cable Assembly Radio Frequency (35 FT)		CLD CLF	2				
		5995-00-405-9183	CG-3460/U (80058)	Cable Assembly, Radio Frequency (100 FT)		CLG	2				
FO-1 thru 4		5995-00-238-4666	CX-10773/U (80058)	Cable Assembly, SP, Electrical (2 FT)		CLF CLG	1				
FO-2		5995-00-008-3248	CX-10774/U (80058)	Cable Assembly SP, Electrical (13 FT 6")		CUE	1				
FO-8 & 11		5995-00-405-9182	CG-3461/U (80058)	Cable Assembly Radio Frequency (375 FT)		CLF	1				

END ITEM

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) PART NUMBER / FSCM	(4) DESCRIPTION	(5) LOCATION	(6) USABLE ON CODE	(7) QTY REQD	(8) QUANTITY RCVD	(8) QUANTITY DATE	(8) QUANTITY DATE	(8) QUANTITY DATE
FO-3 & 4		5995-00-101-9828	CX-10775/U (80058)	Cable Assembly, SP, Electrical (375 FT)		CLD CLF	1				
FO-1		5995-00-565-6134	CX-10775/U (80058)	Cable Assembly, SP, Electrical (300 FT)		CUE	1				
FO-1		5995-00-764-8873	CX-12892/U (80058)	Cable Assembly, SP, Electrical (75 FT)		CUE	1				
2-29		5995-00-230-8386	CX-12810/TPX-46(V) (80058)	Cable Assembly, SP, Electrical, Branched (12 FT)		CUE CLD CLF	1				
FO-3 & 4		5995-00-619-9736	CX-13013/TPX-46(V) (80058)	Cable Assembly Power, Electrical (3 FT)		CLD	1				
FO-3, 4,8		5995-00-249-4909	CX-10779/U (80058)	Cable Assembly, SP, Electrical (50 FT)		CLD CLF	1				
FO-12		5995-00-003-8506	CX-10777/U (80058)	Cable Assembly, SP, Electrical (375 FT)		CLF	1				
FO-13		5995-00-008-3247	CX-10778/U (80058)	Cable Assembly, SP, Electrical (100 FT)		CLG	1				
		5895-00-164-3761	MK-1573/TPX-46(V) (80058)	Installation Kit Program Connectors		CUE	1				
		5895-00-350-5347	MK-1574/TPX-46(V) (80058)	Installation Kit Program Connectors		CLD CLE CLF CLG	1				
		5895-00-013-9312	MK-1630/TPX-46(V) (80058)	Installation Kit Program Connectors NOTE Tripods, Trailers, Radar Masts, Mountings are described in TM's for associated radar equipments and are not part of AN/TPX-46(V).		CLG	1				

SECTION III BASIC ISSUE ITEMS

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) PART NUMBER FSCM	(4) DESCRIPTION	(5) LOCATION	(6) USABLE ON CODE	(7) QTY REQD	(8) QUANTITY RCVD	(8) QUANTITY DATE	(8) QUANTITY DATE	(8) QUANTITY DATE
1-4		5895-00-165-1183	CY-7050/TPX-46(V)* (80058)	Case, Receiver Transmitter Radio			1				
1-1		5895-00-011-3632	CY-6409/TPX-46(V)* (80058)	Case, Coder Decoder Group			1				
1-7		5985-00-155-4205	MX-9157/TPX-46 (80058)	Adapter, Pedestal		CLD CLF CLG	1				
2-5		5180-00-150-1842	TK-228/TPX-46(V) (80058)	Tool Kit, Integrator Set			1				
		4930-00-250-8035	46L650 (83509)	Grease Gun			1				
		5975-00-878-3791	MIL-R-11461 (81349)	Rod, Ground			2				
		4240-00-052-3776	GGG531 (81348)	Goggles, Industrial Safety			1				
				Technical Manuals:							
				TM 11-5073		CUE					
				TM 11-5985-334-15		CLD CLE CLF					
				TM 9-1430-534-12-1		CUE					
				TM 11-1162		CLF					
				TM 11-5895-291-10		CLF					
				TM 11-5895-262-10		CLF					
				TM 11-5895-532-12							
				TM 11-6625-1703-15							

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

D-1. Scope

This appendix lists additional items you are authorized for the support of the AN/TPX-46(V)1, AN/TPX-46(V)2, AN/TPX-46(V)3, AN/TPX-46(v)4, and AN/TPX-46(v)5.

D-2. General

Section II identifies items that do not have to accompany the AN/TPX-46(V)1, AN/TPX-46(V)2, AN/TPX-46(V)3, AN/TPX-46(V)4, and AN/TPX-46(V)5 and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TOE or JTA.

D-3. Explanation of Listing

a. National stock numbers, descriptions and quantities are provided to help you identify and request the additional items you require to support this equipment.

b. Usable on codes in description column is required to identify the different models of the equipment. When there is no Usable On Codes the item is used on all models.

Code	*Used On*
CUE	AN/TPX-46(V)1
CLD	AN/TPX-46(V)2
CLE	AN/TPX-46(V)3
CLF	AN/TPX-46(V)4
CLG	AN/TPX-46(V)5

(Next printed page is D-2)

SECTION II ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION PART NUMBER AND FSCM	USABLE ON CODE	(3) UNIT OF MEAS	(4) QTY AUTH
5985-00-782-5278	AB-621/G (80058) Mast, Antenna	CLD CLE CLF	EA	1
5895-00-148-6932	MK-1730/G (80058) Installation Kit, Mast Erective		EA	1
5895-00-134-2972	MX-9578/TPX-46(V) (80058) Platform Assembly, Maintenance		EA	1
5445-00-542-4561	AB-216/U (80058) Tower		EA	1
	NOTE The following items are required for Mode IV of operation but must be requisitioned separately from the COMSEC custodian in accordance with established procedures for security equipment.			
5810-00-061-3389	KIK-18/TSEC (80058) Code Key		EA	1
5810-00-430-0114	KIR-1A/TSEC (80058) Interogator-Computer		EA	1

APPENDIX E

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the AN/TPX-46(V)1, AN/TPX-46(V)2, AN/TPX-46(V)3, AN/TPX-46(V)4 and AN/TPX-46(V)5. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

E-2. Explanation of Columns

a. Column 1—Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use trichloroethane, item 3, app E").

b. Column 2—Level. This column identifies the lowest level of maintenance that requires the listed item.

C—Operator/Crew

O—Organizational Maintenance

c. Column 3—National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4—Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parenthesis, if applicable.

e. Column 5—Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measures differs from the unit of issue, requisition the lowest unit of issue that will satisy your requirements.

(Next printed page is E-2.)

SECTION II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO. AND FSCM	(5) UNIT OF MEAS
1	O	5985-00-282-8389	Grease Cartridge 1290010-25 (34519)	EA
2	O	8010-00-584-3157	Paint, Rubber, Olive Drab No. X240B7 MIL-F-14072 (81348)	Gal
3	O	9150-00-935-4017	Grease, Aircraft and Instrument MIL-8-23827 (81349)	lb
4	O	8010-00-145-0147	Enamel, Semigloss, Olive Drab X24087 (81348)	Qt
5	O	9150-00-159-4513	Enamel, Semigloss, Black No. 27038 (80244)	Qt
6	C	9150-00-068-9474	Lubricating Oil, Engine MIL-L-2104B (81349)	Qt
7	C	6810-00-551-1487	Trichloroethane O-T-620 Type I (81349)	Qt
8	C	6850-00-086-7123	Antistatic Cleaning Compound 82-12 (04971)	Pint
9	C	8020-00-721-9657	Brush, Paint, Flat 1-1/2 in wide w/FED-SPEC H-B-451 (81348)	EA
10	O	5350-00-264-3485	Paper, Abrasive, Flint, Extra Fine Grade FED-SPEC-PP-105 (81348)	Roll
11	O	5350-00-145-0147	Primer, 3 in Chromate FED-SPEC-TT-P-600 (81348)	Qt
12	O	9390-00-093-4788	Tape, Pressure Sensitive, Friction L-S-300-81348 (26066)	Roll
13	O	5970-00-644-3167	Tape, Electrical, Rubber 3/4 inch TL-183 (80063)	Roll

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FO-8	Interconnection diagram, Interrogator Set AN/TPX-46(V)3, fixed site TYPE IV, without interface box	Fold-in
FO-9	Interconnection diagram, Interrogator Set AN/TPX-46(V)3, fixed site TYPE IV, with interface box	Fold-in
FO-10	Interconnection diagram, Interrogator Set AN/TPX-46(V)3, fixed site TYPE V, with interface box	Fold-in

Section II. DESCRIPTION AND DATA

1-6. Purpose and Use

Interrogator Set AN/TPX-46(V) is an easily transportable identification friend or foe (iff) set, in five configurations. The AN/TPX-46(V)1 is designed for use at improved HAWK sites, the AN/TPX-46(V)2, for use at NIKE-HERCULES sites, the AN/TPX-46(V)3 for use at Defense Acquisition Radar (DAR) sites, the AN/TPX-46(V)4 at AN/GSS-1 or AN/GSS-7 sites with the AN/TSQ-38 or AN/MSQ-18 systems, and Interrogator Set AN/TPX-46(V)6 as a training set. The function of the iff set is to provide the operator with a rapid, secure means of identifying friendly aircraft, and to provide the associated radar with indications of identity to be displayed on the radar plan position indicator (ppi).

a. Interrogations. To establish the identity of friendly aircraft, the iff set transmits coded radio frequency (rf) interrogations to the radar target aircraft. Interrogations may be accomplished in any one of four modes (modes 1,2,3/A and 4) of operation which are initiated manually by the operator or automatically from the associated radar. A fifth mode (mode C) which is provided to establish the altitude of the target aircraft, is initiated and processed by the associated radar, is pulse decoded in the synchronizer.

b. Replies. If the radar target aircraft is equipped with the appropriate equipment and mode settings, it will recognize the mode in which it is being interrogated and will encode and transmit a reply in that same mode. The replies will be received, processed, and evaluated by the iff set. When it is determined that the aircraft has replied properly to interrogations, an identification indication will be presented to the associated radar for display on the radar ppi. Replies received in mode C operation are delivered to the associated radar for decoding of the altitude information.

1-7. Items Comprising an Operable Interrogator Set AN/ TPX-46(V)1 (fig. FO-1 and FO-2)

Interrogator Set AN/TPX-46(V)1 is designed for use with improved HAWK sites to provide the battery control center (BCC) of the site with a rapid secure means of identifying friendly aircraft. The installation of the iff set at the HAWK site may be in either of two different setups. In one setup the coder-decoder (c-d) and receiver-transmitter (r-t) groups and the control box are installed in the ICC, and the antenna and pedestal are mounted on a HAWK pedestal adapter on the top of the van (fig. FO-2). In the other setup, the c-d group case and the control box are installed in the van. The antenna and pedestal are mounted on a HAWK tripod and pedestal adapter which may be located up to 375 feet from the van (fig. FO-1). The r-t group is located at the base of the tripod. Components of the AN/TPX-46(V)1, as well as the quantity, size, weight, and federal stock number of each component are listed below.

	Quantity	*Height (in.)*	*Depth (in.)*	*Width (in.)*	*Unit Weight (lbs.)*	*Federal Stock No.*
Interrogator Set AN/TPX-46(V)1 consisting of:						5895-423-1693
Coder Decoder Group OX-7(V)1/TPX-46(V), composed of:						5895-163-4980
Case, Coder Decoder Group CY-6409/TPX-46(V), which contains:	1	28.86	25.72	25.06	245	5895-011-3632
Synchronizer, Electrical SN-420/TPX-46(V)	1	8.82	17.70	15.30	33	5895-350-5346
Control, Antenna C-8738/TPX-46(V)	1	8.82	20.10	15.30	44	5895-141-3606
Signal Processor CP-925/TPX-46(V)	1	8.82	20.48	21.82	53	5895-167-7939
Switching Unit, Computer, Circuits SA-1836/TPX-46(V)	1	4.12	1.75	4.75		5895-350-5343
Receiver-Transmitter Group OR-85/TPX-46(V), composed of:						5895-165-1184
Case, Receiver-Transmitter, Radio CY-7050/TPM-46(V) which contains:	1	14.10	25.10	20.96	115	5895-165-1183
Receiver-Transmitter Radio RT-1026/TPX-46(V)	1	9.47	20.72	16.29	65	5895-165-1185
Control, Interrogator Set C-7570/TPX-46(V)	1	9.60	9.58	8.10	12	5895-141-3607
Antenna-Radome AS-2167A/TPX-46(V)	1	25.39	15.0	88.04	50	5985-106-2677
Pedestal, Antenna AB-1076/TPX-46(V)	1	23.80	10.10	18.72	104	5985-166-0222
Cable Assembly, Radio Frequency, CG-3460/U (2 ft)	2				1	5995-224-3274
Cable Assembly, Radio Frequency, CG-3460/U (13 ft 6 in.)	2				3	5995-224-3271
Cable Assembly, Special Purpose, Electrical CX-10773/U (2 ft)	1				1.5	5995-238-4666

	Quantity	Height (in.)	Depth (in.)	Width (in.)	Unit Weight (lbs.)	Federal Stock No.
Cable Assembly, Special Purpose, Electrical CX-10774/U (13 ft 6 in)	1				14.5	5995-008-3248
Cable Assembly, Special Purpose, Electrical CX-12892/U (75 ft)	1				80	5995-764-8873
Cable Assembly, Special Purpose, Electrical CX-10775/U (300 ft)	1				290	5995-565-6134
Cable Assembly, Special Purpose, Electrical, Branched CX-12810/TPX-46(V)	1			144 (length)	16.5	5995-230-8386
Reel, Cable DR-7 with Adapter, Reel MX-9300/TPX-46(V)	2	27.75	27.75	16.75	98	8130-634-7984 8130-881-6885
Installation Kit, Program Connectors MK-1573/TPX-46(V)	1				1	5895-164-3761
Tool Kit, Interrogator Set TK-228/TPX-46(V)	1				2.5	5180-150-1842

1-8. Items Comprising an Operable Interrogator Set AN/ TPX-46(V)2 (fig. FO-3, FO-4, and FO-5)

Interrogator Set AN/TPX-46(V)2 is designed for use at NIKE-HERCULES (TYPE I) site to provide either the Battery Control officer (BCO) or the operators with a rapid, secure means of identifying friendly aircraft. The c-d group is located in the radar building and the r-t group is located at the base of Mast AB-621/B, which may be located up to 375 feet from the radar building. Installed on the mast are the antenna, antenna pedestal and pedestal adapter assembly. The control box and monitor alarm functions are performed in the Nike-HERCULES BC van. Components of the AN/TPX-46(V)2, as well as the quantity, size, weight, and federal stock number of each component are listed below.

	Quantity	Height (in.)	Depth (in.)	Width (in.)	Unit Weight (lbs.)	Federal Stock No.
Interrogator Set AN/TPX-46(V)2, fixed site TYPES I, II, consisting of:						5895-423-1694
Coder Decoder Group OX-7(V)1/TPX-46(V), composed of:						5895-163-4980
Cases, Coder Decoder Group CY-6409/TPX-46(V), which contains:	1	28.86	25.72	25.06	245	5895-011-3632
Synchronizer, Electrical SN-420/TPX-46(V)	1	8.82	17.70	15.30	33	5895-350-5346
Control, Antenna C-8738/TPX-46(V)	1	8.82	20.10	15.30	44	5895-141-3606
Signal Processor CP-925/TPX-46(V)	1	8.82	20.48	21.82	53	5895-167-7939
Switching Unit, Computer Circuits SA-1836/TPX 46 (V)	1	4.12	1.75	4.75	1	5895-350-5343
Transformer, power, isolation TF-578/TPX-46(V)	1	16.00	23.62	14.80	39.5	5950-617-7703
Receiver-Transmitter Group OR-85/ TPX-46(V), composed of:						5895-165-1184
Case, Receiver-Transmitter, Radio CY-7050/TPX-46(V) which contains:	1	14.10	25.10	20.96	115	5895-165-1183
Receiver-Transmitter Radio RT-1026/TPX-46(V)	1	9.47	20.72	16.29	65	5895-165-1185
Control Interrogator set C-7571/TPX-46(V)	1	14.04	9.30	5.42	10.5	5895-011-3629
Antenna-Radome AS-2167/TPX-46(V)	1	25.39	15.0	88.04	50	5985-166-0223
Pedestal, Antenna AB-1076/TPX-46(v)	1	23.80	10.10	18.72	104	5985-166-0222
Cable Assembly, Radio Frequency, CG-3460/U (2 ft)	2				3	5995-244-3274
Cable Assembly, Radio Frequency, CG-3460/U (35 ft)	2				10	5995-257-2836
Cable Assembly, Special Purpose, Electrical CX-10773/U (2 ft)	1				1.5	5995-238-4666
Cable Assembly, Special Purpose, Electrical CX-10775/U (375 ft)	1				353	5995-101-9828
Cable Assembly, Special Purpose, Electrical, Branches CX-12810/TPX-46(V)	1			144 (length)	16.5	5995-230-8386
Cable assembly, Power, Electrical CX-13013/TPX-46(V)	1			36 (length)		5995-619-9736

1-11. Items Comprising an Operable Interrogator Set AN/ TPX-46(V)6

(fig. FO-13)

Interrogator Set AN/TPX-46(V) 6 is designed as a training unit for the purpose of providing operating and maintenance training for Army personnel who will be using the AN/TPX-46(V) in its various configurations. Components of the AN/TPX-46(V)6, as well as the quantity, size, weight, and federal stock number of each component are listed below.

	Quantity	Height (in.)	Depth (in.)	Width (in.)	Unit Weight (lbs.)	Federal Stock No.
Interrogator Set AN/TPX-46(V)6 consisting of						5895-423-1702
Coder Decoder Group OX-7(V)1/TPX-46(V), composed of:						5895-163-4980
Case, Coder Decoder Group CY-6409/TPX-46(V), which contains:	1	28.86	25.72	25.06	245	5895-011-3532
Synchronizer, Electrical SN-420/TPX-46(V)	1	8.82	17.70	15.30	33	5895-350-5346
Control, Antenna C-8737/TPX-46(V)	1	8.82	20.10	15.30	44	5895-141-3606
Signal Processor CP925/TPX-46(V)	1	8.82	20.48	21.82	53	5895-167-7939
Switching Unit, Computer Circuits SA-1836/TPX-46(V)	1	4.12	1.75	4.75	1	5895-350-5343
Receiver-Transmitter Group OR-85/TPX-46 (V), composed of:						5895-165-1184
Case, Receiver-Transmitter Radio CY-7050/TPX-46(V), which contains:	1	14.10	25.10	20.96	115	5895-165-1183
Receiver-Transmitter Radio RT-1026/TPX-46(V)	1	9.47	20.75	16.29	65	5895-165-1185
Control, Interrogator Set C-7570/TPX-46(V)	1	9.60	9.58	8.10	12	5895-141-3607
Alarm, Monitor BZ-162/TPX-46(V)	1	9.2	4.54	10.10	10	5840-110-8176
Antenna-Radome AS-2167/TPX-46(V)	1	25.39	15.0	88.04	50	5985-166-0223
Pedestal, Antenna AB-1076/TPX-46(V)	1	23.80	10.10	18.72	96	5985-166-0222
Adapter, Pedestal MX-9157/TPX-46(V)	1	16.76	7.00	48.00	27	5985-155-4205
Cable Assembly, Radio Frequency CG-3460/U (2 ft)	2				1	5995-224-3274
Cable Assembly, Special Purpose, Electrical CX-10773/U (2 ft)	1				1.5	5995-238-4666
Cable Assembly, Special Purpose, Electrical CX-10778/U (100 ft)	1				79	5995-008-3247
Reel, Cable RC-473/G	1	36	36	26	145	8130-075-6179
Installation Kit, Program Connectors MK-1630/TPX-46(V)	1				2	5895-013-9312
Tool Kit, Interrogator Set TK-228/TPX-46(V)	1				2.5	5180-150-1842
Cable Assembly, Radio Frequency CG-3460/U (100 ft)	2				50	5995-405-9183

1-12. Expendable Consumable Items

A list of expendable consumable items required for operation appears in table 1-1. The supplies and materiasl listed in this table are required for operation of this equipment and are authorized to be requisitioned by SB 700-50. The FSN for the applicable unit of issue required can be found in appropriate supply catalogs. The FSCM is used as an element in item identification to designate manufacturer or distributor or Government Agency, etc and is identified in SB 708-42.

Table 1-1. Expendable Consumable Supplies and Materials

Item	Description	Part Number	FSCM	FSC
Grease Cartridge	4 in. od., 2½ in. i.d., 2½ in. lg. 1 ea.	1290010-25	17478	9150
Paint, rubber	Olive drab for Antenna-Radome, 1 gallon	A885B, MIL-P-9503	25472	8010
Methyl-Ethyl-Keytone	1 pt.	MIL-I-00261C, Fed o-C265	81349	6810
Grease, Aircraft & Instrument	For Bearings, Gears, Sliding & Rolling Surfaces 1 lb	MIL-G-23827	81349	9150
Enamel, Semigloss, Olive Drab	Paint 1 qt.	X24087, FED-STD-595	80244	8010
Enamel, Semigloss, Black	Paint 1 qt.	27038, FED-STD-595	80244	8010
Lubricating Oil, Engine	Grade 30, for Air Filters 1 qt.	MIL-L-2104B	81349	9150
Trichloroethane	Cleaning Compound 1 qt.	Fed Spec O-T-620, Type 1	81349	6810
Anti-Static & Cleaner Compound	For Meter Face Glass 1 pt.	82-12	04941	6850

1-13. Common Names

Nomenclature and common name assignments for components of Interrogator Set AN/TPX-46(V) and Interrogator Computer KIR-1A/TSEC are as follows:

Common Name	*Nomenclature*
7 ft. antenna	Antenna-Radome AS-2167/TPX-46(V) or AS-2167A/TPX-46(V)
14 ft. antenna	Antenna-Radome AS-2740/TPX-46(V)
Antenna control	Control, Antenna C-8738/TPX-46(V)
C-D group	Coder-Decoder Group OX-7(V)/TPX-46(V)
C-D group case	Case, Coder-Decoder Group CY-6409/TPX-46(V)
Isolation transformer	Transformer, Power, Isolation TF-578/TPX-46(V)
Cable CX-13013	Cable Assembly, Power, Electrical CX-13013/TPX-46(V)
Cable CG-3460/U (2 ft)	Cable Assembly, Radio Frequency CG-3460/U (2 ft)
Cable CG-3460/U (13.5 ft.)	Cable Assembly, Radio Frequency CG-3460/U (13 ft 5 in.)
Cable CG-3460/U (35 ft)	Cable Assembly, Radio Frequency CG-3460/U (35 ft)
Cable CG-3460/U (100 ft)	Cable Assembly, Radio Frequency CG-3460/U (100 ft)
Cable CG-3461/U (375 ft)	Cable Assembly, Radio Frequency CG-3461/U (375 ft)
Cable CX-10773/U (2 ft)	Cable Assembly, Special Purpose, Electrical CX-10773/U (2 ft)
Cable CX-10774/U (13.5 ft)	Cable Assembly, Special Purpose, Electrical CX-10774/U (13 ft 6 in.)
Cable CX-12892/U (75 ft)	Cable Assembly, Special Purpose, Electrical CX-12892/U (75 ft)
Cable CX-10775/U (300 ft)	Cable Assembly, Special Purpose, Electrical CX-10775/U (300 ft)
Cable CX-10775/U (375 ft)	Cable Assembly, Special Purpose, Electrical, CX-10775/U (375 ft)
Cable CX-12810/TPX-46(V)	Cable Assembly, Special Purpose, Electrical, Branched CX-12810/TPX-46(V)
Cable CX-10777/U (375 ft)	Cable Assembly, Special Purpose, Electrical CX-1077/U (375 ft)
Cable CX-10778/U (100 ft)	Cable Assembly, Special Purpose, Electrical CX-10778/U (100 ft)
Cable CX-10779/U (50 ft)	Cable Assembly, Special Purpose, Electrical CX-10779/U (50 ft)
Code Key	Code Key KIK-18/TSEC
Control Box	Control, Interrogator Set C-7570/TPX-46(V)
Control Panel 1	Control, Interrogator Set C-7571/TPX-46(V)
Control Panel 2	Control, Interrogator Set C-7572/TPX-46(V)
Iff set	Interrogator Set AN/TPX-46(V)
Interrogator computer	Interrogator Computer KIR-1A/TSEC
Large Cable Reel	Reel, Cable RC-473/G
Mode 4 test plug	Switching Unit, Computer Circuits SA-1836/TPX-46(V)
Monitor alarm	Alarm, Monitor BX-162/TPX-46(V)
Pedestal	Pedestal, Antenna AB-1076/TPX-46(V)
Pedestal adapter	Adapter, Pedestal MX-9157/TPX-46(V)
Processor	Signal Processor CP-925/TPX-46(V)
Programmer kit 1	Installation Kit, Program Connectors KM-1573/TPX-46(V)
Programmer kit 2	Installation Kit, Program Connectors MK-1574/TPX-46(V)
R-t group	Receiver-Transmitter Group OR-85/TPX-46(V)
R-t group case	Case, Receiver-Transmitter, Radio CY-7050/TPX-46(V)
Receiver-transmitter	Receiver-Transmitter, Radio RT-1026/TPX-46(V)
Small cable reel	Reel, Cable RC-474/G
Special cable reel	Reel, Cable DR-7 with Adapter, Reel MX-9300/TPX-46(V)
Synchronizer	Synchronizer, Electrical SN-420/TPX-46(V)
Tool kit	Took Kit, Interrogator Set TK-228/TPX-46(V)

1-14. Description of Equipment

NOTE

The following paragraphs cover all major components of all configurations of the iff set. Refer to paragraphs 1-7 through 1-11 for components of each configuration. Interrogator Set AN/TPX-46(V) is composed of three major

operating groups, a control box, two control panels, and a monitor alarm. The three major groups are the c-d group (para 1–15), the r-t group (para 1–16), and the antenna group (para 1–17). The control box and two control panels are described in paragraph 1–18 and the monitor alarm in paragraph 1–19.

1–15. C-D Group
(fig. 1–1, 1–2 and 1–3)

The c-d group is contained in the c-d group case and consists of the synchronizer, the antenna control, the processor, and the interrogator computer. The c-d group case contains quick disconnect, chassis slides for removal and replacement of the synchronizer, the antenna control, and the processor. These assemblies are connected electrically to each other and to the interrogator computer by means of cabling harnesses. These cabling harnesses which are routed throughout the c-d group case are mounted on retractable arms which permit the synchronizer, antenna control, and the processor to be extended, during operation, to the full length of the chassis slides. An internally mounted connector mates with the connector on the interrogator computer when it is installed in the c-d group case. A power control panel, mounted on the top front of the c-d group case, controls power to all the assemblies and the blower motor in the group case, and to the r-t group. Externally mounted connectors provide for connection of the group case to either control box, or control panel 1, or control panel 2, and to the r-t group, the pedestal and to the associated radar. Ventilation is provided for the assemblies of c-d group by means of a blower motor and filter. The air input vent is located on the right side of the c-d group case and an air exhaust port is located on the upper left rear of the c-d group case. The assemblies of the c-d group, in conjunction with the control box, provide for encoding interrogations in the selective identification feature (sif) modes of operation and in the crypto-secure mode (mode 4) of operation. These interrogations are routed to the r-t group for transmission via the antenna group to the target aircraft. Replies received at the antenna are detected in the receiver-transmitter and then routed to the c-d group for processing and evaluation. Indications of a valid series of replies are routed from the c-d group to the associated radar for display on the radar ppi scoe or to an associated computer. The antenna control assembly provides for synchronization of the iff set antenna with the radar antenna so that both antennas are transmitting to the same target aircraft.

1–16. R-T Group
(fig. 1–4)

The r-t group consists of an outer case containing shock mounts to which an inner case is installed. The inner case which provides housing for the receiver-transmitter has an air exhaust port built into the rear of the case and contains quick disconnect, chassis slides for quick removal and replacement of the receiver-transmitter. The space between the inner and outer cases provides for air passage. The receiver-transmitter contains a blower motor whose air input is a filtered vent located on the front panel. Also located on the front panel of the receiver-transmitter are external connectors which provide for connection to the c-d group case and to the antenna group. The receiver-transmitter receives coded interrogations from the c-d group. These interrogations are used as modulation pulses for keying a 1030-megahertz (MHz) transmitter signal which is sent to the antenna group for transmission to the target aircraft. Replies from the target aircraft are detected in the receiver-transmitter and sent to the c-d group for decoding, processing, and evaluation.

1–17. Antenna Group

The antenna group consists of up to three components, depending on the configuration of the iff set. These components are the 14 ft antenna, 7 ft antenna, pedestal, and pedestal adapter.

a. 14 ft Antenna. (A, fig. 1–5) This antenna is designed for mounting on top of the radar antenna and therefore requires no pedestal.

b. 7 ft Antenna. (B, fig. 1–5) This antenna assembly with its hybrid coupler is contained in a tubular fiberglass radome which is mounted on the pedestal. The radome is two parts together with knurled head screws which are captive to one half of the radome. Eight screened vents are provided for drainage of water accumulation within the radome. Two externally mounted coaxial connectors, which are connected internally to the hybrid coupler, provide for connection to the pedestal. The antenna radiates rf interrogations and receives rf replies. Antenna-Radome AS–2167/TPX–46(V) is not provided with a telescope mount, whereas Antenna-Radome AS–

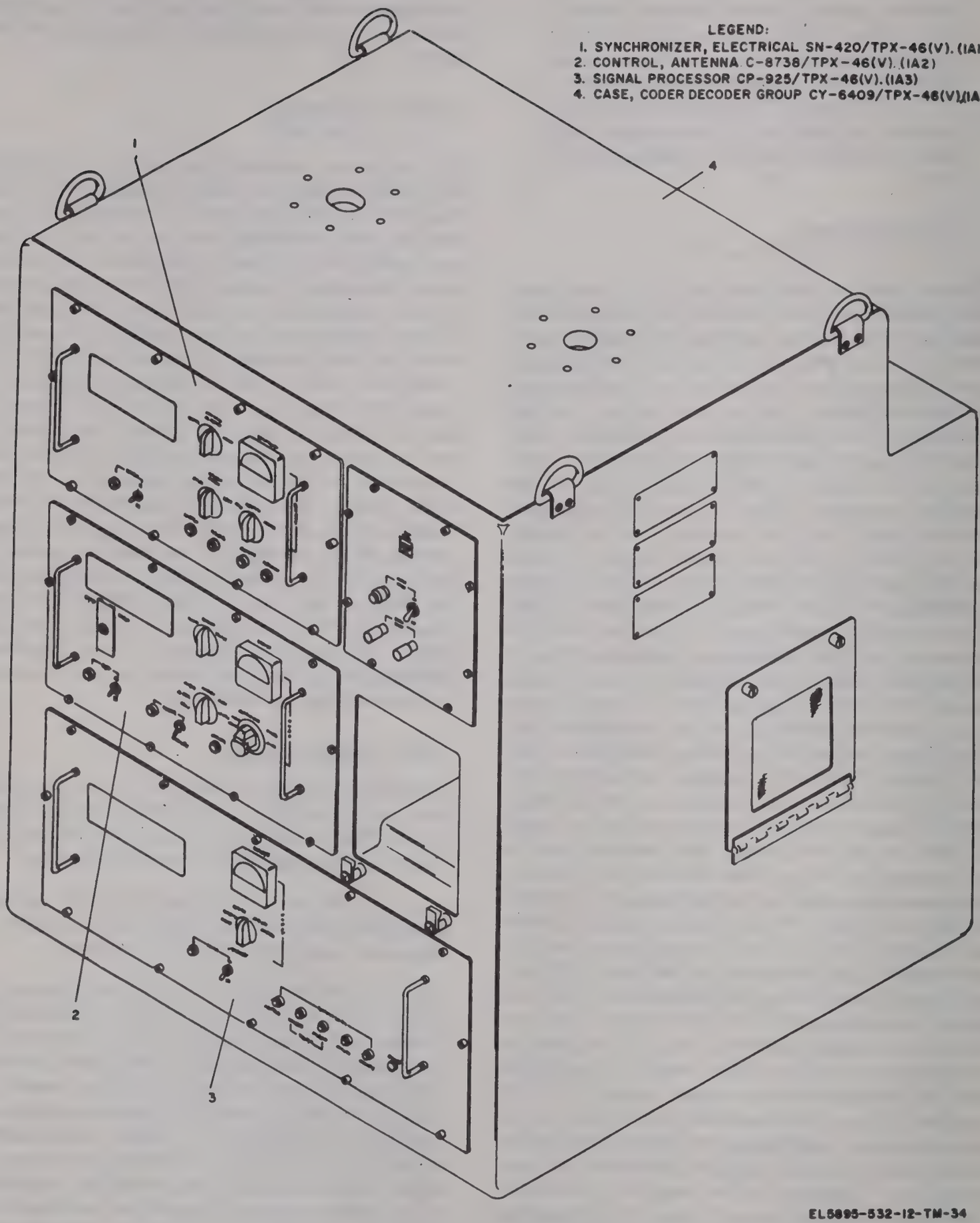


Figure 1-1. Coder-Decoder Group OX-7(V)1/TPX-46(V) (unit 1).

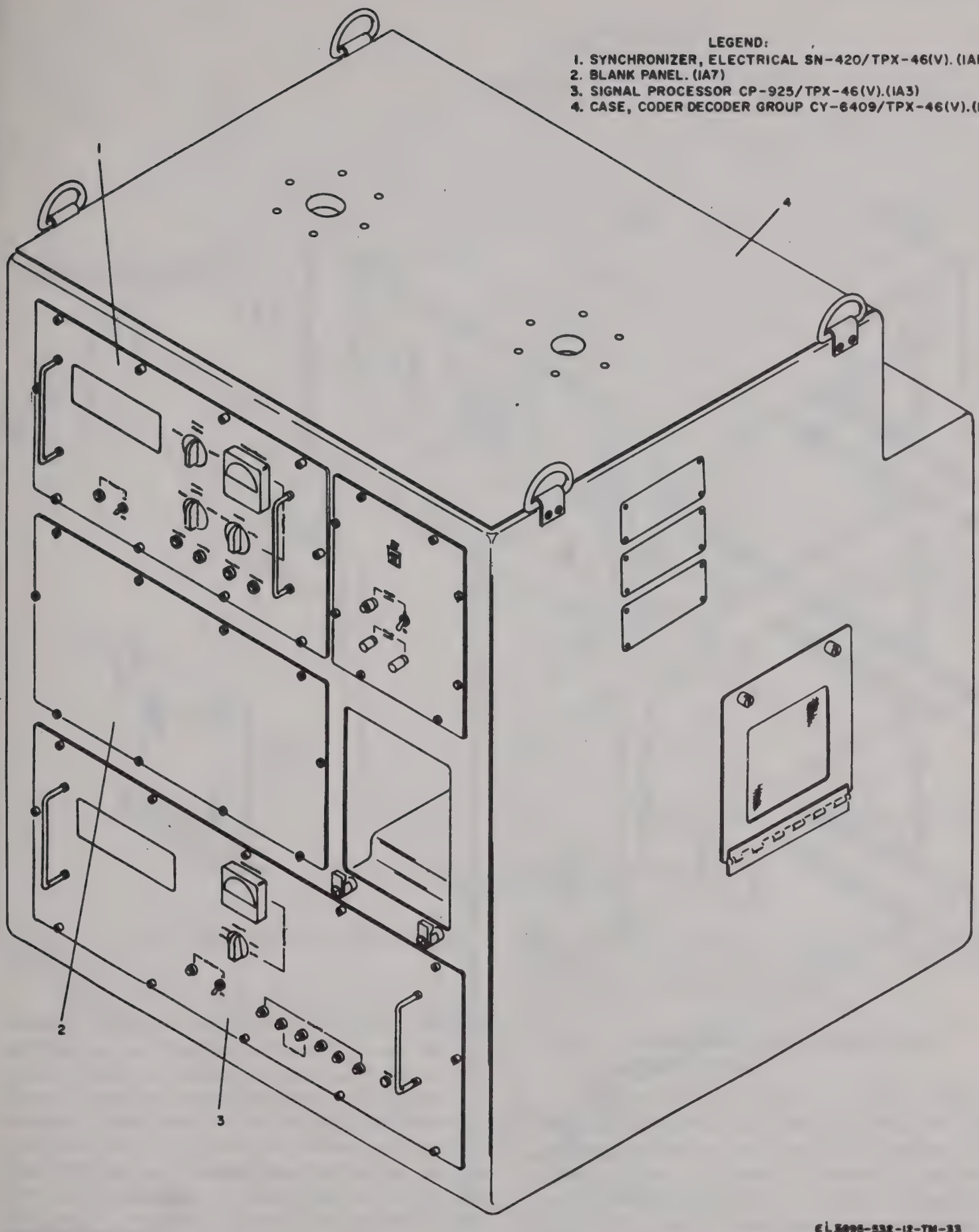
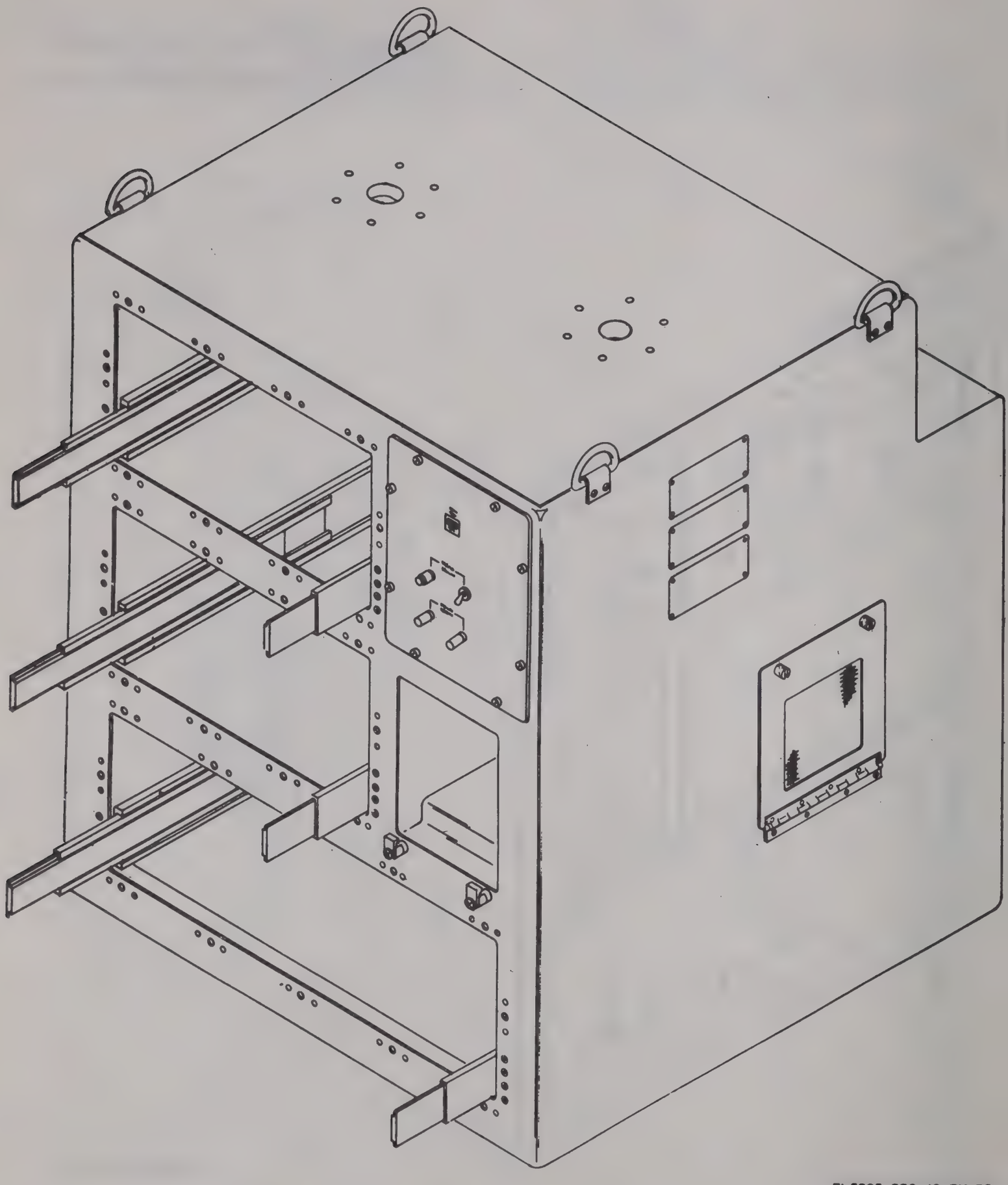


Figure 1-2. Coder-Decoder Group OX-7(V)2/TPX-46(V) (unit 1).



EL 5895-532-12-TM-38

Figure 1-3. Coder-Decoder Group OX-7(V)1/TPX-46(V) with assemblies removed.

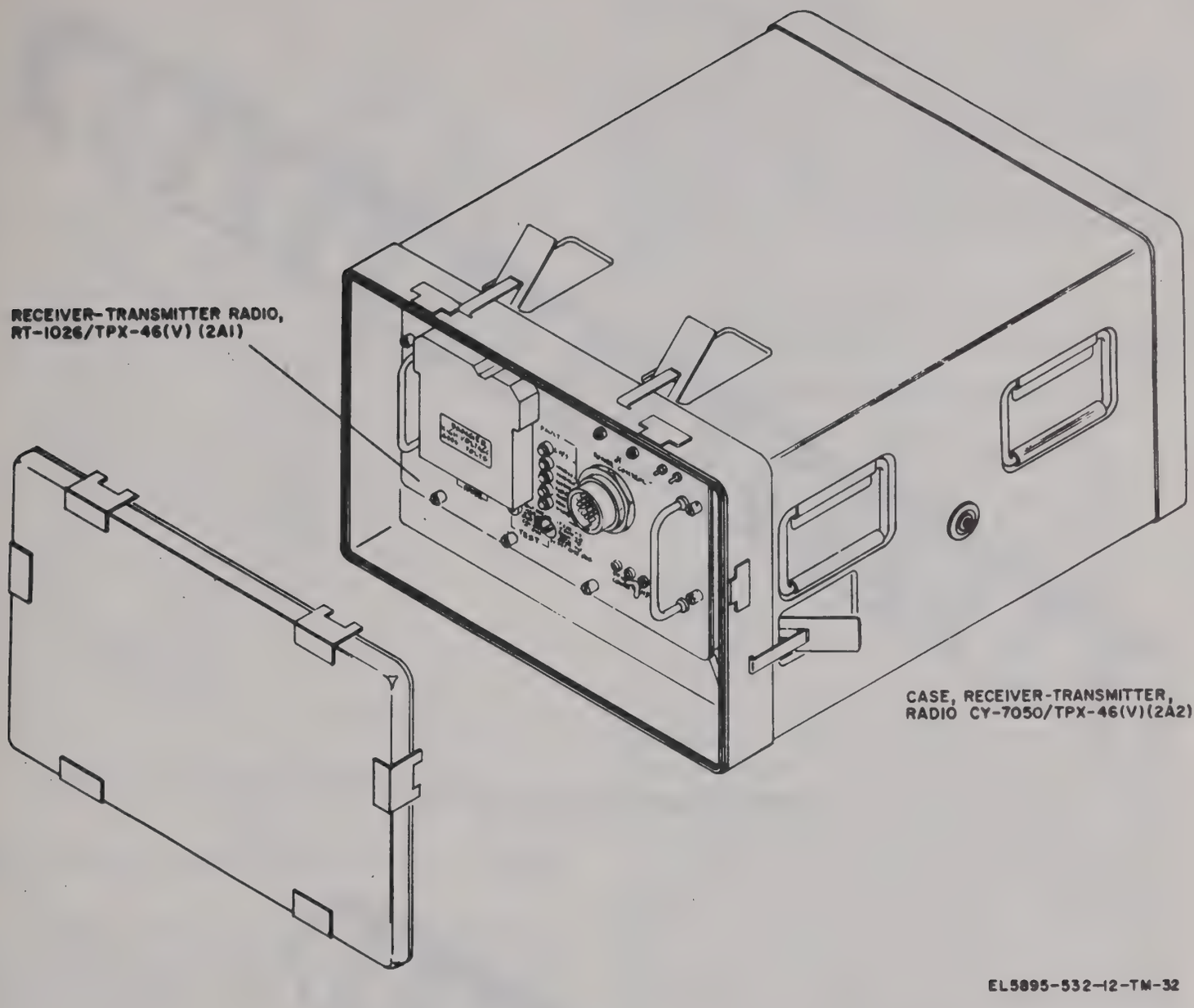


Figure 1-4. Receiver-Transmitter Group OR-85/ TPX-46(V) (unit 2).

2167A/TPX-4(V), for use in AN/TPX-46(V)1 configurations is.

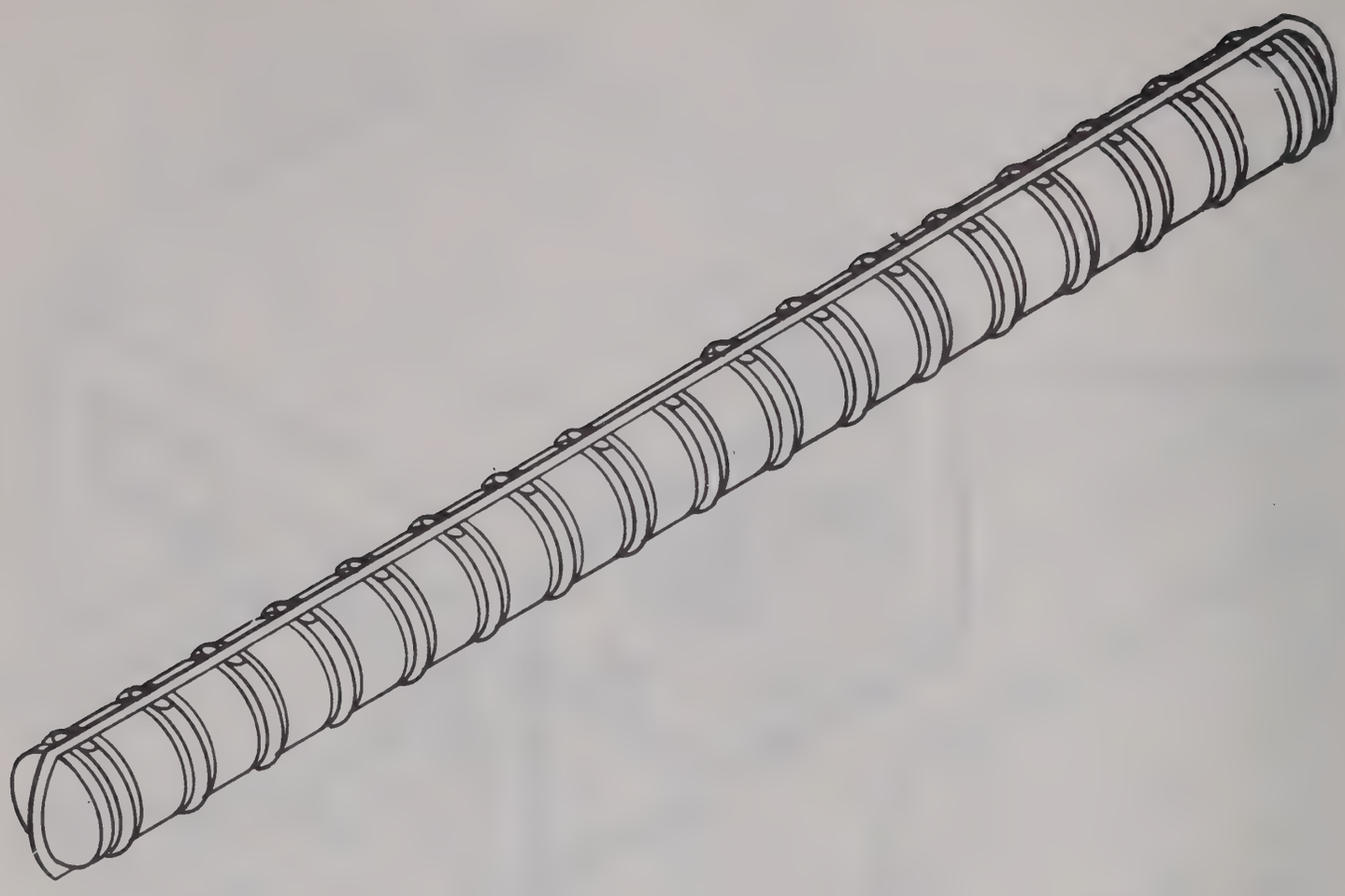
c. Pedestal. (fig. 1-6) The pedestal assembly contains the drive motor for antenna rotation, as well as a rotating coaxial coupler for the transmission of interrogations and replies between the receiver-transmitter assembly and the antenna. Also included on the pedestal assembly are synchros and a resolver which provide signals for antenna synchronization; cable connectors for connection to the antenna and to the r-t group; connector for a voice powered telephone not part of AN/TPX-46(V); a safety switch to prevent antenna rotation whenever a repairman is working on the antenna or pedestal assembly; and spirit levels for leveling of pedestal assembly.

d. Pedestal adapter. (fig. 1-7) The pedestal adapter provides a means to mount the pedestal on Mast AB-621/G.

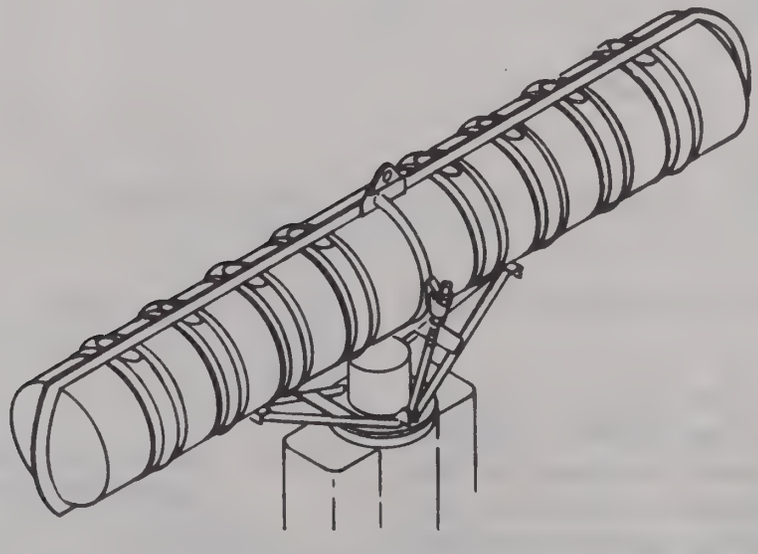
1-18. Control Box, Control Panel 1, and Control Panel 2

a. Control Box. (A, fig. 1-8) The control box provides for operating power control, selection of mode of operation, selection of sif codes of operation, control of mode 4 operation, control of video presentation, and indication of equipment fault. The control box may be mounted on the console of the associated radar ppi scope. Mounted on the control box are two connectors for connection to the monitor alarm and to the group case.

b. Control Panel 1. (B, fig. 1-8) Control panel



A. ANTENNA RADOME AS-2740/TPX-46(V) (UNIT 4)



B. ANTENNA RADOME AS-2167/TPX-46(V) (3A1)

EL5895-532-12-TM-19

Figure 1-5. Antenna-Radome AS-2167/TPX-46(V) (unit 4) and Antenna-Radome AS-2740/ TPX-46(V) (3A1).

1 provides for control of operating power, selection of sif codes, control of mode 4 operation, and indication of equipment fault. Control panel 1 may be mounted on a wall of the associated radar shelter. Mounted on the control panel 1 are three connectors for connection to the associ-

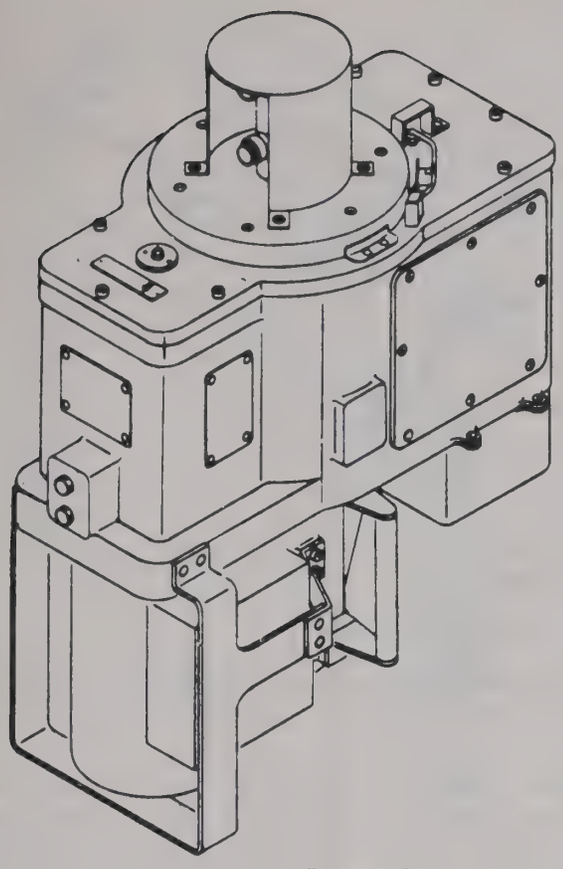


Figure 1-6. Pedestal, Antenna AB-1076A/ TPX-46(V) (3A2).

ated radar, the monitor alarm, and the c-d group case.

c. Control Panel 2. (C, fig. 1-8) Control panel 2 provides for selection of sif codes of operation, selection of mode 4 code A or B operation, and partial control of video presentation. Control panel 2 may be mounted on the shelter wall. Mounted on control panel 2 are three connectors for connection to the associated radar console, the monitor alarm, and to the control box and c-d group.

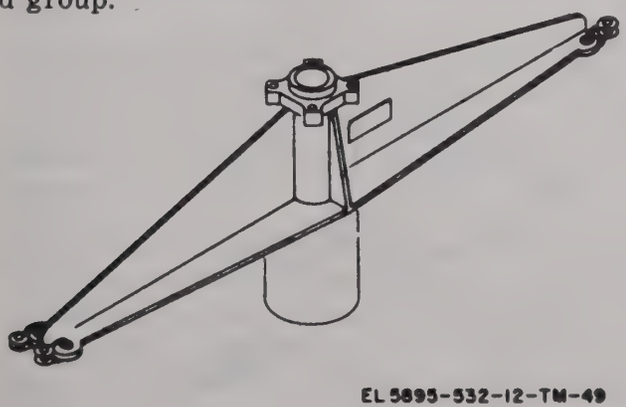


Figure 1-7. Adapter, Pedestal MX-9157/ TPX-46(V) (3A3).

1-19. Monitor Alarm

(D, fig. 1-8)

The monitor alarm provides alarm signals whenever a fault is detected in the interrogator set. These signals consist of a lighted fault indicator lamp and an audio tone. The monitor alarm may be mounted in any convenient location which is within visual and audio range of operating personnel.

1-19.1. ISOLATION TRANSFORMER

THE ISOLATION TRANSFORMER IS A 1:1 TRANSFORMER PROVIDED WITH THE AN/TPX-46(V)2 TO ISOLATE THE IFF SET POWER FROM THE RADAR SET POWER.

1-20. Description of Minor Components

NOTE

This paragraph covers all minor components of all the configurations of the iff set. Refer to paragraphs 1-7 through 1-11 for differences between minor components of each configuration. The minor components of Interrogator Set AN/ TPX-46(V) are described in *a* through **p** below.

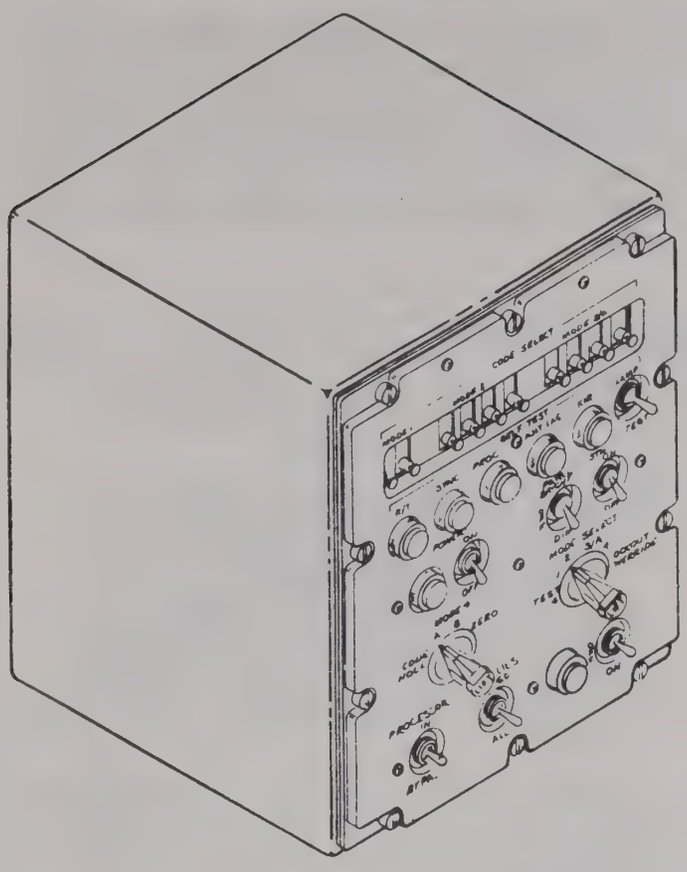
a. Mode 4 Test Plug (fig. 1-9) The mode 4 test plug is installed in the interrogator computer connector receptacle in the c-d group case when the interrogator computer is not installed. Two major functions are provided by the mode 4 test plug. One function is to provide a means to check the mode 4 circuits of the synchronizer, control box or panel, and the c-d group case. The second function provides an alarm indication when mode 4 challenge commands are initiated. The mode 4 test plug is stored inside the interrogator computer compartment of the c-d group case when the interrogator computer is installed in the c-d group case.

b. Cable CG-3460/U. Cable CG-3460/U, provided in four lengths, is a single strand RG-213/U coaxial cable used for transmission of radio frequencies between the r-t group and the pedestal, and between the pedestal and the antenna.

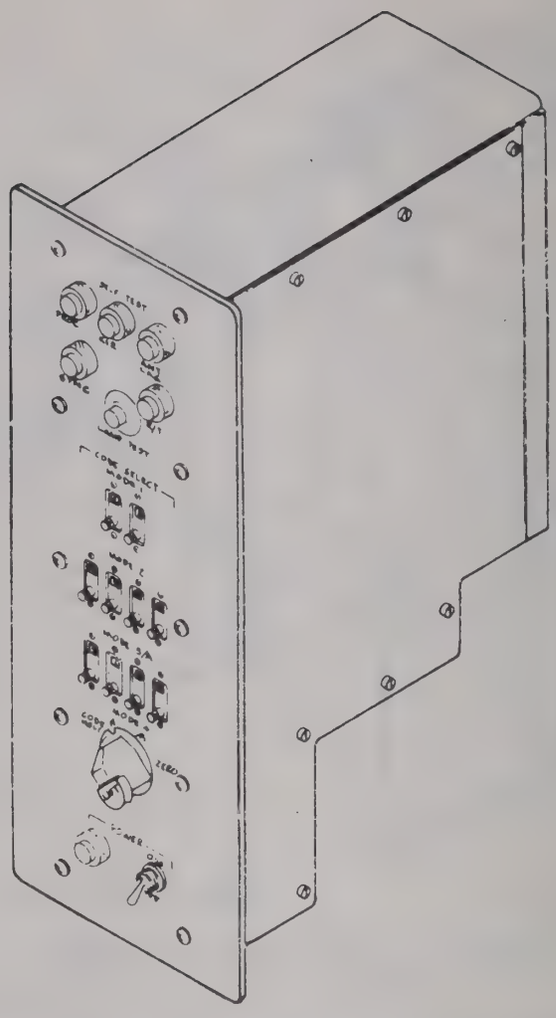
(1) *Cable CG-3460/U (2 ft).* These cables interconnect antenna connectors J1 and J2 with pedestal connectors J1 and J2, respectively.

(2) *Cable CG-3460/U (13.5 ft).* These cables interconnect receiver-transmitter connectors J2 and J3 with pedestal connectors J4 and J3, respectively, when the antenna group is mounted on a tripod or on the van roof.

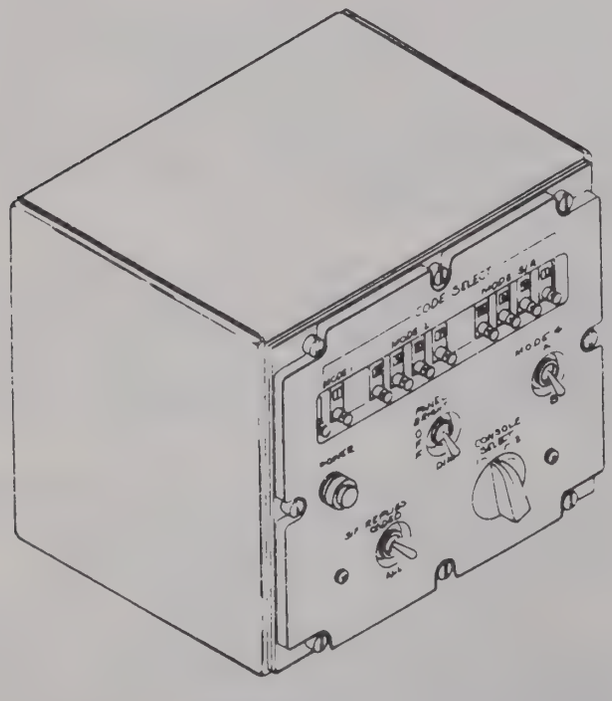
(3) *Cable CG-3460/U (35 ft).* These cables



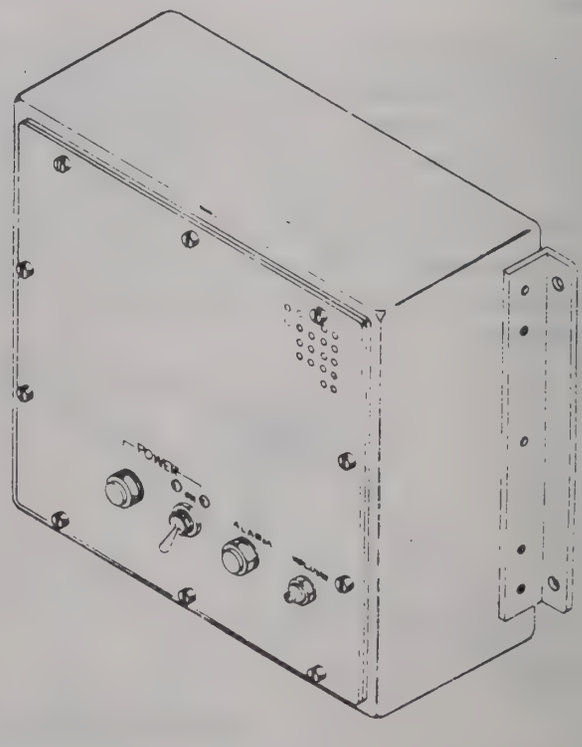
A. CONTROL, INTERROGATOR SET C-7570/TPX-46(V)(UNIT 5)



B. CONTROL, INTERROGATOR SET C-7571/TPX-46(V)(UNIT 6)



C. CONTROL, INTERROGATOR SET C-7572/TPX-46(V)(UNIT 7)



D. ALARM, MONITOR BZ-162/TPX-46(V)(UNIT 8)

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Figure 1-8. Control, Interrogator Sets C-7570/TPX-46(V) (unit 5), C-7571/TPX-46(V) (unit 6), and C-7572/ TPX-46(V) (unit 7); and Alarm, Monitor BZ-162/TPX-46(V) (unit 8).

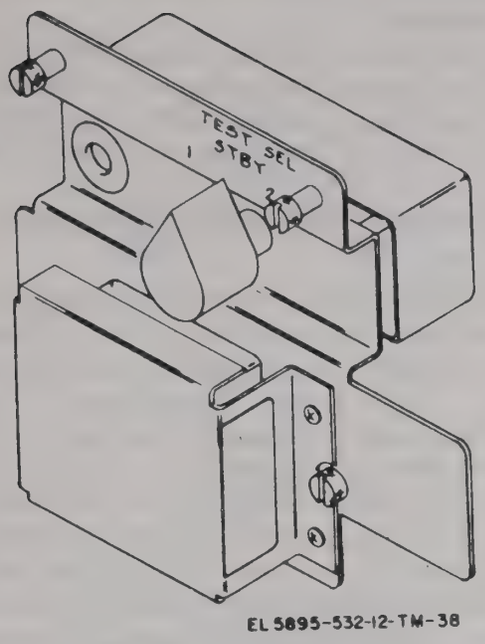


Figure 1-9. Switching Unit, Computer Circuits SA-1836/TPX-46(V) (1A6).

are used instead of the 13.5 ft length when the antenna group is installed on MAST AB-621/G, raised to 30 ft height.

(4) *Cable CG-3460/U (100 ft).* These cables are used instead of the 13 ft 5 in. cables when the antenna group is mounted on Mast AB-621/G which is located beyond the limits of the 35 ft cables.

c. Cable CG-3461/U (375 ft). Cable CG-3461/U (375 ft) is an RG-11 A/U cable used for transmission of iff display video between the AN/GSS-1 or AN/GSS-7 van and the AN/TSQ-38 or AN/MSQ-18 van.

d. Cable CX-10773/U (2 ft). Cable CX-10773/U (2 ft) has 6 conductors and provides for transmission of motor control signals between connectors A2J1 and J6 on the pedestal assembly.

e. Cable CX-10774/U (13.5 ft). Cable CX-10774/U (13.5 ft) has 31 conductors and provides for transmission of azimuth control signals between the HAWK van and connector J5 on the pedestal.

f. Cable CX-12892/U (75 ft). This cable has 46 conductors and provides for transmission of receiver-transmitter control and video signals, and antenna azimuth control signals between cable CX-10775/U (300 ft) and cable CX-12810/TPX-46(V).

g. Cable CX-13013. Cable CX-13013 has three conductors and provides for transmission of power from isolation transformer connector J2 to connector A5J11 on the c-d group case.

h. Cable CX-10775/U (300 ft). This cable has 46 conductors and provides for transmission of receiver-transmitter control and video signals, and antenna azimuth control signals between the associated radar van and cable CX-12892/U (75 ft).

i. Cable CX-10775/U (375 ft). Cable CX-10775/U (375 ft) has 46 conductors and provides for transmission of receiver-transmitter control and video signals, and antenna azimuth control signals between the van of the associated radar and cable CX-12810/TPX-46(V).

j. Cable CX-12810/TPX-46(V). Cable CX-12810/TPX-46(V) has 46 conductors and is branched to provide for transmission of receiver-transmitter control and video signals between cable CX-10775/U (375 ft) or cable CX-12892/U (75 ft.) and receiver-transmitter connector J1; and for transmission of antenna azimuth control signals between cable CX-10775/U (375 ft) or cable CX-12892/U (75 ft) and cable CX-10779/V (50 ft) or pedestal connector J5.

k. Cable CX-10777/U (375 ft). Cable CX-10777/U (375 ft) has 45 conductors and provides for transmission of iff control signals between the AN/GSS-1 or AN/GSS-7 van and the AN/TSQ-38 of AN/MSQ-18 van.

l. Cable CX-10778/U (100 ft). Cable CX-10778/U (100 ft) has 31 conductors and is used in the AN/TPX-46(V)6 configuration to interconnect the training facility and the pedestal.

m. Cable CX-10779/U (50 ft). Cable CX-10779/U (50 ft) has 31 conductors and provides for transmission of antenna azimuth control signals between cable CX-12810/TPX-46(V) and pedestal connector J5.

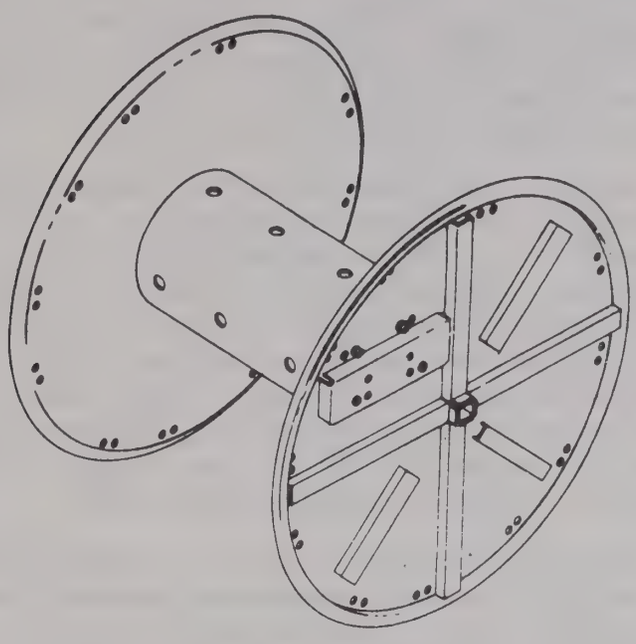
n. Reels, Cable RC-473/G, DR-7 with Adapter, and Reel MX-9300/TPX-46(V) are provided for the cables of the interrogator set. Refer to paragraphs 1-7 through 1-11 for the types of reels supplied with each configuration.

o. *Tool Kit.* (fig. 2-5) The tool kit supplied with the AN/TPX-46(V) consists of one each of the following:

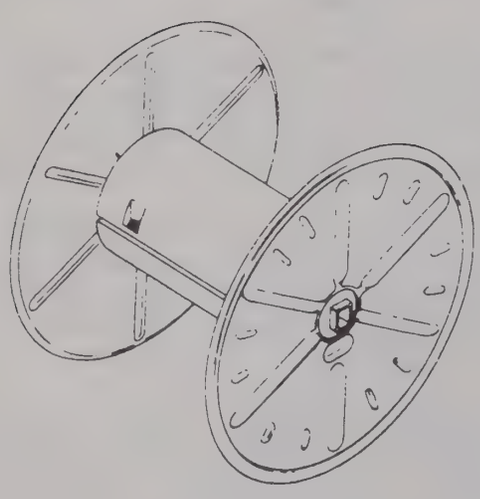
(1) Phillips screwdriver.
(2) 7/8 x 1-inch open-end wrench.
(3) 1/2-inch combination wrench.
(4) Hex T-wrench.
(5) Tool roll.

p. *Running Spares.* (fig. 1-11) The running spares supplied with the AN/TPX-46(V) consist of the following:

(1) 4 ea lamp, sub miniature MS24515-718
(2) 3 ea lamp, incandescent MS25237-330
(3) 3 ea lamp, incandescent MS18209-387
(4) 4 ea lamp, incandescent SM-A-586318



REEL, CABLE RC-473/G



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REEL, CABLE DR-7 AND ADAPTER MX-9300/TPX-46(V)

Figure 1-10. Reels, Cable RC-473/G, DR-7 and DR-7 with Reel, Adapter MX-9300/TPX-46(V).

1-21. Description of Program Connectors (fig. 1-12)

Program connectors are provided with each configuration of Interrogator Set AN/TPX-46(V). These connectors are provided to program the iff set to meet established friend admission/enemy rejection criteria. The program connectors are supplied in three different kits; kit No. 1 is issued with the AN/TPX-46(V)1; kit No. 2 is issued with the AN/TPX-46(V)2, AN/TPX-46(V)3, and AN/TPX-46(V)4, and kit No. 3 is issued with AN/TPX-46(V)6. With the exception of differences in selected programs, the description of the three kits is the same. Kit No. 1 and kit No. 2 each consist of 16 program connectors, of which four have no color code and are never changed; the remaining twelve are divided into three groups of four each. Kit No. 3 contains all unique program connectors of kits No. 1 and No. 2, and are used to form kits No. 1 or No. 2 as required. The individual groups are color coded, green, yellow, and red and are installed in color groups. The program of the green set provides for the highest enemy rejection, the red provides for a highest probability of friend recognition, and the yellow provides a median between the green and red.

1-22. Differences Between Models

The differences between models of the iff set are due to using different components and cables for the various configurations. The major components, the c-d group, and r/t unit, are common to all configurations. Any component used in one configuration is identical to that same component used in any other configuration, with the exception of certain cables, the length of which may vary, and the seven foot antenna. Antenna-Radome AS-2167A/TPX-46 is provided with a telescope mount for boresighting in AN/TPX-46(V)1 configurations. Other configurations of the AN/TPX-46(V) use Antenna-Radome AS-2167/TPX-46(V) which does not have a telescope mount. Substitution of AS-2167A/TPX-46(V) is permissible, but substitution of AS-2167/TPX-46(V) for AS-2167A/TPX-46(V) is not permissible. The differences between the various config-

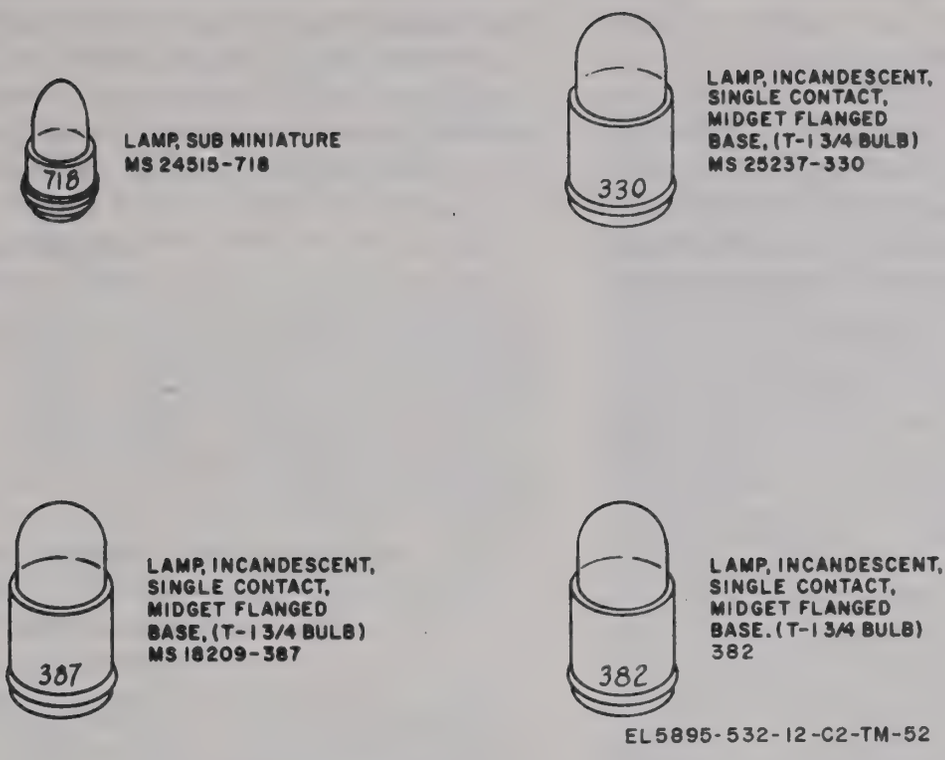


Figure 1-11. Lamps used in Interrogator Set AN/TPX-46(V).

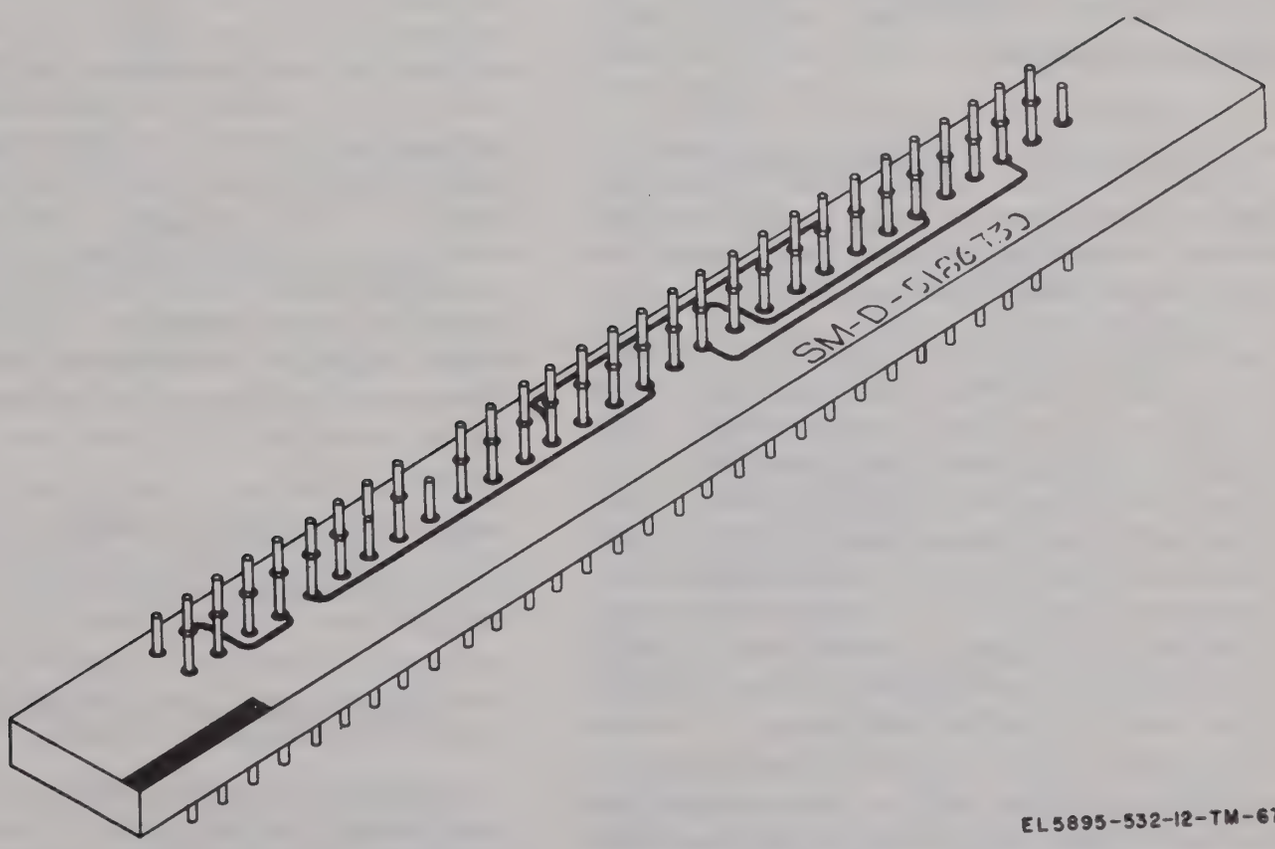


Figure 1-12. Program connector (typical).

urations are described and tabulated in paragraphs 1-7 through 1-11 and shown in figures FO-1 through FO-13.

1-23. Equipment Application

a. Equipment Function. Interrogator Set AN/TPX-46(V) transmits iff interrogations (challenges) and receives iff replies. This challenge/reply process provides the operator with a rapid and secure means of identifying friendly aircraft.

b. Application. The iff set encodes and transmits coded interrogations, in various modes of operation, to the radar target aircraft. If the target aircraft is equipped with a transponder set with the correct mode setting, it will receive the coded interrogations, decode them, and respond with a code reply based on the mode of interrogation. The coded replies are received and decoded and, depending on the mode of operation, are then defruited or processed and evaluated. Both the defruited sif replies and the processed mode 4 replies which meet the evaluation criteria are delivered to the associated radar as identification indications for display on the radar ppi, or for computer information.

1-24. Identification

The identification of radar target aircraft is a function of challenge and reply and consists of pulse pairs or coded pulse trains transmitted from the interrogator set to the radar target aircraft and coded replies transmitted from the target aircraft to the interrogator set.

a. Challenge. Challenges to the target aircraft may be made in any one of four sif modes (mode 1, 2, 3/A or C) or in one crypto secure mode (mode 4). Mode C is used when operating in one of the sif modes. Mode C interrogations, when initiated, are interlaced with the operating sif modes. An sif challenge consists of a pair of rf pulses spaced 3, 5, 8, or 21 microseconds apart for modes 1, 2, 3/A or C, respectively. In mode 4 the challenge consists of four sync pulses followed by a train of up to 32 pulses.

b. Reply. Upon receipt of an sif challenge, the target aircraft will encode a reply consisting of up to 12 rf code pulses contained between two bracket pulses. The spacing of the bracket pulses is 20.3 microseconds and is the same for all of the sif modes. Upon receipt of a mode 4 challenge, the target aircraft will transmit three rf pulses which are spaced 1.8-microseconds apart and are varied over a 64-microsecond period, as a function of the interrogation signal. The received sif replies are detected in the receiver-transmitter and, except for mode C, are delivered to the synchronizer for decoding and then to the processor for elimination of non-synchronous replies (defruiting). Mode C replies are delivered to the associated radar for decoding of altitude information. The detected mode 4 replies are delivered to the synchronizer for triple pulse decoding. The triple pulse decoded video is then sent to the processor and to the interrogator computer. The interrogator computer time decodes the triple pulse decoded video and sends the time decoded video to the processor. The triple pulse-decoded video and the time decoded video are applied to the processor for spoof counting, target detection and evaluation.

1-25. Encoding and Decoding

Encoding sif challenges is a function of the synchronizer and encoding mode 4 challenges is a function of the interrogator computer. Selection of the mode to be used is made by the setting of the MODE SELECT switch on the control box or control panel 1, which energizes the synchronizer circuits, and for mode 4, the interrogator computer. Mode C interrogations are controlled by the associated radar controls. Code settings for the recognition of sif replies are made by the settings of the CODE SELECT switches on the control box or control panel 1. Mode 4 codes are set into the interrogator computer with the code key. When operating in mode 4, code A or code B may be selected by the setting of MODE 4 switch on the control box or control panel 1. Recognized replies are delivered to the processor for processing and evaluation. The encoded challenges are delivered to the receiver-transmitter for transmission to the target aircraft.

1-26. Reply Processing and Evaluation

Reply processing and evaluation is a function of the processor which receives decoded sif video and mode 4 triple pulse decoded video from the synchronizer, and time decoded mode 4 video from the interrogator computer.

a. Decoded Sif Video. Decoded sif video is processed to eliminate any replies which are nonsynchronous. These replies could be either replies from transponders replying to another iff set, or from other sources of interference. The decoded and defruited replies are sent to the associated radar as target video for display on the radar ppi scope.

b. Decoded Mode 4 Video. The decoded mode 4

video, which consists of triple pulse-decode and time decode video are processed by counting valid replies, nonsynchronous replies, and replies not received for challenges. These counts are evaluated and when certain evaluation criteria are met, an indication of identification will be sent to the associated radar for display on the radar ppi.

1-27. Iff Presentation (fig. 3-11)

When operating in the sif modes, the display video which is sent to the associated radar for display on the radar ppi (fig. 3-11) will be target present, identification of position (ip) or emergency. When operating in mode 4, target present and friend tail will be displayed. There is no ip or emergency in mode 4.

1-28. Self-Test Fault Detection and Identification

The iff set is designed to test itself automatically, to monitor transmission of challenges, and to provide indications when a fault is detected or when challenge transmission is not as it should be.

a. When a fault is detected, the following indications should occur:

(1) A SELF-TEST fault indicator lamp on the control box or control panel 1 should light which assembly has the fault.

(2) The monitor alarm should be heard.

(3) A FAULT indicator lamp on the indicated assembly should light, indicating which module or group of cards within the assembly has a fault.

b. When the isls pulse is not being correctly transmitted, the CHALLENGE lamp will not light when challenging and the monitor alarm should sound. No FAULT indicator lamp will be lighted.

1-29. Interrogation Side Lobe Suppression (Isls)

The isls feature of the interrogator set restricts the recognition of transmitted interrogation pulse trains, for those aircraft utilizing the isls capability, and to those aircraft located within a specified antenna beamwidth. The isls function is accomplished by generating a special pulse, known as the isls pulse, as part of the interrogation pulse train. This pulse is used to electrically change the antenna transmission pattern during this portion of the interrogation cycle. During the transmission of normal interrogation pulses, the antenna transmission pattern is characterized by a major lobe with an axis along the center line of the antenna, and smaller side and back lobes with axes at angles to the beam center line. During isls pulse time, however, the antenna transmission pattern is characterized by two high level side lobes with axes at angles to the boresight of the antenna and with a minimum (null) occurring along the antenna boresight. The overlapping effect of the isls antenna pattern restricts the effective beamwidth of the major lobe of the normal interrogation pattern and cancels the effect of its smaller side lobes. Aircraft within the null zone, where isls transmission is small (the level of normal interrogation pulses exceeds the isls pulse by at least 9 db) will normally reply to the transmitted interrogation. Aircraft outside of the null zone, where isls transmission is large (the level of normal interrogation pulses is less than the isls pulse), will have their transponders inhibited and will not reply. Isls effectively prevents transmission of replies by aircraft located in the antenna sidelobes, thus limiting the interrogation beamwidth to a sector centered on the antenna beam centerline.

1-30. Receiver Side Lobe Suppression (Rsls)

The rsls feature of the interrogator set restricts the recognition of reply pulse trains to those aircraft located within the specified antenna beamwidth. The rsls function is accomplished, in the receiver-transmitter, by comparing the level of reply pulses received in two antenna patterns (sum and difference). The level of the reply pulses received in the two antenna patterns depends on the location of the aircraft with respect to the center of the antenna pattern beam centerline. Replies received from an aircraft located on the beam centerline, will be detected mainly in the sum antenna pattern. Replies received from an aircraft located on either side of the beam centerline will be detected in both the sum and difference antenna patterns. The ratio of the energy received by the sum and difference antenna patterns varies with the distance (displacement) of the aircraft from the beam centerline. The amount of energy received by the sum antenna pattern decreases with the displacement of the aircraft from the beam centerline. Below a specified sum-to-difference pattern energy ratio, the recognition of a reply by the interrogator set is inhibited. The higher the

sum-to-difference pattern energy ratio, the narrower the effective display beamwidth. The effect of rsls is to restrict interrogator set processing of received replies to replies from only those aircraft located along the antenna beam centerline.

1-31. Technical Characteristics

a. Overall Equipment.

Range	1 to 200 nautical miles (nm) (370 kilometers (km)), minimum (min)
Resolution	1/3 nm (0.63 km)
Azimuth coverage	360°
Elevation beamwidth	±22.5° at -3 db points relative to center of main beam.
Tracking rates	
Internal control	5, 10, 15, 20 or 25 rpm
External control	0 to 25 rpm
Input power requirements	
Voltage	115 ±11.5 volts ac single phase, 60 ±3 or 400 ±20 Hz
Power	1385 watts max, steady state, when used with Interrogator Computer KIR-1A/TSEC.
	1350 watts max, steady state, when used without Interrogator Computer KIR-1A/TSEC.

b. Transmitting System.

Frequency	1030 ±0.2 MHz.
Wavelength	11.4 inches (29.1 cm)
Peak power	1,000 watts min
Average power	10 watts
Modulation	Pulse coded modulation (PCM)
Pulse repetition rate	500 pps max
Duty cycle	1% max
RF power source	Cavity amplifier

c. RF System.

Transmission line type	Coaxial cable
Antenna	
Type	Sum and difference
Radiating elements	Dipole
Gain	
7 ft Antenna	17.0 dB min
14 ft Antenna	19.0 dB min
Rotation speed	25 rpm max
Type of scan	Circular
Beam width	
Horizontal	
7 ft Antenna	9.5° max
14 ft Antenna	4.5 ±0.5° max
	50 ±0.5°
Side lobe attenuation	
7 ft Antenna	22 dB below main lobe min
14 ft Antenna	23 dB below main lobe min

d. Receiving System.

Type	Log if, dual channel
Bandwidth	
3 dB	11.4 MHz
40 dB	22 MHz
Input impedance	50 ohms
Sensitivity	−80 dBm

e. Antenna Positioning System.

Drive system	dc shunt-type motor, harmonic drive
Rotation speed	0–25 rpm
Synchronization time	8 sec max
Tracking accuracy, with full wind and ice load, at 25 rpm	2° max

CHAPTER 2

SERVICE UPON RECEIPT AND INSTALLATION

Section I. SYSTEMS PLANNING AND GENERAL INSTALLATION

2-1. Planning

Interrogator Set AN/TPX-46(V) is designed to be incorporated into various existing radar systems. Since these systems have been modified to accept the iff set, any special planning required for installation of the iff set will be contained in the radar system modification instructions.

2-2. Installation Sequence

a. General. Installation of the iff set in its various configurations varies with the site at which is to be installed. The installation sequence for each configuration is listed in *b* through *e* below.

NOTE

Common names are listed in paragraph 1-13.

b. Installation Sequence for AN/TPX-46 (V)1.

(1) General information (para 2-7).

(2) Tools, test equipment and materials (para 2-8).

(3) Assembly of 7-foot antenna (para 2-9).

(4) Installation of c-d group case (para 2-10).

(5) Installation of control box (para 2-11).

(6) Pedestal synchro/resolver, connections (para 2-18).

(7) Installation of pedestal on tripod or radar van (para 2-20).

(8) Installation of 7-foot antenna on pedestal (para 2-21).

(9) Installation of r-t group at base of tripod or mast (para 2-24), or installation of r-t group on c-d group case (para 2-25).

(10) Installation of cables (para 2-26 and 2-27 and 2-28 or 2-29).

c. Installation Sequence for AN/TPX-46 (V)2.

(1) General information (para 2-7).

(2) Tools, test equipment and materials (para 2-8).

(3) Assembly of 7-foot antenna (para 2-9).

(4) Installation of c-d group case (para 2-10) and isolation transformer (para 2-10.1).

(5) Installation of control box (para 2-11).

(6) Installation of control panel 1 (para 2-12).

(7) Preparation of Mast AB-621/G for installation and erection of antenna assembly (para 2-15 and 2-16).

(8) Installation of pedestal adapter on Mast AB-621/G (para 2-17).

(9) Pedestal synchro/resolver connections (para 2-18).

(10) Installation of pedestal on pedestal adapter (para 2-19).

(11) Installation of 7-foot antenna on pedestal (para 2-21).

(12) Erection of mast launcher and antenna group (para 2-22).

(13) Installation of r-t group at base of mast (para 2-24).

(14) Installation of cables (para 2-26, 2-27, and 2-30 or 2-31).

d. Installation Sequence for AN/TPX-46(V)3.

(1) General information (para 2-7).

(2) Tools, test equipment, and materials (para 2-8).

(3) Installation of c-d group case (para 2-10).

(4) Installation of control box (para 2-11).

(5) Installation of monitor alarm (para 2-14).

(6) Preparation of Mast AB-621/G for installation and erection of antenna group (para 2-15 and 2-16).

(7) Installation of pedestal adapter on Mast AB-621/G (para 2-17).

(8) Pedestal synchro/resolver connections (para 2-18).

(9) Installation of pedestal on pedestal adapter (para 2-19).

(10) Installation of 14-foot antenna on pedestal or on radar antenna (refer to the associated radar technical manual).

(11) Erection of mast launcher and antenna group (para 2-22).

(12) Installation of r-t group at base of mast (para 2-24), or installation of r-t group on c-d group case (para 2-25).

(13) Installation of cables (para 2-26, 2-27, 2-32 through 2-37).

e. Installation Sequence for AN/TPX-46(V)4.

(1) General information (para 2-7).

(2) Tools, test equipment, and materials (para 2-8).

(3) Assembly of 7-foot antenna (para 2-9).

(4) Installation of c-d group case (para 2-11).

(5) Installation of control box (para 2-11).

(6) Installation of control panel 2 (para 2-13).

(7) Installation of monitor alarm (para 2-14).

(8) Preparation of Mast AB-621/G for installation and erection of antenna group (para 2-15 and 2-16).

(9) Installation of pedestal adapter on Mast AB-621/G (para 2-17).

(10) Pedestal synchro/resolver connections (para 2-18).

(11) Installation of pedestal on pedestal adapter (para 2-19).

(12) Installation of 7-foot antenna on pedestal (para 2-21).

(13) Erection of mast launcher and antenna group (para 2-22).

(14) Installation of r-t group at base of mast (para 2-24).

(15) Installation of cables (para 2-26, 2-27, and 2-38).

Section II. SITE AND SHELTER REQUIREMENTS

2-3. General

Interrogator Set AN/TPX-46(V) operates in conjunction with an associated radar system; therefore, the primary site of the interrogator set antenna is that of the radar system. Siting within the primary location is dictated by the cable length connecting the antenna with the other components of the interrogator set, which is up to 375 feet. Siting within the 375-foot radius is determined by the peculiarities of the interrogation link and radiofrequency propagation at the interrogation and reply frequencies. These parameters and other siting information are explained in paragraphs 2-3.1 through 2-3.5. These principles must be understood before interrogator set antenna can be knowledgeably sited.

2-3.1. Interrogation Link

As shown in figure 2-0.1, the interrogation link consists of Interrogator Set AN/TPX-46(V) which generates the interrogation that is radiated to the aircraft through the IFF antenna; the rf path to the aircraft; the antenna and transponder in the aircraft which receives the interrogation, decodes it, and transmits a reply to the IFF antenna; the AN/TPX-46(V) which receives and decodes the reply; and the associated radar that displays the reply video (or uses it for other than display purposes).

NOTE

The FAULT lamps on the AN/TPX-46(V) check only operation of the interrogator set, and not the rf path, transponder, or associated radar.

2-3.2 Interrogation Coding

a. For the SIF mode, each interrogation cycle consists of three pulses of rf energy designated P1, P2, and P3. Each pulse is 0.8 micro-second duration. The time duration between the leading edges of the P1 and P3 pulses indicate the challenging mode to the transponder. The P2 pulse, used for interrogator side lobe suppression (isls), follows the P1 pulse by 2.0 microseconds. The chart below indicates the SIF modes, P1/P3 spacing, and use.

Mode	*P1/P3 spacing (microseconds)*	*Application*
1	3.0	Military
2	5.0	Military
3/A	8.0	Air Traffic Control/Military
C	21.0	Altitude Reporting

Mode C is not selectable on the AN/TPX-46(V). However, for radars which supply a mode C enable to the AN/TPX-46(V), the mode C interrogations are generated and interlaced on a one-for-one basis with mode 3/A challenges. The replies are detected, and mode C video is applied to the radar for altitude decoding.

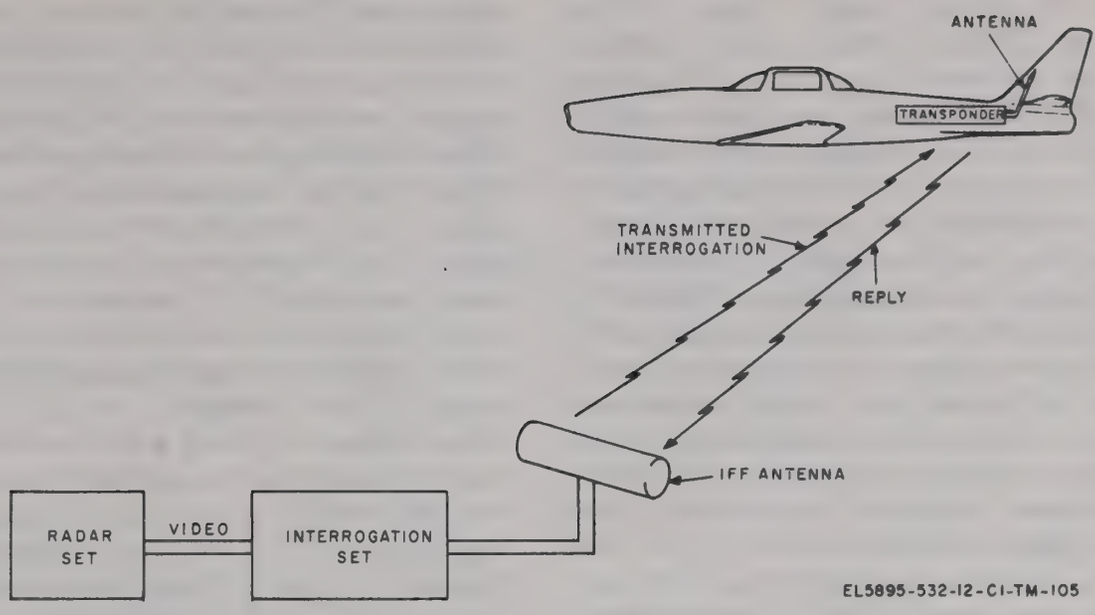


Figure 2–0.1. Iff interrogation/reply link.

b. In mode 4, four sync pulses, followed by a space, followed by an interrogation up to 32 bits is transmitted. The coding is generated by the associated interrogator computer. The fifth bit is the isls bit.

2–3.3. Transponder Characteristics

Although transponders differ, all must meet minimum US National Standard performance standards. It is beyond the scope of this manual to provide definitive radiation and reception patterns for transponder equipped aircraft. The antenna patterns differ widely because of masking due to the antenna location and aircraft design. In actual practice, some aircraft will reply to interrogations at specific azimuth, range, and elevations, and those of another design will not, due to the masking peculiarities of different types of aircraft. Minimum requirements for transponder equipment are given below.

a. Antenna. Omnidirectional in the horizontal plane with a ±30° vertical beamwidth.

b. Minimum Trigger Level (MTL). MTL is a combination of parameters including receiver sensitivity, P1/P3 pulse comparison, and isls characteristics, which if all parameters are met at their most extreme tolerances, will result in triggering a response to at least 90 percent of the received interrogations.

(1) *Receiver sensitivity.*

(*a*) Minus 71 db below 1 milliwatt at antenna end of transmission line.

(*b*) Transmission line loss to receiver: nominal 3 db.

(2) *Pulse comparison characteristics.* The following chart provides the criteria for a transponder to reply or suppress upon receipt of pulses.

Replies to at least 90% of interrogations
P3 is within −1 to +3 db of P1
P2 is 9 db or lower than P1
Valid interrogations are 10 db or more above random pulses not recognized as P1, P2, or P3
Suppresses at least 90% of interrogations above MTL if:
Spacing between P1 and P3 is in excess of ±1.0 usec from selected mode spacing.
Only one pulse is received.
Received P2 pulse is equal to or in excess of P1 (interrogator side lobe suppression).

2–3.4. Antenna Patterns and Interrogator Set Rf Propagation and Reception

a. Free Space Antenna Patterns. Figure 2–0.2 is the free space vertical pattern for the iff antenna, and figure 2–0.3 is the free space horizontal pattern for the iff antenna. These patterns, and the signal strengths associated with them, are valid only for radiation in free space. In actual practice, these patterns are modified by absorption, refraction, and reflection. Of the three, reflection is the most significant and the only one that must be considered for siting purposes.

b. Nulling. Figure 2–0.4 shows how energy from the iff antenna can strike the target aircraft from both the main beam and from a reflected beam. If the two energy sources at the aircraft antenna are in phase, a significant gain above the free space signal will be realized. On the other hand, if the two energy sources are equal in amplitude and out of phase, a complete

cancellation of signal could occur. This phenomena is termed lobing, and occurs throughout the pattern in varying degrees. Usually, the effects of lobing creating a null of sufficient depth at close ranges is not evident because the strength of the reflected signal is not equal in amplitude to the main beam signal, and the resulting null is still of sufficient strength to trigger the transponder. (Refer to paragraph 2–3.3 for transponder characteristics.) At the longer ranges, at angles near grazing where the reflected and main beams are nearly equal in strength and parallel, the nulls can be very deep and wide, as much as 10 or 12 miles in some cases. Multipath nulling can also occur in the opposite direction; that is, on the transponder's rf transmission replies. The result, in either case, is an *iff hole;* a dead area. This phenomena is peculiar to all rf propagation in the frequency ranges of interest.

c. Isls and Isls Multipath Effects. Only aircraft along the main beam are of interest when a challenge is initiated. However, the horizontal antenna pattern, as shown in figure 2–0.3, has side lobes, and aircraft in the side lobes will reply to challenges if the criteria given in paragraph 2–2.3 is met and will show up as false targets along the azimuth of the main beam. To negate this effect, interrogator side lobe suppression (isls) and receiver side lobe suppression (rsls) features are incorporated in the interrogator set. Figure 2–0.3 shows the sum lobe and difference lobes that make up the antenna pattern. The P1 and P3 pulses (interrogation pulses) are transmitted on the sum lobe, and a P2 pulse (isls pulse) is transmitted on the difference lobes 2.0 microseconds later than the P1 pulse. If an aircraft is in one of the difference lobes, the P2 pulse will be detected and compared with the P1/P3 pulses, and if it meets the isls criteria, the transponder will be inhibited from replying. Along the main beam, any multipath that results in an approximate 2.0-microsecond delay between receipt of the direct rf energy and reflected rf energy will place the reflected P1 pulse in the time slot of the P2 isls pulse and inhibit the transponder if the reflected P1 pulse is of sufficient amplitude. Since 2.0 microseconds corresponds to 600 meters range, this means that any reflected P1 pulse of sufficient amplitude that arrives at the target through a multipath longer than the direct path by 600 meters will inhibit the transponder. Since the reflected path causing this effect is only 600 meters longer than the main path, and the reflected pulse must be of sufficient amplitude, this phenomena is usually but not always caused by multipath reflections from reflecting surfaces relatively close to the iff antenna. This problem, as well as all other problems which tend to creat *iff holes*, is significantly magnified when the interrogator set is challenging in

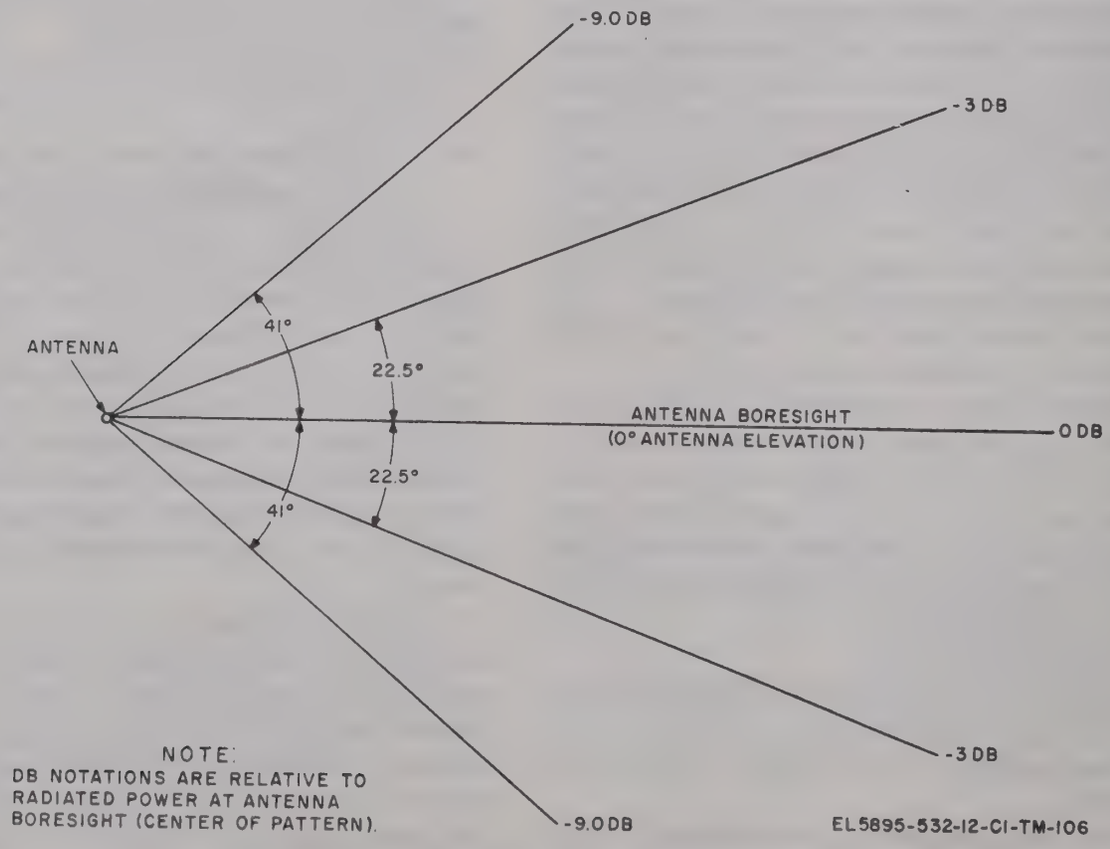


Figure 2–0.2 Iff antenna free space vertical pattern.

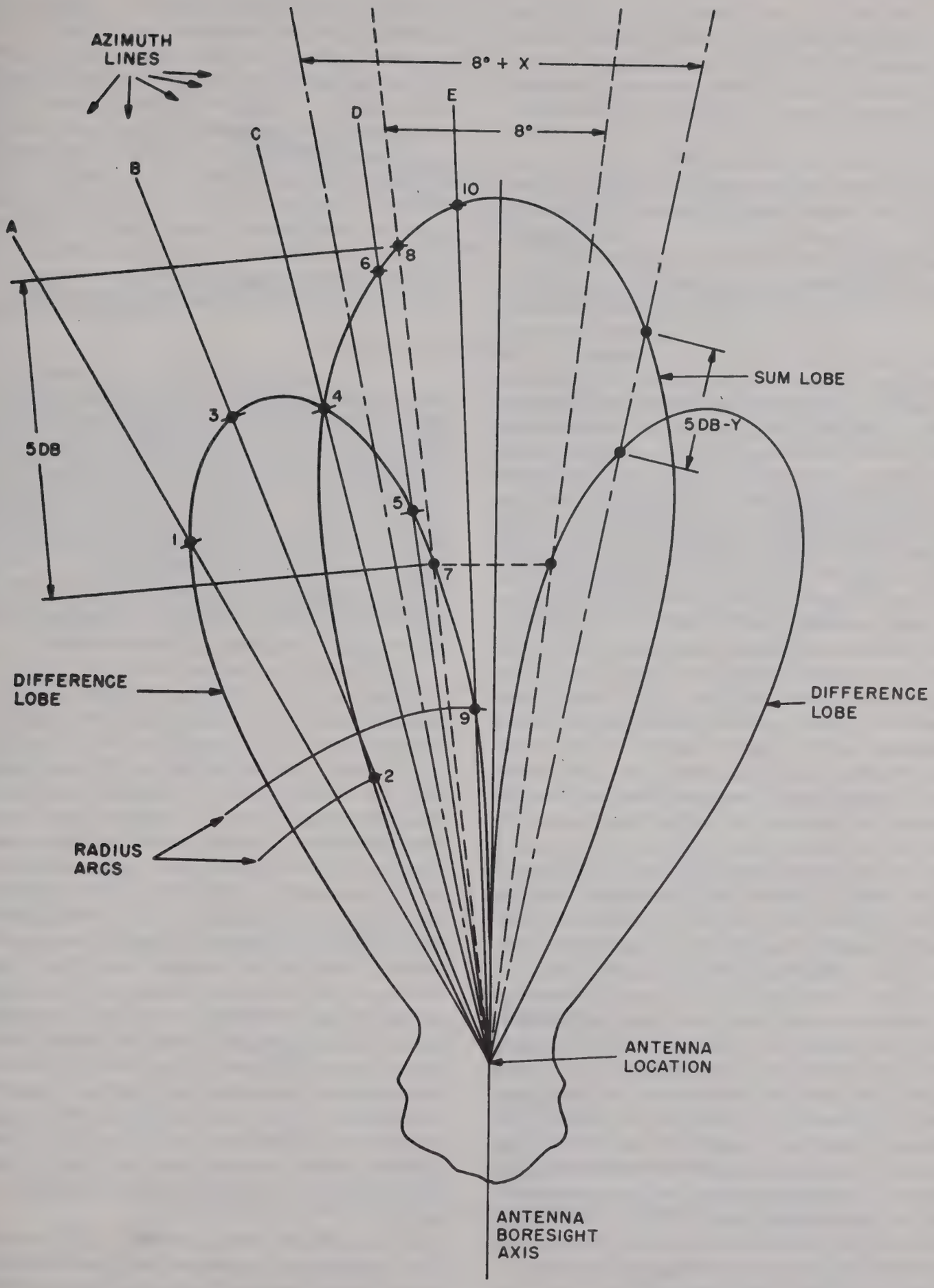


Figure 2-0.3 Iff antenna free space horizontal pattern.

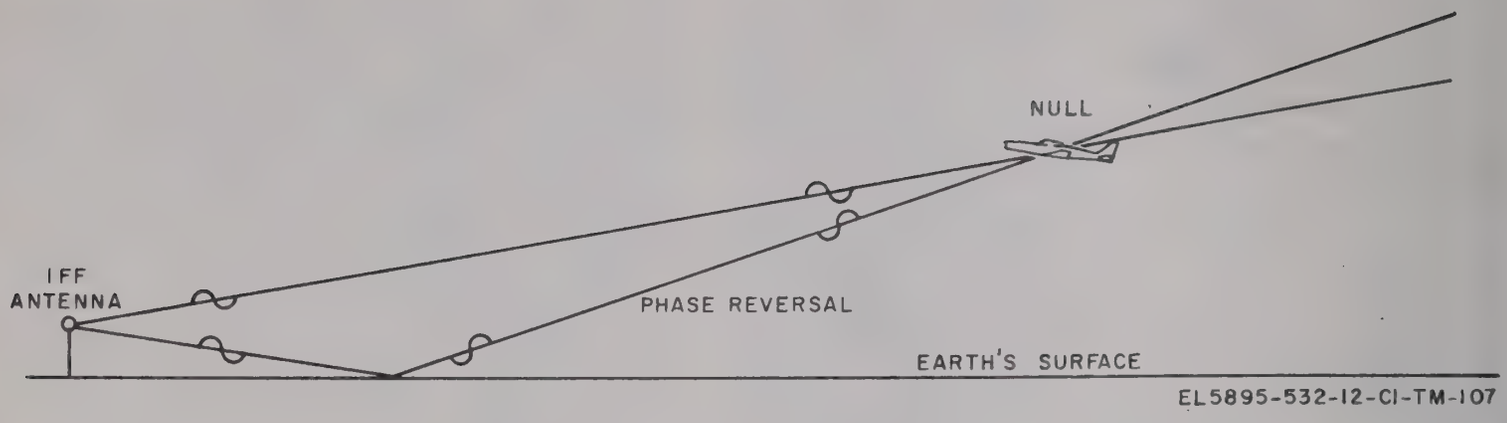


Figure 2–0.4. Multipath causing a null.

mode 4. Four sync pulses precede the isls pulse; therefore, any of the four can be delayed and appear in the isls time slot, thus inhibiting the transponder if the reflected pulse is of sufficient amplitude. The reflected sync pulses, which precede the isls pulse by 2, 4, 6, and 8 microseconds, correspond to range delays of 600, 1,200, 1,800 and 2,400 meters. This means that the reflecting object can be much farther from the iff antenna than that causing the problem in the other modes, where a multipath causing an isls effect is only 600 meters longer than the direct path. To negate this effect, site the AN/TPX–46(V) antenna as far from potential reflecting surfaces as possible and at right angles to the main threat. Figure 2–0.5 illustrates right and wrong ways of siting. Also, if possible, site the antenna so that when a potential reflecting surface is swept, the reflected rays will bounce at sharp angles to the main beam rather than nearly parallel with it. Figure 2–0.6 illustrates how the reflected beam will or will not interfere depending on the angle at which it strikes the reflecting surface. Reflections from the earth can also cause isls multipath effects, although the angles and distances associated with each will differ. Raising the antenna or tilting it to a greater angle than 10° will help, although the detection range may be reduced somewhat for low-flying aircraft the more the antenna is tilted. The maximum detection range of the associated radar should be considered when increasing the tilt angle. For test purposes, isls may be overridden by depressing and holding the SELF TEST switch on the R/T front panel. This action inhibits the P2 pulse from being transmitted.

d. Rsls and Rsls Multipath Effects. The rsls circuits in the interrogator set inhibit replies received from aircraft which are not along the main beam (sum channel) from being processed as targets. This action is accomplished by comparing the amplitude of the signal received in the sum channel to the signal received in the difference channel and inhibiting video processing if the sum channel signal does not exceed the difference channel signal by a preset amount. Rsls is required to inhibit replies from aircraft not along the main beam which are replying as a result of the following:

(1) Transponders not being equipped with isls features and replying to sidelobes of the interrogator challenging other aircraft.

(2) Transponders not along the main beam replying to other interrogator sets. Since multipaths also occur for the reply, as well as the interrogation, it is possible that a multipath could have a nulling effect in the sum channel (signals received out of phase), and another multipath could have an additive effect in one of the difference channels, and therefore the rsls feature of the interrogator set would inhibit what is actually a valid reply. This effect could be caused by siting the AN/TPX–46(V) antenna too close to a reflecting object. Because of the timing involved to achieve this effect, the reflecting surface causing the signal to be directed to one of the difference lobes will probably be closer to the antenna than 100 yards, and the target loss will occur when the aircraft is approaching or departing on a radian rather than tangentially. For test purposes, rsls may be overridden by setting the CHANNEL switch, located inside the top front of the r/t unit to SINGLE, thus disabling the difference channels.

e. GTC (Gain Time Control). GTC is used in the interrogator set to prevent low-level replies from distant targets from being processed in the time frame (range) of close-in targets. (For example, a target at 250 miles could appear at the 50-mile range under certain circumstances without GTC.) The receiver sensitivity is low at

the beginning of receive time, and is increased as the range (time) increases. As with interrogations, nulling can occur on replies from aircraft, although this is not as serious as the nulling on the interrogation path. Because of the different frequencies involved, the interrogation path nulls and the reply path nulls do not coincide, thus making the effective null of the interrogation link wider than either of the individual nulls as the aircraft moves from an interrogation path null area to a reply null area. The GTC circuits may be disabled for test purposes by setting the GTC switch on the r/t unit to OFF.

2–3.5. Installation Siting Criteria

As explained previously, iff targets can be lost as a result of multipath nulls wherein either the interrogation signal is nulled, and is insufficient to trigger the transponder; or the reply signal is nulled and is insufficient to be received. Also, reflected pulses can cause an isls action in the transponder by simulating a P2 isls pulse; or a multipath signal of sufficient strength from the transponder coupled with a nulling effect on the sum lobe can cause an rsls action in the AN/TPX–46(V) receiver by simulating a reply from the difference lobe. The following siting criteria is given under the assumption that the primary site of the iff antenna is dictated by the radar.

a. Orient the iff antenna so that it is at right angles to the direction of the main threat area and associated radar equipment and buildings (fig. 2–0.5).

b. Site the iff antenna as far as practical from all potentially reflective objects, thus minimizing the signal strength and increasing the delay between reflected pulses.

c. If possible, site the iff antenna so that no extremely flat reflective surfaces are between it and the main threat direction such as runways, bodies of water, smooth hard surfaced fields, etc, particularly if damp.

d. Orient the iff antenna (or associated radar vans, if mobile) so that reflected rays do not strike them at glancing angles, but as close to 45° as possible (fig. 2–0.6).

e. Set the antenna tilt angle to 10°, except for AN/TPX–46(V), set the tilt angle to 25°.

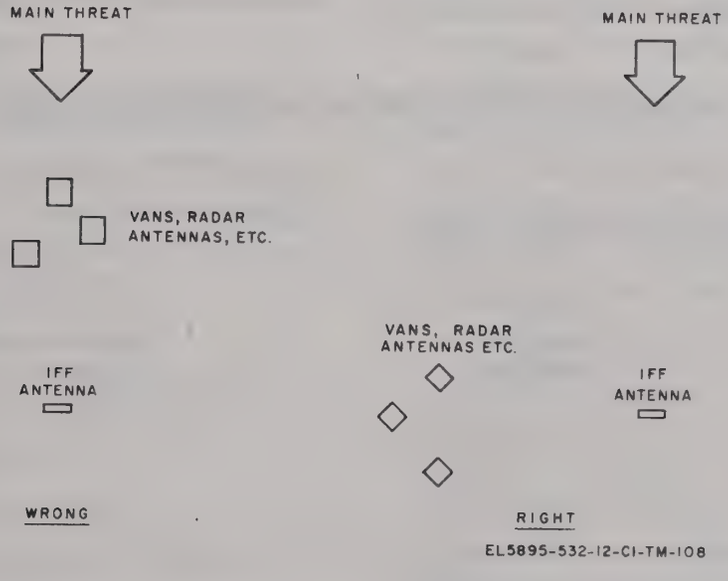


Figure 2–0.5. Site orientation of iff antenna to eliminate isls multipath effects.

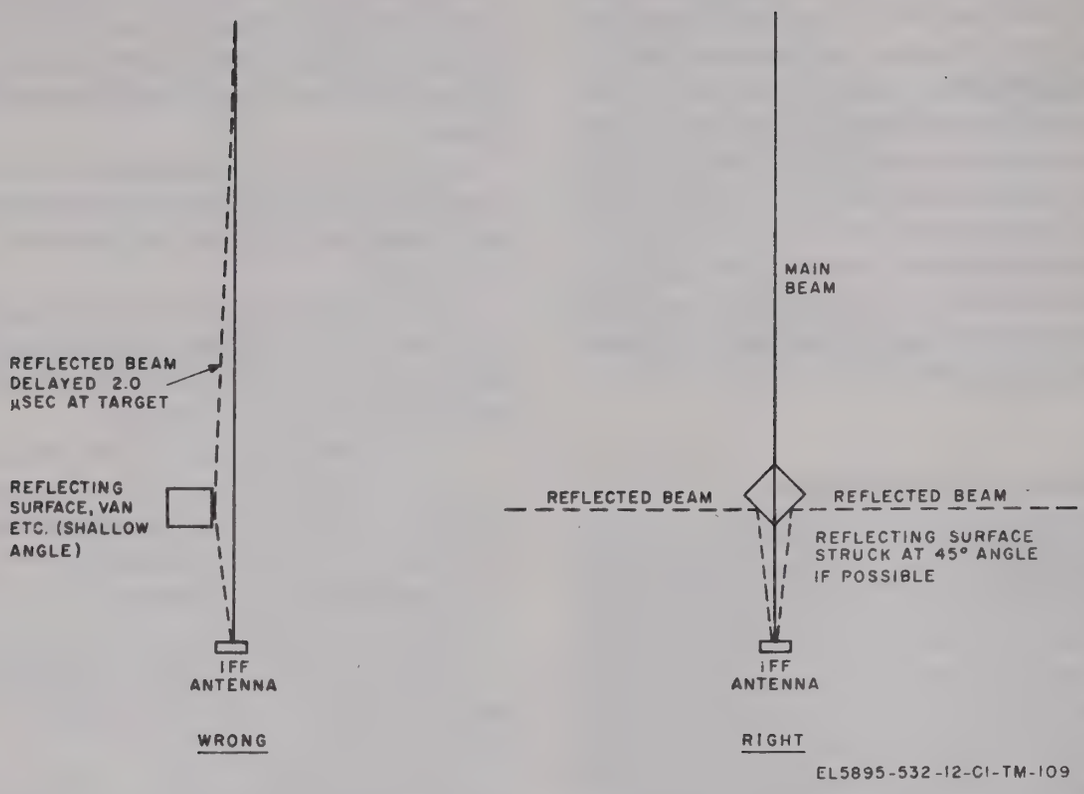


Figure 2–0.6. Orientation of iff antenna to reflecting surfaces to eliminate isls multipath effects.

2–4. Shelter Requirements

Interrogator Set AN/TPX–46(V) is designed for use with fixed, semifixed, or portable radar sets. The c-d group and associated control are mounted in the radar shelter. The r-t group is usually mounted at the base of the antenna mast, but may be installed and secured on top of the c-d group case. Dimensions and weights of all components of the iff set are contained in paragraphs 1–7 through 1–11.

Section III. SERVICE UPON RECEIPT OF MATERIEL

2–5. Unpacking

When packed for shipment, the major components of Interrogator Set AN/TPX–46(V) are shipped as follows:

Equipment	*Container*	*Approximate container size (in.)*	*Figure no.*
C-d group	wood box	32 x 30 x 34[a]	2–1
R-t group	wood box	31 x 26½ x 20	2–1

Equipment	Container	Approximate container size (in.)	Figure no.
Control box		12 1/2 x 12 1/2 x 11 [b]	2-2 (typical)
Control panel 1	Individual fiberboard boxes	17 x 12 x 8 1/2 [b]	2-2 (typical)
Control panel 2	inside overall fiberboard box.	11 x 10 1/2 x 10 1/2 [b]	
Monitor alarm		13 x 11 1/2 x 7 1/2 [b]	2-2 (typical)
Pedestal	wood box	26 x 12 x 21 [c]	2-3
Pedestal adapter	wood box	50 x 30 x 9 [d]	2-3
Small cable reel	wood box	32 x 32 x 25 [e]	2-3 (typical)
Large cable reel	wood box	38 x 38 x 28 [e]	2-3 (typical)
Special cable reel	wood box	30 x 30 x 22 [e]	2-3 (typical)
7-foot antenna	wood box	95 1/2 x 24 x 27 1/2 [f]	2-4
	fiberboard box	35 x 11 x 10 [g]	
14-foot antenna	wood box	174 x 24 x 27 1/2	2-4
Programmer kit	fiberboard box	Shipped separately	—

Notes:

[a] A 27 x 7 x 6 1/2-inch fiberboard box containing running spares, tool kit and holddown straps is packed inside container.
[b] Individual box dimensions given. Overall container size will vary with equipment configuration.
[c] Pedestal mounting hardware and cable CX-10778/U (2 ft) are packed inside container.
[d] Shackles (part of pedestal adapter) are packed inside container.
[e] Contents of cable reels will vary with configuration. See paragraphs 2-28 through 2-39.
[f] Two cables CG-3460/U (2 ft) are packed inside container.
[g] Fiberboard box contains antenna support, tilt adjust strut, rear support and assembly hardware for the 7-foot antenna. See paragraph 2-9.

a. Unpacking wood boxes.

To unpack the wood boxes, proceed as follows:

(1) Cut metal bands where they cross top of box.

(2) Using a nail puller, remove all nails securing top of box. Remove top of box.

NOTE

Also remove cross brace and inside corner braces from pedestal box.

(3) Remove component from box.

NOTE

The c-d group must be mechanically lifted from its box. Remove tape securing polyethylene wrap to gain access to lifting rings.

(4) Remove polyethylene wrap from component.

NOTE

The pedestal is bolted to a wood platform and must be unbolted from the platform prior to installation.

b. Unpacking fiberboard boxes.

(1) Remove sealing tape and filler material from box.

(2) Remove components or individual boxes from outer box. Unpack individually boxed components.

(3) Remove polyethylene wrap from components.

2-6. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (para 1-2b).

b. Check the equipment against the component listing (para 1-7 through 1-11) and the packing slip to see if the shipment is complete. Report all discrepancies in accordance with TM 38-750. The equipment should be placed in service even though a minor assembly or part that does not affect proper functioning is missing.

c. Check to see whether equipment has been modified. (Equipment which has been modified will have the MWO number on the front panel, near the nomenclature plate). Check also to see whether all currently applicable MWO have been applied. (Current MWO applicable to the equipment are listed in DA Pam 310-7.)

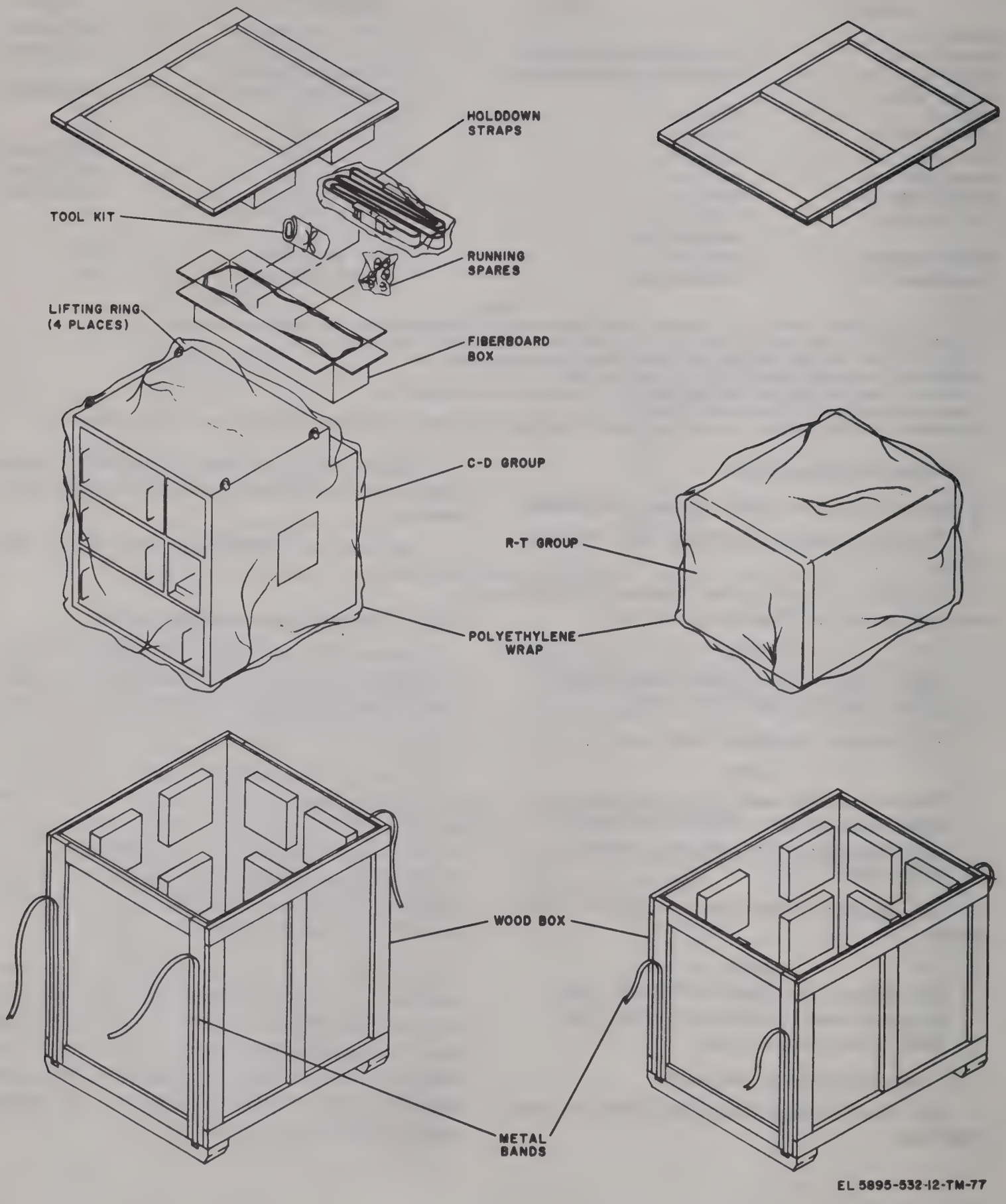


Figure 2-1. C-d group and r-t group packaging.

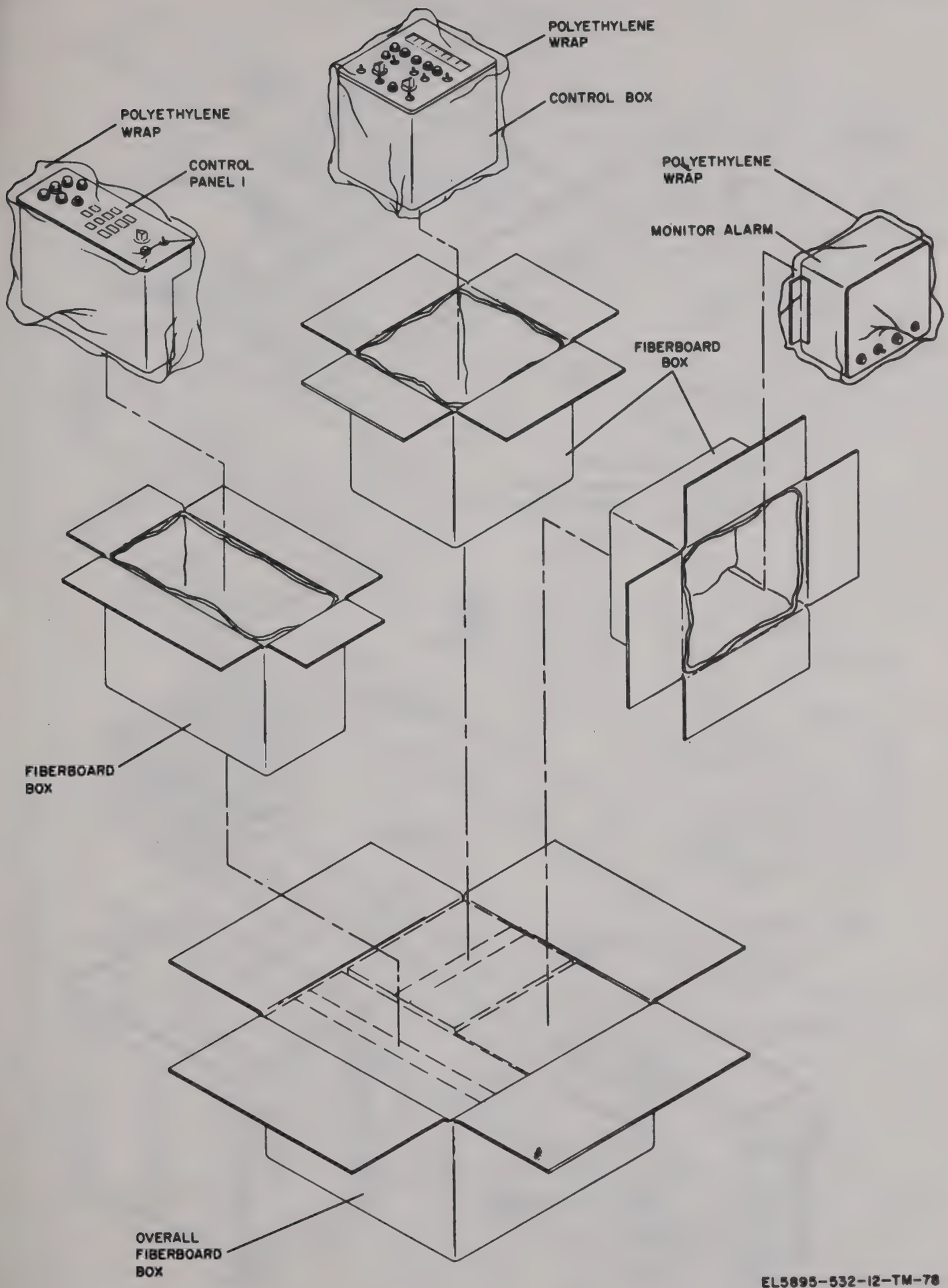


Figure 2-2. Control box, control panel 1, and monitor alarm packaging (typical).

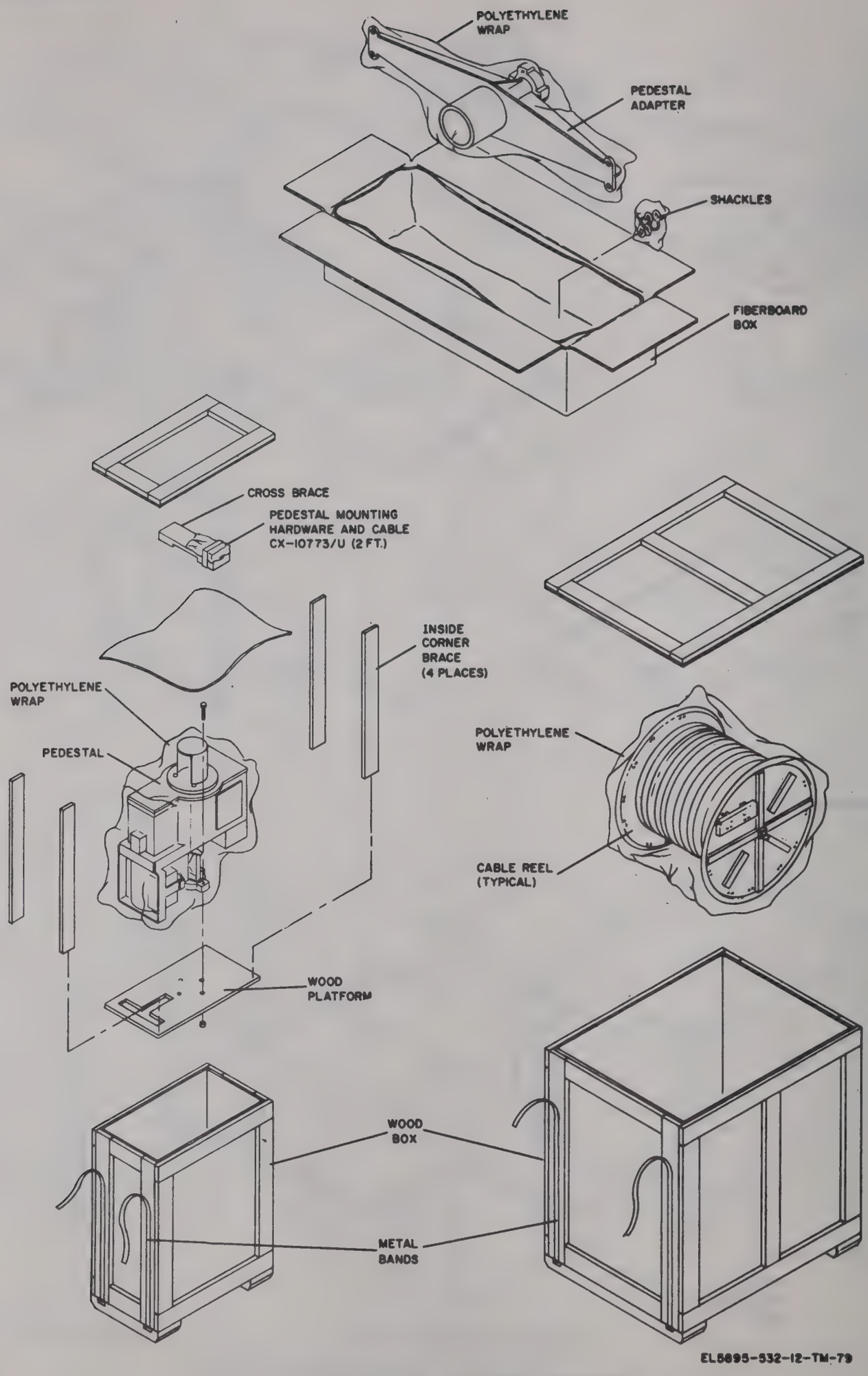


Figure 2-3. Pedestal, pedestal adapter and cable reel packaging.

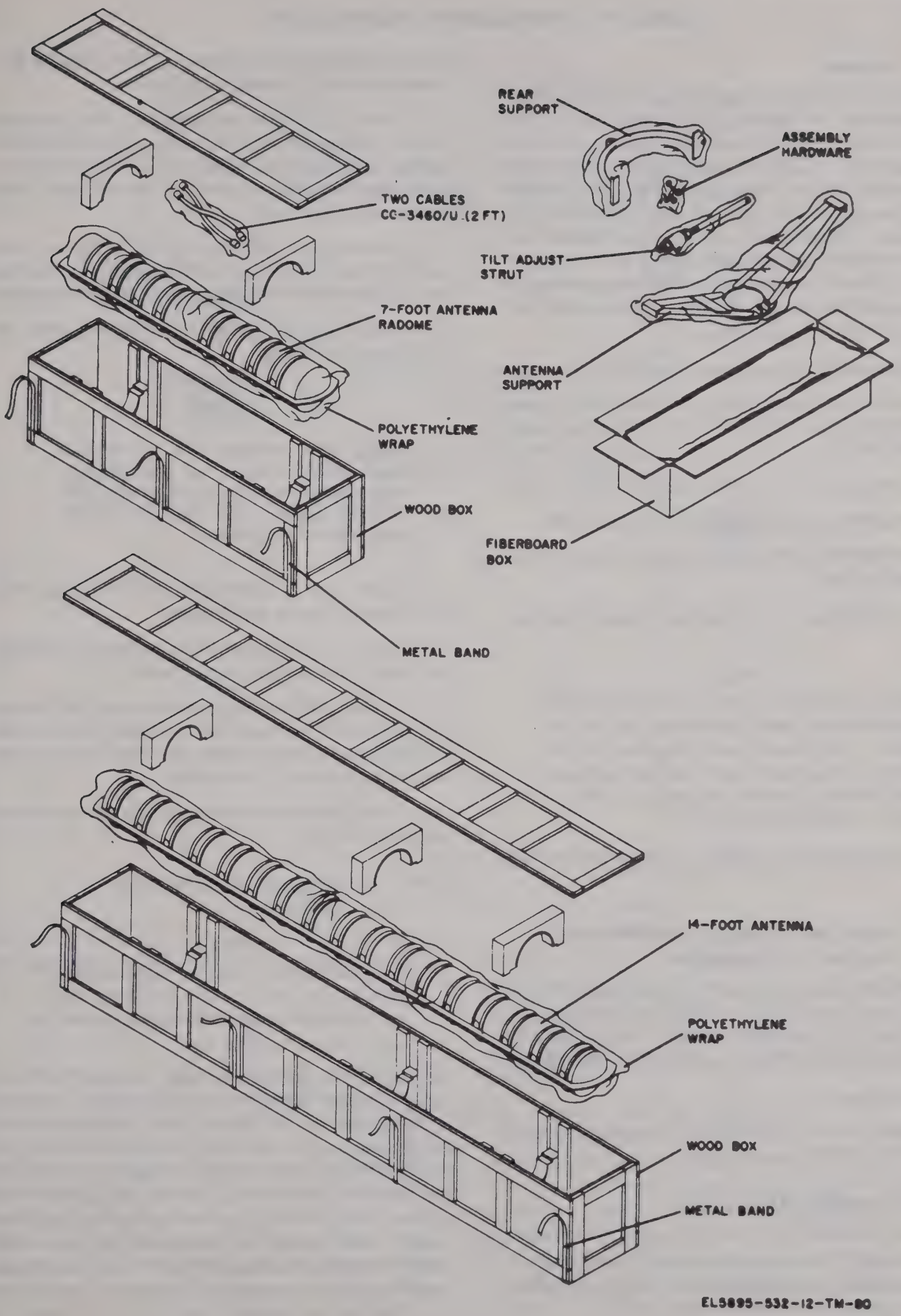


Figure 2-4. Antenna packaging.

Section IV. INSTALLATION INSTRUCTIONS

2-7. General

Installation of the interrogator set requires 3 men and consists of locating and installing the c-d group; installation of the control box and/or control panel 1 or control panel 2; installation of the monitor alarm; locating and installing the antenna group and r-t group; and installation of all cables. Components of the interrogator set are installed in the sequence given below, regardless of iff set configuration. The components of each configuration are listed in paragraphs 1-7 through 1-13.

a. Installation of c-d group (para 2-10).

b. Installation of control box (para 2-11) and/or control panel 1 (para 2-12) or control panel 2 (para 2-13).

c. Installation of monitor alarm (para 2-14).

d. Assembly of 7-foot antenna (para 2-9).

e. Installation of antenna group (para 2-15 through 2-23).

f. Installation of r-t group (para 2-24 and 2-25).

NOTE

Cable lengths for the various fixed site installations vary depending on the site itself. For exact cable lengths of lettered cables referred to in the text and the foldout cabling diagrams, refer to TM 11-5895-532-34-1P.

g. Installation of cables (para 2-26 through 2-39).

2-8. Tools, Test Equipment, and Materials Required for Installation

a. Tools. Tools required for installation of the iff set are contained in Tool Kit, Interrogator Set TK-228/TPX-46(V) (fig. 2-5) which is supplied with the iff set, and Tool Kit TK-105/G.

b. Equipment.

Oscilloscope AN/USM-281A, Dumont Fairchild Model 765 MHF, or equivalent.

2-9. Assembly of Equipment
(fig. 2-6)

Each item of the AN/TPX-46(V) except the 7-foot antenna is complete and fully assembled when shipped from the factory. To assemble the 7-foot antenna, proceed as follows:

a. Install the rear support on the antenna radome by inserting screws equipped with washers through the angle brackets and radome and then fastening the rear support to the radome with locknuts and washers.

b. Position the radome on the antenna support so that the holes in the antenna brackets are aligned with the holes in the support brackets.

c. Install a quick release pin through each set of aligned brackets.

NOTE

Rotate quick release pins through at least 90° to insure that the locking balls clear the tubular supports. A distinct audible click will be heard when the balls release.

d. Align hole in lower end of tilt adjust strut with holes in lower strut mount.

e. Install a quick release pin through tilt adjust strut and lower strut mount.

f. Position the antenna radome and tilt adjust strut so that the upper strut mount mates with the tilt adjust collar. Align the hole in the strut mount with those in the collar.

g. Install a quick release pin through the collar and strut mount.

2-10. C-d Group Case Installation
(fig. 2-7)

NOTE

The c-d group weighs approximately 245 pounds and should be lifted mechanically by the four lifting rings on the top of the c-d group case.

To install the c-d group case, remove the processor and antenna control assemblies outlined in paragraph 5-13*a*. Install a 3/8-inch diameter hexagonal head screw with flat washer through each of the eight holes located around the perimeter of the bottom of the c-d group case. Secure these screws to the c-d group platform in the radar shelter as outlined in the associated radar technical manual. Refer to the associated radar technical manual for detailed installation

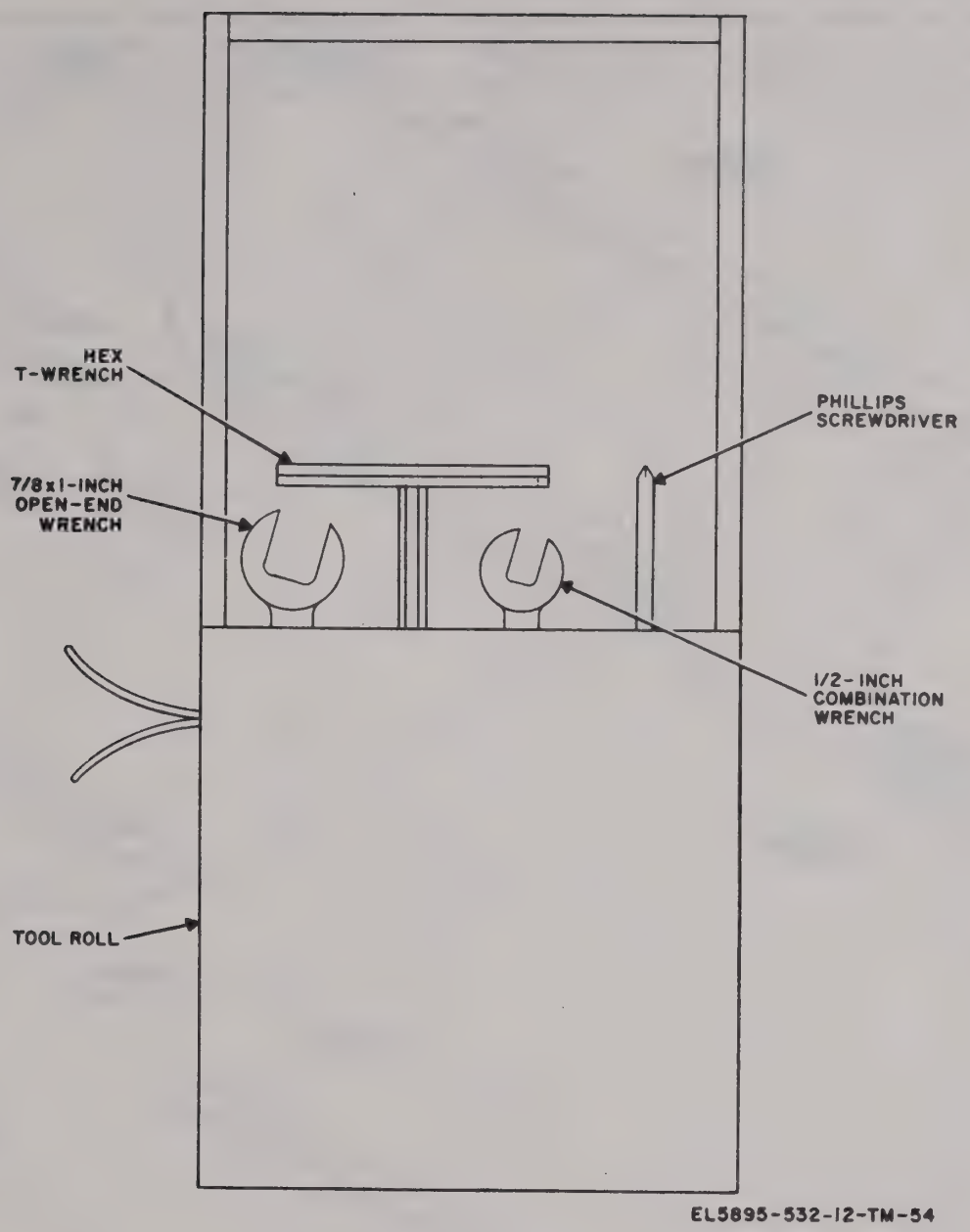


Figure 2-5. Tool Kit, Interrogator Set TK-228/TPX-46(V).

procedures. Reinstall the processor and antenna control assemblies in the c-d group case (para 5-13 *d*).

2-10.1. Isolation Transformer Installation
(fig. 2-7.1)

The installation of the isolation transformer consists of assembling the mounting angles on the mounting base and installing the completed assembly on the c-d group case.

a. Place the six studs in each angle through the corresponding holes in the mounting base.

b. Secure each of the studs with an AN960XC10 washer and an SM-A-787899-1 nut.

c. Remove the two screws and washers which secure each of the four lifting rings on the group case. Discard the screws. Retain the washers.

d. Install the mounting plate assembly on the group case.

e. Reverse the lifting rings and install the lifting rings and mounting angles to the c-d group case using two MS51958-81B screws and the washers retained from *c*, above, for each lifting ring.

2-11. Control Box Installation
(fig. 2-8)

The control box is designed to be secured to the mounting surface in the radar shelter via four holes containing 1/4-20 threaded inserts. These holes are located on the top and bottom sides of the control box. To mount the control box, insert 1/4-20 screws with lockwashers and flat washers through the mounting surface into the mounting

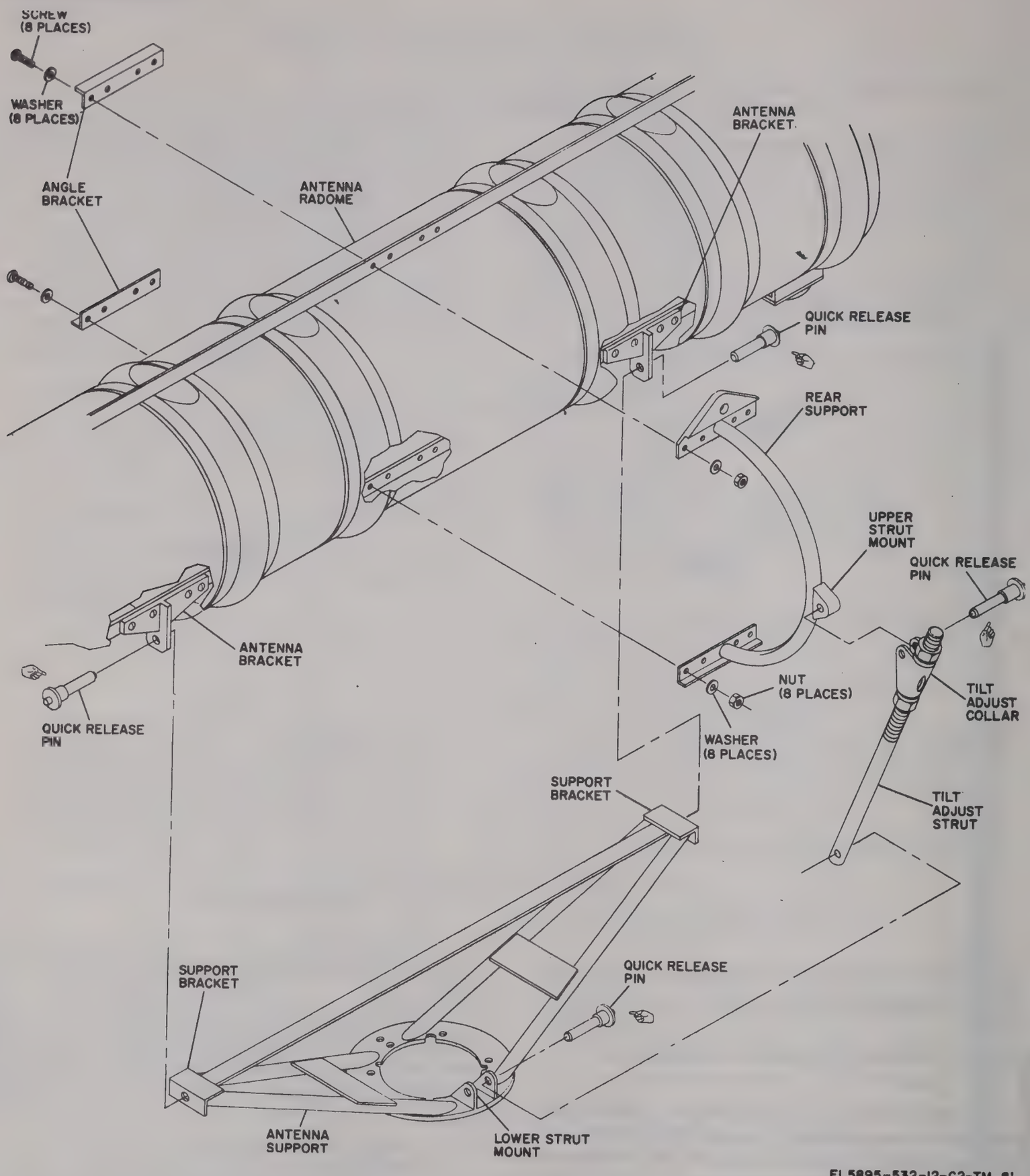


Figure 2-6. Assembly of 7-foot antenna.

holes. The length of the 1/4-20 screws should be 3/8-inch longer than the mounting surface. Refer to the associated radar technical manual for detailed installation procedures.

2-12. Control Panel 1 Installation (fig. 2-9)

Control panel 1 is provided with six standoffs threaded for 10-32 hardware. To mount control panel 1, insert 10-32 screws with lockwashers and flat washers through the mounting surface into the mounting holes. The length of the 10-32 screws should be 3/8-inch longer than the mounting surface. Refer to the associated radar technical manual for detailed installation procedures.

2-13. Control Panel 2 Installation
(fig. 2-10)

Control panel 2 is designed to be mounted on its top, bottom or rear sides. These sides each contain four mounting holes equipped with 1/4-20 threaded inserts. To mount control panel 2, insert 1/4-20 screws equipped with lockwashers and flat washers through the mounting surface. The length of the 1/4-20 screws should be 3/8-inch longer than the mounting surface. Refer to the

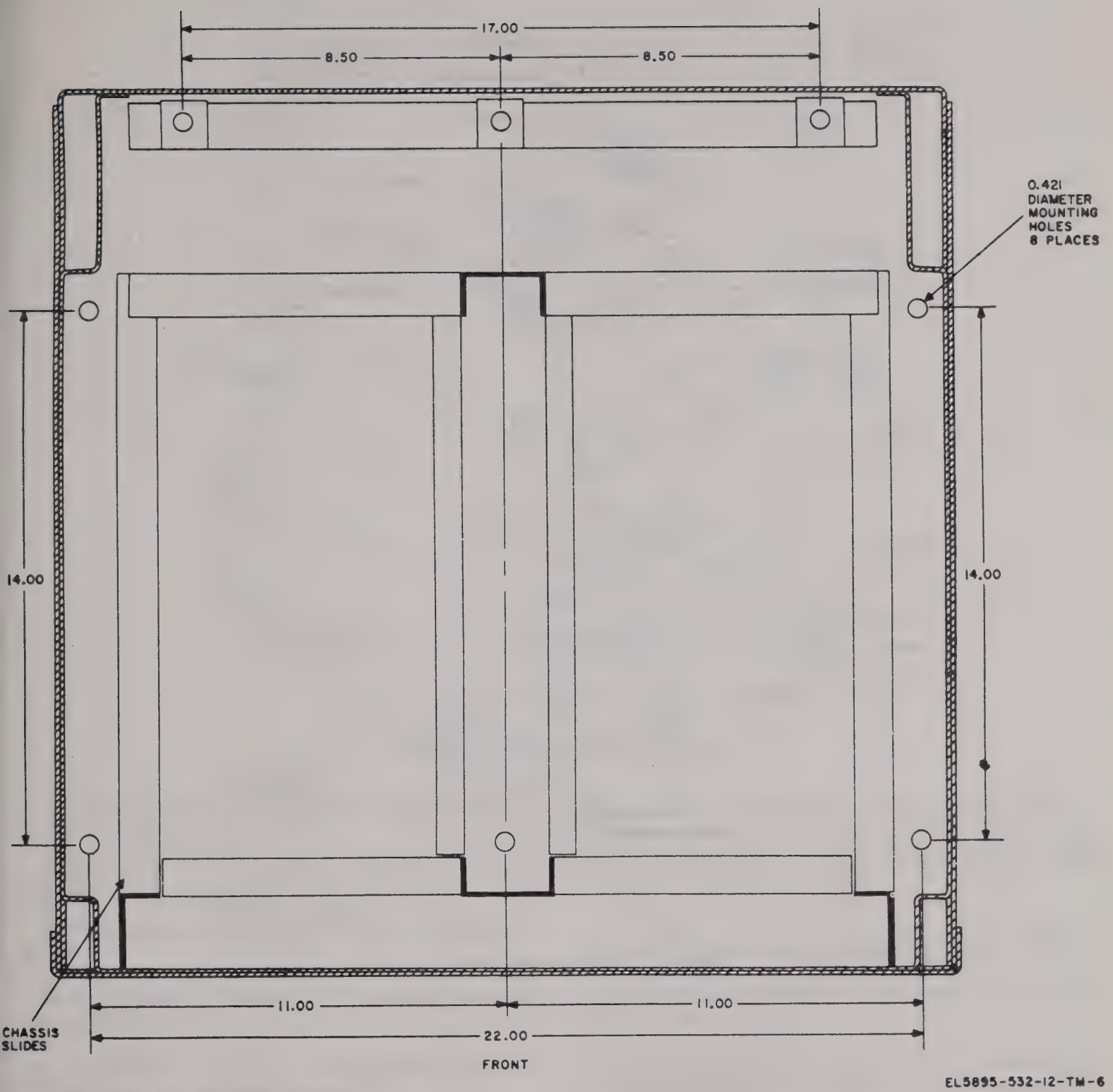


Figure 2-7. C-d group case installation.

associated radar technical manual for detailed installation procedures.

2-14. Monitor Alarm Installation
(fig. 2-11)

The monitor alarm is equipped with mounting flanges each containing two mounting holes. To mount the monitor alarm, insert 10-32 screws with flat washers through the mounting surface and mounting holes. Secure the screws with lock washers and 10-32 nuts. Refer to the associated radar technical manual for detailed installation procedures.

2-15. Sequence of Installation and Erection of Antenna Group Components

Components of the antenna group are installed and erected in the sequence below:

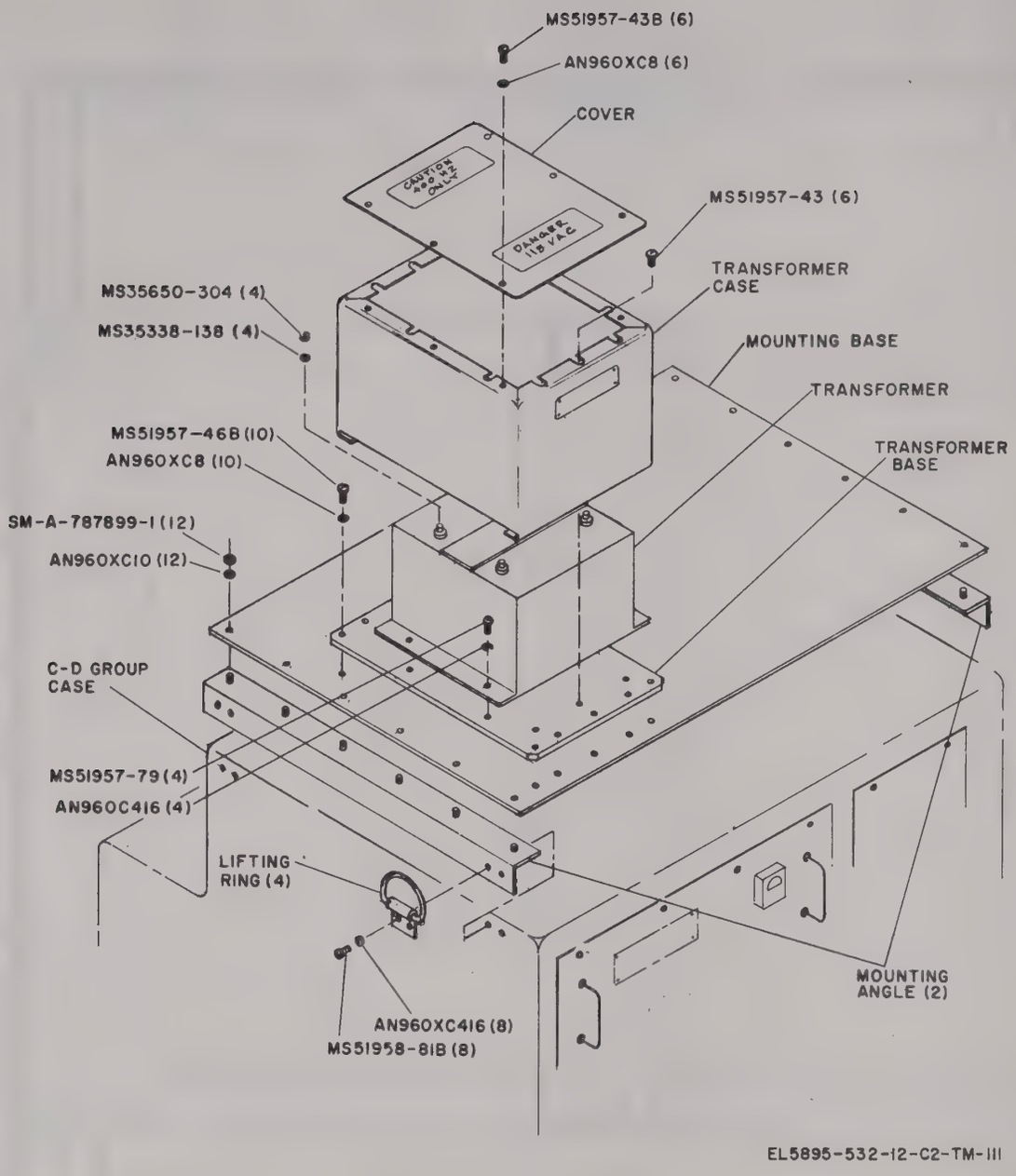


Figure 2-7.1. Isolation transformer installation.

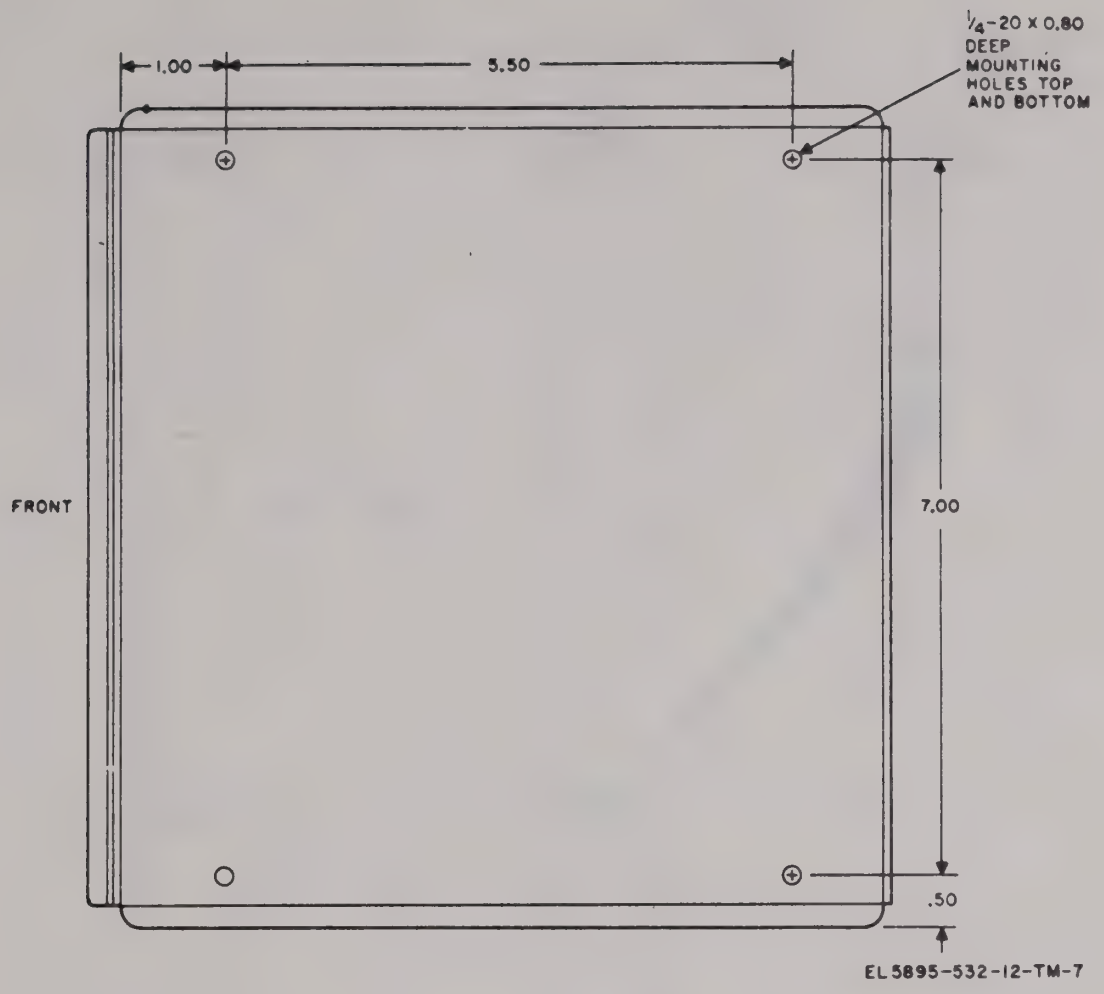


Figure 2–8. Control box installation.

a. Preparation of Mast AB–621/G for antenna group installation (para 2–16).

b. Installation of pedestal adapter on Mast AB–621/G (para 2–17).

c. Pedestal synchro/revolver connections (para 2–18).

d. Installation of pedestal on pedestal adapter (para 2–19).

e. Assembly (para 2–9) and installation of 7-foot antenna on pedestal (para 2–21).

f. Cabling connections as outlined in paragraphs 2–28 or 2–38, as applicable.

g. Erection of mast launcher and antenna group (2–22).

2–16. Preparation of Mast AB–621/G for Antenna Group Installation (fig. 2–12, 2–13, and 2–14).

a. In addition to the 4 guy stakes installed as described in TM 11–5985–334–15, drive a stake into the ground approximately 15 feet from the base of the mast launcher on the opposite side of the base from the mast carrier(fig. 2–12). This stake will be used in the erection of the mast launcher and antenna group.

b. Install the hinged gin pole base plate at the base of the mast launcher (fig. 2–13).

c. Insert a mast section into the gin pole base plate socket.

d. Place the gin pole cap over the mast section and bring the boom to an upright position.

e. To install erection cable:

(1) Attach gin pole erection cable snap hook to upper guy ring lug hole which is farthest from the ground (fig. 2–13).

(2) Extend gin pole erection cable through gin pole cap channel, insert quick release pin over the cable, and attach the end of the cable to the snap hook on winch hoist (figs. 2–13 and 2–14).

(3) Secure the snap hook of the winch hoist to the mast erection stake.

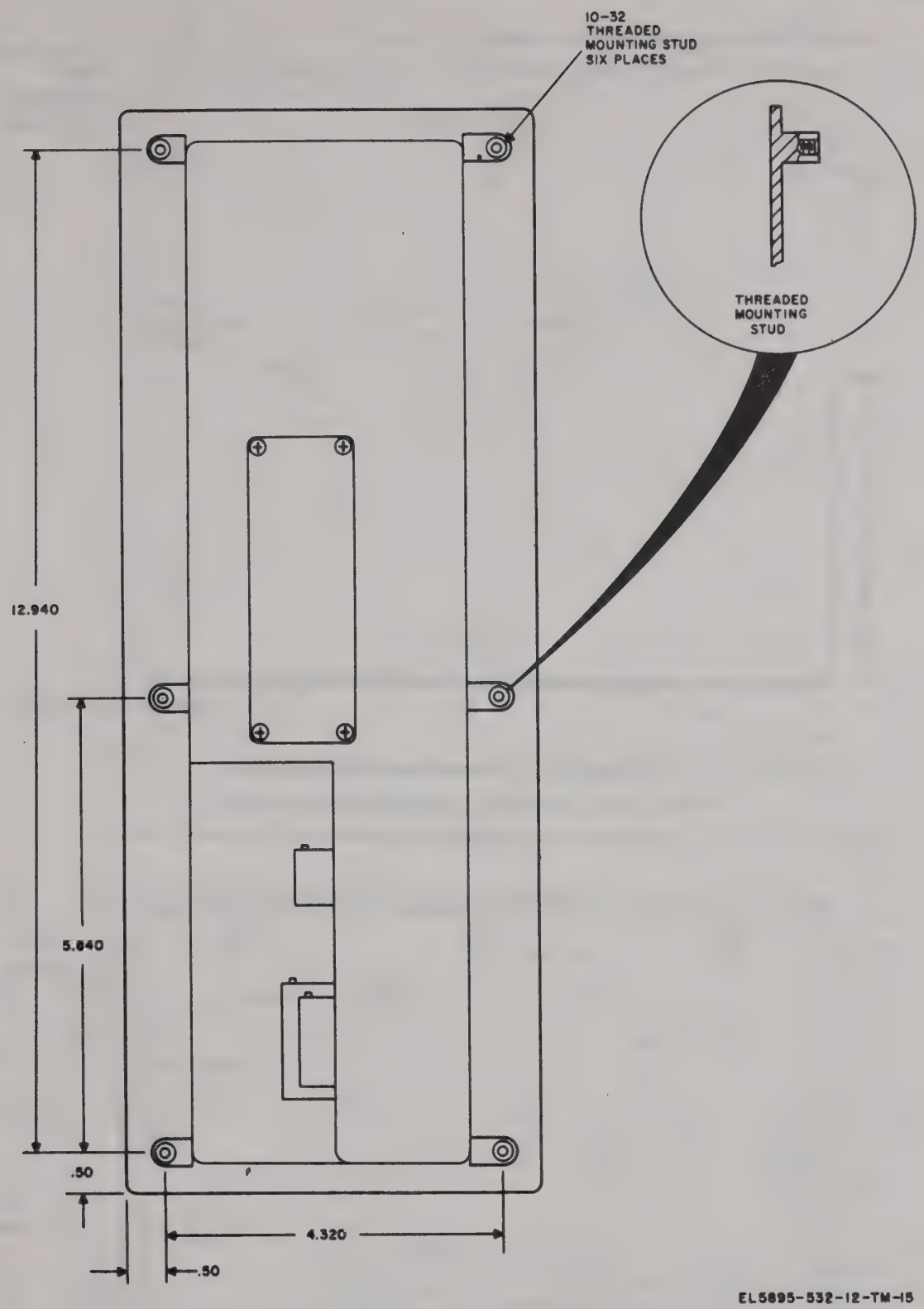


Figure 2–9. Control panel 1 installation.

f. Attach the free end snap hooks of the two special cables into the two upper guy ring lug holes which are closest to the ground.

g. Prior to installation of guy wires and erection cable, extend guy wires and erection cable to the point where the loose cable end on the adjustment assembly is approximately one foot long to accomplish this, move the brake handle catch away from the cable brake handle. Swing cable brake handle down to release cable. Extend cable to desired length. Swing cable brake up to the point where it is engaged in the slot on the brake handle catch. The brake handle catch is held in position with a spring. Turn adjusting nut counterclockwise until approximately one half of the threads are exposed. Follow the procedures in the order listed below to install guy wires, stabilizing lines, erection cable, and winch assembly.

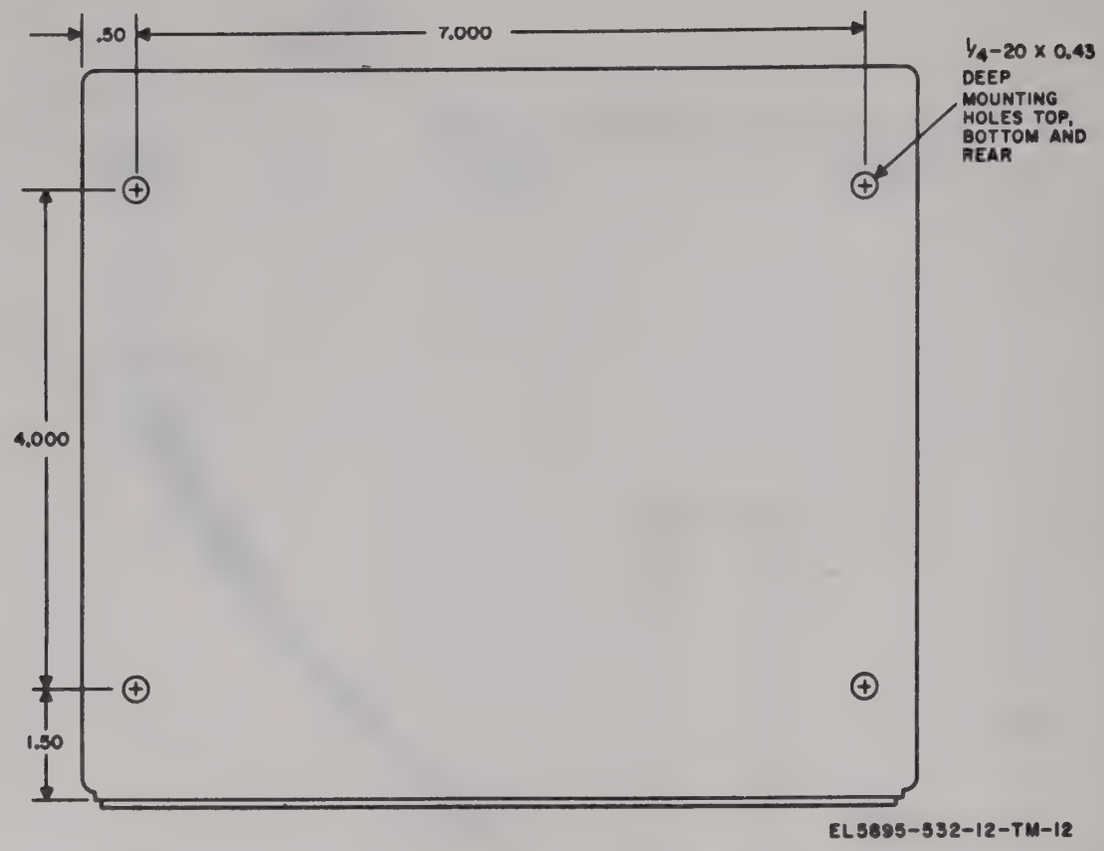


Figure 2-10. Control panel 2 installation.

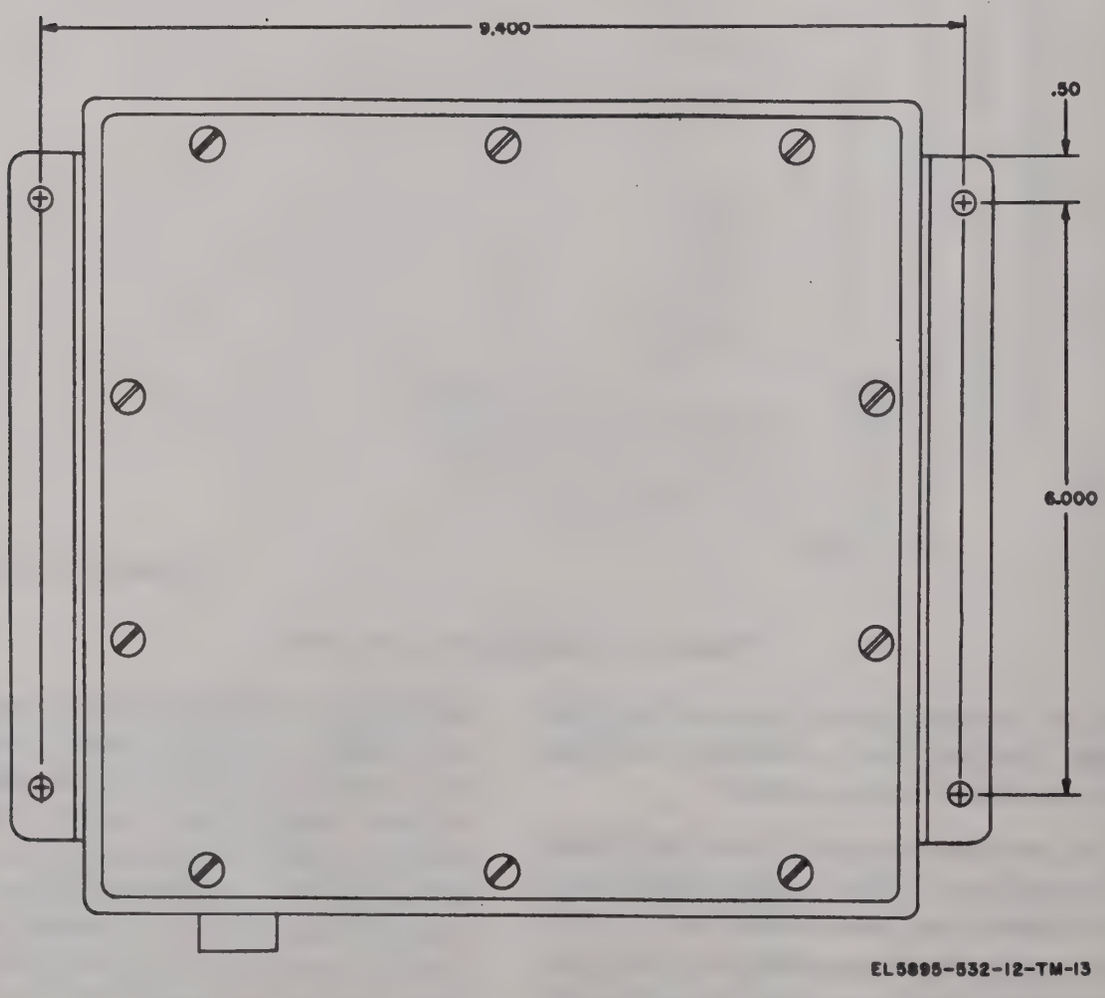


Figure 2-11. Monitor alarm installation.

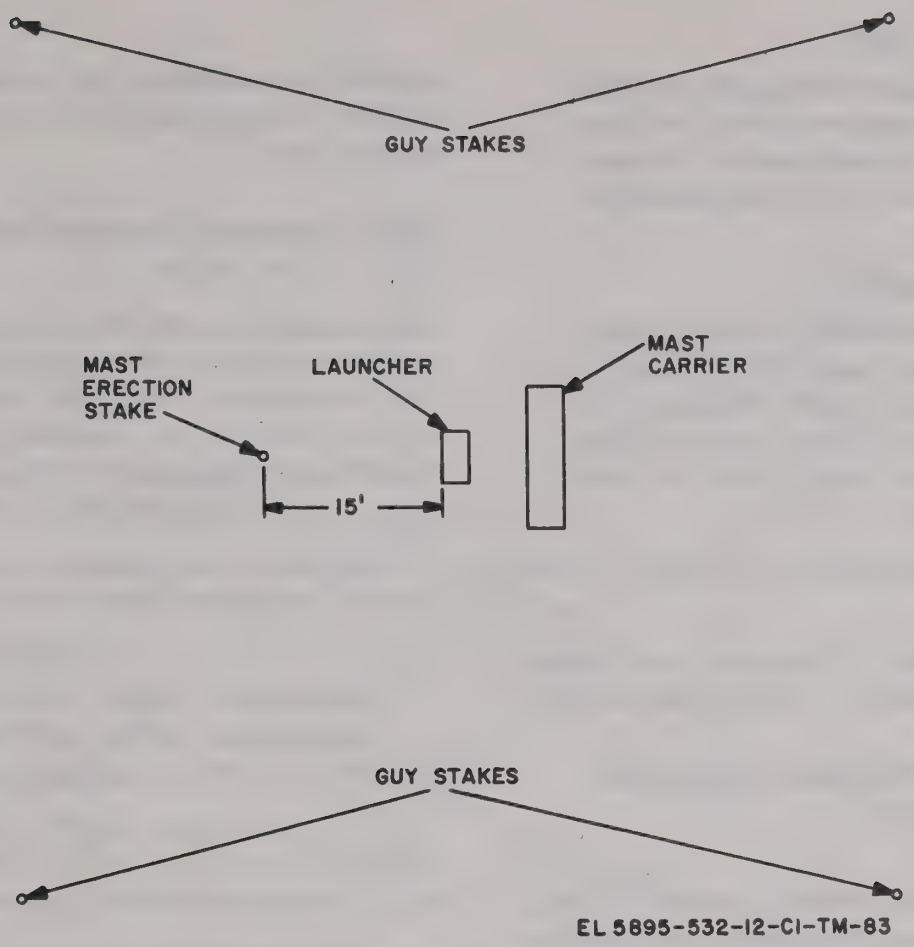


Figure 2-12. Positioning of Mast Erection Stake.

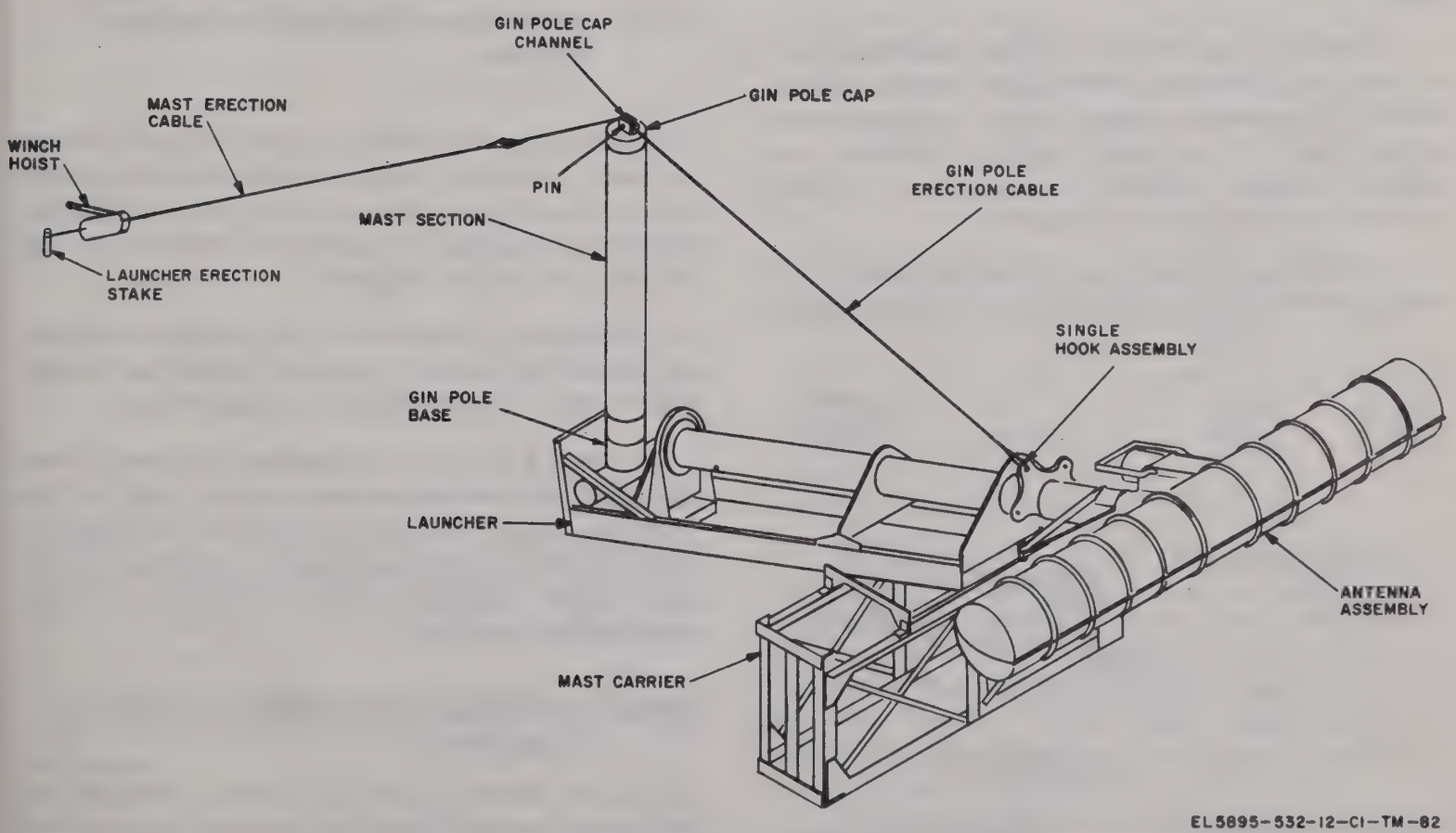


Figure 2-13. Erection of Mast Launcher and Antenna Group.

NOTE

When installing guy wires, insure that the longest end, measured from the fuy wire adjustment is connected to the appropriate connector on the mast-antenna assembly.

NOTE

Procedure for attachment of remaining guy cables to mast assembly is correct as outlined in TM 11–5985–334–15. The eye ends of the four guy cables should be attached to the snap hooks of the winch assemblies.

h. Attach four blue coded guy cables to launcher.

i. Fabricate baseplate (if needed) and install holding stakes as outlined in TM 11–5985–334–15.

2–17. Installation of Pedestal Adapter on Mast AB–621/G
(fig. 2–15)

The lower section of the pedestal adapter is equipped with keys which are designed to engage keyways in the upper mast section of Mast AB–621/G. To install the pedestal adapter, proceed as follows:

a. Visually align the keys in the pedestal adapter with the keyways in the upper mast section. Lower the pedestal adapter onto the upper mast section until it is firmly seated, rotating the pedestal adapter slightly if necessary to allow the keys to engage the keyways.

b. Attach a red coded guy wire (provided with Mast AB–621/G) to each of the four shackles

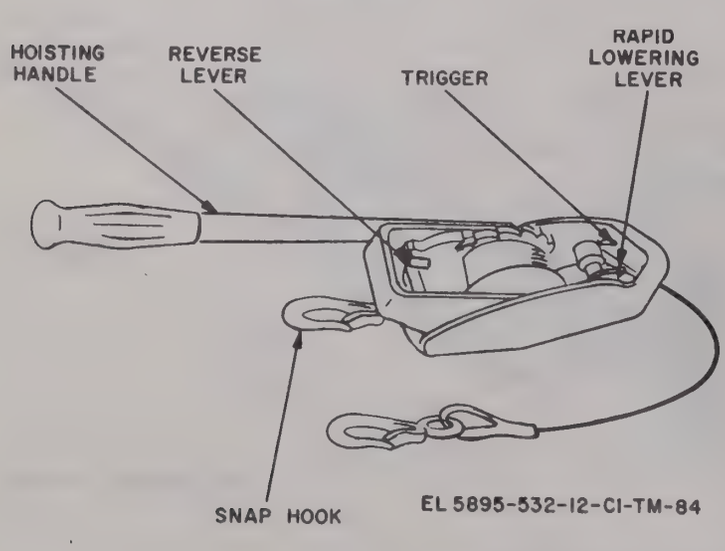


Figure 2–14. Winch Assembly.

located on the ends of the pedestal adapter. Refer to TM 11–5985–334–15 for detailed installation procedures.

2–18. Pedestal Synchro/Resolver Connections
(fig. 2–16)

The pedestal assembly is equipped with internal connectors which allow the pedestal to operate in synchronism with the radar antenna using either synchro or resolver reference signals. Specific interconnection of the connectors is determined by the requirements of the associated radar.

a. Remove the pedestal access cover by removing eight retaining screws.

CAUTION

Determine radar synchro or resolver requirements before performing the next step or serious damage may result.

b. Connect plug 3A2P3 to connector 3A2J8 (SYNCHRO) or 3A2J9 (RESOLVER) according to associated radar requirements.

c. Replace pedestal access cover and secure retaining screws.

2–19. Installation of Pedestal on Pedestal Adapter
(fig. 2–17)

The pedestal and pedestal adapter are each equipped with mounting flanges containing four holes and are secured to one another with mounting hardware supplied. To mount the pedestal on the adapter, proceed as follows:

a. Place the pedestal on the pedestal adapter and align the holes in pedestal mounting flange with those in the adapter mounting flange.

b. Insert a 5/16-inch diameter hex head screw equipped with a flat washer through each of the four mounting holes in the pedestal and adapter. Place a flat washer, lockwasher and hex nut on each screw; tighten securely with the 1/2-inch combination wrench.

2–20. Installation of Pedestal on Tripod or Radar Van

Place the pedestal upon the mount provided on the radar van or tripod and align the mounting holes in the pedestal base (fig. 2–18) with those in the mount. Secure the pedestal and level the shelter or tripod using the spirit levels on the

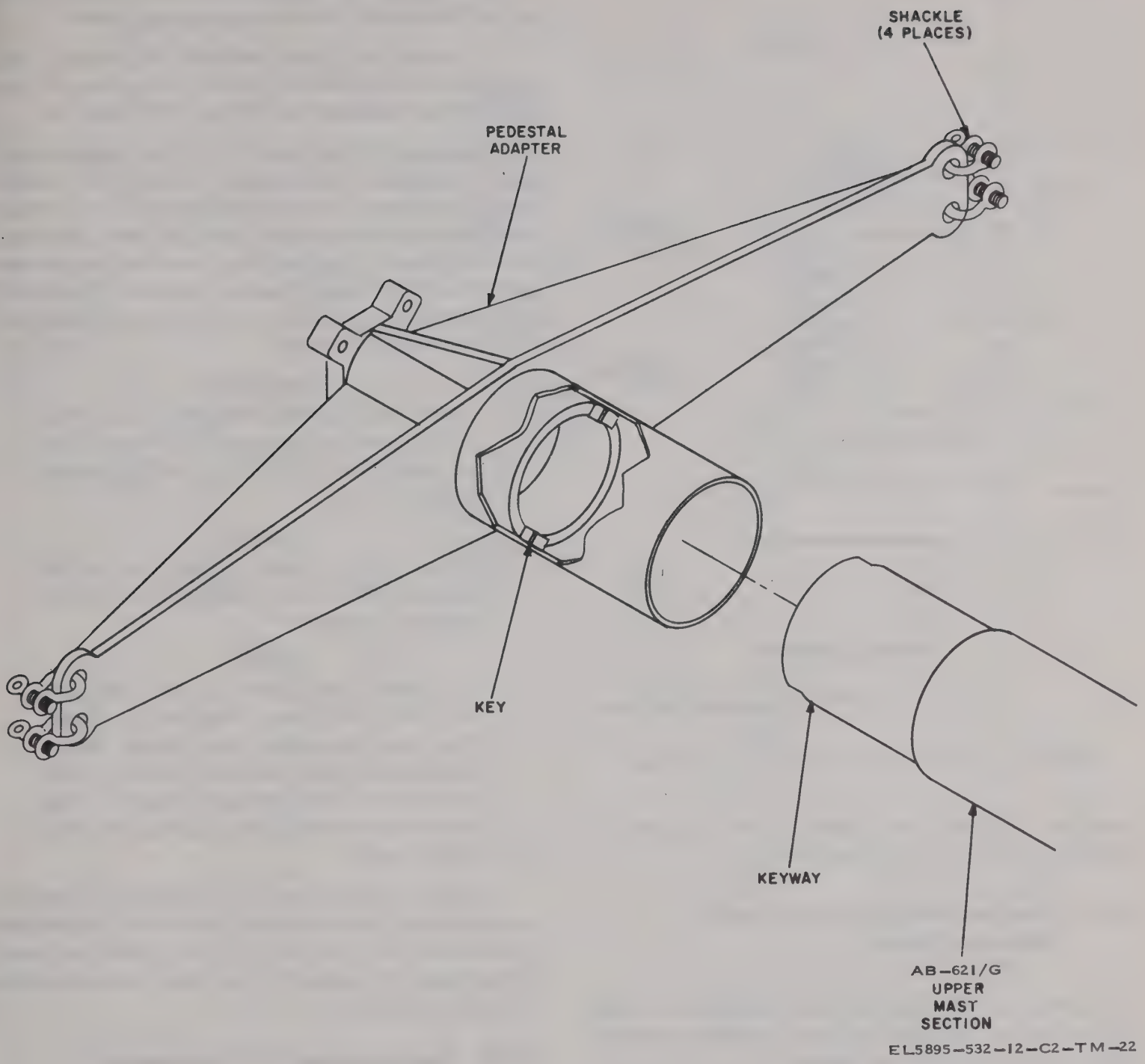


Figure 2-15. Installation of pedestal adapter on Mast AB-621/G.

pedestal (fig. 2-19) referring to the associated radar technical manuals for detailed procedures.

2-21. Installation of 7-ft Antenna on Pedestal (fig. 2-20)

To install the 7-ft antenna on the pedestal, perform the procedures given below in the order indicated.

CAUTION

Support the antenna at each end when positioning the antenna on the pedestal or hoist antenna into position using center lifting eye. Do *not* use the tilt adjusting strut as a handle.

a. Remove quick release pin from lower end of the tilt adjust strut and position the antenna on the pedestal so that the six mounting holes in the antenna support base plate align with the corresponding holes in the antenna mounting plate on the pedestal.

b. Secure the antenna to the pedestal using the six socket head capscrews and lockwashers

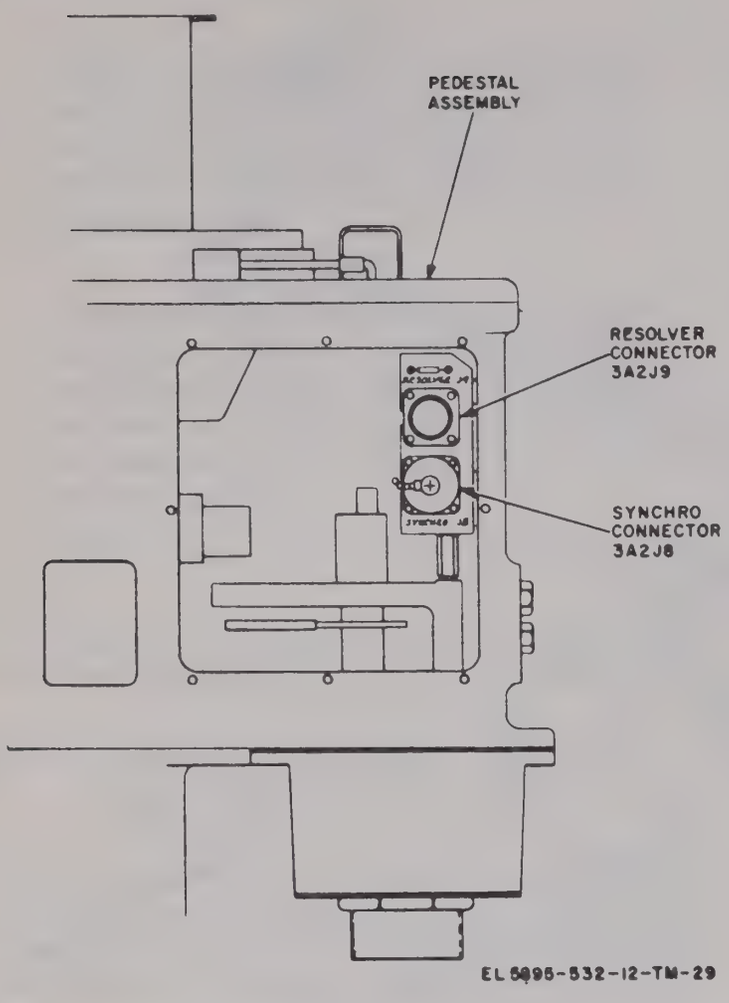


Figure 2-16. Pedestal synchro/resolver connections.

provided. Tighten the screws with the hex T-wrench. Reinstall tilt adjust strut.

2-22. Erection of Mast Launcher and Antenna Group
(fig. 2-13)

a. Prior to erection of mast assembly, check that all nuts and quick release fasteners are secure and dust covers are mated.

b. Erect launcher assembly by operating winch assembly attached to erection cable. At least one man should guide the launcher during its erection, while another man operates the winch.

c. Upon erection, check that the mast launcher is vertical and tighten blue guy wires as outlined in TM 11-5985-334-15.

d. Release the erection winch trigger, remove the gin pole erection snap hook from the upper guy ring lug hole, and clear the gin pole erection cable from the mast work area. Remove the winch hoist from the launcher erection stake and attach it to the remaining GP-113 mast stake.

e. Attach the two remaining cable snap hooks to the two vacant upper guy ring lug holes.

f. Proceed with the antenna alignment and driving of hinge stakes through the base of the launcher as outlined in TM 11-5985-334-15.

g. Raising of the mast is a six man operation. One man works each of the four winch hoists attached to the guy cables, one man works the elevator crank and one man prepares mast sections, operates the hand brake and assures that the mast remains vertical. Operating procedures for raising the mast are contained in TM 11-5985-334-15.

CAUTION

Insure that mast is exactly straight, with no bends, when it is raised. Do not attempt erection in winds in excess of 30 mph.

NOTE

Before raising mast, connect all cables as described in this chapter for the appropriate system.

NOTE

The winch hoists will not be effective until the third mast section is added. The men operating the winch hoists while controlling the mast during erection must permit enough slack in the cables to prevent over loading the elevator crank.

h. After performing the equipment turn-on, boresighting, and antenna alignment procedures (paragraphs 2-52 through 2-54), raise the mast. Procedures for lowering the mast are contained in paragraph 3-25.

2-23. Installation of 14 ft Antenna on Radar Antenna

Refer to associated radar technical manuals for installation of the 14 ft antenna on the radar antenna.

2-24. Installation of R-T Group at Base of Tripod or Mast AB-621/G

To install the r-t group at the base of a tripod or an Mast AB-621/G, proceed as follows:

a. Depress the automatic pressure release valve on the right side of the r-t group case.

b. Remove the front cover of r-t group by first releasing six cover clamps and then removing front cover.

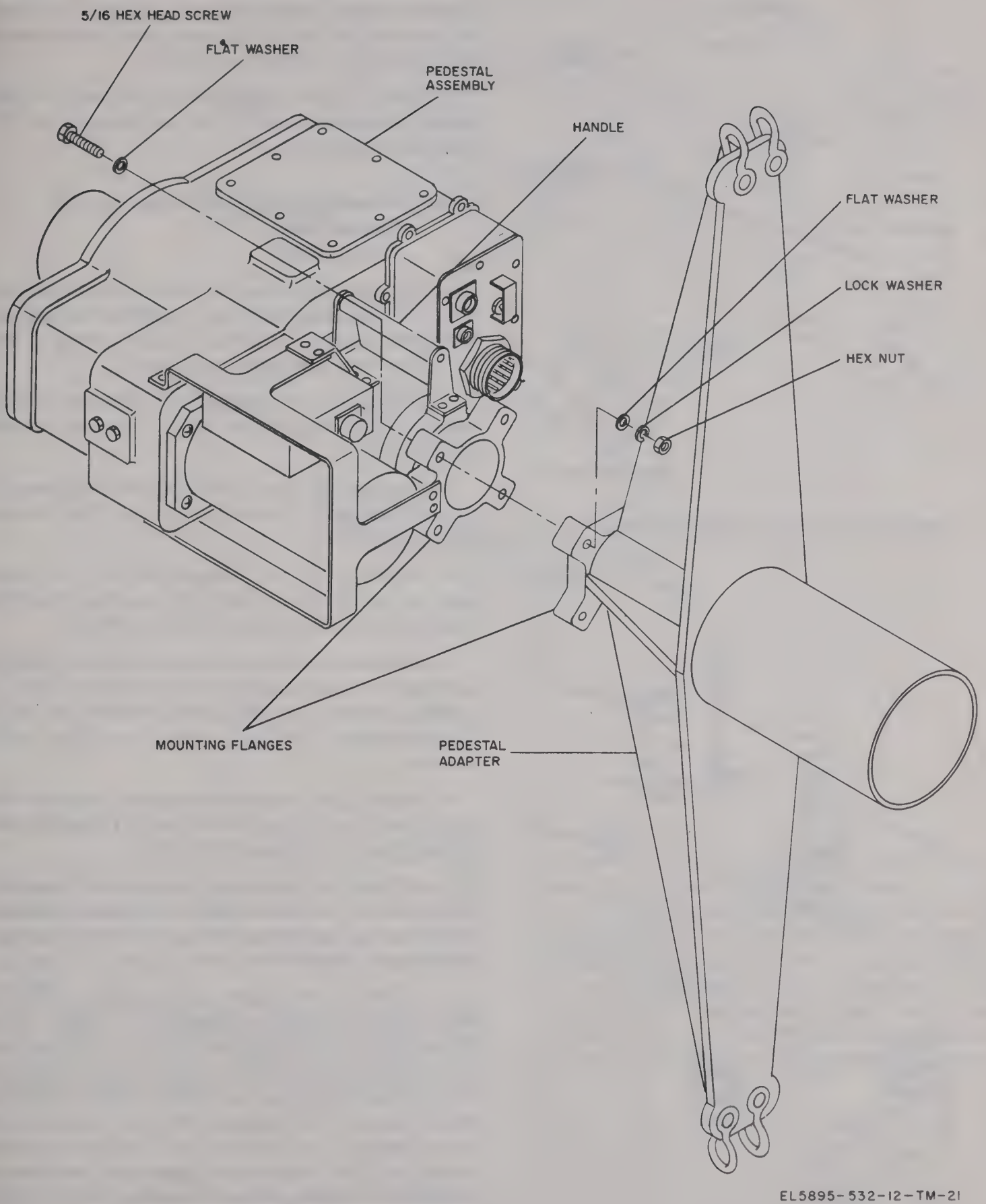


Figure 2-17. Installation of pedestal on pedestal adapter.

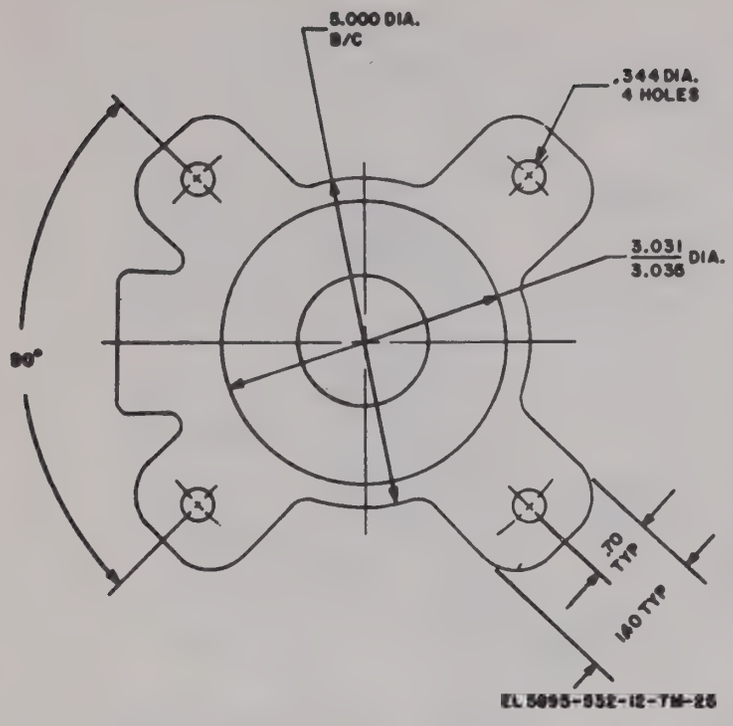


Figure 2–18. Pedestal installation details.

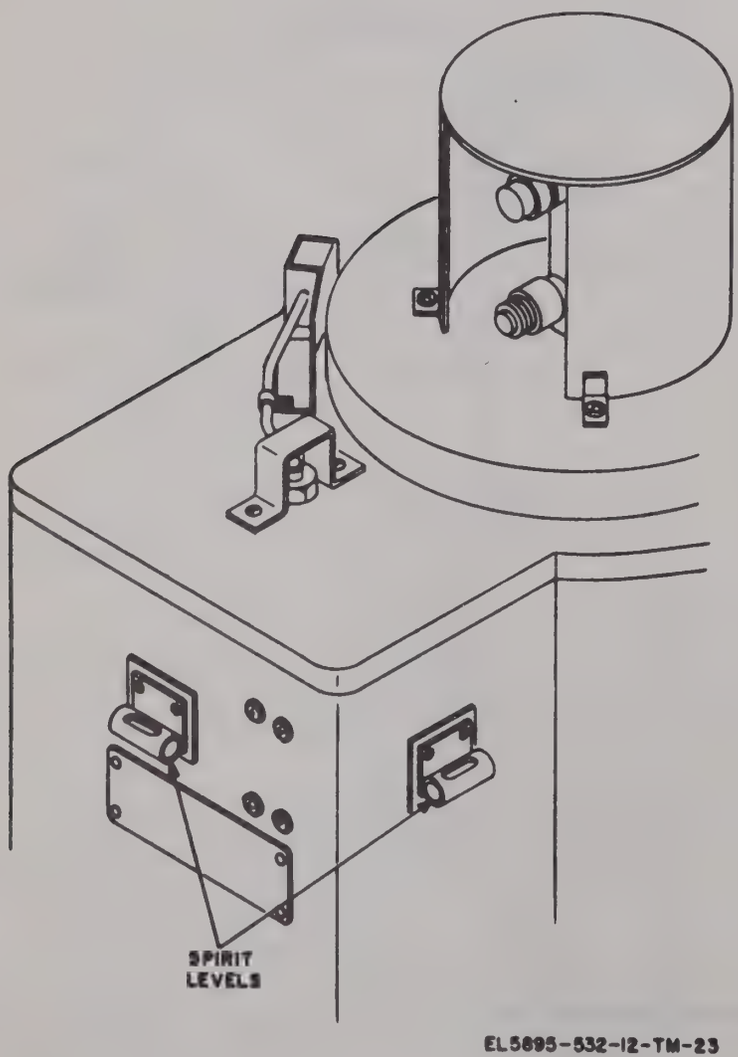


Figure 2–19. Pedestal assembly spirit level locations.

c. Place the r-t group on the depot supplied bracket within cable distance of both the control center (375 feet maximum) and the antenna mast or tripod (5 feet maximum).

d. The r-t group must be positioned so that ample clearance is available for removal of the receiver-transmitter.

2–25. Installation of R-T Group on C-D Group Case

(fig. 2–21)

The r-t group is secured to the c-d group case by means of locating keyways, holddown rings and holddown straps. To attach the r-t group to the c-d group case, proceed as follows.

a. Depress the automatic pressure release valve on the right side of the r-t group case (fig. 2–21).

b. Remove the front cover of the r-t group by first releasing six cover clamps and then removing front cover.

c. Position the r-t group over the c-d group case as shown in figure 2–21, insuring that the locating keys seat firmly in the keyways.

d. Separate the two halves of the snap catches attached to the holddown straps (fig. 2–22) by pulling outward on the catch release rod while simultaneously pulling upward on the catch handle.

e. Attach the snaps to the snap rings on the c-d group case making sure that the straight side of the snaps are closest to the case.

f. Adjust the length of the straps to permit fastening of the snap catch by pulling inward on the strap adjusting bar while simultaneously applying tension to the strap.

g. Hold the two halves of the snap catches in the relative positions shown in figure 2–21. Place the catch retaining rod in the retaining rod slot and adjust the straps to a slight tension. Press down on the catch handle until the catch release rod engages the catch release slot as indicated by an audible click. If the tightening action of the snap catch does not sufficiently tension the straps, release the snap catch, tighten the strap and refasten the catch.

2–26. Installation of Cables

The following points are to be observed when planning cable runs.

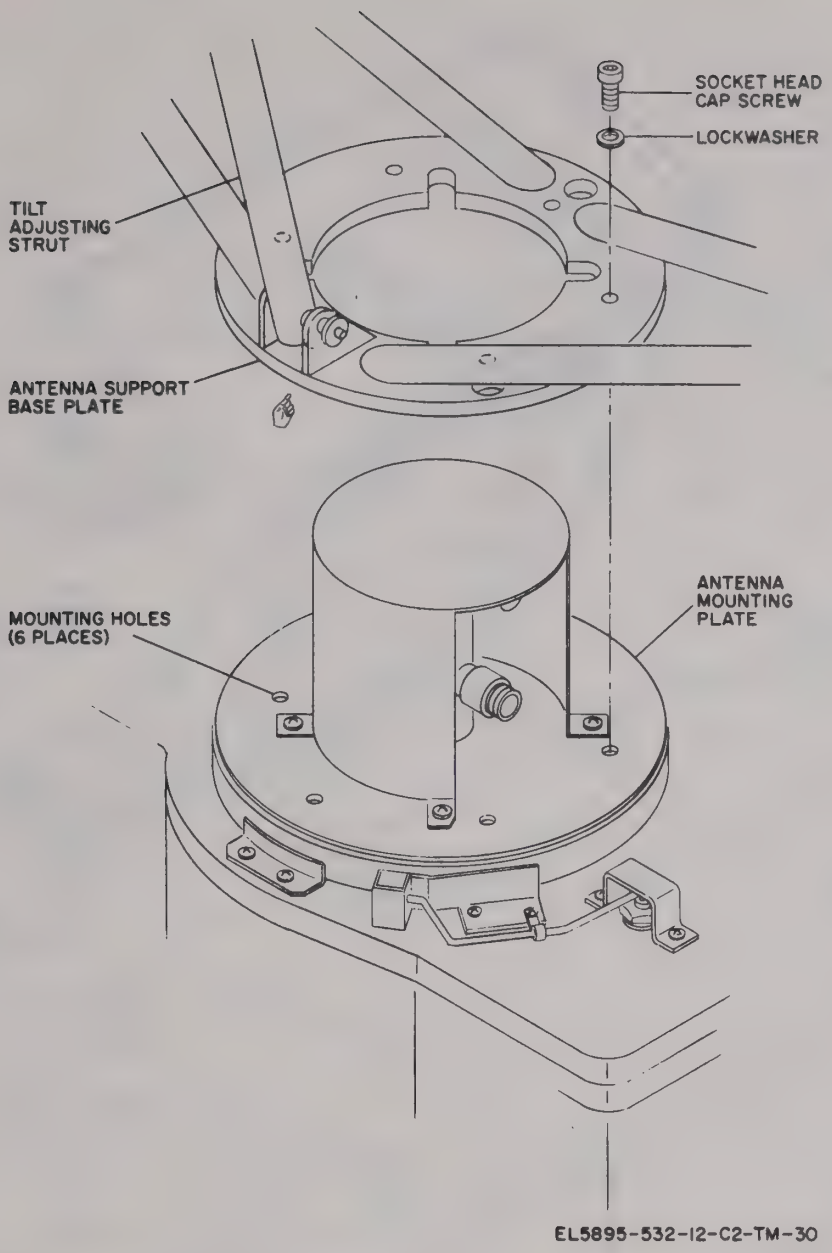


Figure 2-20. Installation of 7-foot antenna of pedestal.

a. Avoid sharp bends and bends over sharp objects. Minimum bend radius is four times the outside diameter of the cable.

b. Protect cables from rubbing against sharp objects if they are to be strung between two points.

c. Protect cables from damage if they are to be run across roadways or heavily travelled areas.

d. When making connections inspect each connector and receptacle to insure that connector pins are not bent or broken and pin sockets are free from dirt or other obstructions.

e. All cable connectors and receptacles of the various units are equipped with captive protective cap covers. Each pair of corresponding cover caps are threaded to match. After connection of a cable connector to a unit receptacle and tightening the connection, screw the two cover caps together to prevent contamination of the threaded parts.

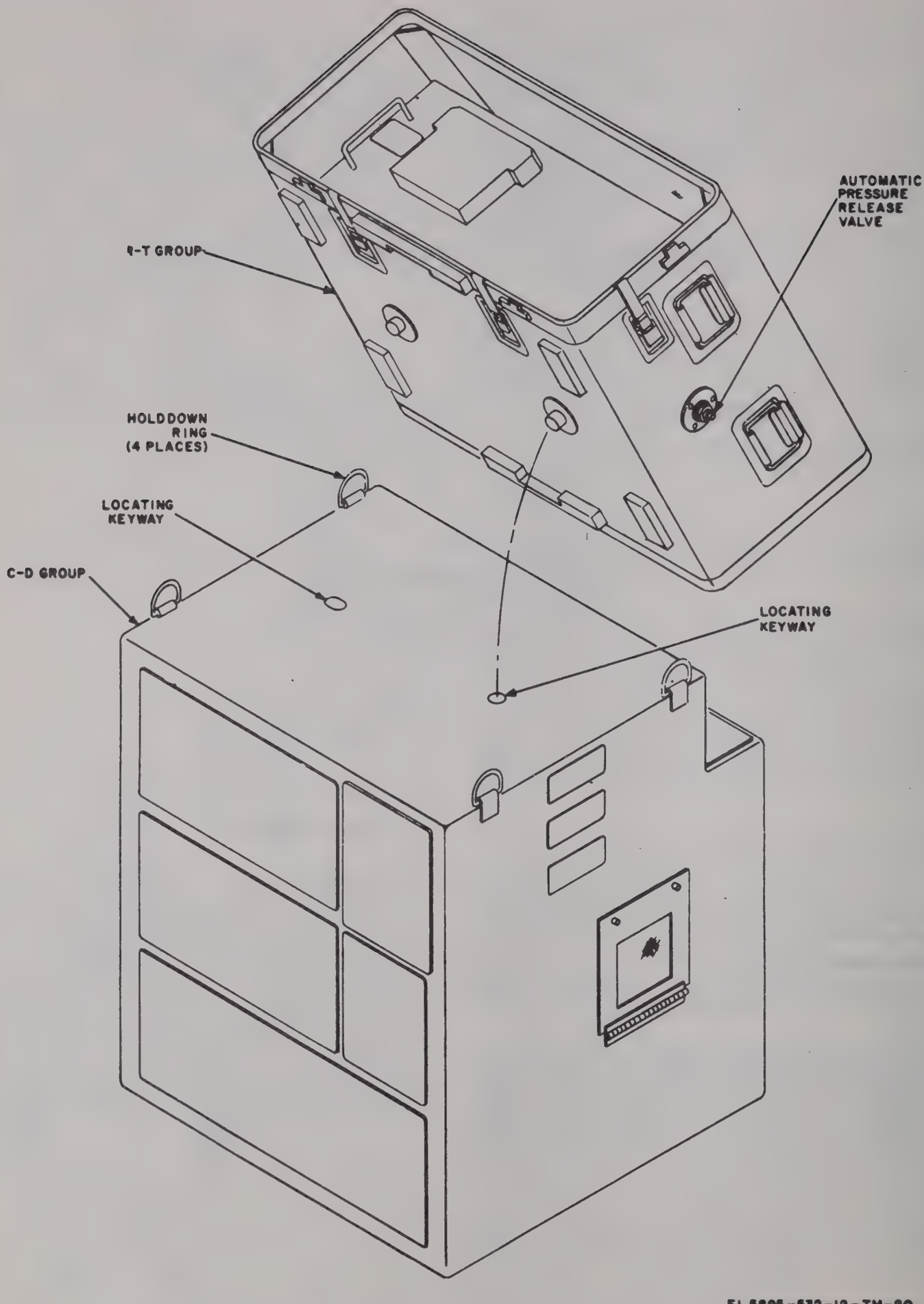


Figure 2-21. Installation of r-t group on c-d group case.

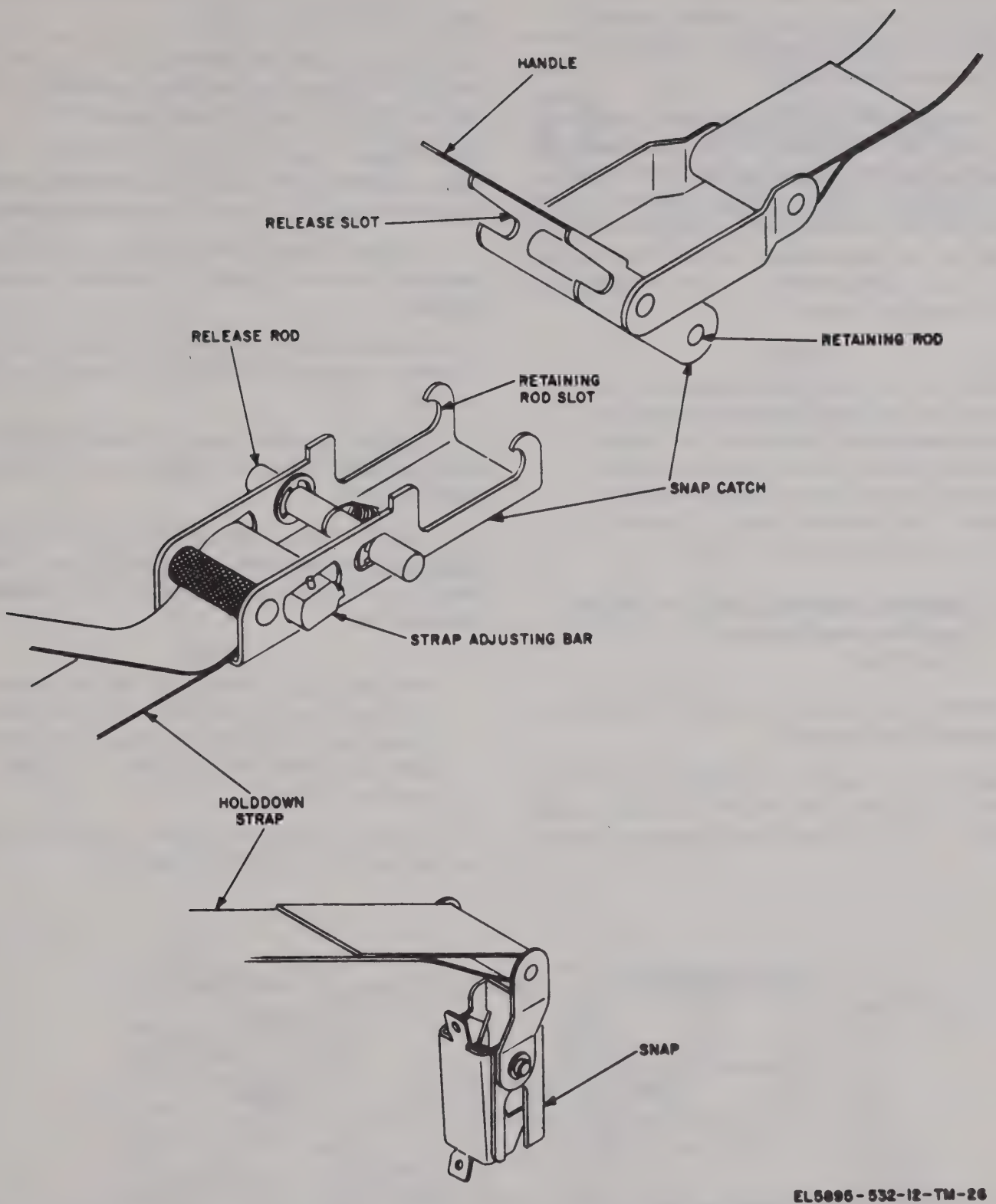


Figure 2-22. R-t group holddown strap details.

2-27. Cabling Connections

WARNING

Prior to installation of cables, set AZ DRIVE switch (fig. 2-23) on pedestal assembly to SAFE OFF.

CAUTION

To prevent possible damage when radar azimuth data is cabled to RADAR AZIMUTH receptacle 1J14 on the c-d group case, loosen 10 captive screws securing antenna control assembly 1A2 to c-d group case. Then slide antenna control assembly outward and check that the setting of EXT REF FREQ switch 1A2S5 and the plug connection of azimuth zero adjust module 1A2A4 correspond to the type of radar azimuth data

(60 Hz SYNC, 400 Hz SYNC, or 4 kHz RSLVR). Slide antenna control assembly into c-d group case and tighten its 10 retaining screws.

Cabling connections for the various configurations of the AN/TPX-46(V) are contained in paragraphs 2-28 through 2-39. In all configurations, cabling instructions for components of the iff set which are located within the radar shelter or van as well as external connections to the shelter or van, are covered in the appropriate radar set technical manual.

NOTE

Refer to the following figures as required for external connector locations on components of the iff set: c-d group, figure 2-24; r-t group, figure 3-8; control box, figure 2-25; control panel 1, figure 2-26; control panel 2, figure 2-27; monitor alarm, figure 2-28.

2-28. Cabling Connections, AN/TPX-46(V)1, Tripod Mounted Antenna

(fig. FO-1)

a. Remove one cable CX-10775/U (300 ft) from the special cable reel.

b. Remove two cables CG-3460/U (13.5 ft) one cable CX-12810/TPX-46(V) and one cable CX-12892/U (75 ft) from the other special cable reel.

c. Unpack two cables CG-3460/U (2 ft), one cable CX-10773/U (2 ft).

d. Connect cable CG-3460/U (2 ft) from connector 3A1J1 on the antenna assembly to connector 3A2J1 on the pedestal assembly.

e. Connect another cable CG-3460/U (2 ft) from connector 3A1J2 on the antenna assembly to connector 3A2J2 on the pedestal assembly.

f. Connect cable CX-10773/U (2 ft) from pedestal connector 3A2J6 to pedestal connector 3A2A2J1.

g. Connect cable CG-3460/U (13.5 ft) from pedestal connector 3A2J4 to r-t group connector 2A1J2.

h. Connect another cable CG-3460/U (13.5 ft) from pedestal connector 3A2J3 to r-t group connector 2A1J3.

i. Connect cable CX-10775/U (300 ft) to appropriate connector on the ICC or IPCP. Refer to TM 9-1430-534-12-1 for detailed procedures.

NOTE

Perform step *j*, below, if the r-t group is located more than 300 ft from the radar van. If the radar van is located less than 300 ft from the r-t group, proceed to step *k*.

j. Connect cable CX-12892/U (75 ft) to free end of cable CX-10775/U (300 ft).

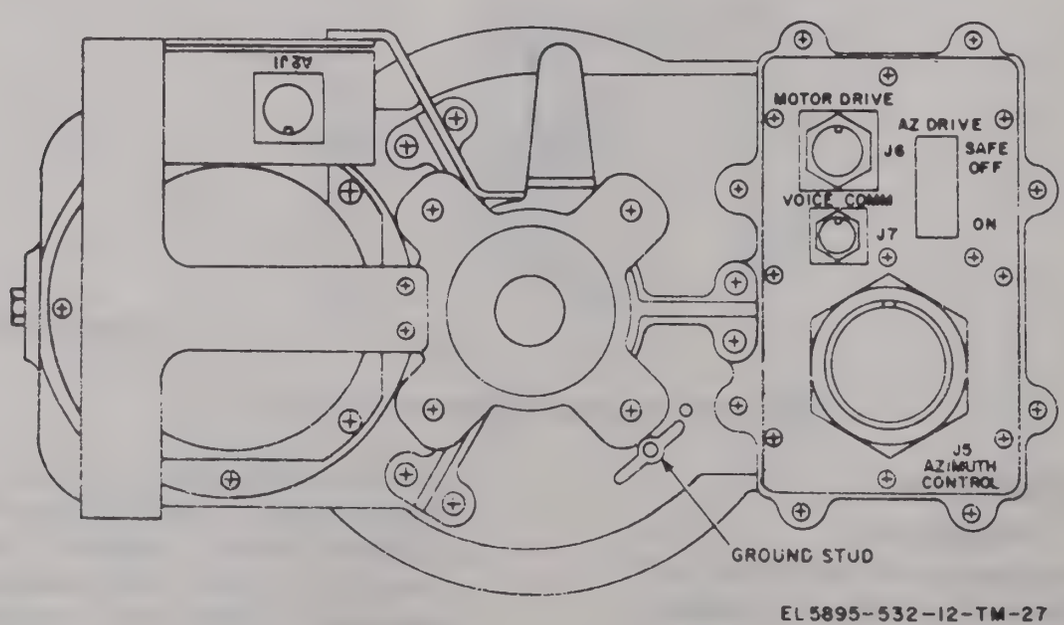


Figure 2-23. Pedestal assembly, bottom view.

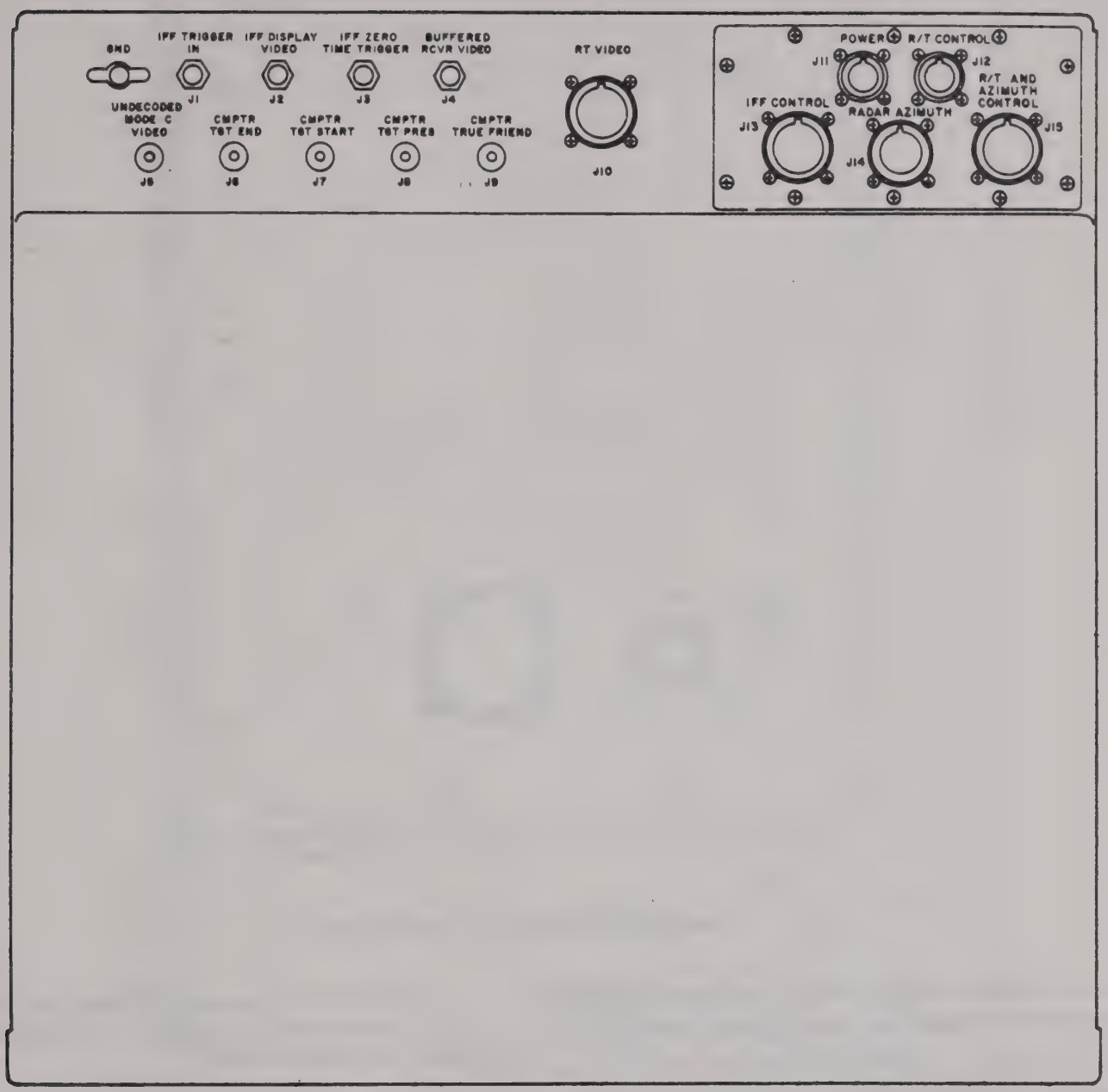


Figure 2–24. C-d group external connectors.

k. Connect free end of cable CX–12892/U (75 ft) or cable CX–10775/U (300 ft) to cable CX–12810/TPX–46(V) (fig. 2–29).

l. Connect the remaining ends of cable CX–12810/TPX–46(V) to r-t group connector 2A1J1 and to pedestal assembly connector 3A2J5.

m. Refer to TM 9-1430-534-12-1 for connection of cables to the c-d group and the control box.

2–29. Cabling Connections, AN/TPX–46(V)1, Van Mounted Antenna

(fig. FO–2)

a. Remove two cables CG–3460/U (13.5 ft) from the special cable reel.

b. Connect cable CG–3460/U (2 ft) from connector 3A1J1 on the antenna assembly to connector 3A2J1 on the pedestal assembly.

c. Connect another cable CG–3460/U (2 ft)

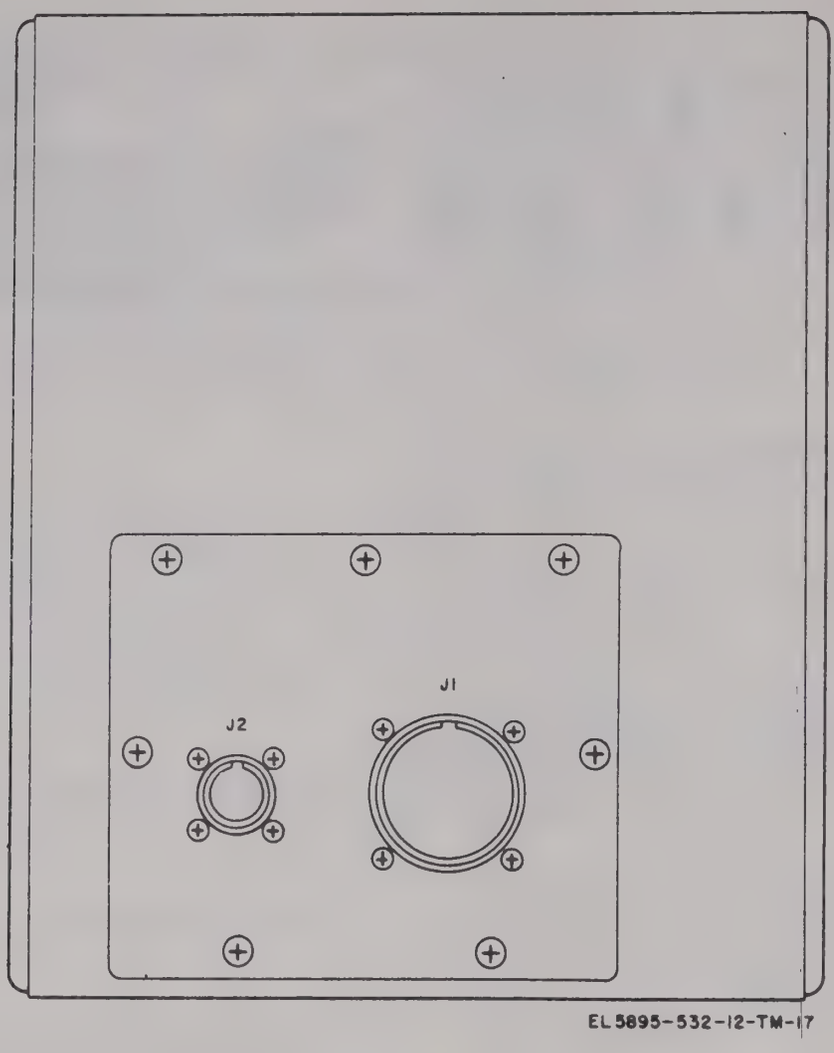


Figure 2–25. Control box external connectors.

from connector 3A1J2 on the antenna assembly to connector 3A2J2 on the pedestal assembly.

d. Connect cable CX–10773/U (2 ft) from pedestal connector 3A2J6 to pedestal connector 3A2A2J1.

NOTE

Refer to TM 9-1430-534-12-1 for connections to radar van and cable routing (steps *e*, *f*, and *g* below).

e. Connect cable CG–3460/U (13.5 ft) from pedestal connector 3A2J3 to appropriate connector on ICC or IPCP.

f. Connect another cable CG–3460/U (13.5 ft) from pedestal connector 3A2J4 to appropriate connector on ICC or IPCP.

g. Connect cable CX–10774 (13.5 ft) from pedestal connector 3A2J5 to appropriate connector on ICC or IPCP.

h. Refer to the associated radar technical manual for connection of cables to the c-d group, r-t group and control box.

2–30. Cabling Connections, AN/TPX–46(V)2 (fig. FO–3)

NOTE

Refer to TM 11–5985–334–15 for cable routing procedures in vicinity of Mast AB–621/G.

a. Connect cable CG–3460/U (2 ft) from antenna connector 3A1J1 to connector 3A2J1 on the pedestal assembly.

b. Connect another cable CG–3460/U (2 ft) from antenna connector 3A1J2 to connector 3A-2J2 on the pedestal assembly.

c. Connect cable CX–10773/U (2 ft) from pedestal connector 3A2J6 to pedestal connector 3A2A2J1.

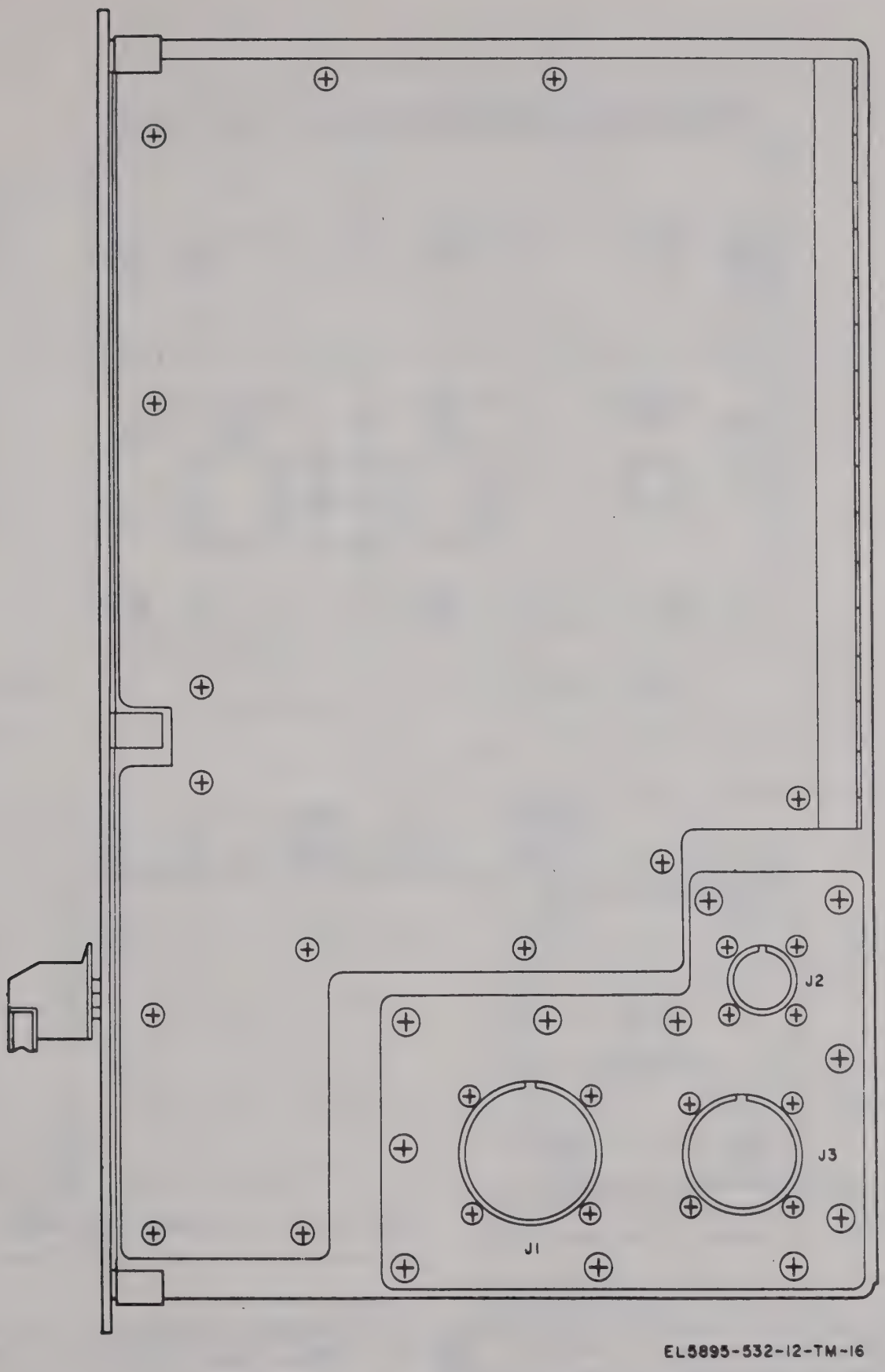


Figure 2-26. Control panel 1 external connectors.

d. Connect cable CG-3460/U (35 ft) from pedestal connector 3A2J4 to r-t group connector 2A1J2.

e. Connect another cable CG-3460/U (35 ft) from pedestal connector 3A2J3 to r-f group connector 2A1J3.

f. Connect cable CX-10775/U (375 ft) to appropriate connector on radar van. Refer to associated radar technical manual for detailed procedures.

g. Connect free end of cable CX-10755/U (375 ft) to cable CX-12810/TPX-46(V) (fig.

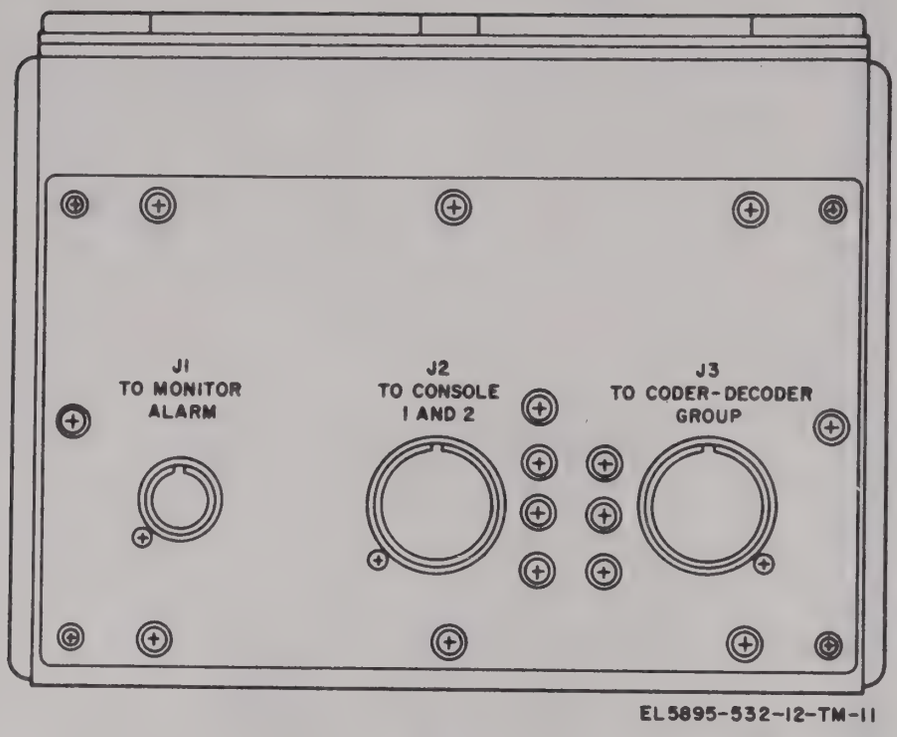


Figure 2-27. Control panel 2, external connectors.

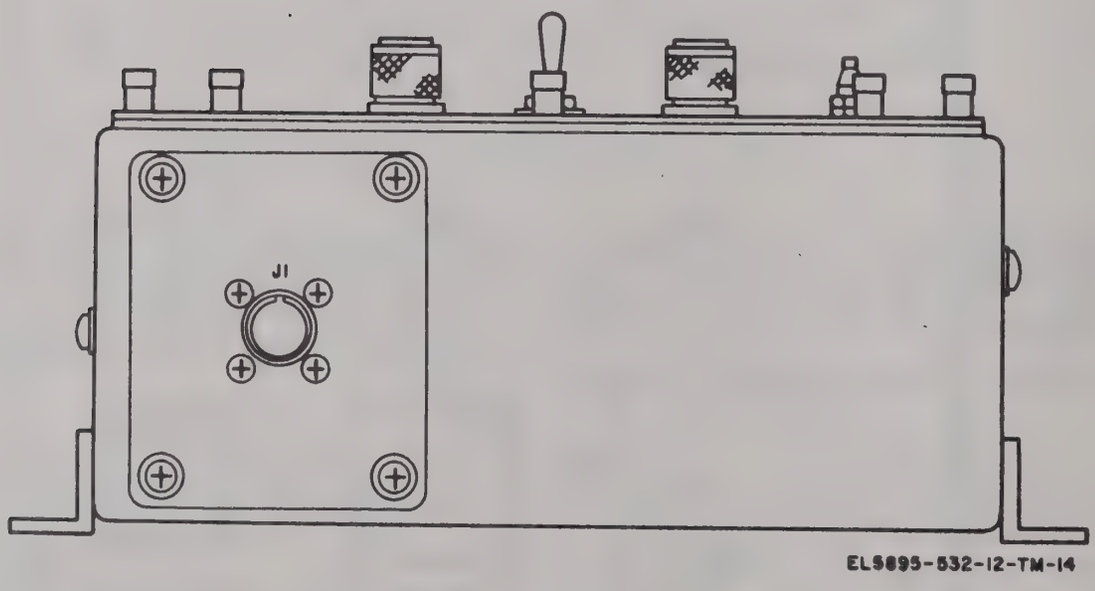


Figure 2-28. Monitor alarm, external connectors.

2-29). Connect one end of cable CX-10779/U (50 ft) to pedestal connector 3A2J5.

h. Connect the remaining ends of cable CX-12810/TPX-46(V) to r-t group connector 2A1J1 and to the free end of cable CX-10779/U (50 ft).

i. Connect cable CX-13013 between isolation transformer connector 17J2 and c-d group connector 1A5J11.

j. Refer to the associated radar technical manual for connection of cables to control panel 1 and the c-d group.

2-31. Cabling Connections, AN/ TPX-46(V)2, Fixed Site TYPE I
(fig. FO-4)

NOTES

1. Refer to associated technical manuals for external connector locations.
2. Refer to TM 11-5985-334-15 for cable routing procedures in vicinity of Mast AB-621/G.

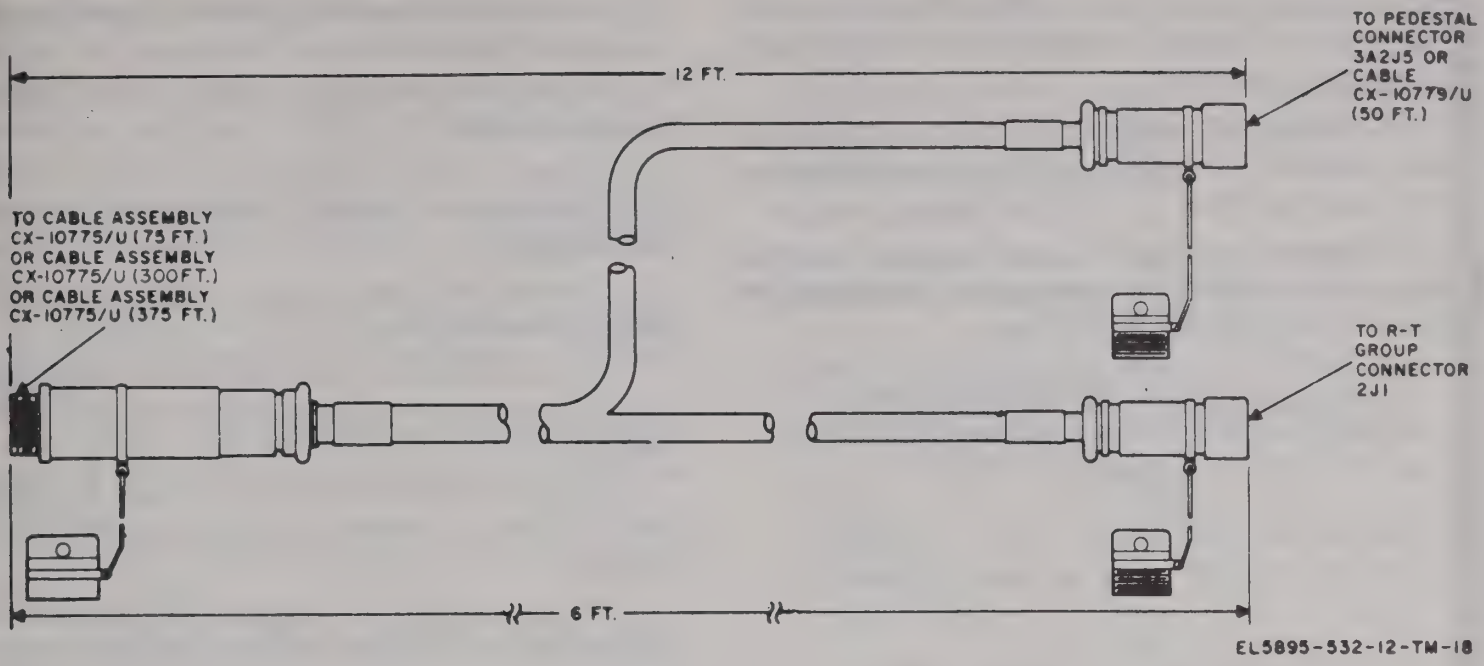


Figure 2-29. Cable CX-12810/TPX-46(V).

3) Deleted

4) Deleted

a. Connect one cable CG-3460/U (2 ft.) from antenna connector 3A1J1 to connector 3A2J1 on the pedestal assembly.

b. Connect another cable CG-3460/U (2 ft.) from antenna connector 3A1J2 to connector 3A2J2 on the pedestal assembly.

c. Connect cable CX-10773/U (2 ft.) between pedestal connnectors 3A2J6 and 3A2A2J1.

NOTE

If the r-t is to be situated less than 35 ft from the antenna pedestal, perform step *d* and *e*, then proceed to step 1, below. Otherwise, proceed to step *f*.

d. Connect one cable CG-3460/U (35 ft.) from pedestal connector 3A2J3 to r-t group connector 2A1J3.

e. Connect another cable CG-3460/U (35 ft) from pedestal connector 3A2J4 to r-t group connector 2A1J2.

f. Connect cable CG-3460/U (35 ft.) from pedestal connector 3A2J3 to one end of cable J.

g. Connect cable CG-3460/U (35 ft.) from pedestal connector 3A2J4 to one end of cable H.

h. Connect the free end of cable J to one end of cable CG-3460/U.

i. Connect the free end of cable CG-3460/U to r-t group connector 2A1J3.

j. Connect the free end of cable H to one end of cable CG-3460/U.

k. Connect the free end of cable CG-3460/U to r-t group connector 2A1J2.

l. Connect cable CX-10775/U (375 ft) to appropriate connector on radar building. Refer to associated radar technical manual for detailed procedures.

m. Connect free end of cable CX-10775/U (375 ft) to cable CX-12810/TPX-46(V) (figure 2-29). Connect one end of cable CX-10779/U (50 ft) to pedestal connector 3A2J5.

n. Connect the remaining ends of cable CX-12810/TPX-46(V) to r-t group connector J1 and to the free end of cable CX-10779/U (50 ft.)

o. Connect the single end of cable DD to appropriate connector on the radar building.

p. Connect cable ends DD1, DD2, and DD3 and one end of cable C to c-d group connectors 1A5J15, 1A5J12, 1A5J10, and 1A7J1, respectively.

q. Connect cable ends B1, B2, B3 and B4 to c-d group connectors 1A5J1, 1A5J2, 1A5J13, and 1A5J14, respectively.

r. Connect the single end of cable B and one end of cable G to the appropriate connectors on the radar building.

s. Connect the single end of cable A and the free end of cable G to appropriate connectors on the NIKE-HERCULES BC van.

t. Connect cable CX-13013 between isolation transformer connector 17J2 and c-d group connector 1A5J11.

2-32. Cabling Connections, AN/TPX-46(V)3, fixed site TYPE III, Indoor R-T

(fig. FO-6)

NOTE

Refer to the associated radar antenna omni-antenna, diplexer, rotary joint and radar and AN/TSQ-51 technical manuals for more detailed procedures and external connector locations.

a. Connect cable O from monitor alarm connector 8J1 to control box connector 5J2.

b. Connect cable V between the appropriate connectors on the AN/TSQ-51 and radar buildings.

c. Connect cable W between the appropriate connectors on the AN/TSQ-51 and radar buildings.

d. Connect cable L from c-d group connector 1A5J13 to the appropriate connector on the radar building.

e. Connect cable M from c-d group connector 1A5J2 to the appropriate connector on the radar building.

f. Connect one end of cable H to c-d group connector 1A5J1.

g. Connect one end of cable I to c-d group connector 1A5J11.

h. Connect cable ends K1, K2 and K3 to c-d group connectors 1A5J10, 1A5J12 and 1A5J15, respectively.

i. Connect the single end of cable K to r-t group connector 2A1J1.

j. Connect cable E from r-t group connector 2A1J2 to the appropriate connector on the radar building.

k. Connect cable D from r-t group connector 2A1J3 to the appropriate connector on the radar building.

l. Connect cable B between the appropriate connectors on the radar building and the rotary joint.

m. Connect cable C between the appropriate connectors on the radar building and diplexer 1.

n. Connect cable R between the appropriate connectors on diplexer 1 and the rotary joint.

o. Connect cable S between the appropriate connector on the rotary joint and one end of cable F.

p. Connect the free end of cable F to iff antenna connector 4J1.

q. Connect cable T between the appropriate connectors on the rotary joint diplexer 2.

r. Connect cable A between the appropriate connectors on diplexer 2 and the omni-antenna.

s. Connect cable J from the appropriate connector on diplexer 2 to one end of cable G.

t. Connect the free end of cable G to iff antenna connector 4J2.

2-33. Cabling Connections, AN/TPX-46(V)3, fixed site TYPE III, Indoor R-T

(fig. FO-7)

NOTE

Refer to the associated radar antenna, omni-antenna, diplexer, rotary joint and radar and AN/TSQ-51 technical manuals for more detailed procedures and external connector locations.

a. Connect cable O from monitor alarm connector 8J1 to control box connector 5J2.

b. Connect cable V between the appropriate connectors on the AN/TSQ-51 and radar buildings.

c. Connect cable W between the appropriate connectors on the AN/TSQ-51 and radar buildings.

d. Connect cable L from c-d group connector 1A5J13 to the appropriate connector on the radar building.

e. Connect cable M from c-d group connector 1A5J2 to the appropriate connector on the radar building.

f. Connect one end of cable H to c-d group connector 1A5J1.

g. Connect one end of cable I to c-d group connector 1A5J11.

h. Connect cable ends KK1, KK2 and KK3 to c-d group connectors 1A5J10, 1A5J12, and 1A5J15, respectively.

i. Connect the single end of KK to the appropriate connector on the radar building.

j. Connect cable CX-10775/U between the appropriate connectors on the radar building to the appropriate connector on the cable P.

k. Connect cable CX-10775/U between the appropriate connector on the radar building and cable P.

l. Connect the appropriate end of cable P to one end of cable Q.

m. Connect the free end of cable Q to r-t group connector 2A1J1.

n. Connect cable E between r-t group connector 2A1J2 and one end of cable B.

o. Connect cable D between r-t group connector 2A1J3 and one end of cable C.

p. Connect free end of cable B to the appropriate connector on the rotary joint.

q. Connect the free end of cable C to the appropriate connector on diplexer 1.

r. Connect cable S between the appropriate connector on the rotary joint and one end of cable F.

s. Connect the free end of cable F to iff antenna connector 4J1.

t. Connect cable R between the appropriate connectors on the rotary joint and diplexer 1.

u. Connect cable T between the appropriate connectors on diplexer 2 and the rotary joint.

v. Connect cable J from the appropriate connector on diplexer 2 to one end of cable G.

w. Connect the free end of cable G to iff antenna connector 4J2.

x. Connect cable A between the appropriate connectors on diplexer 2 and the omni-antenna.

2-34. Cabling Connections, AN/TPX-46(V)3, Type IV, Without Interface Box

(fig. FO-8)

NOTE

Refer to TM 11-5985-334-15 for cable routing procedures in vicinity of Mast AB-621/G.

a. Connect cable A from monitor alarm connector 8J1 to control box connector 5J2.

b. Connect cable F between the appropriate connectors on the AN/TSQ-51 and radar buildings.

c. Connect cable G between the appropriate connectors on the AN/TSQ-51 and radar buildings.

d. Connect cable B from c-d group connector 1A5J13 to the appropriate connector on the radar building.

e. Connect cable C from c-d group connector 1A5J2 to the appropriate connector on the radar building.

f. Connect one end of cable R to c-d group connector 1A5J1.

g. Connect one end of cable N to c-d group connector 1A5J11.

h. Connect one end of cable U to c-d group connector 1A5J14.

i. Connect cable ends O1, O2 and O3 to c-d group connectors 1A5J10, 1A5J12 and 1A5J15, respectively and cable end O4 to the appropriate connector on the radar building.

j. Connect the single end of cable O to r-t group connector 2A1J1.

k. Connect cable V from r-t group connector 2A1J2 to the appropriate connector on the radar building.

l. Connect cable W from r-t group connector 2A1J3 to the appropriate connector on the radar building.

m. Connect cable X between the appropriate connectors on the radar building and one end of cable AA.

n. Connect the free end of cable AA to pedestal connector 3A2J4.

o. Connect cable Y between the appropriate connectors on the radar building and one end of cable AB.

p. Connect the free end of cable AB to pedestal connector 3A2J3.

q. Connect cable Z between the appropriate connector on the radar building and pedestal connector 3A2J5.

r. Connect cable CX–10773/U (2 ft) between the pedestal connectors 3A2J6 and 3A2A2J1.

s. Connect cable CG–3460/U (2 ft) between pedestal connector 3A2J1 and antenna connector 3A1J1.

t. Connect cable CG–3460/U (2 ft) between pedestal connector 3A2J2 and antenna connector 3A1J2.

2–35. Cabling Connections, AN/TPX–46(V)3, Type IV with Interface Box

(fig. FO–9)

NOTE

Refer to TM 11–5985–334–15 for cable routing procedures in the vicinity of Mast AB–621/G.

a. Connect cable A between monitor alarm connector 8J1 and control box connector 5J2.

b. Connect cable F between the appropriate connectors on the AN/TSQ–51 and radar buildings.

c. Connect cable G between the appropriate connectors on the AN/TSQ–51 and radar buildings.

d. Connect cable B between the appropriate connectors on the radar building and the interface box.

e. Connect cable C between the appropriate connectors on the radar building and the interface box.

f. Connect cable E between c-d group connector 1A5J1 and the appropriate connector on the interface box.

g. Connect cable H between c-d group connector 1A5J2 and the appropriate connector on the interface box.

h. Connect cable I between c-d group connector 1A5J10 and the appropriate connector on the interface box.

i. Connect cable K between c-d group connector 1A5J12 and the appropriate connector on the interface box.

j. Connect cable L between c-d group connector 1A5J13 and the appropriate connector on the interface box.

k. Connect cable J between c-d group connector 1A5J14 and the appropriate connector on the interface box.

l. Connect cable M between c-d group connector 1A5J15 and the appropriate connector on the interface box.

m. Connect one end of cable N to c-d group connector 1A5J11.

n. Connect cable ends D1, D2, and D3 to the appropriate connectors on the interface box.

o. Connect cable end D4 to the appropriate connector on the radar building.

p. Connect the free end of cable D to r-t group connector 2A1J1.

q. Connect cable V between r-t group connector 2A1J2 and the appropriate connector on the radar building.

r. Connect cable W between r-t group connector 2A1J3 and the appropriate connector on the radar building.

s. Connect cable Z between the appropriate connector on the radar building and pedestal connector on the radar building and pedestal connector 3A2J5.

t. Connect cable X between the appropriate connector on the radar building and one end of cable AA.

u. Connect the free end of cable AA to pedestal connector 3A2J4.

v. Connect cable Y between the appropriate connector on the radar building and one end of cable AB.

w. Connect free end of cable AB to pedestal connector 3A2J3.

x. Connect cable CX–10773/U (2 ft) between pedestal connectors 3A2J6 and 3A2A2J1.

y. Connect cable CG–3460/U (2 ft) between pedestal connector 3A2J1 and antenna connector 3A1J1.

z. Connect cable CG–3460/U (2 ft) between pedestal connector 3A2J2 and antenna connector 3A1J2.

2–36. Cabling Connections, AN/TPX–46(V)3, Type V, With Interface Box

(fig. FO–10)

NOTE

Refer to TM 11–5985–334–15 for cable

routing procedures in the vicinity of Mast AB–621/G.

a. Connect cable A from monitor alarm connector 8J1 to control box connector 5J2.

b. Connect cable F between the appropriate connectors on the AN/TSQ–51 and radar buildings.

c. Connect cable G between the appropriate connector on the AN/TSQ–51 and radar buildings.

d. Connect cable C between the appropriate connectors on the radar building and the interface box.

e. Connect cable B between the appropriate connectors on the radar building and the interface box.

f. Connect cable E between c-d group connector 1A5J1 and the appropriate connector on the interface box.

g. Connect cable H between c-d group connector 1A5J2 and the appropriate connector on the interface box.

h. Connect cable I between c-d group connector 1A5J10 and the appropriate connector on the interface box.

i. Connect cable K between c-d group connector 1A5J12 and the appropriate connector on the interface box.

j. Connect cable L between c-d group connector 1A5J13 and the appropriate connector on the interface box.

k. Connect cable J between c-d group connector 1A5J14 and the appropriate connector on the interface box.

l. Connect cable M between c-d group connector 1A5J15 and the appropriate connector on the interface box.

m. Connect one end of cable N to c-d connector 1A5J11.

n. Connect cable ends D1, D2 and D3 to the appropriate connectors on the interface box.

o. Connect the free end of cable D to the appropriate connector on the radar building.

p. Connect cables R, S, T, U, and X to the appropriate connectors on the interface box.

q. Connect cable Q between the appropriate connectors on the radar building and cable AF.

r. Connect cable AC between the appropriate connector of cable AF and pedestal connector 3A2J5.

s. Connect the free end of cable AF to r-t group connector 2A1J1.

t. Connect cable AJ between r-t group connector 2A1J2 and one end of cable AH.

u. Connect cable AL between pedestal connector 3A2J4 and the free end of cable AH.

v. Connect cable AK between r-t group connector 2A1J3 and one end of cable AI.

w. Connect cable AM between pedestal connector 3A2J3 and the free end of cable AI.

x. Connect cable CX–10773/U (2 ft) between pedestal connector 3A2J6 and 3A2A2J1.

y. Connect cable CG–3460/U (2 ft) between pedestal connector 3A2J1 and antenna connector 3A1J1.

z. Connect cable CG–3460/U (2 ft) between pedestal connector 3A2J2 and antenna connector 3A1J2.

2–37. Cabling Connections, AN/TPX–46(V)3, Type V Without Interface Box

(fig. FO–11)

NOTE

Refer to TM 11–5985–334–15 for cable routing procedures in the vicinity of Mast AB–621/G.

a. Control cable A between monitor alarm connector 8J1 and control box connector 5J2.

b. Connect cables F and G between the appropriate connectors on the AN/TSQ–51 and radar buildings.

c. Connect cable B between the appropriate connector on the radar building and c-d group connector 1A5J13.

d. Connect cable C between the appropriate connector on the radar building and c-d group connector 1A5J2.

e. Connect cable ends D1, D2 and D3 to c-d group connectors 1A5J10, 1A5J12, and 1A5J15, respectively.

f. Connect the free end of cable D to the appropriate connector on the radar building.

g. Connect cables R, U and N to c-d group connectors 1A5J1, 1A5J14, and 1A5J11, respectively.

h. Connect cable Q between appropriate connector on radar building and one end of cable AF.

i. Connect the appropriate end of cable AF to one end of cable AG.

j. Connect free end of cable AG to pedestal connector 3A2J5.

k. Connect the free end of cable AF to r-t group connector 2A1J1.

l. Connect cable AC between r-t group connector 2A1J2 and one end of cable AH.

m. Connect cable AD between pedestal connector 3A2J4 and the free end of cable AH.

n. Connect cable AB between r-t group connector 2A1J3 and one end of cable AI.

o. Connect cable AE between pedestal connector 3A2J3 and the free end of cable AI.

p. Connect cable CX-10773/U (2 ft) between pedestal connectors 3A2J6 and 3A2A2J1.

q. Connect cable CG-3460/U between pedestal connector 3A2J1 and antenna connector 3A1J1.

r. Connect cable CG-3460/U between pedestal connector 3A2J2 and antenna connector 3A1J2.

2-38. Cabling Connections, AN/TPX-46(V)4 (fig. FO-12)

NOTE

Refer to TM 11-5985-334-15 for cable mounting in the vicinity of Mast AB-621/G.

a. Remove two cables CG-3460/U (35 ft), one cable CX-10779/U (50 ft), one cable CX-12810/TPX-46(V) and one cable CX-10775/U (375 ft) cable reel.

b. Remove one cable CG3461/U (375 ft) and one cable CX-10777/U (375 ft) from the small cable reel.

c. Unpack two cables CG-3460/U (2 ft) and one cable CX-10773/U (2 ft).

d. Connect cable CG-3460/U (2 ft) from connector 3A1J1 on the antenna assembly to connector 3A2J1 on the pedestal assembly.

e. Connect another cable CG-3460/U (2 ft) from connector 3A1J2 on the antenna assembly to connector 3A2J2 on the pedestal assembly.

f. Connect cable CX-10773/U (2 ft) from pedestal connector 3A2J6 to pedestal connector 3A2A2J1.

g. Connect cable CG-3460/U (35 ft) from pedestal connector 3A2J4 to r-t group connector 2A1J2.

h. Connect another cable CG-3460/U (35 ft) from pedestal connector 3A2J3 to r-t group connector 2A1J3.

i. Connect cable CX-10779/U (50 ft) to pedestal connector 3A2J5.

j. Connect cable CX-10775/U (375 ft) to the appropriate connector on the AN/GSS-1 or AN/GSS-7 radar van. Refer to associated radar technical manual for detailed procedures.

k. Connect free end of cable CX-10775/M (375 ft) to cable CX-12810/TPX-46(V) (fig. 2-29).

l. Connect remaining ends of cable CX-12810/TPX-46(V) to r-t group connector 2A1J1 and to free end of cable CX-10779/U (50 ft).

m. Connect cable CG-3461/U (375 ft) from the appropriate connector on the AN/GSS-1 or AN/GSS-7 radar van to the appropriate connector on the AN/TSQ-37 or AN/MSQ-18 OC van. Refer to associated radar manuals for detailed procedures.

n. Connect cable CX-10777/U (375 ft) from the AN/GSS-1 or AN/GSS-7 radar van to the AN/TSQ-38 or AN/MSQ-18 OC van. Refer to the associated radar technical manuals for detailed procedures.

o. Refer to the associated radar technical manuals for cable connections to van-mounted components and OC van interconnections.

2-39. Cabling Connections, AN/TPX-46(V)6 (fig. FO-13)

a. Remove two cables CG-3460/U (100 ft) and one cable CX-10778/U (100 ft) from the large cable reel.

b. Unpack two cables CG-3460/U (2 ft) and one cable CX-10773/U (2 ft).

c. Connect cable CG-3460/U (2 ft) from connector 3A1J1 on the antenna assembly to connector 3A2J1 on the pedestal assembly.

d. Connect another cable CG-3460/U (2 ft) from connector 3A1J2 on the antenna assembly to connector 3A2J2 on the pedestal assembly.

e. Connect cable CX-10773/U (2 ft) from pedestal connector 3A2J6 to pedestal connector 3A2A2J1.

f. Connect cable CG-3460/U (100 ft) from pedestal connector 3A2J4 to the appropriate connector at the training installation.

g. Connect another cable CG-3460/U (100 ft) from pedestal connector 3A2J3 to the appropriate connector at the training installation.

h. Connect cable CX-10778/U (100 ft) from pedestal connector 3A2J5 to the appropriate connector at the training installation.

Section V. PRELIMINARY ADJUSTMENT OF EQUIPMENT

2-40. General

This section covers the preliminary checks and adjustments that must be made on Interrogator Set AN/TPX-46(V) after installation and prior to circuit alignment. The required procedures are performed in the sequence given below, regardless of iff set configuration.

a. Grounding (para 2-41)

b. Cabling checks (para 2-42)

c. Equipment checks and preliminary control settings (para 2-43)

d. Program Connector installation (para 2-44 through 2-46)

2-41. Grounding

Grounding procedures for NIKE-HERCULES systems are given in TM 9-1400-250-15/3. When installing the interrogator set in all other systems, it is necessary to connect the pedestal assembly and r-t group (when mounted at base of antenna) to an earth ground, by connection to a grounding rod. For this purpose two grounding rods are supplied. To install and connect grounding rods, proceed as follows:

WARNING

Wear safety glasses when sledge hammering grounding rods into place, to prevent damage to eyes from flying metal parts.

NOTE

Perform steps *a, b* and *c* only when r-t group is mounted at the base of the antenna. When the r-t group is mounted in the radar van, start grounding procedure with step *d.*

a. Drive a grounding rod into the ground near the r-t group.

b. Remove the wing nut from the ground lug (GND) on the r-t group front panel (fig. 3-8). Connect a number 6 ground wire to the lug and then replace and tighten the wing nut.

c. Connect the opposite end of the grounding wire to the grounding rod.

d. Drive a grounding rod into the ground near the base of the antenna.

e. Remove the wing nut from the ground lug on the pedestal assembly (fig. 2-23). Connect a number 6 ground wire to the lug and then replace and tighten the wing nut.

f. Connect the opposite end of the ground wire installed in step *e* to the ground rod installed in step *d.*

g. Remove the wing nut from the ground lug (GND) on the c-d group case (fig. 2-24). Connect a number 6 ground wire to the lug and then replace and tighten the wing nut.

h. Connect the opposite end of the grounding wire installed in step *g* to the associated radar system ground.

2-42. Cabling Checks

After installation and prior to applying power to the equipment, refer to figures FO-1 through FO-13, as applicable, and check to see that the interrogator set has been correctly cabled as follows:

a. Check to see that the cables are connected to the proper receptacles.

b. Check to insure that cable connections are securely tightened.

c. Check to see that cable runs are free from sharp bends (minimum bend radius is four times the outside diameter of cable) and that intervan cables and cables from the radar van to the r-t group and antenna group are protected from vehicular or heavy pedestrian traffic.

d. Check to see that no cables are unnecessarily taut and that there is no strain on cable connectors.

e. Check that ground connections are tight.

f. Check that protective caps are screwed together.

2-43. Equipment Checks and Preliminary Control Settings

This paragraph covers the preliminary control settings and equipment check that must be made on the iff set prior to installation alignment and adjustment.

NOTE

Check that all indicator lamp dimmer rings are rotated fully counterclockwise.

NOTE

Refer to chapter 3, section I for functions of referenced controls and indicators.

a. On the power control panel (figure 3-4), set SYSTEM POWER circuit breaker to OFF.

b. On the processor assembly front panel (fig. 3-5), set POWER circuit breaker to OFF and set METER switch to OUT.

c. On the synchronizer assembly front panel (fig. 3–6), set the controls as follows:

Control	*Setting*
POWER circuit breaker	OFF
IFF TRIG SELECT switch	EXT
COUNTDOWN switch	LOW, NORMAL or HIGH as required
METER switch	OUT

d. Loosen the twelve captive screws securing the synchronizer assembly to the c-d group case. Slide the synchronizer out of the c-d group case until the out-going limit stops are reached (fig. 5–2).

e. On the right front corner of the synchronizer chassis (fig. 2–30), set the SPECIAL-NORMAL switch to SPECIAL for AN/TPX–46(V)2 configurations, and NORMAL for all other configurations. Set the PARALLEL-SERIAL switch to PARALLEL for AN/TPX–46(V)1 configurations, and to SERIAL for all other configurations. Set the IN–OUT switch and the TAIL-EYELASH switch as desired. For IPCP application, set TAIL-EYELASH switch to EYELASH.

f. Depress the in-going limit stops (fig. 5–2) on the synchronizer and slide the assembly into the c-d group case. Tighten the front panel retaining screws.

g. On the antenna control assembly front panel (fig. 3–7), set the controls as follows:

Control	*Setting*
POWER circuit breaker	OFF
POWER ECA circuit breaker	OFF
ANT SYNC switch	EXT
INT ANT SYNC RPM switch	0
METER switch	OUT

h. Loosen the ten captive screws securing the antenna control assembly to the c-d group case. Slide the antenna control assembly out of the c-d group case until the out-going limit stops are reached.

CAUTION

Determine the type radar synchro or resolver requirements before performing steps *i* and *j* to prevent serious damage.

i. On the right front corner of the antenna control assembly chassis (lg. 2–31) set the EXT REF FREQ switch to 60 HZ, 400 HZ or 4 KHZ as required. Set the SYNCHRO REF switch to EXT.

j. On the left front corner of the antenna control assembly chassis (fig. 2–31), insert plug 1A2A4P1 in connector 1A2J1 (RSLVR) or connector 1A2J2 (SYNC) as required. Tighten connector retaining screw (fig. 5–6) and place dust cap (fig. 2–31) over unused connector.

k. Depress the in-going limit stops on the antenna control and slide the assembly into the c-d group case. Do not tighten the retaining screws at this time.

l. Remove the mode 4 test plug from its storage compartment in the c-d group case by loosening four captive retaining screws (fig. 2–32).

m. Insert the mode 4 test plug in KIR connector XA4P1 in c-d group case and tighten the lower retaining screws securely (fig. 2–32).

n. Set the TEST SEL switch on the mode 4 test plug to STBY.

o. On the receiver-transmitter front panel (fig. 3–8), set POWER circuit breaker to OFF and set TEST SELECTOR switch to OFF.

p. Loosen the twelve captive screws securing the receiver-transmitter to the r-t group case. Slide the receiver-transmitter out of the r-t group case until the out-going limit stops are reached.

q. On the receiver-transmitter chassis (fig. 2–33), set the controls as follows:

Control	*Setting*
GTC switch	ON
CHANNEL switch	DUAL
XMTR PWR switch	NORM
RCVR GATE switch	STOP PULSE
MOD switch	ON

r. Depress the in-going limit stops on the receiver-transmitter and slide the assembly into the r-t group case and tighten the captive retaining screws.

s. On the control box (fig. 3–1), set the controls as follows:

Control	*Setting*
POWER circuit breaker	OFF
PANEL switch	DIM
STROBE switch	OFF
MODE 4 switch	A
MODE SELECT switch	1
PROCESSOR SWITCH	IN
CODE SELECT subpanel	
MODE 1 switches	Code of the day
MODE 2 switches	Code of the day
MODE 3/A switches	Code of the day

t. On control panel 1 (fig. 3–2), set the controls as follows:

Control	*Setting*
POWER circuit breaker	OFF
MODE 4 switch	A
CODE SELECT subpanel	
MODE 1 switches	Code of the day
MODE 2 switches	Code of the day
MODE 3/A switches	Code of the day

u. On control panel 2 (fig. 3–3), set the controls as follows:

Control	*Setting*
PANEL switch	DIM
MODE 4 switch	A
CONSOLE SELECT switch	As required
CODE SELECT Subpanel	
MODE 1 switches	Code of the day
MODE 2 switches	Code of the day
MODE 3/A switches	Code of the day

2–44. Program Connectors
(fig. 1–12)

Program connectors are supplied in three different kits. Kit No. 1 is issued with the AN/TPX–46(V)1 configuration, kit No. 2 is issued to all configurations except the AN/TPX–46(V)1 and the AN/TPX–46(V)6. Kit No. 3 is issued to the AN/TPX–46(V)6. The processor program connectors provide the capability to program the iff set to meet established friend admission and enemy rejection criteria. Kit No. 1 and Kit No. 2 each consist of 16 program connectors, of which four have no color code and are never changed. The remaining twelve are divided into three groups of four each. Kit No. 3 contains all unique program connectors of kits No. 1 and No. 2 and are used for form kits No. 1 or No. 2 as required. The individual groups are color-coded green, yellow, and red. Only one color-coded set is installed at a time. The green set programs the iff set with the most secure program by establishing the highest enemy rejection. The red set provides a higher probability for recognition of friends and, correspondingly, fewer enemy rejections. The yellow set provides a median between the red and the green. The set to be installed shall be determined by the unit commanding officer who also shall store unused sets of program connectors. Refer to the following charts for reference designations of the program connectors and the reference designations of the cards to which the program connectors are to be mounted. Figures 2–30 and 2–34 illustrate the locations of mounted program connectors in the synchronizer and processor.

NOTE

All program connectors used in conjunction with the processor are marked CONFIDENTIAL. When the connectors are mated with their respective printed circuit card assemblies, the connectors and assemblies become CONFIDENTIAL. When a mated program connector/printed circuit card assembly is installed in the processor, the entire processor assembly also becomes CONFIDENTIAL.

PROGRAM CONNECTOR KIT NO. 1

CARD	PROGRAM CONNECTOR	KEY	COLOR
1A3A5	1A3A5U17	A10	GREEN
1A3A5	1A3A5U17	A10	YELLOW
1A3A5	1A3A5U17	A10	RED
1A3A7	1A3A7U17	NOTCH	GREEN
1A3A7	1A3A7U17	NOTCH	YELLOW
1A3A7	1A3A7U17	NOTCH	RED
1A3A8	1A3A8U17	B11	GREEN
1A3A8	1A3A8U17	B11	YELLOW
1A3A8	1A3A8U17	B11	RED
1A3A13	1A3A13U17	B20	GREEN
1A3A13	1A3A13U17	B20	YELLOW
1A3A13	1A3A13U17	B20	RED
1A3A1	1A3A1U17	B13	—
1A3A3	1A3A3U17	A26	—
1A1A3	1A1A3U17	A7	—
1A1A21	1A1A21U17	B3	—

PROGRAM CONNECTOR KIT NO. 2

CARD	PROGRAM CONNECTOR	KEY	COLOR
1A3A5	1A3A5U17	A10	GREEN
1A3A5	1A3A5U17	A10	YELLOW
1A3A5	1A3A5U17	A10	RED
1A3A7	1A3A7U17	NOTCH	GREEN
1A3A7	1A3A7U17	NOTCH	YELLOW
1A3A7	1A3A7U17	NOTCH	RED
1A3A8	1A3A8U17	B11	GREEN
1A3A8	1A3A8U17	B11	YELLOW
1A3A8	1A3A8U17	B11	RED
1A3A13	1A3A13U17	B20	GREEN
1A3A13	1A3A13U17	B20	YELLOW
1A3A13	1A3A13U17	B20	RED
1A3A1	1A3A1U17	B13	—
1A3A3	1A3A3U17	A26	—
1A1A3	1A1A3U17	A7	—
1A1A21	1A1A21U17	B3	—

PROGRAM CONNECTOR KIT NO. 3

CARD	PROGRAM CONNECTOR	KEY	COLOR
1A3A5	1A3A5U17	A10	GREEN
1A3A5	1A3A5U17	A10	GREEN
1A3A5	1A3A5U17	A10	YELLOW
1A3A5	1A3A5U17	A10	RED
1A3A7	1A3A7U17	NOTCH	GREEN
1A3A7	1A3A7U17	NOTCH	GREEN
1A3A7	1A3A7U17	NOTCH	YELLOW
1A3A7	1A3A7U17	NOTCH	YELLOW
1A3A7	1A3A7U17	NOTCH	RED
1A3A7	1A3A7U17	NOTCH	RED
1A3A8	1A3A8U17	B11	GREEN
1A3A8	1A3A8U17	B11	GREEN
1A3A8	1A3A8U17	B11	YELLOW
1A3A8	1A3A8U17	B11	RED
1A3A13	1A3A13U17	B20	GREEN
1A3A13	1A3A13U17	B20	YELLOW
1A3A13	1A3A13U17	B20	RED
1A3A1	1A3A1U17	B13	—
1A3A3	1A3A3U17	A26	—
1A1A3	1A1A3U17	A7	—
1A1A21	1A1A21U17	B3	—

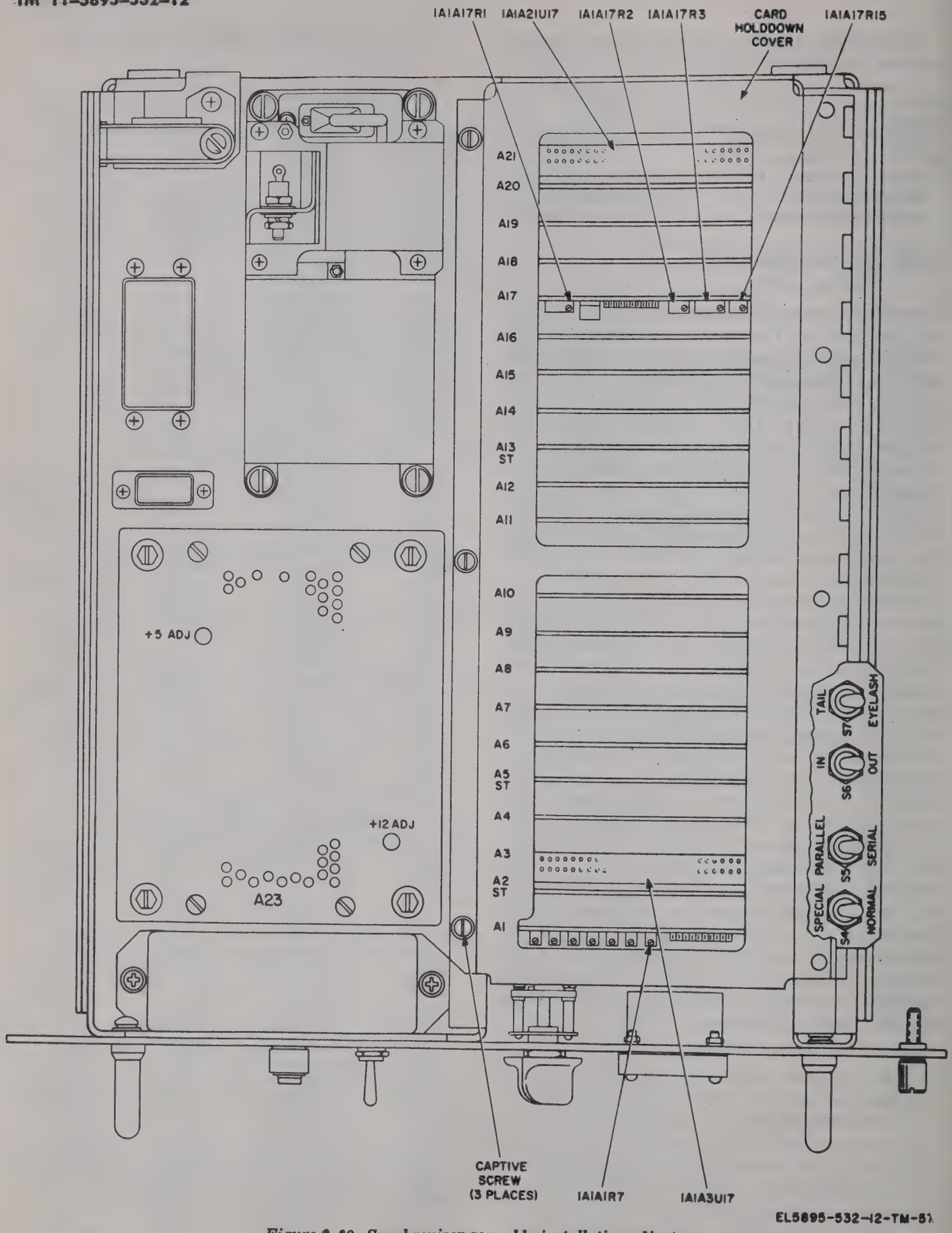


Figure 2-30. Synchronizer assembly installation adjustments and program connector location.

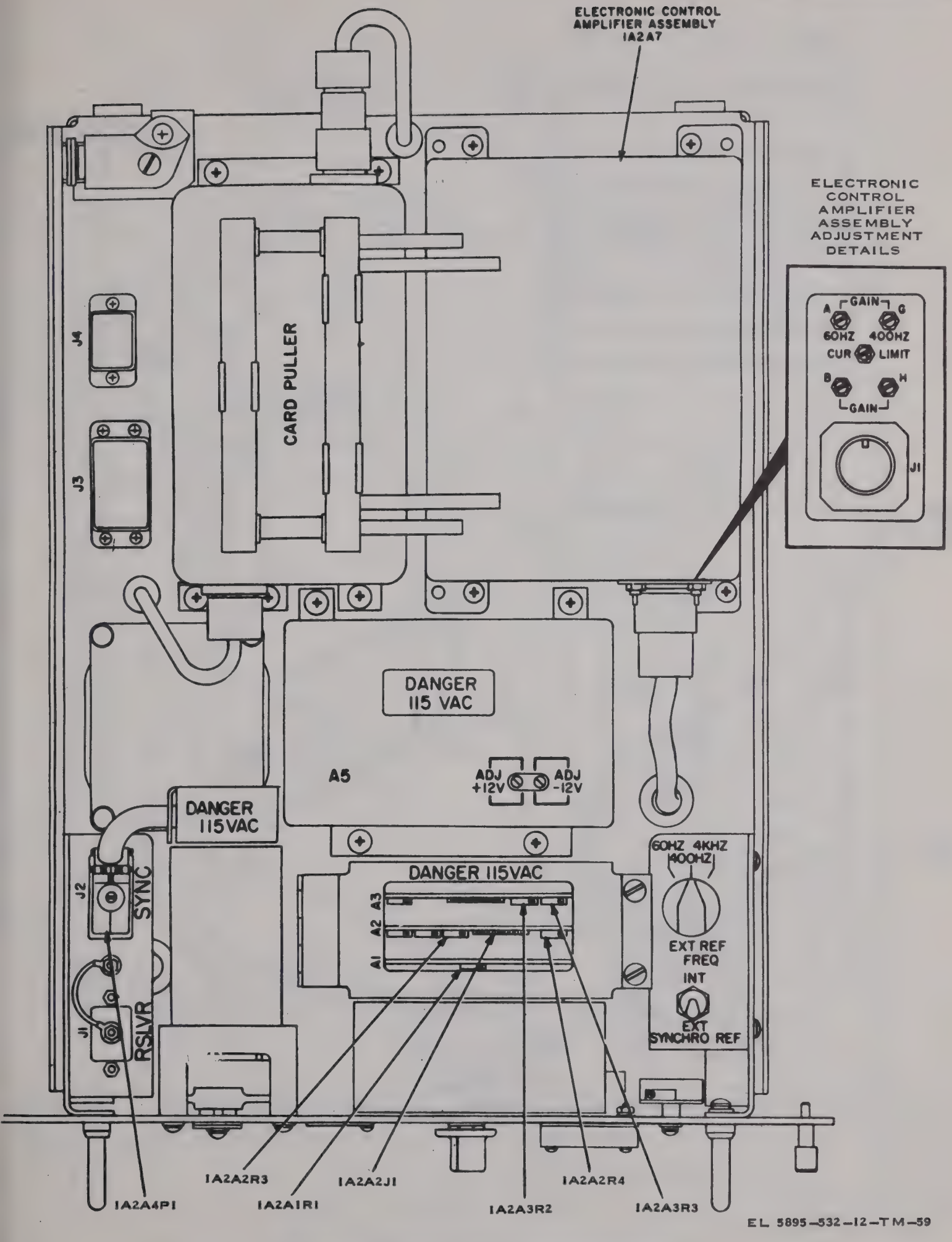


Figure 2-31. Antenna control assembly installation adjustments.

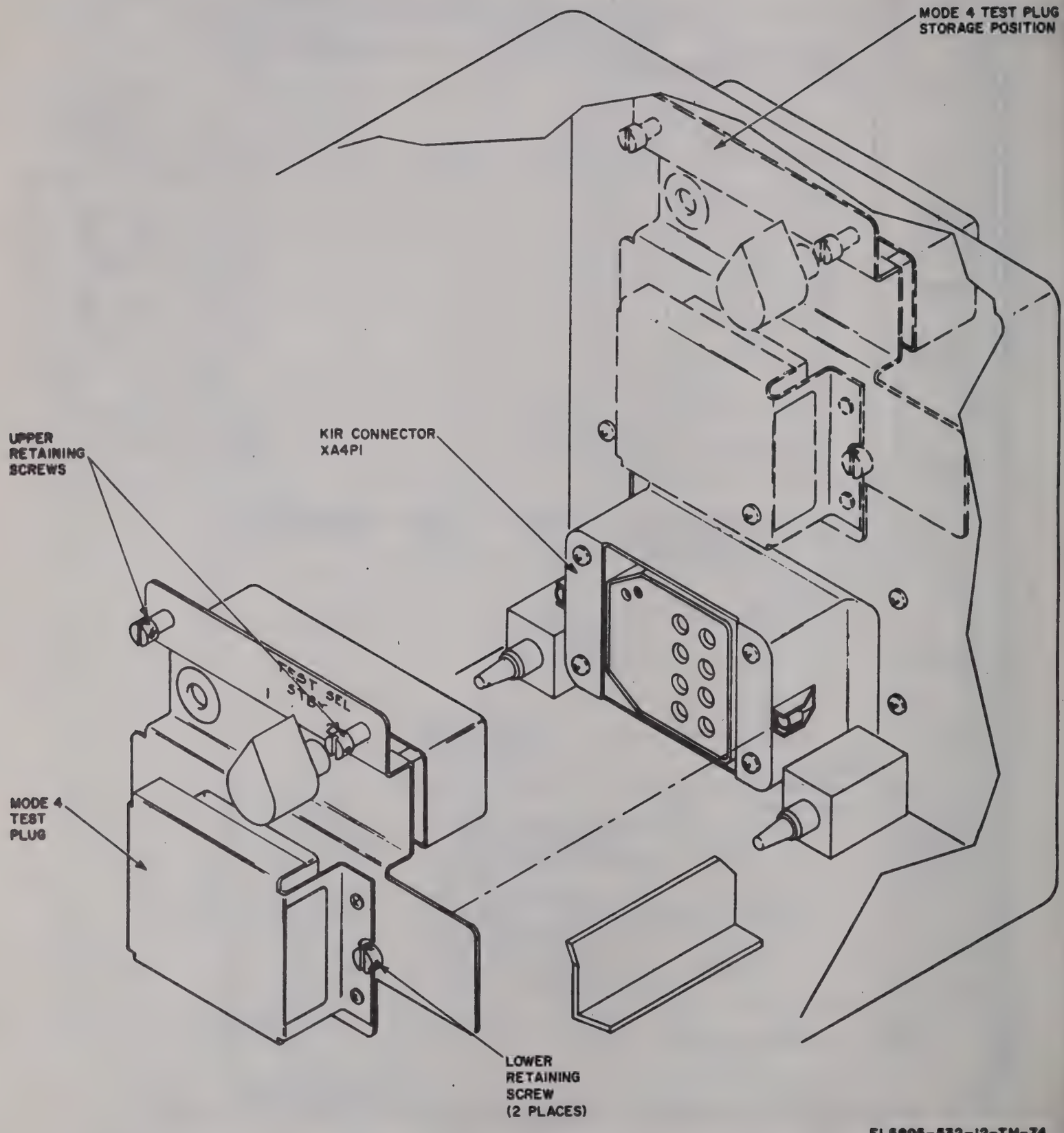


Figure 2-32. Mode 4 test plug installation

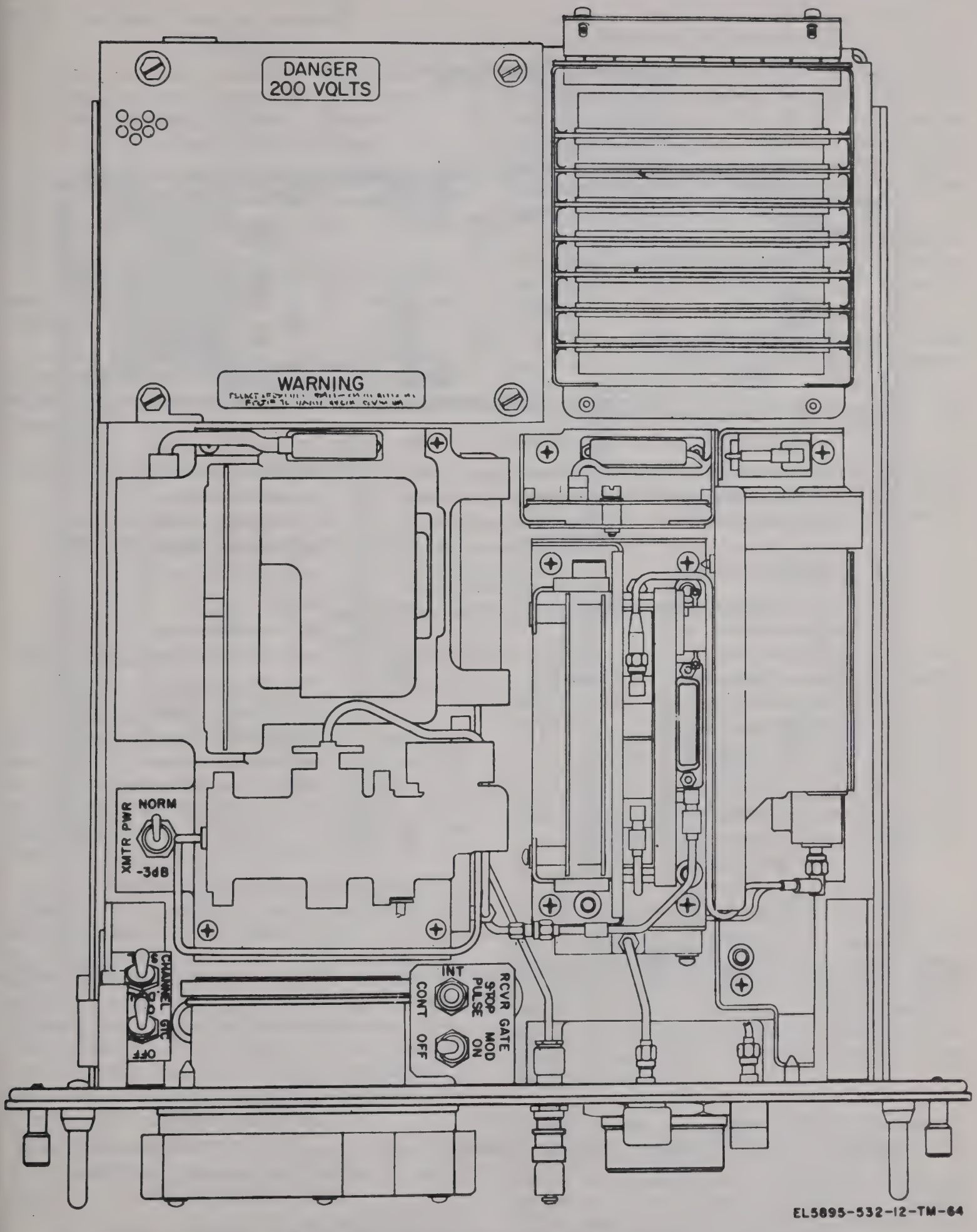


Figure 2–33. Receiver-transmitter installation adjustments.

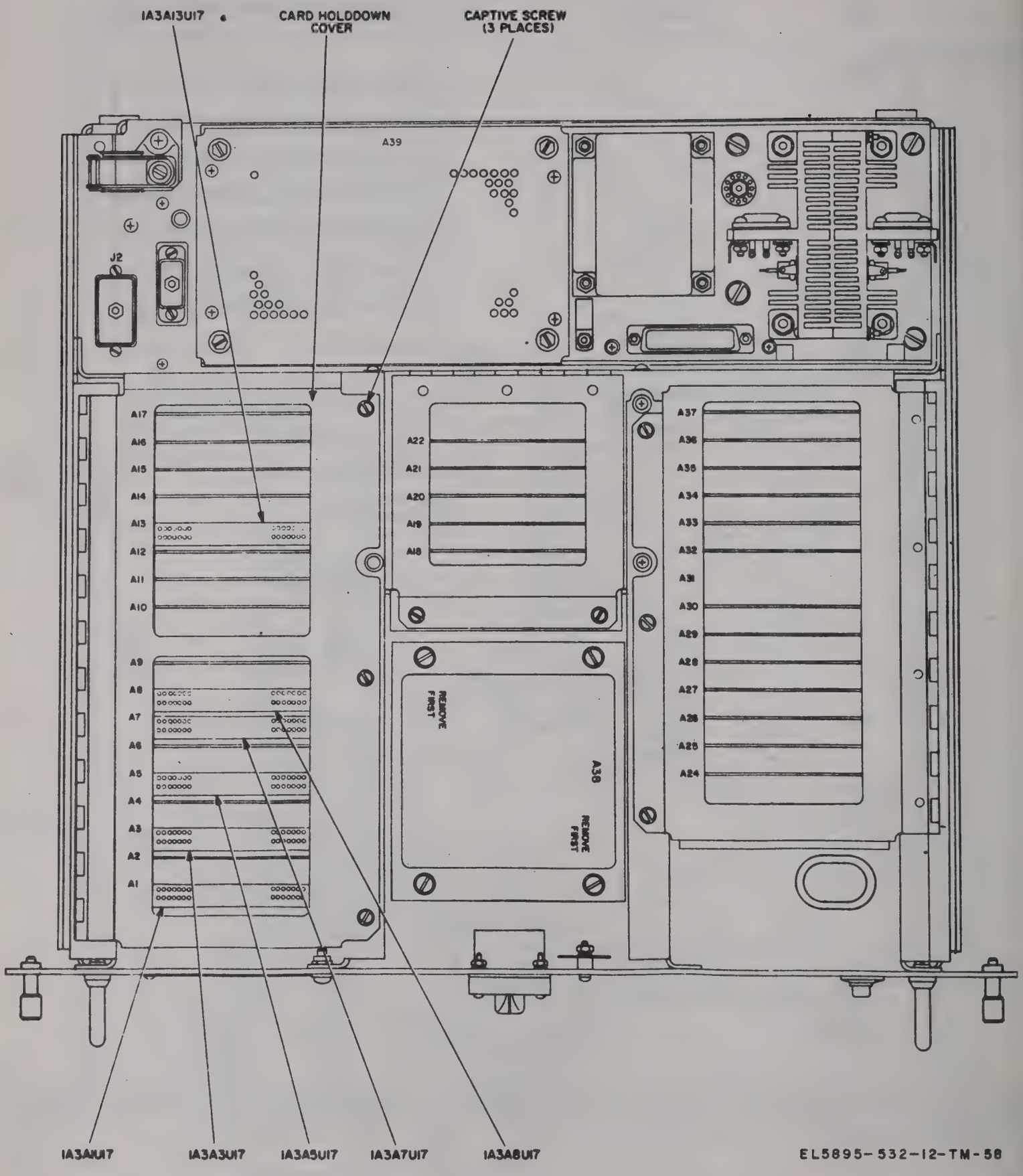


Figure 2-34. Processor assembly program connector locations.

2-45. Program Connector Removal

CAUTION

When removing program connectors, apply equal pressure on each end of program connector to avoid damage to printed wiring and connector pins.

a. Loosen front panel retaining screws on the processor assembly or synchronizer assembly and slide assembly out of case until the out-going limit-stops are reached.

b. Loosen captive retaining screws on synchronizer (fig. 2-30) or processor (fig. 2-34) and raise card holddown cover.

c. Apply uniform upward pressure on each end of program connector and remove it; ensure that program connector pins are not bent during removal.

2-46. Program Connector Replacement

CAUTION

When installing program connectors, apply equal pressure to each end of the program connector to avoid damage to printed wiring and connector pins.

Program connectors are keyed so that they may not be improperly installed. The key on the program connector is a missing pin or notch in the spacer bar; the key on the mating connector is a plugged receptacle or a notched guide. Install program connectors in the synchronizer and processor as follows:

a. Place the program connector in position on the mating receptacle; ensure that key is in correct position and that all pins are correctly aligned.

b. Apply uniform downward pressure at each end of connector and press the program connector into the mating connector.

c. Close and secure card holddown cover with captive screws.

d. Depress the in-going limit stops on the assembly and slide the assembly into its case. Tighten the captive retaining screws on the assembly front panel.

Section VI. ALIGNMENT AND ADJUSTMENT PROCEDURES

2-47. General

a. The iff set alignments and adjustments required during installation are those which provide proper azimuth alignment and range displacement of the iff display video with respect to the corresponding radar video in the radar display, together with the turn-on checks applicable when power is applied to the iff set for the first time.

b. Proper azimuth alignment of the iff display video requires azimuth synchronization of the iff set antenna to the radar antenna. In configurations using the 14-foot antenna, this azimuth synchronization is obtained without the need for adjustment because the 14-foot antenna is physically mounted on the radar antenna. However, in configurations using the 7-foot antenna, azimuth synchronization involves boresighting the iff set antenna and adjusting its positioning circuits in the antenna control assembly.

(1) When the M90F telescope is available for boresighting, proceed as directed in paragraphs 2-49 and 2-51 through 2-54.

(2) When a telescope is not available, proceed as directed in paragraphs 2-50 through 2-54.

c. The range displacement and appearance (thickness, friend tail length, and pulse amplitudes) of the iff display video can be changed if desired. The adjustment procedures when using the ppi display are given in paragraph 2-55, which also contains instructions for readjusting the AZ ADJ control to correct minor azimuth misalignments. The adjustment procedures when using an oscilloscope are given in paragraph 2-56.

2-48. Test Point and Adjustment Locations

The locations of adjustments and test points on a typical card are illustrated in figure 2-35. These adjustments and test points are numbered from left to right. The first potentiometer from the left is R1, the first test point block from the left is J1, and the first test point from the left end of J1 is J1-1.

2-49. Antenna Boresighting Using Telescope

Antenna boresighting is accomplished with the aid of the telescope which may be mounted on the iff set, 7-foot antenna for forward sighting or for back sighting, depending on the requirements of the associated radar sighting method. In either case, the alignment method is the same

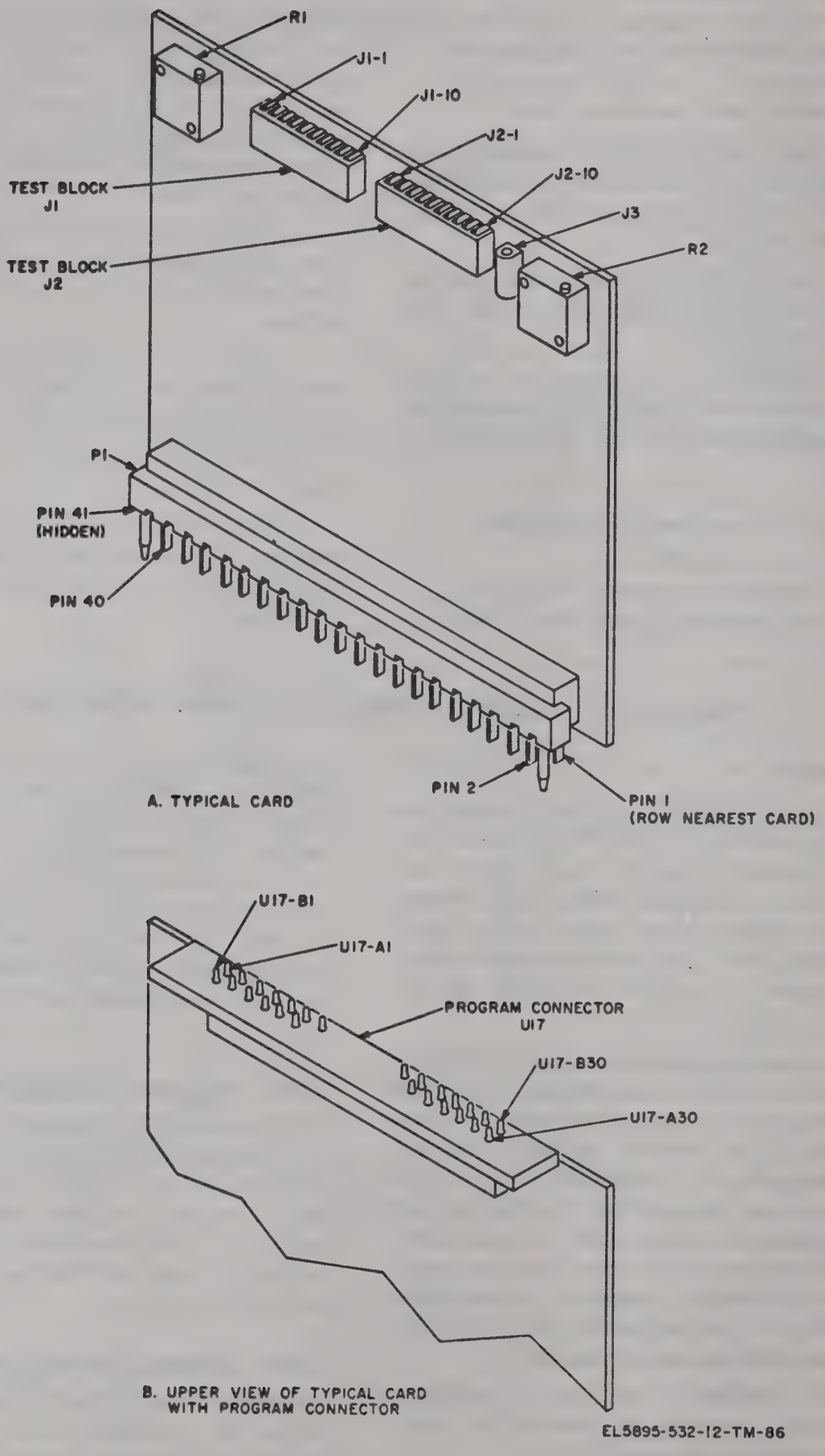


Figure 2-35. Locations of test points and adjustments (typilcal).

with the exception of the direction the antennas are facing. Antenna tilt adjustment is contained in paragraph 2-51. To align the iff set antenna with that of the associated radar, proceed as follows:

a. Optically or electrically position the radar antenna so that broadside corresponding to the main beam is facing a visible fixed distance reference object. Refer to TM 9-1430-534-12-1 for detailed procedures.

b. On the pedestal assembly set AZ DRIVE switch (fig. 2-23) to SAFE OFF.

c. Manually rotate the iff set antenna until it is directed in the same direction as that of the radar antenna.

d. On the telescope mount located on the bottom of the iff set antenna (fig. 2-36) loosen the telescope retaining screw.

e. Slide the mounting bar on the M90F telescope into the telescope mounting receptacle (fig. 2-36), so that the telescope faces reference object. Secure the telescope by tightening the telescope retaining screw on the telescope mount.

f. Using the M90F telescope for sighting, manually position the iff set antenna until the reference object is centered in the crosshairs of the M90F. Adjust the tilt of iff set antenna (para 2-51) as necessary to obtain proper sighting.

NOTE

Do not change iff antenna or radar antenna azimuth until equipment turn-on and alignment procedures (para 2-52) and antenna control assembly alignment procedures (para 2-53) have been completed.

2-50. Antenna Boresighting Without Telescope

WARNING

The following procedures are to be performed only if a secure mount is available for the repairman to stand on. This mount must be sufficently stable to maintain the weight of the repairman and high enough for the repairman to see over the tope of the antenna.

a. Optically or electrically position the radar antenna so that the broadside corresponding to the main beam is facing a visible fixed distant reference object. Refer to TM 9-1430-534-12-1 for detailed procedures. Note the direction, in azimuth, of the radar antenna.

b. On the pedestal assembly, set AZ DRIVE switch (fig. 2-23) to SAFE OFF.

c. Manually rotate the iff antenna until the line along the axis of the radome is pointed in the direction of the reference object.

d. Using the line (crack) between the radome halves as a sight, manually align the antenna so that one end of the antenna is pointed exactly at the reference object.

e. Using a Phillips head screwdriver, loosen three Phillips head retaining screws which secure the azimuth strobe ring (fig. 2-39).

f. Rotate the azimuth strobe ring for an azimuth index reading of zero.

g. Tighten azimuth strobe ring retaining screws.

h. Manually rotate the iff antenna 1600 mils so that the front of the antenna is facing the referenced object. This would be a clockwise rotation to 1600 mils or counterclockwise to 4800 mils.

i. Loosen azimuth strobe ring as in step *e.*

j. Rotate the azimuth strobe ring for the same reading as that noted for the radar in step *a.*

k. Tighten azimuth strobe ring retaining screws.

NOTE

Do not change iff antenna or radar antenna azimuth until after equipment turn-on and alignment procedures (para 2-52), and antenna control assembly alignment procedures (para 2-53) have been performed. Lock the radar antenna in place.

2-51. Antenna Tilt Adjustment

(fig. 2-37)

a. In order to minimize the effects of obstructions and reflecting surfaces, an antenna tilt adjustment is provided. The tilt adjustment allows the antenna elevation angle to be adjusted between zero and ten degrees above pedestal horizontal. Set the tilt angle to ten degrees, except for AN/TPX-46(V)1, set the tilt angle to 25°. However, at unusually high sites (i.e., mountain top installations) the tilt angle must be determined by the site installation team and is a depot or contractor function.

b. To increase the angle of antenna tilt, loosen the lower tilt adjust nut, while holding the upper tilt adjust nut stationary, until the desired tilt angle is displayed by the tilt indicator next to the index mark. When the desired tilt angle is

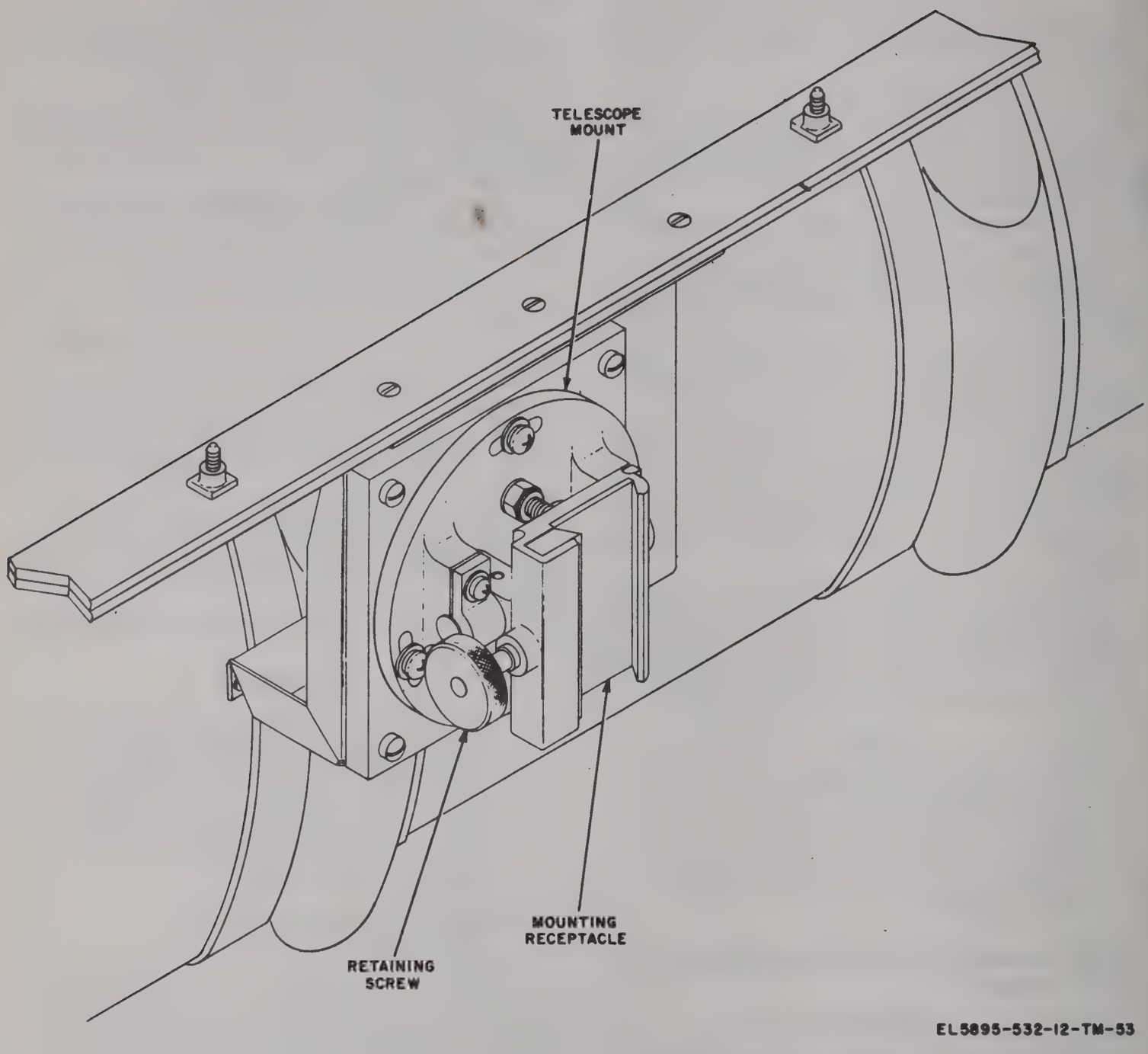


Figure 2-36. Telescope mount.

set, tighten the upper tilt adjust nut while holding the lower tilt adjust nut stationary.

c. To decrease the angle of antenna tilt, loosen the upper tilt adjust nut, while holding the lower tilt adjust nut stationary. Turn the lower tilt adjust nut until the desired tilt angle is displayed by the tilt indicator next to the index mark. Tighten the upper tilt adjust nut while holding the lower tilt adjust nut stationary.

d. On the pedestal (fig. 2-23) set the AZ DRIVE switch to ON.

2-52. Equipment Turn-on and Alignment Procedures

Unless otherwise noted, the equipment turn-on and alignment procedures apply to all components of the iff set, regardless of configuration. Perform the following procedures in the other indicated, disregarding steps that do not apply to the particular iff set configuration in use.

WARNING

Prior to performing this procedure, insure that all personnel are clear of the antenna rotation path.

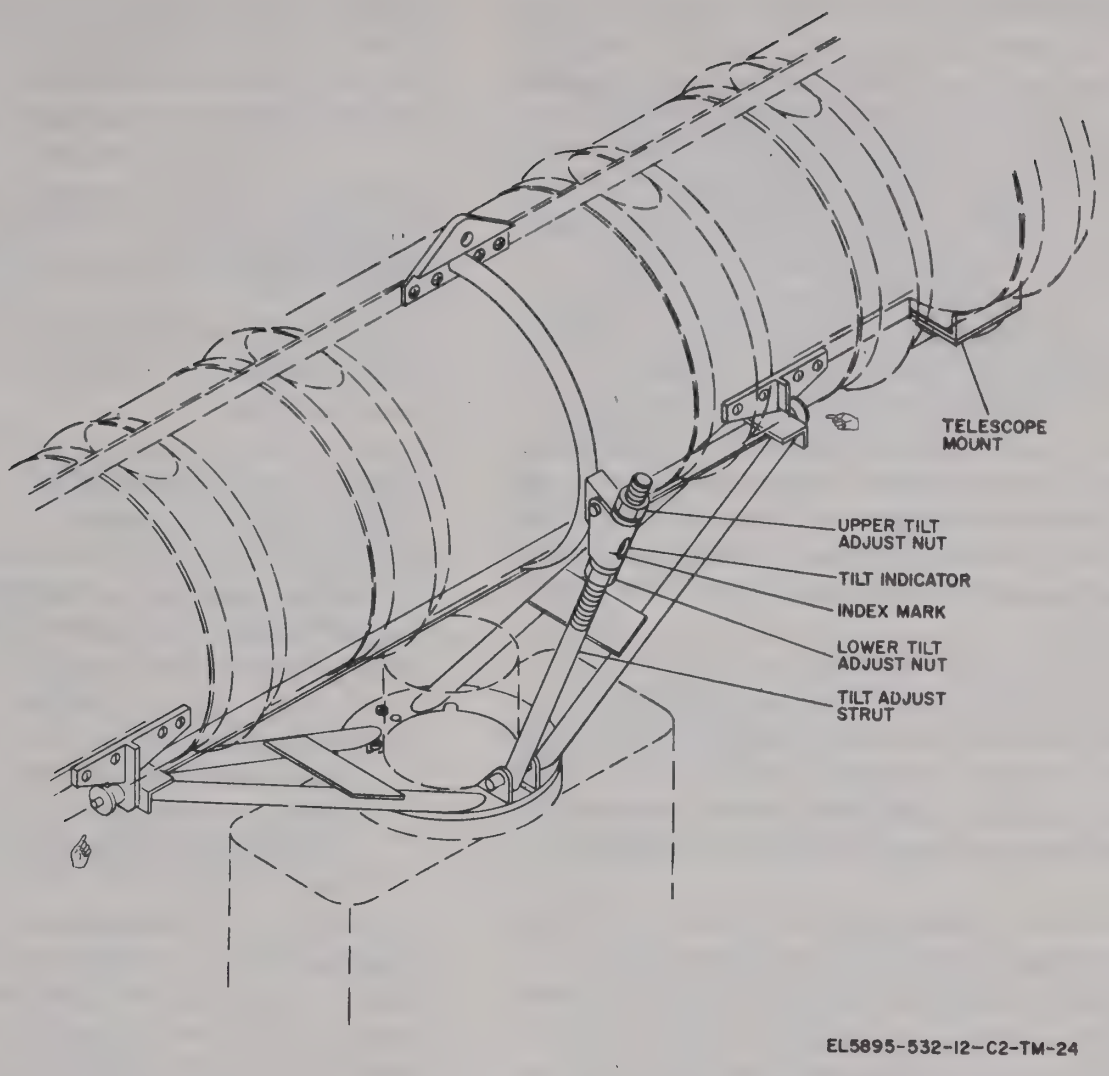


Figure 2-37. Antenna tilt adjustment.

CAUTION

When using the AN/TPX-46(V)2 configuration, make sure that input power is 400 Hz, to avoid damage to the isolation transformer.

CAUTION

Check that sum and difference channel cables between the receiver-transmitter and the pedestal, and between the pedestal and antenna are properly connected. This is to insure that the transmitter will be properly loaded when transmitting and will avoid serious damage to the transmitter circuits.

NOTE

SELF TEST FAULT indicator lamps on the control box and control panel 1 light whenever faults exist in the iff set. This will also occur if an assembly in the c-d group or r-t group is not energized. During the following procedures some fault indications will exist until the last assembly has been energized.

a. On the pedestal assembly, (fig. 2-23), set the AZ DRIVE switch to ON.

b. On the power control panel (fig. 3-4), set the SYSTEM POWER circuit breaker to ON. SYSTEM POWER indicator lamp will light.

NOTE

When using the AN/TPX-46(V)4 configuration, insure that control is transferred to the control box before performing step *c.*

c. On the control box (fig. 3-1), set the POWER circuit breaker to ON. POWER indicator lamp and all SELF TEST lamps except the KIR lamp will light. Hold LAMP TEST switch to TEST; KIR SELF TEST lamp and CHALLENGE lamp will light.

d. On control panel 1 (fig. 3-2) set POWER circuit breaker to ON. POWER indicator lamp and all SELF TEST lamps except the KIR lamp will light. Depress the LAMP TEST switch; KIR SELF TEST lamp will light.

e. On the synchronizer assembly, set the POWER circuit breaker to ON. POWER in-

dicator lamp will light. FAULT indicator lamps are out. Depress each FAULT indicator lamp in succession; each lamp will light when depressed.

f. On the synchronizer assembly, (fig. 3-6), rotate the METER switch through −12V, +5V, and +12V positions. At each position a green zone reading will be indicated on the PWR SUP TEST meter. Set METER switch to OUT.

g. On the processor assembly, (fig. 3-5), set the POWER circuit breaker to ON. POWER indicator lamp will light. FAULT indicator lamps are out. Depress each FAULT indicator lamp in succession; each lamp will light when depressed.

h. On the processor assembly, rotate the METER switch through −5V, +5V, +12V, and MEMORY positions. At each position a green zone reading will be indicated on the PWR SUP TEST meter.

i. On the antenna control assembly (fig. 3-7), set the POWER circuit breaker to ON.

j. On the antenna control assembly, rotate the METER switch through −12V and +12V position. At each position a green zone reading will be indicated on the PWR SUP TEST/NULL meter.

k. Perform antenna control assembly alignment procedures given in paragraph 2-53.

l. Perform azimuth strobe ring adjustment procedures given in paragraph 2-54.

m. On the receiver-transmitter (fig. 3-8), set the POWER circuit breaker to ON. POWER indicator lamp will light. All FAULT indicator lamps will go out within approximately 80 seconds. Depress each fault indicator lamp in succession; each lamp will light when depressed.

n. Perform the mode 4 test plug confidence checks given in paragraph 3-16*d*.

NOTE

If the interrogator computer is to be used with the iff set, perform steps *o* through *r*. If the interrogator computer is not to be used, proceed to step *s*.

o. On the power control panel (fig. 3-4), set SYSTEM POWER circuit breaker to OFF.

p. Remove the mode 4 test plug from the interrogator computer connector in the c-d group case by loosening the two lower captive retaining screws (fig. 2-32) and pulling the plug firmly outward. Install the mode 4 test plug in its storage compartment and tighten the four captive retaining screws.

q. Install the interrogator computer (fig. 2-38) in the c-d group case following the procedures given in paragraph 5-13*e* and insert the code of the day in the interrogator computer. Refer to KAO-75/TSEC for detailed procedures.

r. On the power control panel (fig. 3-4), set SYSTEM POWER circuit breaker to ON. After 80 seconds, all SELF TEST FAULT indicator lamps on the control box or control panel 1 will be out.

s. On the monitor alarm (fig. 3-9), set POWER circuit breaker to ON. The POWER indicator lamp will light.

t. On the control box or control panel 1, depress the LAMP TEST switch. All SELF TEST indicator lamps will light and monitor alarm will sound. Simultaneously adjust the VOLUME control on the monitor alarm so that the alarm is clearly audible above the surrounding noise. Release the LAMP TEST switch.

NOTE

When performing the following steps using the AN/TPX-46(V)2 configuration, initiate challenges at the radar set with controls corresponding to those on the control box.

u. On the control box (fig. 3-1), hold CHALLENGE switch to TEST. Observe the radar ppi and insure that there are no holes or missing tails on the test pattern (fig. 3-12). Release the CHALLENGE switch.

v. Interrogate known target of opportunity by holding CHALLENGE switch on control box to ON. CHALLENGE indicator lamp will light. Check that sif reply (fig. 3-12) appears on ppi in proper relationship to radar reply. Refer to paragraph 2-55 for adjustment of iff presentation. Release CHALLENGE switch.

w. On the control box, hold SIF REPLIES switch to ALL and simultaneously hold CHALLENGE switch to ON. CHALLENGE indicator lamp will light and radar ppi will display a sif reply for every target responding in mode 1. Release CHALLENGE and SIF REPLIES switches.

x. On the control box, set MODE SELECT switch to 2.

y. On the control box, hold CHALLENGE switch to ON and SIF REPLIES switch to ALL. CHALLENGE indicator lamp will light and

radar ppi will display an sif reply for every target responding in mode 2. Release CHALLENGE and SIF REPLIES switches.

z. On the control box, set MODE SELECT switch to 3/A.

aa. Hold CHALLENGE switch to ON and SIF REPLIES switch to ALL. CHALLENGE indicator lamp will light and radar ppi will display an sif reply for every target responding in mode 3/A. Release CHALLENGE and SIF REPLIES switches.

ab. On the control box, set MODE SELECT switch to TEST 4 by pulling outward on switch knob and holding switch in position. Simultaneously hold CHALLENGE switch to TEST. This initiates a simulated mode 4 challenge as well as test targets. The fact that R/T SELF TEST lamp does not light indicates that the transmitter is functioning normally. The radar ppi will display test pattern (fig. 3–12). Release MODE SELECT and CHALLENGE switches.

ac. On the control box and control panel 1, set all CODE SELECT switches to unused codes.

ad. Repeat steps *v* through *ab*. No. iff replies will be displayed on the radar ppi except when the CHALLENGE switch is depressed.

NOTE

Perform steps *ae* and *af* only if the interrogator computer is installed.

ae. On the control box set the MODE SELECT switch to 4.

af. Hold the CHALLENGE switch to ON. CHALLENGE indicator lamp will light and radar ppi will display a friend indication for every target correctly responding in mode 4. Release CHALLENGE switch.

2–53. Antenna Control Assembly Alignment

(fig. 2–31 and 3–7)

NOTE

During performance of this procedure, do not press ANT LAG lamp to check its operation, because it may remain on at certain times and give a false indication.

NOTE

This procedure is to be performed on site after initial mechanical alignment of the radar and iff antennas (para 2–49 or 2–50) and equipment turn-on (steps *a* through *j* para 2–52) have been performed.

NOTE

Various combinations of azimuth data and primary power will be encountered at the sites with which the iff set will be operating. Particular attention must be placed on determining the type of azimuth data and primary power at hand. The following procedures must be carefully interpreted to insure that those adjustments appropriate to the system at hand are used.

a. On the antenna control assembly set ANT SYNC switch to EXT, and POWER ECA switch to OFF; and at the pedestal assembly, assure that AZ DRIVE switch is set to SAFE OFF.

b. Set METER switch to AZ COARSE.

c. Open AZ ADJ access cover by loosening captive retaining screw and rotating cover approximately 90 degrees.

d. Using a screwdriver loosen AZ ADJ LOCK by rotating it at least one-half turn counterclockwise.

NOTE

In steps *e* and *g*, below, if rotation of AZ ADJ is continued beyond the point where the indication stops decreasing, the antenna positioning circuits will be displaced from the true null (by 30 degrees per turn of AZ ADJ), but the indication will remain the same and will not reveal the error.

NOTE

The procedures in *e* through *g*, below, are provided to null the iff antenna circuits with those of the associated radar antenna.

e. Observe PWR SUP TEST/NULL meter. Rotate AZ ADJ clockwise until positive deflection is noted on meter. Continue *slowly* turning clockwise until minimum on scale reading is obtained.

f. Set METER switch to AZ FINE.

g. Rotate AZ ADJ approximately one-eighth turn counterclockwise, and then, slowly clockwise until minimum on scale reading is obtained. This setting places the antenna positioning circuits at the true null.

h. Tighten AZ ADJ LOCK, close access cover and tighten cover retaining screw.

i. Set METER switch to OUT.

j. Note reading on antenna azimuth index and

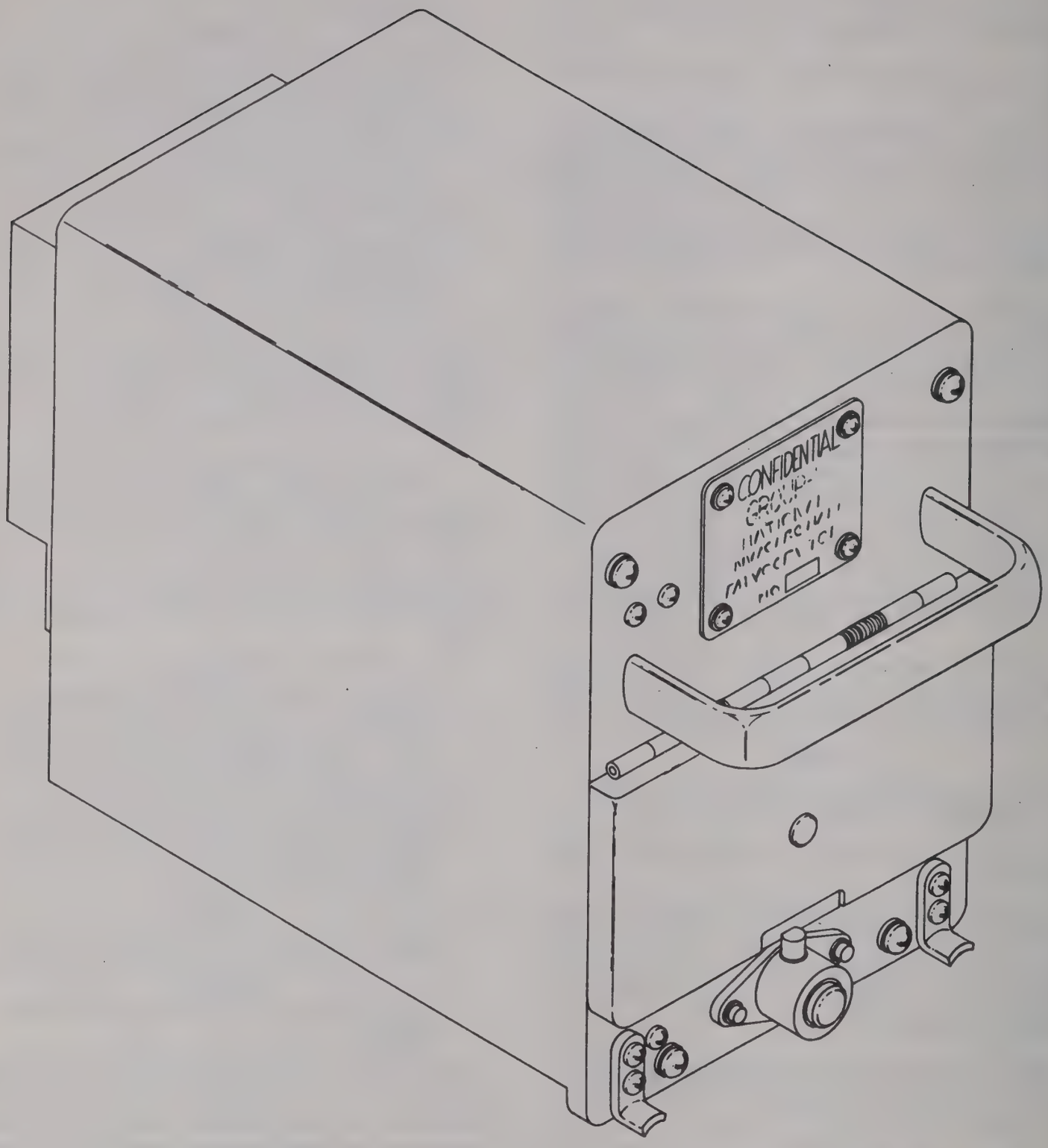


Figure 2-38. Interrogator computer.

manually rotate iff antenna two degrees clockwise (increase in azimuth reading) (35 mils) from antenna beam centerline position. This provides a 2 degree error in iff antenna azimuth with respect to the radar antenna azimuth.

k. Loosen captive front panel retaining screws and slide antenna control assembly out of c-d group case until the outgoing limit stops are reached.

l. On the oscilloscope, set the triggering to internal dc, and set the time base and vertical gain as follows depending on the radar azimuth data frequency:

Ref Freq.	*Time Base*	*Vertical Gain*
60 Hz	5 msec/cm	0.2v/div.
400 Hz	1 msec/cm	0.2v/div.
4000 Hz	0.1 msec/cm	0.2v/div.

m. Connect oscilloscope to test point 1A2A2-J1–2.

NOTE

The procedures in *n* and *o*, below, are provided to adjust for phase shift of radar reference data. This phase shift will vary with each site.

The purpose of steps *n* and *o* are to obtain the best possible representation of the waveshapes shown in figure 2–41. All sites will not be able to obtain these shapes exactly due to differences in cable lengths. Try to eliminate sharp edges in the waveform and large negative undershoots below ground. It may not be possible to completely eliminate undershoots and sharp edges but minimizations of these will provide the best performance.

n. Adjust 1A2A1R1 for best symmetrical waveshape (fig. 2–41, A for 60 Hz, B for 400 Hz, and C for 4 kHz) approximating a full wave rectified signal.

NOTE

The waveforms (fig. 2–41) were taken at a general support maintenance testbed and are, therefore, idealized waveforms which are presented for guidance.

o. Adjust 1A2A2R3 and 1A2A2R4 to further improve waveform symmetry.

p. Disconnect oscilloscope from 1A2A2J1–2.

NOTE

The procedure in *q*, below, is provided to establish the threshold at which the ANT LAG indicator lamp lights with the 2 degree error provided in *j*, above.

q. At sites providing 60 Hz or 4 kHz radar azimuth data, perform step *q*(1) and then proceed to step *r*. At sites providing only 400 Hz radar azimuth data, proceed to step *q*(2), below, then proceed to step *r*. Insure that the EXT REF REQ switch on the chassis of the antenna control assembly is set to correspond with the particular radar azimuth data frequency in use.

(1) *Adjustment for 60 Hz or 4 KHz Reference Data.* Observe the ANT LAG indicator lamp. If lamp is off adjust 1A2A3R2 counterclockwise until the ANT LAG indicator lamp lights. If indicator lamp is on initially:

(*a*) Adjust 1A2A3R2 30 turns clockwise.

(*b*) Remove the error by manually positioning the iff antenna to position noted in step *j* above.

(*c*) Manually rotate antenna 35 mils as in step *j*, above, to reintroduce the 2° error.

NOTE

If ANT LAG lamp is still lit, repeat steps (*a*) through (*c*) above.

(*d*) Slowly adjust 1A2A3R2 counterclockwise until ANT LAG indicator lamp lights.

(2) *Adjustment for 400 Hz Reference Data.* Rotate 1A2A3R3 fully clockwise and then adjust 1A2A2R2 until ANT LAG indicator lamp lights. If indicator lamp is on after adjustment of 1A2A3R3, perform steps (*a*) through (*d*), below.

(*a*) Adjust 1A2A3R2 30 turns clockwise.

(*b*) Remove the error by positioning the iff antenna to position noted in step *j* above.

(*c*) Manually rotate antenna 35 mils as in step *j*, above, to reintroduce the 2° error.

NOTE

If ANT LAG lamp is still lit, repeat steps (*a*) through (*c*), above.

(*d*) Slowly adjust 1A2A3R2 counterclockwise until ANT LAG indicator lamp lights.

NOTE

Potentiometer 1A2A3R2 is used at sites where both 60 Hz and 400 Hz synchro data is used. When this alignment procedure is used at one of these sites, perform the 60 Hz alignment procedure first. Then perform the 400 Hz alignment procedure with the following changes. Do not adjust 1A2A3R2 during the 400 Hz alignment. Adjust 1A2A3R3 to set the error detection threshold. This will result in an alignment of the error detection threshold which does not have to be changed for future changes in the synchro reference frequency.

r. Set oscilloscope controls as in step 1.

s. Connect oscilloscope to test point 1A2A2J1–5.

NOTE

The waveform at 1A2A2J1–5 represents the error in the iff antenna positioning circuits. Its amplitude at this point corresponds to the 2-degree error established in step *j*.

NOTE

In step *t*, below, reference is made to *primary power*. Do not confuse it with reference data.

t. On electronic control amplifier 1A2A7, if 60 Hz *primary power* is provided, rotate GAIN 60 Hz A control fully counterclockwise, or if 400 Hz *primary power* is provided rotate GAIN 400 Hz G control fully counterclockwise.

u. Return the iff antenna to its 0 degree error azimuth position.

v. Offset the iff antenna by 1.5 degrees (27 mils) clockwise. Note and record the peak-to-peak voltage on the oscilloscope.

w. Return the iff antenna to its 0 degree error azimuth position and then offset it by 1.5 degrees (27 mils) counterclockwise. Note and record the peak-to-peak voltage on the oscilloscope.

x. The two peak-to-peak voltage obtained in step *v* and *w*, above, represent the error voltage of a 1.5 degree azimuth error. If the two voltages obtained are not equal pick the larger value. This voltage will be known as the 1.5 degree error voltage for the remainder of this procedure.

y. On the pedestal, set the AZ DRIVE switch to ON, then set radar antenna in motion.

NOTE

Oscilloscope waveform amplitude represents iff antenna azimuth error. With iff antenna not rotating (POWER ECA switch OFF), the amplitude varies at radar antenna scan rate, passing through zero twice per radar antenna scan. In the following procedure (POWER ECA switch ON), iff antenna rotation is indicated when the waveform stops passing through zero. Smooth rotation is indicated by constant amplitude. Rapid 2 to 5 Hz amplitude fluctuations (waveform modification) represent hunting. The intent of the adjustments is to obtain the smallest practical waveform amplitude with no evidence of hunting.

z. Set POWER ECA switch to ON.

aa. At sites where 60 Hz primary power is provided, perform step (1), below, and then proceed to step *ab*. Where 400 Hz power is provided, perform step (2), below, and then proceed to step *ab*.

NOTE

At sites where radar antenna rotation speed may be varied, the appropriate steps of (1) or (2), below, should be performed first at the lowest radar antenna rotation speed, then readjusted at each higher speed. This sequence should be repeated, if required, until the iff antenna rotates smoothly at all speeds.

(1) *Adjustment for 60 Hz Primary Power Input.* Slowly rotate GAIN A 60 HZ control clockwise until antenna starts to rotate. Rotate 1A2A2R1 for minimum waveform modulation on oscilloscope. To further reduce modulation, adjust 1A2A2R2 and readjust GAIN A 60 HZ control to further decrease waveform modulation. Ensure that iff antenna is rotating smoothly and is in synchronism with radar antenna. ANT LAG FAULT indicator lamp is out and voltage on oscilloscope is less than the 1.5 degree error voltage.

(2) *Adjustment for 400 Hz Primary Power Input.* Slowly rotate GAIN G 400 Hz control clockwise until antenna starts to rotate. ANT LAG fault lamp is out. Rotate 1A2A2R1 for minimum waveform modulation on oscilloscope. To further reduce modulation, adjust 1A2A2R2 and readjust GAIN G 400 Hz control to further reduce waveform modulation. Ensure that iff antenna is rotating smoothly and is in synchronism with radar antenna. ANT LAG FAULT indicator is out and voltage on oscilloscope is less than the 1.5 degree error voltage.

ab. Disconnect oscilloscope from test point 1A2A2J1-5.

ac. Set POWER ECA switch to OFF.

NOTE

The internal mode of operation is used only at sites where the radar is slaved to the iff set.

ad. On electronic control amplifier 1A2A7, rotate GAIN B and GAIN H controls fully counterclockwise.

ae. Set ANT SYNC switch to INT.

af. Set POWER ECA switch to ON.

ag. Set INT ANT SYNC switch to 15 rpm CW.

NOTE

If the antenna is not visible, use the oscilloscope indication as provided in the note below and step below. Otherwise, simply observe antenna motion to obtain smooth rotation at the selected speeds while making adjustments.

NOTE

If the oscilloscope indication is used, the signal observed is the tachometer feedback, which is a dc signal, the amplitude of which is proportional to the speed of rotation of the antenna. Hunting of the antenna is indicated by the oscilloscope trace moving up and down (amplitude variations). Adjustments should be made for the least amount of hunt at the desired speed, preferably, a steady state dc level. Ignore low level ac components which may also be observed on the tachometer feedback signal which do not represent hunting.

ah. Connect the oscilloscope to 1A3A3J1–6 to observe the dc tachometer feedback.

ai. On electronic control amplifier, rotate GAIN H control one-quarter turn cw.

aj. On electronic control amplifier, rotate GAIN B control to obtain smoothest possible antenna rotation.

ak. Readjust GAIN H and GAIN B controls until antenna rotates smoothly at 15 rpm and ANT LAG FAULT indicator lamp is out.

al. Rotate the INT LAG SYNC switch through 5, 10, 15, 20 and 25 rpm CW positions, pausing at each position to ensure that the iff antenna rotates smoothly and at the selected speed and that ANT LAG FAULT indicator lamp is out.

am. Set INT ANT SYNC switch to 0. Antenna will stop rotating.

an. When iff antenna has come to a full stop, rotate the INT ANT SYNC switch through 5, 10, 15, 20 and 25 rpm CCW positions, pausing at each position to ensure that iff antenna rotates smoothly and at the selected speed and that ANT LAG FAULT indicator lamp is out.

NOTE

If ANT LAG FAULT indicator lamp remains on in any of the RPM positions, repeat steps *ad* through *am* with the following exception; in step *ai*, rotate GAIN H control one-eighth turn clockwise. If that does not cause ANT LAG FAULT indicator lamp to be out in all RPM positions, repeat steps *ad* through *am* and with GAIN H control set three-eighths turn clockwise.

ao. Set INT ANT SYNC switch to 0.

ap. Set ANT SYNC switch to EXT. Iff antenna will synchronize with radar antenna.

aq. Depress ANT LAG FAULT indicator lamp; lamp will light when depressed.

ar. Release the in-going limit stops on the antenna control assembly and slide the assembly into the c–d group case. Tighten the captive retaining screws on the assembly front panel.

2–54. Azimuth Strobe Ring Adjustment (fig. 2–39)

The iff set is equipped to provide an azimuth strobe indication at 0° azimuth reference to the radar ppi. The strobe is initiated by the closure of a reed switch on the pedestal assembly; the reed switch is actuated once each antenna revolution by a magnet imbedded in the azimuth strobe ring. To adjust the azimuth strobe ring proceed as follows:

a. Rotate the radar antenna until it is directed 0° azimuth. The iff antenna will follow.

WARNING

Prior to performing next step, set AZ DRIVE switch on pedestal assembly (fig. 2–23) to SAFE OFF.

b. Using the Phillips screwdriver, loosen three Phillips head retaining screws which hold the azimuth ring in place on the pedestal assembly (fig. 2–39).

c. Rotate the azimuth ring so that the 0 indication on the ring lines up with the 0 mark on the azimuth index.

d. Tighten azimuth ring retaining screws securely.

e. Move clear of antenna rotation path and set AZ DRIVE switch to ON.

NOTE

When performing next step, the radar must be in operation and transmitting.

f. On the control box (fig. 3–1), set STROBE switch to ON. As the sweep on the radar ppi passes 0° azimuth, a dotted strobe line will appear. If the strobe line does not appear exactly at 0° azimuth, note its displacement (averaged over several scans) and record in mils. Then, using the procedures of *a* through *e* above, adjust azimuth ring as directed in *g* or *h* below.

g. If strobe line appeared before ppi sweep reached 0° azimuth, rotate azimuth ring in the direction opposite to normal antenna rotation by the amount (in mils) recorded in step f.

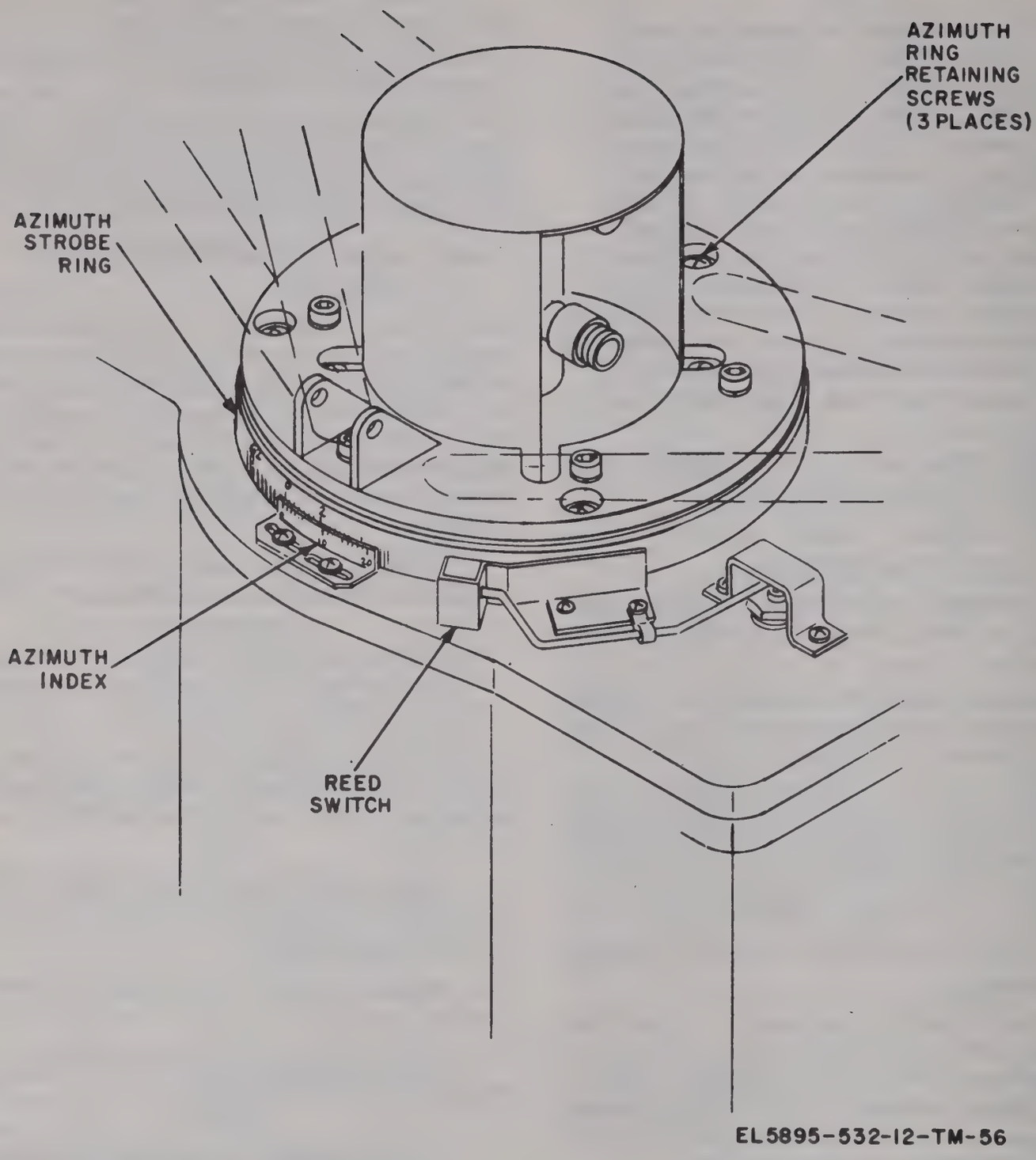


Figure 2–39. Azimuth ring details.

h. If strobe line appeared after ppi sweep passed 0° azimuth, rotate azimuth ring in the same amount (in mils) recorded in step *f*.

2–55. Iff Display Adjustment
(figs. 2–30, 2–40, and 3–7)

The iff display can be adjusted, when interrogating, to suit individual site ppi display requirements. To adjust the positioning and characteristics of the iff display, perform the following procedures as required.

NOTE

The following pertains to display video adjustments. For adjustments using an oscilloscope refer to paragraph 2–56.

a. Adjustment of Iff Display Azimuth.

(1) On the antenna control assembly open AZ ADJ access cover by loosening captive retaining screw. Loosen AZ ADJ LOCK.

(2) Using a screwdriver, adjust the AZ ADJ control so that the iff display azimuth is centered on radar return azimuth.

(3) Tighten AZ ADJ LOCK, close access cover and tighten cover retaining screw.

(4) Iff display azimuth has now been corrected, but the iff strobe has been displaced from 0° by the corresponding amount. To correct the iff strobe azimuth, readjust the azimuth ring as directed in paragraph 2–54, steps *f.*, *g.*, and *h.*

NOTE

Prior to performing the following procedures, extend the synchronizer from the c–d group case; after performing the procedures replace the synchronizer in the c–d group case.

b. Adjustment of Target Arc Range Dimension.

(1) On the control box (fig. 3–1), set CHALLENGE switch to TEST and set PROCESSOR switch to BYPASS. A test target pattern similar to figure 3–12 will be displayed on the radar ppi except that targets will not have friend tails.

NOTE

Set radar ppi for maximum range when observing TEST pattern.

(2) To vary the thickness of the target arc, adjust 1A1A17R1 (fig. 2–30) as required.

(3) On the control box set PROCESSOR switch to IN.

c. Adjustment of Friend Tail Range Dimension.

(1) On the control box, hold CHALLENGE switch to TEST and test PROCESSOR switch to IN. A test target pattern similar to figure 3–12 will appear on the radar ppi.

(2) To vary the length of the friend tail, adjust 1A1A17R3 as required.

d. Adjustment of Iff Display Range Position.

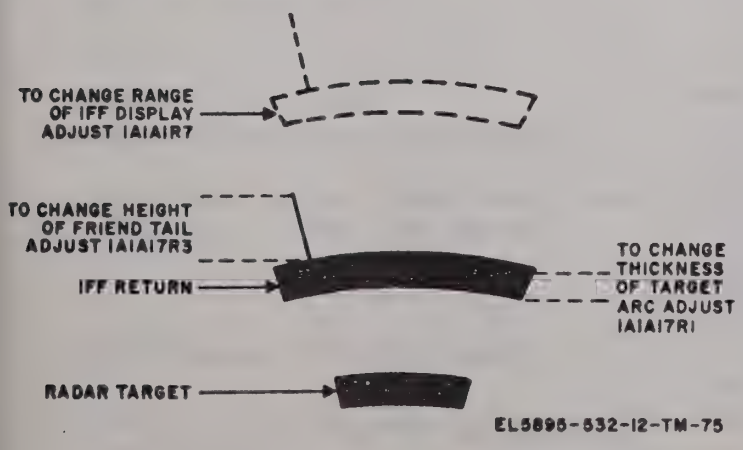


Figure 2–40. Iff display adjustment.

To change the range position of the iff display, adjust 1A1A1R7 as required with the delay switch (S6, figure 2–30) set to the OUT position.

e. Adjustment of Target Pulse Amplitude. To change the amplitude of the target pulse, set the PROCESSOR switch on the control box to BYPASS and adjust 1A1A17R2 as required.

f. Adjustment of Friend Pulse Amplitude. To change the amplitude of the friend pulse, adjust 1A1A17R15 as required.

2–56. Iff Display Adjustments Using Oscilloscope

(fig. 2–30)

a. General. At some sites, such as DAR, the iff display video on the ppi is unaffected by adjustments as described in paragraph 2–55. At such sites an oscilloscope is necessary to adjust the synchronizer display video output. The iff display adjustment in *b.* through *d.* below, are the same adjustments as performed at the factory and should be made only if the display video on the ppi is incorrect or missing.

b. Reshaped Target Present Pulse Adjustment. The settings of potentiometers 1A1A17R1 and R2 determine the characteristics of the target present pulse. To make these adjustments, proceed as follows:

(1) At the control box, set the PROCESSOR switch to BYPASS and CHALLENGE switch to TEST.

(2) Connect the vertical input of the oscilloscope between 1A1A17J1–3 and ground.

(3) At the oscilloscope, set the controls to observe positive-going pulse using internal synchronization.

(4) Adjust potentiometer 1A1A17R1 until the width of the displayed pulse is 1.0 ±0.1 microsecond.

(5) Adjust potentiometer 1A1A17R2 until the amplitude of displayed pulse is 3 ±0.1 volts.

(6) Disconnect and remove the oscilloscope.

c. Reshaped Friend Pulse Amplitude Adjustment. The setting of potentiometer 1A1A17R3. determines the width of the reshaped friend pulse. To make this adjustment, proceed as follows:

(1) At the control box, set the PROCESSOR switch to IN and CHALLENGE switch to TEST.

(2) Connect the vertical input of the oscilloscope between 1A1A17J1–6 and ground.

(3) At the oscilloscope, set the controls to observe a positive-going pulse using internal synchronization.

(4) Adjust potentiometer 1A1A17R3 until the width of the displayed pulse is 20 ±1.0 microseconds.

(5) Disconnect and remove the oscilloscope.

d. Friend Pulse Amplitude Adjustment. The setting of potentiometer 1A1A17R15 determines the amplitude of the friend pulse. To make this adjustment, proceed as follows:

(1) At the control box, set the PROCESSOR swtich to IN and CHALLENGE switch to TEST.

(2) Connect the vertical input of the oscilloscope between 1A1A17J1–3 and ground.

(3) At the oscilloscope, set the controls to observe a positive-going pulse using internal synchronization.

(4) Adjust potentiometer 1A1A17R15 until the amplitude of the 20-microsecond pulse is 5 ±0.1 volts.

(5) Disconnect and remove oscilloscope.

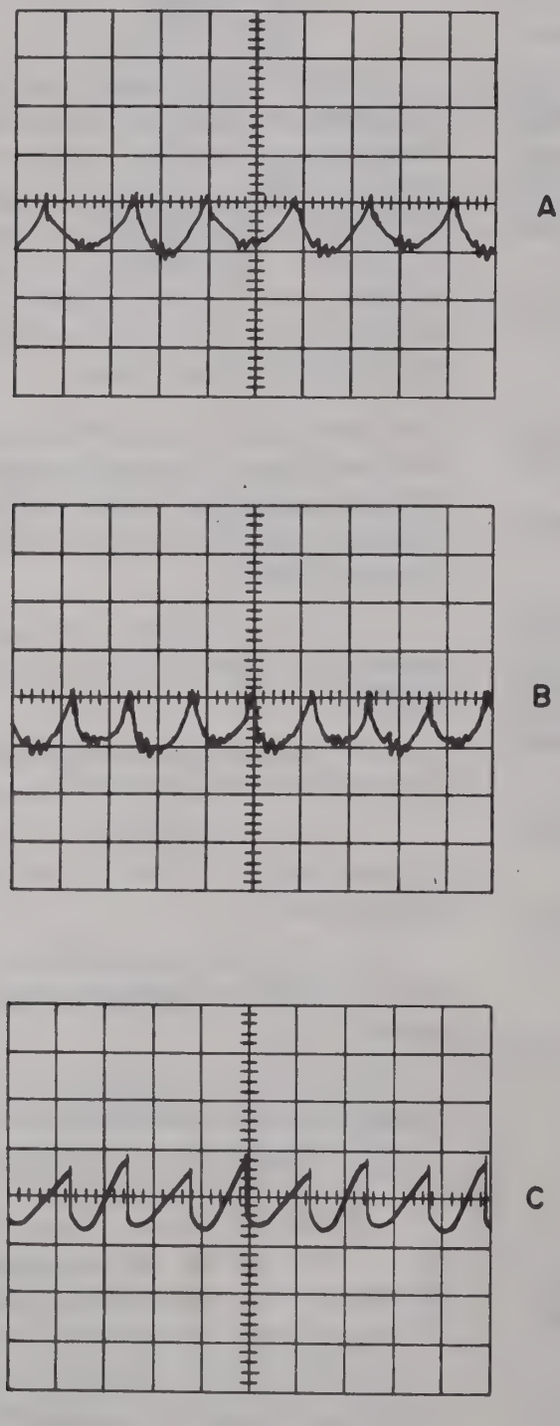


Figure 2–41. Antenna control assembly alignment waveforms.

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. OPERATOR'S CONTROL AND INSTRUMENTS

NOTE

This chapter covers only those items of Interrogator Set AN/TPX-46(V) which are used by the operator; items used by maintenance personnel are covered in instructions for the appropriate maintenance category.

3-1. Damage from Improper Settings and POWER Circuit Breaker Guards

a. Switches may be in any position when initial power is applied to the iff set and no damage will result.

b. To reduce the possibility of accidental removal of power to any of the iff set components, switch guards are installed on all POWER switches of components in the c-d group case. Figure 3-13 shows a typical POWER switch guard.

3-2. Operator's Controls and Indicators

Paragraphs 3-3 through 3-11 describe the controls and indicators which are used by the operator. Control box controls and indicators are contained in paragraph 3-3, control panel 1 in paragraph 3-4, control panel 2 in paragraph 3-5, assemblies of the coder-decoder group in paragraph 3-6 through 3-9, the receiver transmitter group in paragraph 3-10 and the monitor alarm in paragraph 3-11.

3-3. Control Box, Controls and Indicators (fig. 3-1)

Control or indicator	*Function*
POWER circuit breaker	When set to ON, and power control panel system power switch is set to ON, energizes power relay in group case and makes power available to the monitor alarm. White POWER indicator lamp lights.
SELF TEST subpanel:	
	NOTE Fault indicator lamps will light and monitor alarm will be heard if POWER switches on the corresponding assemblies are set to OFF.
R/T fault indicator lamp	When lighted, indicates fault in the receiver-transmitter assembly. WHEN FLASHING, INDICATES TRANSMITTER POWER OUTPUT IS MARGINAL.
SYNC fault indicator lamp	When lighted, indicates fault in synchronizer assembly, or that iff triggers are not being received from associated radar.
PROC fault indicator lamp	When lighted, indicates fault in processor assembly.
ANT LAG fault indictor lamp	When lighted, indicates iff set antenna is either leading or lagging the radar antenna excessively, or that iff set antenna is not rotating at internally selected speed.
KIR fault indicator lamp	When lighted, indicates fault in interrogator computer.
LAMP TEST switch (two-position toggle)	When held to on (up), lights the CHALLENGE indicator lamp, all SELF TEST indicator lamps, and activates monitor alarm.
CHALLENGE switch (three-position toggle, spring loaded to OFF (center position).	When held to ON, permits iff set to transmit challenges and receive replies in the selected mode of operation. (Green CHALLENGE indicator lamp lights when equipment is operating normally.) When held to TEST, provides simulated target return pattern on radar ppi.
STROBE switch (two-position toggle)	When set to ON, provides an azimuth strobe display on radar ppi at azimuth zero reference.
PANEL switch (three-position toggle, center position OFF).	When set to DIM, provides dim illumination of control box panel.

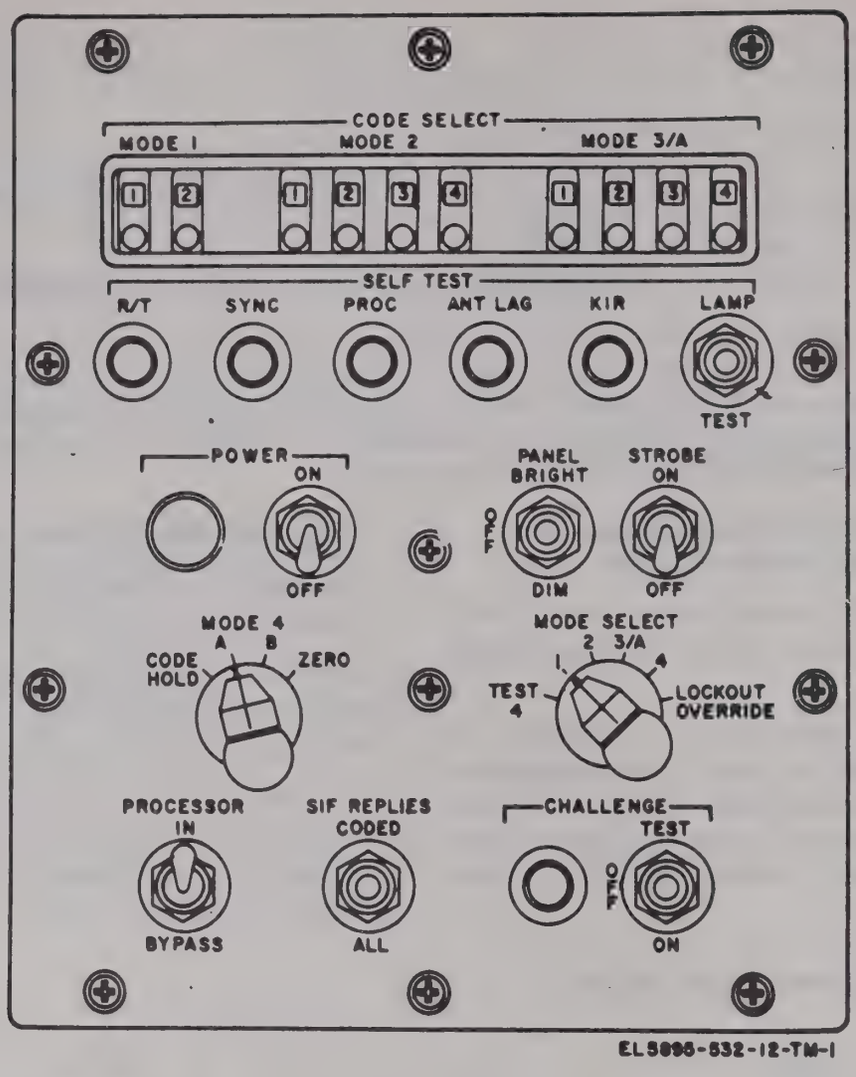


Figure 3-1. Control box controls and indicators.

Control or indicator	*Function*
	When set to BRIGHT, provides bright illumination of control box panel.
CODE SELECT subpanel	Sif numerical codes are set with CODE select switches and are shown on indicator.
MODE 1 (two push-button-switch assemblies)	Each time each switch is pressed, numerals of sif code are changed to next higher number.
MODE 2 (four pushbutton switch assemblies)	Same as MODE 1.
MODE 3/A (four pushbutton-switch assemblies)	Same as MODE 1.
PROCESSOR switch (two-position toggle)	When set to IN, processed mode 4 target video or defruited sif target video is displayed in real time on the radar ppi.
	When set to BYPASS, all mode 4 time decoded video and decoded sif video is displayed on the radar ppi.
SIF REPLIES switch (two-position toggle, spring loaded to CODED position).	When set to CODED, only replies of select mode and code are displayed on the radar ppi.
	When held to ALL, all sif replies received (regardless of code or mode settings) are displayed on radar ppi.
MODE 4 switch (four-position rotary, knob pull and rotation are required to select ZERO and CODE HOLD. ZERO and CODE HOLD are momentary positions).	Controls operation in mode 4

Sw pos	*Function*
CODE HOLD	Applies a mechanical hold to the mode 4 code setting when power will be removed from the computer for more than five seconds. Must be held in position for 15 seconds before power removal and at time power is removed.
A	Permits mode 4 code A to be used.
B	Permits mode 4 code B to be used.
ZERO	Removes mode 4 code setting from the interrogator computer.

Control or indicator	*Function*
MODE SELECT switch (six-position rotary, knob pull and rotation are required to select TEST 4 and LOCKOUT OVERRIDE. TEST 4 and LOCKOUT OVERRIDE positions are momentary).	Selects mode of operation.

Sw pos	*Function*
TEST 4	Special test position when operating in mode 4, described in KAM-198A/TSEC Maintenance Manual KIR-1A/TSEC.
1	Selects sif mode 1 operation, MODE 1 CODE SELECT switch lamps light.
2	Selects sif mode 2 operation, MODE 2 CODE SELECT switch lamps light.
3/A	Selects sif mode 3/A operation, MODE 3/A CODE SELECT switch lamps light.
4	Selects mode 4 operation. Overrides mode 4 lockout due to low randomness condition, and permits mode 4 operation to continue.
LOCKOUT OVERRIDE	

3-4. Control Panel 1, Controls and Indicators (fig. 3-2)

Control or indicator	*Function*
SELF TEST subpanel:	
	NOTE SELF TEST fault indicator lamps will light if POWER switches on the corresponding assemblies are set to OFF.
PROC fault indicator lamp	When lighted, indicates fault in processor assembly.
KIR fault indicator lamp	When lighted, indicates fault in interrogator computer.
ANT LAG fault indicator lamp	When lighted, indicates that iff set antenna is either leading or lagging radar antenna excessively, or that iff set antenna is not rotating at the internally selected speed.
SYNC fault indicator lamp	When lighted, indicates fault in synchronizer assembly, or that iff triggers are not being received from associated radar.
R/T fault indicator lamp	When lighted, indicates fault in receiver-transmitter assembly. WHEN FLASHING, INDICATES TRANSMITTER POWER OUTPUT IS MARGINAL.
LAMP TEST pushbutton	When depressed, lights the CHALLENGE indicator lamp, all SELF TEST indicator lamps, and activates monitor alarm.
CODE SELECT subpanel	Sif numerical codes are set with CODE SELECT switches and are shown on indicators.
MODE 1 (two pushbutton-switch assemblies)	Each time each switch is pressed, numerals of sif code are changed to next higher number.
MODE 2 (four pushbutton-switches)	Same as MODE 1.
MODE 3/A (four pushbutton-switches)	Same as MODE 1.
MODE 4 switch (four-position rotary, knob pull and rotation required for ZERO and CODE HOLD positions. ZERO and CODE HOLD positions are momentary).	Controls operation in mode 4.

Sw pos	*Function*
CODE HOLD	Applies a mechanical hold on mode 4 code setting when power will be removed from the interrogator computer for more than five seconds. Must be held in position for 15 seconds before power removal and at time power is removed.
A	Permits mode 4 code A to be used.
B	Permits mode 4 code B to be used.
ZERO	Removes mode 4 code setting from the interrogator computer.

POWER circuit breaker	When set to ON, and power control panel SYSTEM POWER circuit breaker is set to ON, makes power available to the monitor alarm and energizes power relay in the group case. (POWER indicator lamp lights.)

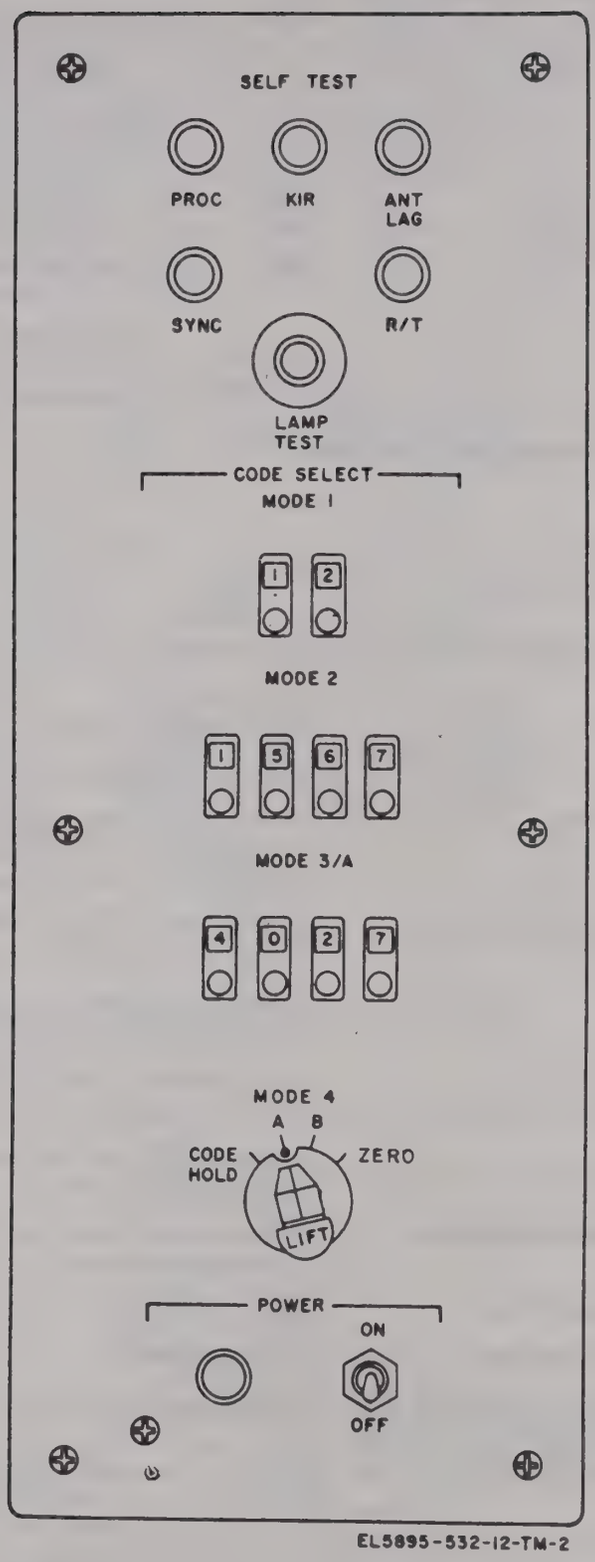


Figure 3-2. Control panel 1, controls and indicators.

3-5. Control Panel 2, Controls and Indicators (fig. 3-3)

Control or indicator	*Function*
POWER indicator lamp	When lighted, indicates that POWER switches on control box or associated radar control and group case are set to ON.
PANEL switch (three-position toggle, center position OFF).	When set to DIM, provides dim illumination of control panel. When set to BRIGHT, provides bright illumination of control panel.
MODE 4 switch (two-position toggle)	When set to A, permits mode 4 code A to be used. When set to B, permits mode 4 code B to be used.
SIF REPLIES switch (two-position toggle, spring-loaded to CODED).	When set to CODED, only replies of selected sif code and mode are displayed on radar ppi. When set to ALL, all replies of selected sif mode, regardless of code setting, are available for display on radar ppi.
CONSOLE SELECT switch	This switch is set to either 1 or 2 to select console which will initiate challenges, select modes of interrogation, and monitor fault and challenge indicator lamps.
CODE SELECT subpanel	Functions are the same as for CODE SELECT subpanel of the control box.

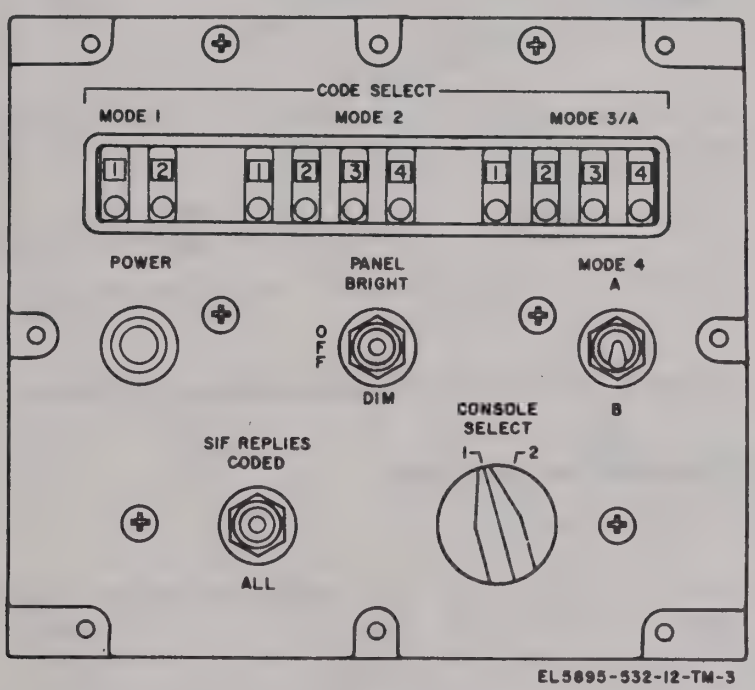


Figure 3-3. Control panel 2, controls and indicators.

3-6. Power Control Panel Assembly, Controls and Indicators (fig. 3-4)

Control or indicator	*Function*
SYSTEM POWER circuit breaker	When set to ON, and either control box POWER circuit breaker or control panel 1 POWER circuit breaker is set to ON, provides power to interrogator computer and blower motor, and makes power available to processor, synchronizer, antenna control assemblies, and receiver-transmitter.

NOTE

If power is being applied from the associated radar SYSTEM POWER indicator lamp will light when SYSTEM POWER circuit breaker is set to ON independently of control box POWER circuit breaker setting.

VOICE COMM connector jacks	For connection of sound-powered phones.
TOTAL HOURS meter	Indicates total hours of operation, and is powered only when synchronizer assembly POWER circuit breaker is set to ON.

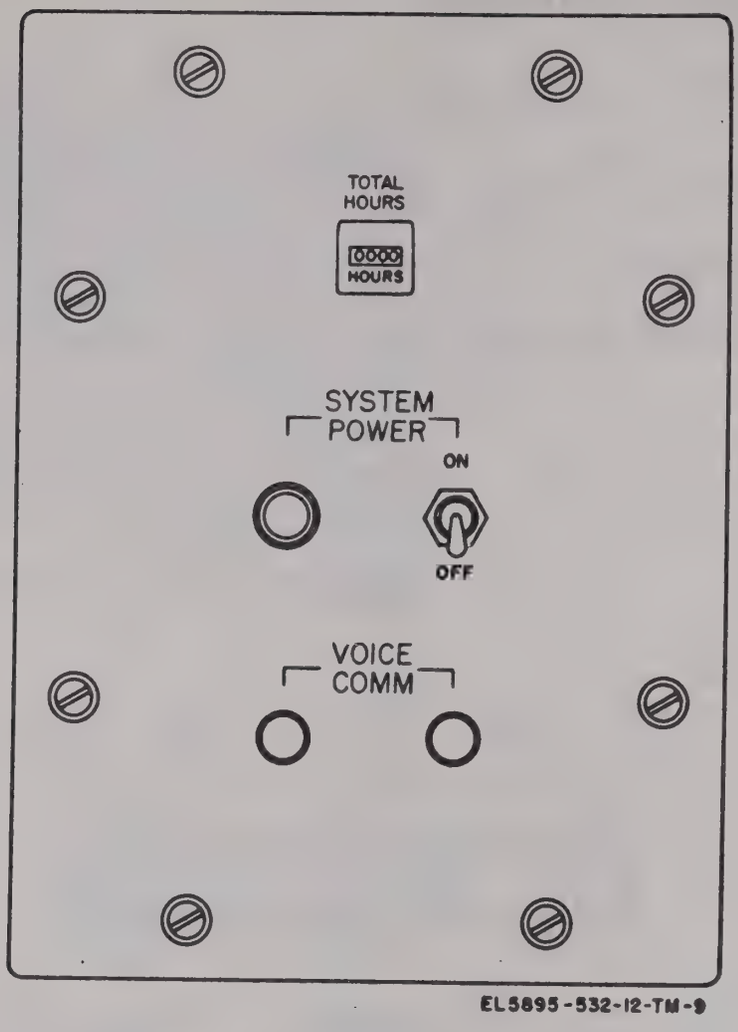


Figure 3–4. Power control panel, controls and indicators.

3–7. Processor Assembly, Controls and Indicators
(fig. 3–5)

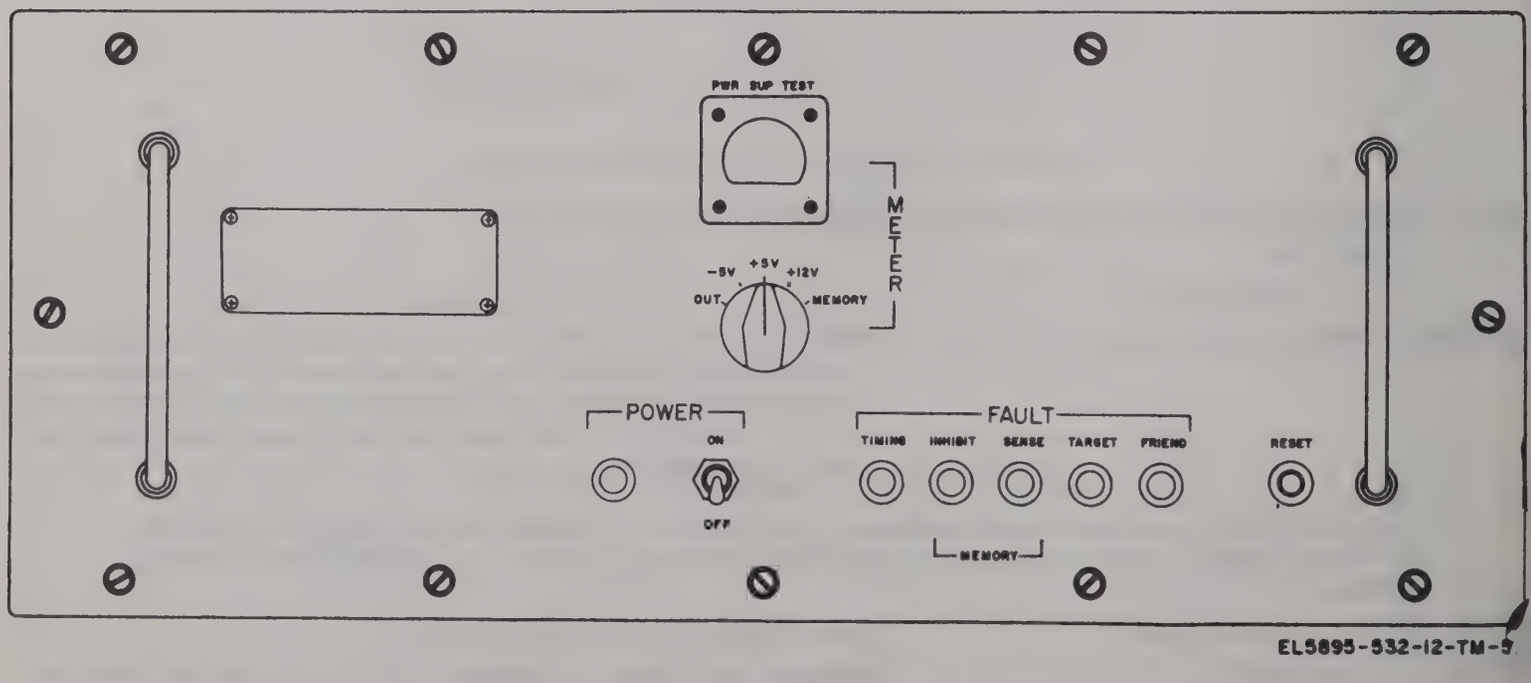


Figure 3–5. Processor assembly, controls and indicators.

Control or indicator	*Function*
POWER circuit breaker	When set to ON, applies power to processor assembly.
FAULT subpanel:	
TIMING FAULT indicator lamp	When lighted, indicates fault in timing card group. (See para 3-14*c*, *Note*)
TARGET FAULT indicator lamp	When lighted, indicates fault in target arithmetic card group.
FRIEND FAULT indicator lamp	When lighted, indicates fault in friend arithmetic card group.
MEMORY INHIBIT FAULT indicator lamp	When lighted, indicates fault in memory circuit inhibit driver card group.
MEMORY SENSE FAULT indicator lamp	When lighted, indicates fault in memory circuit sensing and addressing card group.
METER switch (five-position rotary)	Selects processor power supply output voltages for measurement on PWR SUP TEST meter.

SW pos	*Function*
+5V	Applies output from +5 volt power supply to PWR SUP TEST meter for solid green area reading.
−5V	Applies output from −5 volt power supply to PWR SUP TEST meter for solid green area reading.
+12V	Applies output from +12 volt power supply to PWR SUP TEST meter for solid green area reading.
MEMORY	Applies output from memory power supply to PWR SUP TEST meter for green area reading.
OUT	Applies short across PWR SUP TEST meter terminals.

NOTE

Readings other than those outlined above indicate fault exists in associated power supply.

RESET switch (pushbutton)	When depressed, clears processor memory circuits.

3-8. Synchronizer Assembly, Controls and Indicators (fig. 3-6)

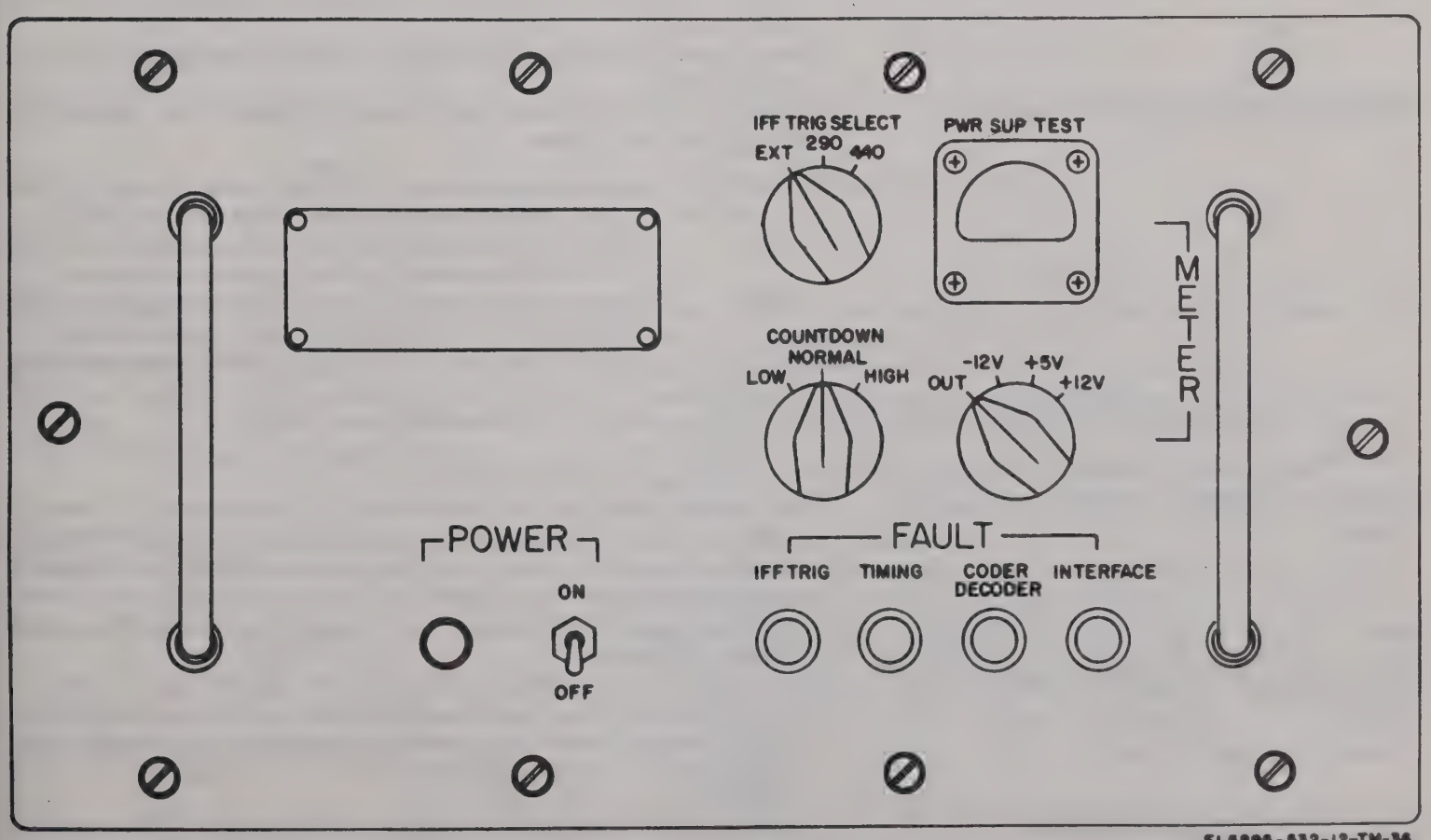


Figure 3-6. Synchronizer assembly, controls and indicators.

Control or indicator	*Function*
POWER circuit breaker	When set to ON and when c-d group case and control POWER circuit breakers are set to ON, applies power to synchronizer, and to TOTAL HOURS meter on power control panel. (White POWER indicator lamp lights and TOTAL HOURS meter operates.)
FAULT subpanel:	
IFF TRIG FAULT indicator lamp	When lighted, indicates that iff triggers are not being received by timing circuits, or that they are being received at a prf which is too low.
TIMING FAULT indicator lamp	When lighted, indicates that pretriggers are not being generated or that they are not correctly timed.
CODER DECODER FAULT indicator lamp	When lighted, indicates fault in coder-decoder card group or delay line.
INTERFACE FAULT indicator lamp	When lighted, indicates fault in interface card group.
COUNT DOWN switch (three-position rotary)	Setting of this switch establishes points at which input iff trigger will be counted down. When set to LOW, there is no countdown for iff triggers between 175 ±4pps and 411 ±8pps, 3 to 2 countdown for iff triggers between 411 ±8pps and 616 ±12pps, and countdown to first submultiple less than 411 ±8 for iff triggers between 616 ±12pps and 1950 ±39pps. When set to NORM, there is no countdown for iff triggers between 175 ±4pps and 445 ±9pps, 3 to 2 countdown for iff triggers between 445 ±9pps and 670 ±13pps, and countdown to first submultiple less than 445 ±9pps for iff triggers between 670 ±13pps and 1950 ±39pps. When set to HIGH, there is no countdown for iff triggers between 175 ±4pps and 507 ±10pps, 3 to 2 countdown for iff triggers between 507 ±10pps and 760 ±15pps, and countdown to first submultiple less than 507 ±10pps for iff triggers between 760 ±15 and 1950 ±39pps.
IFF TRIG select switch (three-position rotary)	Selects triggers for synchronizer timing circuits. When set to EXT, selects iff trigger from associated radar. When set to 290, selects internally generated pretriggers at prf of 290 ±10pps. When set to 440, selects internally generated pretriggers at prf of 440 ±10pps.
METER switch (four-position rotary)	Selects synchronizer power supply output voltages to be measured on PWR SUP TEST meter.

Sw pos	*Function*
−12V	Applies output from −12 volt power supply to PWR SUP TEST meter for solid green area reading.
+5V	Applies output from +5 volt power supply to PWR SUP TEST meter for solid green area reading.
+12V	Applies output from +12 volt power supply to PWR SUP TEST meter for solid green area reading.
OUT	Applies short across PWR SUP TEST meter terminals.

NOTE

Any reading other than a green area reading indicates a fault in the associated power supply.

NOTE

The following switches are located inside the synchronizer assembly (fig. 5-4).

SPECIAL—NORMAL switch (two-position toggle).	This switch is set during installation. If synchronizer is part of AN/TPX-46(V)2 configuration, this switch is to be set to SPECIAL. This will provide bypass for settings of the COUNTDOWN switch and establish 2 to 1 countdown for sif operation and 1 to 1 countdown for mode 4 operation. On all other configurations this switch is set to NORMAL.
PARALLEL—SERIAL switch (two-position toggle).	This switch is set during installation. If synchronizer is part of AN/TPX-46(V)1 configuration, this switch is to be set to PARALLEL. This will provide an enable to processor for parallel reply evaluation. On all other configurations this switch will be set to SERIAL.
DELAY switch (two-position toggle)	When set to IN, delays sif pretrigger generation by fixed amount, to allow iff display video to be displayed at greater range than that of radar target display.

Control or indicator	*Function*
TAIL-EYELASH switch (two-position toggle)	When set to TAIL, friend display on the radar ppi (fig. 3–11) will be shown with tail. When set to EYELASH, friend display on the radar ppi will be shown with series of tails providing an "eyelash" effect.

3–9. Antenna Control Assembly, Controls and Indicators (fig. 3–7)

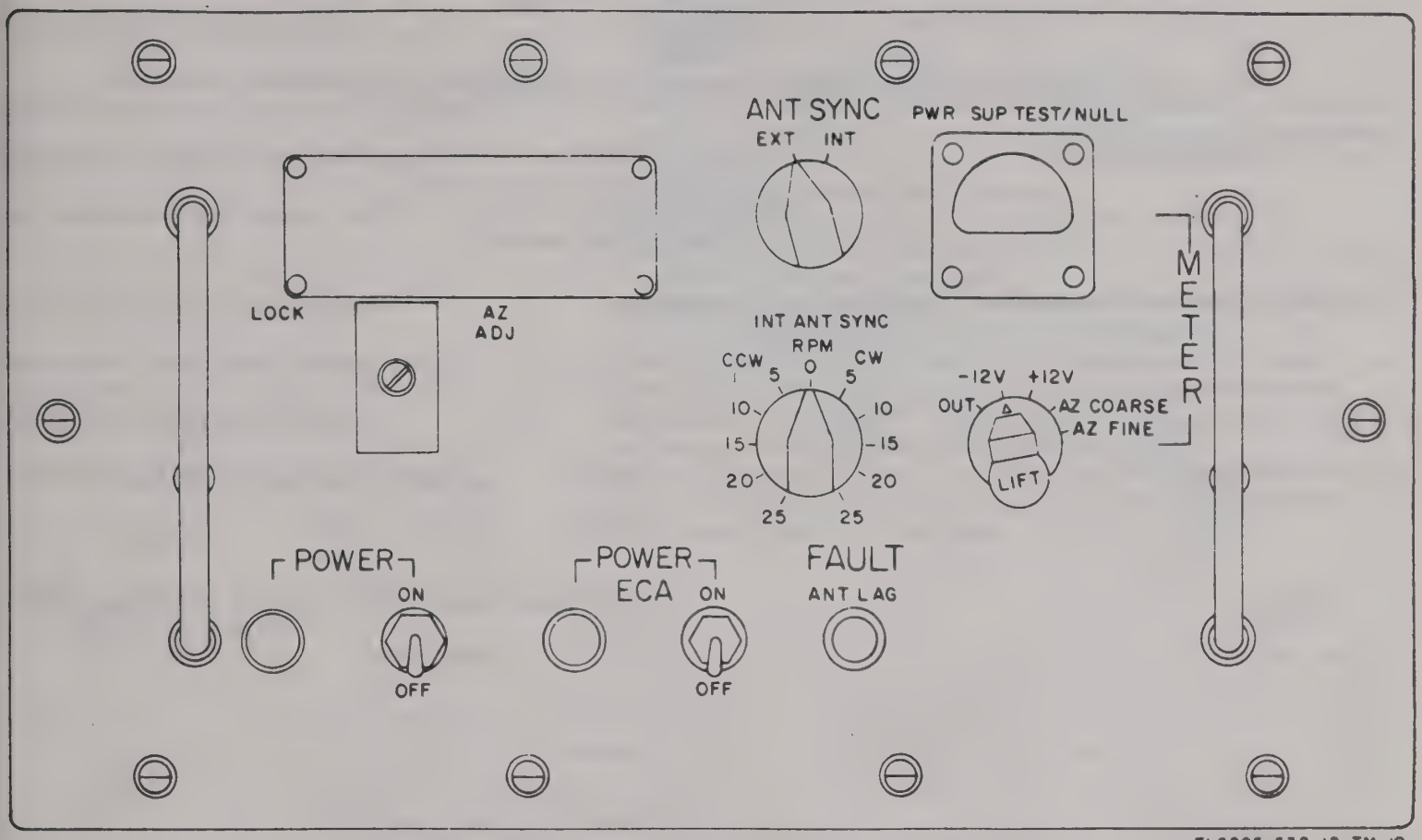


Figure 3–7. Antenna control assembly, controls and indicators.

Control or indicator	*Function*
AZ ADJ (screwdriver adjust synchro)	Adjusts position of synchro differential transmitter for alignment of iff set antenna with radar antenna.
LOCK (screwdriver adjust)	Locks synchro differential transmitter in adjusted position.
INT ANT SYNC RPM switch (eleven position rotary).	Selects antenna clockwise or counterclockwise rotation at speeds of 0, 5, 10, 15, 20, or 25 rpm when ANT SYNC switch is set to INT.
ANT SYNC switch (two-position rotary)	When set to EXT, selects external antenna control data from associated radar. When set to INT, selects antenna speed control generated within the antenna control assembly.
POWER circuit breaker	When set to ON, applies power to all parts of the assembly except the electronic control amplifier. (White POWER indicator lamp lights.)
POWER ECA circuit breaker	When set to ON, and if POWER circuit breaker on antenna control assembly and AZ DRIVE switch on pedestal are set to ON, applies power to electronic control amplifier module of antenna control assembly. (POWER ECA indicator lamp lights.)
ANT LAG FAULT indicator lamp	When lighted, indicates that iff set antenna is leading or lagging radar antenna excessively.
METER switch (five-position rotary, knob pull and rotation required to select AZ FINE position).	Selects antenna control assembly power supply outputs voltages and null currents for measurement of PWR SUP TEST/NULL meter.

Control or indicator	Function
Sw pos	*Function*
−12V	Applies output of −12 volt power supply to PWR SUP TEST/NULL meter for solid green area reading.
+12V	Applies output from +12V volt power supply to PWR SUP TEST/NULL meter for solid green area reading.
AZ COARSE	These positions are used during installation (para 2-53).
AZ FINE	

NOTE

The following switch is located inside the antenna control assembly (fig. 5-6)

SYNCHRO REF switch	When set to INT, selects internal iff reference voltage for operation of the antenna control assembly. When set EXT, selects radar reference voltage for operation of the antenna control assembly.

3-10. Receiver-Transmitter, Controls and Indicators (fig. 3-8)

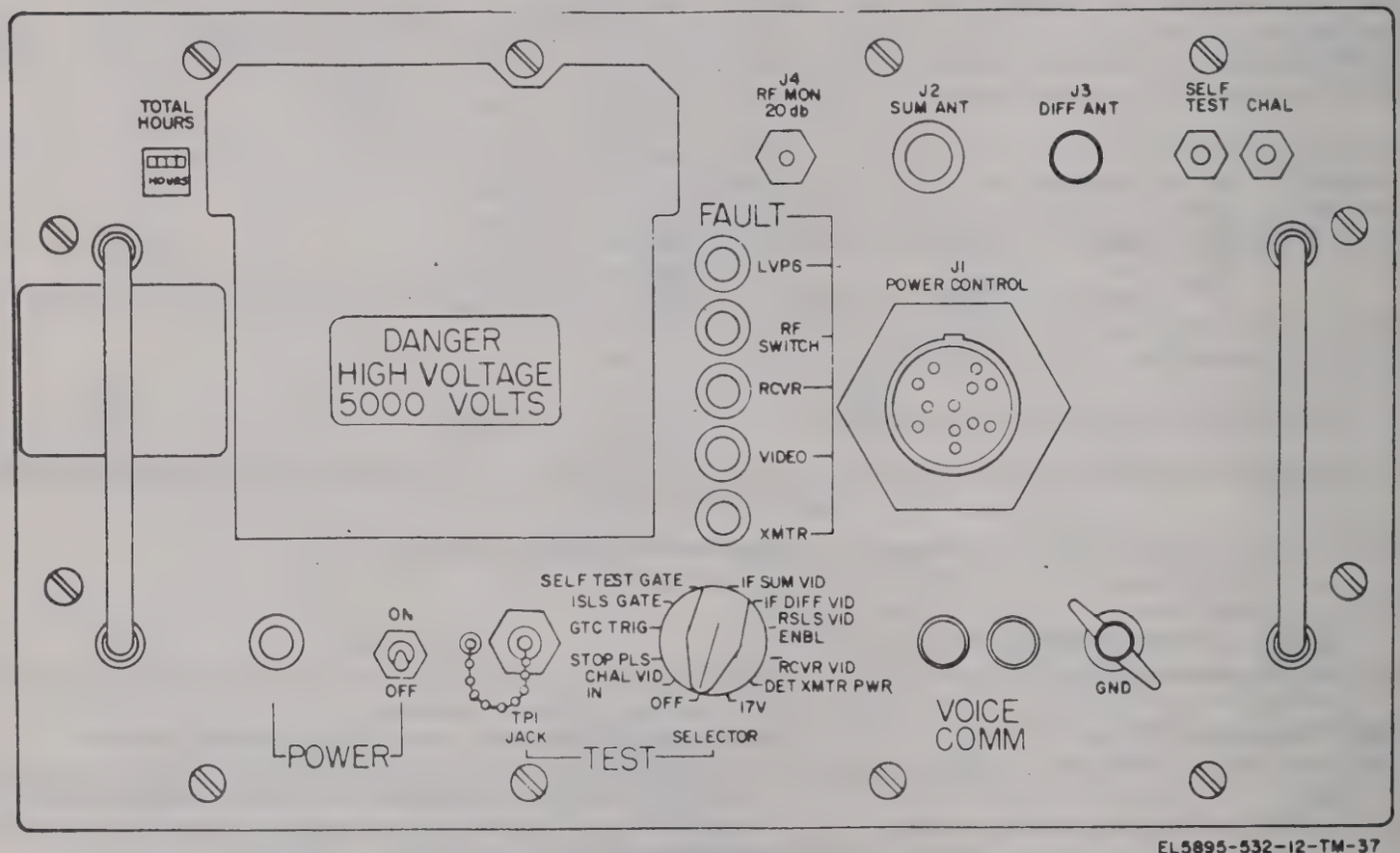


Figure 3-8. Receiver-transmitter, controls and indicators.

Control or indicator	Function
TOTAL HOURS meter	Indicates total hours of receiver-transmitter operation.
FAULT subpanel:	
RF SWITCH FAULT indicator lamp	When lighted, indicates fault in rf switch module.
XMTR FAULT indicator lamp	When lighted, indicates fault in transmitter/power supply module. WHEN FLASHING, INDICATES TRANSMITTER POWER OUTPUT IS MARGINAL
RCVR Fault indicator lamp	When lighted, indicates fault in receiver module.
VIDEO FAULT indicator lamp	When lighted, indicates fault in video circuits.
LVPS FAULT indicator lamp	When lighted, indicates fault in low voltage power supply.

Control or indicator	*Function*
SELF TEST switch (two-position toggle, spring loaded to off (down) position).	When held to on (up), simulates faults in the receiver-transmitter self-test circuits.
CHAL switch (two-position toggle, spring loaded to off (down) position)	When held to on (up), initiates challenges in selected mode.
POWER circuit breaker	When set to ON, applies power to the receiver-transmitter assembly. (POWER indicator lamp lights.)
TEST SELECTOR switch (12-position)	Applies significant signals to TEST JACK TP1. (For direct support or higher category maintenance personnel.)
VOICE COMM connector jacks	For connection of sound powered phones.
	NOTE
The following switches are located inside the receiver transmitter assembly (fig. 5-7).	
RCVR GATE switch (three-position toggle)	When set to STOP PULSE (normal operating position), receiver gate length is controlled by receiver gate stop pulse from synchronizer. When set to INT, receiver gate length is terminated by an internally generated receiver gate stop pulse. When set to CONT, receiver gate is enabled continuously. The INT and CONT positions are for use by direct support or higher category maintenance personnel.
MOD switch (two-position toggle)	This switch is set to OFF to disable modulator circuits for direct circuits or higher category maintenance procedures.
CHANNEL switch (two-position toggle)	When set to DUAL, both sum and difference receiver channels are used. When set to SNGL, only sum receiver channel is used.
GTC switch (two-position toggle)	This switch is set to OFF to disable GTC action for direct support or higher category maintenance procedures.
XMTR PWR switch (two-position toggle)	This switch is set to −3 dB to reduce transmitter power by 3 dB for direct support or higher category maintenance procedures, or for special operating procedures.

3-11. Monitor Alarm, Controls and Indicators (fig. 3-9)

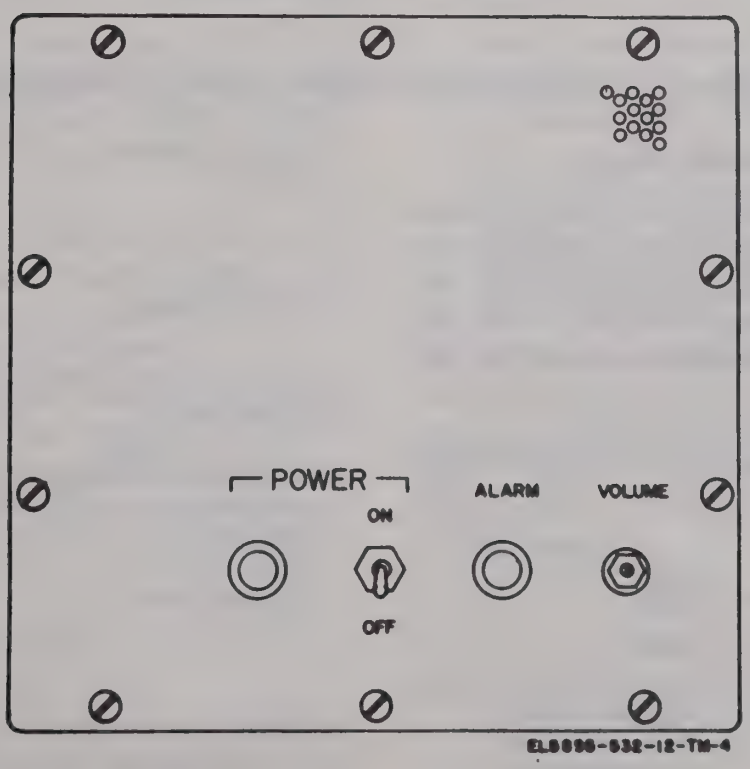


Figure 3-9. Monitor alarm, controls and indicators.

Control or indicator	*Function*
POWER circuit breaker	When set to ON, provides power to monitor alarm. (White POWER lamp lights.)
VOLUME control (screwdriver adjust)	Clockwise rotation increases volume of monitor alarm signal.
ALARM indictor lamp	When lighted, indicates fault in iff set.

3–12. Mode 4 Test Plug Control (fig. 3–10)

NOTE

The mode 4 test plug is installed in connector receptacle XA4P1 in the c–d group case, when the interrogator computer is not installed.

Control	*Function*
TEST SEL switch (three-position rotary)	Provides means for checking mode 4 circuits of iff set (para 3–16). When set to STBY, causes KIR SELF TEST fault indicator to light and monitor alarm to sound whenever mode 4 operation is attempted.

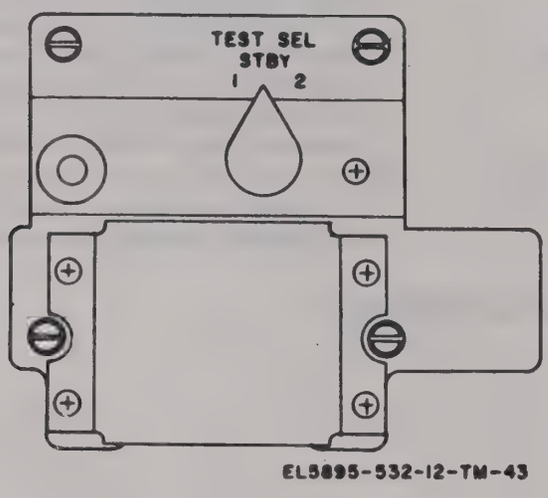


Figure 3–10. Mode 4 test plug.

Section II. OPERATION UNDER USUAL CONDITIONS

3–13. Preliminary Control Settings

Although the iff set is used in five different configurations, once installed and with internal controls set as required by the associated radar, the preliminary control settings are the same. To prepare the iff set for operation, proceed as follows:

a. On the control box (fig. 3–1), set the controls as follows:

Control	*Setting*
POWER	OFF
STROBE	OFF
PANEL	DIM
CODE SELECT subpanel	
MODE 1	Code of the day
MODE 2	Code of the day
MODE 3/A	Code of the day
PROCESSOR	IN
MODE 4	A or B as required for operation in mode 4 or to A if mode 4 test plug is installed.
MODE SELECT	As required for operation.

b. On control panel 1 (fig. 3–2) set the controls as follows:

Control	*Setting*
CODE SELECT subpanel	
MODE 1	Code of the day
MODE 2	Code of the day
MODE 3/A	Code of the day
MODE 4 switch	Code A or B as required for operation in mode 4 or to A if mode 4 test plug is installed.
POWER circuit breaker	OFF

c. On control panel 2 (fig. 3–3), set the controls as follows:

NOTE

Control panel 2 must be used with the control box.

Control	*Setting*
PANEL switch	DIM
MODE 4	A or B as required for operation in mode 4 or to A if mode 4 test plug is installed.
CONSOLE SELECT switch	1 or 2 as required

d. On the synchronizer assembly front panel (fig. 3–6), set the controls as follows:

Control	*Setting*
POWER circuit breaker	ON
IFF TRIG SELECT switch	EXT
METER switch	OUT

e. On the processor assembly front panel (fig. 3–5), set POWER circuit breaker to ON, and METER switch to OUT.

f. On the power control panel (fig. 3–4), set SYSTEM POWER circuit breaked to ON. SYSTEM POWER indicator lamp will light if power is being applied from the associated radar.

g. On the antenna control assembly front panel (fig. 3–7), set the controls as follows:

Control	*Setting*
INT ANT SYNC RPM switch	0
ANT SYNC switch	EXT
POWER circuit breaker	ON
POWER ECA circuit breaker	ON
METER switch	OUT

h. On the receiver-transmitter assembly front panel (fig. 3–8), set the POWER circuit to ON.

i. On the monitor alarm front panel (fig. 3–9), set POWER circuit breaker to ON. The volume of the monitor must be set after equipment turn-on. To adjust the volume of the monitor alarm proceed as follows:

(1) If equipment is in the warm-up stage, the monitor alarm will be activated. Adjust the VOLUME control so that the sound is clearly audible above all other sounds in the area.

(2) If the equipment has warmed up, activate the monitor alarm by holding LAMP TEST switch on the control box or control panel 1 to on (up). This will activate the monitor alarm which may be adjusted as in (1), above. Release LAMP TEST switch to off.

j. On the pedestal assembly, set AZ DRIVE switch (fig. 2–23) to ON.

k. The interrogator computer is cryto classified and requires code setting by authorized personnel.

l. If the mode 4 test plug is installed in place of the interrogator computer, set mode 4 test plug TEST SEL switch (fig. 3–10) to STBY.

3–14. Turn On Procedure

The iff set is powered by input power from the associated radar. Presence of the input power is indicated by the lighting of POWER indicator lamp on the power control panel assembly when POWER circuit breaker is set to ON.

NOTE

Any fault occurring in the iff set will be indicated by the lighting of the associated fault indicator lamp and an audible tone from the monitor alarm. When this occurs, check which assembly is indicated and set the control box or control panel POWER switch to OFF. Check the indicated assembly to insure that the POWER circuit breaker is set to ON and that the assembly is correctly installed. If the fault is still present when power is applied, notify organizational maintenance personnel.

a. Control Box or Control Panel 1 (fig. 3–1 or 3–2).

(1) Set POWER circuit breaker to ON. POWER indicator lamp will light indicating iff set power is on.

NOTE

The receiver-transmitter assembly contains an 80–second time delay. During this period the R/T SELF TEST fault indicator lamp will be lighted and the monitor alarm signal will be heard. If there are no faults in the receiver-transmitter, the fault indicator lamp will go out and the alarm signal will cease after 80 seconds.

(2) Momentarily hold LAMP TEST switch to the on (up) position. All (five) fault indicator lamps and CHALLENGE indicator lamp will light indicating that all lamps are good, and during this time the monitor alarm signal will be heard.

b. Power Control Panel (fig. 3–4).

(1) Check that TOTAL HOURS meter is operating, indicating that synchronizer is on.

(2) Check that blower motor is operating.

c. Processor Assembly (fig. 3–5).

NOTE

When power is simultaneously applied to the synchronizer and processor, the TIMING FAULT lamp of the processor will be lighted. To extinguish the lamp, set processor POWER switch to OFF, and then to ON.

(1) Check that POWER indicator lamp is lighted, indicating that power is on.

(2) Rotate METER switch through the −5 V, +5 V, +12 V, and MEMORY positions. At each position except MEMORY the reading on PWR SUP TEST meter will be in the solid green area, and for MEMORY in the green area. The readings, as described, indicated that the processor power supply is functioning properly.

(3) Set METER switch to OUT.

(4) Momentarily depress each FAULT lamp. Each lamp will light when depressed, indicating that lamp is good.

d. Synchronizer Assembly (fig. 3–6).

(1) Check that POWER indicator lamp is lighted, indicating that power is on.

(2) Rotate METER switch through the −12 V, +5 V, and +12 V positions. At each position the reading on the PWR SUP TEST meter will be in the solid green area, indicating that the synchronizer power supply is functioning properly. Set METER switch to OUT.

(3) Momentarily depress each FAULT lamp. Each lamp will light when depressed, indicating that lamp is good.

e. Antenna Control Assembly (fig. 3–7).

(1) Check that POWER and POWER ECA indicator lamps are lighted, indicating that power is on.

(2) Set METER switch to the −12 V and +12 V positions. At each position, the reading on PWR SUP TEST/NULL meter will be in the solid green area, indicating that the antenna control power supply is functioning properly.

(3) Set METER switch to OUT.

(4) Momentarily depress ANT LAG FAULT indicator lamp. Lamp will light when depressed, indicating that lamp is good.

f. Receiver-Transmitter (fig. 3–8).

(1) Check that POWER indicator lamp is lighted, indicating that power is on.

(2) Check that TOTAL HOURS meter is operating.

(3) Momentarily depress each FAULT indicator lamp. Each lamp will light when depressed, indicating that lamp is good.

g. Monitor Alarm (fig. 3–9). Check that POWER indicator lamp is lighted, indicating that power is on.

h. Mode 4 Test Plug (fig. 3–10). If the mode 4 test plug is installed, check that PWR indicator lamp is lighted, indicating that power is being supplied.

3–15. Operating Procedures

Operation of the iff set is performed by the radar operator at the console of the associated radar. Operation consists of transmitting interrogations to radar target aircraft, receiving replies as a result of the interrogations, evaluating replies, and providing the associated radar with an indication of the reply evaluation. Interrogations are transmitted in any one of five modes (*a*, below). These modes are mode 1, 2, or 3/A; or mode C interlaced with mode 1, 2, or 3/A; or mode 4. When replies, received from target aircraft, in mode 1, 2, 3/A, or 4, fulfill an established evaluation criteria, a target present (*b*, below) indication will be delivered to the associated radar. In the sif modes of operation, target present indications may be derived from aircraft which are transmitting normal sif replies (*b*, below), identification of position (ip) replies (*e*, below), or emergency replies (*d*, below). There are no ip or emergency replies for mode 4. In mode 4, once target present has been established, the iff set continues to evaluate the target aircraft. If the received replies reach a new evaluation criteria, a mode 4 friend indication (*e*, below) will be delivered to the associated radar. During the process of evaluation of replies, the iff set eliminates all nonsynchronous replies (fruit, *f*, below). The mode C reply, which indicates the altitude of the target aircraft, is available to the associated radar for decoding.

a. Target Interrogation. Target interrogation consists of transmitting coded rf interrogations to the radar target aircraft. Interrogations in modes 1, 2, 3/A (sif modes), and C consist of rf pulse pairs. A pulse pair in mode 1 has a separation, leading edge to leading edge, of 3.0 microseconds, in mode 2 the separation is 5.0 microseconds, in mode 3/A the separation is 8.0 microseconds, and in mode C the separation is 21.0 microseconds. Sif mode interrogations are encoded in the synchronizer. Interrogations in

mode C are enabled remotely by the associated radar and encoded in the synchronizer during sif operation. When enabled, the mode C interrogations are interlaced, one for one, with the selected sif mode. An interrogation in mode 4 consists of four rf sync pulses followed by a train of up to 32 cryptographically encoded rf pulses. The mode 4 interrogation is encoded in the interrogator computer. Interrogating procedures are outlined below.

(1) *Interrogations in modes 1, 2, and 3/A.*

(*a*) Check that CODE SELECT switches, on the control box or control panel 1 are set to the correct code.

(*b*) Set MODE SELECT switch on the control box or the associated radar controls to the desired mode of operation (1, 2, or 3/A).

(*c*) Hold CHALLENGE switch to ON when interrogation is desired. CHALLENGE indicator lamp will light when interrogations are being properly transmitted.

(2) *Interrogation in mode 4.*

(*a*) Set MODE SELECT switch on the control box or the associated radar controls to 4.

(*b*) Set Mode 4 switch on the control box, control panel 1, or control panel 2 to A or B as required.

(*c*) Hold CHALLENGE switch to ON when interrogation is desired. CHALLENGE indicator lamp will light when interrogations are being properly transmitted.

b. Normal Sif Reply (fig. 3–11). A normal sif reply consists of a train of up to 12 code pulses contained between two bracket pulses which are separated, leading edge to leading edge, by 20.3 microseconds. In order for the reply to be accepted by the iff set, the CODE SELECT switches in the aircraft must contain the same code settings as that of the control box or control panel. The display video (target present) for normal sif replies is a single arc at the same azimuth but greater in range than that of the radar target return for the same aircraft.

c. IP Reply (fig. 3–11). An ip reply is transmitted to establish the identity of one aircraft in a group of two or more. This reply in mode 1 consists of two normal replies separated by 4.35 microseconds between the leading edge of the last bracket pulse of the first reply and the leading edge of the first bracket pulse of the second reply. In modes 2 and 3/A a normal reply is followed by a special position identification (spi) pulse. The spi pulse is separated from the last bracket pulse of the normal reply by 4.35 microseconds. The display video for an ip reply consists of two arcs instead of the one arc described for a normal reply.

d. Emergency Reply (fig. 3–11). An emergency reply is received when the pilot of the aircraft switches to emergency. At this time, all replies to sif interrogations will be emergency replies. In modes 1 and 2, an emergency reply consists of a normal reply, followed by three sets of bracket pulses. Spacing between sets of bracket pulses is 4.35 microseconds. In mode 3/A the emergency reply is a reply with a code setting of 7700, regardless of the normal mode 3/A code setting in the aircraft, followed by three sets of bracket pulses as in modes 1 and 2. The display video for an emergency reply is four arcs instead of the one arc as described for a normal reply. When operating in mode 3/A and with any code other than 7700, the display will disappear when an emergency reply is transmitted. The emergency reply will reappear if the SIF replies switch is held to ALL or if the CODE SELECT switches in the control box are set to 7700 during subsequent interrogations of that aircraft.

e. Mode 4 Reply (fig. 3–11). A mode 4 reply consists of a group of three pulses spaced 1.8 microsecond apart. The position of the pulse group, over a 64 microsecond time period, with respect to the target range is a coding function of the interrogator computer. The display for mode 4 video is in two different forms (target present, and friend with tail or eyelash.)

(1) *Target present.* The target present display for mode 4 is the same as that for normal sif replies (*b*, above).

(2) *Friend with tail or eyelash.* When the mode 4 replies have met the evaluation criteria for friend recognition, a friend display will be delivered to the radar ppi. The type of display is dependent upon the setting of the TAIL-EYELASH switch in the synchronizer. With this switch set to TAIL, the friend indication will be a target present indication with a tail. If the switch is set to EYELASH, the friend indication will be a target present indication with a series of tails producing an eyelash effect.

f. Fruit (fig. 3–11). Fruit is the result of replies from transponders which are replying to other interrogators. The number of nonsynchronous replies may be observed on the associated radar display by setting the PROCESSOR switch on the control box or control panel 1 to BYPASS. With the PROCESSOR switch to BYPASS, no

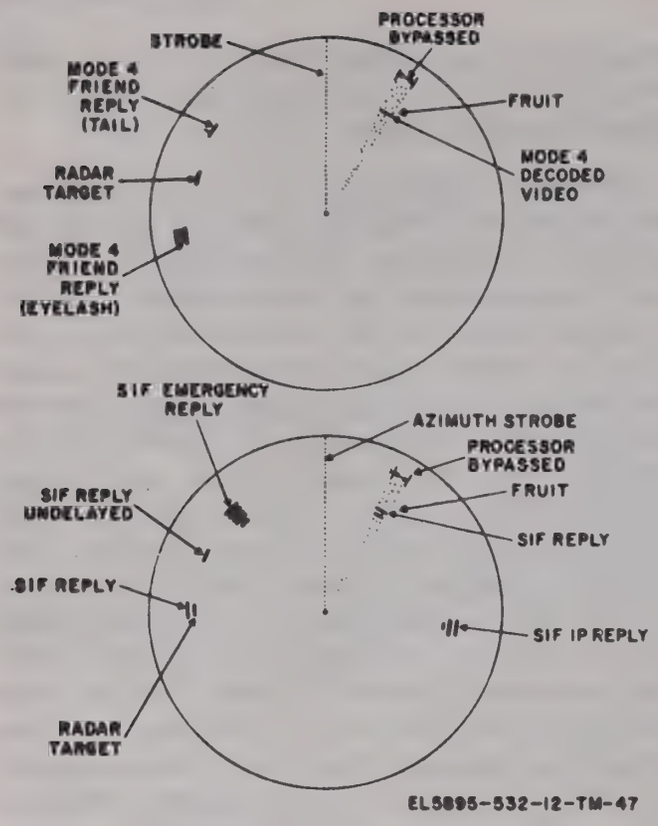


Figure 3-11. Iff Presentation.

replies will be evaluated and all decoded replies will be displayed.

3-16. Operational Confidence Checks (fig. 3-12)

Operational confidence checks of the interrogator set consist of observation of the SELF TEST fault indicator lamps during operation, the generation of a video test pattern which can be displayed on the associated radar ppi, the generation of a test mode 4 challenge, and a check of the mode 4 circuits when the interrogator computer is not installed in the c-d group case.

a. The fact that the SELF TEST fault indicator lamps do not light during normal operation is an indication that the iff set functions are normal.

b. A check of the synchronizer and processor functions may be accomplished by setting CHALLENGE switch on the control box or the radar control to TEST. A test pattern (fig. 3-12) will be displayed on the radar ppi scope. the test pattern indicates normal synchronizer and processor functioning.

c. During the time that CHALLENGE switch is set to TEST (*b*, above), synchronizer challenge-circuits and the receiver-transmitter transmitting circuits may be checked by setting MODE SELECT switch (fig. 3-1) to TEST 4. This action causes 32-pulse test interrogations to be applied to the receiver-transmitter circuits. The CHALLENGE indicator lamp will light when these test interrogations are being properly transmitted.

d. The c-d group circuits which are used for mode 4 operation may be checked by use of the mode 4 test plug when the interrogator computer is not installed. To check these circuits, install the mode 4 test plug (fig. 2-32) and, using the following chart, make the listed control box and mode 4 test plug settings and check for the listed indication of the KIR SELF TEST fault indicator lamp.

Control box switches	
CHALLENGE	*MODE SELECT*
ON	1
ON	4
ON	TEST 4
ON	LOCKOUT OVERRIDE
ON	1
ON/OFF	LOCKOUT OVERRIDE
ON/OFF	TEST 4
ON/OFF	1
ON/OFF	1
ON/OFF	1
ON	1
ON	1

Mode 4 test plug		*Indication of KIR SELF TEST*
MODE 4	*TEST SEL switch*	*lamp*
A	STBY	Off
A	STBY	Lighted
A	STBY	Lighted
A	STBY	Lighted
A	1	Off
A	1	Lighted
A	1	Lighted
A	1	Lighted
CODE HOLD	1	Lighted
CODE HOLD	STBY	Lighted
ZERO	2	Off
A	STBY	Off

3-17. Procedure for Placing Equipment in Standby Condition

The iff set is in standby condition and may be activated for challenging in approximately 80 seconds if all switches are set as outlined in paragraph 3-3, and if the interrogator computer code has been retained. To retain the mode 4 code setting, pull knob and rotate MODE 4 switch (fig. 3-1 or 3-2) to CODE HOLD. While holding this position set control box or control panel 1 POWER circuit breaker to OFF. Hold



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Figure 3-12. test target pattern.

MODE 4 switch to CODE HOLD for 15 seconds before, and at time POWER switch is set to OFF.

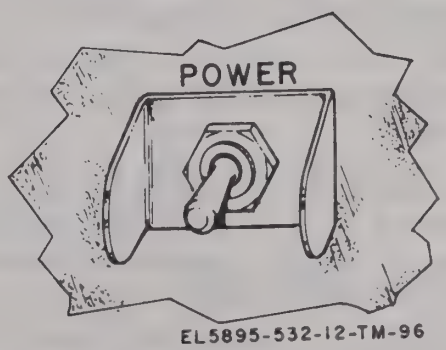
3-18. Procedure for Shutdown

To shut down the iff set, proceed as follows:

a. Set control box (fig. 3-1) or control panel (fig. 3-2) POWER circuit breaker to OFF.

b. Set power control panel (fig. 3-4) SYSTEM POWER circuit breaker to OFF.

c. Procedures in *a* and *b*, above, remove all power from the iff set and zeroize the interrogator computer code setting.



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Figure 3-13. Power switch guard, typical.

Section III. OPERATION UNDER USUAL CONDITIONS

3-19. Operation Under Casualty Conditions

In some cases, where it is necessary, operation of the iff set may be continued even if part of the equipment is malfunctioning. These cases are as follows:

a. If the processor malfunctions, operation may

be continued by setting PROCESSOR switch on control box (fig. 3–1) to BYPASS. When this action is taken, all recognized replies will be displayed on the radar ppi without processor evaluation of mode 4 replies or defruiting of sif replies.

b. If operation in any one of the four modes fails, operation in the remaining modes may continue on an emergency basis.

c. If the interrogator computer is not providing mode 4 interrogations because of a low randomness condition, interrogations may be resumed by setting MODE SELECT switch (fig. 3–1) to LOCKOUT OVERRIDE. (Special permission from the site commander is required for this operation.) Emergency operation using the LOCKOUT OVERRIDE function should be held to a minimum to prevent a possible security compromise. Replace defective interrogator computer immediately.

d. If part of the radar is disabled, with exception of the radar ppi and the servo distribution system, and if normal power is available, the iff set may be operated as a secondary target acquisition set. This operation, described below, will determine the position of those aircraft having the capability to reply to interrogations.

(1) Refer to the associated radar technical manual to prepare the radar ppi to receive sweep triggers, azimuth synchronization, and display video from the iff set.

(2) Set all switches and controls to preliminary control settings (para 3–12), except set the following controls as indicated:

Control	*Setting*
Synchronizer IFF TRIG SELECT switch	290 or 440 whichever is closer to the normal radar prf.
Antenna control INT ANT SYNC RPM switch.	Standard operating speed and direction of the associated radar.
Antenna control ANT SYNC switch.	INT.

(3) Set POWER circuit breaker on the control box or control panel 2 to ON and resume interrogations. Reply video will be displayed on the radar ppi indicating positions of responding aircraft.

e. On the pedestal assembly, if filter 3A2A1A2 fails, it may be bypassed by connecting cable CX–10773 V from connector 3A2J6 directly to motor connector 3A2A1A2J1.

3–20. Operation in Arctic Climates

Subzero temperatures below −40°F (−40°C) and climatic conditions associated with cold weather affect the efficient use of the equipment. Instructions and precautions for operation under such adverse conditions are as follows:

a. Keep the equipment as warm and dry as possible. This is possible with the units mounted within the radar shelter. Units outside the shelter should be protected from icy drafts and snow.

b. Under extreme ice or snow conditions, the exposed units should be inspected and any accumulation of ice and snow on the units should be removed.

c. When the equipment is first turned on in a cold condition, wait for five minutes before setting CHALLENGE switch to ON, when time permits, to minimize stress to the equipment. There is an 80-second delay in a receiver-transmitter, which automatically provides sufficient time for the transmitter to warm up.

d. All air vents on the receiver-transmitter should be periodically checked and cleared of ice and snow as required.

e. Use care when touching the metal portions of the equipment with bare hands. If the bare hand is not completely dry, it is possible for the hand to freeze to bare cold metal.

3–21. Operation in Tropical Climates

Since moisture and humidity conditions are more severe in the tropics, it is recommended that drainage be provided around the r–t group case and the antenna mast base. Air vents should be periodically checked and all foreign matter, if any, be removed. Wipe moisture, caused by condensation, from the equipment whenever necessary.

3–22. Operation in Desert Climates

Since sand and heat conditions are encountered when operating in desert climates, more attention must be given to the equipment.

a. Check air vents frequently and brush away any accumulation of sand at the air filter locations. Clean air filters as required (para 5–26).

b. Do not open the equipment unless necessary. If is necessary to open the r–t group case during sand storm conditions, provide protection from sand as well as possible with a piece of canvas or blanket.

c. Be careful when handling the units if they have been exposed to the sun for long periods

of time. The exterior surfaces of the metal may reach temperatures as high as 150°F (70°C). The temperature inside may be even higher. Always wear gloves and clothing that cover the entire body and arms when handling the equipment under such conditions.

3–23. Operation in High Winds

The iff antenna may be safely operated on Mast AB–621/G in winds up to 100 miles per hour. In case of high wind warnings of winds in excess of 100 miles per hour, the antenna should be lowered.

Section IV. PREPARATION FOR MOVEMENT

3–24. General

Preparation for movement of the iff set in mobile configurations consists of removing, reeling, and stowing cables; removing and stowing the antenna, antenna pedestal, and pedestal adapter; and securing r–t group on the c–d group case. Stowage of these components is contained in the associated radar set technical manuals. Preparation for movement of the iff set in fixed sites consists of removal and packaging of all components of the iff set. Packaging instructions are contained in paragraph 3–30.

3–25. Lowering of Mast AB–621/G

Lowering of the mast is a six man operation. One man operates each of the four winch assemblies attached to the red coded guy cables, one man works the elevator crank and one man removes mast sections, operates the hand brake and assures that the mast remains vertical. Operating procedures for lowering the mast are found in TM 11–5985–334–15.

3–26. Lowering of Mast Launcher and Antenna Group Onto Mast Carrier

a. Remove stakes from base of launcher.

b. Insert these stakes into the ground to form a hinge as described in TM 11–5985–334–15.

c. Remove and stow two red coded guy wires from the two upper guy ring lug holes closet to the erection stake.

d. Attach twin snap hook assembly to the two vacant upper guy ring lug holes (fig. 2–13).

e. Using winch, tighten erection cable.

f. Manually raise erection gin pole so erection cable slides into channel on cap and slide cable stops into position (fig. 2–13).

g. Using winch, lower must and antenna group onto mast carrier.

3–27. Interrogator Set AN/TPX–46(V)1, Preparation for Movement

Interrogator Set AN/TPX–46(V)1 may be installed in either of two configurations. The first configuration is where the pedestal and antenna are mounted on the HAWK tripod. Preparation for movement of this configuration is covered in *a*, below. The second configuration is where the pedestal and antenna are mounted on the top of the van. Preparation for movement of this configuration is covered in *b*, below.

a. Tripod Mounted Antenna. To prepare for movement of the iff set when the pedestal and antenna are mounted on the tripod and the receiver-transmitter is installed at the base of the tripod, proceed as follows:

(1) Remove all poer from the iff set.

(2) Remove and stow grounding cables from the pedestal, the receiver-transmitter, and the grounding stakes.

(3) Remove and stow the grounding stakes.

(4) Remove all cables from antenna, pedestal, receiver-transmitter, and van will (fig. FO–1).

(5) Place cable CX–10775/U (300 ft) on one special cable reel.

(6) On the other special cable reel, place cable CX–12810/TPX–46(V) cable CX–12892/U (75 ft) and two cables CG–3460/U (13.5 ft).

(7) Stow the cable reels.

(8) Using the hex T-wrench, remove six hex-head cap screws and six lock washers (fig. 2–20) which secure the antenna mounting plate to the pedestal. Remove the antenna.

(9) Reinstall the six hex-head cap screws and lock washers in the pedestal.

(10) Stow the antenna and the two cables CG–3460/U (2 ft).

(11) Remove four 5/16-inch hex-head screws, four lock washers, and eight flat washers (fig.

2–17) which secure the pedestal to the pedestal adapter.

(12) Stow the four hex-head screws, four lockwashers, and eight flat washers.

(13) Stow the pedestal and cable CX–10773/U (2 ft).

(14) Place the cover on the r–t group case (fig. 1–4) and secure it with six cover clamps.

(15) Install the r–t group case (with front panel in place) on the c–d group case as described in paragraph 2–25*c* through *h*.

b. Van Mounted Antenna. To prepare for movement of the iff set when the pedestal and antenna are mounted on the top of the radar van, proceed as follows:

(1) Remove all power from the iff set.

(2) Remove all cables from the antenna and pedestal (fig. FO–2)

(3) Install cable CX–10774/U (13.5 ft) and 2 cables CG–3460/U (13.5 ft) on the special cable reel.

(4) Stow the cable reel.

(5) Perform steps (8) through (13) in *a*, above.

3–28. Interrogator Set AN/TPX–46(V)2, Preparation for Movement

Interrogator Set AN/TPX–46(V) 2 is installed with the pedestal adapter, pedestal, and antenna mounted on Mast AB–621/G. Removal procedures in *a* through *n*, below, are to be performed when all power has been removed from the iff set and Mast AB–621/G has been lowered.

a. Remove and stow grounding cables from the antenna pedestal, the receiver-transmitter, and the grounding stakes.

b. Remove and stow the grounding stakes.

c. Remove and stow all cables from antenna, pedestal, receiver-transmitter, and van wall (figs. FO–3 and FO–4).

d. Using the hex T-wrench, remove six hex-head cap screws and six washers (fig. 2–20) which secure the antenna mounting plate to the pedestal. Remove the antenna.

e. Reinstall the six hex-head cap screws and six washers in the pedestal.

f. Stow the antenna.

g. Remove four 5/16-inch hex-head screws, four lock washers, and eight flat washers (fig. 2–17) which secure the pedestal to the pedestal adapter.

h. Stow the four hex-head screws, four lockwashers, and eight flat washers.

i. Stow the pedestal.

j. Remove guy wires from guy wire spreaders on the pedestal adapter.

k. Lift the pedestal adapter from the upper mast section.

l. Stow the pedestal adapter.

m. Place the front cover on the r–t group case (fig. 1–4) and secure it with six cover clamps.

n. Install the r–t group case on the c–d group case as described in paragraph 2–25.

3–29. Interrogator Set AN/TPX–46(V)3, Preparation for Movement

Interrogator Set AN/TPX–46(V) 3 is installed in an AN/TSQ–51 building and utilizes cables provided by that facility. To prepare the iff set for movement, proceed as follows:

a. Refer to the associated radar technical manuals and disconnect all cabling to the components of the iff set.

b. Remove and stow the interrogator computer (see KAO–75/TSEC).

c. Remove the processor assembly from c–d group case (para 5–14*a*).

d. Remove eight 3/8-inch diameter hex-head capscrews and eight flat washers (fig. 2–7) which secure the c–d group case to its mounting base.

e. Reinstall the processor assembly in the c–d group case (para 5–14*e*).

NOTE

The c–d group case weighs in excess of 245 pounds and should be lifted mechanically by the four lifting rings on the top of the c–d group case.

f. Remove four 1/4–20 screws, four lock washers, and four flat washers (fig. 2–8) which secure the control box to its mounting plate. Remove the control box.

g. Remove two 10–32 nuts and two lockwashers, and two 10–32 screws and two flat washers (fig. 2–11) which secure the monitor alarm to its mounting base. Remove the monitor alarm.

h. Place the front cover on the r–t group case.

i. Packaging of the components of the iff set is covered in paragraph 3–31.

3–30. Interrogator Set AN/TPX–46(V)4, Preparation for Movement

Interrogator Set AN/TPX–46(V) 4 is installed with the pedestal adapter, pedestal, and antenna mounted on Mast AB–621/G. Removal procedures in *a* through *n*, below, are to be performed when all power has been removed from the iff set and Mast AB–621/G has been lowered.

a. Remove and stow grounding cables from the antenna pedestal the receiver-transmitter, and the grounding stakes.

b. Remove and stow the grounding stakes.

c. Remove all cables from antenna, pedestal, receiver-transmitter and van walls (fig. FO–12).

d. Place two cables CG–3460/U (35 ft), one cable CX–10779/U (50 ft), one cable CX–12810/TPX–46/U and one cable CX–10775/U (375 ft) on the large cable reel.

e. Place one cable CG–3461/U (375 ft) on the small cable reel.

f. Stow the cable reels.

g. Using the hex T-wrench, remove six hex-head cap screws and six washers (fig. 2–20) which secure the antenna mounting plate to the pedestal. Remove the antenna.

h. Reinstall the six hex-head cap screws and six washers in the pedestal.

i. Stow the antenna and the two cables CG–3460/U (2 ft).

j. Remove four 5/16-inch hex-head screws, four lockwashers, and eight flat washers (fig. 2–17) which secure the pedestal to the pedestal adapter.

k. Stow the four hex-head screws, four lockwashers, and eight flat washers.

l. Stow the pedestal, pedestal adapter and cable CX–10773/U (2 ft).

m. Place the front cover on the r–t group case (fig. 1–4) and secure it with six cover clamps.

n. Install the r–t group case on the c–d group case as described in paragraph 2–25.

3–31. Repackaging of Interrogator Set AN/TPX–46(V).

If shipment of the iff set becomes necessary, package equipment in a manner similar to the original packaging configuration, using equivalent packaging materials. Refer to the latest revision SB 38–100.

3–32. Reinstallation of Iff Set

The sequence for reinstallation of the iff set, after movement, is as follows:

a. Preparation of Mast AB–621/G for antenna group installation (para 2–15 and 2–16).

b. Install pedestal adapter on Mast AB–621/G (para 2–17).

c. Check synchro/resolver connections (para 2–18).

d. Install pedestal on pedestal adapter (para 2–19), or on tripod or radar van (para 2–20).

e. Install antenna on pedestal (para 2–21).

f. Erect mast launcher and antenna group (para 2–22).

g. Connect all cables (para 2–26 and 2–27, and 2–28, 2–29, 2–30, or 2–38, as applicable).

h. Ground equipment (para 2–41).

i. Check cables (para 2–42).

j. Perform equipment checks and preliminary control settings.

k. Install program connectors (para 2–44 through 2–46).

l. Perform antenna boresighting procedures (para 2–49 or 2–50).

m. Perform antenna tilt adjustment (para 2–51).

n. Perform equipments turn on procedure (all except step *k* of para 2–52, antenna control assembly alignment).

CHAPTER 4

OPERATOR/CREW MAINTENANCE

4-1. General

Operator/crew maintenance of Interrogator Set AN/TPX-46(V) consists of maintaining the equipment in a clean condition (para 4-2) and during operation to observe fault indicators, to monitor meters, and check switching functions. The organizational repairman will be notified anytime the operator suspects the iff set is malfunctioning or whenever a fault indicator lamp is lighted or the monitor alarm sounds.

4-2. Cleaning

Inspect the exteriors of all units of the iff set daily. These items should be free of dust, dirt, grease and corrosion.

a. Remove dust and loose dirt with a clean soft cloth.

WARNING

The fumes of trichloroethane (cleaning compound) are toxic. Provide ventilation whenever used. DO NOT USE NEAR AN OPEN FLAME. Trichloroethane is not flammable but exposure of the fumes to an open flame or hot metal forms highly toxic phosgene gas.

b. Remove grease, corrosive residue, and ground in dirt from exterior surfaces; use a cloth dampened, but not wet, with cleaning compound.

c. Remove dust or dirt from plugs and jacks with a soft bristle brush.

CAUTION

Do not press the meter faces (glass) when cleaning; the meter may be damaged.

d. Clean CODE SELECT switches and indicator faces with a soft, dry camel's-hair brush or soft, dry cloth.

e. Clean the front panels, and control knobs; use a soft, clean cloth and a camel's-hair brush. If the dirt is difficult to remove, dampen the cloth with water; if necessary, use a mild soap, and rinse throughly.

f. Clean meter faces with anti-static cleaner.

g. Clean captive, knurled head screw threads using a soft cloth dampened with cleaning compound.

CHAPTER 5

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. TOOLS AND EQUIPMENT

5-1. Tools and Equipment Required

a. Tools. Tools required by organizational maintenance are listed below:

(1) Tool Kit, Electronic Equipment TK-101/G.

(2) Tool Kit, Interrogator Set TK-228/TPX-46(V) (fig. 2-5).

(3) Grease Gun, FSN 4930-250-8038.

b. Test Equipment. Test equipment required for organizational maintenance is listed below:

(1) Multimeter AN/PSM-6 (HAWK).

(2) Multimeter TS-352B/U (HERCULES).

(3) Oscilloscope AN/USM-281A, or Oscilloscope, Dumont Fairchild Model 765 MHF.

Section II. REPAINTING AND REFINISHING INSTRUCTIONS

5-2. Repainting

When repainting or touching up bare spots on the components of the iff set, proceed as follows:

a. Lightly sand surface to be painted to insure that all loose paints, corrosion, dirt, or fungus are removed.

b. Brush on one coat of number X24087 (MIL-F-14072), green (olive drab) enamel paint on the outer portions of the group cases, the control box, the pedestal, or the monitor alarm; or one thin coat of number X27038 black paint (MIL-F-14072) on the front panels of the assemblies: or one thin coat of olive drab (lusterless) paint (MIL-P-9503) on the antenna radome. These paints are listed in SB 11-573, Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment, and AR 746-1, Color, Marking, and Preparation of Equipment for Shipment.

c. For instructions on painting and refinishing, refer to TB 43-0118, Field Instructions for Painting and Preserving Electronic Command Equipment.

Section III. LUBRICATION INSTRUCTIONS

5-3. Harmonic Drive Lubrication

Lubrication of the harmonic drive, whch is located in the pedestal, is required periodically and is in two phases. The first phase is at organizational level which requires periodic greasing with a grease gun. The second phase, to be performed by direct support maintenance personnel, requires periodic replacement of the grease cartridge. The periods between greasing and replacement of cartridges are based upon the average rpm of the antenna.

a. Refer to the following chart to determine the periods between greasing and grease cartridge replacement.

Average Antenna rpm	*Period for Greasing*	*Period for Cartridge Replacement*
Up to 6	6 months	12 months
7 to 13	5 months	10 months
14 to 20	4 months	8 months
21 to 25	3 months	6 months

b. Following is a list of bulk quantities of grease that may be ordered for lubricating the harmonic drive.

NSN	*Amount*
9150-00-935-4017	14-oz cartridge
9150-00-985-7246	1-lb can
9150-00-985-7247	5-lb can

c. To lubricate the harmonic drive, proceed as follows:

(1) Check that grease fitting on the pedestal assembly (fig. 5-1) is clean and that grease duct is not blocked.

(2) Using a grease gun, insert 3 fluid ounces of MIL-G-23827 grease into the harmonic drive.

(3) Using a clean, lint free cloth, clean grease grease fitting and surrounding pedestal area.

5-4. Chassis Slide Lubrication

Do not lubricate chassis slides. Lubrication will only tend to cause contamination build-up.

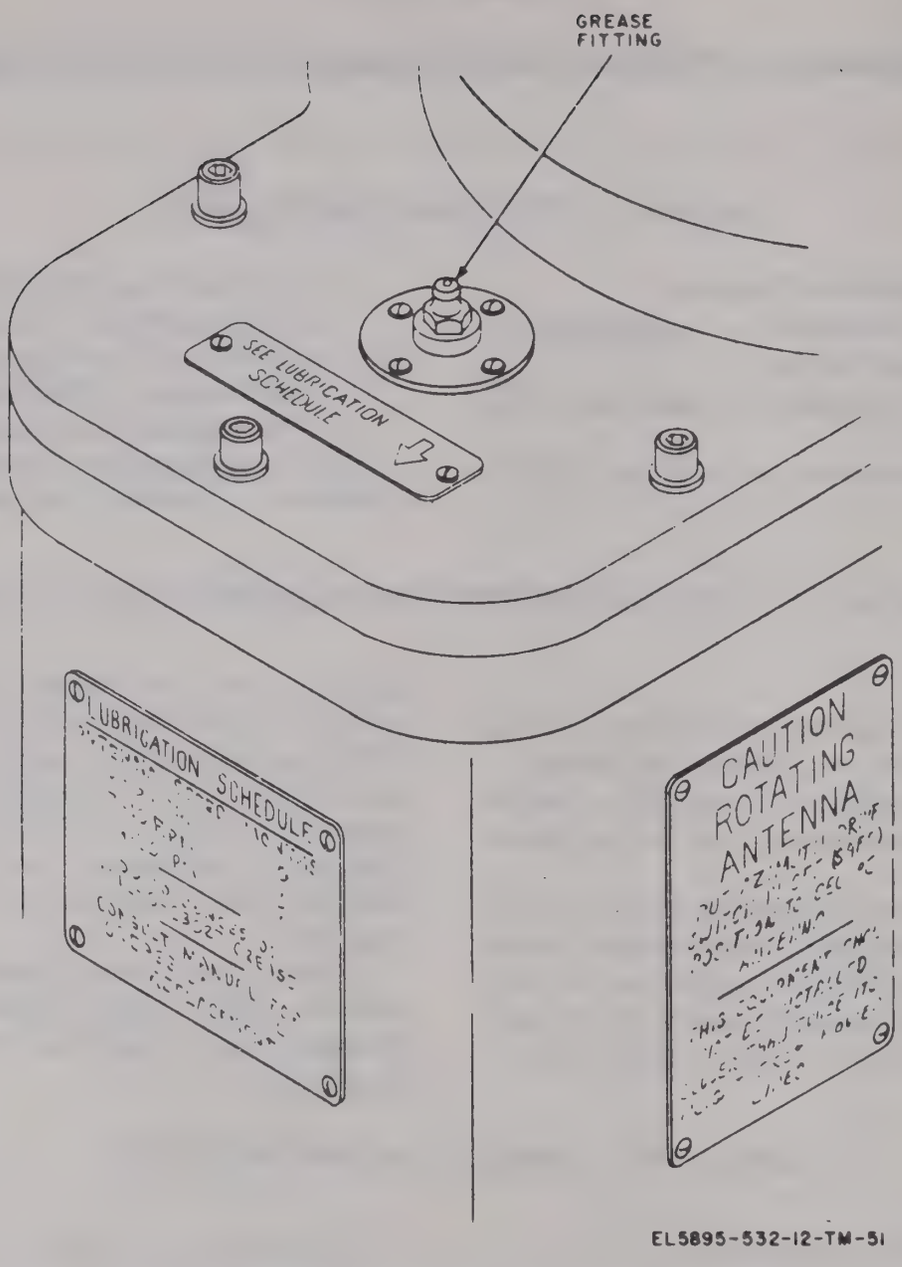


Figure 5–1. Pedestal assembly, grease fitting location.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

5–5. General

To insure that Interrogator Set AN/TPX–46(V) is always ready for operation, it must be inspected systematically on a monthly basis, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services (pmcs) to be performed are listed and described in paragraph 5–6. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the equipment will be noted for correction to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted which effects normal operation of the iff set. Record all deficiencies together with the corrective action taken (paragraph 1–2*a*).

5–6. Instructions for the Performance of PMCS

Sequence No.	*Item*	*Procedure*	*Reference*
Lubricate in accordance with instructions in paragraph 5–3.			
1	Exterior surfaces	Inspect exterior surfaces of all components of the iif set for dust, dirt, or corrosion.	Clean (para 4–2) or sand and lightly brush up (para 5–2).

Sequence No.	Item	Procedure	Reference
2	External items	Inspect items such as mounting screws, latches, handles, and hinges for tightness or breakage.	Tighten mounting screws. Refer to direct support maintenance for repair of broken items.
3	Meters	Inspect meters for damage	Refer to direct support maintenance for repair of defective meters.
4	Indicator lamps	Inspect indicator lamps and lenses for damage.	Replace damaged indicator lamp or lens (para 5–21).
5	Air vents	Check that air vents in c-d and r-t groups are free from obstructions.	Remove obstructions, clean dirty air filters (para 5–26).
6	C-d and r-t group assemblies	Check that c-d group assemblies and receiver-transmitter are properly secured.	Seat and secure assemblies (para 5–13).
7	Knobs, dials and switches	While making the operational check (para 5–7), observe that the mechanical action of each knob, dial, and switch is smooth and free from binding.	Adjust or replace defective knob or dial. Refer to direct support maintenance for repair of switches.
8	Cables	Inspect cables and cords for cuts, kinks, breaks, or excessive wear.	Repair minor damage (para 5–25). Refer to direct support maintenance for repair of broken cable.
9	Operational check	Perform operational check (para 5–7)	

5–7. Operational Check

a. General. The operational check, provides a troubleshooting aid for organizational maintenance personnel for the detection and location of trouble in the IFF set. If the corrective measures outlined in the operational check procedures do not remedy the abnormal condition, higher category maintenance is required.

b. Procedures. Procedures for performance of the operational check are listed below in the sequence in which they are to be performed. Also listed are normal indications to be observed and corrective actions to be taken if the indications are not normal. If the equipment is turned on and operating steps 1 and 2 need not be performed.

Step No.	Procedure	Normal Indications	Corrective Action
1	Set all switches to their preliminary positions (para 3–13).	Power Control Panel SYSTEM POWER circuit breaker remains ON. Power Control Panel SYSTEM POWER indicator lamp is lighted.	Perform short circuit isolation procedure (para 5–9). *a.* Check that associated radar switches are set to apply power to the IFF set. *b.* Check power control panel SYSTEM POWER indicator lamp. Replace lamp if defective (para 5–21). *c.* For AN/TPX-46(V)2, perform power input check (para 5-9.1) *d.* Check power input (115 vac) on radar power cable pins that mate with 1A5J11 pin A and pin B. If present, replace c-d group case 1A5. If not present, a fault exists in the associated radar or in radar power cable to c-d group case.

Warning: Check that all personnel are clear of antenna rotation path before performing step 2.

Note: The following controls are either on the control box, control panel 1, control panel 2, or the equivalent remote controls of the associated radar.

Note: SELF TEST FAULT indicator lamps will light if POWER circuit breakers on the associated assemblies are not set to ON.

Note: For the following steps the associated radar must be operating and supplying IFF triggers to the IFF set.

Step No.	Procedure	Normal Indications	Corrective Action
2	Set POWER circuit breaker to ON.	POWER circuit breaker remains on.	Perform short circuit isolation procedure (para 5–9).
		POWER indicator lamp lights.	*a.* Replace lamp if defective (para 5–21). *b.* Check for 115 vac input to control box at radar cable pins that mate with 5J1 pin A to pin B or 6J1 pin A to pin B. If present, replace control box (unit 5 or 6). *c.* Check for 115 vac between 1A5J13 pin A and pin B. If present, replace the cable between the c–d group case and the control box (unit 5 or 6). If not present, replace c–d group case 1A5.
		C–d group case blower motor is operating. TOTAL HOURS meter is operating.	*a.* Check synchronizer voltage (step 11). *b.* Call direct support maintenance for replacement of TOTAL HOURS meter or blower motor.
		Antenna is rotating smoothly. After 80 seconds all SELF TEST FAULT indicator lamps are off and monitor alarm is silent.	Proceed to step 15.
	Note: If any SELF TEST fault indicator lamp is lighted on the control box, and the corresponding assembly has no FAULT indicator lamp lighted; check PRESS to TEST FAULT lamps, if they are good, replace lamp driver card 5A1 or 6A1. If SELF TEST fault indicator is still lighted, replace indicated assembly.		
		R/T lamp is off.	See step 20.
		SYNC lamp is off.	See steps 11 through 14.
		PROC lamp is off.	See steps 17 through 19.
		ANT LAG lamp is off and antenna rotates smoothly.	See steps 15 and 16.
		KIR lamp is off.	*a.* Reinsert code into interrogator computer. *b.* Replace Interrogator Computer. *c.* Paragraph 5–10. *d.* Replace 5A1 or 6A1.
		Selected CODE SELECT switch lamps are lighted. (On control panel 1, all CODE SELECT switch lamps are lighted.)	Replace defective lamps (para 5–22 or 5–23).
8	Momentarily hold LAMP TEST switch to the On (down) position.	All SELF TEST FAULT indicator and CHALLENGE indicator lamps are lighted.	*a.* If all lamps are off replace lamp driver card (para 5–19 or 5–20). *b.* If some lamps are lighted, replace defective lamps (para 5–21).
		Monitor Alarm Sounds.	*a.* Check monitor alarm POWER circuit breaker. If it remains on, proceed to *b.*, below. If it does not remain on, replace monitor alarm unit 8. *b.* Check for 115 vac at input to monitor alarm at cable pins that mate with 8J1 pin A to pin B. If present, replace monitor alarm unit 8. If not, proceed to step *c.*

Step No.	Procedure	Normal Indications	Corrective Action
			c. Check for 115 volts out of control box between 5J2 pin A and pin B. If present, replace cable between control box and monitor alarm. If not present, replace control box unit 5 or 6.
4	Set PANEL switch to Bright.	Panel lamps are brightly lighted.	Replace control box unit 1A5 or 1A6.
5	Rotate MODE SELECT switch through positions 1, 2, 3/A,and 4.	At positions 1, 2, and 3/A, selected CODE SELECT switch lamps are lighted.	If all lamps in the selected mode are out, replace control box unit 5. If some lamps are out, replace defective lamps (para 5–22).
		On control panel 1, all CODE SELECT lamps are lighted whenever power is applied.	*a.* If all lamps are out, replace control panel 1, unit 6. *b.* Replace defective lamps.
		At position 4, no CODE SELECT switch lamps are lighted (except on control panel 1, as above).	Replace control box, unit 5.
6	Set PROCESSOR switch to BYPASS and hold CHALLENGE switch to TEST.	Test pattern appears on radar ppi scope as shown in figure 3–12, except that target indications do not have friend tails.	*a.* Replace interface card group cards 1A1A13 through 1A1A20 (color code, dark green) in the synchronizer (para 5–17 and 5–18). *b.* Replace synchronizer 1A1. If holes appear in test pattern and no SELF TEST lamps are lighted.
7	Hold CHALLENGE switch to TEST and set PROCESSOR switch to IN.	Test patterns appears on radar ppi scope as shown in figure 3–12.	*a.* Replace memory sensing card group cards 1A3A10 through 1A3A12 and 1A3A28 through 1A3A37. (Color Code, dark green), (para 5–17 and 5–18). *b.* Replace program connectors associated with removed cards. *c.* Replace memory module 1A3A39 (para 5–14). *d.* Replace processor 1A2.
8	Rotate MODE SELECT switch through positions 1, 2, 3/A, and 4. At each position, hold CHALLENGE switch to ON.	CHALLENGE indicator lamp lights at each position.	*a.* If CHALLENGE indicator lamp lights in some modes but not in all modes: (1) Replace coder-decoder card group cards 1A1A6 and 1A1A8 (color code, white) and interface card group card 1A1A14. (Color code, dark green) (para 5–17 and 5–18). (2) Replace lamp driver card. (3) Replace control box Unit 5 or Unit 6. *b.* If CHALLENGE indicator does not light in any mode: (1) Replace lamp driver card 5A1 or 6A1 (para 5–20). (2) Replace rf switch module 2A1A3 (para 5–14).
		R/T lamp is off.	See step 20.
		SYNC lamp is off.	See step 13.
9	Hold CHALLENGE switch to TEST and MODE SELECT switch to TEST 4.	Test pattern appears as in step 6.	*a.* See step 6. *b.* If no FAULT lamps are lighted, check mode 4 circuits (para 5–10).
		R/T lamp is off.	See step 20.

Step No.	Procedure	Normal Indications	Corrective Action
10	Hold STROBE switch to ON.	Azimuth line (strobe) appears on the radar ppi scope at 0° azimuth coincident with radar sweep.	*a.* If the strobe line does not appear at 0 degrees on the ppi and the iff returns *are* correctly positioned, perform the azimuth strobe ring adjustment (para 2–54). *b.* If the strobe line and iff returns on the ppi are both incorrectly positioned, perform the procedures in paragraph 2–55*a*. *c.* If strobe line does not appear: (1) Replace interface card group cards 1A1A14 and 1A1A17 (color code, dark green) (para 5–17 and 5–18). (2) Replace control box 1A5. (3) Call direct support for assistance.
11	On the synchronizer rotate METER switch through positions −12V, +5V, and +12V.	Green area reading on PWR SUP TEST meter at each position.	*a.* If any reading is abnormal (other than missing), perform power supply adjustments (para 5–27). *b.* If voltage is missing, replace power supply module 1A1A23. *c.* If all voltages are missing replace transformer 1A1A24. *d.* If any voltages are still missing proceed to step 12.
	Caution: In the following steps, set synchronizer POWER circuit breaker to OFF when removing or reinstalling cards.		
12	On the synchronizer set METER switches as indicated.	Green area reading on PWR SUP TEST meter with METER switch set to −12V.	*a.* Remove and reinstall each of the following cards, 1A1A8, 1A1A11, 1A1A14, 1A1A18, and 1A1A19. Each time a card is removed, set POWER circuit breaker to ON and check PWR SUP TEST meter for a green area reading. If no reading is obtained, reinstall card and proceed to next card. If green area reading is obtained, replace removed card with a known good card. *b.* Replace synchronizer 1A1.
		Green area reading on PWR SUP TEST meter with METER switch to +5V.	*a.* Remove and reinstall each of the following cards using procedure outlined for −12V. (1A1A1 through 1A1A21). *b.* Replace synchronizer 1A1.
		Green area reading on PWR SUP TEST meter with METER switch set to +12V.	*a.* Remove and reinstall each of the following cards using the procedure outlined for −12V. (1A1A2, 1A1A11, 1A1A14, 1A1A16, 1A1A17, 1A1A19, and 1A1A20). *b.* Replace synchronizer 1A1.
13	On the Synchronizer set METER switch to OFF.		
14	Visually check synchronizer front panel.	POWER indicator lamp is lighted.	*a.* Replace lamp if defective. (para 5–21).

Step No.	Procedure	Normal Indications	Corrective Action
			b. Check for 115 vac between 1A5P2 pin 1 and pin 2. If present, replace synchronizer 1A1. If not present, replace c–d group case, 1A5.
			Note: If more than one FAULT lamp is lighted, see paragraph 5–11.
		IFF TRIG FAULT lamp is off.	*a.* Check that associated radar switches are set to provide iff triggers.
			b. In the synchronizer, replace the following cards: post trigger generator card 1A1A21 (color code, blue), interface and card group cards 1A1A16 or 1A1A19 (color code, dark green) or timing card group cards 1A1A2, 1A1A3 or 1A1A6 (color code, yellow).
			c. Replace synchronizer 1A1.
		TIMING FAULT indicator lamp is off.	*a.* In the synchronizer, replace timing card group cards 1A1A1 through 1A1A4 (color code, yellow) post trigger generator card 1A1A21 (color code, blue) or interface card group card 1A1A16 (color code, dark green) (para 5–17 and 5–18).
			b. Replace synchronizer 1A1.
		CODER-DECODER FAULT indicator lamp is off.	*a.* In the synchronizer, replace coder-decoder card group cards 1A1A5 through 1A1A12 (color code, white), or interface card group cards 1A1A19, 1A1A20 or 1A1A16 (color code, dark green) (para 5–17 and 5–18).
			b. Replace delay line module 1A1A22 (para 5–15).
			c. Replace synchronizer 1A1.
		INTERFACE FAULT indicator lamp is off.	*a.* Replace interface card group cards 1A1A13 through 1A1A20 (color code, dark green)
			b. Replace synchronizer 1A1.
15	On the antenna control rotate METER switch to the −12V and +12 positions.	Green area reading on PWR SUP TEST/NULL meter at each position.	*a.* If reading is abnormal, perform power supply adjustments. (para 5–28).
			b. If no readings are obtained, replace power supply module 1A2A5 (para 5–14).
			c. Replace antenna control assembly.
16	Visually check antenna control front panel.	POWER indicator lamp is lighted.	*a.* Replace lamp if defective (para 5–21).
			b. Check for 115 vac between 1A5P4 pin 1 and pin 2. If present, replace antenna control assembly 1A2.
			If not present, replace c–d group case 1A5.
		ECA POWER ECA indicator lamp is lighted.	*a.* Replace defective lamp (para 5–21).

Step No.	Procedure	Normal Indications	Corrective Action
			b. Replace electronic control amplifier 1A2A7.
			c. Replace antenna control assembly.
		ANT LAG FAULT indicator lamp is off and antenna rotates smoothly.	*a.* Place ANT SYNC switch to INT and INT ANT SYNC RPM switch to 15 cw. If ANT LAG indicator lamp is off, proceed to step *c*. If ANT LAG indicator lamp remains on, proceed to step *d*.
			b. Perform antenna control assembly alignment procedure, para 2-53.
			c. Replace in order; antenna control card group (1A2A1, 1A2A2, and 1A2A3), zeroize module 1A2A4, electronic control amplifier 1A2A7, antenna pedestal assembly 3A2. After replacement of each item, perform alignment procedure (para 2-53).
			d. Replace in order electronic control amplifier 1A2A7, antenna control card group (1A2A1, 1A2A2 and 1A2A3), ECA filter 1A2A6, zeroize module 1A2A4, antenna control 1A2, antenna pedestal assembly 3A2. After replacement of each item, perform alignment procedure (para 2-53).
17	On the processor rotate METER switch through positions −5V, +5V, +12V and MEMORY.	Solid green area reading on PWR SUP TEST meter for ±5 and +12V, and green area reading for MEMORY. **Note:** If MEMORY INHIBIT FAULT indicator lamp is lighted, set processor POWER switch to OFF and then back to ON.	*a.* If reading is abnormal, perform power supply adjustments (para 5-29). If still abnormal, replace regulator card ±12 volt regulator card 1A3A21 or ±5 volt regulator card 1A3A22.
			b. If no voltage reading is obtained, replace the corresponding regulator card. If still abnormal, replace power supply module 1A3A39 (para 5-14).
			c. If any voltages are still missing, proceed to step 18.
	Caution: In the following steps, set processor POWER circuit breaker to OFF when removing or reinstalling cards.		
18		Solid green area reading with METER switch set to +5V.	*a.* Remove and reinstall all cards in the processor except module 1A3A39, cards 1A3A21, 1A3A22 and those cards in power supply 1A3A24. Each time a card is removed, set POWER circuit breaker to ON and check PWR SUP TEST meter for a solid green area reading. If no reading is obtained reinstall card and proceed to the next one. If solid green area reading is obtained, replace removed card with a known good card.
			b. Replace processor 1A3.

Step No.	Procedure	Normal Indications	Corrective Action
		Solid green area reading with METER switch set to −5V.	*a.* Remove and reinstall each of the following cards using procedure outlined for +5V. (1A3A11, 1A3A12, 1A3A16, 1A3A17, 1A3A18, 1A3A24, through 1A3A30, and 1A3A34 through 1A3A37). *b.* Replace processor 1A3.
		Solid green area reading with METER switch set to +12V.	*a.* Remove and reinstall each of the following cards using procedure outlined for +5V. (1A3A10, 1A3A14, 1A3A18). *b.* Replace processor 1A3.
		Green area reading with METER switch set to MEMORY.	Remove and reinstall each of the following cards using procedure outlined for +5V. (1A3A25 through 1A3A30, 1A3A34 through 1A3A37, and memory module 1A3A38).
19	Visually check processor front panel.	POWER indicator lamp is lighted.	*a.* Replace lamp is defective (para 5–21). *b.* Check for 115 vac between 1A5P6 pin 1 and pin 2. If present, replace processor 1A3. If not present, replace c–d group case 1A5. **Note:** If more than one FAULT indicator lamp is lighted, see paragraph 5–11.
		TIMING FAULT indicator lamp is off.	*a.* Replace timing card group cards 1A3A18 through 1A3A20, (color code, light green) and self-test III card 1A3A17 (color code, yellow) (para 5–17 and 5–18). *b.* Replace processor 1A3. **Note:** When replacing cards with program connectors, program connectors should also be replaced.
		TARGET FAULT indicator lamp is off.	*a.* Refer to paragraphs 5–17 and 5–18 and replace; target arithmetic card group cards 1A3A1 through 1A3A4 (color code, blue); friend arithmetic card group cards 1A3A5 and 1A3A8 (color coded, white); and self test card group cards 1A3A13 through 1A3A17 (color coded, white). *b.* Replace processor 1A3.
		FRIEND FAULT indicator lamp is off.	*a.* Replace friend arithmetic card group cards 1A3A5 through 1A3A9 (color coded, white); target arithmetic card group cards 1A3A3 and 1A3A4 (color coded, blue); and self test card group card 1A3A13, and 1A3A17 (color coded, yellow) (para 5–17 and 5–18). *b.* Replace processor 1A3.

Step No.	Procedure	Normal Indications	Corrective Action
		MEMORY INHIBIT FAULT indicator lamp is off.	a. Replace memory inhibit card group cards 1A3A24 through 1A3A27 (color coded, orange); target arithmetic card group cards 1A3A1 and 1A3A4 (color coded, blue); memory sensing card group cards 1A3A11, 1A3A12, or 1A3A33 (color coded, dark green); self test card group cards 1A3A13 through 1A3A17 (color coded, yellow) (para 5-17 and 5-18). b. Replace processor 1A3.
		MEMORY SENSE FAULT indicator lamp is off.	a. Refer to paragraphs 5-17 and 5-18 and replace memory circuit sensing card group cards 1A3A10 through 1A3A12 and 1A3A28 through 1A3A37 (color code, dark green); self test card group cards 1A3A13 through 1A3A17 (color code, yellow); or memory module 1A3A38. b. Replace processor 1A3.
20	Visually check receiver-transmitter front panel and initial challenges.	POWER indicator is lighted.	a. Replace lamp if defective (para 5-21). b. Check for 115 vac between cable pins that mate with 2A1P1 pin A and pin B. If present, replace receiver-transmitter 2A1. c. Check for 115 vac between 1A5J15 pin g and pin r. If present, a fault exists in associated radar or the cables to the receiver-transmitter. If not present, replace c-d group case 1A5. Note: If more than one FAULT lamp is lighted, see paragraph 5-11.
		RF SWITCH FAULT indicator lamp is off.	a. Replace rf switch module 2A1A3. (para 5-14). or self test card 2A1A10 (color code, yellow) (para 5-17 and 5-18). b. Replace receiver-transmitter 2A1.
		XMTR FAULT indicator lamp is off.	a. Replace transmitter/power supply module 2A1A1 (para 5-16) or self test card 2A1A10 (para 5-17 and 5-18). b. Replace receiver-transmitter 2A1.
		RCVR FAULT indicator lamp is off.	a. Replace receiver module 2A1A4 (para 5-16) and self test card 2A1A10 (color coded, yellow). b. Replace receiver-transmitter 2A1.
		VIDEO FAULT indicator lamp is off.	a. Replace video card group cards 2A1A5 through 2A1A11 (color code, yellow) (para 5-17 and 5-18). b. Replace receiver-transmitter

Step No.	Procedure	Normal Indications	Corrective Action
		LVPS FAULT indicator lamp is off.	*a.* On the r-t unit, set TEST SELECTOR switch to 17V. Measure between TEST TP1 JACK and ground for +19 ±1 vdc. If correct, proceed to step *b*. If incorrect, replace transmitter module 2A1A1 (para 5–16). If LVPS FAULT indicator is still lit, proceed to step *c*. *b.* Perform power supply adjustment (para 5–28). *c.* Replace low voltage power supply module 2A1A2A1 (para 5–14).
		TOTAL HOURS meter is operating.	*d.* Replace receiver-transmitter 2A1 at the earliest down-time opportunity.
21	Memontarily, hold CHALLENGE and SELF TEST switches to on (up) position.	All FAULT indicator lamps with exception of LVPS lamp, are lighted.	*a.* Depress each PUSH-TO-TEST lamp and replace defective lamps (para 5–21). *b.* Replace self-test card 2A1A10 or 2A1A11 (para 5–17 and 5–18). *c.* Replace receiver-transmitter 2A1.
		On the control front panel R/T SELF TEST fault indicator lamp is lighted. Monitor alarm is heard.	Replace lamp if defective (para 5–21). See step 3.
22	Depress LVPS PUSH-TO-TEST.	LVPS is lighted.	*a.* Replace lamp if defective.
23	Momentarily, hold CHALLENGE switch to ON position.	All FAULT indicator lamps are off.	Refer to step 20.

CAUTION

Perform the following step only if authorized personnel are available for resetting code in the interrogator computer

24	On control set MODE 4 switch to ZERO.	KIR SELF TEST fault indicator lamp lights.	Refer to paragraph 5–10. If still abnormal, replace control or c-d group case.

Section V. TROUBLESHOOTING

5–8. General

Troubleshooting the iff at organizational category consists of observing the symptoms given in the troubleshooting chart (para 5–8.1) and performing the operational checkout (para 5–7). Troubleshooting procedures referenced in the operational check consist of the following:

a. Short circuit isolation procedures (para 5–9).

b. Mode 4 circuits check (para 5–10).

c. Multiple FAULT light fault isolation (para 5–11).

5–8.1. Troubleshooting Chart

Symptom	Probable cause	Corrective action
No replies	Defective card or module	Perform operational check, para 5–7.
All replies normal at all ranges, but one or more receiver/transmitter FAULT lamps lighted.	*a.* Defective self-test card 2A1A11 if LVPS FAULT lamp lit.	*a.* Replace 2A1A11
	b. Defective self-test card 2A1A10 if RF SWITCH, RCVR, VIDEO, or XMTR FAULT lamp lit.	*b.* Replace 2A1A10
Wide arcs, getting wider as range increases, and/or ring around at closer ranges. No FAULT lamps lighted, CHALLENGE lamp OFF when challenging.	High VSWR in difference channel causing attenuated P2 (isls) pulse.	Replace rf switch module or difference channel rf cable
Dead areas of coverage (iff holes); replies normal in other areas; no FAULT lamps lighted, CHALLENGE lamp lighted when challenging.	Reflections from ground, buildings, vans, etc. causing nulling.	Refer to Chapter 2 for siting information and relocate antenna and/or reflecting object.

5-9. Short Circuit Isolation

A power short circuit in the iff set will cause an associated circuit breaker to trip to the OFF position. A POWER circuit breaker is located on the c-d group case power control panel, on the front panel of each of the assemblies, on the control box, and on control panel 1. Procedures in *a* and *b* below will assist the organizational repairman to isolate the short circuit to a unit, assembly, module, card, or cable.

NOTE

In the following procedures, reference to the control will be to the control box, control panel 1, or to the equivalent control of the associated radar.

a. Power Control Panel SYSTEM POWER Circuit Breaker. If the power control panel SYSTEM POWER circuit breaker trips to OFF when the control POWER circuit breaker is set to OFF, proceed as follows:

(1) Disconnect the cable connector from connector receptacle 1A5J13 on the c-d group case.

(2) Set power control panel SYSTEM POWER circuit breaker to ON. If circuit breaker remains on, proceed to (3) below. If circuit breaker trips to OFF, the power short circuit is in the c-d group case. Refer to direct support maintenance for repair of c-d group case.

(3) Reconnect cable to cable receptacle 1A5J13 and disconnect the oposite end of that cable from connector receptacle J1 on the control.

(4) Set power control panel SYSTEM POWER circuit breaker to ON. If circuit breaker remains on, the power short circuit is in the control. Refer to direct support maintenance for repair of the control. If circuit breaker trips to OFF, the power short circuit is in the cable connected to connector receptacle 1A5J13.

b. Control POWER Circuit Breaker. If the control POWER circuit breaker trips to OFF and the SYSTEM POWER circuit breaker remains on, the power short circuit is in the control, the cable between control receptacle J1 and c-d group case receptacle 1A5J13, or in the c-d group case. Refer to direct support maintenance for repairs. If SYSTEM POWER circuit breaker trips to OFF when control POWER circuit breaker is set to ON, set all POWER circuit breakers on all assemblies to OFF and proceed as follows:

(1) Set SYSTEM POWER and control POWER circuit breakers to ON. If SYSTEM POWER circuit breaker remains on, proceed to (6). If SYSTEM POWER circuit breaker trips to OFF, proceed to (2), below.

(2) Remove the interrogator computer from the c-d group case and set SYSTEM POWER circuit breaker to ON. If circuit breaker remains on, the power short circuit is in the interrogator computer. Replace the interrogator computer. If circuit breaker trips to OFF, reinstall interrogator computer in c-d group case and proceed to (3), below.

(3) Remove the cable from connector receptacle 1A5J15 on the c-d group case and set SYSTEM POWER circuit breaker to ON. If circuit breaker remains on proceed to (4), below. If the circuit breaker trips to OFF, the power short circuit is in the c-d group case. Refer to direct support maintenance for repair of c-d group case.

(4) Reconnect cable to connector receptacle 1A5J15 on the c-d group case, disconnect the other ends of this cable from connector receptacles 2A1J1 on the receiver-transmitter and 3A2J5 on the pedestal, and set SYSTEM POWER circuit breaker to ON. If circuit breaker remains on, proceed to (5). If circuit breaker trips to OFF, the power short circuit is in the cable. Refer to direct support maintenance for repair of cable.

(5) Reconnect the cable ends to connector receptacles 2A1J1 on the reciever-transmitter and 3A2J5 on the pedestal, one at a time, and set SYSTEM POWER circuit breaker to ON. If circuit breaker trips to OFF the power short circuit is in the last assembly connected. Refer to direct support maintenance for repair of receiver-transmitter or pedestal.

(6) Set SYSTEM POWER circuit breaker and synchronizer POWER circuit breaker to ON. If either circuit breaker trips to OFF, proceed to (7), below. If both circuit breakers remain on, proceed to (9).

(7) Remove all modules and card groups from the synchronizer and set SYSTEM POWER and sychronizer POWER circuit breakers to ON. If either circuit breaker trips to OFF, the power short circuit is in the synchronizer chassis. Refer to direct support maintenance for repair of synchronizer chassis. If both circuit breakers remain on, proceed to (8), below.

(8) Reinstall each module and card groups one at a time. After each installation, set SYSTEM POWER and synchronizer POWER circuit breakers to ON. If either circuit breaker trips to OFF, the power short circuit is in the last module or card group installed. Replace defective

module. Isolate and replace defective card of a card group by means of card substitution (para 5-17 and 5-18).

(9) Perform steps (6) and (7) for the antenna control assembly, the processor, and the receiver-transmitter.

5-9.1. AN/TPX-46(V)2 Power Input Check

If c-d group case power control panel SYSTEM POWER indicator lamp does not light when pressed, or when SYSTEM POWER circuit breaker is set to ON;

a. Disconnect cable CX-13013 from connector receptacle 1A5J11. Check for 115 volts between cable pins A and B. If voltage is not present, proceed to b, below. If voltage is present, a fault exists in the c-d group case. Refer to direct support maintenance for repair of the c-d group case.

b. Disconnect cable CX-13013 from connector receptacle J2 on the isolation transformer. Check for 115 vac between pins J2-A and J2-B. If voltage is not present, proceed to c, below. If voltage is present, fault exists in cable CX-13013. Replace cable CX-13013.

c. Check power input on radar power cable pins that mate with isolation transformer pins J1-A and J1-B. If power is present, a fault exists in the isolation transformer. Replace isolation transformer (para 5-14.1). If power is not present, a fault exists in the associated radar or in radar power cable to the isolation transformer.

5-10. Mode 4 Circuits Check

The mode 4 test plug is used to provide a means of isolating a KIR fault to the interrogator computer or to the mode 4 circuits of the c-d group case, the synchronizer, and the control. To isolate to one or the other, proceed as follows:

a. Remove the interrogator computer from the c–d group case.

b. Install the mode 4 test plug connector 1A4P1 (fig 2–32) into kit connector XA4P1.

c. Perform the procedures as outlined in paragraph 3–16*d*. If all conditions are normal, replace the interrogator computer. If any abnormal condition is indicated, the fault is in the synchronizer, the c–d group case, or the control circuits. Refer to direct support maintenance for repair.

5–11. Multiple FAULT Light Fault Isolation

It is possible to have more than one FAULT lamp lighted on an assembly as a result of one fault. The arrangement of the FAULT lamps on the front panel of each assembly is indicative of the procedure for fault isolation. FAULT lamps on the processor and synchronizer are in a row from left to right and on the receiver-transmitter in a row from top to bottom. The order for troubleshooting is also from left to right, and top to bottom. To troubleshoot multiple FAULT lamps on an assembly, refer to paragraphs 5–17 and 5–18, and replace those card groups or modules in the order of the lighted lamps, left to right or top to bottom.

Section VI. MAINTENANCE OF INTERROGATOR SET AN/TPX–46(V)

5–12. General

Maintenance of Interrogator Set AN/TPX–46(V) consists of repair by substitution of known good assemblies or cards for like items which are suspected to be faulty, and by alignment after replacement of components of the antenna control assembly.

a. Repair. Repair of the iff set consists of the following:

(1) Touch up painting of base or scratched exterior surfaces (para 5–2).

(2) Removal and replacement of assemblies (para 5–13).

(3) Removal and replacement of modules (para 5–14, 5–15, and 5–16).

(4) Removal and replacement of card groups (para 5–17 and 5–18).

(5) Removal and replacement of lamp driver card 5A1 (para 5–19).

(6) Removal and replacement of lamp driver card 6A1 (para 5–20).

(7) Removal and replacement of front panel indicator lamps (para 5–21).

(8) Removal and replacement of control box and control panel 2 CODE SELECT switch lamps (para 5–22).

(9) Removal and replacement of control panel 1 CODE SELECT switch lamps (para 5–23).

(10) Replacement or adjustment or knobs (para 5–24).

(11) Minor cable repairs (para 5–25).

(12) Removal, cleaning, and replacement of air filter (para 5–26).

b. Alignment. After replacement of boards or cards in the antenna control assembly, perform alignment procedures of paragraph 2–53.

5–13. Removal and Replacement of Assemblies

The assemblies of the c–d and r–t groups, with exception of the interrogator computer, are secured by knurled head captive screws and are installed on track mounted slides (fig. 5–2). Electrical connectors on these assemblies, with exception of the receiver-transmitter, are easily accessible once the assembly is extended from the group case. The electrical connectors for the receiver-transmitter are mounted on the front panel. The interrogator computer, which is mounted on guide rails, is secured in the c–d group case by four retaining latches. This assembly has a chassis mounted electrical connector which mates with a connector receptacle when it is installed in the group case.

a. Removal of Synchronizer, Processor, and Antenna Control Assemblies. To remove the synchronizer, processor, or antenna control assembly, proceed as follows:

(1) Loosen captive knurled head retaining screws.

(2) Slide assembly forward until outgoing limit stops engage (fig. 5–2).

(3) Remove cable connectors from connector receptacles on the assembly by loosening connector retaining screw (fig. 5–3).

(4) Remove the assembly from the track

slides by depressing the outgoing limit stops (fig. 5-2).

(5) Reinstall the slides into the group case to prevent accidental damage to the slides by depressing the slide locks (fig. 5-2).

b. Removal of Interrogator Computer. To remove the interrogator computer, proceed as follows:

(1) Loosen the screw in each of the two retaining latches and swing the latches away from the assembly panel.

(2) Slide the assembly forward until the mating connectors are separated.

(3) Remove the assembly from the group case.

(4) If operation is to be resumed without the interrogator computer, install the mode 4 test plug in the interrogator computer receptacle.

c. Removal of Receiver-Transmitter Assembly. To remove the receiver-transmitter assembly from the r-t group case, proceed as follows:

(1) Remove all cables from the connector receptacles on the front panel of the receiver-transmitter.

(2) Proceed as described in *a* (1), *a* (2), *a* (4) and *a* (5), above.

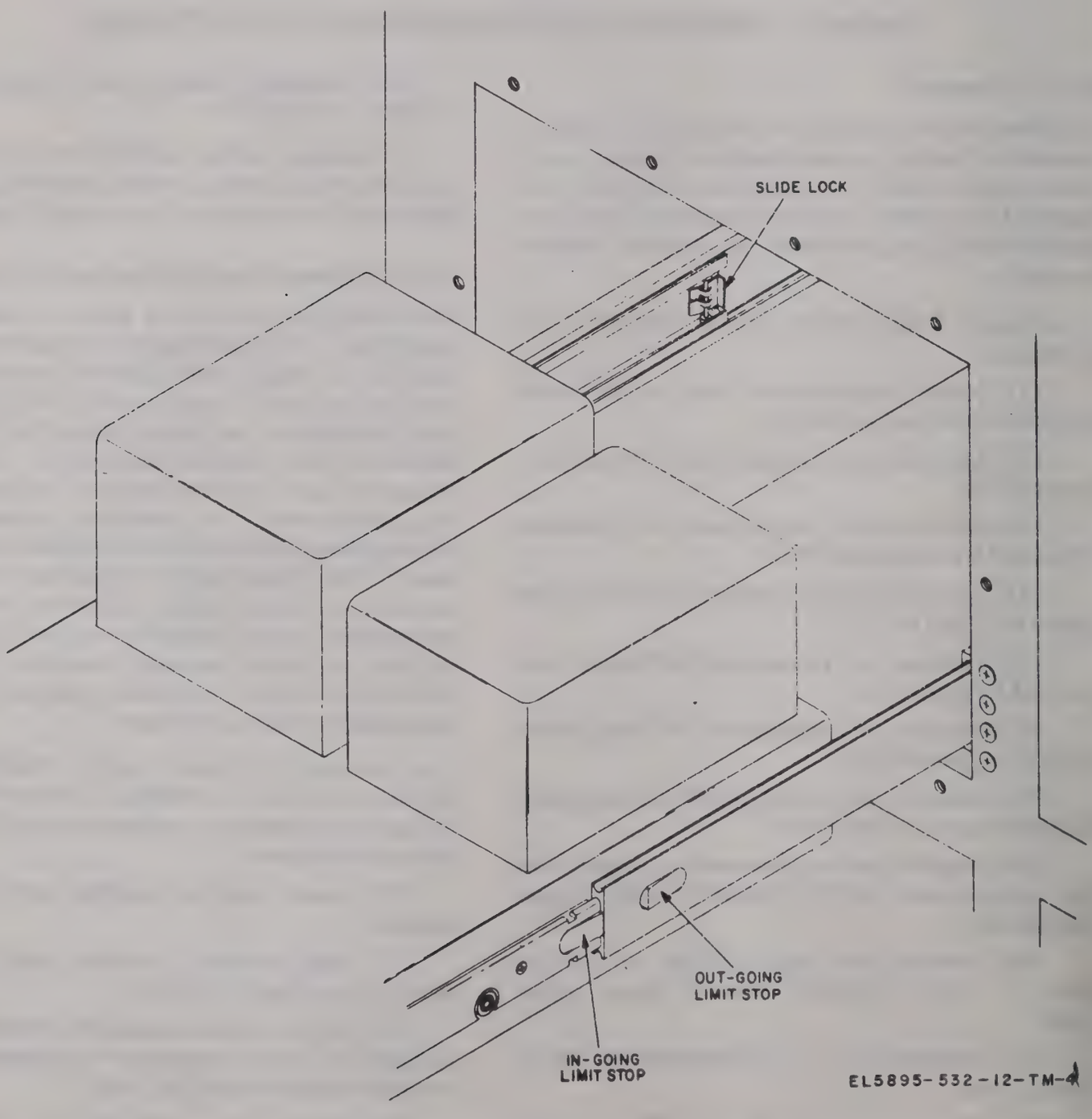


Figure 5-2. Chassis slides.

d. Replacement of Synchronizer, Processor and Antenna Control Assemblies. To replace the synchronizer, processor, or antenna control assembly in the c-d group case, proceed as follows:

(1) Slide the track slides forward to their fully extended position.

(2) Align the slide sections on the assembly with the track slides to engage the two slide sections and slide the assembly forward until the in-going limit stops engage.

CAUTION

Do not use a screwdriver to tighten connector retaining screw. Fingertighten only.

(3) Reconnect the cable connectors to the assembly connector receptacles.

(4) Depress the in-going limit stops and slide the assembly into the group case.

(5) Secure the assembly in the group case with the knurled head captive screws.

e. Replacement of Interrogator Computer. To replace the interrogator computer in the c-d group case, proceed as follows:

(1) If the mode 4 test plug is installed in place of the interrogator computer, remove the mode 4 test plug and place it in its holder in the c-d group case.

(2) Place the end of the interrogator-computer on its guide rails and slide it evenly into the c-d group case until the mating connectors are connected.

(3) Secure the interrogator computer in place by swinging the two retaining latches into position on the front panel and securing them with the latch screws.

f. Replacement of the Reciver-Transmitter Assembly. To replace the receiver-transmitter assembly in the r-t group case, proceed as follows:

(1) Proceed as in *d* (1), *d* (2), *d* (4) and *d* (5) above.

(2) Reconnect the cable connectors to the connector receptacles on the front of the receiver-transmitter assembly.

5-13.1. Removal and Replacement of Isolation Transformer (fig. 2-7.1)

a. Removal. To remove the isolation transformer, proceed as follows:

(1) Remove the radar power cable and the c-d group power cable from connector receptacles J1 and J2, respectively.

(2) Remove six MS51957-43B phillips head screws and six AN960XC8 washers which secure the top of the enclosure.

(3) Remove four MS35650-304 nuts and four MS35338-138 washers which secure the wires to terminals 1, 2, 3, and 4 on T1. Tag and remove wires.

(4) Remove six MS51957-43 phillips head screws which secure the enclosure to the base. Remove the enclosure.

(5) Remove four MS51957-79 phillips head screws and four AN960C416 lockwashers which secure transformer T1 to the base. Remove T1.

b. Replacement. To replace isolation transformer T1, proceed as follows:

(1) Place transformer T1 on the base so that terminals T1-1 and T1-3 are located toward the front of the c-d group case. Secure T1 to the base with four AN960C416 lockwashers and four MS51957-79 phillips head screws.

(2) Place the enclosure in position on the base so that the connectors are facing the rear of the group case. Secure the enclosure to the base with six MS51957-43 phillips head screws.

(3) Install wires tagged in a(3), above, to their appropriate terminals. Secure each wire with one MS35338-138 washer and one MS35650-304 nut.

(4) Place the cover in position on the enclosure so that the decals are readable from the front of the group case. Secure the cover to the enclosure with six AN960XC8 washers and six MS51957-43B phillips head screws.

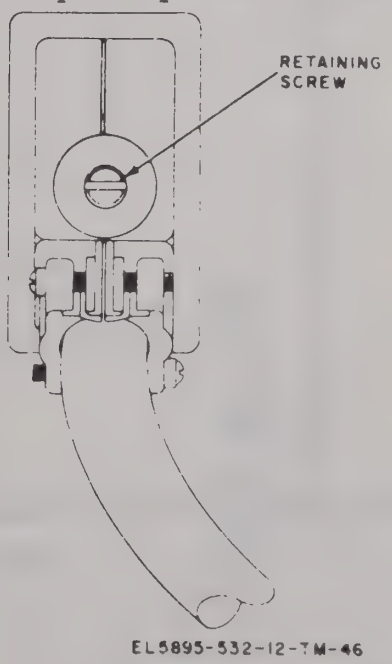


Figure 5-3. Chassis cable connectors.

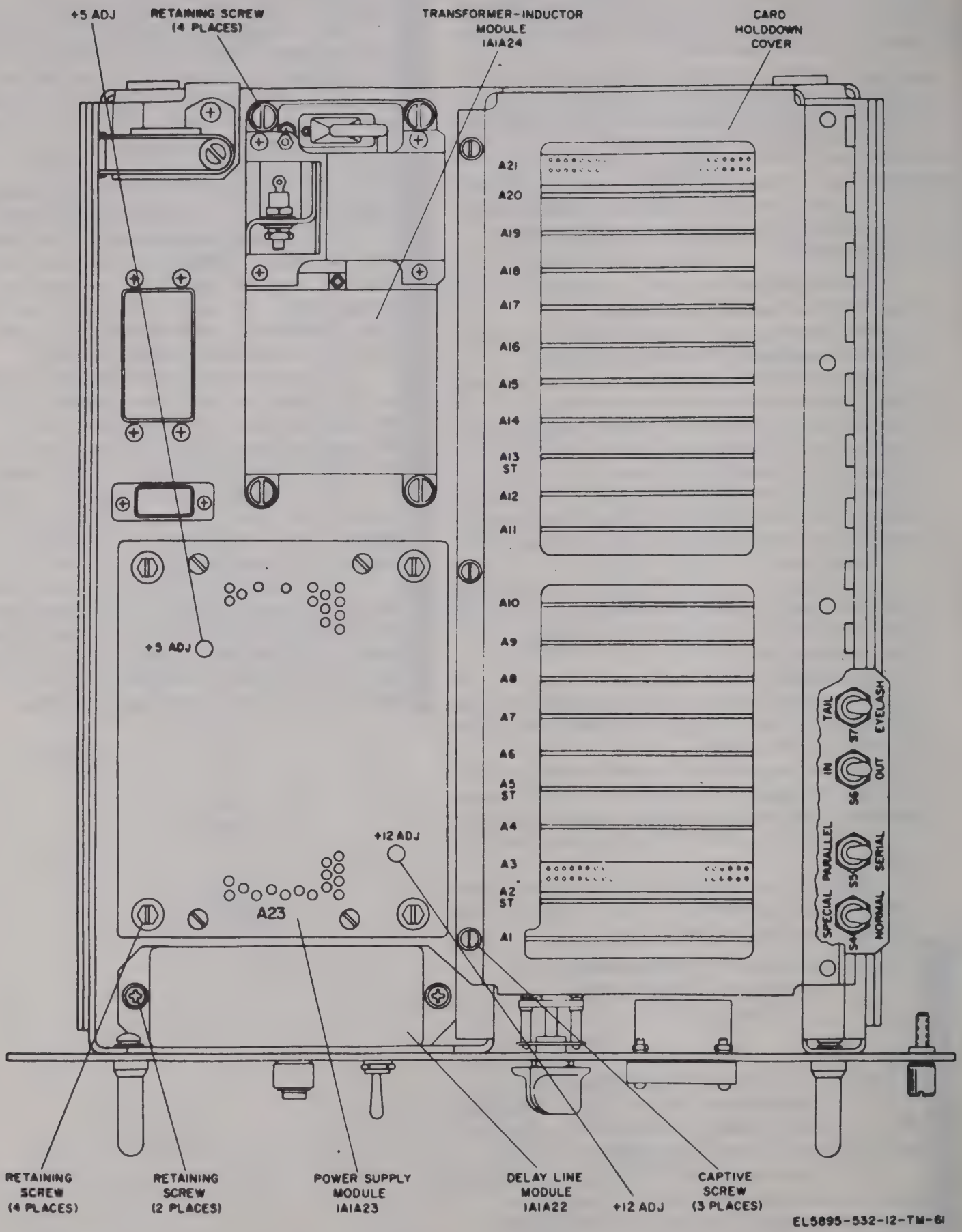


Figure 5-4. Synchronizer assembly, top view.

5-14. Removal and Replacement of Modules (fig. 5-4, 5-5 and 5-6)

Removal and replacement procedures for modules of the iff set are the same in most cases and are described in *a* through *c* below. Special procedures are required for the delay line module (para 5-15), and the receiver-transmitter modules (para 5-16).

a. General. When removing and replacing modules, observe the following precautions:

(1) Use the correct screwdriver for loosening retaining screws.

(2) On memory module 1A3A38, two retaining screws are marked REMOVE FIRST. Two remaining screws are jack screws and must be removed last, by loosening them alternately until module is free (fig. 5-5).

(3) Prior to replacement of modules, check to insure that mating connectors, on the module and within the assembly, are free from dirt or other obstructions, and that no connector pins are bent or broken.

(4) When replacing a module, insure that module locating pins are correctly fitted into guide holes in the chassis.

(5) On memory module 1A3A38, alternately tighten jack screws and then tighten screws marked REMOVE FIRST (fig. 5-5).

b. Removal. To remove a module, loosen all retaining screws while observing precautions in *a* above, and gently lift the module from the assembly.

c. Replacement. When replacing a module, observe the precautions outlined in *a* above, and proceed as follows:

(1) Place module locating pins into the guide holes in the chassis before mating connectors.

(2) Tighten jack screw alternately until module is firmly seated.

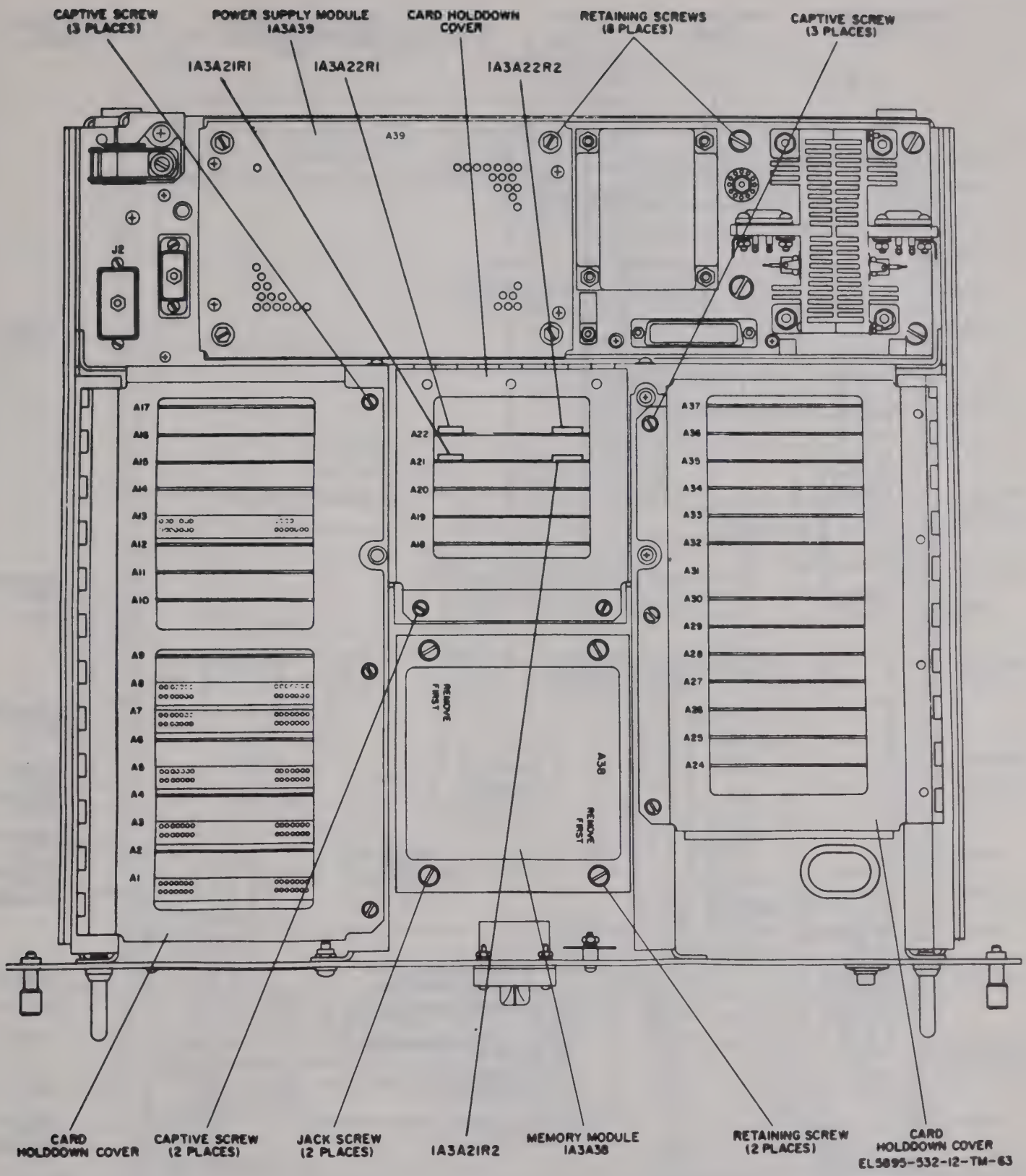


Figure 5–5. Processor assembly, top view.

(3) Tighten screws marked REMOVE FIRST.

5–15. Removal and Replacement of Delay Line Module

(fig. 5–4)

The delay line module differs from other modules of the iff set in that it is not a plug-in item. The connector for the delay line is located under the synchronizer chassis and must be removed first. After removal of the delay line connector, remove the delay line as described in paragraph 5–14.

5–16. Removal and Replacement of Receiver-Transmitter Modules

(fig. 5–7)

a. General. When removing and replacing mod-

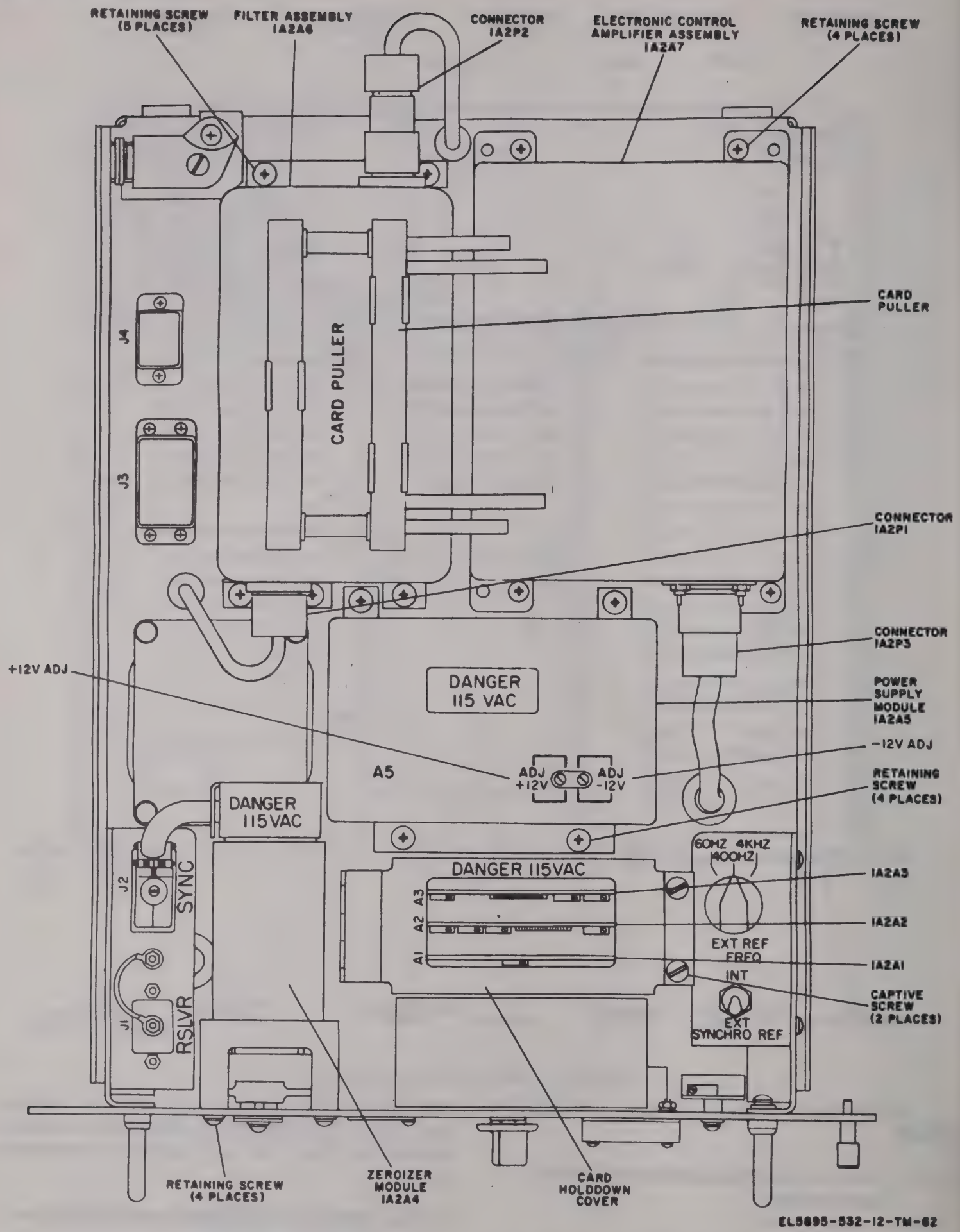


Figure 5–6. Antenna control assembly, top view.

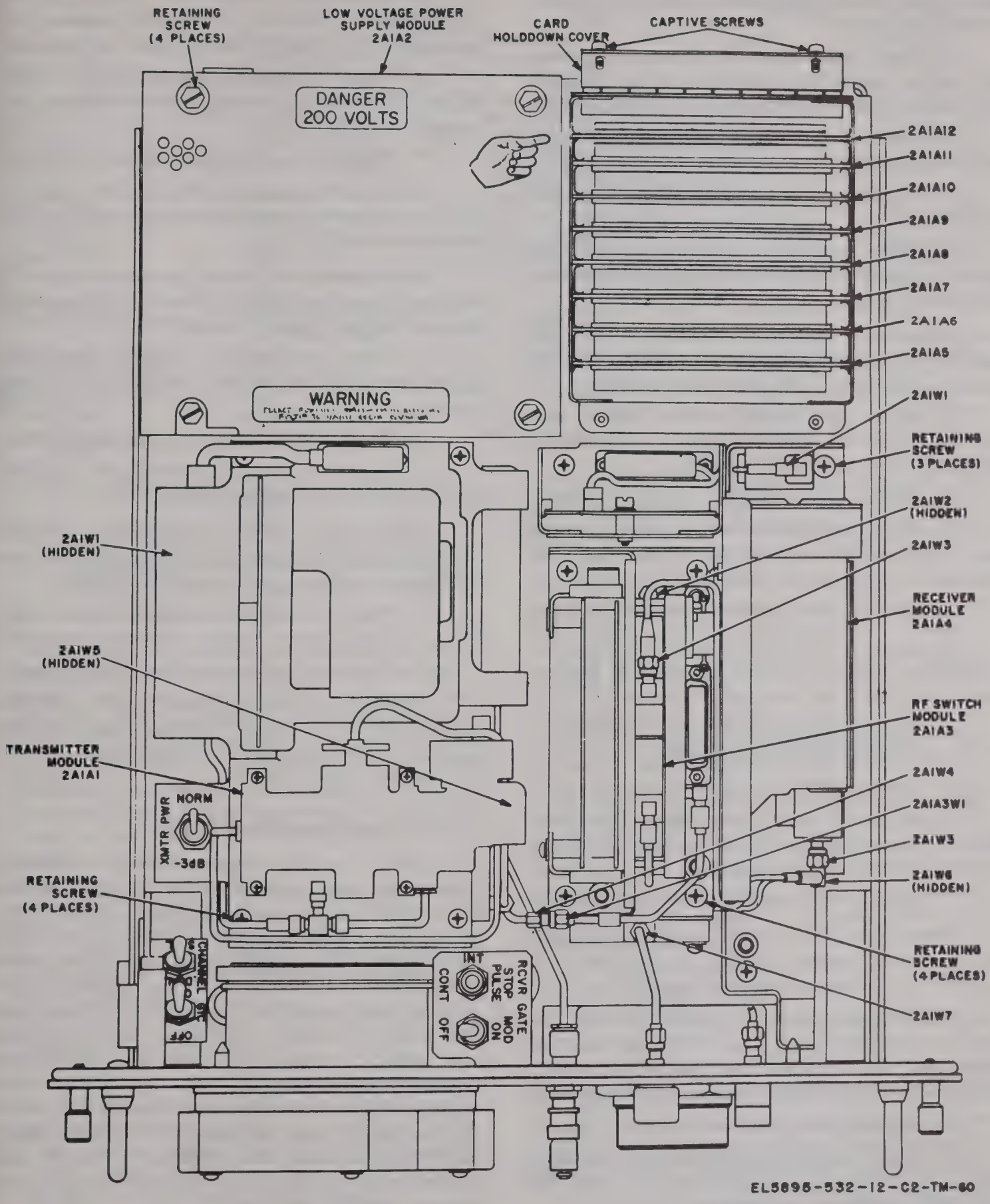


Figure 5-7. Receiver-transmitter assembly, top view.

ules in the receiver-transmitter, observe the following precautions:

(1) Use the correct screwdriver for loosening module retaining screws to avoid damage to screw head slots, and creation of metal splinters.

(2) Exercise care when disconnecting rigid coaxial line connectors.

(3) Do not use rigid coaxial lines for hand holds.

(4) When replacing modules, insure that module locating pins are correctly aligned before mating connectors.

b. Removal of Transmitter Module 2A1A1. To remove the transmitter module, observe the precautions in *a* above and proceed as follows:

(1) Disconnect coaxial cables 2A1W5 and 2A1W1 from transmitter module. Disconnect cable 2A1W4 from cable 2A1A3W1.

(2) Remove four module retaining screws.

(3) Apply uniform upward pressure on each side of the module and lift the module until the electrical connectors are separated.

(4) Remove the module from the chassis.

c. Removal of Receiver Module 2A1A4. To remove the receiver module, observe the precautions in *a* above and proceed as follows:

(1) Disconnect coaxial cables 2A1W1, 2A1W3 and 2A1W6 from receiver module.

(2) Remove three module retaining screws.

(3) Apply uniform upward pressure on each side of the module and lift the module until the electrical connectors are separated.

(4) Remove the module from the chassis.

d. Removal of RF Switch Module 2A1A3. To remove the rf switch module, observe the precautions in *a* above and proceed as follows:

(1) Disconnect coaxial cables 2A1W2, 2A1W3 and 2A1W7 from the rf switch module. Disconnect cable 2A1W4 from cable 2A1A3W1. Disconnect cable 2A1W6 from the receiver module.

(2) Remove four module retaining screws.

(3) Apply uniform upward pressure on each side of the module and lift the module until the electrical connectors are separated.

e. Replacement of Transmitter Module 2A1A1. To replace the transmitter module, observe the precautions in *a* above and proceed as follows:

(1) Place the module locating pins into the guide holes in the chassis before mating connector.

(2) Tighten four module retaining screws.

(3) Connect coaxial cables 2A1W5 and 2A1W1 to transmitter module. Connect cable 2A1W4 to cable 2A1A3W1.

f. Replacement of Receiver Module 2A1A4. To replace the receiver module, observe the precaution in *a* above and proceed as follows:

(1) Place the module locating pins into guide holes in the chassis before mating connectors.

(2) Tighten three module retaining screws.

(3) Connect coaxial cables 2A1W1, 2A1W3 and 2A1W6 to the receiver module.

g. Replacement of RF Switch Module 2A1A3. To replace the rf switch module, observe the precautions in *a* above and proceed as follows:

(1) Place the module locating pins into guide holes in the chassis before mating connectors.

(2) Tighten four module retaining screws.

(3) Connect coaxial cables 2A1W2, 2A1W3 and 2A1W7 to rf switch module. Connect cable 2A1W4 to cable 2A1A3W1. Connect cable 2A1W6 to receiver module.

5-17. Card Group Identification

In order to ease maintenance procedures and to provide for quick identification of card groups, the printed wiring cards are color coded to indicate the card group and the assembly to which they belong. Color coding of printed wiring cards consists of one color at the top center of the card to denote assembly to which it belongs, and one color at the top right of the card to denote card group to which it belongs. If a card type is used in more than one card group, the color coding at the top right will consist of colors for each of the card groups. The following chart lists the individual card groups as well as the assembly and group color codes, and the reference designations for the cards.

Assembly	*Card group*	*Card ref desig*	*Assembly (center) color*	*Card group (corner) color*
Synchronizer	Timing	1A1A1 through 1A1A4	Red	Yellow
Synchronizer	Coder-decoder	1A1A5 through 1A1A12	Red	White
Synchronizer	Interface	1A1A13 through 1A1A20	Red	Dark green

Assembly	Card group	Card ref desig	Assembly (center) color	Card group (corner) color
Synchronizer	Post Trigger Generator	1A1A21	Red	Blue
Synchronizer	Power Supply Module 1A1A23	1A1A23A1 through 1A1A23A3	Red	Red
Antenna Control		1A2A1 through 1A2A3	Orange	White
Processor	Target Arithmetic	1A3A1 through 1A3A4	Brown	Blue
Processor	Friend Arithmetic	1A3A5 through 1A3A9	Brown	White
Processor	Memory Sensing	1A3A10 through 1A3A12 and 1A3A28 through 1A3A37	Brown	Dark green
Processor	Self-Test	1A3A13 through 1A3A17	Brown	Yellow
Processor	Timing	1A3A18 through 1A3A20	Brown	Light green
Processor	Power Supply	1A3A21 and 1A3A22	Brown	Red
Processor	Memory Inhibit	1A3A24 through 1A3A27	Brown	Orange
Receiver-transmitter	Transmitter module 2A1A1	2A1A1A1	Light green	Blue
Receiver-transmitter	Low voltage power supply module 2A1A2A1	2A1A2A1A1 through 2A1A2A1A	Light green	Red
Receiver-transmitter	Rf switch	2A1A3A1 and 2A1A3A2	Light green	Light green
Receiver-transmitter	Receiver self-test	2A1A4A2	Light green	Brown
Receiver-transmitter	Video	2A1A5 through 2A1A12	Light green	Yellow
Control box	Lamp driver	5A1	Yellow	Light green
Control panel 1	Lamp driver	6A1	Yellow	Light green

5–18. Removal and Replacement of Cards

CAUTION

Before removing or replacing cards, remove power from the associated assembly by setting the assembly POWER circuit breaker to OFF.

Replacement of cards at organizational maintenance level is performed only when the operational check has indicated that a card or group of cards must be replaced. Removal and replacement of cards is described in *a* and *b*, below respectively. Card substitution (*c*, below) is used to isolate a malfunction of a group of cards to one card. This method is used when the operational check indicates that a card group must be replaced.

a. Removal of Cards. To remove cards from a card rack, proceed as follows:

(1) Slide the indicated assembly out of the group case until the outgoing slide limit locks engage (para 5–13).

(2) Loosen captive screws on card hold-down cover and raise cover.

(3) Remove the card puller from its storage location. The card puller is located on the back of the blank panel in the AN/TPX–46(V) 3 configuration and on the top of filter assembly 1A2A6 (fig. 5–6) on the antenna control assembly chassis in all other configurations.

(4) Place the extractor pins of the card puller through holes located near the top of each side of the card.

(5) While insuring that the card puller end posts are firmly set on the card rack chassis, firmly squeeze the extractor grips together. This will disengage the card connector from the connector receptacle.

(6) Remove the card from the card rack while taking care not to damage card.

(7) Replace the card puller in its storage location.

b. Replacement of Cards. Install the card into its connector receptacle, observing the guide key, and press it evenly and firmly into place.

c. Card Substitution. Do not substitute printed wiring cards indiscriminately. Card substitution should be used only when a card group is found to be defective by the operational check. When substituting cards, refer to paragraph 5–17 for color coding of defective card group and proceed as follows:

(1) Remove one card at a time from the defective card group.

(2) As each card is removed, substitute a known good card.

(3) Each time a substitute card is installed, set associated assembly POWER switch to ON.

(4) Repeat steps (1) through (3) until the FAULT indicator lamp does not light when assembly POWER circuit breaker is set to ON.

(5) If this maintenance is being performed during normal operating time, proceed to (6) below or if during normal down time, proceed to (9) below.

(6) Close card hold-down cover and secure it with captive screws.

(7) Resume normal operation.

(8) Tag removed cards for reinstallation during normal down time.

(9) Clean connector pins of removed cards with inhibisol cleaning solvent or a solution of 70 percent alcohol and 30 percent distilled water.

(10) Replace the cards one at a time, as described in (1), (2), and (3) above, with exception of last card removed ((4) above).

(11) Return known good cards to storage.

(12) Close card hold-down cover and secure it with captive screws.

5–19. Removal and Replacement of Lamp Driver Card 5A1 From Control Box (fig. 5–8)

a. Removal. Remove lamp driver card 5A1 from the control box as follows:

(1) Remove captive retaining screws to release the control box front panel from the control box case.

(2) Swing the front panel out from case; be careful not to damage the wiring harness.

(3) Remove the two retaining screws from the board clamping bar and raise the bar.

(4) Using a card puller, remove lamp driver board from card receptacle.

b. Replacement. Replace lamp driver card 5A1 as follows:

(1) Place the lamp driver card in position on board receptacle; insure that component side of card is facing out and that lamp driver card connector is correctly aligned with the card receptacle.

(2) Apply uniform downward pressure on each top corner of the lamp driver card, and press the lamp driver card into place in the card receptacle.

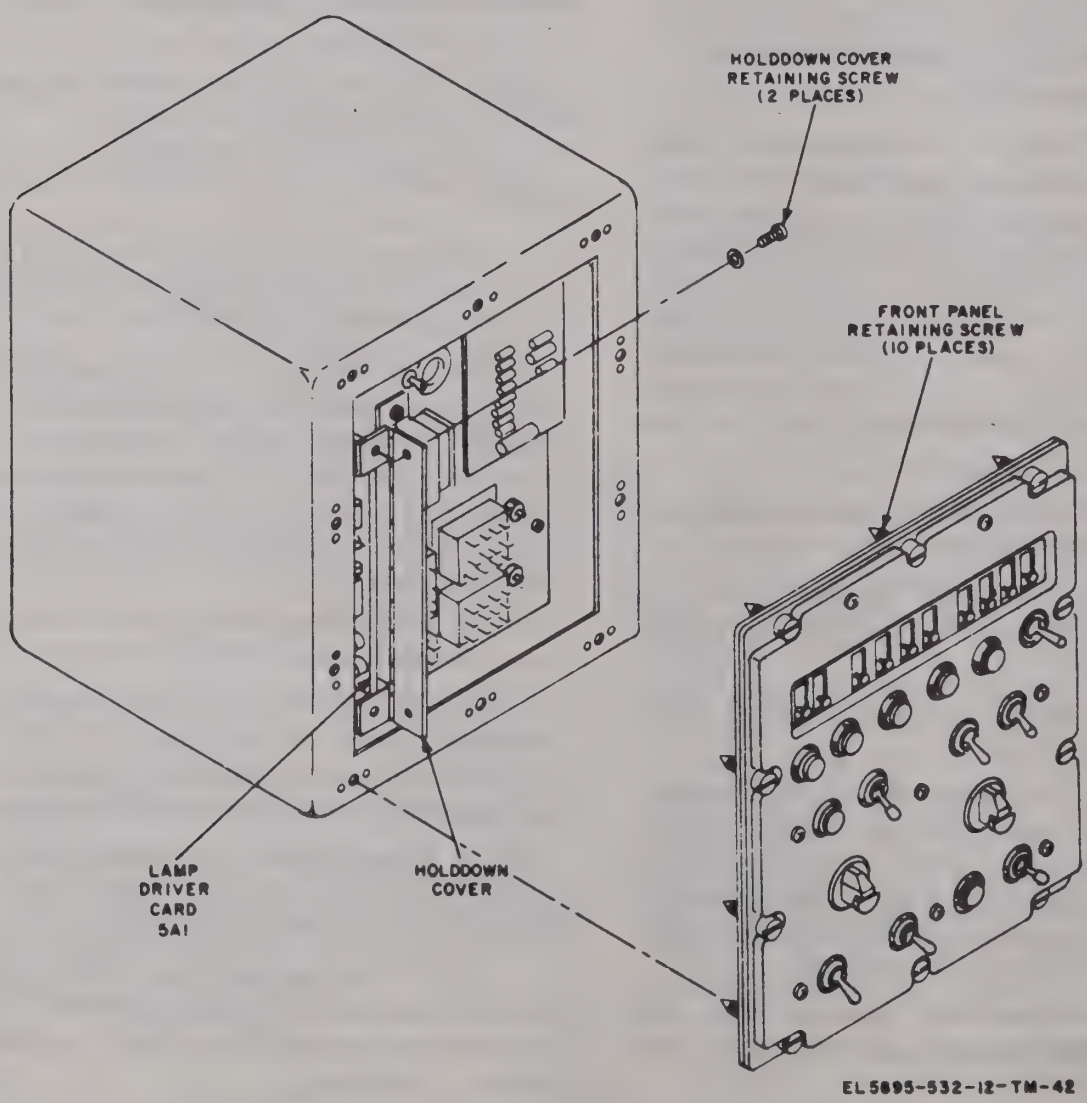


Figure 5–8. Control box, lamp driver board and code select switch locations.

(3) Install the card clamping bar in place on top of the lamp driver card and secure it with two retaining screws.

(4) Reinstall the control box front panel on the control box case and secure it with ten phillips-head retaining screws.

5-20. Removal and Replacement of Lamp Driver Card 6A1 From Control Panel 1 (fig. 5-9)

a. Removal. Remove lamp driver card 6A1 from control panel 1 as follows:

(1) Remove 18 phillips head retaining screws

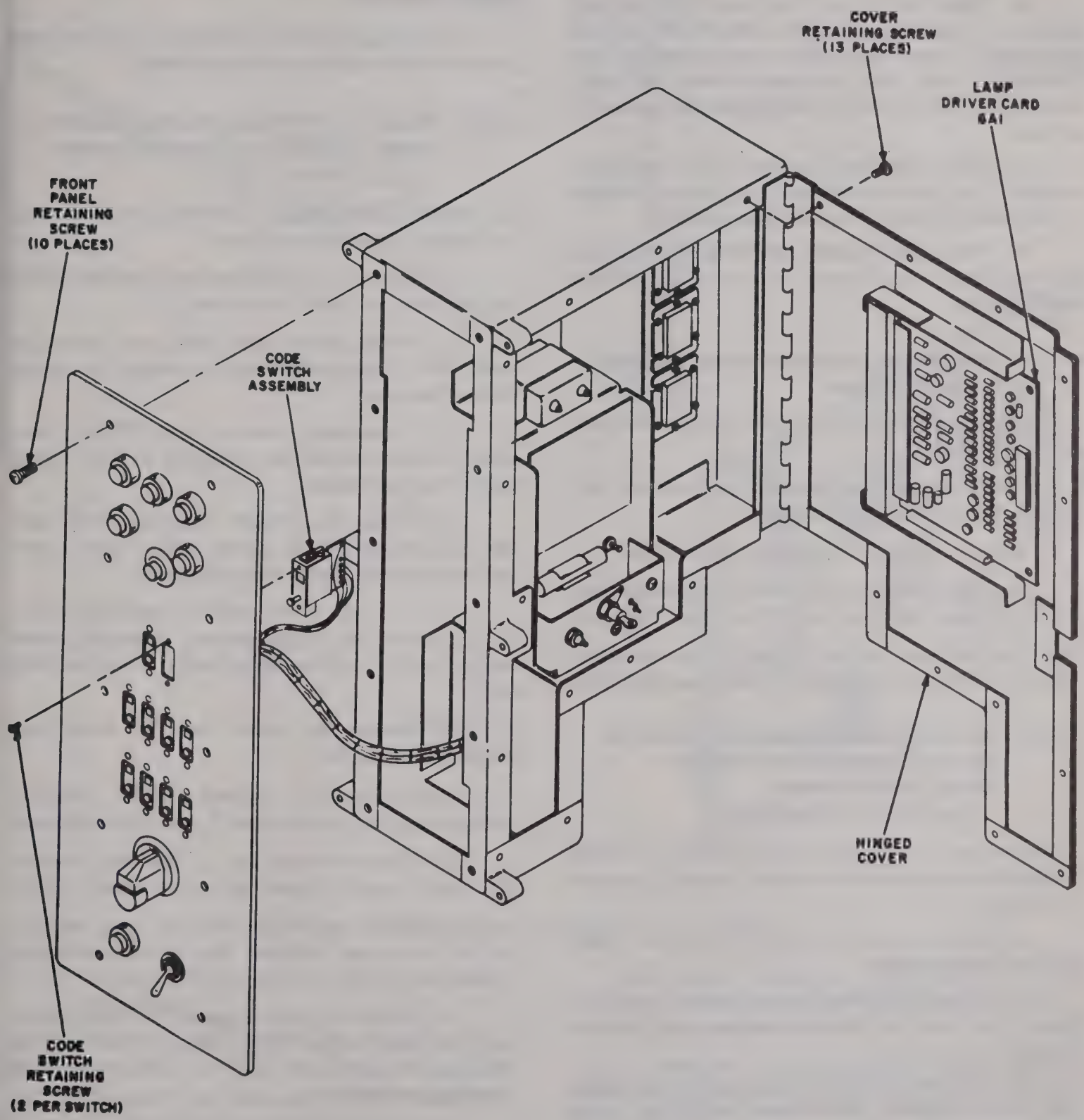


Figure 5-9. Control panel 1, lamp driver card and code select switch locations.

which secure the hinged cover on the side of control panel 1. Open the hinged cover.

(2) Using a card puller, remove lamp driver card 6A1 from board receptacle.

b. Replacement. Replace lamp driver card 6A1 in control panel 1 as follows:

(1) Place the lamp driver card in the card receptacle, insuring that the component side of the board is away from the hinged cover of control panel 1 and that the lamp driver card connector and the connector receptacle are correctly aligned.

(2) Apply uniform pressure on each top corner of the lamp driver card and press the lamp driver card into position in the receptacle.

(3) Place the hinged cover in position on control panel 1 and secure it, using 13 phillips head screws.

5-21. Removal and Replacement of Indicator Lamps or Lenses

To remove and replace defective lamps or lenses, proceed as follows:

a. Rotate the lens holder counterclockwise and remove it from the lamp assembly.

b. Remove the lamp from the lens holder.

c. Replace the lamp with one of identical rating or replace the lens holder with a new one.

d. Replace lens holder in the lamp assembly and secure it by rotating it in a clockwise direction.

5-22. Removal and Replacement of Control Box and Control Panel 2 CODE SELECT Switch Lamps

(fig. 5-8, 5-10 and 5-11)

a. Removal. To remove CODE SELECT switch lamps of the control box or control panel 2, proceed as follows:

(1) Loosen captive retaining screws which secure the front panel.

(2) Swing the front panel away from the case being careful not to damage the wiring harness.

(3) On the defective code switch assembly (fig. 5-11), loosen the contact retaining screw and swing the upper contact away from the lamp end.

(4) Remove the lamp from the lower contact and lamp socket.

b. Replacement. To replace the CODE SELECT switch lamps, proceed as follows:

(1) Place the bulb end of the lamp through the lower contact into the lamp socket.

(2) Swing the upper contact into position on the lamp end and tighten the upper contact retaining screw.

(3) Swing the front panel into position and secure it with captive retaining screws.

5-23. Removal and Replacement of Control Panel 1 CODE SELECT Switch Lamps

(fig. 5-9 and 5-11)

To remove CODE SELECT switch lamps of control panel 1, proceed as follows:

(1) Remove ten Phillips head screws which secure the front panel to the case.

(2) Gently remove the front panel from the case while taking care not to stretch or strain wiring harness.

(3) If necessary, remove two Phillips head screws which secure the defective switch assembly to the front panel.

(4) Swing the switch assembly with gasket out of the switch group while taking care not to stretch or strain wiring harness.

(5) On the code switch assembly (fig. 5-11), loosen the upper contact retaining screw and swing the upper contact away from the lamp end.

(6) Remove the lamp from the lower contact and lamp socket.

b. Replacement. To replace CODE SELECT switch lamps of control panel 1, proceed as follows:

(1) Place the bulb end of the lamp through the lower lamp contact into the lamp socket.

(2) Swing the upper contact into position on the lamp and tighten the contact retaining screw.

(3) Swing the switch assembly with gasket into position on the front panel, while insuring that gasket holes are aligned with screw holes in switch assembly.

(4) Secure the switch assembly to the front panel with two Phillips head screws.

(5) Install front panel onto the case and secure it with ten Phillips head screws.

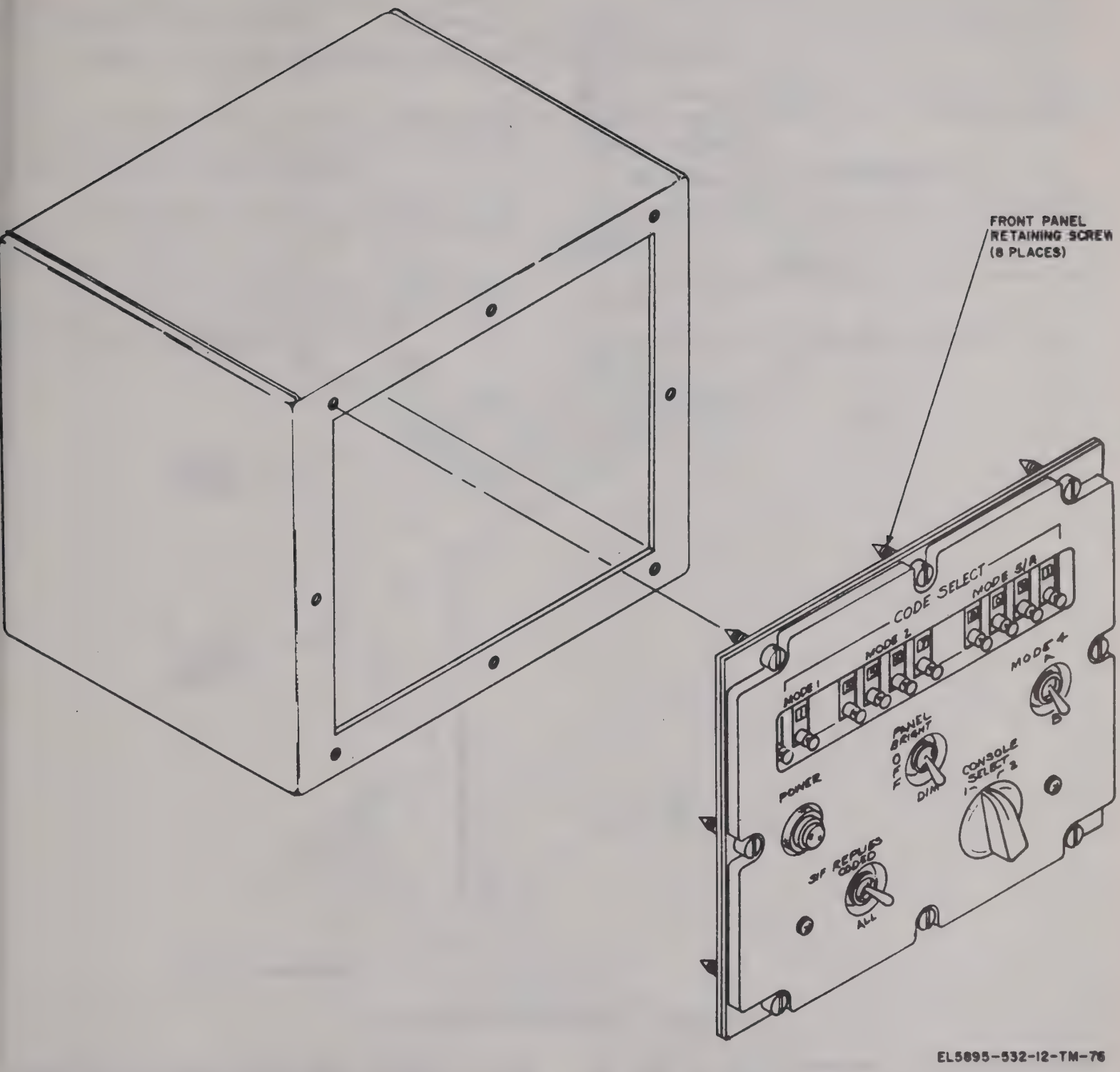


Figure 5–10. Control panel 2, code select switch locations.

5–24. Replacement or Adjustment of Knobs and Dials

a. Replacement. To replace a knob or dial, proceed as follows:

(1) Loosen the setscrew on the defective knob or dial and remove from its shaft.

(2) Place the new knob or dial on its shaft and tighten the setscrew.

(3) Rotate the knob or dial to its extreme clockwise position.

(4) Loosen setscrew and position knob or dial to the extreme clockwise indicated position.

(5) Tighten setscrew.

b. Adjustment. To adjust a knob or dial, tighten setscre and proceed as described in *a* (3) through *a* (5), above.

5–25. Minor Cable Repairs

Repair of cables at organizational maintenance level consists of repair of cuts, breaks, or worn

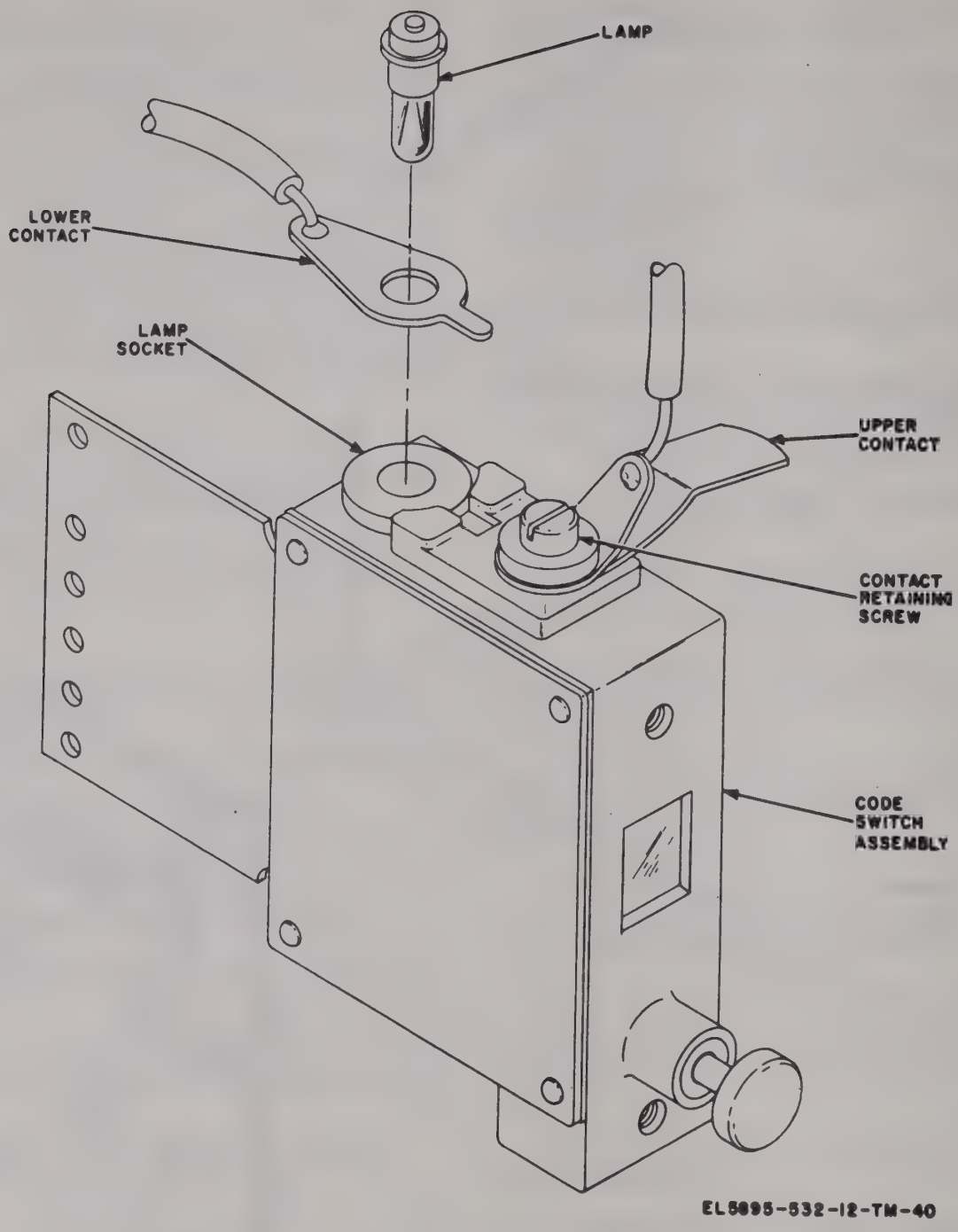


Figure 5–11. Code select switch lamp removal.

spots in the cable insulation. This is done by covering the damaged spot first with rubber tape and then with friction tape. Broken or shorted cable conductors are to be repaired by direct support maintenance personnel.

5–26. Cleaning and Replacement of Air Filters

The iff set has two air filters, one is located on the right side of the c–d group case (fig. 5–12) and the other on the front panel of the receiver-transmitter (fig. 5–13). To remove, clean, and replace filters, proceed as follows:

a. Remove the c–d group case filter by loosening two knurled head captive screws, swing filter holder out, and remove the filter from the filter holder. Insert spare filter as described in *e.* below.

b. Remove the receiver-transmitter filter by loosening six Phillips head retaining screws which secure the filter cover to the receiver-transmitter front panel. Remove the filter cover, retaining plate, and filter from the receiver-transmitter. Insert the spare filter as described in *d.* below.

c. To clean the filters, proceed as follows:

(1) Tape the filter edge lightly to remove loose dirt.

(2) Wash the filter in hot water using dish-

washing compound or detergent; use a brush to remove dirt from the wire mesh.

(3) Rinse the filter thoroughly with hot water.

(4) Shake the filter to remove excess water and place it flat on two supports to drain. Let it dry thoroughly before reoiling.

(5) Dip the filter in a bath of MIL-L-2104B Grade 30 filter oil. Tap the edge lightly against the tub to remove excess oil.

(6) Place the filter flat on two supports with the arrow pointing up. Allow the filter to drain 8 to 16 hours before replacing.

(7) Cleaned filter is to be stored as a spare.

d. To replace the receiver-transmitter filter, proceed as follows:

(1) Place the filter over guide pins so that the arrow on the filter is up and pointing to the receiver-transmitter.

(2) Place retaining plate over filter.

(3) Install the filter cover over the retaining plate and secure it with six Phillips head screws.

e. To replace the c-d group filter, proceed as follows:

(1) Place the filter into the filter holder

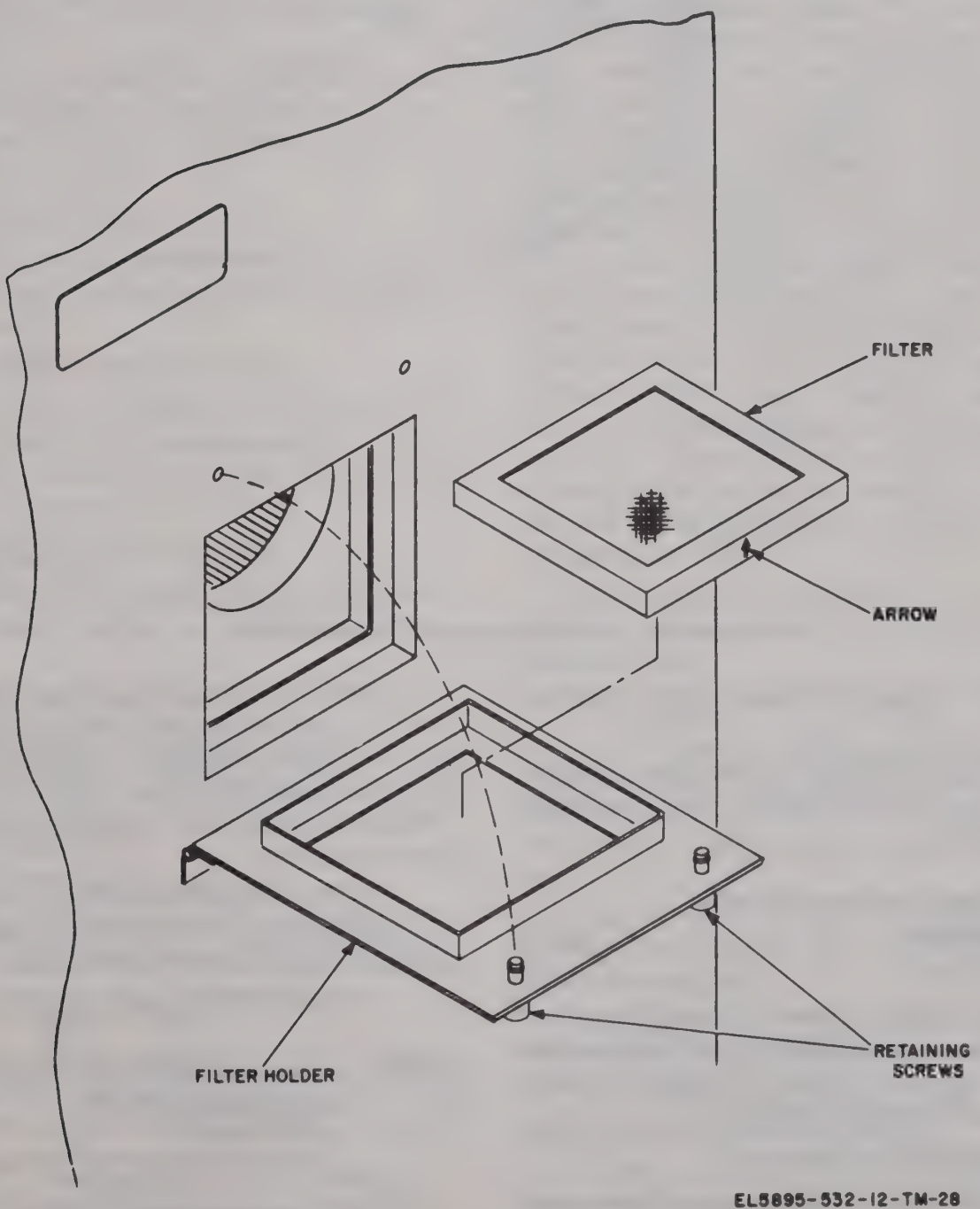


Figure 5-12. C-d group case filter location.

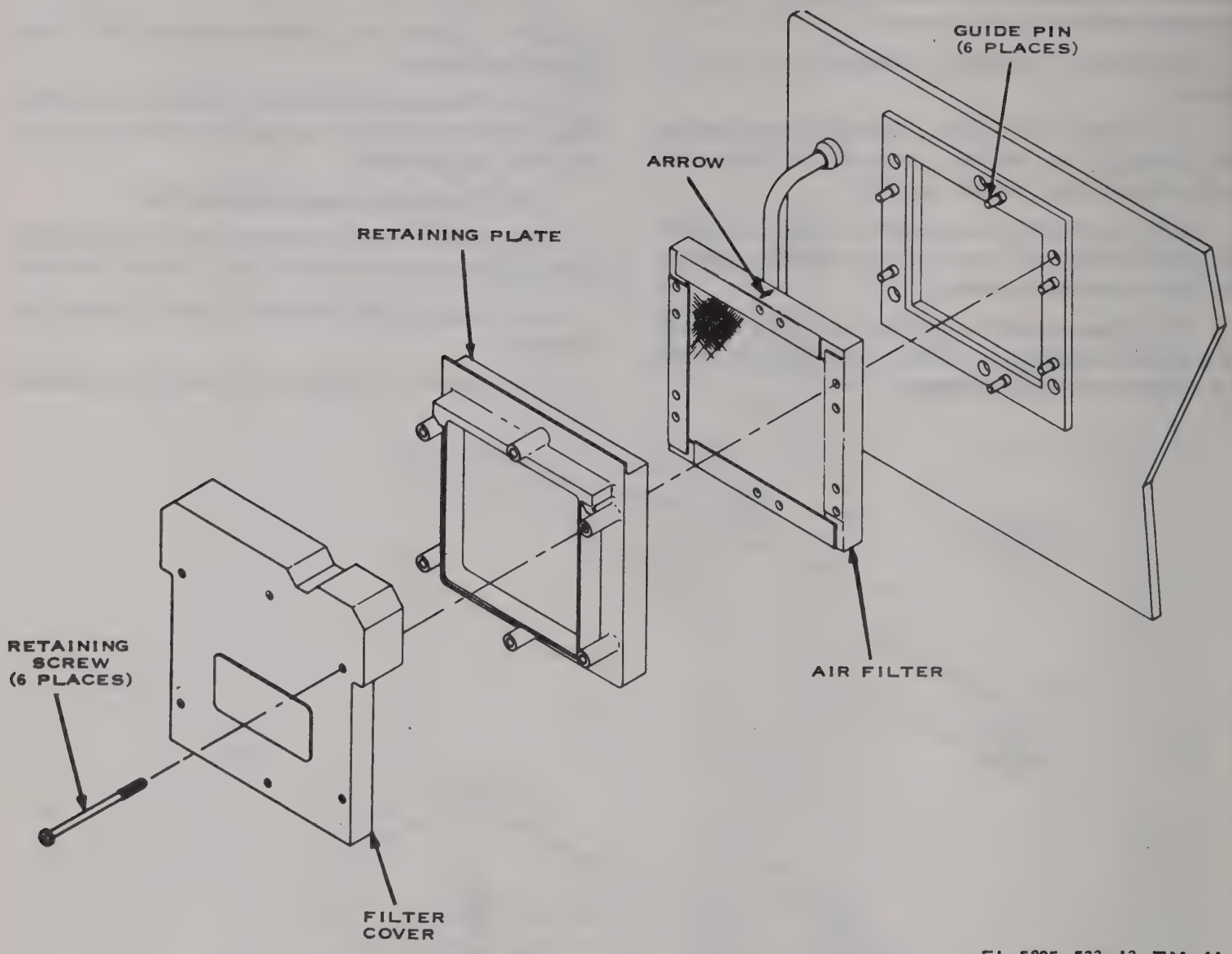


Figure 5-13. Receiver-transmitter filter location.

with the arrow up and pointing to the c–d group case.

(2) Swing the filter holder into position on the group case and secure it with captive retaining screws.

5–27. Synchronizer Power Supply Adjustment
(fig. 5–4)

a. Plus 5-Volt Adjustment. The setting of +5 ADJ potentiometer 1A1A23A2A1R1 determines the +5-volt regulator output voltage. To make this adjustment, proceed as follows:

(1) Set METER switch to +5.

(2) Adjust +5 ADJ for a center green area reading on PWR SUP TEST meter.

(3) Set METER switch to OUT.

b. Plus 12-Volt Adjustment. The setting of +12 ADJ potentiometer 1A23A1A1R1 determines the +12-volt regulator output voltage which, in turn, establishes the −12-volt output of the −12 volt regulator to make this adjustment, proceed as follows:

(1) Set METER switch to +12.

(2) Adjust +12 ADJ for a center green area reading on PWR SUP TEST meter.

(3) Set METER switch to OUT.

5–28. Antenna Control Assembly Power Supply Adjustments
(fig. 5–6)

a. Plus 12-Volt Adjustment. The setting of +12V ADJ potentiometer 1A2A5A1R1 determines the +12-volt regulator output voltage. To make this adjustment, proceed as follows:

(1) Set METER switch to +12V.

(2) Adjust +12V ADJ for a center green area reading on PWR SUP TEST/NULL meter.

(3) Set METER switch to OUT.

b. Minus 12-Volt Adjustment. The setting of −12V ADJ potentiometer 1A2A5A1R2 determines the −12-volt regulator output voltage. To make this adjustment, proceed as follows:

(1) Set METER switch to −12V.

(2) Adjust −12V ADJ for a center green area reading on PWR SUP TEST/NULL meter.

(3) Set METER switch to OUT.

5–29. Processor Power Supply Adjustments (fig. 5–5)

a. +12-Volt Adjustment. The setting of potentiometer 1A3A21R1 determines the +12-volt regulator power output voltage. To make this adjustment, proceed as follows:

(1) Set METER switch to +12V.

(2) Adjust potentiometer 1A3A21R1 for a center green area reading on PWR SUP TEST meter.

(3) Set METER switch to OUT.

b. Minus 5-Volt Adjustment. The setting of potentiometer 1A3A22R2 determines the −5-volt regulator output voltage. To make this adjustment, proceed as follows:

(1) Set METER switch to −5V.

(2) Adjust potentiometer 1A3A22R2 for a center green area reading on PWR SUP TEST meter.

(3) Set METER switch to OUT.

c. Plus 5-Volt Adjustment. The setting of potentiometer 1A3A22R1 determines the +5-volt regulator output voltage. To perform this adjustment, proceed as follows:

(1) Set METER switch to +5V.

(2) Adjust potentiometer 1A3A22R1 for a center green area reading on PWR SUP TEST meter.

(3) Set METER switch to OUT.

d. Memory Voltage Adjustment. The setting of potentiometer 1A3A21R2 determines the memory voltage regulator output voltage. To perform this adjustment proceed as follows:

NOTE

This adjustment should not be performed unless equipment temperature can be allowed to stabilize to room temperature. Once stabilized (approximately one hour), the adjustment procedures must be performed within 10 minutes after equipment turn-on.

(1) Set METER switch to MEMORY.

(2) Adjust potentiometer 1A3A21R2 for a center green area reading on PWR SUP TEST meter.

(3) Set METER switch to OUT.

5–30. Adjustment of Iff Display Azimuth for Testing of Co-operative Sites

a. In installations where iff operation is shared with the operation of other services or the FAA, it is possible that the AN/TPX–46 equipment will passively use iff display video from other equipment. Since in this type of application the active features of the AN/TPX–46 are not used, it will be required to perform a tactical operational check daily or as scheduled by cognizant authority. When performing such tests, it is necessary to avoid interference with the other operational iff equipment in the area by shifting the iff antenna 90-degrees in azimuth relative to the radar antenna. When this is done, it should be noted that all azimuth readings will be erroneous; however, for purposes of testing, the operational status of the equipment results of this nature are acceptable. To shift the iff antenna azimuth, proceed as follows:

(1) At the antenna control assembly, open AZ ADJ access cover by loosening the captive retaining screw.

(2) Loosen AZ ADJ LOCK.

(3) Rotate AZ ADJ control three full turns counterclockwise for an approximate 90 degree clockwise movement of the iff antenna, or three full turns clockwise for a counterclockwise offset.

(4) Check the offset position by setting STROBE switch to ON and observing strobe position on display.

(5) Adjust AZ ADJ control as required to achieve an offset of 90 degrees.

(6) Tighten AZ ADJ LOCK, and replace and secure AZ ADJ access cover.

b. After tests have been completed, return equipment to operational status by performing procedure in paragraph 2–55.

CHAPTER 6
MATERIAL USED IN CONJUNCTION WITH INTERROGATOR SET AN/TPX-46(V)

6-1. General

Material used in conjunction with the iff set consists of the Interrogator Computer KIR-1A/TSEC, Code Key KIK-18/TSEC, and Mast AB-621/G. These items are required, but are not part of the iff set, and will be supplied to the sites where they are to be used.

6-2. Interrogator Computer KIR-1A/TSEC

The interrogator computer, which is cryptomaterial, is required for encoding of mode 4 interrogations and time decoding of mode 4 replies. It is equipped with Power Supply ZACA/TSEC, for operation with a power input of 115 volts, single phase ac, at 60 or 400 Hz. Maintenance instructions for the interrogator computer are contained in KAM-225B/TSEC, Limited Maintenance Manual KIR-1A/TSEC and KIT-1A/TSEC; and KAM-223B/TSEC, Maintenance Manual KIR-1A/TSEC. Security regulations for the interrogator computer are contained in KAO-75/TSEC, Operating Instructions for KIR-1A/TSEC and KIT-1A/TSEC.

6-3. Code Key KIK-18/TSEC

Code Key KIK-18/TSEC is required for setting codes into the interrogator computer. The manuals which apply to the interrogator computer also apply to the code key.

6-4. Mast AB-621/G

Mast AB-621/G is required for use with Antenna AS-2167/TPX-46(V) and Pedestal, Antenna AB-1076/TPX-46(V). Mast AB-621/G provides a mount of up to 50 feet (in 5-foot increments) for the antenna and pedestal. Operation and installation instructions for Mast AB-621/Glare contained in TM 11-5985-334-15, Operators, Organizational, Direct Support, General Support, and Depot Maintenance Manual.

6-5. Tower AB-216/U

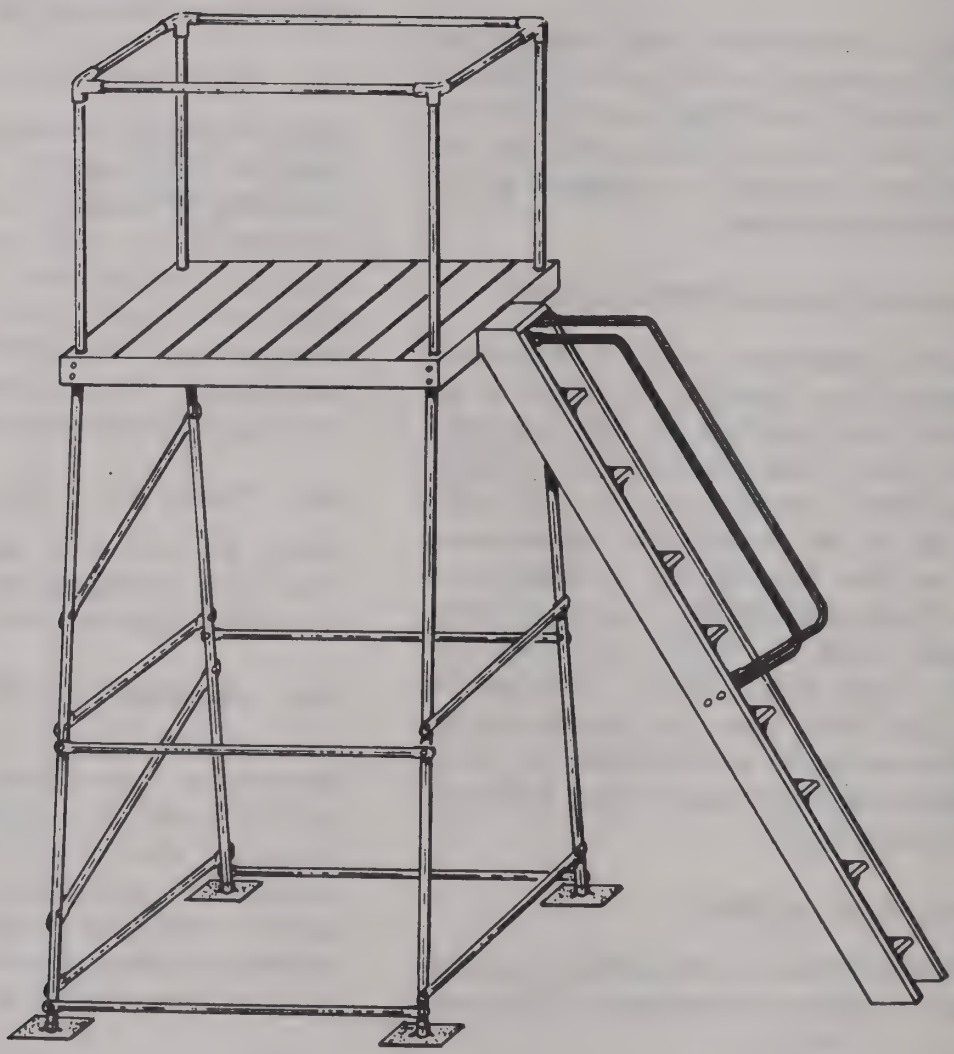
Tower AB-216/U is required for use at co-use FAA sites. Installation instructions for Tower AB-216/U are contained in TM 11-5073.

6-6. Antenna Access Platform

An antenna access platform is supplied by Tobyhanna Army Depot for each installation of AN/TPX-46(V) configurations that use Mast Assembly AB-621/G. This platform, or suitable equivalent, is required for safe access to the antenna assembly for maintenance and alignment procedures when the mast is lowered. The platform is illustrated in figure 6-1.

6-7. Installation Kit, Mast Erection MK-1730/G

Installation Kit, Mast Erection MK-1730/G is required in configurations of the AN/TPX-46(V) that use Mast Assembly AB-621/G.



EL5895-532-12-TM-97

Figure 6–1. Antenna access platform.

CHAPTER 7

DESTRUCTION OF MATERIEL TO PREVENT ENEMY USE

7-1. Authority for Destruction

Destruction of the equipment will be accomplished only upon order of the commander. Use the destruction procedures in TM 750-244-2 to prevent further use of the equipment.

7-2. Priorities for Destruction

The following order of priority is suggested for Interrogator Sets AN/TPX-46(V)1, AN/TPX-(V)2, AN/TPX-46(V)3, AN/TPX-46(V)4, and AN/TPX-46(V)6.

a. Give the highest priority to cryptomaterial and other literature, in that order, pertaining to code settings.

b. Interrogator Computer KIR-1A/TSEC is cryptomaterial. Refer to KAM-225B/TSEC, Maintenance Manual KIR-1A/TSEC for methods of destruction for this unit.

c. Remove and destroy program connectors from the processor. Then destroy the processor.

d. Destroy the receiver-transmitter, synchronizer, antenna control, control box, pedestal, antenna and c-d group case, in that order.

e. Destroy the cables and spare parts last.

APPENDIX A

REFERENCES

Following is a list of references available to the operator and organizational maintenance personnel of Interrogator Set AN/TPX-46(V).

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	US Army Equipment Index of Modification Work Orders.
FM 21-40	Chemical, Biological, Radiological, and Nuclear Defense.
SB 11-573	Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment.
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies and Equipment Used by the Army.
SC 5180-91-CL-R13	Tool Kit, Electronic Equipment TK-101/G.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment.
TM 3-220	Chemical, Biological, and Radiological (CBR) Decontamination.
TM 11-5073	Towers AB-216/U and AB-216A/U, Tower Section AB-298/U, Guy Kit MK-99/U, Accessory Kit MK-100/U, and Guy Kit MK-101/U.
TM 11-5895-532-ESC	Equipment Serviceability Criteria for Interrogator Set AN/TPX-46(V) 1,2,3,4, and 6.
TM 11-5985-334-15	Operator, Organizational, DS, GS and Depot Maintenance Manual Including Repair Parts and Special Tiiks List: Mast AB-621/G.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).
TM 9-1430-534-12-1	Operator and Organizational Maintenance Manual: Radar Set AN/MPQ-50(XO-1) (Improved HAWK Air Defense Guided Missile System).
TM 9-1400-250-15/3	Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual: General and Preventive Maintenance Services (NIKE-HERCULES and Improved NIKE-HERCULES air Defense Guided Missile Systems and NIKE-HERCULES Anti-Tactical Ballistic Missile System).

APPENDIX B

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

B–1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

B–2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

b. Test. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc. This is accomplished with external test equipment and does not include operation of the equipment and operator type tests using internal meters or indicating devices.

c. Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

d. Adjust. To rectify to the extent necessary to bring into proper operating range.

e. Align. To adjust two or more components or assemblies of an electrical or mechanical system so that their functions are properly synchronized. This does not include setting the frequency control knob of radio receivers or transmitters to the desired frequency.

f. Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

g. Install. To set up for use in an operational environment such as an encampment, site, or vehicle.

h. Replace. To replace unserviceable items with serviceable like items.

i. Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. Overhaul. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

k. Rebuild. The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

l. Symbols. The uppercase letter placed in the appropriate column indicates the lowest level at

which that particular maintenance function is to be performed.

B–3. Explanation of Format

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Functional Group. Column 2 lists the noun names of components, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

Code	*Maintenance category*
C	Operator/crew
O	Organizational maintenance
F	Direct support maintenance
H	General support maintenance
D	Depot maintenance

d. Column 4, Tools and Test Equipment. Column 4 specifies, by code, those tools and test equipments required to perform the designated function. The numbers appearing in this column refer to specific tools and test equipment which are identified in table I.

e. Column 5, Remarks. Self-explanatory.

B–4. Explanation of Format of Table I, Tool and Test Equipment Requirements

The columns in table I, are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number of the specific tool or test equipment.

e. Tool Number. Not used.

SECTION II. MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
	INTERROGATOR SET AN/TPX-46(V)	C											none	Visual, exterior
			O										none	Thru self-test
				O									24	Preventive maint.
					O	O							24	Servo loop
								F					24	*Initial installation by contractor
									F				5,10,24	or depot installation teams.
										O			24,30	By replacement of lamps, cards and modules except as noted in ACU
														No overhaul requirement
														No rebuild requirement
	* ASSISTANCE FROM DIRECT SUPPORT PERSONNEL MAY BE REQUIRED TO PEAK UP THE ACU AFTER REPLACEMENT OF 1A2A1, 1A2A2, 1A2A3, 1A2A7					-								
1	CODER-DECODER GROUP CX-7(V)/TPX-46(V)	C											none	Visual, exterior
			O										none	Using self-test
			F										9,24	On-site
				O									24	Preventive
							H						1,3,4,5, 10,24	Panel voltmeters
										O			24	
											O		24	Card, module and lamp replacement
											F		9,24,25	Group case part replacement
														No overhaul requirement
														No rebuild requirement

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A1	SYNCHRONIZER ASSEMBLY SN-420/TPX-46(V)	C											none	Visual, exterior
			H										1,3,4,5,9, 10,11	
				O									24	Preventive
					H	H							1,3,4,5,9 10,11	
							H						1,3,4,5,10, 24	Panel voltmeter
									O				24	
										O			24	By card, module and lamp replacement
										H			1,3,4,5,9, 10,11,24	By chassis mounted part replacement
														No overhaul requirement
														No rebuild requirement
1A1A1	TRIGGER COUNTDOWN CIRCUIT CARD	O			O				O				24	Visual inspection 1A1A1 Adjust
			H		H								1,3,4,5 9,11	Functional test
			D		D					D			1,3,4,5,9, 11,24,26,27	
1A1A2	TIMING SELF-TEST CIRCUIT CARD	O							O				24	Visual inspection
			H		H								1,3,4,5 9,11	Functional test
			D		D					D			1,3,4,5,9, 11,24,26,27	
1A1A3	COUNTER DECODER CIRCUIT CARD	O							O				24	Visual inspection
			H										1,3,4,5, 9,11	Functional test
			D							D			1,3,4,5,9, 11,24,26,27	

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A1A4	10 MHz OSC & CNTR CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9,11 1.3.4.5.9.11,24,26,27	Visual inspection Functional test
1A1A5	CODER/DECODER SELF-TEST CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9,24,26,27	Visual inspection Functional test
1A1A6	SIF CHALLENGE VIDEO CIRCUIT CARD	O	H D		H D				O	D			24 1,3,4,5,9 1,3,4,5,9,24,26,27	Visual inspection Functional test
1A1A7	M4 & M4 CHAL VIDEO CIRCUIT CARD	O	H D		H D				O	D			24 1,3,4,5,9 1,3,4,5,9,24,26,27	Visual inspection Functional test
1A1A8	REPLY VIDEO CIRCUIT CARD	O	H D		H D				O	D			24 1,3,4,5,9 1,3,4,5,9,24,26,27	Visual inspection Functional test
1A1A9	CORRECT CODE 1 CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9,24,26,27	Visual inspection Functional test
1A1A10	CORRECT CODE 2 CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9,24,26,27	Visual inspection Functional test

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GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A1A11/14	LEVEL SHIFTER (2) CIRCUIT CARD	O	H						O	H			24 1,3,4,5,9, 24,26	Visual inspection
1A1A12	IP & EMERGENCY CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9, 24,26	Visual inspection Functional test
1A1A13	INTERFACE SELF-TEST CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9, 24,26	Visual inspection Functional test
1A1A15	TARGET VIDEO CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9, 24,26	Visual inspection Functional test
1A1A16	PROCESSOR VIDEO CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9, 24,26	Visual inspection Functional test
1A1A17	DISPLAY VIDEO CIRCUIT CARD	O	H D		O H D				O	D			24 1,3,4,5,9 24,26	Visual inspection-1A1A17adjust Functional test
1A1A18	TEST TARGET GEN. CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9, 24,26	Visual inspection Functional test

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MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A1A19	BUFFER CIRCUIT CARD	O							O				24	Visual inspection
			H										1,3,4,5,9	Functional test
			D							D			1,3,4,5,9, 24,26	
1A1A20	LINE DRIVER CIRCUIT CARD	O							O				24	Visual inspection
			H							H			1,3,4,5,9 24,26,27	
1A1A21	POST TRIGGER GEN. CIRCUIT CARD	O							O				24	Visual inspection
			H										1,3,4,5,9,11	
			D							D			1,3,4,5,9,11, 24,26	
1A1A22	DELAY LINE MODULE	O							O				24	Visual inspection
			H							H			1,3,4,5,9, 24,27	
1A1A23	POWER SUPPLY MODULE	O			O				O				24	Visual inspection; voltmeter greenline adjust
			O										none	Use built-in test equipment 1A1A23A1 and 23A2
										O			24	By card replacement
					H					H			1,3,4,5,9,10, 24,27	
1A1A23A1	+12 VOLT REGULATOR CIRCUIT CARD	O			O				O				24	Visual inspection; voltmeter greenline adjust
			H		H					H			1,3,4,5,9,10, 24,26,27	
1A1A23A2	+5 VOLT REGULATOR CIRCUIT CARD	O			O				O				24	Visual inspection; voltmeter greenline adjust
			H		H					H			1,3,4,5,9,10, 24,26,27	
1A1A23A3	-12 VOLT INVERTER CIRCUIT CARD	O							O				24	Visual inspection; not adjustable
			H							H			1,3,4,5,9,10, 24,26,27	

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GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A1A24	TRANSFORMER MODULE	O	H						O	H			24 1,3,4,5,9,11,24	Visual inspection
1A2	ANTENNA CONTROL UNT C-8738/TPX-46(V)	C	H			O F							none 1,3,4,5,9,10,5,24 5,10,24	Visual exterior Preventive; peakup required after replacement of 1A2A1, 1A2A2, 1A2A3, or 1A2A7
							H		O	O H			1,3,4,5,9,10 24 5,8,9,24 1,3,4,5,9,10,24,25	Panel meter On site By card and module replacement By chassis mounted part replacement No overhaul required
1A2A1	MODE SWITCHING CIRCUIT CARD	O	H		O	F			O	H			5,10,24 1,3,4,5,9,24,26	Visual inspection; peakup required by DS personnel after replacement
1A2A2	SERVO PREAMPLIFIER CIRCUIT CARD	O	H		O	F			O	H			5,10,24 1,3,4,5,9,24,26	Visual inspection; peakup required by DS personnel after replacement
1A2A3	TLI/SELF-TEST CIRCUIT CARD	O	H		O H	F			O	H			5,10,24 1,3,4,5,9,24,26,27	Visual inspection; peakup required by DS personnel after replacement

*Assistance from direct support personnel may be required to pick up the ACU after replacement of 1A2A1, 1A2A2, 1A2A3, or 1A2A7.

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MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A2A4	ZEROIZER MODULE	O							O				24	Visual inspection
			H										1,3,4,5,9	
					O								24	Using ACU panel meter
										H			1,3,4,5,9, 24,27	
1A2A5	POWER SUPPLY MODULE	O			O				O				24	Visual inspection; voltmeter
			H		H					H			1,3,4,5,9,10, 24,27	greenline adjust
1A2A6	FILTER ASSY	O							O				24	Visual inspection
			H							H			1,3,4,5,9,24	
1A2A7	ELECTRONIC CONTROL AMPLIFIER	O			O	F			O				5,10,24	Visual inspection; peakup requirement after replacement
			H								.		1,3,4,5,9,24	Functional test; except current limit adjust
			D		D								1,3,4,5,9,24	
										D				Tobyhanna Army Depot and/or manufacturer
1A3	PROCESSOR ASSY CP-925/TPX-46(V)	C											none	Visual, exterior
			H										1,3,4,5,9,10	Functional test
				O									24	
							H						1,3,4,5,10	Panel Voltmeter
									O				24	On site
										O			24	By lamp, card and module replacement
					H					H			1,3,4,5,9, 10,24	Repair by chassis mounted part replacement
											D	D	1 thru 5, 9, 10,24,26,28, 29	

Change 2

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A3A1	TARGET THRESHOLD DETECTOR CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9,24, 26,28,29	Visual inspection Functional test
1A3A2	REPLY DISCRIMINATOR CIRCUIT CARD	O	H D		H D				O	D			24 1,3,4,5,9 1,3,4,5,9,24, 26,28,29	Visual inspection Functional test
1A3A3	TARGET ADDER CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9,24, 26,28,29	Visual inspection Functional test
1A3A4	TARGET GATING CIRCUIT CARD	O	H D		H D				O	D			24 1,3,4,5,9 1,3,4,5,9,24, 26,28,29	Visual inspection Functional test
1A3A5	FRIEND THRESHOLD DETECTOR CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9,24, 26,28,29	Visual inspection Functional test
1A3A6	FRIEND ADDER CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9,24 26,28,29	Visual inspection Functional test
1A3A7	FRIEND WEIGHTING (-) CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9,24 26,28,29	Visual inspection Functional test

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GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A3A8	FRIEND WEIGHTING (+) CIRCUIT CARD	O	H D						O	 D			24 1,3,4,5,9 1,3,4,5,9, 24,26,28,29	Visual inspection Functional test
1A3A9	SPOOF COUNTER CIRCUIT CARD	O	H D						O	 D			24 1,3,4,5,9 1,3,4,5,9, 24,26,28,29	Visual inspection Functional test
1A3A10	READ STROBE CIRCUIT CARD	O	H D		H D				O	 D			24 1,3,4,5,9 1,3,4,5,9, 24,26,28,29	Visual inspection Functional test
1A3A11/12	SENSE AMPLIFIERS (2) CIRCUIT CARD	O	H D						O	 D			24 1,3,4,5,9 1,3,4,5,9, 24,26,28,29	Visual inspection Functional test
1A3A13	SELF-TEST I CIRCUIT CARD	O	H D						O	 D			24 1,3,4,5,9 1,3,4,5,9 24,26,28,29	Visual inspection Functional test
1A3A14	SELF-TEST IV CIRCUIT CARD	O	H D						O	 D			24 1,3,4,5,9 1,3,4,5,9 24,26,28,29	Visual inspection Functional test
1A3A15	SELF-TEST V CIRCUIT CARD	O	H D						O	 D			24 1,3,4,5,9 1,3,4,5,9 24,26,28,29	Visual inspection Functional test

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A3A16	SELF-TEST II CIRCUIT CARD	O	H D						O	 D			24 1,3,4,5,9 1,3,4,5,9, 24,26,27,28, 29	Visual inspection Functional test
1A3A17	SELF-TEST III CIRCUIT CARD	O	H D						O	 D			24 1,3,4,5,9 1,3,4,5,9, 24,26,27,28, 29	Visual inspection Functional test
1A3A18	CLOCK PULSE GEN. CIRCUIT CARD	O	H		H				O	H			24 1,3,4,5,9, 24,26,27	Visual inspection
1A3A19	RANGE REGISTER CIRCUIT CARD	O	H D						O	 D			24 1,3,4,5,9 1,3,4,5,9, 24,26,27,28, 29	Visual inspection Functional test
1A3A20	RANGE GATING CIRCUIT CARD	O	H D						O	 D			24 1,3,4,5,9 1,3,4,5,9, 24,26,27,28, 29	Visual inspection Functional test
1A3A21	MEMORY & +12 VOLT REG. CIRCUIT CARD	O	H		H				O	H			24 1,3,4,5,9, 10,24,26,27	Visual inspection
1A3A22	+5 VOLT & -5 VOLT REG. CIRCUIT CARD	O	H		H				O	H			24 1,3,4,5,9, 10,24,26,27	Visual inspection
1A3A23														Not used

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A3A24	VOLTAGE DIVIDER CIRCUIT CARD	O	H						O	H			24 1,3,4,5,9, 24,26,27	Visual inspection
1A3A25-30	INHIBIT DRIVERS (6) CIRCUIT CARD	O	H						O	H			24 1,3,4,5,7,9, 24,26,27	Visual inspection
1A3A31														Test connector slot
1A3A32	X COUNTER CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9,24, 26,27,28,29	Visual inspection Functional test
1A3A33	Y COUNTER CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,9 1,3,4,5,9,24, 26,27,28,29	Visual inspection Functional test
1A3A34-37	READ-WRITE DRIVERS (4) CIRCUIT CARD	O	H D						O	D			24 1,3,4,5,7,9 1,3,4,5,7,9, 24,26,27,28, 29	Visual inspection Functional Test
1A3A38	MEMORY CORE MODULE	O	H D						O	D			24 1,3,4,5,7,9 1,3,4,5,7,9, 24,27,28,29	Visual inspection Functional test Tobyhanna Army Depot and/or manufacturer
1A3A39	POWER SUPPLY MODULE	O	H						O	H			24 1,3,4,5,9,10, 24,26,27	Visual inspection

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GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
1A4	INTERROGATOR COMPUTER, KIR-1( )/TSEC													Maintenance of this unit is not performed by AN/TPX-46 system maintenance personnel
1A5	CASE, CODER-DECODER GROUP CY-6409/TPX-46(V)	C											none	Visual exterior
			F										9,24	On-site
				O									none	Preventive
									O				24	On-site
										F			9,24	Part replacement on-site
														No overhaul requirement
														No rebuild requirement
1A6	SWITCHING UNIT, COMPUTER CIRCUITS SA-1836/TPX-46(V)	C											none	visual inspection
			H										1,3,4,5,9	
									O				24	
										H			1,3,4,5,9,24	
														No overhaul requirement
														No rebuild requirement
1A7	PANEL (BLANK)	C											none	Visual exterior
			F										9,24	Test on-site
									O				24	On-site
										F			9,24	Part replacement on-site

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
2	RECEIVER-TRANSMITTER GROUP OR-85( )/TPX-46(V)	C											none	visual exterior
			O										none	Thru self-test
				O									24	Preventive maint
			F		F								3,4,5,6,9, 10,24	
									O				24	On-site
										O			24,30	By replacement of lamps, cards and modules
										F			3,4,5,6,9,10, 24,31,32	By replacement of cards and chassis mounted parts No overhaul requirement No rebuild requirement
2A1	RECEIVER-TRANSMITTER RT-1026/TPX-46(V)	C											none	Visual, exterior
			O										none	Thru self-test
				O									24	Preventive maint
			F		F								3,4,5,6,9, 10,24	
									F				24	On-site
										O			24,31,32	By replacement of lamps, cards and modules
										F			3,4,5,6,9,10, 24,31,32	By replacement of cards and chassis mounted parts No overhaul requirement No rebuild requirement

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MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
2A1A1	TRANSMITTER MODULE	O											24	Visual inspection
			F		F								3,4,5,6,9, 10,24	
									O				24,31,32	
										F			3,4,5,6,9,10, 24,25,31,32	By amplifier chain, final and tube plug-in card chassis mounted
			H		H					H			1,3,4,5,9,10, 24,25,31,32	Part replacement
2A1A1A1	RT MOD & BIAS CIRCUIT CARD	F							F				24	Visual inspection
			F		F								3,4,5,6,9, 24,31,32	Functional test
			D		D					D			1,3,4,5,9,24, 25,26,27,28, 31,32	
2A1A1A2	HVPS CIRCUIT CARD	F											24	Visual inspection
			F										3,4,5,6,9,10, 24,31,32	Functional test
			H						H	H			1,3,4,5,9,10, 24,25,26,27, 31,32	Wired in board

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
2A1A2	LOW VOLTAGE POWER SUPPLY MODULE	O							O				24	Visual inspection
			F		F					F			3,4,5,6,9,10, 24,25,27	Repair by card & part replacement
2A1A2A1	PREREGULATOR CIRCUIT CARD	F							F				24	Visual inspection
			F		F								3 thru 6,9, 10,24	Functional test
			D		D					D			1,3,4,5,9,10, 24,26,27,28	
2A1A2A2	6 VOLT POST REG. CIRCUIT CARD	F							F				24	Visual inspection
			F		F								3,4,5,6,9, 10,24	Functional test
			D		D					D			1,3,4,5,9,10, 24,26,27,28	
2A1A2A3	+6 VOLT POST REG. CIRCUIT CARD	F							F				24	Visual inspection
			F		F								3,4,5,6,9, 10,24	Functional test
			D		D					D			1,3,4,5,9,10, 24,26,27,28	
2A1A2A4	+12 VOLT POST REG. CIRCUIT CARD	F							F				24	Visual inspection
			F		F								3,4,5,6,9, 10,24	Functional test
			D		D					D			1,3,4,5,9,10, 24,26,27,28	
2A1A3	RF SWITCH MODULE	O							O				24,31,32	Visual inspection
			F		F					F			3,4,5,6,9, 24,31,32	By rf diode & card replacement
			H		H					H			1,3,4,5,9,24, 25,27,31,32	By chassis mounted part replacement
2A1A3A1	RF SWITCH SELF TEST CIRCUIT CARD	F							F				24	Visual inspection
			F		F								3,4,5,6,9,24	Functional test
			D		D					D			1,3,4,5,9,24, 26,27,28,31, 32	

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MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
2A1A3A2	SWITCH DRIVER CIRCUIT CARD	F							F				24	Visual inspection
			F										3 thru 6,9,24	Functional test
			D							D			1,3,4,5,9,24, 26,27,28,31, 32	
2A1A4	RECEIVER MODULE	O							O				24,31,32	Visual inspection
			F										3,4,5,6,9, 24,31,32	
			H		H	H							1,3,4,5,9,14, 18,24,31,32	Except L.O.
										F			3,4,5,6,9, 24,30	By mixer diode & plug-in card replacement
			D		D	D				D			1,3,4,5,9,13, 14,18,24,25, 26,28,30,32	
2A1A4A1	RECEIVER ASSY	F							F				24	Visual inspection
			F										3,4,5,6,9,24, 31,32	Functional test
			H		H	H							1,3,4,5,9,14, 18,24,31,32	Except L.O.
			D		D	D				D			1,3,4,5,9,13, 14,18,21,22, 24,25,26,28, 31,32	
2A1A4A1A1	EXCITER/L.O. CIRCUIT BOARD	H											24	Visual inspection
			H										1,3,4,5,9,14, 24	Functional test
									D				24	Wired in board
			D		D				D				1,3,4,5,9,13, 14,24,25,26, 27,28,31,32	

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
2A1A4A1A2	SELF-TEST SIGNAL GENERATOR CIRCUIT BOARD	H											24	Visual inspection
			H		H								1,3,4,5,9,14, 24,31,32	Functional test
									D				24	Wired in board
			D		D					D			1,3,4,5,9,14, 24,25,26,28, 31,32	
2A1A4A1A3	IF PREAMP, SUM CHANNEL CIRCUIT BOARD	H											24	Visual inspection
			H										1,3,4,5,9, 14,24	Functional test
									D				24	Wired in board
			D							D			1,3,4,5,9,14, 24,25,26,28, 31,32	
2A1A4A1A4	IF AMPLIFIER SUM CHANNEL	H											24	Visual inspection
													3,4,5,6,9, 24,31,32	Functional test
									D				24	Wired in board
			D		D					D			1,3,4,5,9,21, 22,24,26,28, 31,32	
2A1A4A1A5	IF PREAMP DIFF CHANNEL CIRCUIT BOARD	H											24	Visual inspection
			H										3,4,5,6,9,24, 31,32	Functional test
									D				24	Wired in board
			D							D			1,3,4,5,9,24, 25,26,28,31, 32	
2A1A4A1A6	IF AMPLIFIER DIFF CHANNEL	H											24	Visual inspection
			H										3,4,5,6,9,24, 24	Functional test
									D					Wired in board
			D		D					D			1,3,4,5,9,31, 22,24,26,28, 31,32	

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MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
2A1A4A1A7	ALLEVIATOR CIRCUIT BOARD	H	H						D	D			24 3,4,5,6,9,24,31,32 24 1,3,4,5,9,24,26,27,28,31,32	Visual inspection Functional test Wired in board
2A1A4A2	RECEIVER SELF-TEST CIRCUIT CARD	F	F D		F D				F	D			24 3,4,5,6,9,24 1,3,4,5,9,24,26,27,28	Visual inspection Functional test
2A1A5	GTC/ISLS GATE GENERATOR CIRCUIT CARD	O	F D		F D				O	D			24 3,4,5,6,9,24 1,3,4,5,9,24,26,27,28	Visual inspection Functional test
2A1A6	PULSE WIDTH RESTORER CIRCUIT CARD	O	F H						O	H			24 3,4,5,6,9,24 1,3,4,5,9,24 26,27	Visual inspection Functional test
2A1A7	RECEIVER SIDE LOBE SUPPRESSION CIRCUIT CARD	O	F D		F D				O	D			24 3,4,5,6,9,24 1,3,4,5,9,24,26,27,28	Visual inspection Functional test
2A1A8	GAIN TIME CONTROL CIRCUIT CARD	O	F D		F D				O	D			24 3,4,5,6,9,24 1,3,4,5,9,24,26,27,28	Visual inspection Functional test
2A1A9	RECEIVER GATE GENERATOR CIRCUIT CARD	O	F D		F D				O	D			24 3,4,5,6,9,24 1,3,4,5,9,24,26,27,28	Visual inspection Functional test

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
2A1A10	SELF-TEST 1 CIRCUIT CARD	0	F D						0	D			24 3,4,5,6,9,24 1,3,4,5,9,24 26,27,28	Visual inspection Functional test
2A1A11	SELF-TEST 2 CIRCUIT CARD	0	F D						0	D			24 3,4,5,6,9,24 1,3,4,5,9,24 26,27,28	Visual inspection Functional test
2A1A12	FAULT TIMER CIRCUIT CARD	0	H D						0	D			24 1,3,4,5,9, 12,24, 1,3,4,5,9, 12,24,26,27	Visual inspection Functional test
2A2	CASE, RECEIVER-TRANSMITTER, RADIO CY-7050/TPX-46(V)	C							F				none	Visual only - case only, no maintenance required
3	ANTENNA GROUP	C	F	F		0			0	F			none 9 24,30 24 24 9	Visual, exterior Test on-site Replace pedestal motor brushes and grease cartridge Bore sight Where piggy backed; will be installed By assy replacement No overhaul requirement No rebuild requirement
3A1	ANTENNA (7 FT) AS-2167/TPX-46(V)	C	H						0	H			none 12,14,15,16 17,19,20 24 12,14 thru 17,19,20, 24,25	Visual, exterior Replace hybrid & connectors
3A2	PEDESTAL ASSY AB-1076/TPX-46(V)	C	F	F O						F			none 9 24,30 * 30 *	Visual, exterior Test on-site Replace motor brushes and replace grease cartridge Grease *See lubrication instructions for harmonic drive in organizational TM

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MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
3A2 (cont)				H					O	H			5,24 1,3,4,5,9,13,15,16,17,19,20,24,30	On-site Subassy replacement
				D										No overhaul requirement No rebuild requirement
3A2A10	SYNCHRO SUBASSY	F											24	Visual only
			F										9	Test on-site
			H			H							1,3,4,5,9,24,25	
									H				24	
										H			1,3,4,5,9,24,25	By motor, synchro gear assy and resolver replacement
3A3	PEDESTAL ADAPTER ASSY	C											none	Visual
									O				24	
4	ANTENNA (14 FT) AS-2740/TPX-46(V)	C											none	Visual, exterior
			H										12,14,15,17,17,19,20	
									O				24	
										H			12,14,15,16,17,19,20,24,25	Replace hybrid & connectors
5	CONTROL BOX C-7570/TPX-46(V)	C											none	Visual, exterior
			F										9,24	On-site
			H										1,3,4,5,9	
									O				none	
										O			24	By lamp, card and knob replacement
										H			1,3,4,5,9,24	By part replacement

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
5A1	LAMP DRIVER CIRCUIT CARD	O											24	Visual inspection
			H							H			1,3,4,5,9,24, 26,27	
6	CONTROL, INTERROGATOR SET C-7571/TPX-46(V)	C											none	Visual, exterior
			F										9,24	On-site
			H										1,3,4,5,9	
									O					
										O			24	By card, lamp & knob replacement
										H			1,3,4,5,9,24	By part replacement
6A1	LAMP DRIVER CIRCUIT CARD	O							O				24	Visual inspection
			H							H			1,3,4,5,9,24, 26,27	
7	CONTROL, INTERROGATOR SET C-7572/TPX-46(V)	C											none	Visual, exterior
			F										9,24	On-site
									O					
			H							H			1,3,4,5,9,24 25,27	
8	ALARM-MONITOR BZ-162/TPX-46(V)	C											none	Visual, exterior
			F										9,24	On-site
					C								24	Volume control
									O					
										O			24	By lamp and knob replacement
			H							H			1,3,4,5,9,24, 25	

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
	CABLE ASSEMBLY, RADIO FREQUENCY CG-3460/U (2 FT) (USED IN V1, V2, V4 AND V6 CONFIGURATIONS)	C											none	Visual only
			F										9	Continuity only
									O				none	
										F			9,24	By connector replacement
	CABLE ASSEMBLY, RADIO FREQUENCY CG-3460/U (13.5 FT) (USED IN V1 CONFIGURATION)	C											none	Visual only
			F										9	Continuity only
									O				none	
										F			9,24	By. connector replacement
	CABLE ASSEMBLY, RADIO FREQUENCY CG-3460/U (60 FT) (USED IN V2 AND V4 CONFIGURATIONS)	C											none	Visual
			F										9	Continuity only
									O				none	
										F			9,24	By connector replacement
	CABLE ASSEMBLY, RADIO FREQUENCY CG-3461/U (375 FT) (USED IN V4 CONFIGURATION)	C											none	Visual
			F										9	Continuity only
									O				none	
										F			9,24	By connector replacement
	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-12810/U (12 FT) (USED IN V1, V2 AND V4 CONFIGURATIONS)	C											none	Visual
			F										9	Continuity only
									O				none	
										F			9,24	By connector replacement
	CABLE ASSEMBLY SPECIAL PURPOSE, ELECTRICAL CX-10777/U (375 FT) (USED IN V4 CONFIGURATIONS)	C											none	Visual only
			F										9	Continuity only
									O				none	
										F			9,24	By connector replacement

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
	CABLE ASSEMBLY SPECIAL PURPOSE, ELECTRICAL CX-10778/U (100 FT) (USED IN V6 CONFIGURATION)	C											none	Visual only
			F										9	Continuity only
									O				none	
										F			9,24	By connector replacement
	CABLE ASSEMBLY SPECIAL PURPOSE, ELECTRICAL CX-10779/U (50 FT) (USED IN V2 AND V4 CONFIGURATIONS)	C											none	Visual only
			F										9	Continuity only
									O				none	
										F			9,24	By connector replacement
	CABLE ASSEMBLY, RADIO FREQUENCY CG-3460/U (100 FT) (USED IN V6 CONFIGURATION)	C											none	Visual only
			O										8,9	Continuity only
			F										9	Continuity only
									O				none	
										F			9,24	By connector replacement
	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-10773/U (2 FT) (USED IN V1, V2, V4 AND V6 CONFIGURATIONS)	C											none	Visual
			F										9	Continuity only
									O				none	
										F			9,24	By connector replacement
	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-10774/U (13.5 FT) (USED IN V1 CONFIGURATION)	C											none	Visual only
			F										9	Continuity only
									O				none	
										F			9,24	By connector replacement
	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL CX-10775/U (375 FT) (USED IN V1, V2 AND V4 CONFIGURATIONS)	C											none	Visual only
			F										9	Continuity only
									O				none	
										F			9,24	By connector replacement

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TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
1	H,D	TEST FACILITIES SYSTEM, AN/TPM-41 (SEE NOTE (2))	6625-106-7476	
2	H,D	HEAT GUN, MASTER APPLIANCE HG501 (SEE NOTE (1)) WITH ADAPTER AND BAFFLE PLATE	4940-561-1002	
3	F,H,D	TEST SET, RADAR AN/UPM-98B OR C	6625-403-7990	
4	F,H,D	TEST SET AN/APM-245A	6625-169-6551	
5	O,F,H,D	OSCILLOSCOPE AN/USM-281A	6625-228-2201	
6	F	TEST FACILITIES SYSTEM AN/TPM-40 (SEE NOTE (3))	6625-106-7477	
7	H,D	PROBE, CURRENT	6625-816-9313	
8	O	MULTIMETER AN/PSM-6 (HAWK)	6625-957-4374	
9	O,F,H,D	MULTIMETER TS-352B/U (HERCULES)	6625-242-5023	
10	F,H,D	VOLTMETER, DIGITAL AN/GSM-64	6625-870-2264	
11	H,D	COUNTER, ELECTRONIC DIGITAL READOUT AN/USM-207	6625-911-6368	
12	H,D	GENERATOR, SIGNAL AN/URM-64	6625-283-9621	
13	D	SPECTRUM ANALYZER AN/UPM-84A	6625-411-3072	
14	H,D	WATTMETER AN/URM-98	6625-566-4990	
15	H,D	SLOTTED LINE IM-92/U	6625-692-6558	
16	H,D	INDICATOR, STANDING WAVE RATIO IM-175/U	6625-892-5670	
17		---DELETED---		
18	H,D	GENERATOR, SWEEP SIGNAL AN/USM-203	6625-935-0145	
19	H,D	ATTENUATOR, FIXED 10DB CN-1024/U	5985-721-0255	
20	H,D	ATTENUATOR, FIXED 6DB, CN-1321/TPM-24(V)	5985-128-0195	
21	D	X-Y PLOTTER, MOSELY 136A		
22	D	MODIFIED UHF SIGNAL GENERATOR (HP 612A) SG-340A/G		

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TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
23		DELETED		
24	O,F,H,D	TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G	5180-610-8177	
25	F,H,D	TOOL KIT, ELECTRONIC EQUIPMENT TK-100/G	5180-605-0079	
26	H,D	REPAIR KIT, PRINTED WIRING BOARD, MK-772/U	5999-757-7042	
27	H,D	TEST SET, TRANSISTOR TS-1836/U	6625-893-2628	
28	D	GENERATOR, SIGNAL SG-950/G OR EQUAL	6625-251-5210	
29		DELETED		
30	O,F,H,D	GREASE GUN; 3 OUNCE	4930-250-8038	
31	O,F,H,D	WRENCH	5120-277-2311	
32	O,F,H,D	WRENCH	5120-302-5696	

NOTE (1): The heat gun with adapter and baffle plate models 100 and 145 is used to buffer all axial lead glass components, as required, when repairing printed wiring board assemblies.

NOTE (2): Test Facilities System AN/TPM-41 provides a test bed for DS/GS maintenance shops. The AN/TPM-41 becomes part of Electronic Shop AN/ASM-189( ) for field army general support maintenance.

TEST FACILITIES SYSTEM AN/TPM-41	6625-00-106-7476
TEST FACILITIES SET AN/TPM-24(V)2	6625-00-423-2133
SIMULATOR GROUP OH-30/TPM	6625-00-042-7874
RECEIVER-TRANSMITTER GROUP OR-85/TPX-46(V)	5895-00-165-1184
CODER-DECODER GROUP OX-7(V)1/TPX-46(V)	5895-00-163-4980
CONTROL, INTERROGATOR SET C-7570/TPX-46(V)	5895-00-141-3607
ALARM, MONITOR BZ-162/TPX-46(V)	5840-00-110-8176
PEDESTAL, ANTENNA AB-1076/TPX-46(V)	5895-00-166-0222
INSTALLATION KIT, PROGRAM CONNECTORS MK-1630/TPX-46(V)	5895-00-013-9312

NOTE (3): Test Facilities System AN/TPM-40 becomes part of Electronic Shop AN/GSM-44 for direct support maintenance.

TEST FACILITIES SYSTEM AN/TPM-40	6625-00-106-7477
INTERCONNECTING GROUP ON-120/TPM-24(V) (Group 2)	6625-00-011-7880
RECEIVER-TRANSMITTER GROUP OR-85/TPX-46(V)	5895-00-165-1184

Change 2

APPENDIX C

BASIC ISSUE ITEMS LIST (BILL) AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST (ITIAL)

Section I. INTRODUCTION

C-1. Scope

This appendix lists basic issue items and items troop installed or authorized required by the crew/operator for installation, operation and maintenance of the AN/TPX-46(V)1,2,3,4, and 6.

C-2. General

This Basic Issue Items and Items Troop Installed or Authorized List is divided into the following sections:

a. Basic Issue Items list—Section II. A list, in alphabetical sequence, of items which are furnished with, and which must be turned in with the end item.

b. Items Troop Installed or Authorized List—Section III. A list, in alphabetical sequence, of items which, at the discretion of the unit commander, may accompany the end items, but are not subject to be turned in with the end item.

C-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings:

a. Illustrations. Not applicable.

b. Federal Stock Number. Indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

d. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., and is identified in SB 708-42.

e. Description. Indicates the Federal item name and a minimum description required to identify the item.

f. Unit of Measure (U/M). Indicates the standard of basic quantity of the listed item as used in performing the actual maintenance function. This measure is expessed by a two-character alphabetical abbreviation (e.g., ea, in., pr, etc). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

g. Quantity Furnished with Equipment (Basic Issue Items Only). Indicates the quantity of the basic issue item furnished with the equipment.

h. Quantity Authorized (Items Troop Installed or Authorized Only). Indicates the quantity of the item authorized to be used with the equipment.

SECTION II. BASIC ISSUE ITEMS LIST

(1) ILLUSTRATION (A) FIG. NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER & FSCM	USABLE ON CODE	(4) QTY FURN WITH EQUIP
		5975-878-3791	MIL-R-11461 (81349)	GROUND ROD	2
		4240-052-3776		GOGGLES, INDUSTRIAL, ALL PLASTIC SAFETY GOGGLES	

SECTION III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) FEDERAL STOCK NUMBER	(2) DESCRIPTION PART NUMBER AND FSCM		USABLE ON CODE	(3) U/M	(4) QTY AUTH
			ERECTION KIT, USED WITH MAST AB-621/G Consisting of the following items:		
	ESD212203	(20309)	BAG, TEXTILE	EA	1
	ESD212202	(20309)	GIN POLE ASSEMBLY	EA	1
	ESD212073	(20309)	GIN POLE CABLE ASSEMBLY	EA	1
	ESD212201	(20309)	GIN POLE CAP ASSEMBLY	EA	1
	ESD212105	(20309)	GUY CABLE EXTENSION (15 FT)	EA	4
	ESD212105	(20309)	GUY CABLE EXTENSION (30 FT)	EA	4
	ESD212105	(20309)	GUY CABLE EXTENSION (50 FT)	EA	8
	S15A	(93601)	WINCH HOIST	EA	4
5985-782-5278			MAST AB-621/G	EA	1
			PLATFORM ASSEMBLY, MAINTENANCE MX-9578/TPX-46(V)	EA	1
			NOTE: The above items are not authorized for all configurations of the AN/TPX-46(V). Refer to the associated radar manuals to determine if MAST AB-621/G and associated equipment are used.		

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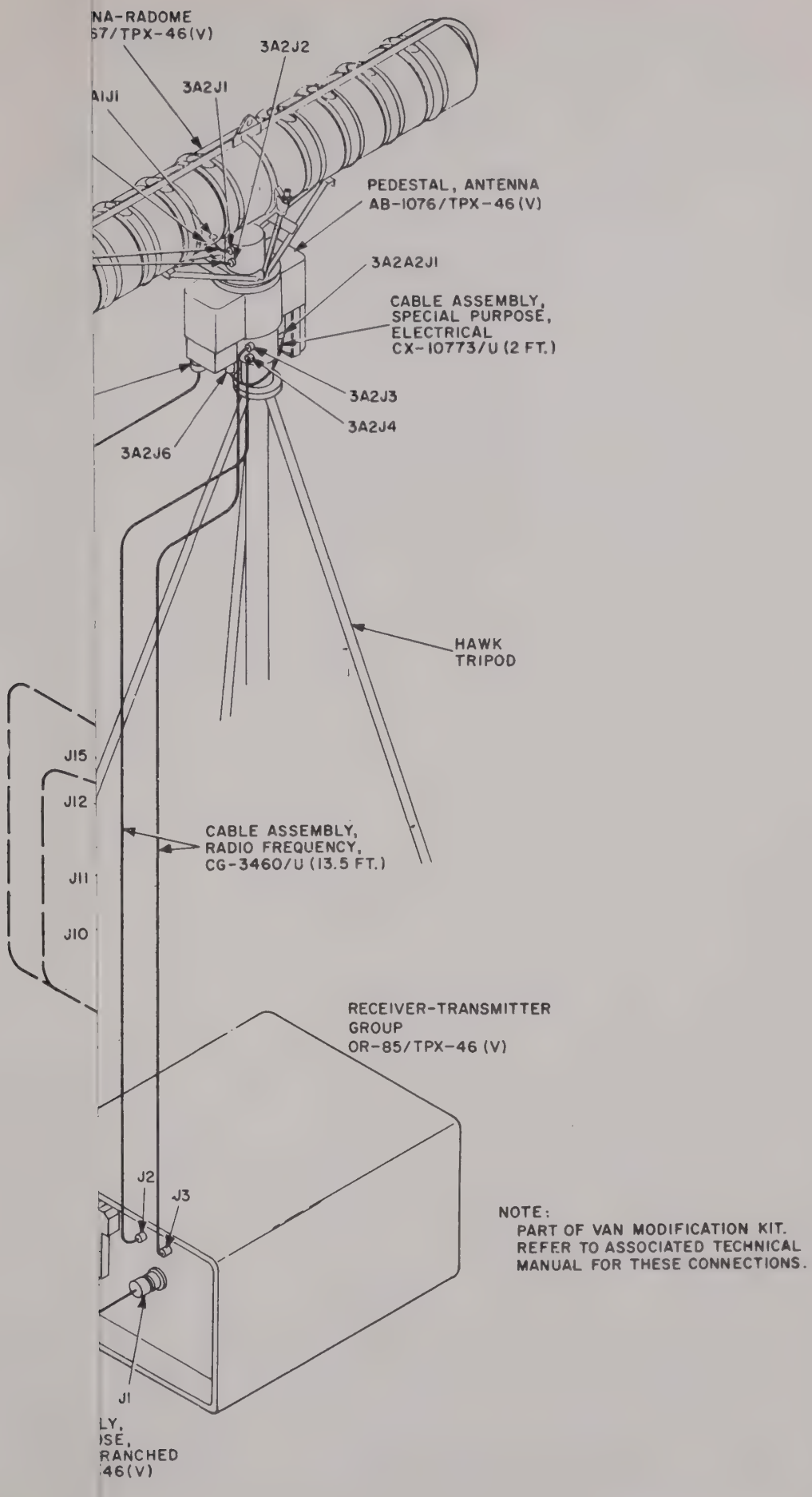
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ARNG & USAR: None.

For explanation of abbreviations used, see AR 310-50.

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NOTE:
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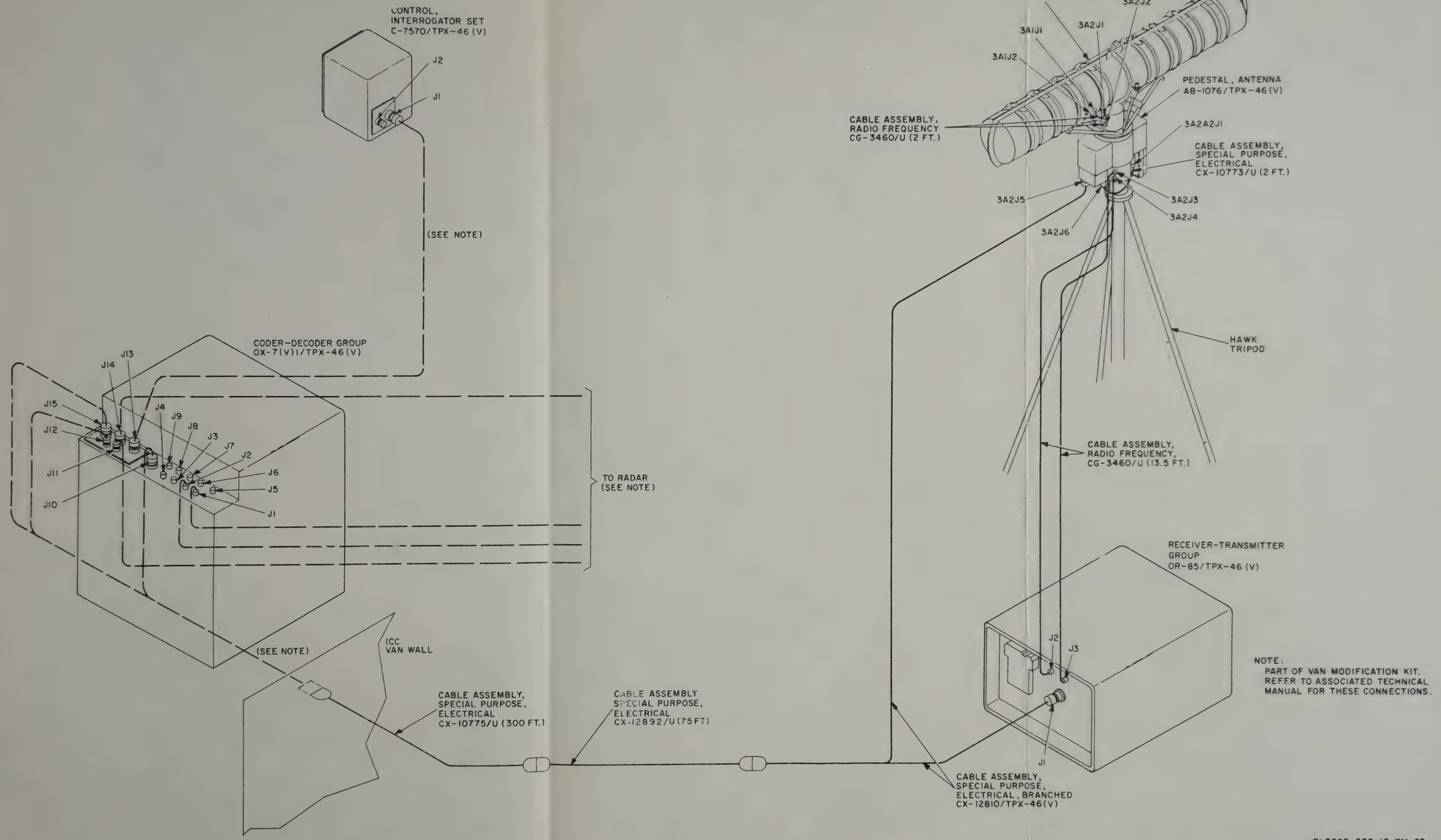
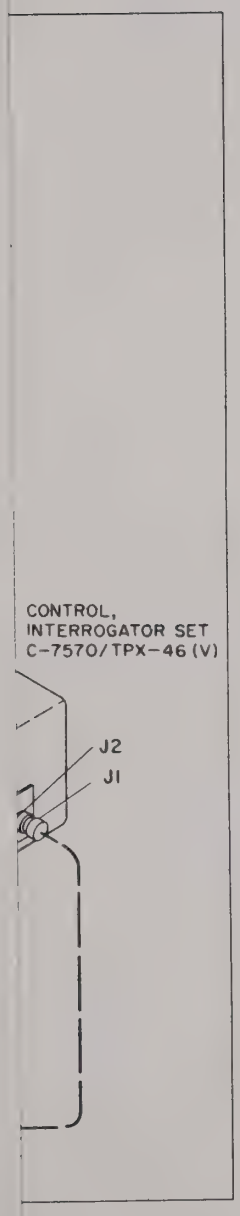


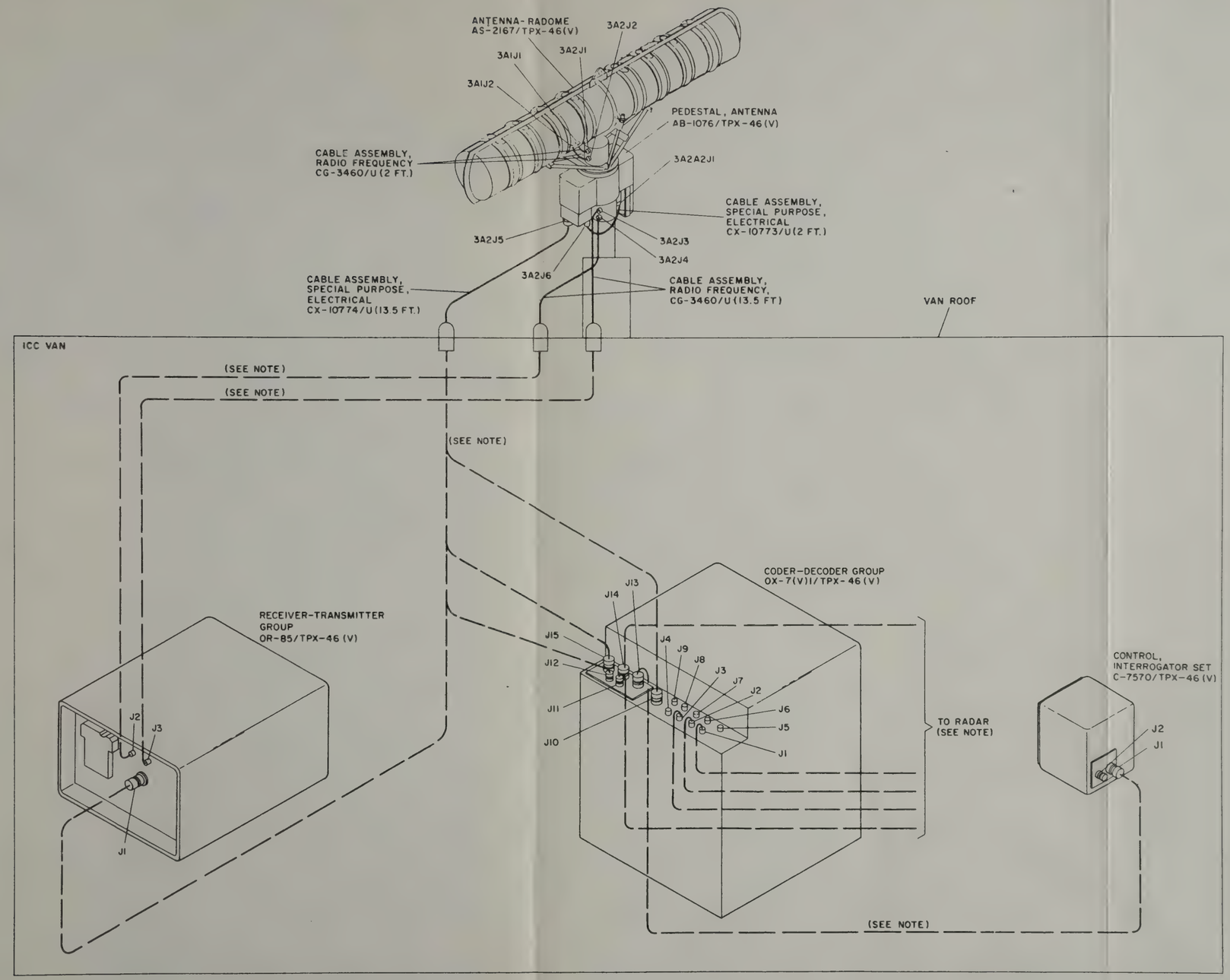
Figure FO–1. Interconnection diagram, Interrogator Set AN/TPX–46(V)1, tripod-mounted antenna.



NOTE:

PART OF VAN MODIFICATION KIT. REFER TO ASSOCIATED TECHNICAL MANUAL FOR THESE CONNECTIONS.

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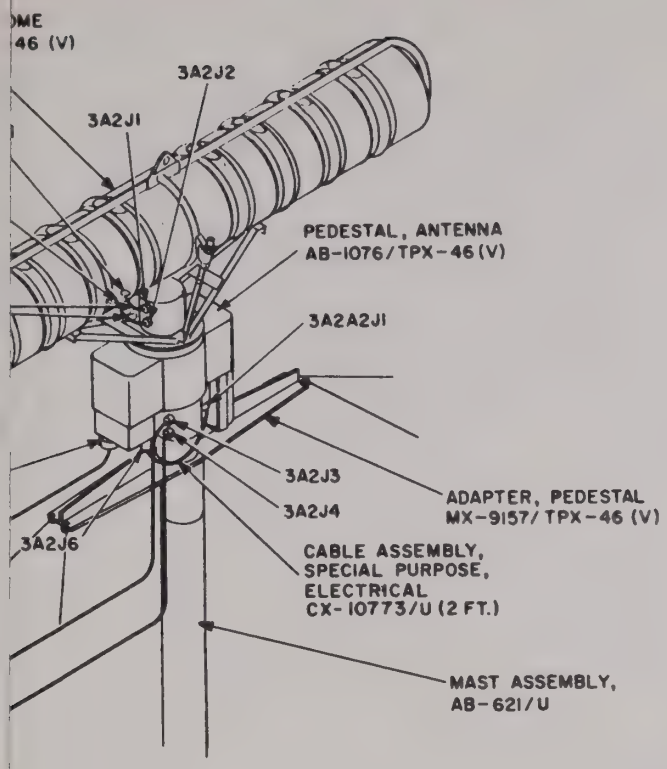


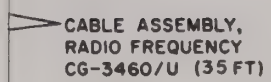
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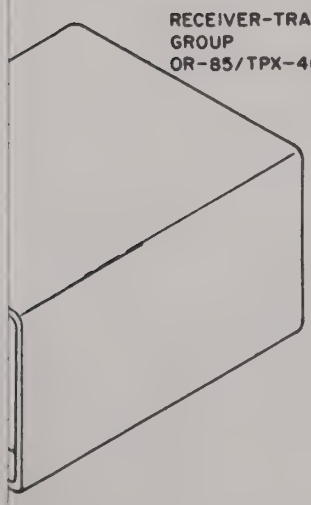
PART OF VAN MODIFICATION KIT
REFER TO ASSOCIATED TECHNICAL
MANUAL FOR THESE CONNECTIONS

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Figure FO-2. Interconnection diagram, Interrogator Set AN/TPX-46(V)1, van roof-mounted antenna.







NOTE:
PART OF VAN WIRING. REFER TO ASSOCIATED RADAR TECHNICAL MANUAL FOR THESE CONNECTIONS.

EL5895-532-12-C2-TM-70

m, Interrogator Set AN/TPX-46(v)2, mobile site.

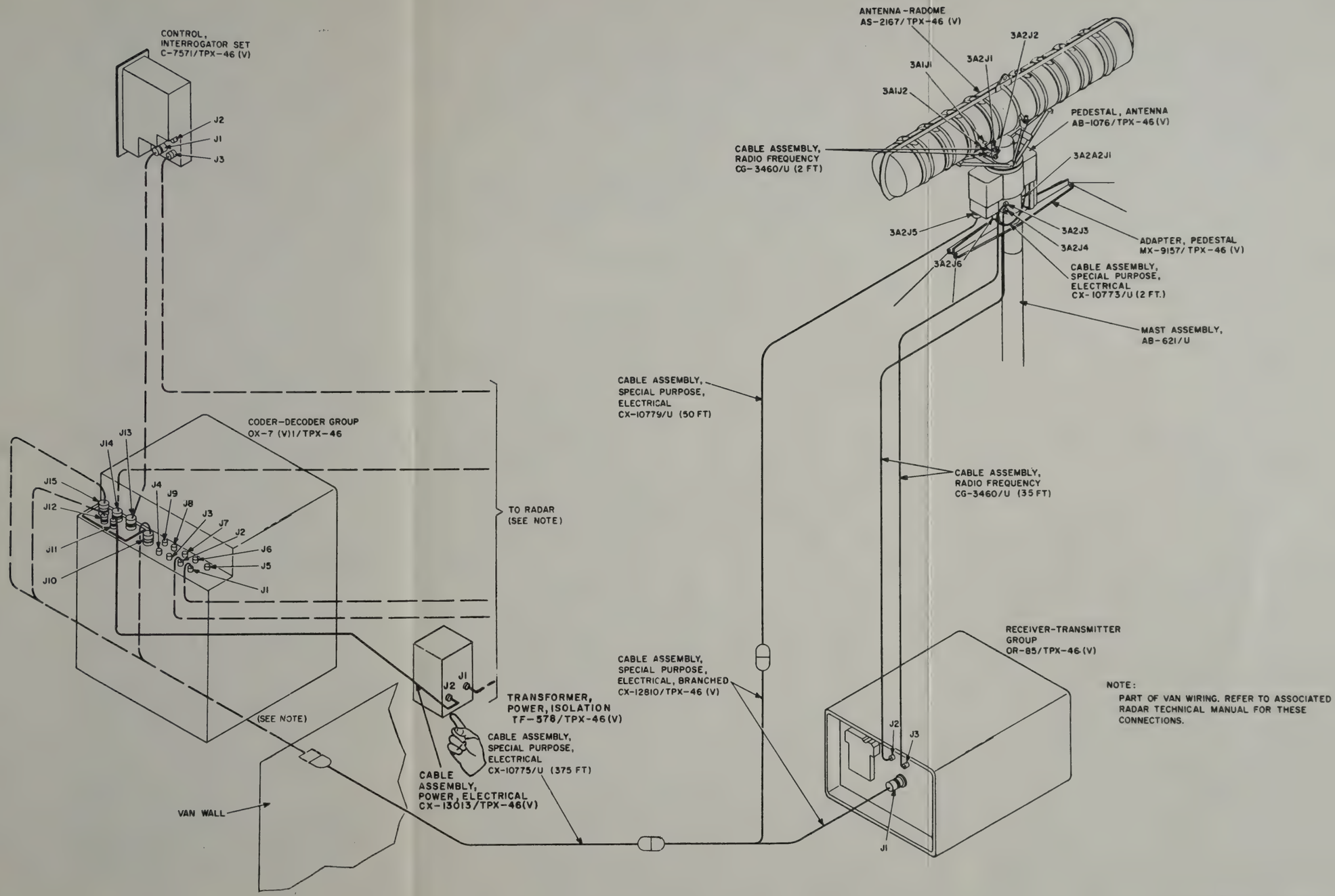
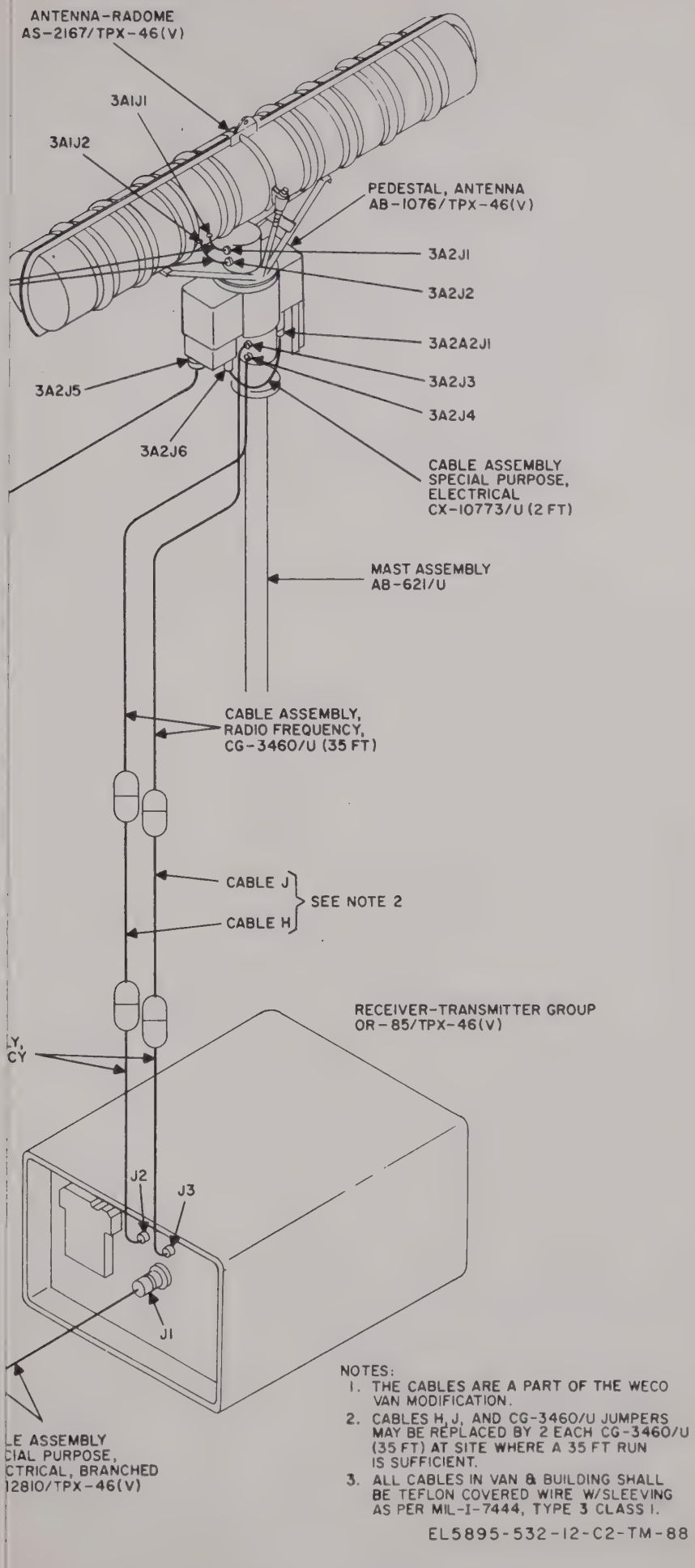


Figure FO-3. Interconnection diagram, Interrogator Set AN/TPX-46(v)2, mobile site.



Interrogator Set AN/TPX-46(V)2, fixed site TYPE 1.

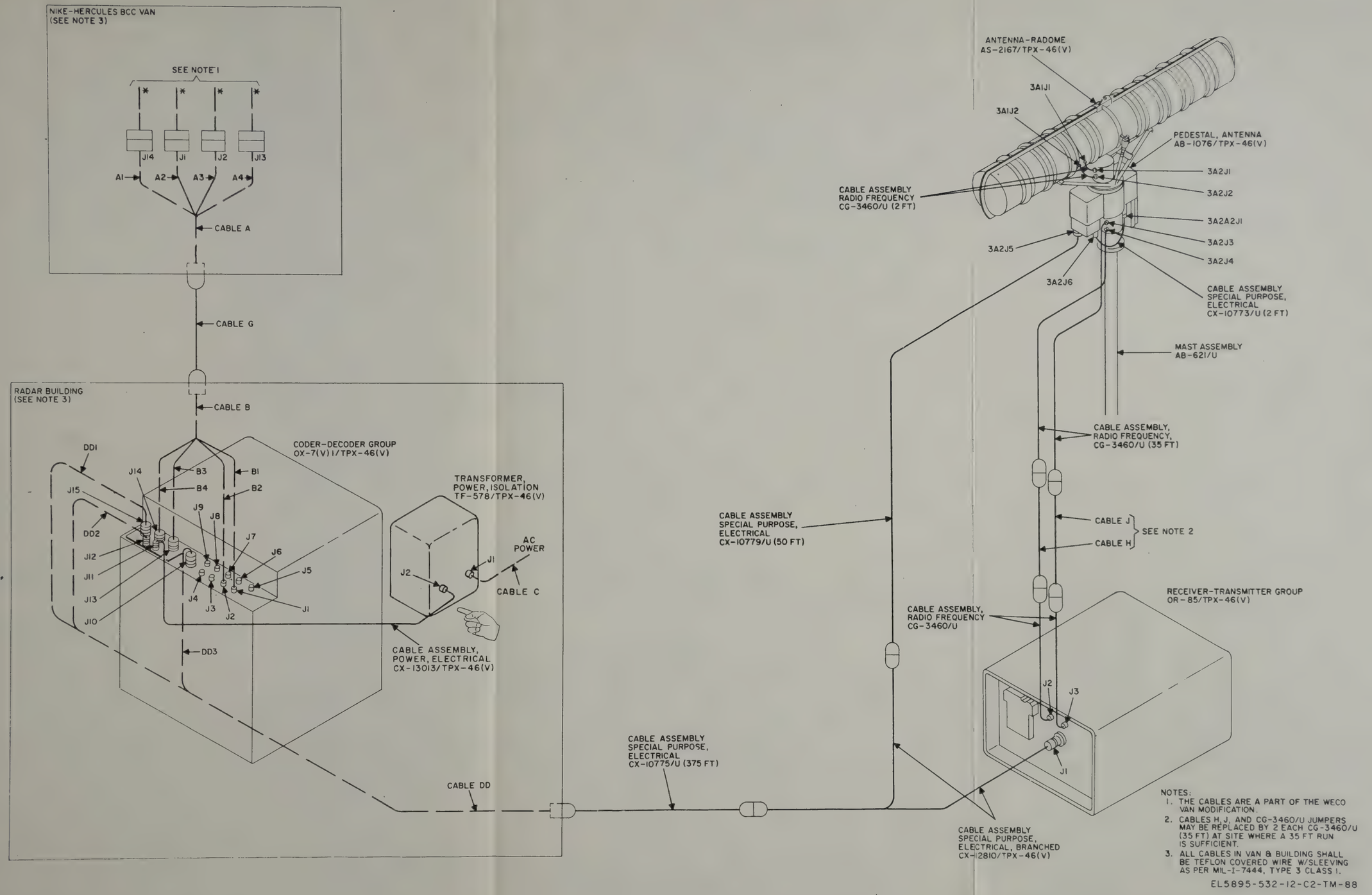
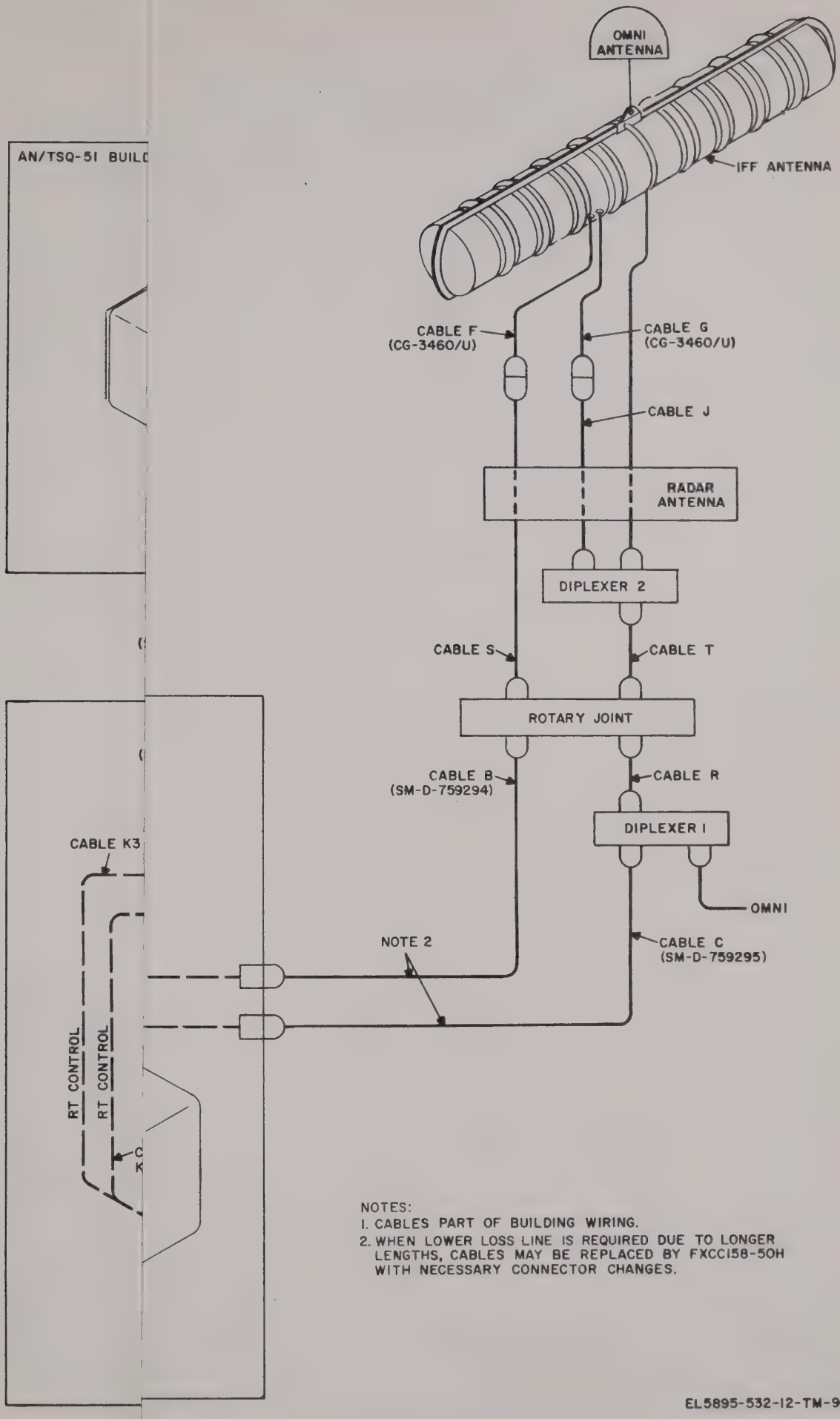


Figure FO-4. Interconnection diagram, Interrogator Set AN/TPX-46(V)2, fixed site TYPE 1.



NOTES:
1. CABLES PART OF BUILDING WIRING.
2. WHEN LOWER LOSS LINE IS REQUIRED DUE TO LONGER LENGTHS, CABLES MAY BE REPLACED BY FXCC158-50H WITH NECESSARY CONNECTOR CHANGES.

EL5895-532-12-TM-90

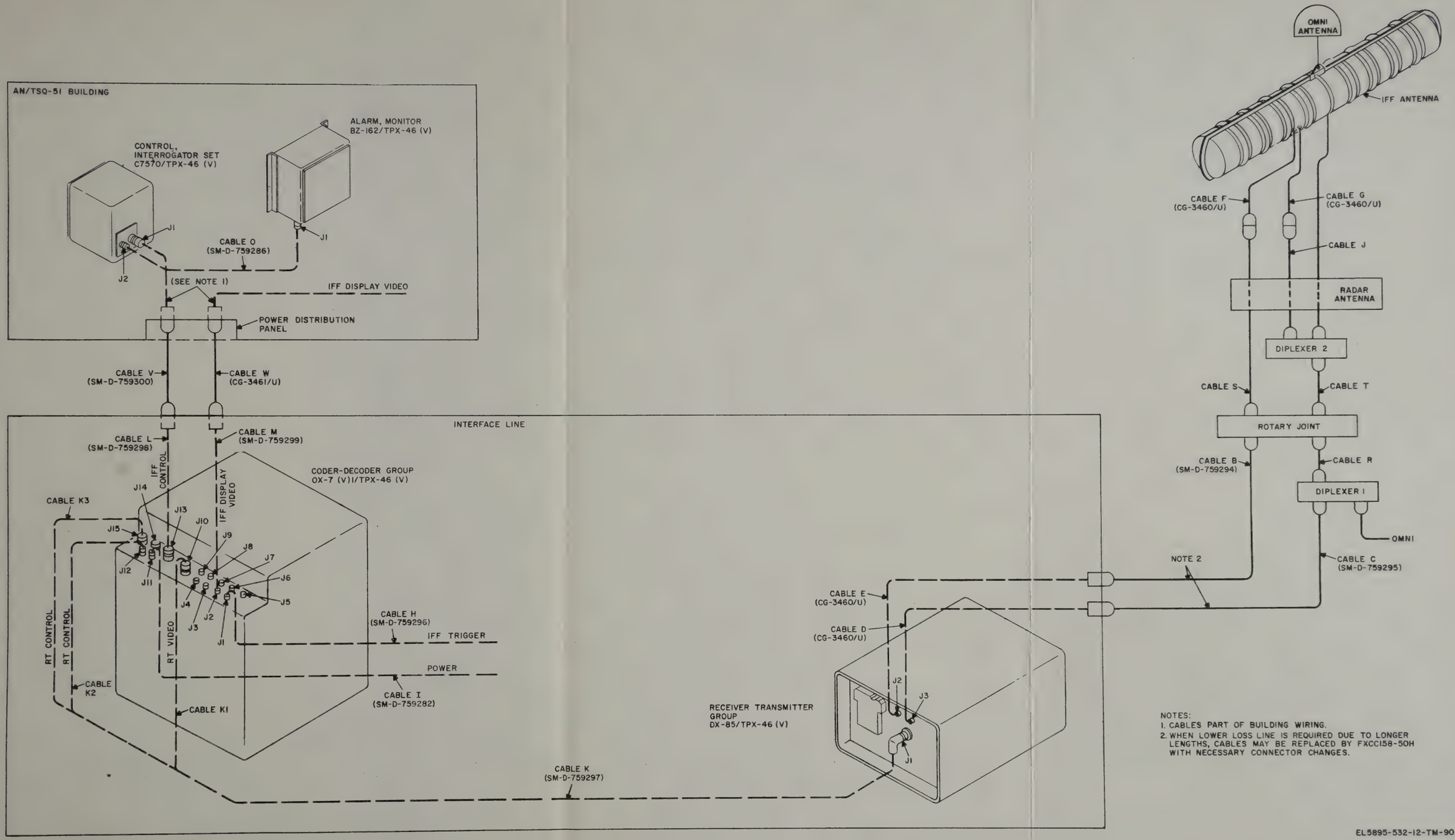
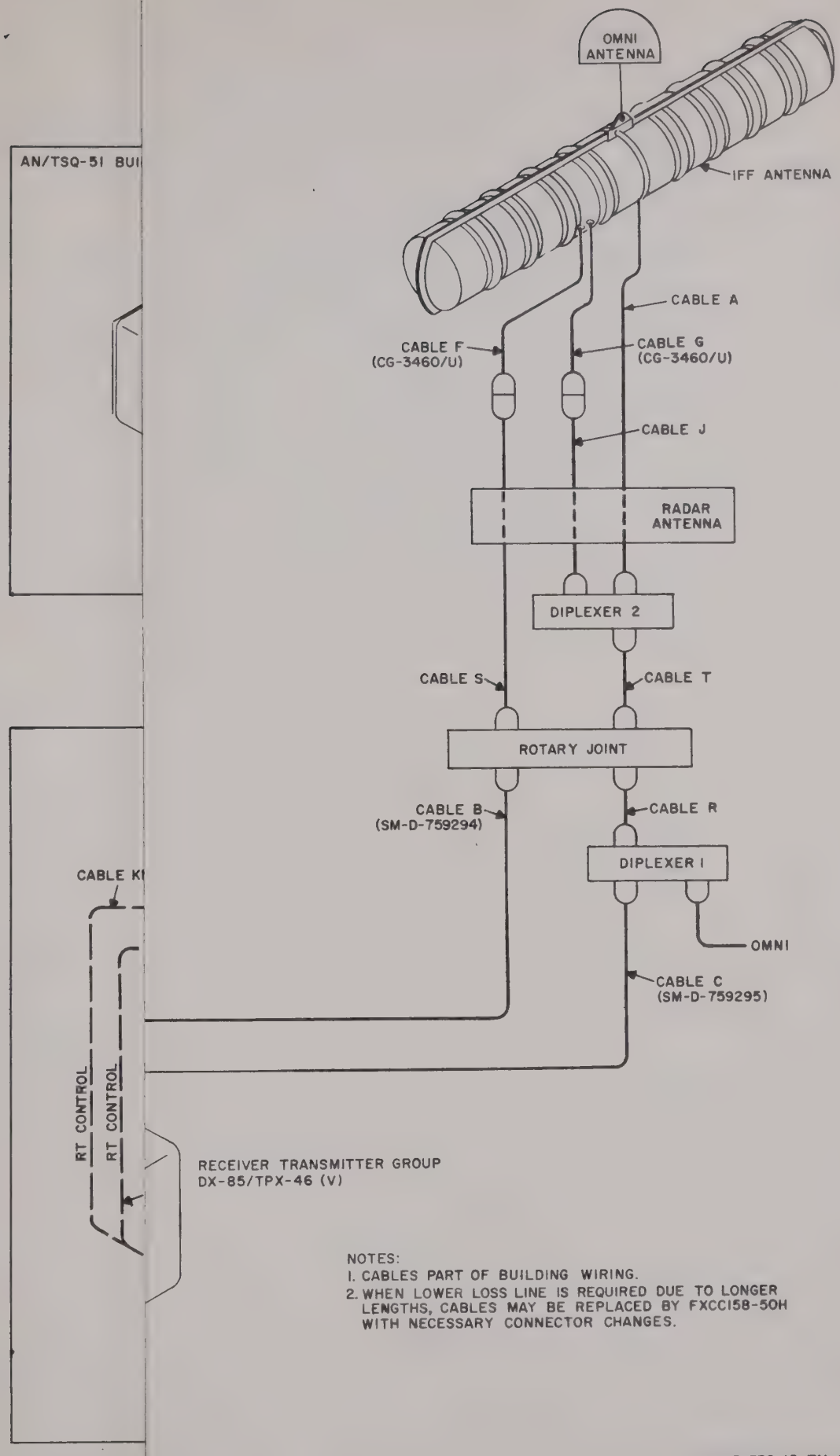


Figure FO–6. Interconnection diagram, Interrogator Set AN/TPX–46(V)3, fixed site TYPE III, indoor r-t.



NOTES:
1. CABLES PART OF BUILDING WIRING.
2. WHEN LOWER LOSS LINE IS REQUIRED DUE TO LONGER LENGTHS, CABLES MAY BE REPLACED BY FXCC158-50H WITH NECESSARY CONNECTOR CHANGES.

EL5895-532-12-TM-91

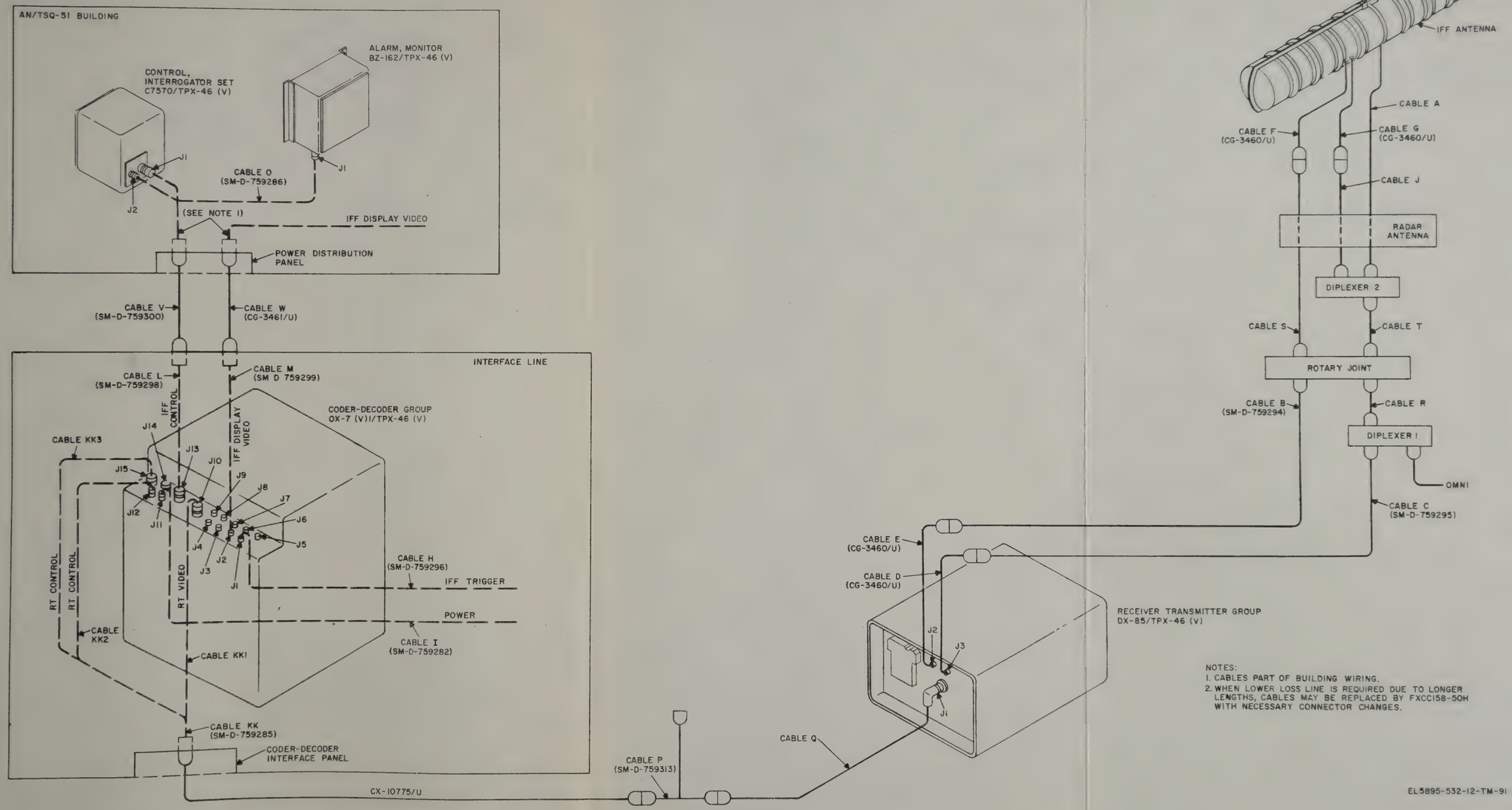
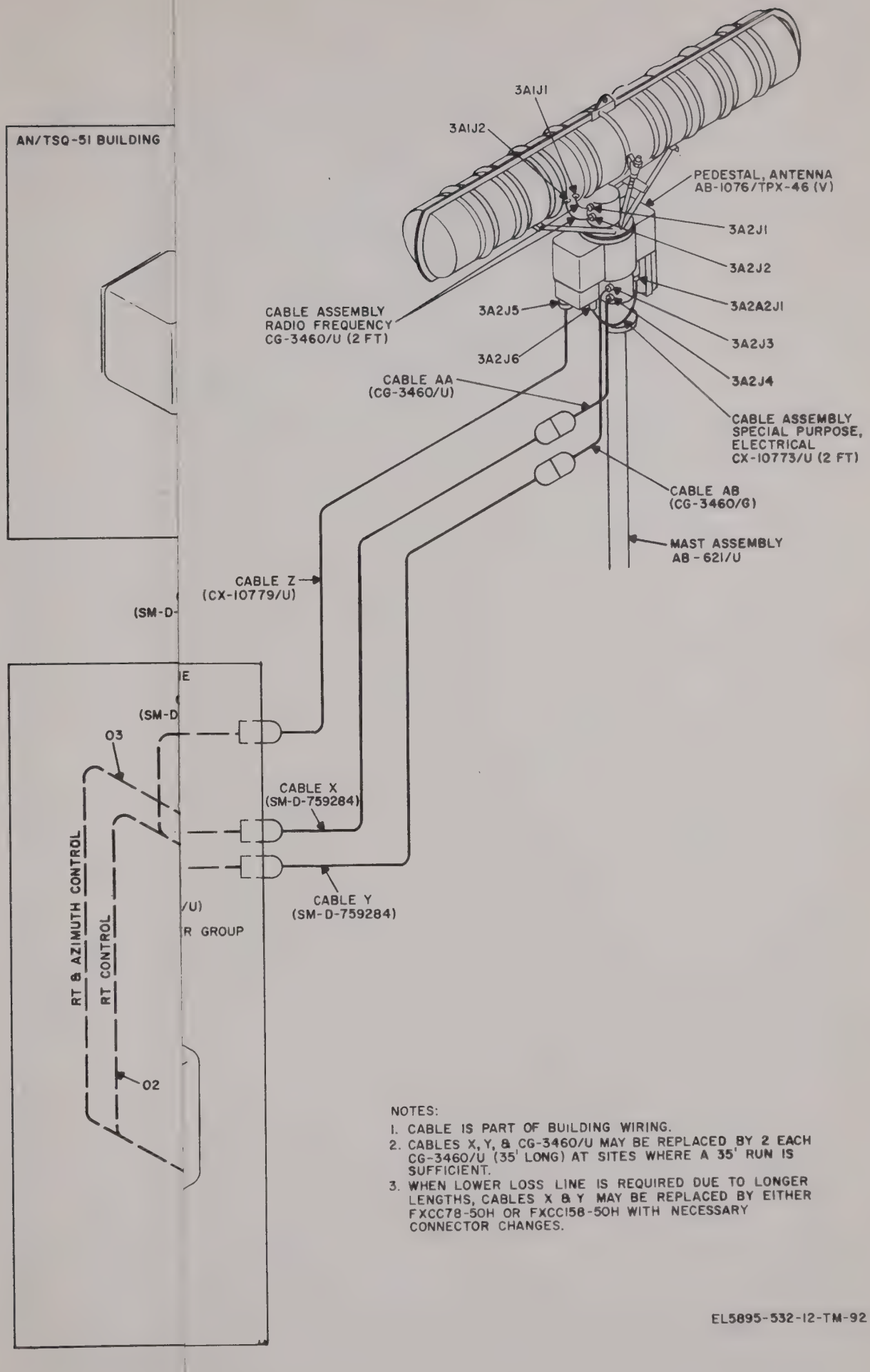


Figure FO–7. Interconnection diagram, Interrogator Set AN/TPX–46(V)3, fixed site TYPE III, remote r-t.



NOTES:

1. CABLE IS PART OF BUILDING WIRING.
2. CABLES X, Y, & CG-3460/U MAY BE REPLACED BY 2 EACH CG-3460/U (35' LONG) AT SITES WHERE A 35' RUN IS SUFFICIENT.
3. WHEN LOWER LOSS LINE IS REQUIRED DUE TO LONGER LENGTHS, CABLES X & Y MAY BE REPLACED BY EITHER FXCC78-50H OR FXCC158-50H WITH NECESSARY CONNECTOR CHANGES.

EL5895-532-12-TM-92

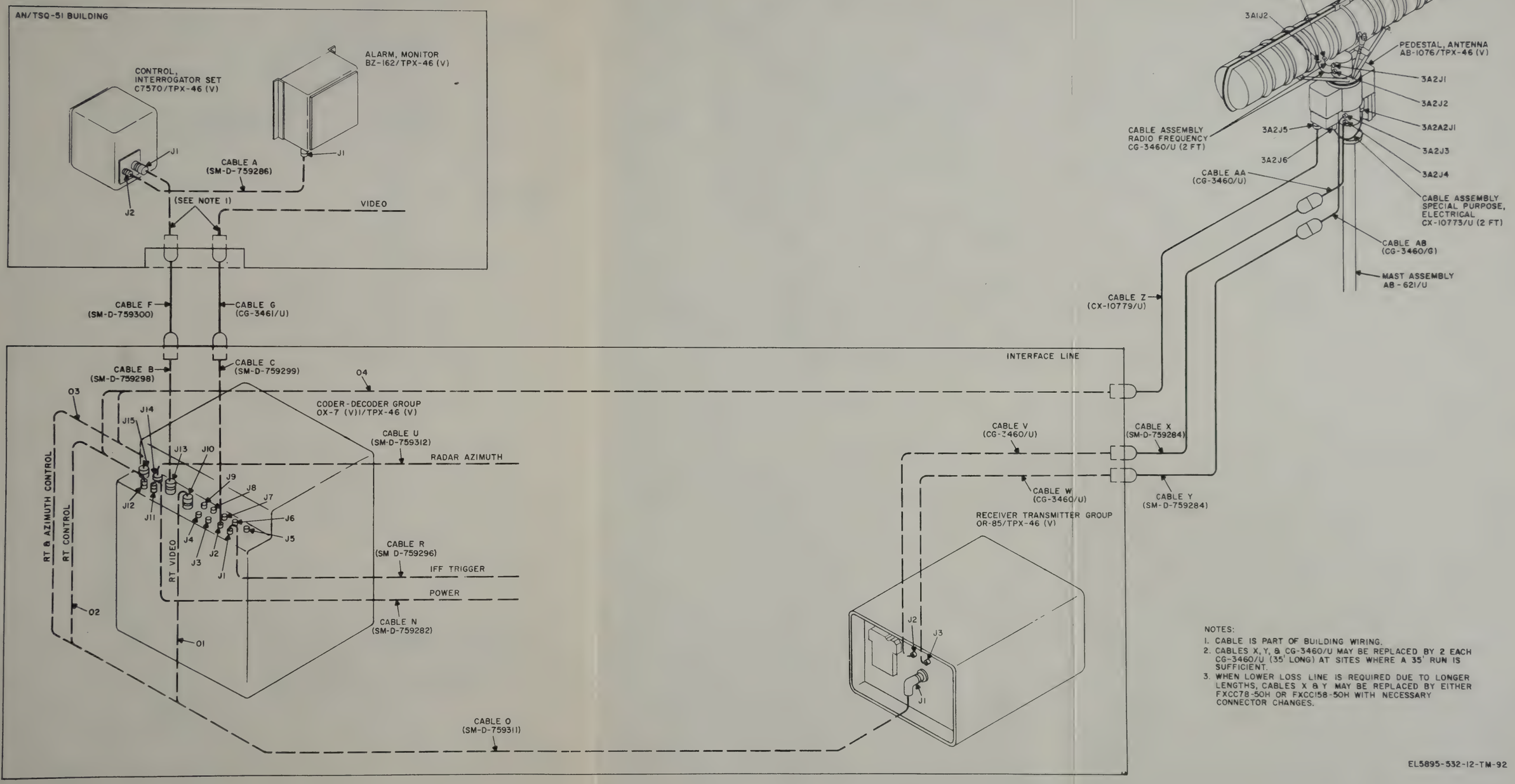
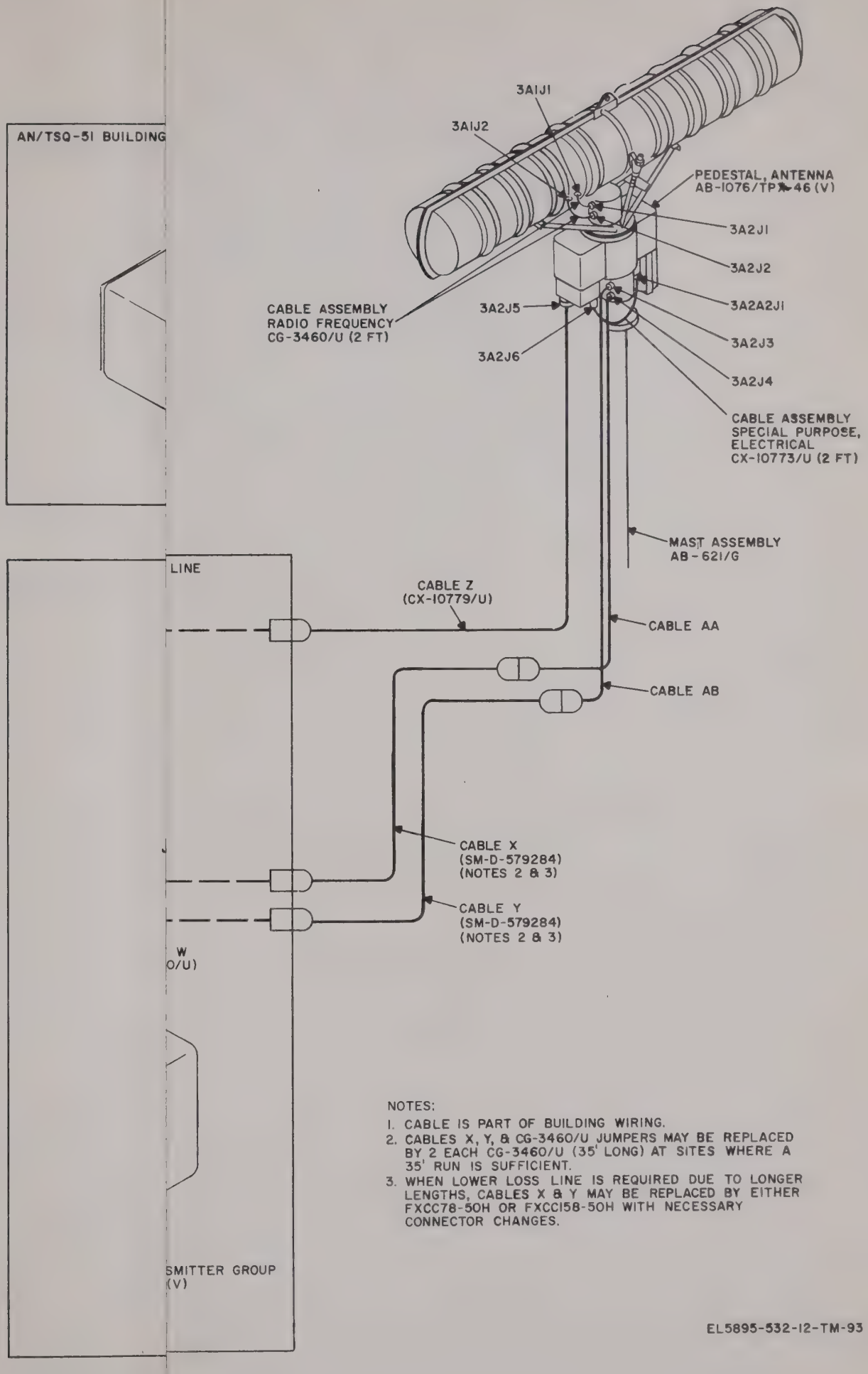


Figure FO–8. Interconnection diagram, Interrogator Set AN/TPX–46(V)3, fixed site TYPE IV, without interface box.



NOTES:

1. CABLE IS PART OF BUILDING WIRING.
2. CABLES X, Y, & CG-3460/U JUMPERS MAY BE REPLACED BY 2 EACH CG-3460/U (35' LONG) AT SITES WHERE A 35' RUN IS SUFFICIENT.
3. WHEN LOWER LOSS LINE IS REQUIRED DUE TO LONGER LENGTHS, CABLES X & Y MAY BE REPLACED BY EITHER FXCC78-50H OR FXCCI58-50H WITH NECESSARY CONNECTOR CHANGES.

EL5895-532-12-TM-93

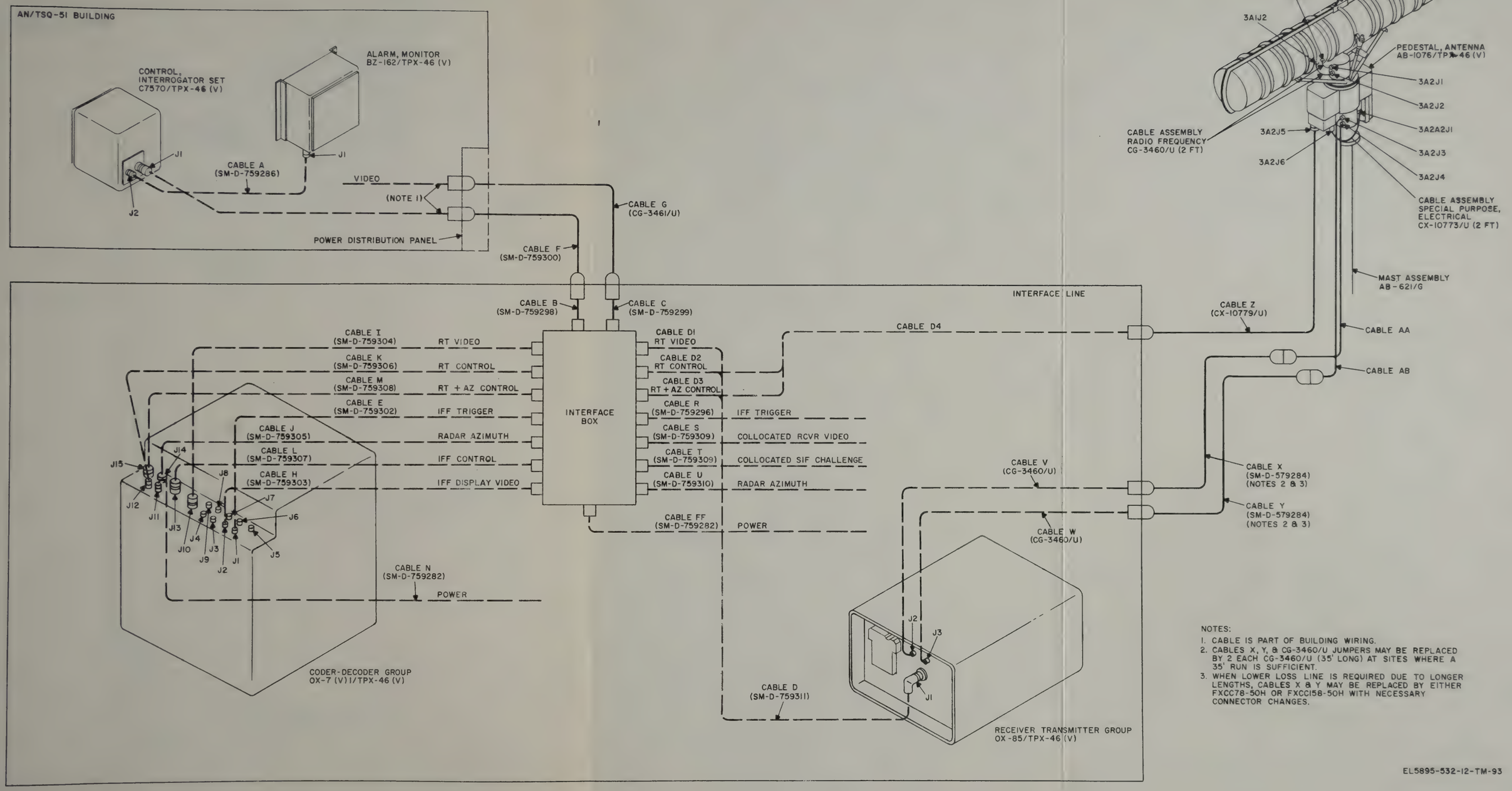
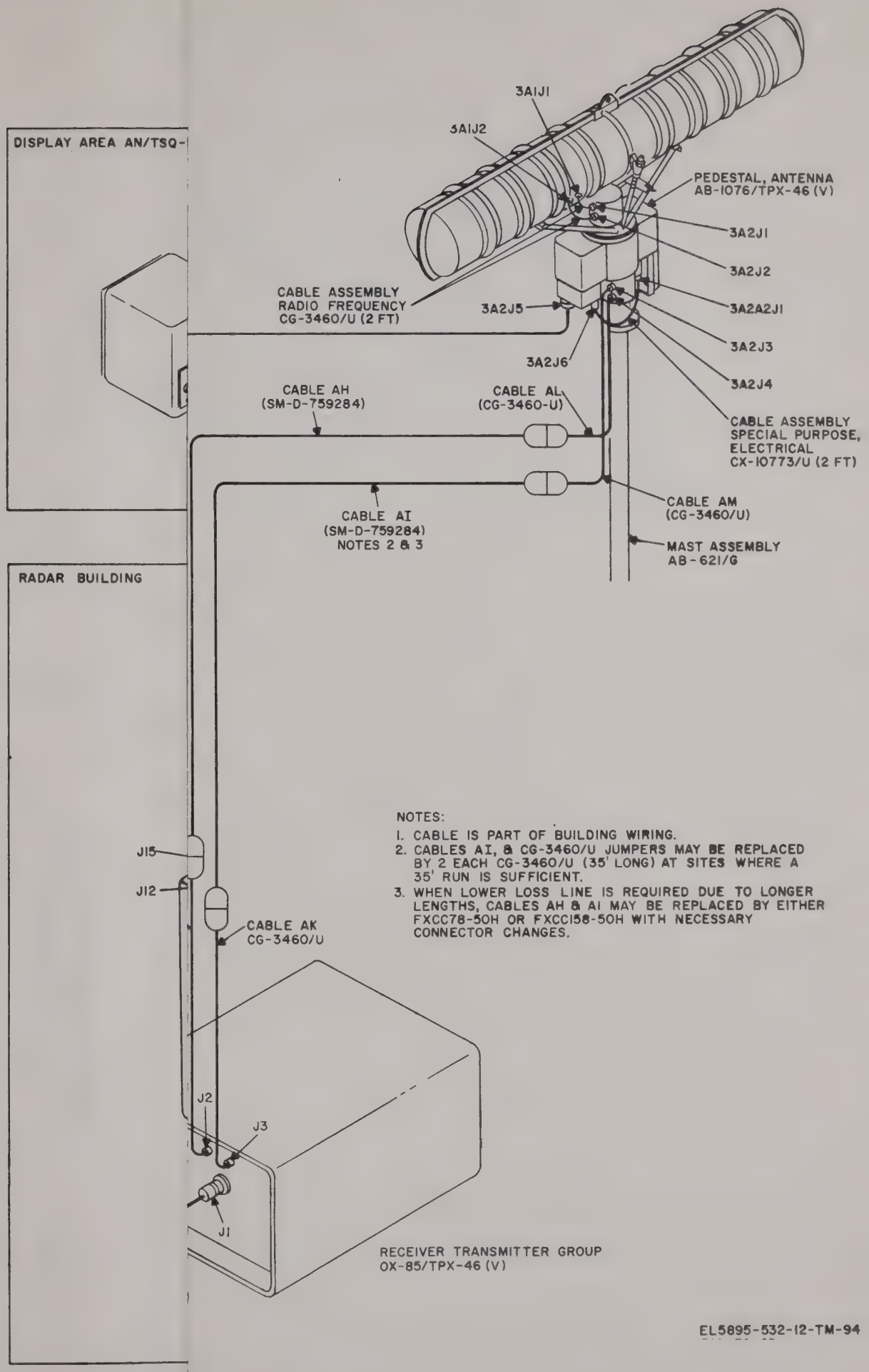


Figure FO–9. Interconnection diagram, Interrogator Set AN/TPX–46(V)3, fixed site TYPE IV, with interface box.



NOTES:

1. CABLE IS PART OF BUILDING WIRING.
2. CABLES AI, & CG-3460/U JUMPERS MAY BE REPLACED BY 2 EACH CG-3460/U (35' LONG) AT SITES WHERE A 35' RUN IS SUFFICIENT.
3. WHEN LOWER LOSS LINE IS REQUIRED DUE TO LONGER LENGTHS, CABLES AH & AI MAY BE REPLACED BY EITHER FXCC78-50H OR FXCC158-50H WITH NECESSARY CONNECTOR CHANGES.

EL5895-532-12-TM-94

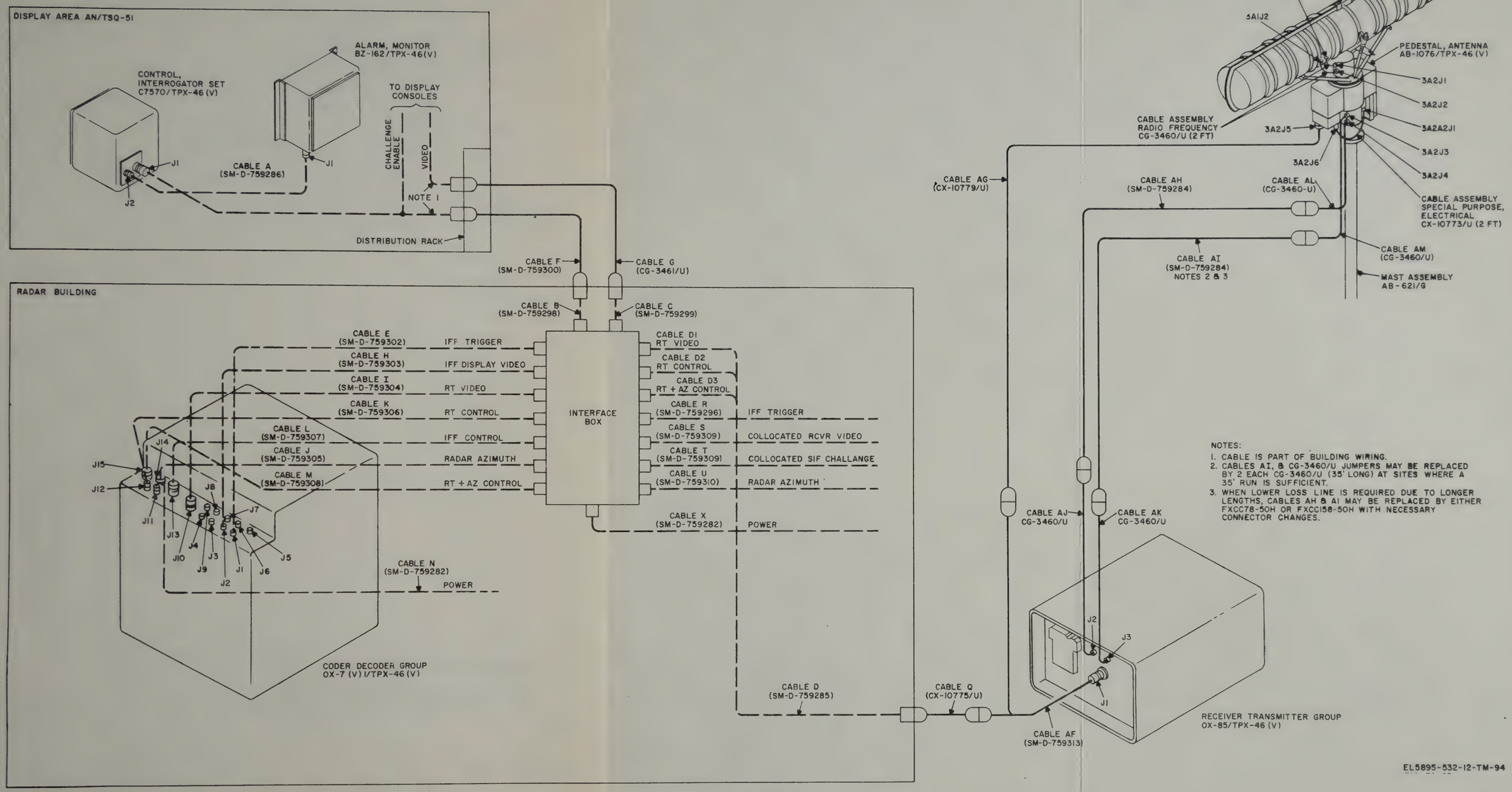
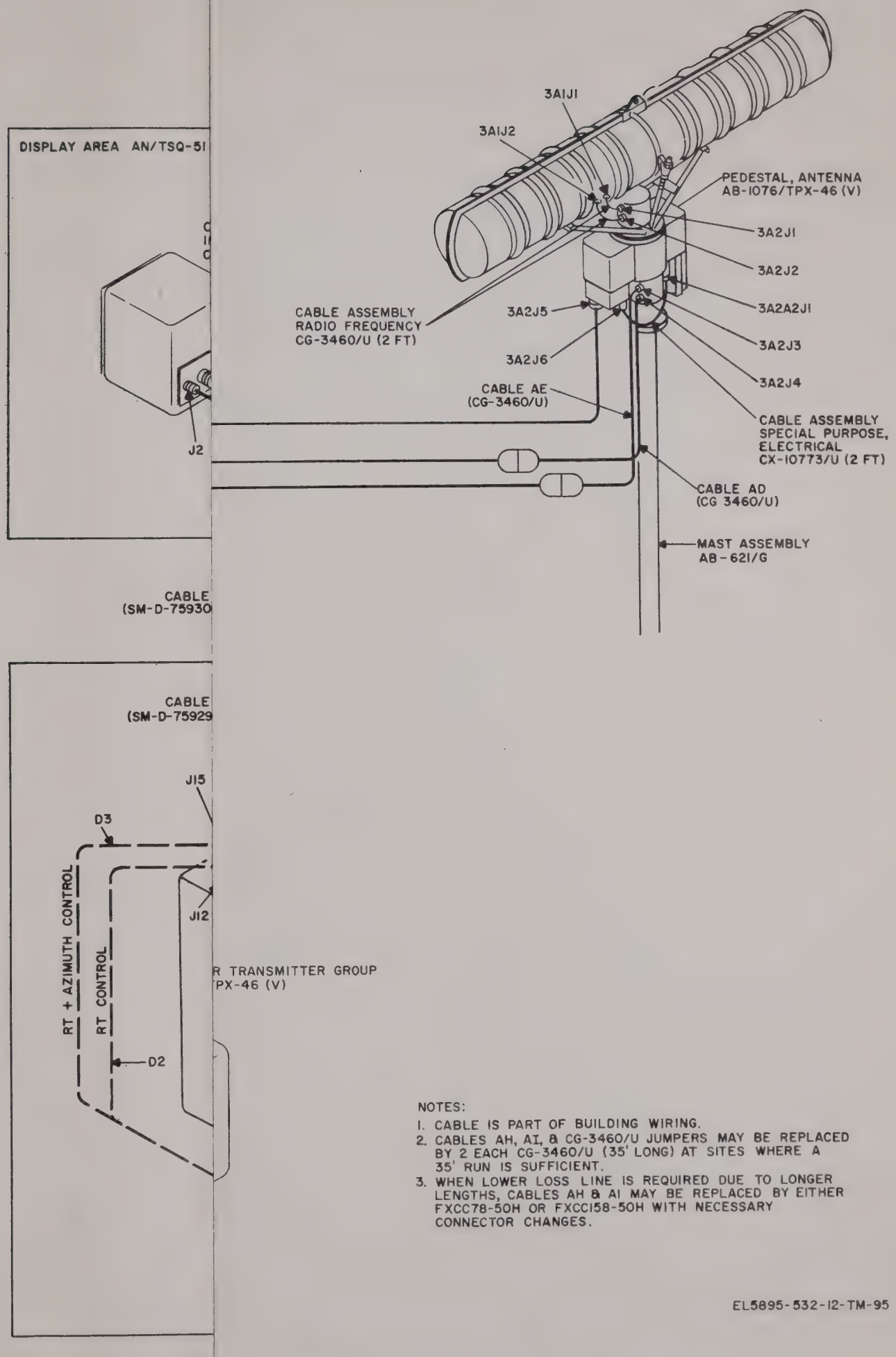


Figure FO–10. Interconnection diagram, Interrogator Set AN/TPX–46(V)3, fixed site TYPE V, with interface box.



NOTES:

1. CABLE IS PART OF BUILDING WIRING.
2. CABLES AH, AI, & CG-3460/U JUMPERS MAY BE REPLACED BY 2 EACH CG-3460/U (35' LONG) AT SITES WHERE A 35' RUN IS SUFFICIENT.
3. WHEN LOWER LOSS LINE IS REQUIRED DUE TO LONGER LENGTHS, CABLES AH & AI MAY BE REPLACED BY EITHER FXCC78-50H OR FXCC158-50H WITH NECESSARY CONNECTOR CHANGES.

EL5895-532-12-TM-95

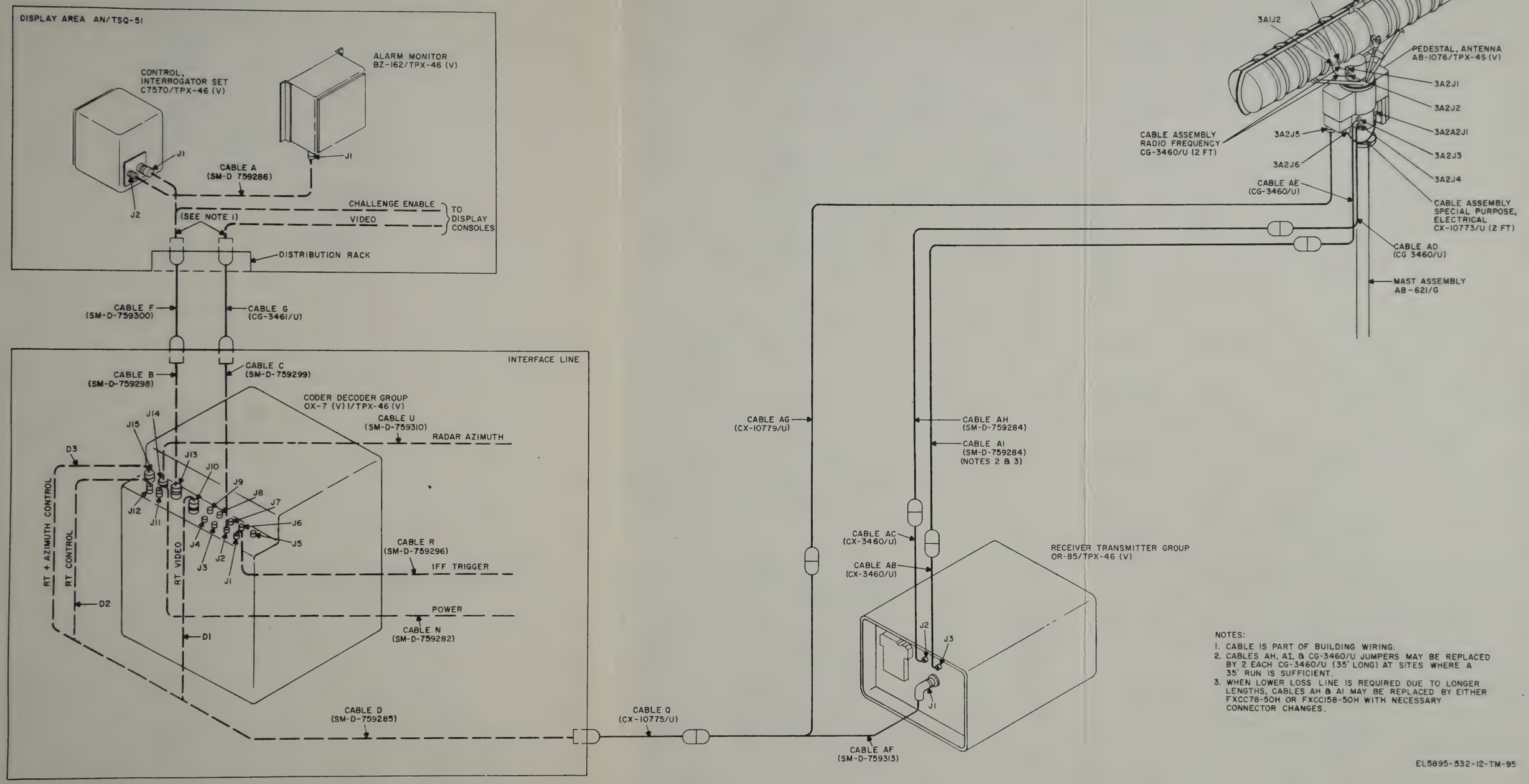
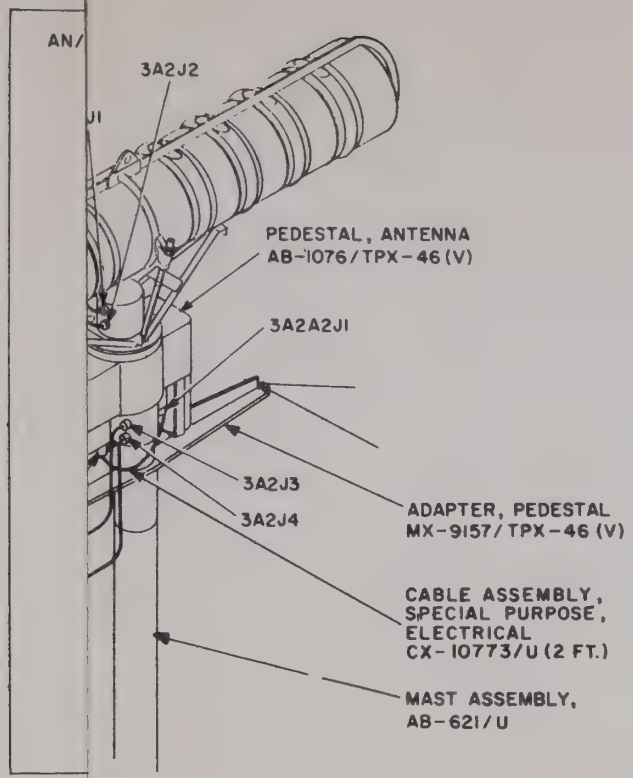
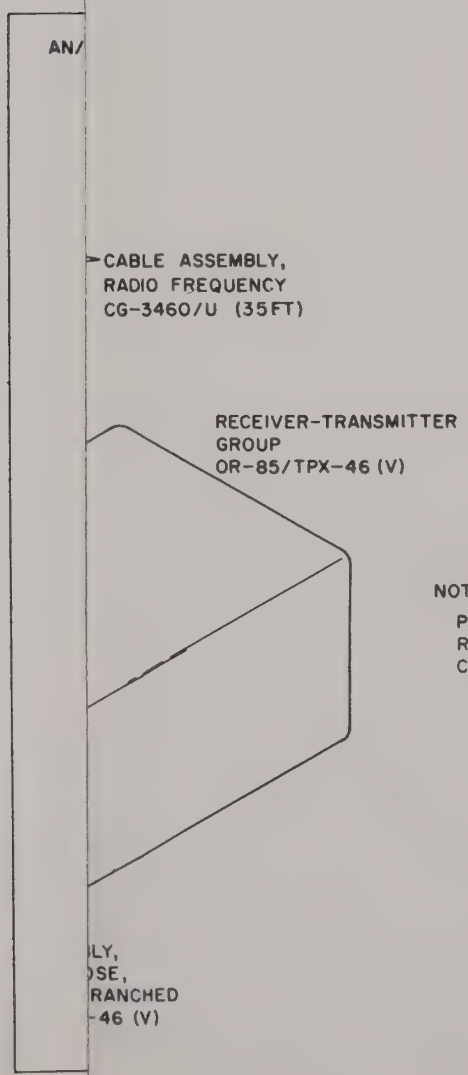


Figure FO–11. Interconnection diagram, Interrogator Set AN/TPX–46(V)3, fixed site TYPE V, without interface box.





NOTE:

PART OF VAN WIRING. REFER TO ASSOCIATED RADAR TECHNICAL MANUAL FOR THESE CONNECTIONS.

EL5895-532-12-TM-72

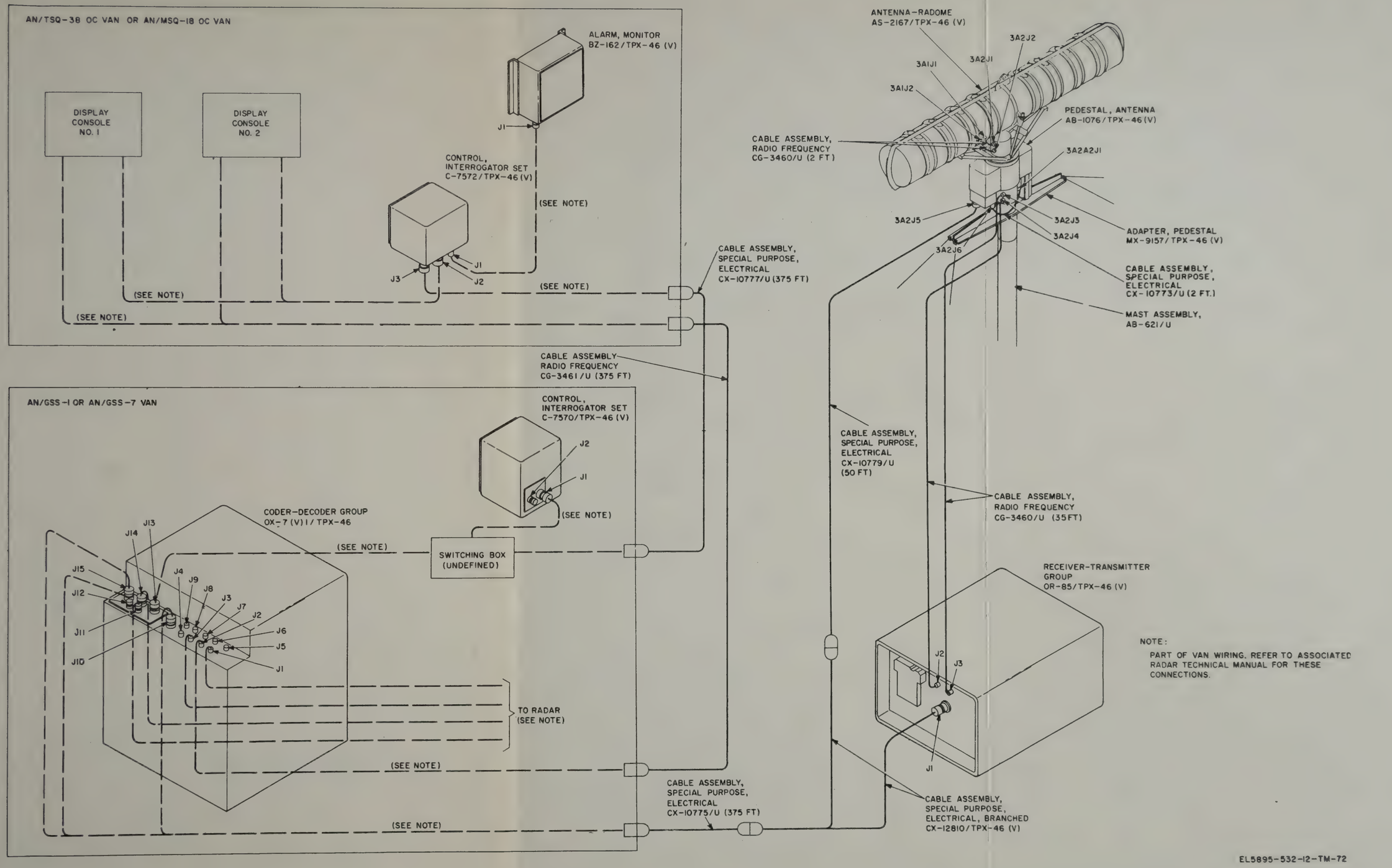
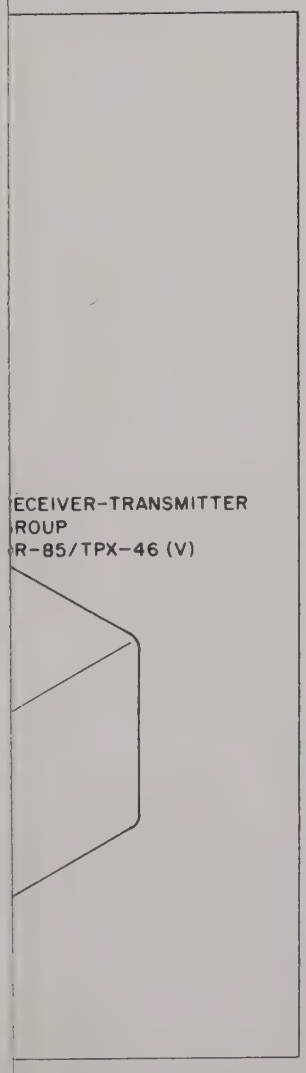


Figure FO-12. Interconnection diagram, Interrogator Set AN/TPX-46(V)4.



NOTE:

PART OF TRAINING INSTALLATION. REFER TO ASSOCIATED TECHNICAL MANUAL FOR THESE CONNECTIONS.

EL5895-532-12-TM-73

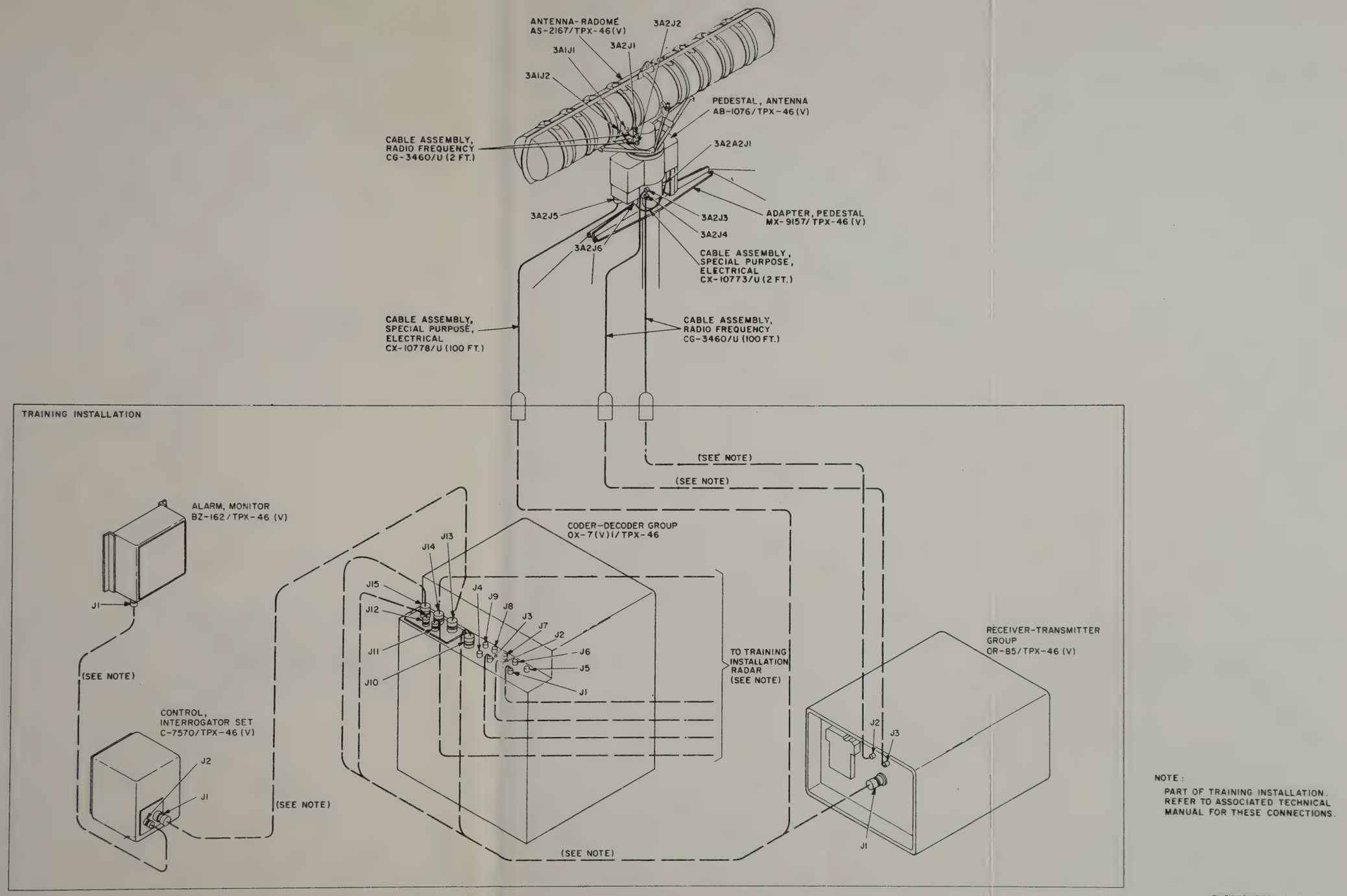


Figure FO–13. Interconnection diagram, Interrogator Set AN/TPX–46(V)6.

ANTENNA

1. RADIATES RF CHALLENGE PULSES INTO THE SUM AND DIFFERENCE PATTERNS.
2. RECEIVES RF REPLIES FROM THE SUM AND DIFFERENCE PATTERNS.

EMBLY

Y INPUT POWER FOR USE IN THE
NTROL AMPLIFIER.

PEDESTAL

1. POSITIONS IFF ANTENNA.
2. GENERATES AN ERROR SIGNAL FOR USE IN THE ANTENNA CONTROL ASSEMBLY.
3. GENERATES IFF AZIMUTH DATA FOR THE RADAR PPI DURING INTERNAL OPERATION.

EL5895-532-12-TM-66

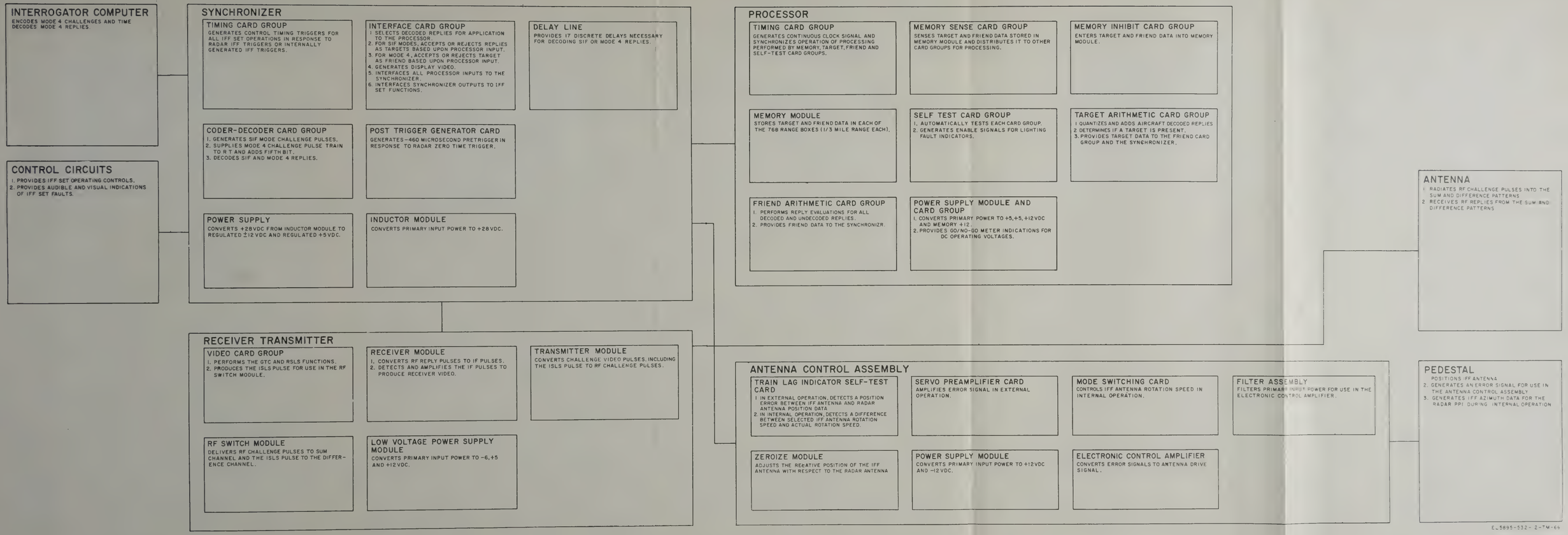
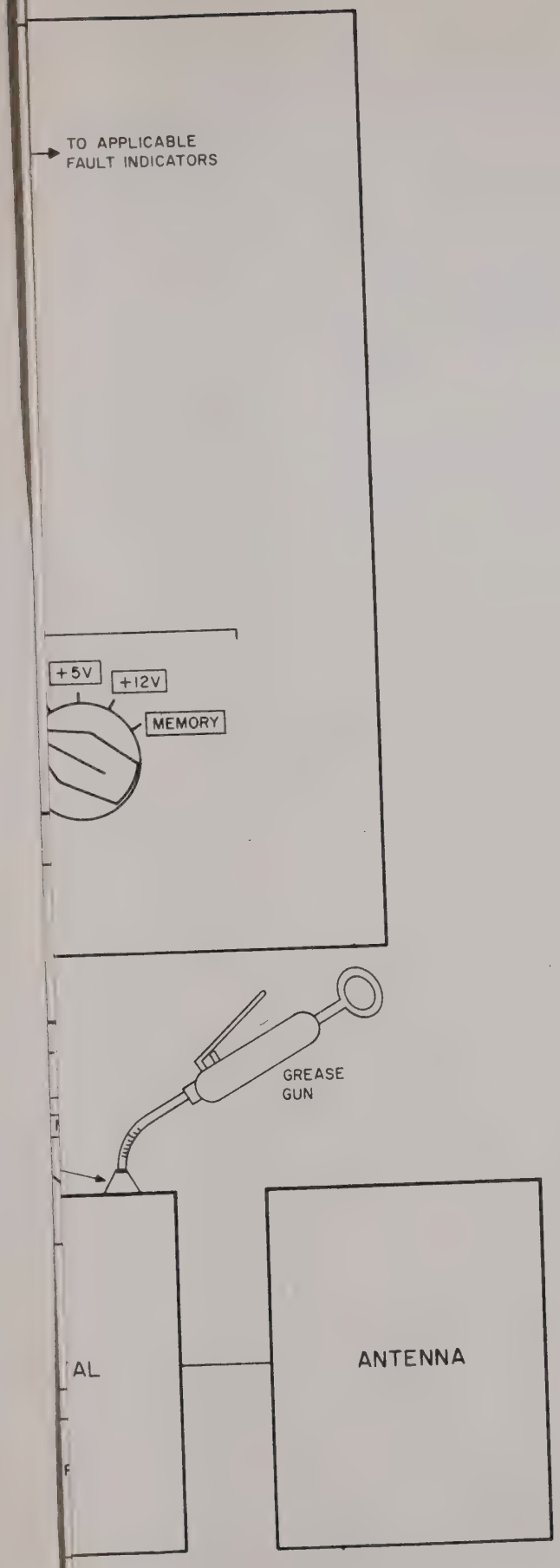
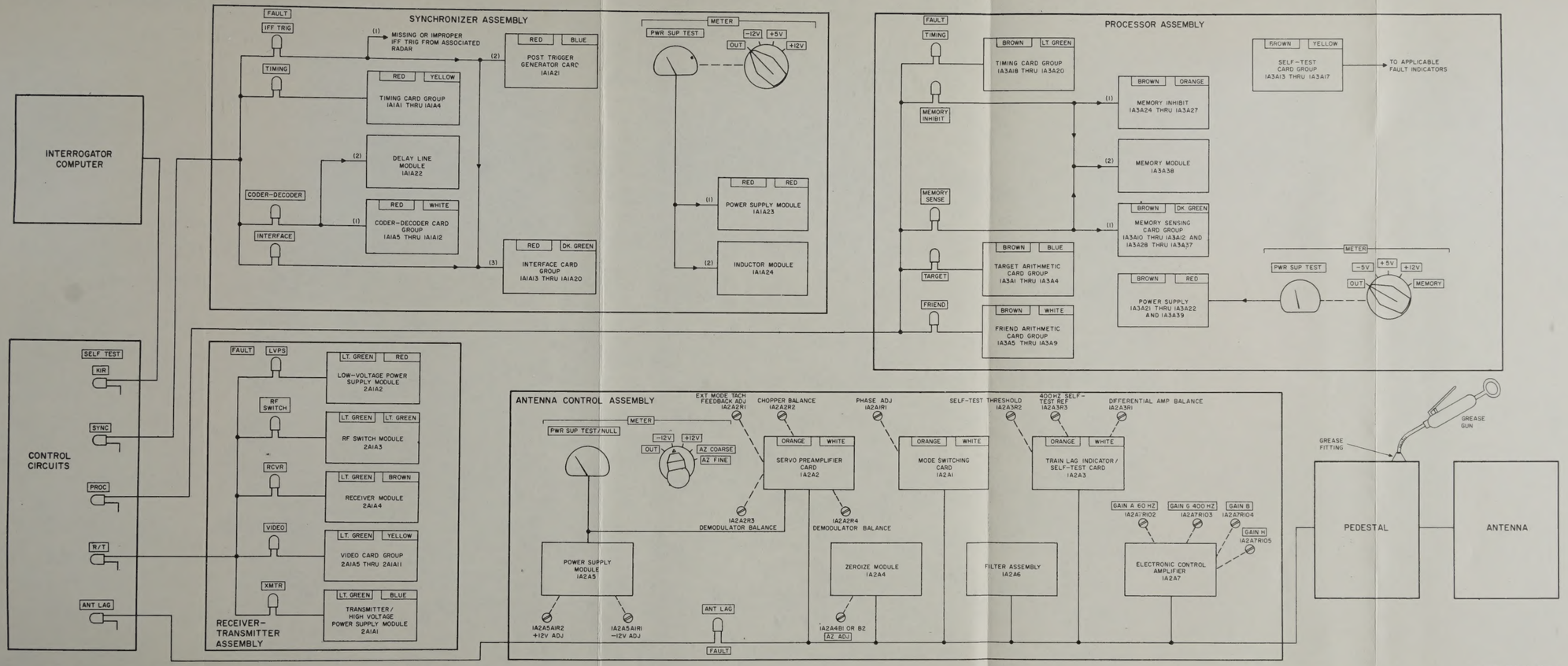


Figure FO-14. Maintenance block diagram.

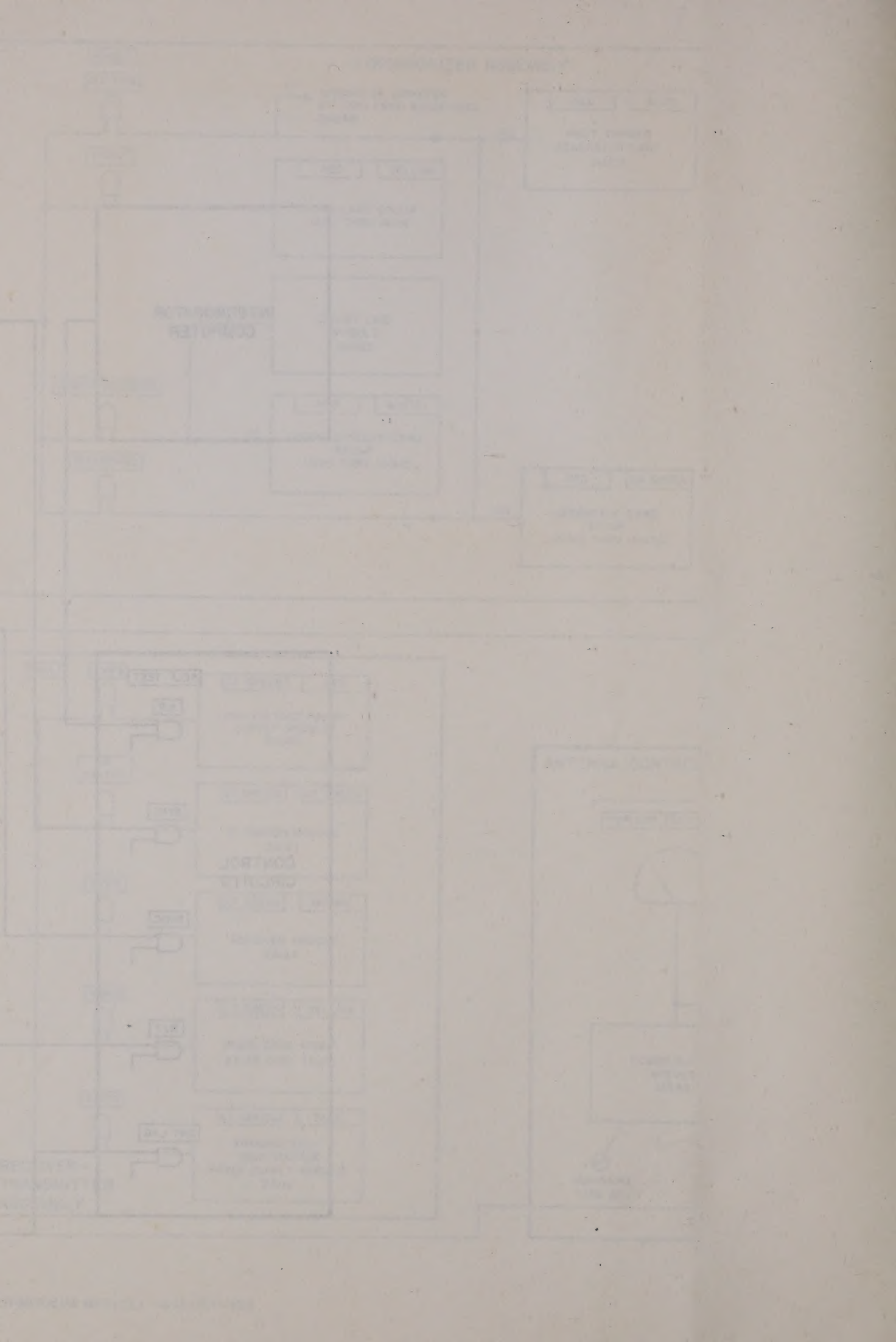


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Figure FO-15. Functional block diagram.



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