TECHNICAL MANUAL

DS AND GS MAINTENANCE MANUAL:

UNITS OF SHILLELAGH GUIDED MISSILE TEST STATION

SUPPLEMENTARY EQUIPMENT TESTED AND REPAIRED BY LCSS

(LAND COMBAT SUPPORT SYSTEM)

This copy is a reprint which includes current pages from Changes 1 THROUGH 4.

HEADQUARTERS, DEPARTMENT OF THE ARMY

APRIL 1973

WARNING

TOXIC AND FLAMMABLE MATERIALS

Cleaning compounds, alcohol, paints, primers, and solvents used in this manual are toxic and flammable and must be used with extreme care. Avoid prolonged or repeated breathing of the vapor. Keep away from heat and open flames. Use only in a well-ventilated area. Whenever possible, solvent cleaning should be conducted in the preclean area of the AN/TSM-94 shelter with the ventilator fan running. The toxic and flammable materials used in this manual are listed below.

Name	*Spec No.*	*Remarks*
Acetone	O-A-51	F, T
Alcohol	O-E-760	F, T
MEK	TT-M-261	F, T
Paint	MIL-E-15090	F, T
Paint	TT-E-515	F, T
Paint	TT-E-527	F, T
Paint	TT-E-529	F, T

1 "F" indicates flammable, and "T" indicates toxic.

WARNING

DANGEROUS VOLTAGE

is used in the operation of this equipment

DEATH ON CONTACT

may result if personnel fail to observe safety precautions

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

Units tested in accordance with this manual contain a maximum voltage of 20 KVAC and 33 VDC.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

WARNING

Do not be misled by the term "low voltage". Potentials as low as 50 volts may cause death under adverse conditions. For artificial respiration, refer to FM21-11.

Technical Manual
No. 9-4935-557-34

DS AND GS MAINTENANCE MANUAL: UNITS OF SHILLELAGH GUIDED MISSILE SYSTEM TEST STATION SUPPLEMENTARY EQUIPMENT TESTED AND REPAIRED BY LCSS (LAND COMBAT SUPPORT SYSTEM)

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 13 April 1973

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

If you find mistakes or if you know of a way to improve this publication, please let us know along with your reasons for the recommendations. Your letter or DA Form 2028, Recommended Changes to Publications, should be mailed directly to Commander, U.S. Army Missile Command, ATTN: AMSMI-LC-ME-PMC, Redstone Arsenal, AL. 35898-5238. A reply will be furnished directly to you.

*This manual together with TM 9-4935-555-34-3, 23 April 1973; TM 94935-555-34-2, 30 April 1973; and TM 9-4935-558-34, 23 April 1973, supersedes TM 9-4935-555-34/2, 25 February 1970 including all changes and TM 9-4935-555-34/3, 20 January 1971 including all changes.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual is published for the information and guidance of personnel responsible for maintaining the SHILLELAGH Supplementary Equipment. This equipment is used with the Land Combat Support System (LCSS) to test and repair SHILLELAGH Units Under Test (UUT's). Refer to TM 9-1425-550-L for a listing of publications applicable to LCSS.

b. This manual is technically correct for the SHILLELAGH Supplementary Equipment if outstanding Modification Work Orders (MWOs) have been incorporated. Refer to DA PAM 750-10 and DARCOM PAM 750-99.

1-2. Maintenance Allocation

In general, the prescribed maintenance responsibilities of the maintenance technician are as reflected in the maintenance allocation chart. Appendix D in TM 94935-552-14/1, and in the allocation of tools and repair parts in TM 9-4935-557-24P

1-3. Forms, Records, and Reports

Refer to DA PAM 738-750 for the pertinent maintenance forms. records. and reports.

Section II. DESCRIPTION AND DATA

1-4. LCSS Support Capability

LCSS consists of an electronic test group (AN/TSM-93), repair and storage group (AN/TSM-94), and an engine generator set. When AN/TSM-94 and AN/TSM-93 are deployed in the field, AN/TSM-94 provides the manual test and main repair capability; AN/TSM-93 provides automatic test and limited repair capabilities.

1-5. SHILLELAGH Supplementary Equipment Test Programs

The UUT's of the SHILLELAGH Supplementary Equipment requiring electronic testing are automatically tested and fault-isolated by means of programs specifically designed for this purpose and these tests are performed in the AN/TSM-93. Individual UUT's are placed on the test bench and connected to AN/TSM-93 with special test cables. AN/TSM-93 performs a programmed series of tests, and the SSVD displays instructions to aid the operator in conducting the program. When a malfunction is detected in a UUT, those SSVD displayed instructions to aid the operator to the proper corrective action. UUTs which are tested and repaired using manual procedures will be tested and repaired in the AN/TSM-94. A UUT index. TM 9.1425-550-10, coordinates SHILLELAGH Supplementary Equipment part numbers with the chapter in this manual containing the test and repair instructions.

1-6. Manual Organization

This manual consists of separate chapters which contain test and repair information for each SHILLELAGH Supplementary Equipment UUT. Each chapter contains a section on tests and a section on repairs.

a. Tests. Section I of each UUT chapter provides the following information:

(1) General information.
(2) Equipment required for tests.
(3) Test instructions. This paragraph contains instructions that are peculiar to the UUT and are not covered in the REF TM's or repair procedures.
(4) Preparation for tests.
(5) Cable hookup diagram. This diagram shows the initial cable hookup for automatically testing a UUT. All cables listed in the equipment required paragraph are not necessarily required for initial hookup, and are not shown on the diagram. Connect the cables not shown on the diagram as directed by the program.
(6) Operator instructions (REF TM's).

b. Repair. Section II of each UUT chapter contains the repair procedures peculiar to the UUT being repaired or not apparent to an experienced technician. When a SSVD display occurs, directing component replacement or to a REF TM. followed by a test termination, the UUT should be disconnected to perform the repair or to perform the conventional troubleshooting directed by REF TM.

1-7. Patchboards

a. Installation of a patchboard is necessary for automatically testing a UUT. The patchboard should not be installed until directed to do so by the test program. See TM 9-4935-552-14/1 for patchboard installation and removal procedures.

b. The UUT test programs contain survey test of patchboard components. Repair of the patchboard varies, depending on the type of patchboard used with the UUT program. If a squib-wired patchboard is used, replace the patchboard component listed in message displayed on SSVD. If a patchboard containing printed circuit cards is used, replace the indicated patchboard subassembly listed in message displayed on SSVD (in parenthesis).

1-8. Test Points

When dc test point measurements are referenced in pairs, connect the positive lead of the test equipment to the first test point listed. Example: P6-5/P6-1. In this example, the positive lead is connected to pin 5 of P6.

1-9. Waveform Converter Probes

The waveform converter (1A6) is designed to accept two different types of probes: active and passive. One active and two identical passive probes are supplied. Both passive probes may be connected at the same time, or one passive probe may be connected with the active probe.

a. Active Probe. The active probe connects the CHANNEL A connectors. Connect the probe BNC connector to the CHANNEL A INPUT connector, and the probe AN type connector to the CHANNEL A POWER connector. Do not connect the return lead on the probe end unless so directed by the program.

b. Passive Probes. Connect the BNC connector of either passive probe to either the CHANNEL A INPUT or the CHANNEL B INPUT connector. Do not connect the return lead on the probe end unless so directed by the program.

1-10. Digital Multimeter Probe

The digital multimeter probe connector is attached to the PROBE INPUT connector on the front panel of the digital multimeter (1A5). The probe has a two-position switch that selects the proper characteristics for resistance measurement, or for ac/dc measurements. When a program calls for probe use, an SSVD display message tells the operator which switch position to use and where to connect the probe.

1-11. Extender Board Probing

Figure 1-1 provides the information necessary for proper orientation of the extender board in a UUT connector and shows it's probing locations.

1-12. Dictionary of Terms

Table 1-1 contains standard UUT terminology used in the SSVD messages and the UUT chapters.

1-13. SSVD (1A1) Abbreviations

a. Table 1-2 contains a list of abbreviations that are used in instructions displayed on the SSVD.

b. When the operator is directed to make an adjustment in accordance with the last displayed number value, the following example shows how to interpret the displayed message.

Example from displayed message	Nominal value of adjustment
+496842 G VAC 1	4.968 VAC

The 1 indicates the decimal point placement as counted from the left side (ignoring the + sign) of the value in the SSVD displayed message.

1-14. Replacement of Components

When a component (assembly, subassembly, module, diode, resistor, wire, etc.) has been replaced, the complete automatic test program must be rerun. Restore the UUT to service only after it successfully passes the GO chain.

1-15. Figure References

Information (parts location, probe points, etc.) contained in the figures is used to support the text material by the following two methods.

a. A figure number is referenced adjacent to a paragraph title and key numbers follow specific items in the text of the paragraph. The key numbers are related to the items they follow and pertain to the figure number adjacent to the paragraph title.

Example: R1 Removal and Installation Procedure (Fig. X-1).

(1) Remove mounting hardware (7) and module cover (4) from UUT (1).
(2) Remove R1 (3).

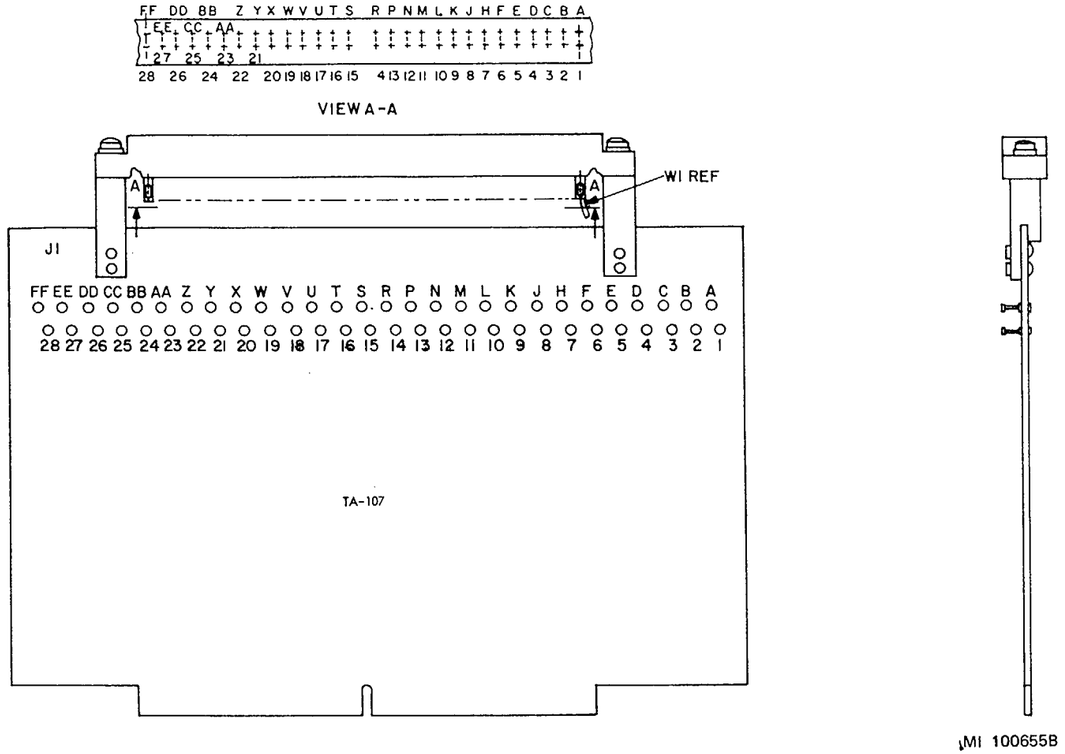


Figure 1-1. TA-107 probing diagram.

b. If the information contained in a particular paragraph refers to more than one figure and specific items in both figures are called out, the figure number is mated to the appropriate key number. When a key number and figure number are indicated in the text and the next item is related to the same figure, the key number can stand alone (as in a above) until a new figure is mentioned.

Example: R1 Removal and Installation Procedures

(1) Remove mounting hardware (7 and 8, fig. X-2), cover (12), and R1 (7, fig. X-1).

1-16. Short Number Cross-Reference

Refer to TM 9-1425-550-10 for a reference designator to APN cross-reference list of all test accessories which have been assigned a reference designator.

1-17. Storage Plan

Refer to TB 9-1425-550-10 for the storage information and inventory lists.

1-18. Program Memory Card

Each program memory card (PMC) has a single test program designed to automatically test one UUT. Procedures for PMC installation and removal are given in TM 9-4935-552-14/1. A UUT index, TM 9-1425-550-10, coordinates LCSS and weapon system part numbers with the technical manual and chapter containing the test and repair instructions.

Table 1-1. Standard UUT Terminology.

Terminology	Explanation
REPLACE or REPL	Replace a faulty subassembly with a spare. Rerun the program unless otherwise directed.
REMOVE	Remove a subassembly only until its status is determined.
REINSTALL	Reinstall a subassembly that was removed previously.
REMOVE AND INSTALL A NEW	Remove a suspected subassembly and install a new one in its place.
REPLACE AXX CANCEL	If an SSVD display ends with CANCEL, it means disregard the previous message or the portion of it between asterisks.
INTERCHANGE AXX AND AYY	Swap positions of the two subassemblies.
PRESS	Operate a pushbutton switch.
"XXX"	Quotation marks enclose lamp or control lettering a it appears on a panel.
LAMP ON	A lamp is on.
LAMP OFF	A lamp is off.
AC/DC PROBE TO "XXX VDC" on XAX RIGHT/LEFT	SSVD display for the digital multimeter probe when the probe is in the AC/DC position. The high side of the probe is connected to the location on the left side of the diagonal. The low or return side of the probe is connected to the location on the right side of the diagonal.
PASSIVE A PROBE PASSIVE B PROBE ACTIVE A PROBE	Standard SSVD displays for the waveform converter probes.
AC/DC PROBE TO JX/JY ON PATCHBOARD	SSVD display for connecting the probe to connectors on the patchboard. The high side of the probe goes to JX, and the return goes to JY.
START TEST XXX	Insert the test number in the last three digits of the UUT TEST NUMBER switches and press the START TEST switch on 1A11.
EOP	All tests go.
TERM	SSVD display which branches back to test 001 and halts the program.

Table 1-2. SSVD (1A1) Message Abbreviations.

Abbreviation	Meaning
A	Apply
AC	Alternating Current
ADAP	Adapter
ADCON	Analog digital converter
ADJ	Adjust
AMPL	Amplifier
AST	Address storage
AUX	Auxiliary
AV	Address verify
B	Base
BD	Board
BRD	Board removed defective
BKR	Breaker
C	Capacitor
C/DP	Controller/data processor
CCW	Counterclockwise
CHK	Check
CKT	Circuit
CKT BKR	Circuit breaker
COLL	Collector
COMP	Compare
CONF	Confidence
CONN	Connect
CONT	Control
CONV	Converter
CR	Diode designation
CTR	Counter
CW	Clockwise
DA	Digital analog converter
DC	Direct current
DEC PT	Decimal point
DISC	Disconnect
DIST	Distribution
DLY	Delay
DMM	Digital multimeter
DOB	Data output buffer
DP	Data processor
E	Emitter
EFF	Effectivity
EXT	External
FLG	Flag
FREQ	Frequency
G	Go
GEN	Generator
GRD	Ground
H	High, halt
HFREQ	High frequency
HLDG	Hold down test fixture
Hz	Hertz
IDENT	Identification
IND	Indicator
INDS	Indicators
INST	Instrument
INT	Internal
INTER	Interrupt
IPS	Internal power supply
IR	Infrared
K	Kilo (10^3)
kHz	Kilohertz
KVA	Kilo volts amperes
L	Low
LAC	Low alternating current
LCSS	Land combat support system
LDC	Low direct current
MAINT	Maintenance
MBA	Measure before apply
MEAS	Measure
MEG	Mega (10^6)
MER	Measure frequency
MHz	Megahertz
MI	Manual interrupt
MIN	Minute
MON	Monitor
MPV	Measure peak voltage
MRE	Measure resistances
MS	Millisecond
MTD	Measure time dual channel
MTS	Measure time single channel
MVAC	Alternating current milivolts
MVDC	Direct current millivolts
MWO	Modification work order
NO	Number
NOS	Numbers
OK	Okay
OSC	Oscillator
PARA	Paragraph
PB	Patchboard
PGN	Pulse generator
PLMA	Program library memory assembly
PMC	Program memory card
POS	Position
POT	Potentiometer
PROC	Proceed
PT	Point
PWR	Power
PWR SUP	Power supply
R	Reset
REF	Reference
REG	Register
REL	Relay
REM	Remove
REPL	Replace
RSA	Relay switch a
RSB	Relay switch b
RSC	Relay switch c
S/D	Source detector
SDA	Source/detector adapter
SEC	Second
SGD	Signal generator attenuated output
SGM	Signal generator modulators
SGMN	Signal generator modulator direct output
SGN	Signal generator direct output
SGP	Signal generator power amplifier
SGQ	Signal generator phase delayed output
SGX	Signal generator phase subaddress
SG 1, 2	Signal generator channel 1, 2
SIG	Signal
STD	Standard
STIM	Stimulus
SQW	Signal generator squarewave output
SW	Switch
SYP	Signal generator sync output
TAP	Test adapter panel
TECH	Technical
TM	Technical manual
TP	Test point
TR	Test results
USEC	Microsecond
UT	Unit rest
UUT	Unit under test
V	Print message
VAC	Alternating current volts
VAR	Variable
VDC	Direct current volts
VENT	Ventilator
VIPS	Volts internal power supply
VP	Volts peak
VPP	Volts peak-to-peak
VRMS	Volt, root mean square
WAVE	Waveform
WC	Waveform converter
XFMR	Transformer
Z	Integrated circuit designation

1-19. Entry Points and Starred Instructions

a. Starred Instructions. Some of test programs have starred instructions (**------**) which are displayed on SSVD during the test program. These instructions define the action to be performed in case AN/TSM-93 hangs up before completion of the test. If the test is completed, the word CANCEL is displayed on SSVD, indicating that the test is completed and canceling any previous starred instructions.

b. Entry Points. Some of the programs contain messages displayed on SSVD of entry points. These are three-digit numbers preceded by the words ENTRY POINT. In the event of an unprogrammed stop or an AN/TSM-93 hangup, the program can be restarted by positioning the three right-hand UUT TEST NUMBER switches to the last entry point displayed and pressing the START TEST switch.

1-20. Cross-Reference Specification to NSN

Refer to table 1-3 for a cross-reference between the specification numbers and the NSN's used in this manual.

1-21. SHILLELAGH Supplementary Equipment

Figures 1-2 through 1-11 illustrate the SHILLELAGH Supplementary Equipment.

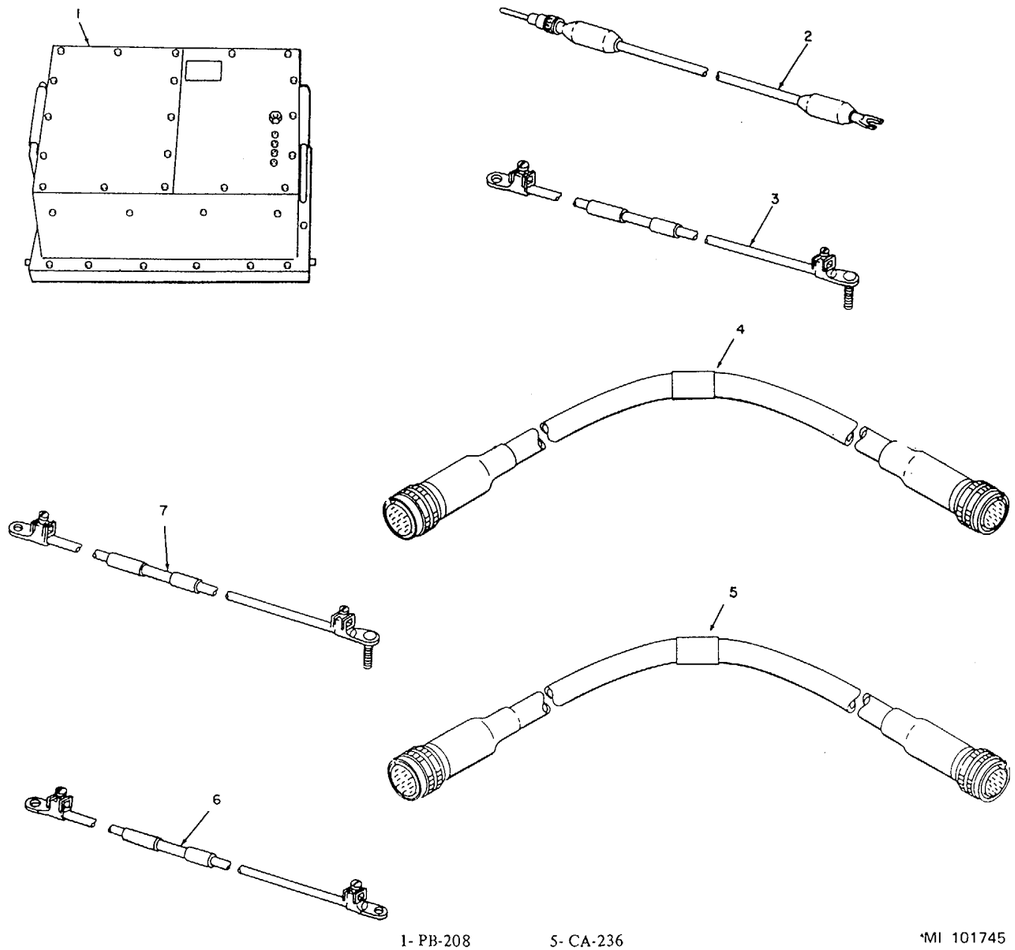
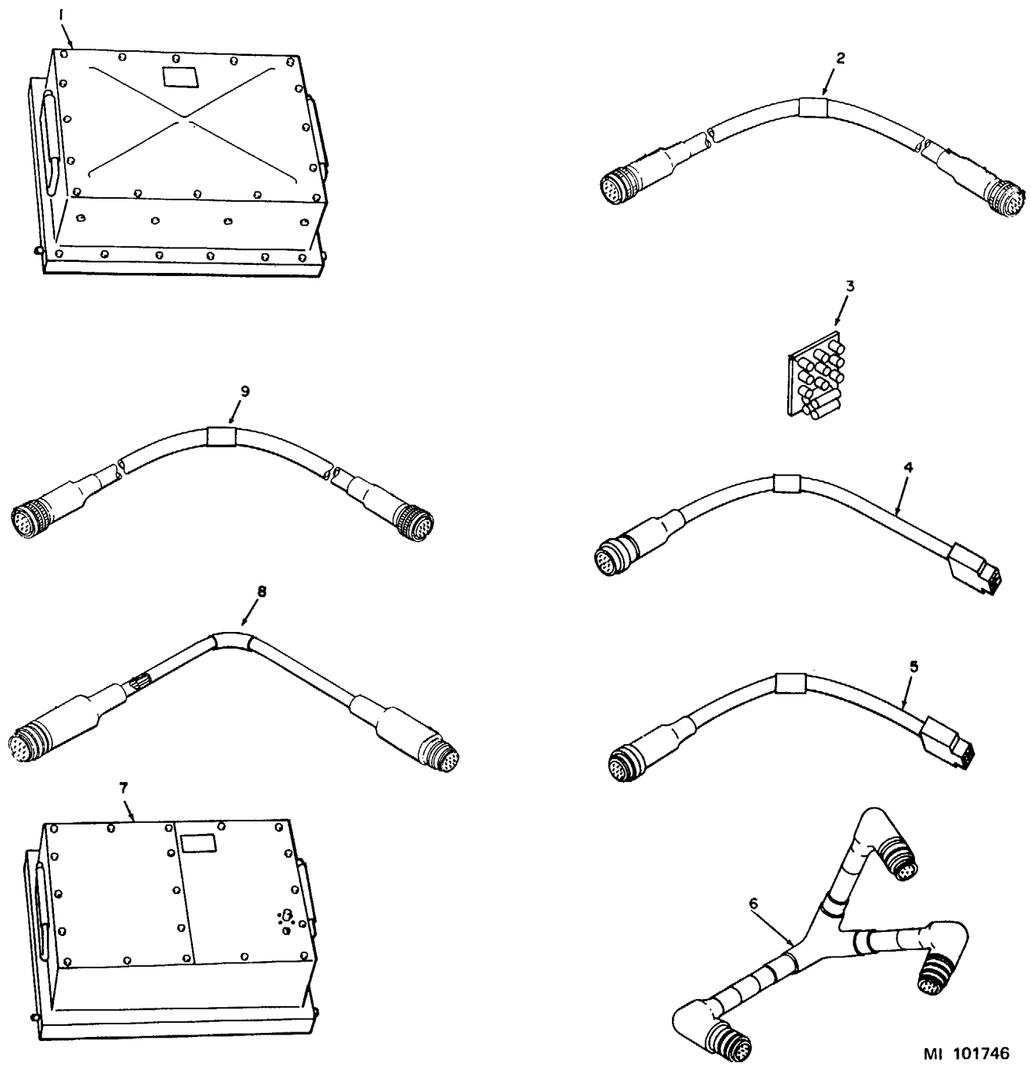


Figure 1-2. SHILLELAGH supplemental equipment – view 1.

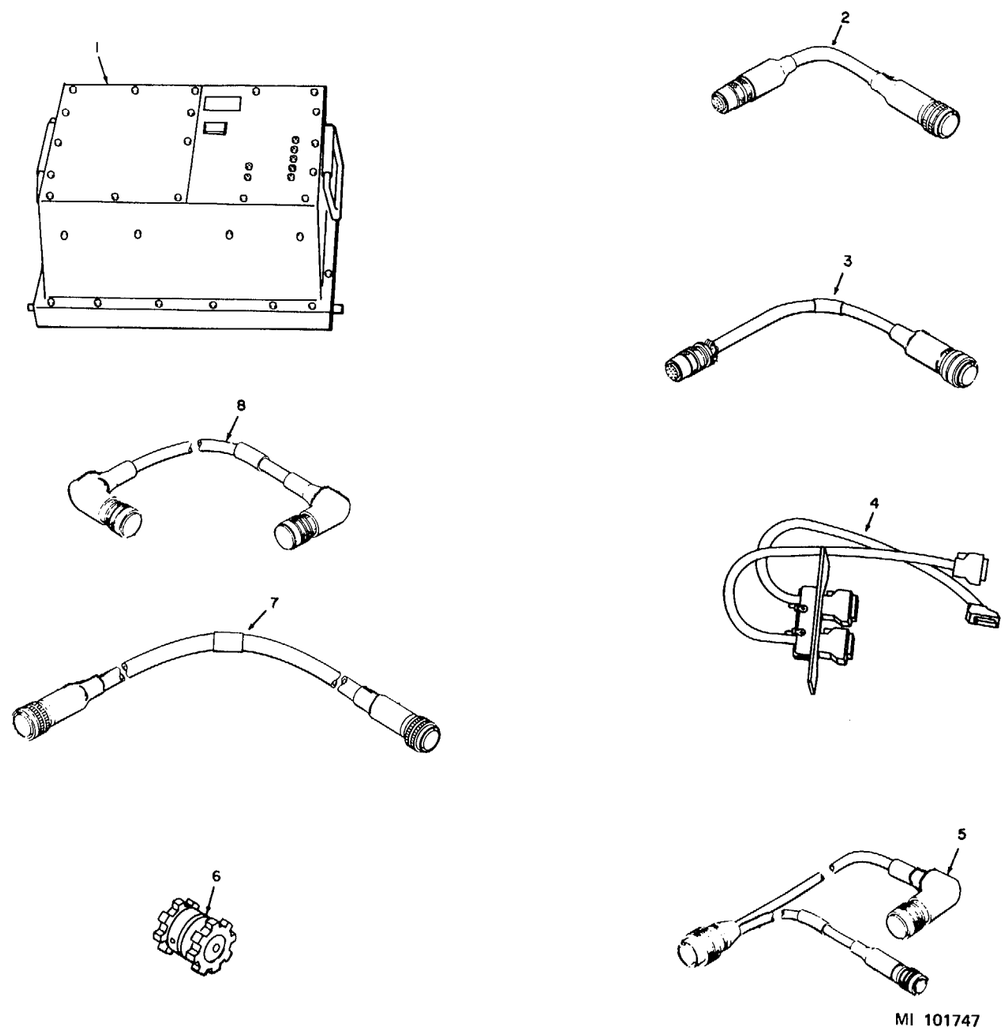
Table 1-3. Cross-Reference Specification to NSN

Specification no.	Nomenclature	NSN
MIL-A-46106	Adhesive sealant, silicone	8040-00-225-4548
MIL-C-22473, grade HVV	Sealing compound	NSN not available
MIL-C-17/113, RG316U	Cable	6145-00-918-9494
MIL-E-15090, Class 2, Type III, Color no. 26492	Paint	8010-00-285-4868
MIL-22129, AWG20	Insulation sleeving	5970-00-899-6660
MIL-I-23053/5, Class 1. 0.187-inch ID, white	Insulation sleeving	5970-00-082-3942
MIL-R-46846, Type 1, Class 1 3/4-inch ID	Insulation sleeving	5970-00-177-1590
MIL-R-46846, Type 1. Class 1, 7/8-inch ID	Insulation sleeving	5970-00-177-1591
MIL-R-46846, Type 1, Class 1, 1-inch ID	Insulation sleeving	5970-00-177-1567
MIL-R-46846, Type 1, Class 1, 1 1/4-inch ID	Insulation sleeving	5970-00-242-6048
MIS-16691-2	Convoluted tubing	9330-00-108-6223
MIS-16691-3	Convoluted tubing	9330-00-108-6251
MIS-16691-4	Convoluted tubing	9330-00-108-6232
MIS-16691-5	Convoluted tubing	9330-00-108-6233
MIS-16691-6	Convoluted tubing	9330-00-108-6234
MIS-16691-7	Convoluted tubing	9330-00-108-6235
M22759/11-12-9	Wire	6145-00-090-5411
M22759/11-20-9	Wire	6145-00-939-4964
M22759/11-22-9	Wire	6145-00-090-5404
M27500-18RCIS6	Cable	6145-00-450-1947
M27500-20RCIS6	Cable	6145-00-144-0114
M27500-22RCIS6	Cable	6145-00-144-0102
TT-E-515, Color no. 37538	Paint	8010-00-297-0811



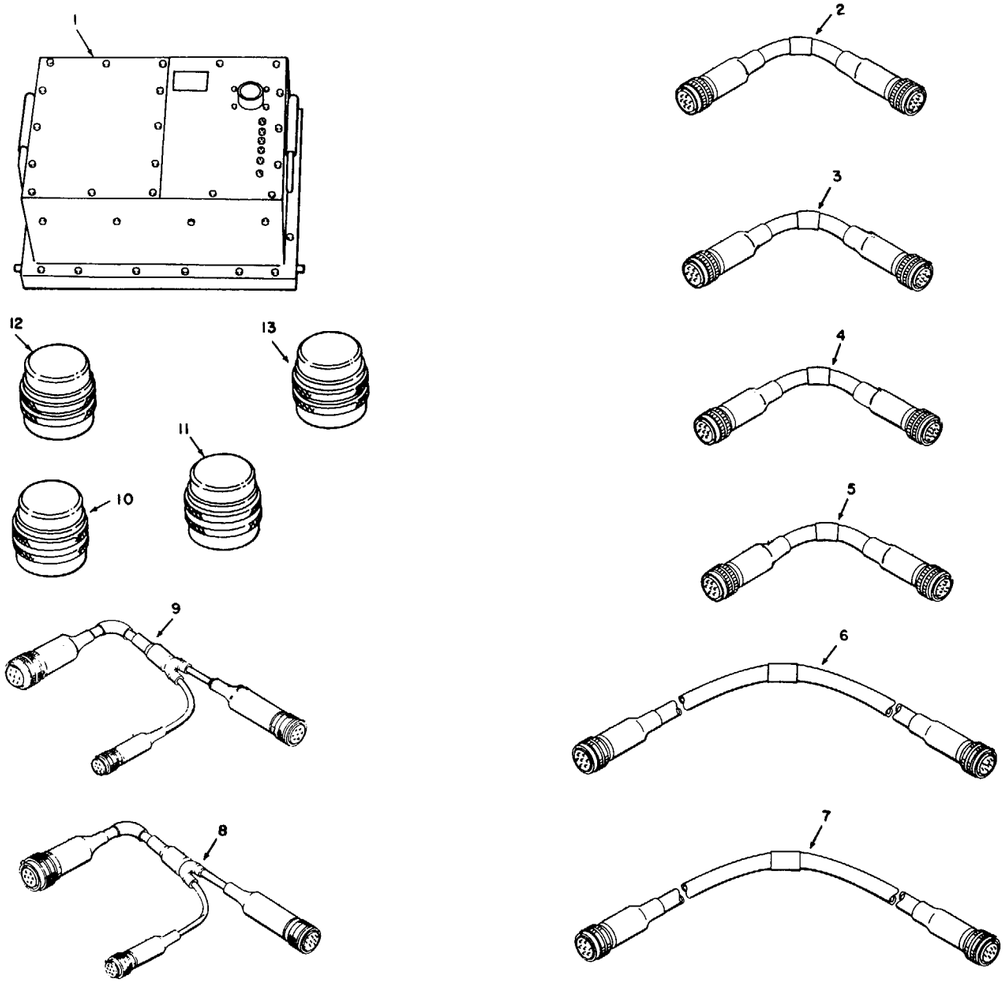
1 – PB-204
2 – CA-240
3 – TA-210
4 – CA-242
5 – CA-241
6 – CA-244
7 – PB-206
8 – CA-226
9 – CA-225

Figure 1-3. SHILLELAGH supplemental equipment – view 2.



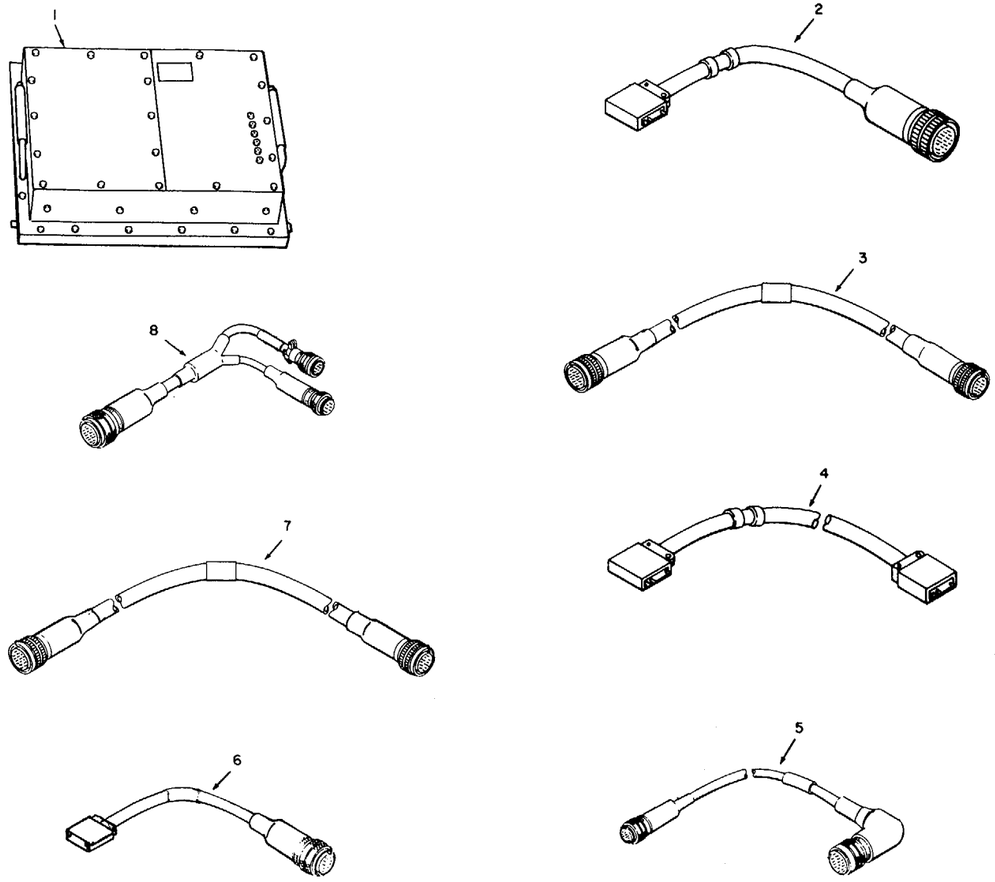
1 – PB-203
2 – CA-211
3 – CA-243
4 – CA-212
5 – CA-210
6 – Binding post
7 – CA-227
8 – CA-209

Figure 1-4. SHILLELAGH supplemental equipment – view 3.



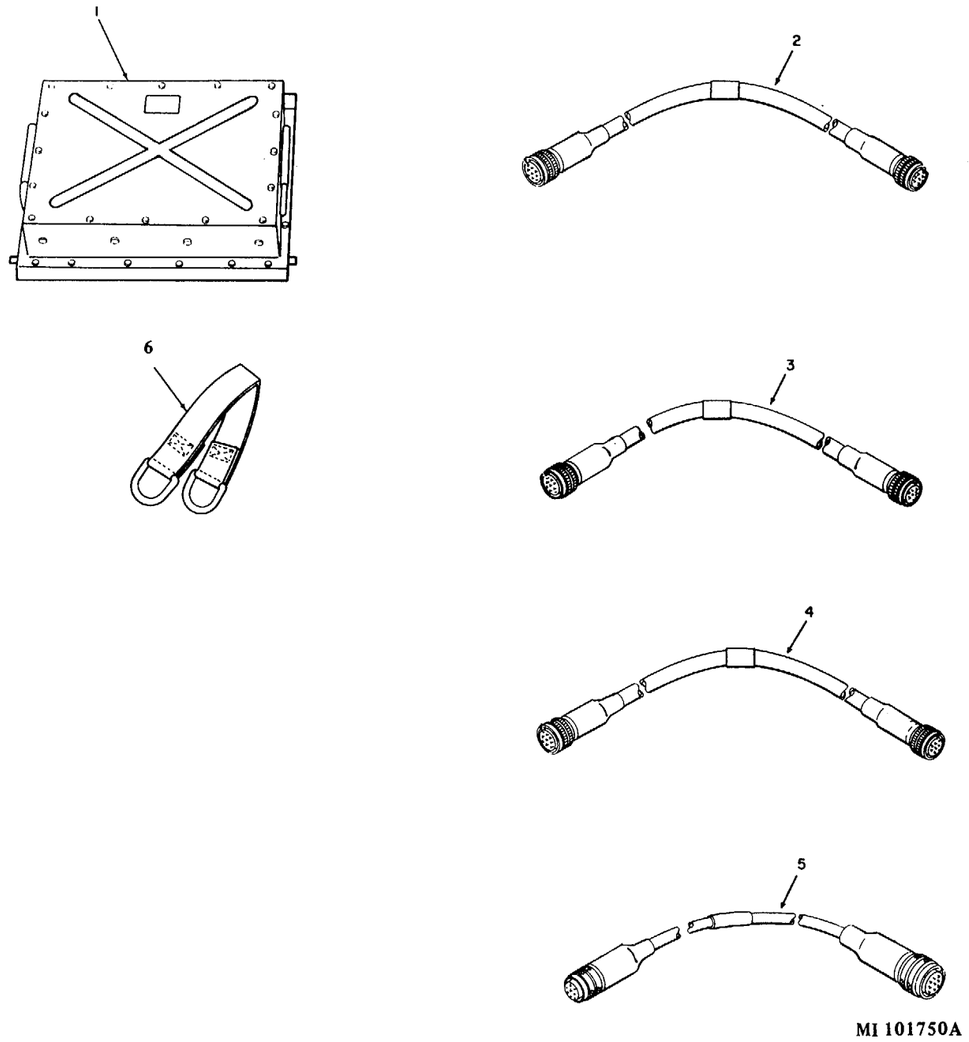
1 – PB-202
2 – CA-222
3 – CA-221
4 – CA-219
5 – CA-217
6 – CA-215
7 – CA-218
8 – CA-216
9 – CA-220
10 – TA-215
11 – TA-214
12 – TA-213
13 – TA-231

Figure 1-5. SHILLELAGH supplemental equipment - view 4



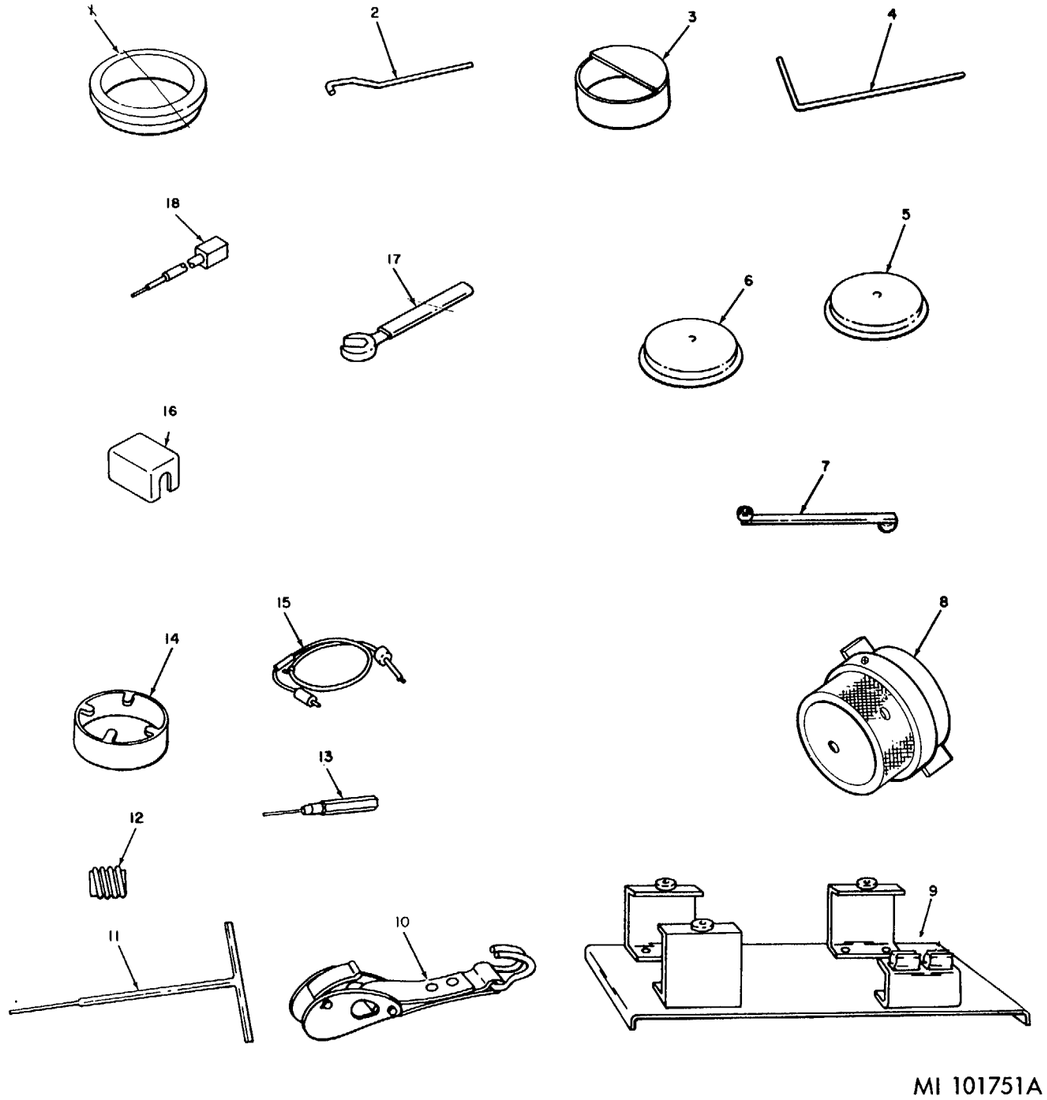
1 – PB-207
2 – CA-232
3 – CA-234
4 – CA-229
5 – CA-231
6 – CA-233
7 – CA-228
8 – CA-230

Figure 1-6. SHILLELAGH supplemental equipment - view 5.



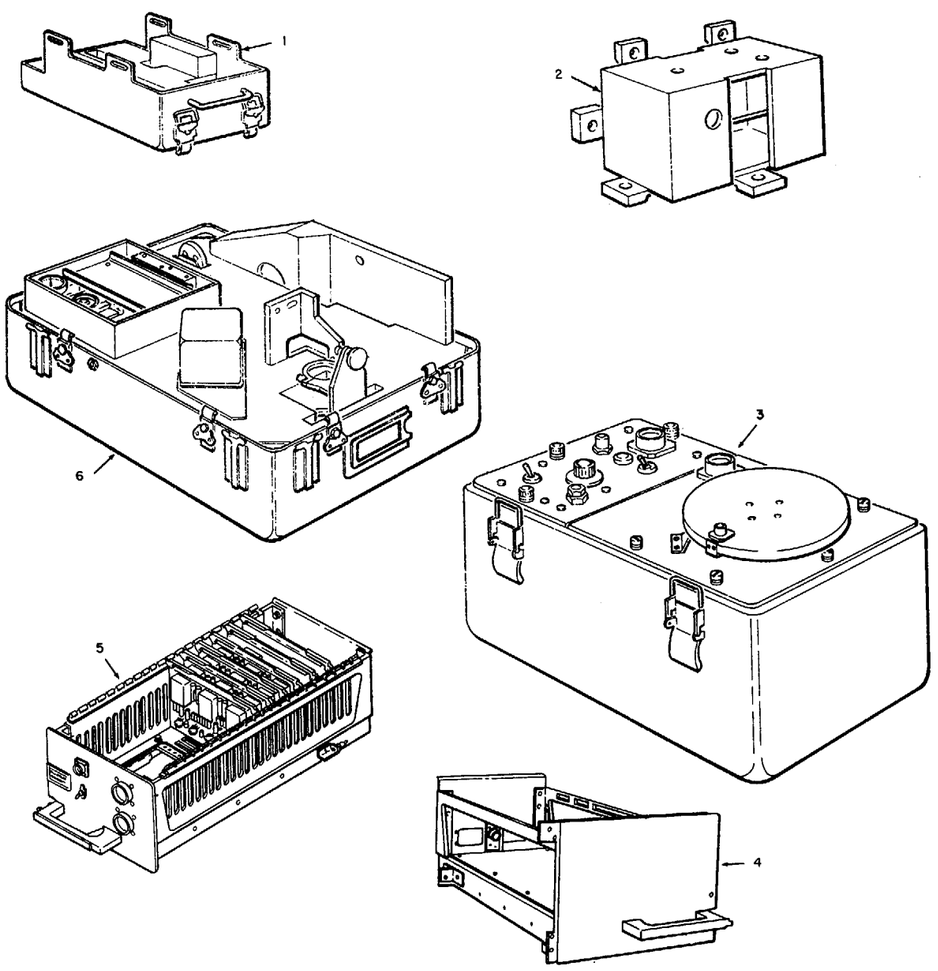
1 – PB-205
2 – CA-223
3 – CA-224
4 – CA-214
5 – CA-213
6 – Strap

Figure 1-7. SHILLELAGH supplemental equipment - view 6.



1 – TA-241
2 – Socket
3 – TA-212
4 – Socket
5 – TA-228
6 – Cap
7 – TA-227
8 – TA-224
9 – TA-243
10 – Strap
11 – TA-226
12 – Screw
13 – Wrench
14 – TA-223
15 – TA-205
16 – Cap
17 – Wrench
18 – TA-233

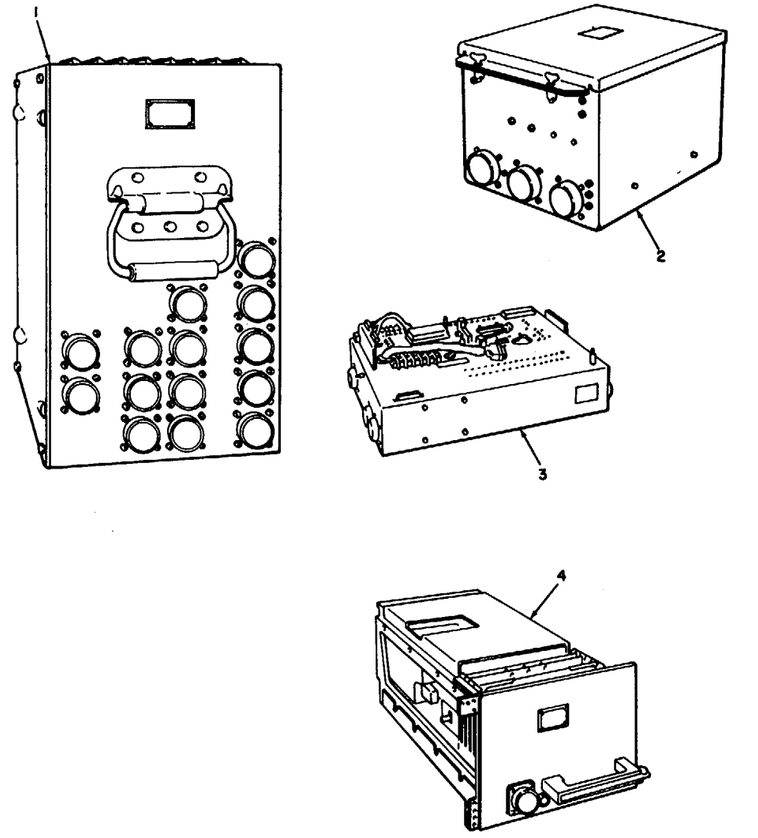
Figure 1-8. SHILLELAGH supplemental equipment - view 7.



MI 101752A

1 – Rate gyro fixture tray
2 – TA-207
3 – TA-220
4 – TA-225
5 – TA-211
6 – TA-229

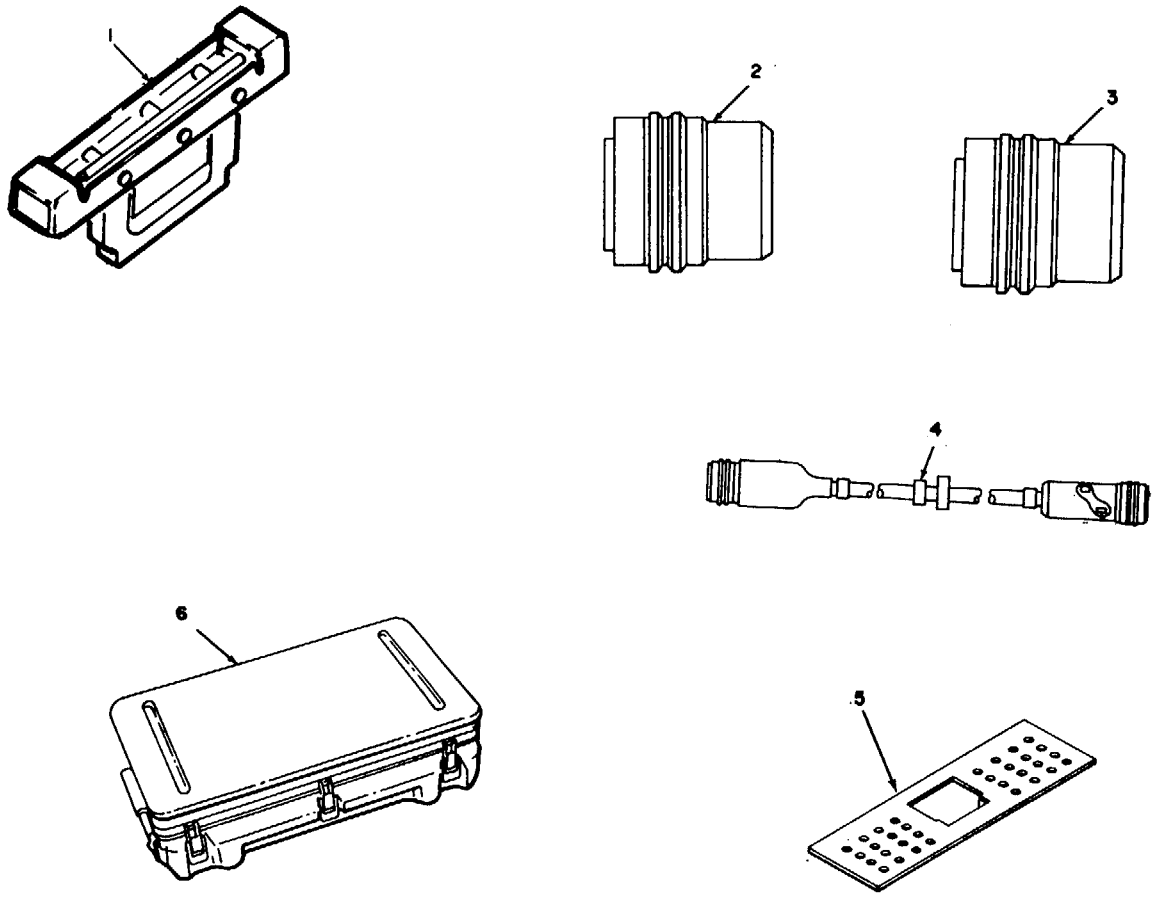
Figure 1-9. SHILLELAGH supplemental equipment - view 8.



MI 101753B

1 - TA-204
2 - TA-206
3 - TA-221
4 - TA-222

Figure 1-10. SHILLELAGH supplemental equipment - view 9.



1 - Board extractor
2 - TA-234, TA-238, TA-240, TA-244, TA-246
3 - TA-235, TA-236, TA-239, TA-242, TA-247
4 - CA-245
5 - Cover
6 - Patchboard container

Figure 1-11. SHILLELAGH supplemental equipment – view 10.

CHAPTER 2

PATCHBOARDS

Section I. MANUAL TESTS

2-1. General

This chapter provides the information necessary to isolate and repair a fault in a patchboard to a single chassis mounted component. Table 2-1 lists the patchboards and the figure references for each of the patchboards contained in this chapter. Figures 2-1 through 2-29 are provided as an aid in troubleshooting and testing the patchboards.

2-2. Equipment Required for Manual Tests

The multimeter, AN/USM-303 or equivalent, 6625-00-933-2406, is required to test the UUT.

2-3. Test Instructions

a. General

(1) Figure 2-1 provides assistance in locating the test points. To read figure 2-1, read the numbers from top to bottom and the letters from right to left For example: Test for continuity between 6F and 12AA.

(2) Section II contains the repair procedures for the printed circuit board type patchboards, and section III contains the repair procedures for the electrical lead type patchboards. In both sections, PB-202 has complete repair procedures and these procedures can be used as a guide for the remaining patchboards, of each type. Any unusual repair procedures have been included for each of the remaining patchboards of each type. Universal contact and electrical contact removal and installation procedures are contained in paragraphs 2-6 and 2-7 respectively.

b. Printed Circuit Type Patchboards.

(1) When checking continuity between pins consisting of either printed circuit wiring or wrapped wiring, proceed as follows: check for continuity between pins, and if it checks faulty, remove the panel on the patchboard and check for continuity from the mating end to the wire wrapping end of the patchboard pin. If continuity exists, check the wire wrapping or the soldered area on the printed circuit board. If the printed circuit board contains faulty etch, return the patchboard to depot. If wire wrapping or a wire is found faulty, replace the wire or re-wrap the ends of the wires.

(2) When checking continuity between pins containing component, mounted on A1 or A2, remove the panel on the patchboard and check for continuity between the patchboard pins and XA1 or XA2. If continuity exists, replace A1 or A2. If continuity checks are faulty, follow the procedures in step (1) above for the wiring between the patchboard pin and XA1 or XA2.

c. Electrical lead Type Patchboards.

(1) When checking continuity between two pins connected by only a patchcord and a fault is indicated, remove the patchcord and check it for continuity. If a fault is indicated in the patchcord, replace it (par. 2-11). When the patchboard tests good and no other action is indicated, return the patchboard to the depot.

(2) When checking resistance between two pins that contain a patchcord and resistors only, use the applicable patchboard figure and multimeter to isolate between the resistors and the patchcord for shorts, opens, or incorrect resistances. Replace the faulty component in accordance with the applicable repair figure. If the fault is not isolated to a faulty resistor or patchcord, return the patchboard to the depot.

(3) When checking resistance between two pins that contain a capacitor or capacitor-resistor combination and a fault is indicated, use the applicable patchboard figure and multimeter to isolate the fault. Replace the faulty patchcord or resistor in accordance with the applicable figure. If a fault is not found in the patchcord or resistor, replace the capacitor in accordance with the applicable repair figure. If the problem is not corrected by replacing the capacitor, return the patchboard to the depot.

(4) When there are indications of a fault in a subassembly stage designated A1, A2, etc., perform the resistance tests described in b and c above as applicable between the subassembly connections and the patchboard pins. If no faulty component is found during these tests, replace the subassembly in accordance with the applicable repair figure. If there are still indications of a fault, return the patchboard to the depot.

(5) When checking resistance between any patchboard pin and a patchcord shield, test for greater than 100 K ohms unless the patchboard figure shows a resistor in the circuit If the resistance is less than 100 K ohms replace the patchcord (par. 2-11). If a resistor is shown between the pin and the shield, check for the resistance and tolerance shown on the patchboard figure. If the resistor is faulty, replace it in accordance with the applicable repair figure.

(6) When checking continuity of circuits that have jacks, connectors, or switches, fault isolate the jacks, connectors, or switches using the multimeter and the applicable patchboard figure. The jacks and connectors are fault isolated by checking their pins for continuity and checking to see that a short does not exist between the jack or connector pins and the shell. Replace the faulty switch, jack, or connector in accordance with the applicable repair figure.

(7) When checking resistance of circuits that contain transistors or diodes, fault isolate the transistor or diode using the multimeter and the applicable patchboard figure. Replace the faulty transistor or diode in accordance with the applicable repair figure.

Table 2-1. Patchboard and Figure References.

Short no.	Patchboard APN	Parts location and schematic figure no.	Repair figure no.
PB-202	13047721	2-2 and 2-3	2-42 and 2-43
PB-202	13047722	2-4 and 2-5	2-31
PB-203	11154362	2-6 and 2-7	2-46
PB-203	11156531	2-8 and 2-9	2-36
PB-204	11156661	2-10 and 2-11	2-37
PB-204	11156651	2-12 and 2-13	2-47
PB-205	11153929	2-14 and 2-15	2-48
PB-205	11156551	2-16 and 2-17	2-38
PB-206	11154063	2-18 and 2-19	2-49 and 2-50
PB-206	11156561	2-20 and 2-21	2-39
PB-207	11153889	2-22 and 2-23	2-51
PB-207	11156571	2-24 and 2-25	2-40
PB-208	11155961	2-26 and 2-27	2-52 and 2-53
PB-208	11156581	2-28 and 2-29	2-41

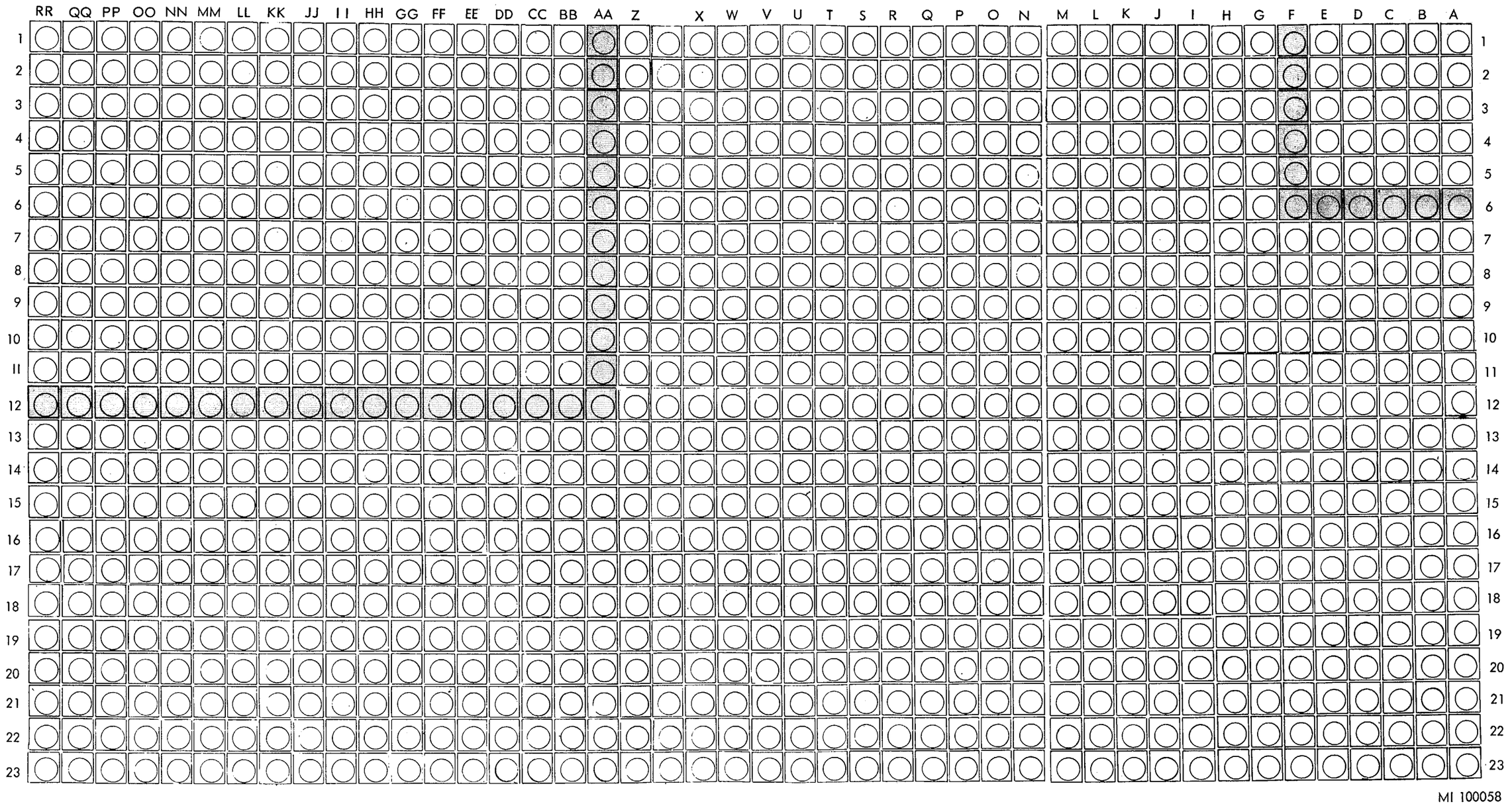
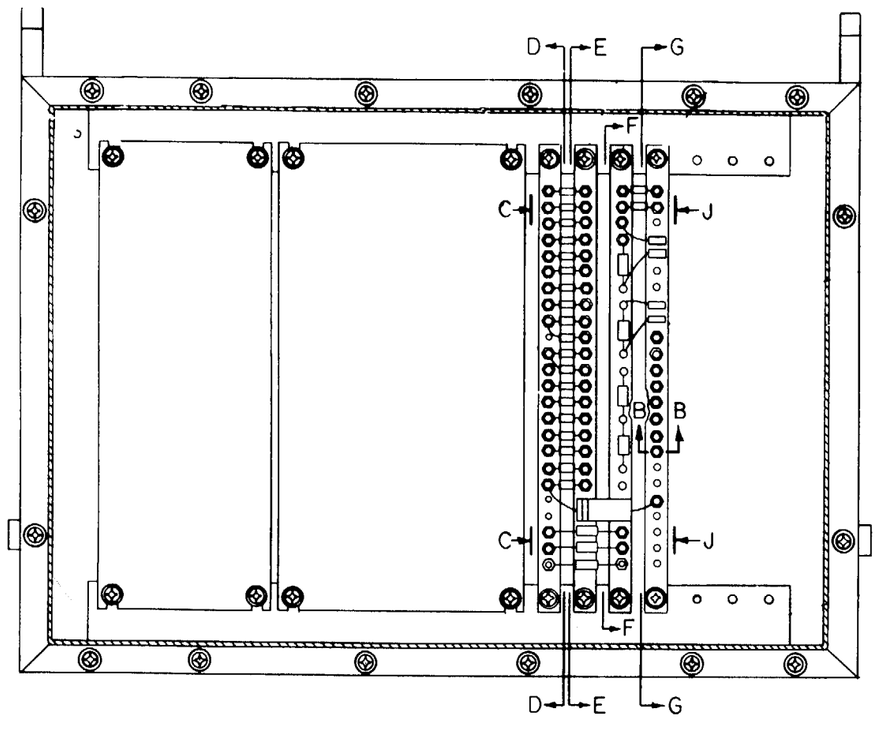
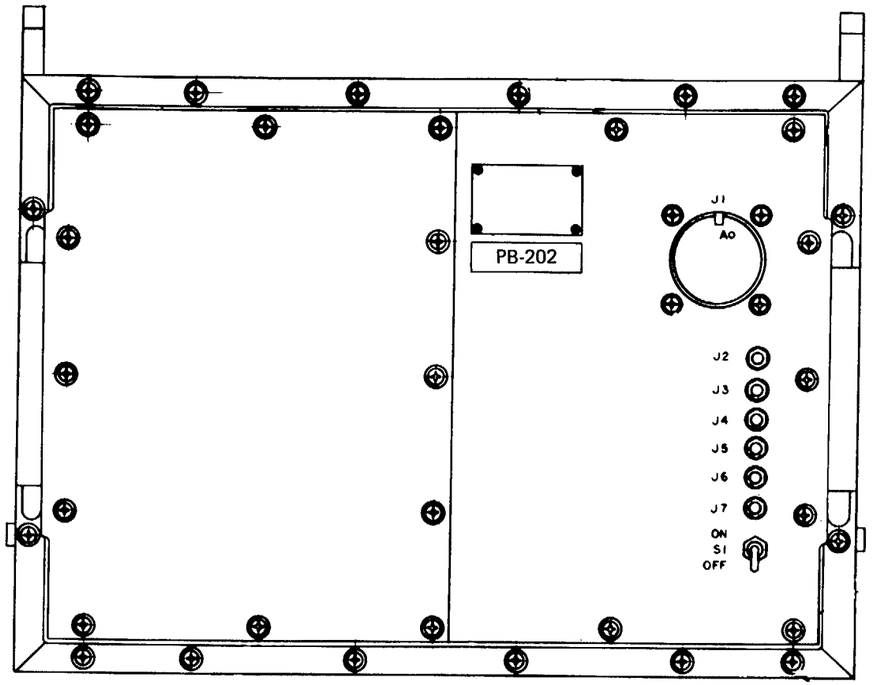
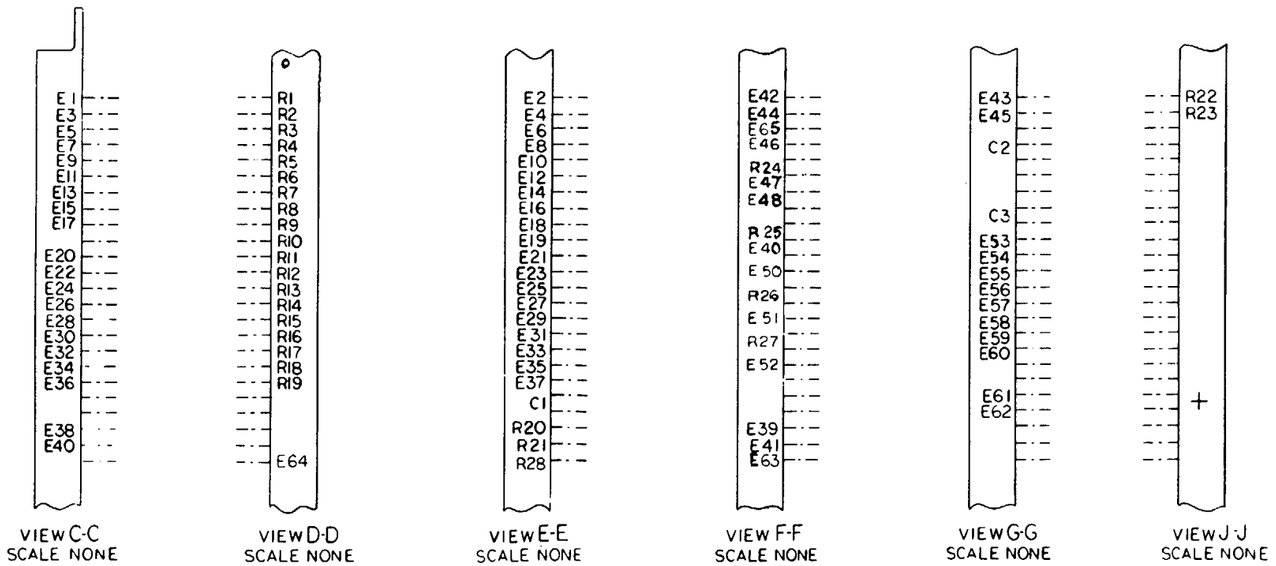
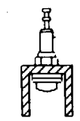


Figure 2-1. Patchboard pin orientation.





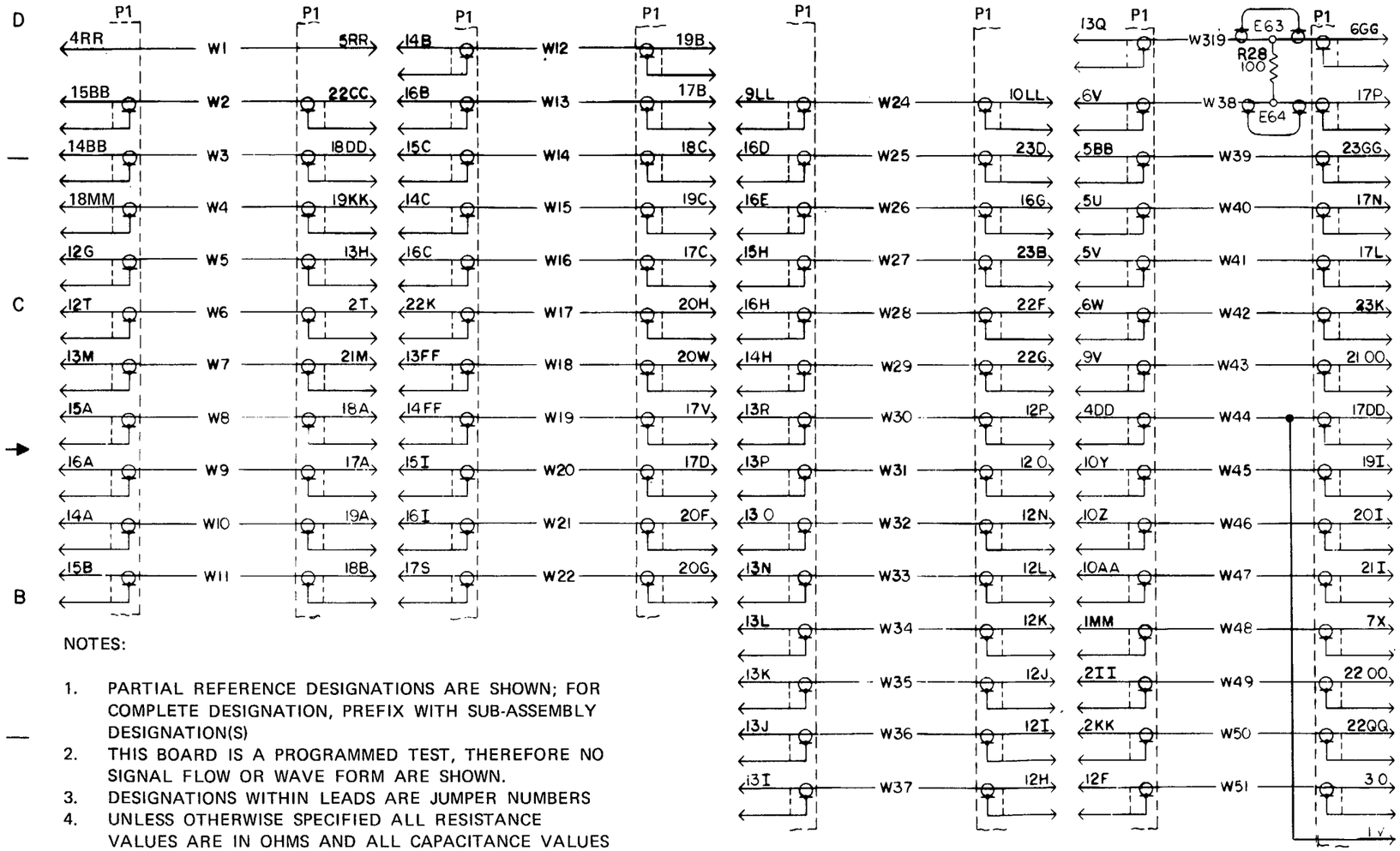




SECTION B-B
SCALE NONE

MI 99291A

Figure 2-2. PB-202, parts location diagram.

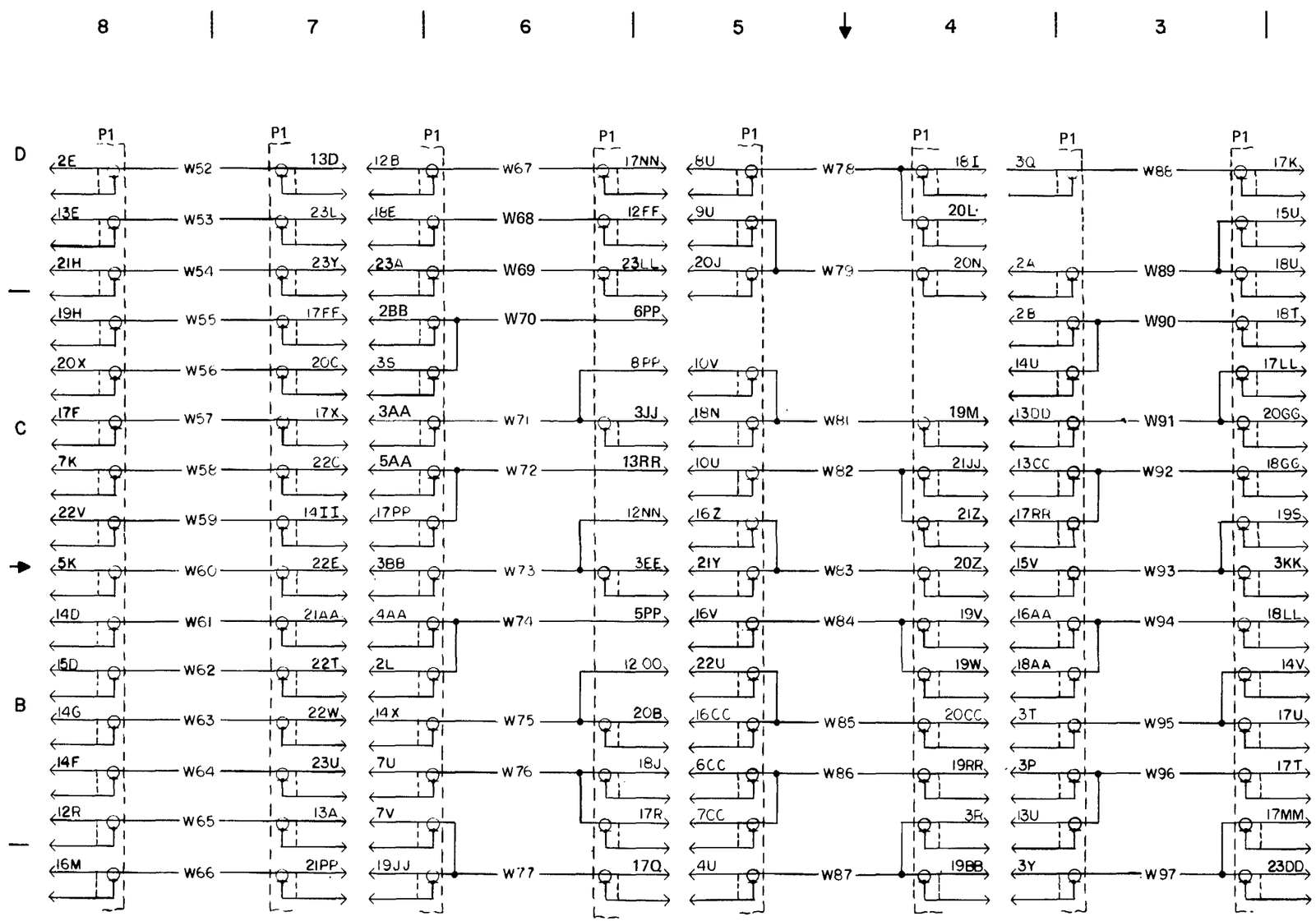


NOTES:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION, PREFIX WITH SUB-ASSEMBLY DESIGNATION(S)
2. THIS BOARD IS A PROGRAMMED TEST, THEREFORE NO SIGNAL FLOW OR WAVE FORM ARE SHOWN.
3. DESIGNATIONS WITHIN LEADS ARE JUMPER NUMBERS
4. UNLESS OTHERWISE SPECIFIED ALL RESISTANCE VALUES ARE IN OHMS AND ALL CAPACITANCE VALUES ARE IN MICROFARADS
5. LETTERS UNDERLINED INDICATE LOWER CASE

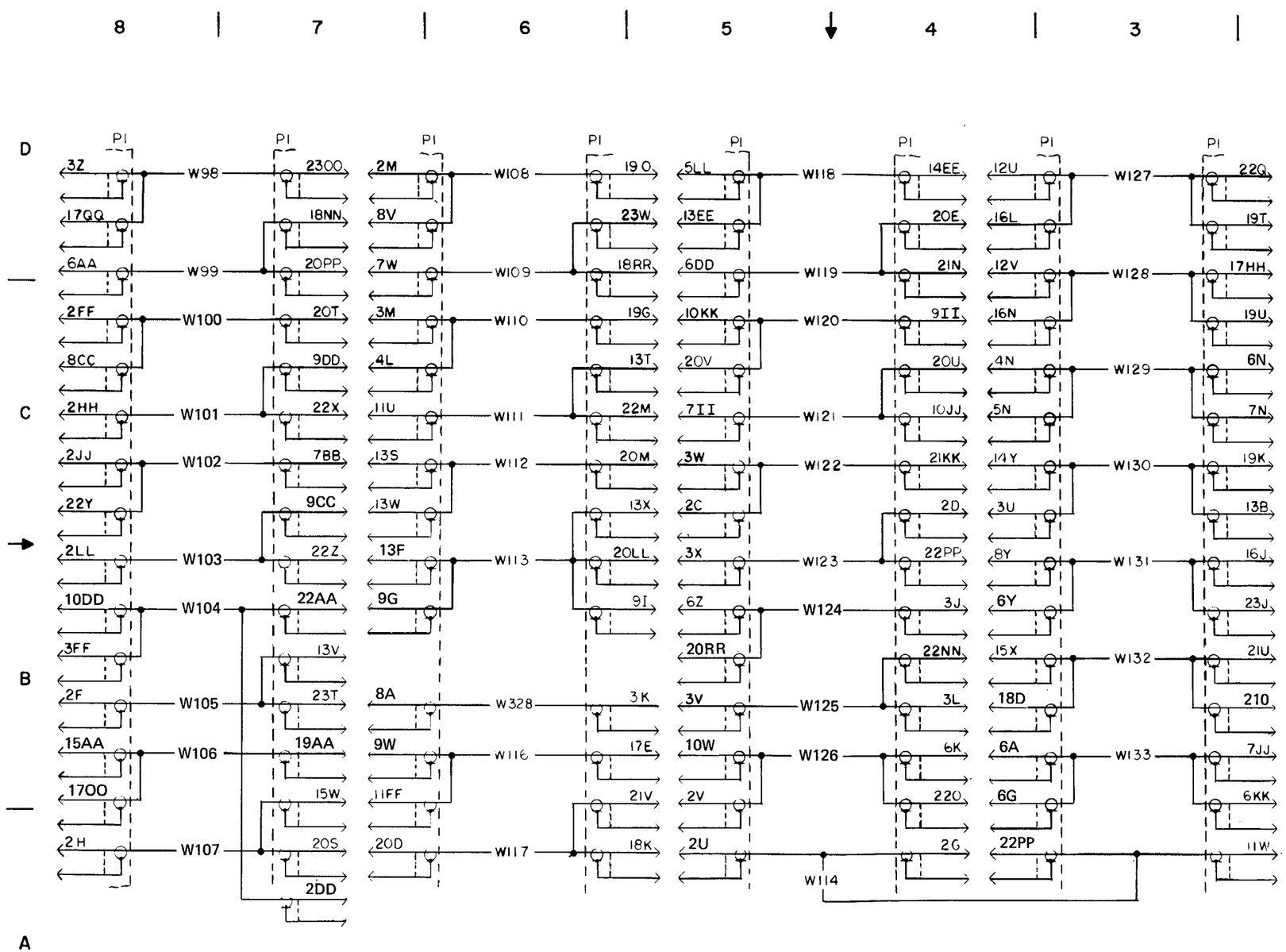
MS008246

Figure 2-3. PB-202, schematic diagram (sheet 1 of 8).



MS008249

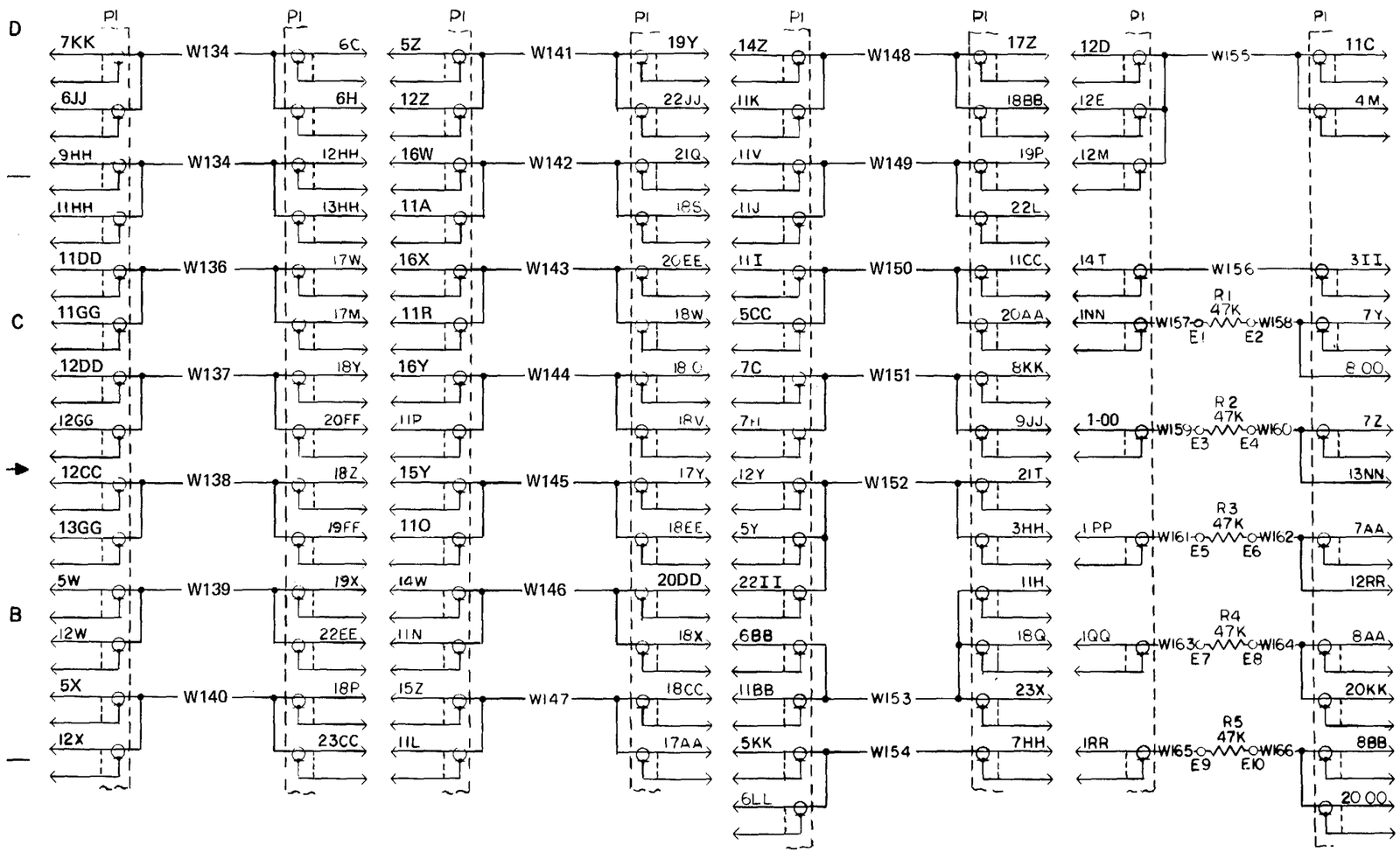
Figure 2-3. (sheet 2 of 8).



MS008245

Figure 2-3. (sheet 3 of 8).

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



MS008248

Figure 2-3. (sheet 4 of 8).

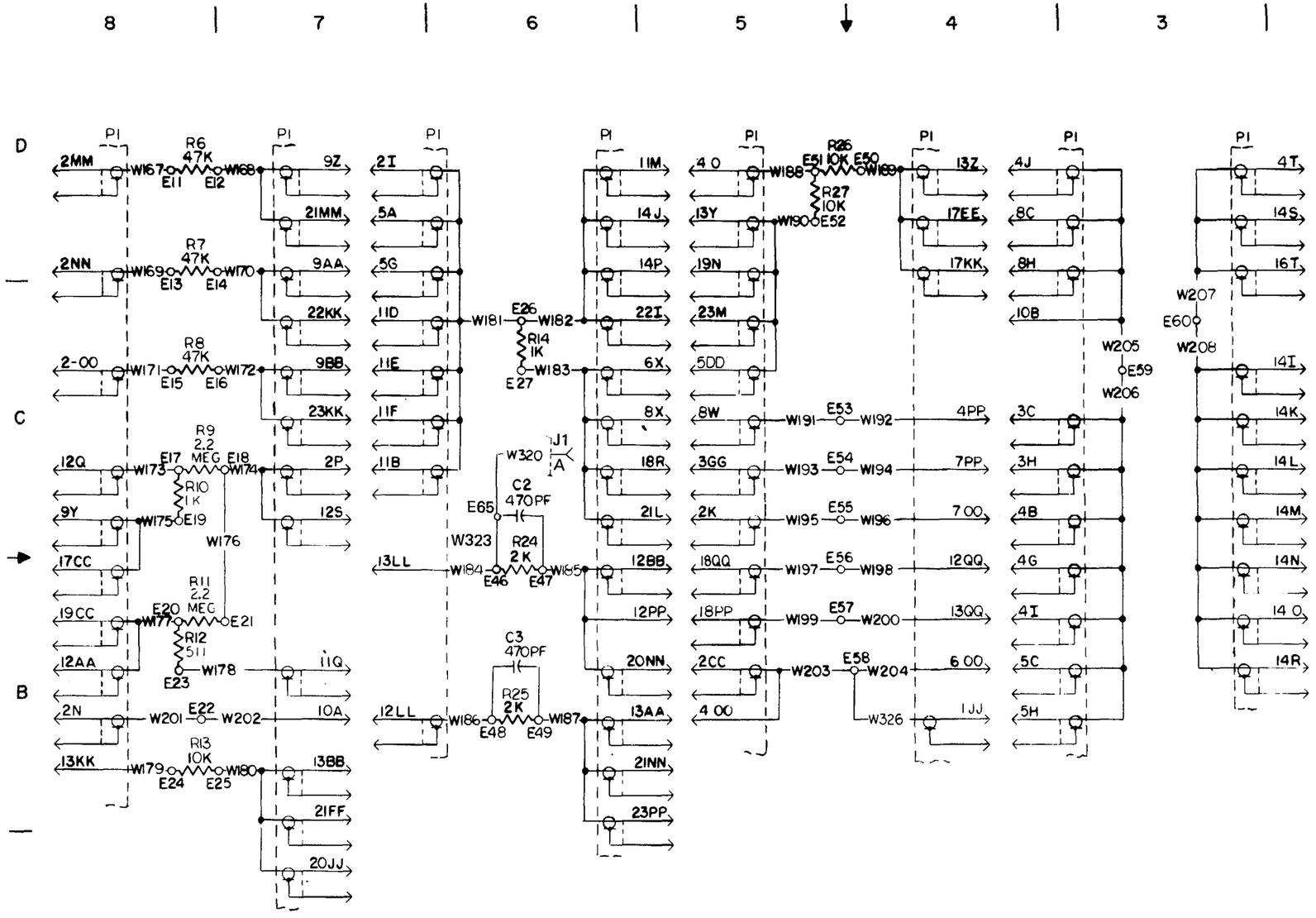
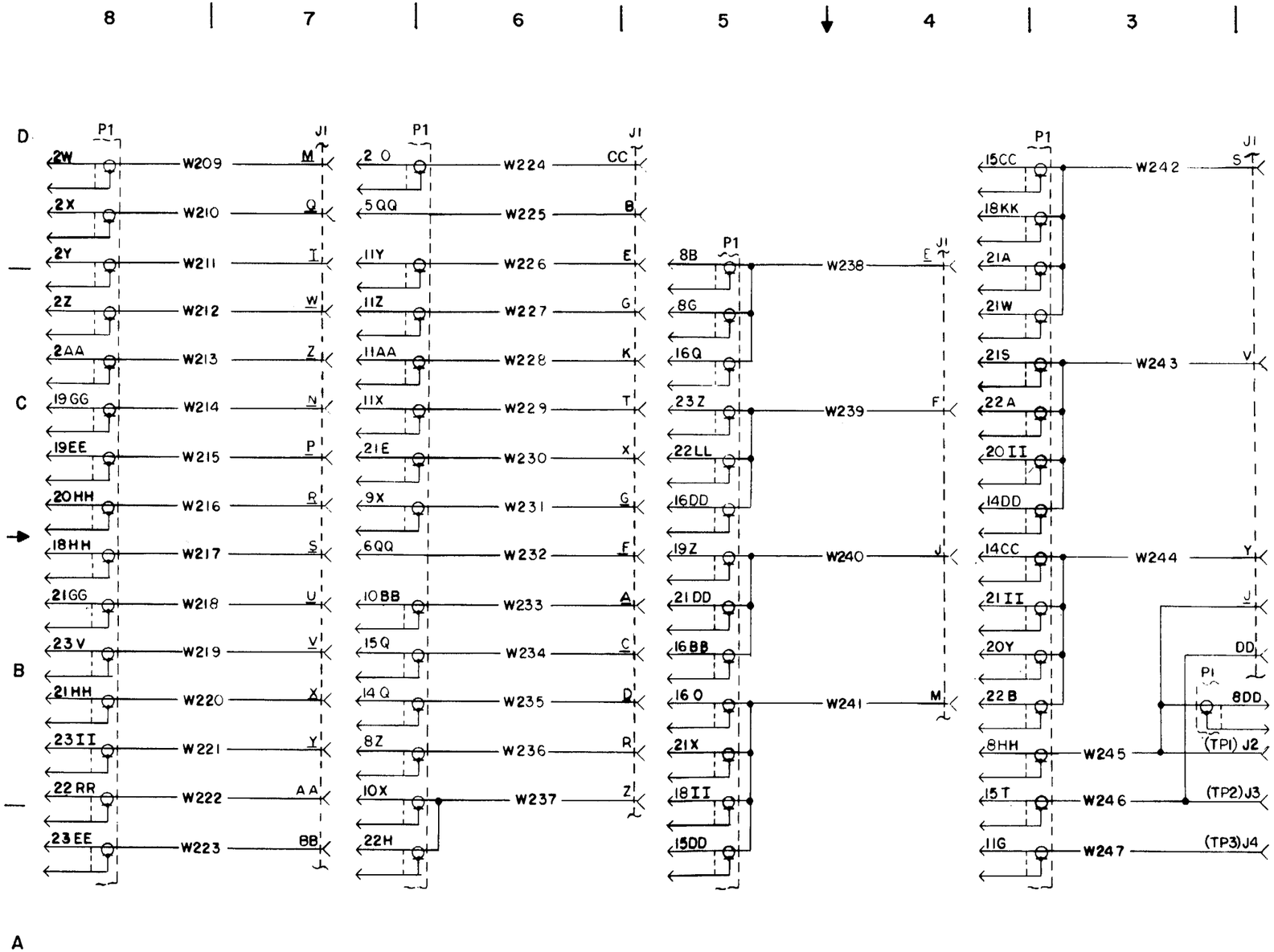
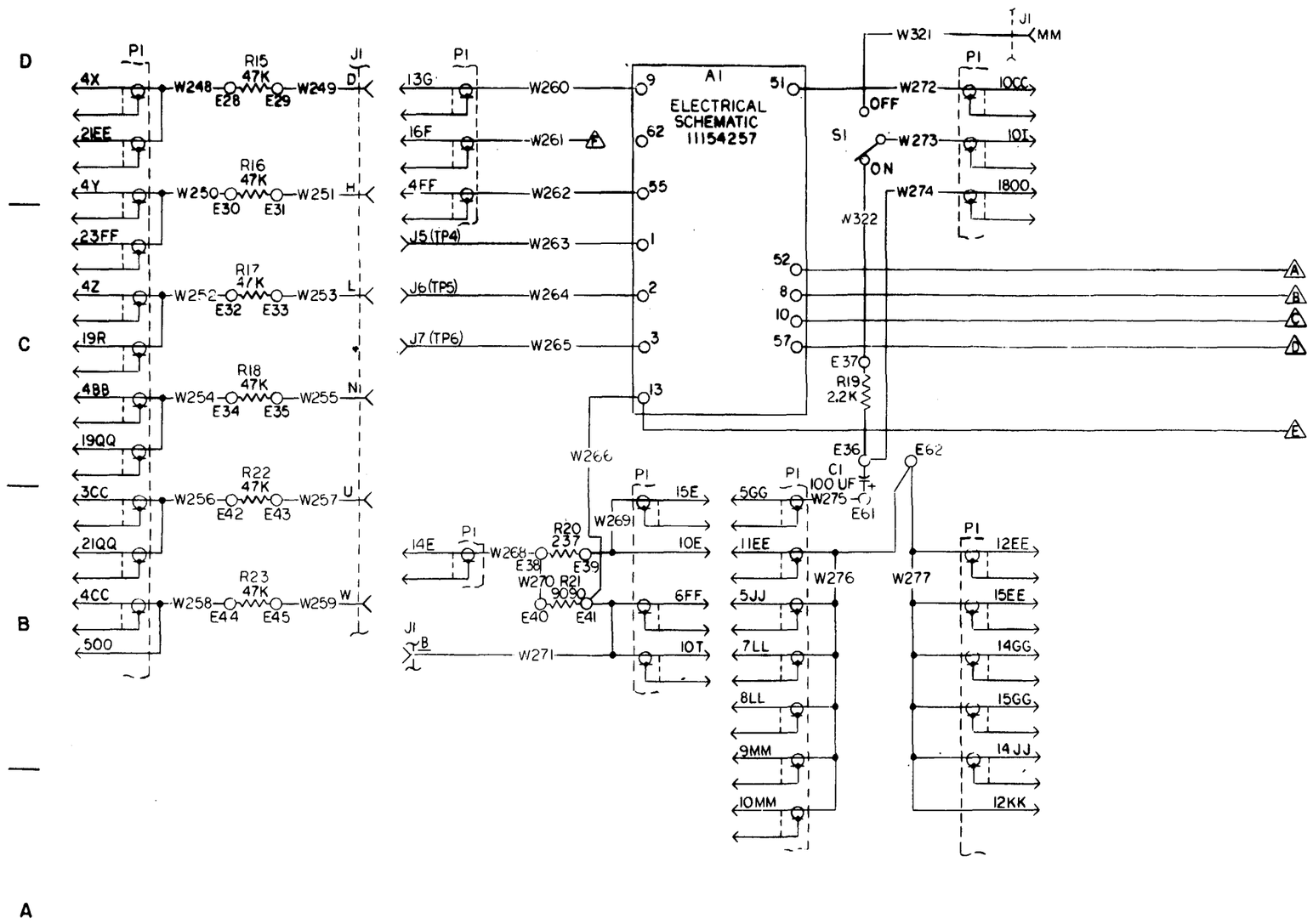


Figure 2-3. (sheet 5 of 8).



MS008250

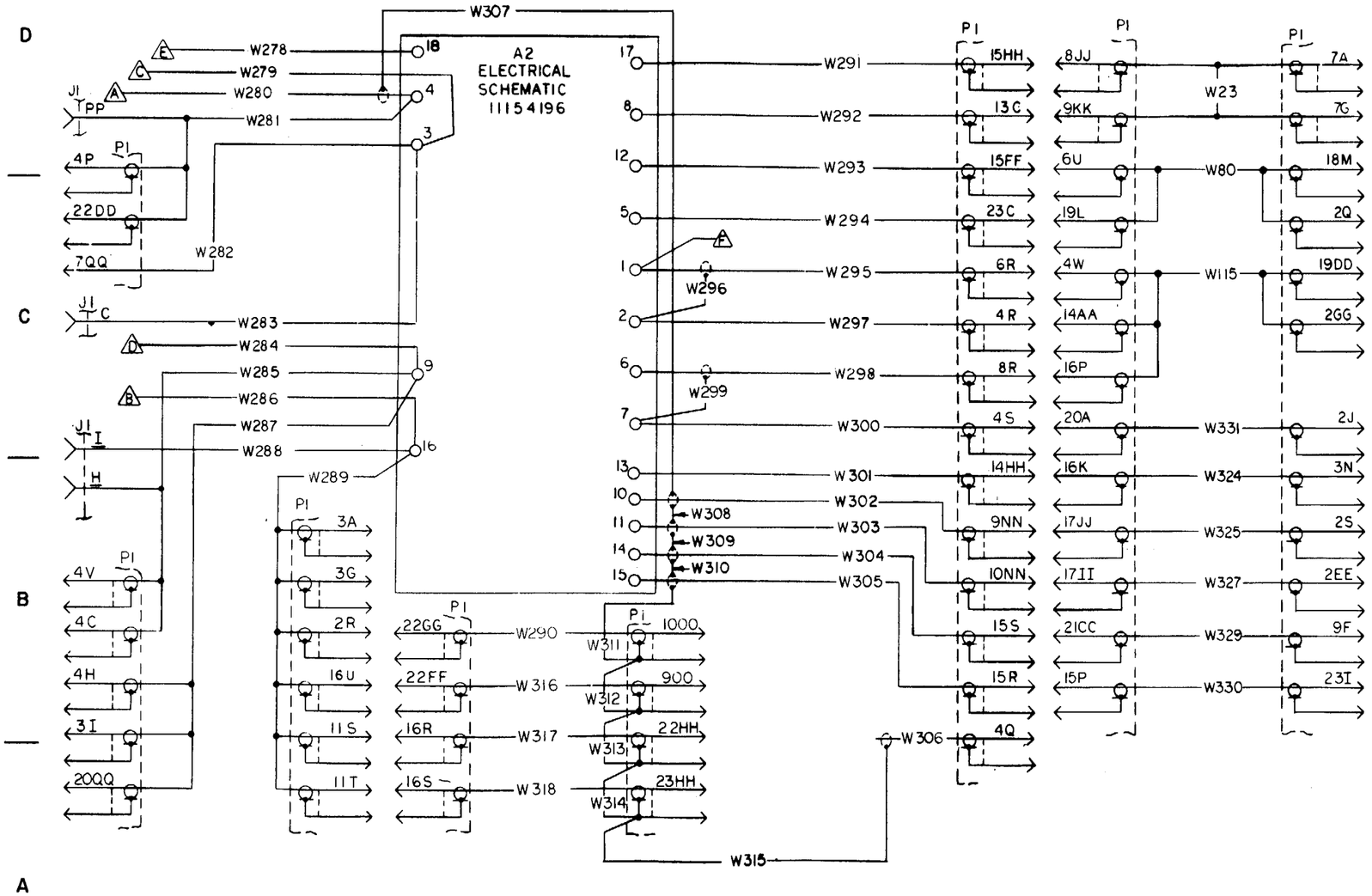
Figure 2-3. (sheet 6 of 8).



MS008251

Figure 2-3. (sheet 7 of 8).

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1



MS008252

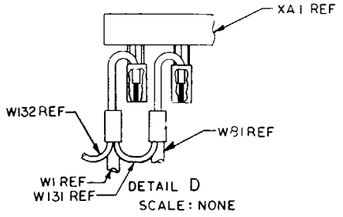
Figure 2-3. (sheet 8 of 8).

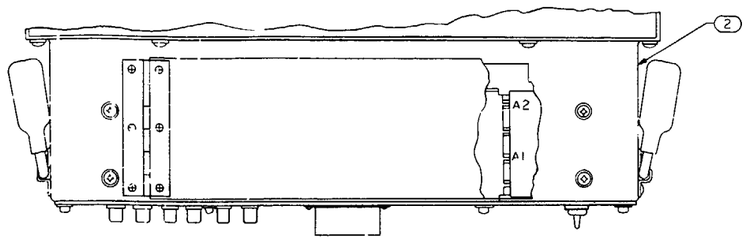
JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W1	B A
W2	P
W3	B A
W4	↑
W5	
W6	
W7	
W8	
W9	
W10	↓
W11	B A
W12	C A
W13	C A
W14	B A
W15	P
W16	B A
W17	↑
W18	
W19	
W20	
W21	↓
W22	B A
W23	C A
W24	C A
W25	P
W26	↑
W27	
W28	
W29	
W30	↓
W31	P
W32	B A
W33	↑
W34	↓
W35	B A

JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W36	B A
W37	B A
W38	P
W39	B A
W40	C A
W41	P
W42	C A
W43	↑
W44	
W45	
W46	
W47	
W48	
W49	
W50	
W51	
W52	↓
W53	C A
W54	B A
W55	↑
W56	
W57	
W58	
W59	
W60	
W61	
W62	
W63	↓
W64	B A
W65	P
W66	P
W67	P
W68	C A
W69	C A
W70	C A

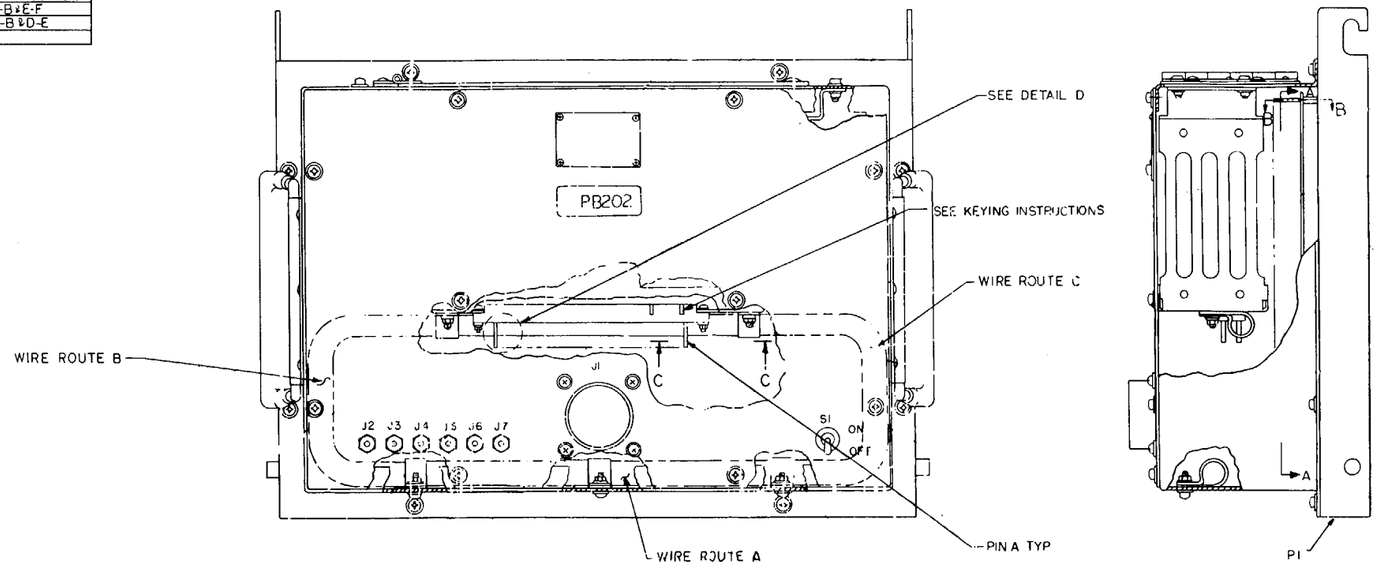
JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W71	C A
W72	↑
W73	
W74	
W75	
W76	
W77	
W78	
W79	↓
W80	C A
W81	B A
W82	A
W83	↑
W84	
W85	
W86	
W87	
W88	
W89	
W90	
W91	
W92	
W93	
W94	
W95	
W96	
W97	
W98	
W99	
W100	
W101	
W102	
W103	
W104	↓
W105	A

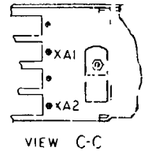
JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W106	A
W107	↑
W108	
W109	
W110	
W111	
W112	
W113	
W114	
W115	↓
W116	A
W117	P
W118	A
W119	↑
W120	
W121	
W122	↓
W123	A
W124	P
W125	A
W126	P
W127	A
W128	A
W129	A
W130	P
W131	P
W132	B A



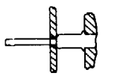


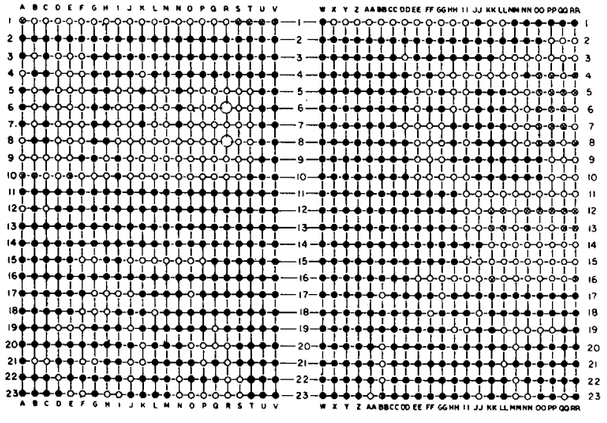
KEYING INSTRUCTIONS	
REF DES	KEY POSITION
XA1	A-B & E-F
XA2	A-B & D-E





VIEW C-C


SECTION B-B
SCALE 2/1


VIEW A-A

MI100729C

Figure 2-4. PB-202, parts location diagram.

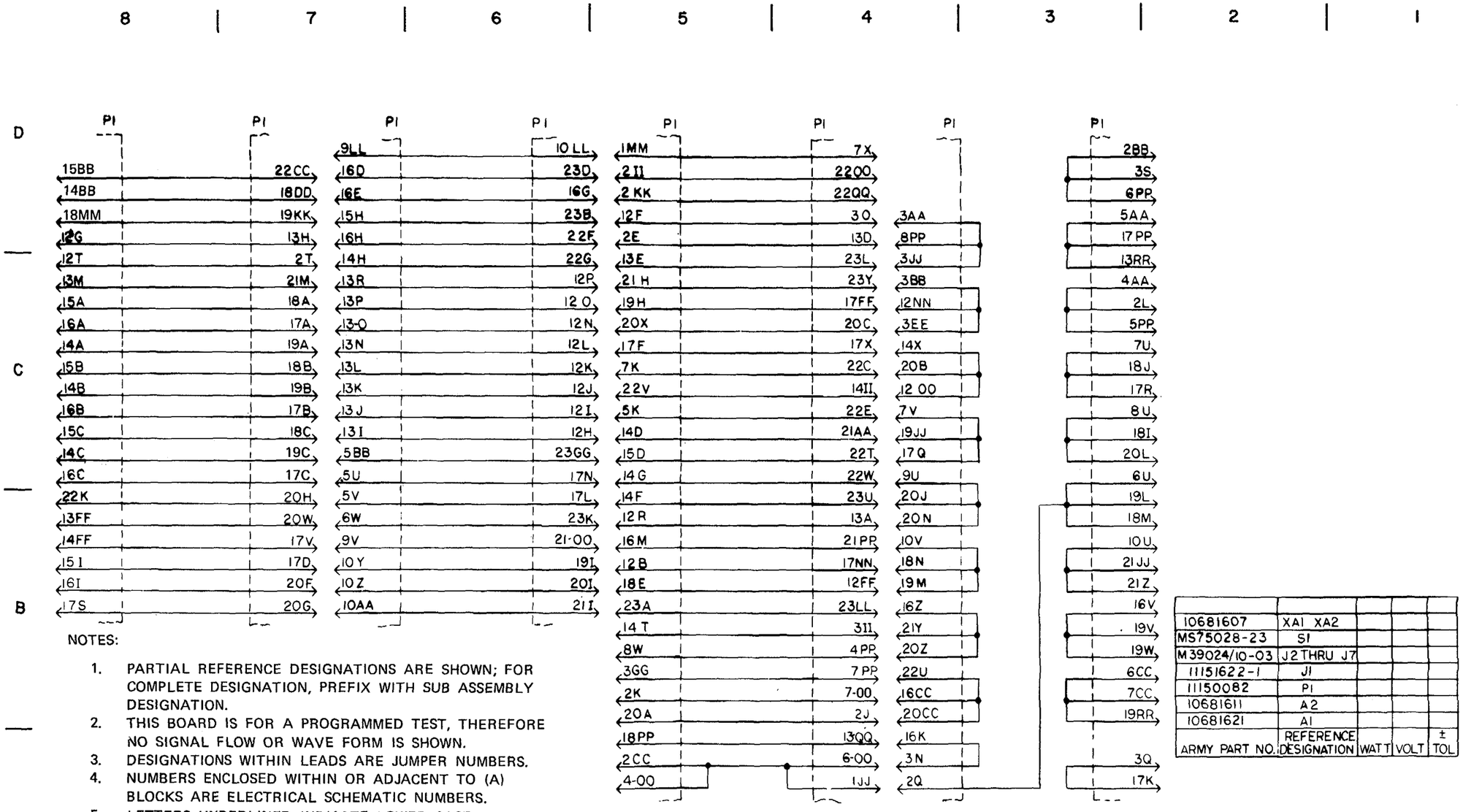


Figure 2-5. PB-202, schematic diagram (sheet 1 of 6).

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

D

C

B

A

P1 2A 15U 18U 13DD 17LL 20GG 15V 19S 3KK 3T 14V 17U 3Y 17MM 23DD 6AA 18NN 20PP 2HH 9DD 22X 2LL 9CC 22Z 2F 13V 23T 15AA 1700 19AA

P1 2B 14U 18T 13CC 17RR 18GG 16AA 18AA 18LL 3P 13U 17T 3Z 17QQ 23 00 2FF 8CC 20T 2JJ 22Y 7BB 2H 15W 20S 2M 8V 19Q 7W 23W 18RR

P1 9G 9I 11U 13T 22M 13S 13W 20M 13F 13X 20LL 9W 11FF 17E 20D 21V 18K 5LL 13EE 14EE 6DD 20E 21N 9II 10KK 20V 7II 20U 10JJ

P1 3W 21KK 2C 3X 2D 22PP 6Z 20RR 3J 3V 3L 22NN 10DD 3FF 22AA 2DD 16P 4W 14AA 19DD 10W 2V 6K 22-0 2U 2G 11W 22P 2N 10A 2GG

P1 12U 16L 22Q 19T 12V 16N 17HH 19U 4N 5N 6N 7N 14Y 3U 19K 13B 8Y 6Y 16J 23J 15X 18D 21U 21-0 6A 6G 7JJ 6KK 5Z 12Z

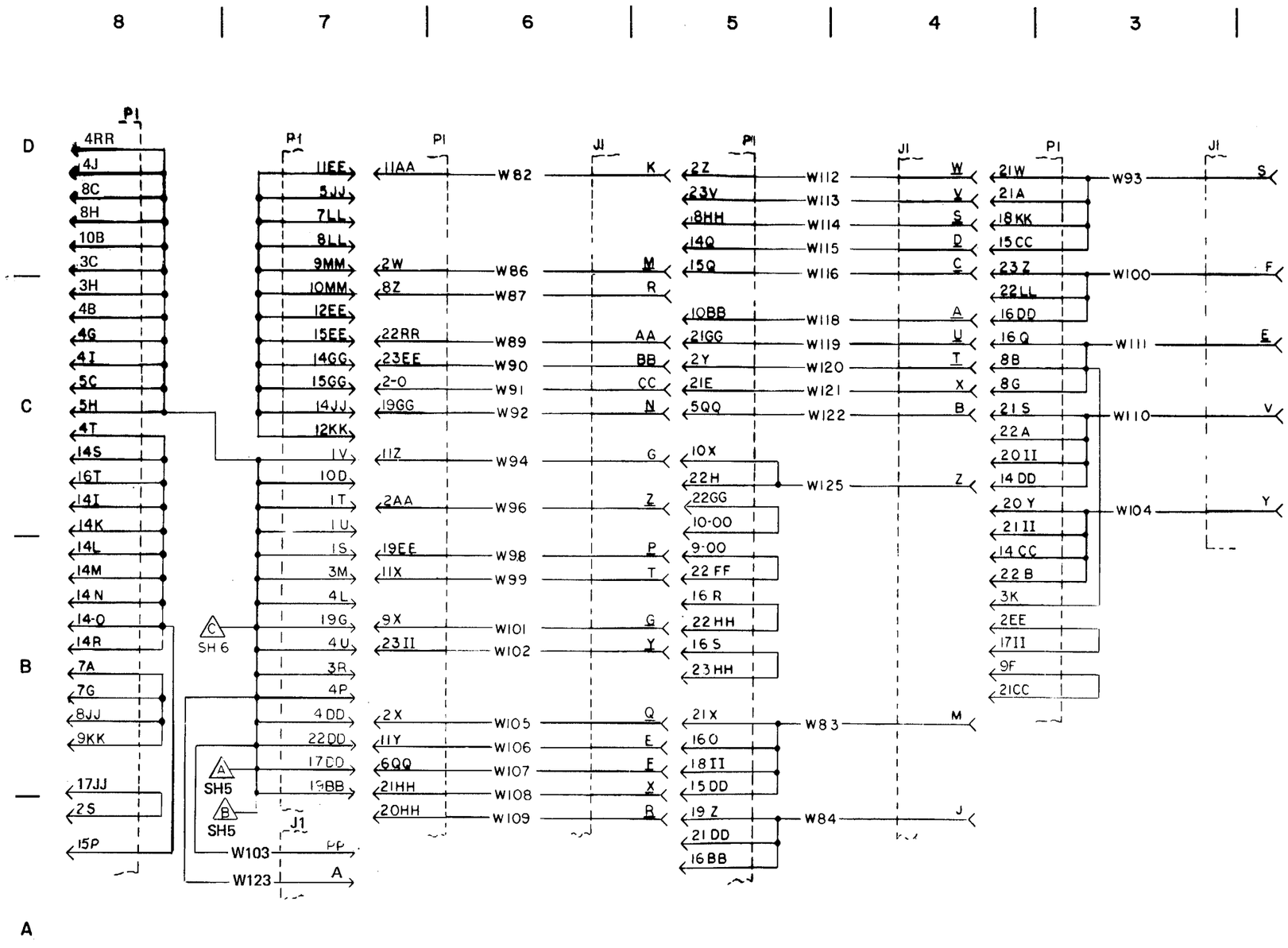
P1 7KK 6JJ 6C 6H 9HH 11HH 12HH 13HH 11DD 11GG 17W 17M 12DD 12GG 18Y 20FF 12CC 13GG 18Z 19FF 5W 12W 19X 22EE 5X 12X 18P 23CC 19Y 22JJ

P1 16W 11A 21Q 18S 16X 11R 20EE 18W 16Y 11P 18-0 18V 15Y 11-0 17Y 18EE 14W 11N 20DD 18X 15Z 11L 18CC 17AA 14Z 11K 17Z 18BB 18QQ 12QQ

P1 11V 11J 19P 22L 11T 5CC 11CC 20AA 7C 7H 8KK 9JJ 12Y 5Y 21T 22II 3HH 6BB 11BB 11H 18Q 23X 5KK 6LL 7HH 12D 12E 12M 11C 4M

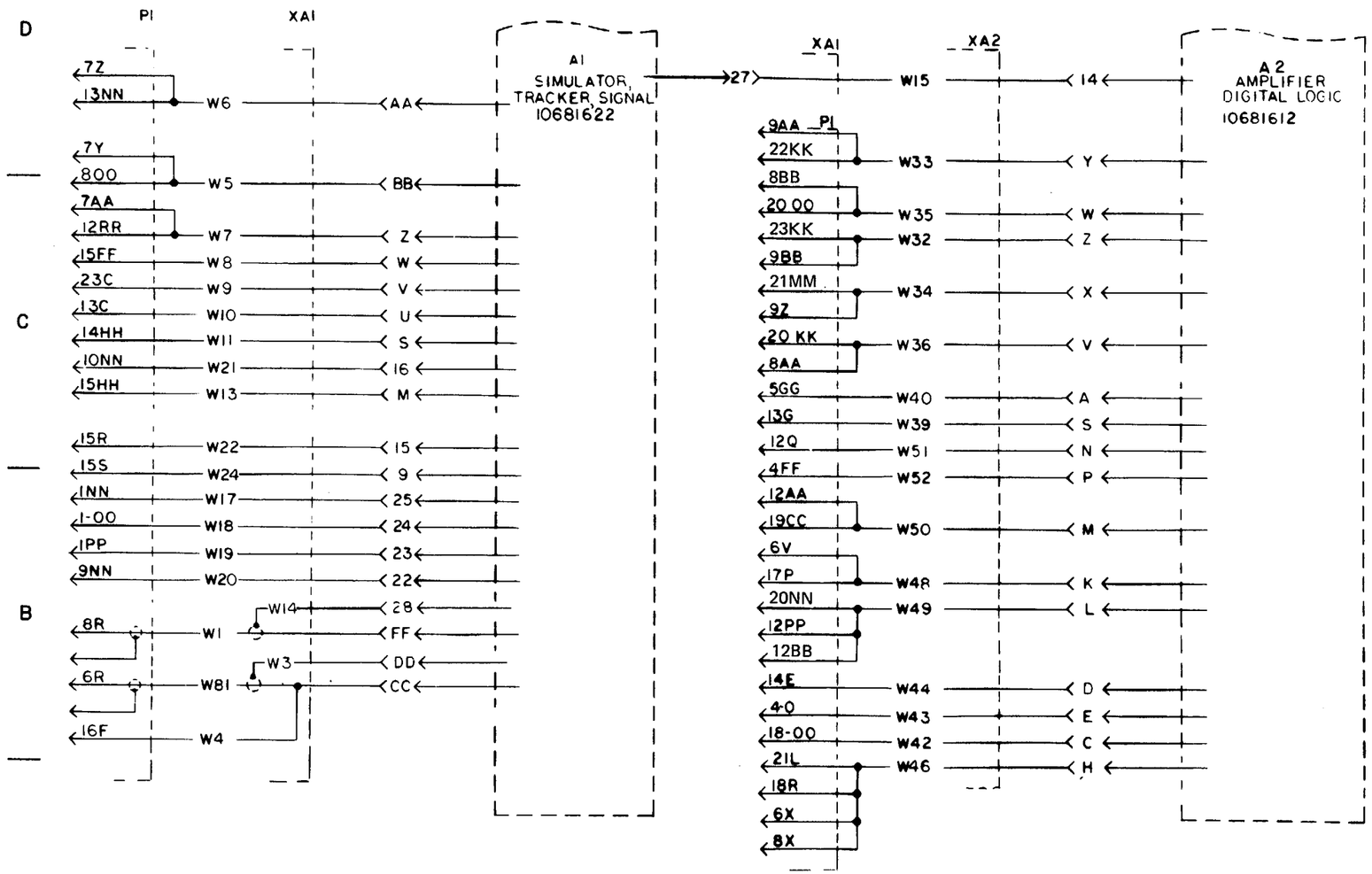
MS008254

Figure 2-5. (sheet 2 of 6).



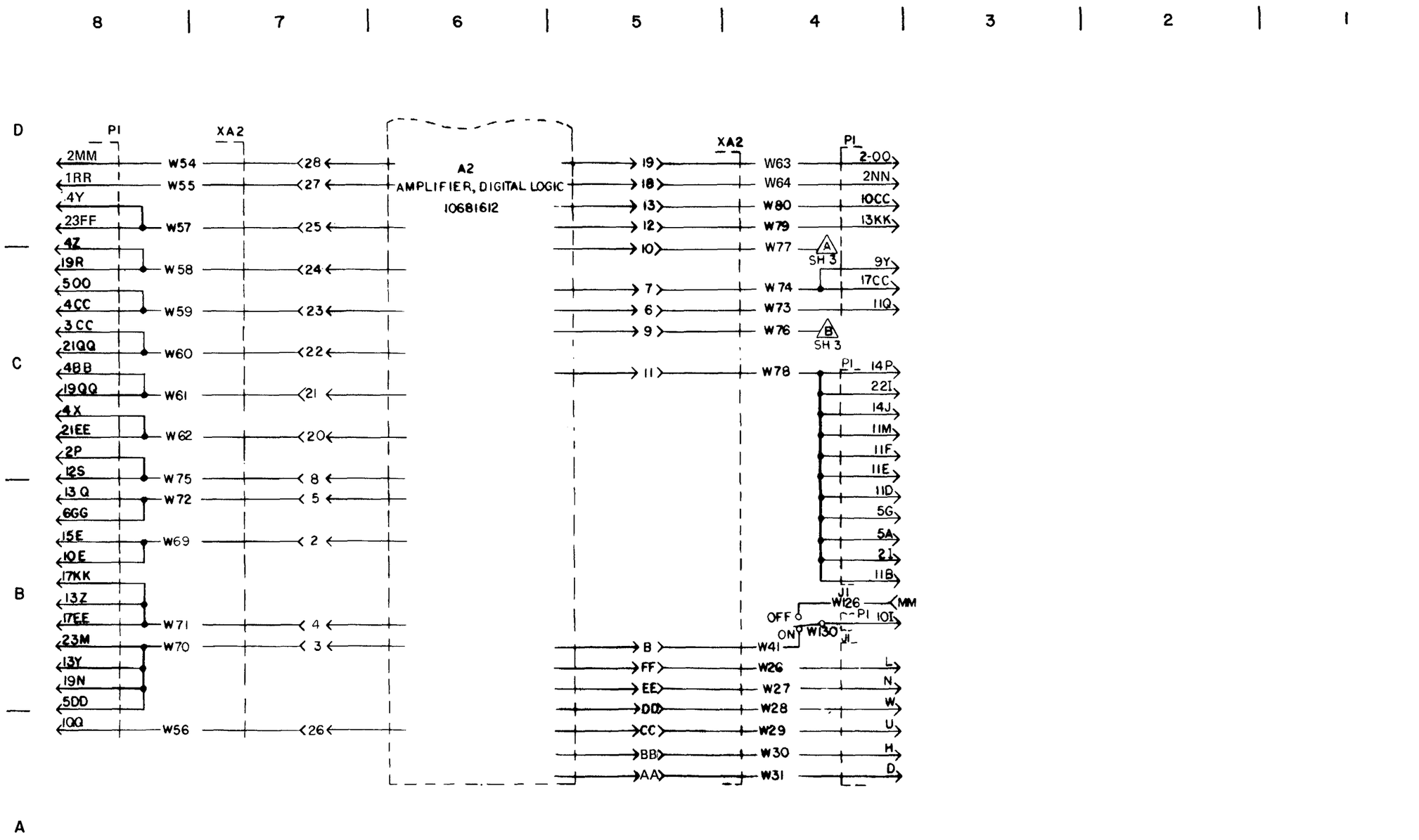
MS008255

Figure 2-5. (sheet 3 of 6).



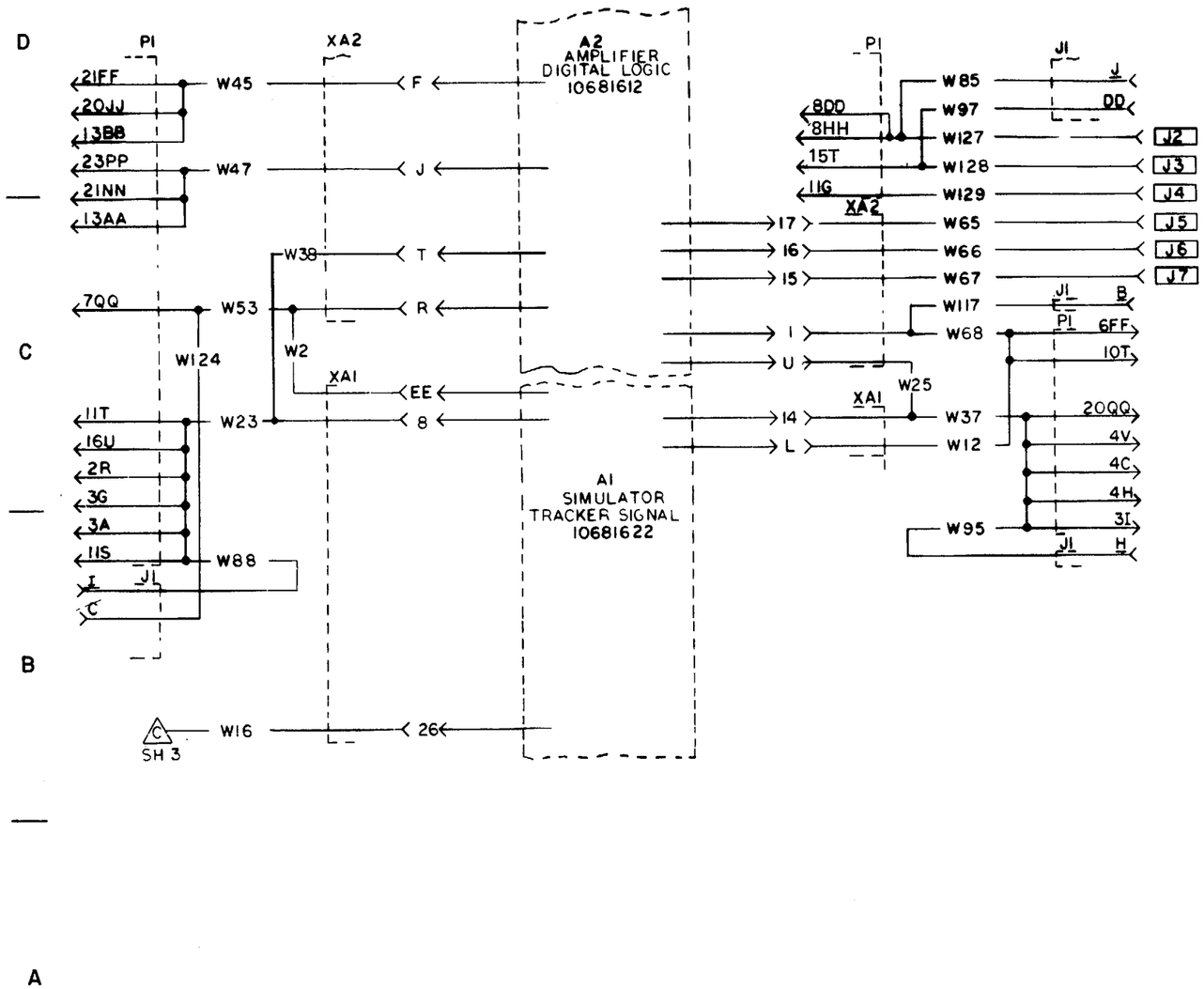
MS008256

Figure 2-5. (sheet 4 of 6).



MS008257

Figure 2-5. (sheet 5 of 6).



MS008258

Figure 2-5. (sheet 6 of 6).

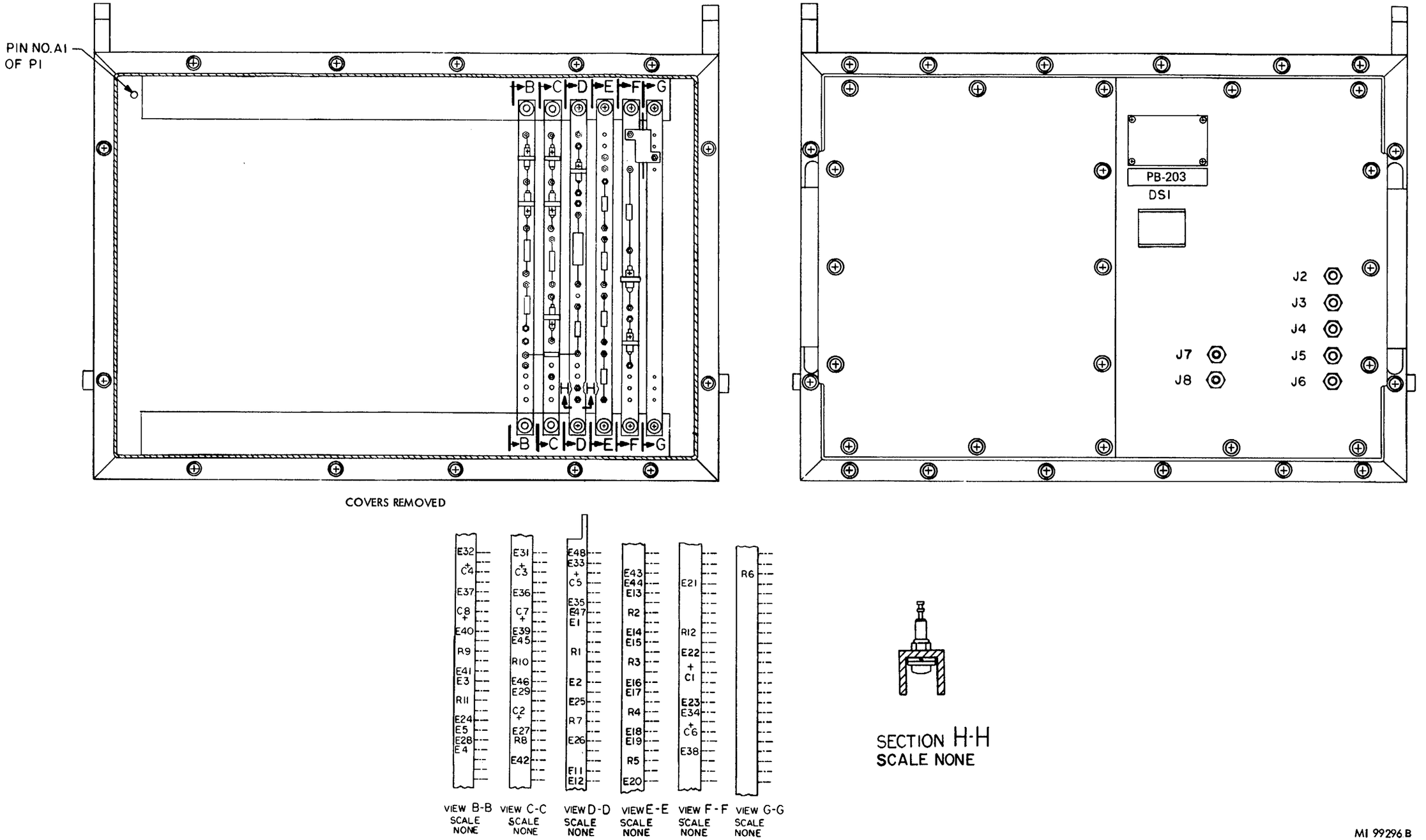
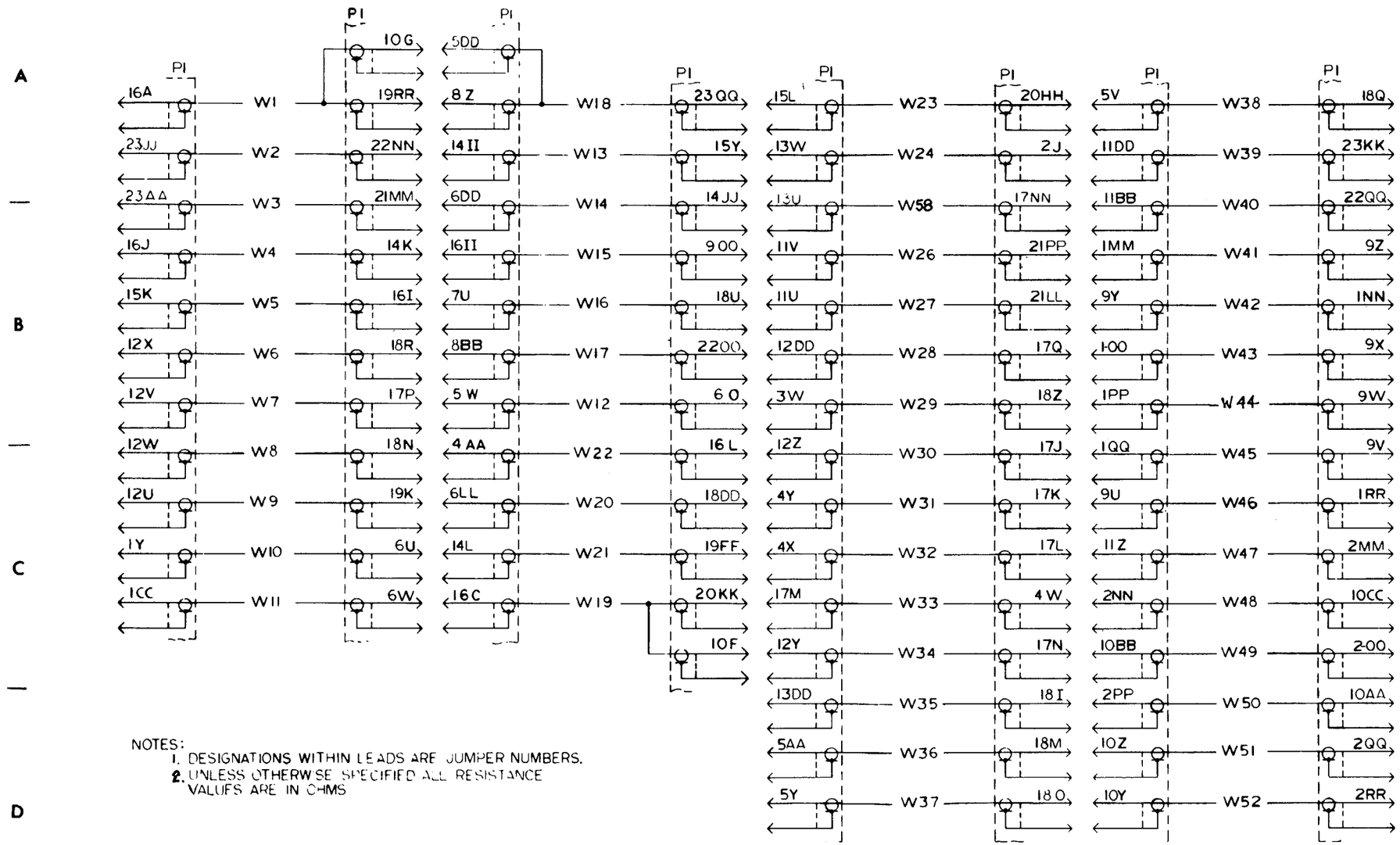


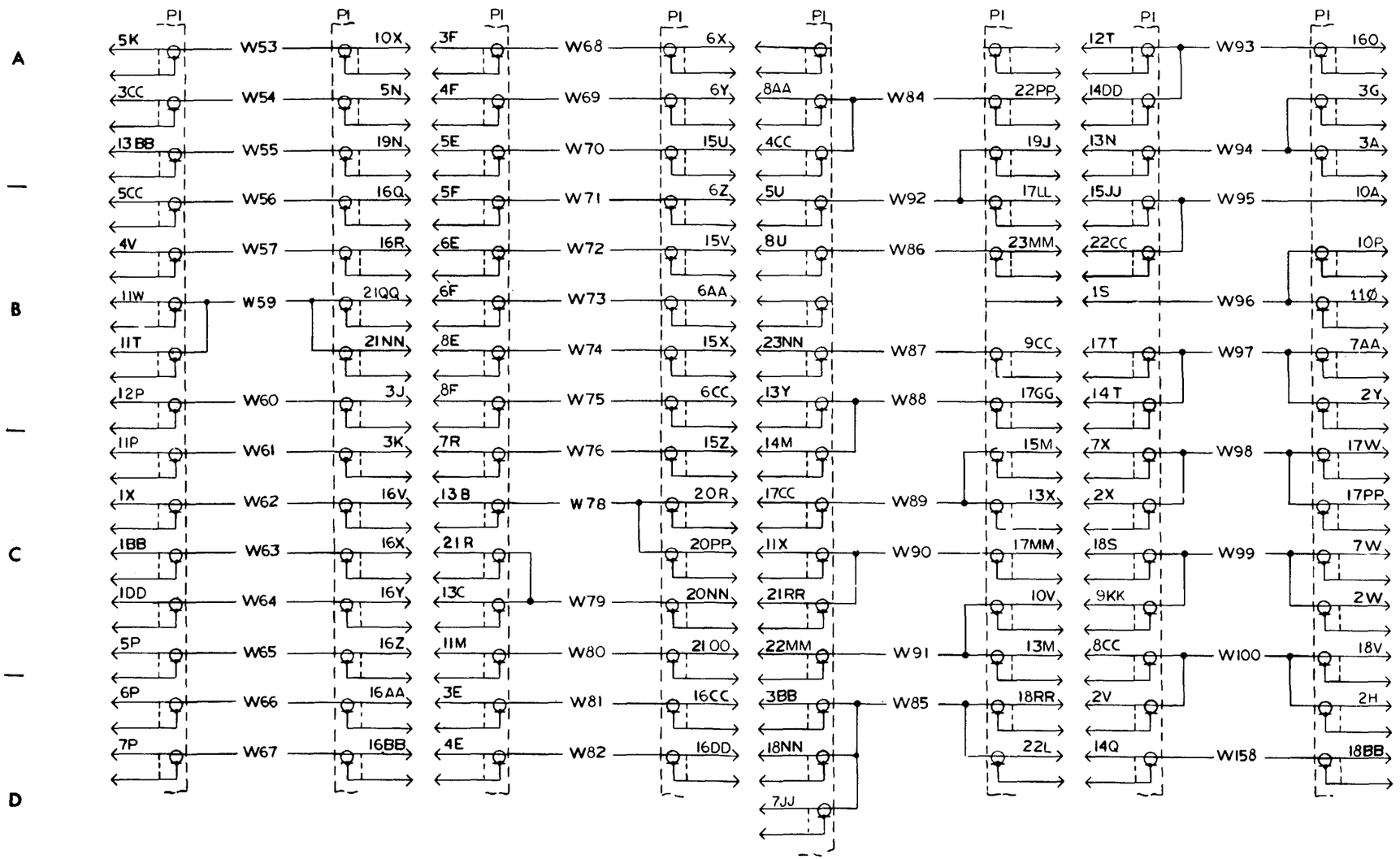
Figure 2-6. PB-203 parts location diagram.



NOTES:
1. DESIGNATIONS WITHIN LEADS ARE JUMPER NUMBERS.
2. UNLESS OTHERWISE SPECIFIED ALL RESISTANCE VALUES ARE IN OHMS

MI 98621A

Figure 2-7. PB-203, schematic diagram (sheet 1 of 5).



MI 98618B

Figure 2-7. (sheet 2 of 5).

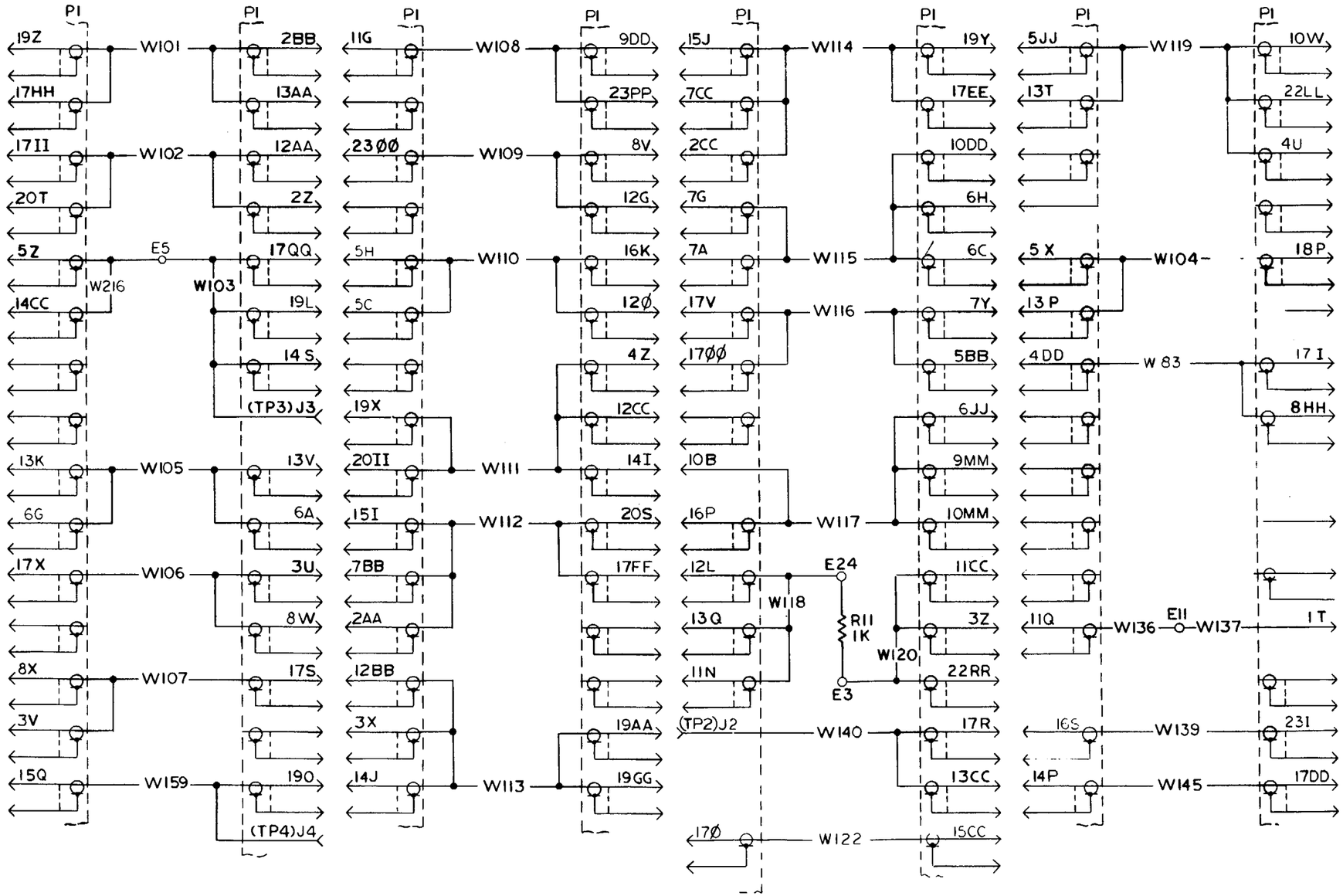
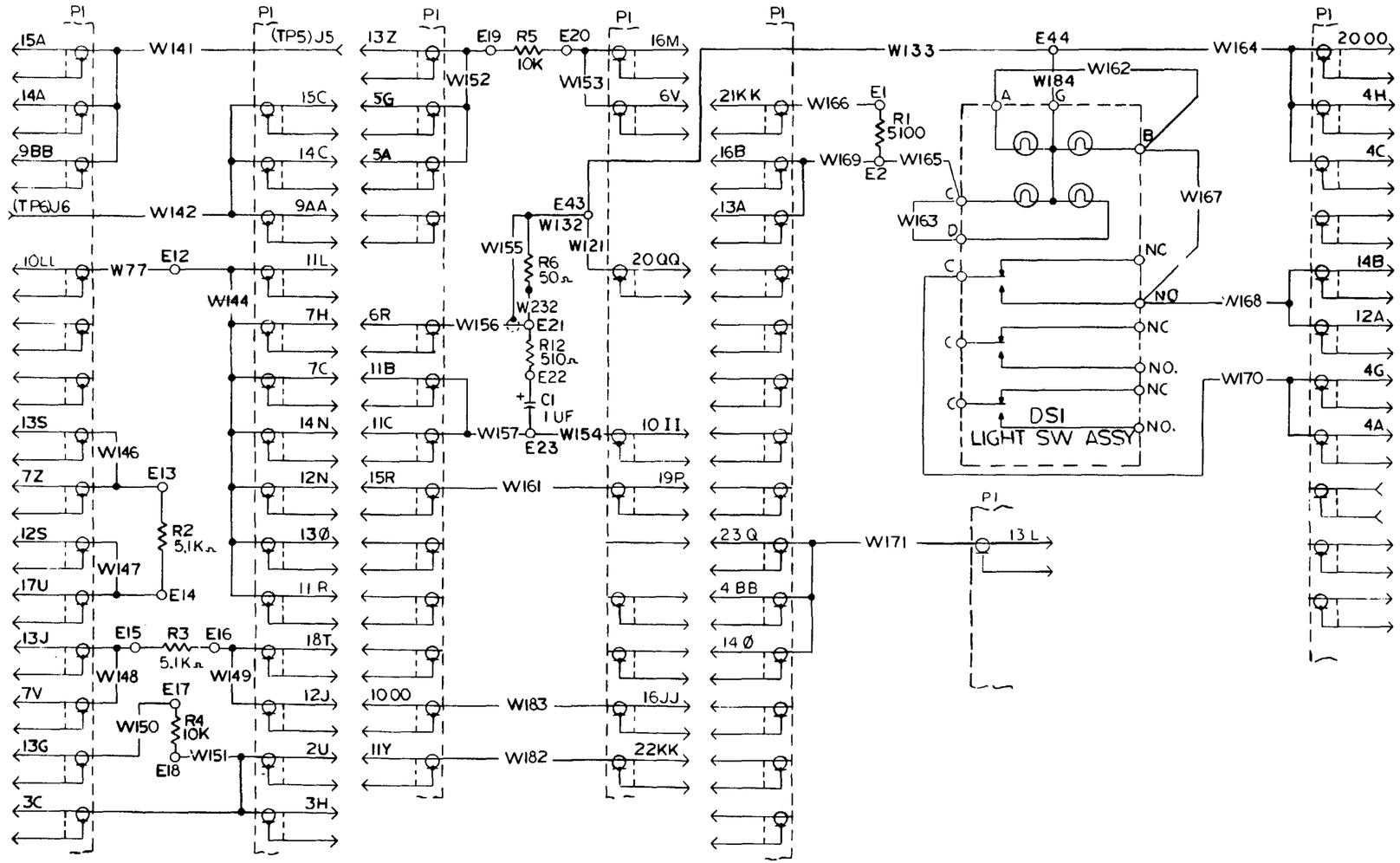


Figure 2-7. (sheet 3 of 5).



M199966 A

Figure 2-7. (sheet 4 of 5).

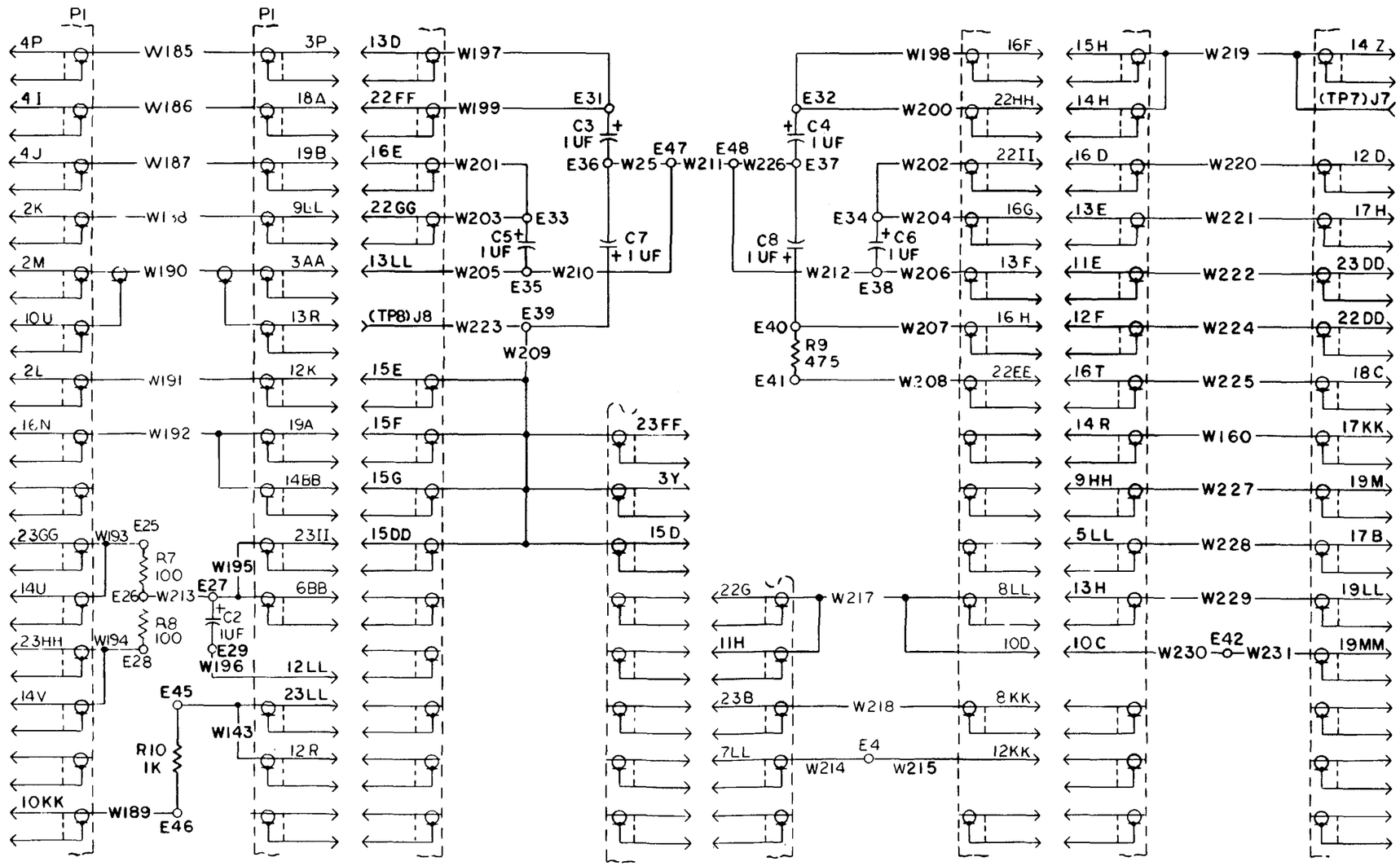
25 | 26 | 27 | 28 | 29 | 30

A

B

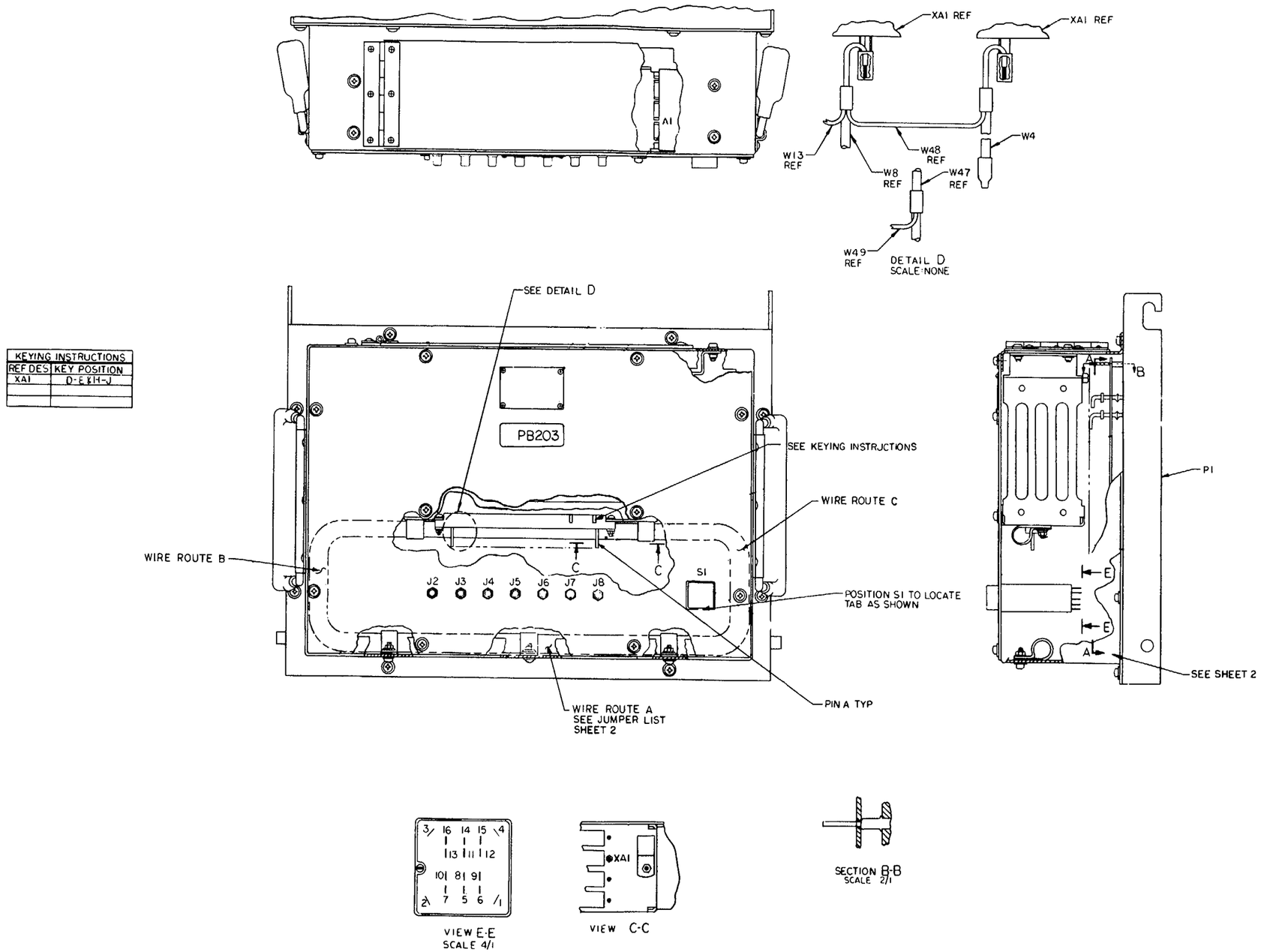
C

D



M199967 A

Figure 2-7. (sheet 5 of 5).

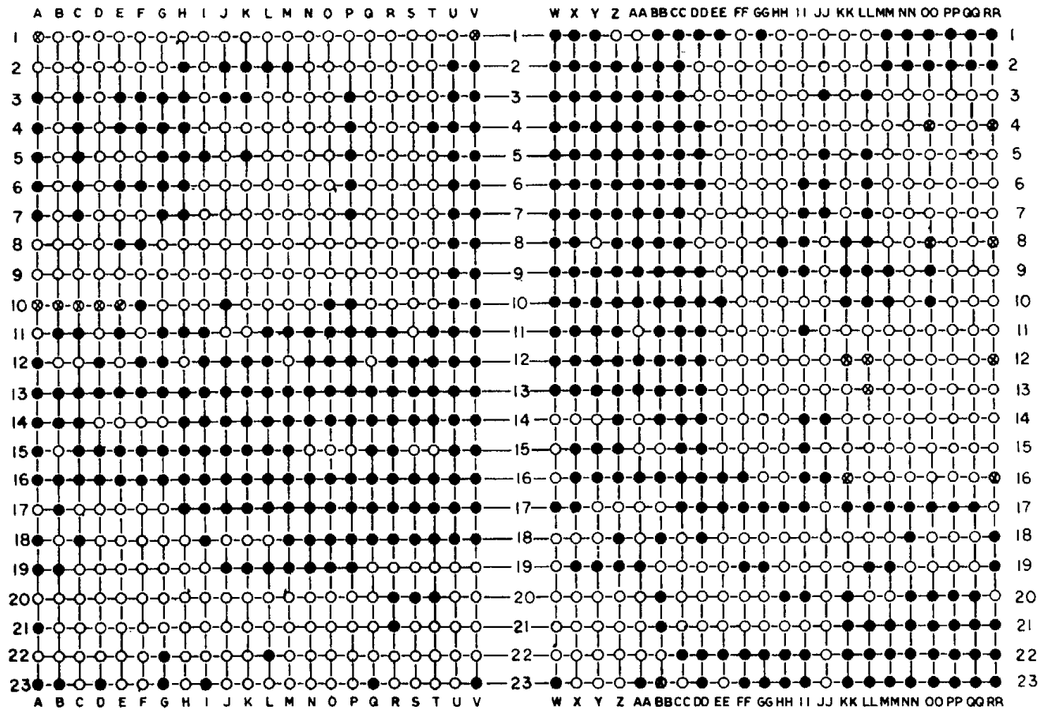


MI 100779 B

Figure 2-8. PB-203, parts location diagram (sheet 1 of 2).

JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W1	CA
W2	CA
W3	CA
W4	BA
W5	
W6	
W7	
W8	
W9	
W10	
W11	
W12	BA
W13	P
W14	BA
W15	
W16	
W17	
W18	BA
W19	CA
W20	
W21	
W22	
W23	
W24	
W25	
W26	
W27	
W28	
W29	
W30	
W31	CA
W32	CA
W33	A
W34	A
W35	A

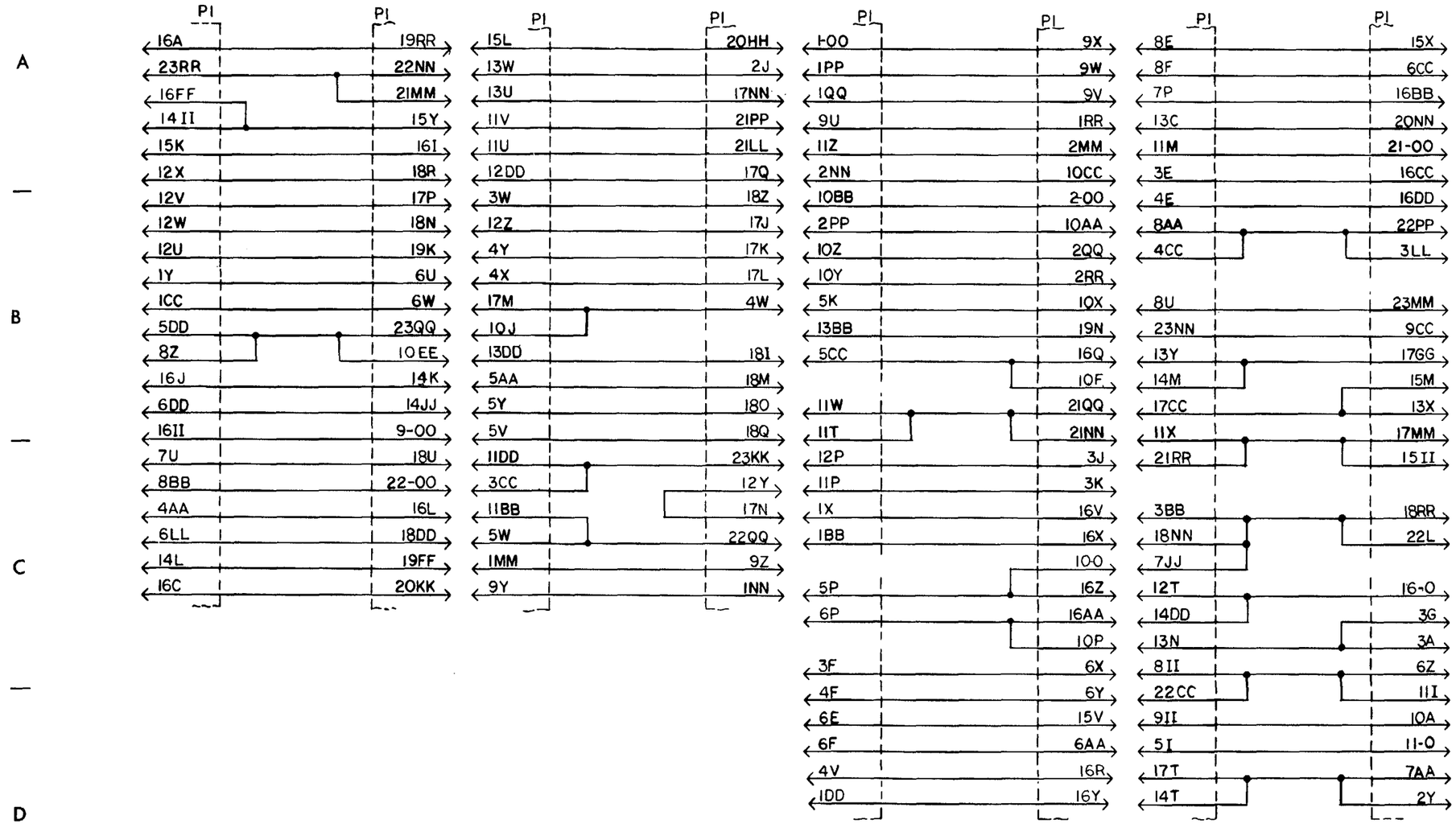
JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W36	A
W37	A
W38	A
W39	A
W40	A
W41	P
W42	A
W43	A
W44	P
W45	P
W46	A
W47	P
W48	P
W49	P



VIEW A-A
SEE SHEET 1

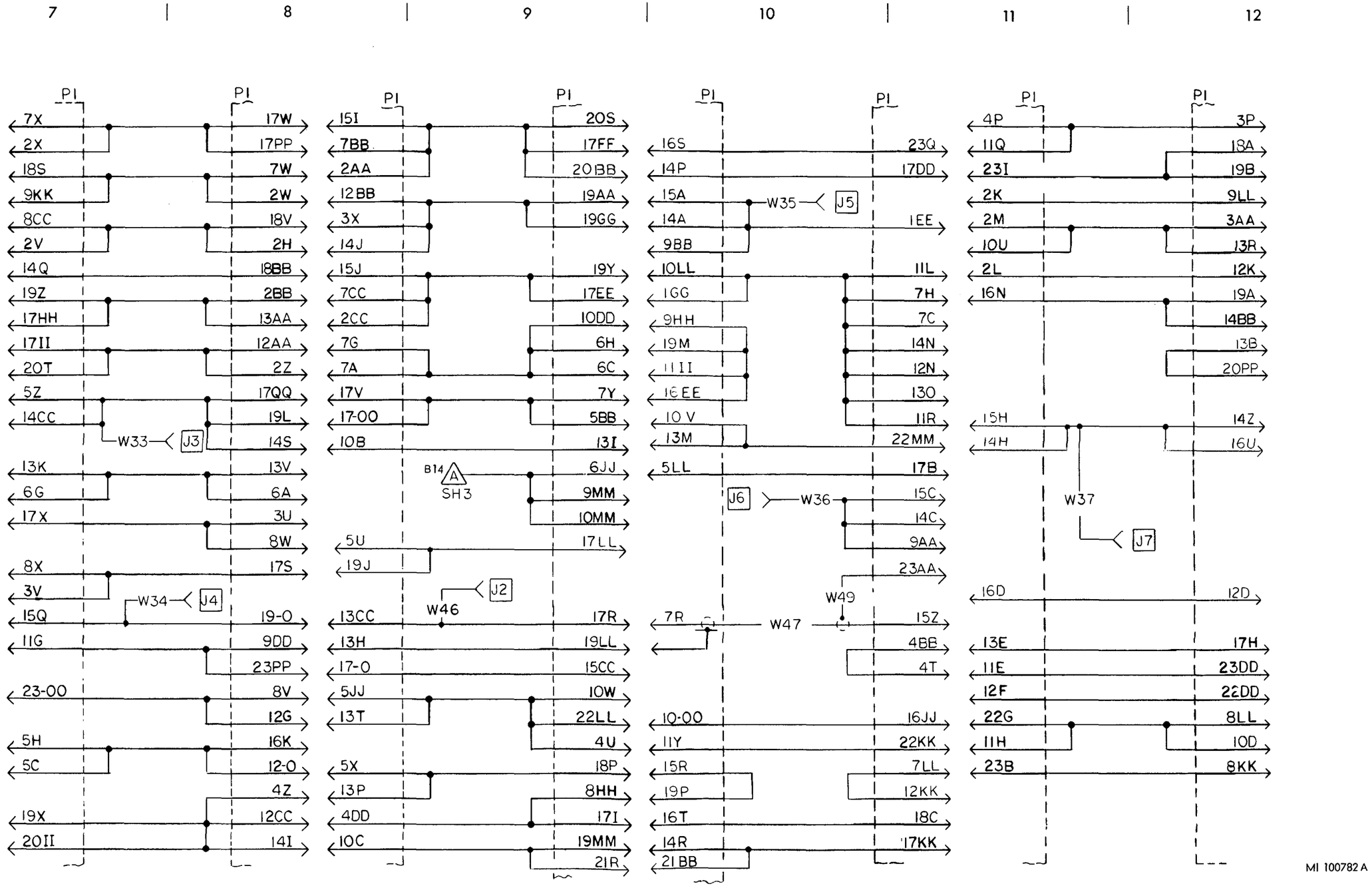
MI 100780 A

Figure 2-8. (sheet 2 of 2).



MI 100781 B

Figure 2-9. PB-203, schematic diagram (sheet 1 of 4).



MI 100782 A

Figure 2-9. (sheet 2 of 4).

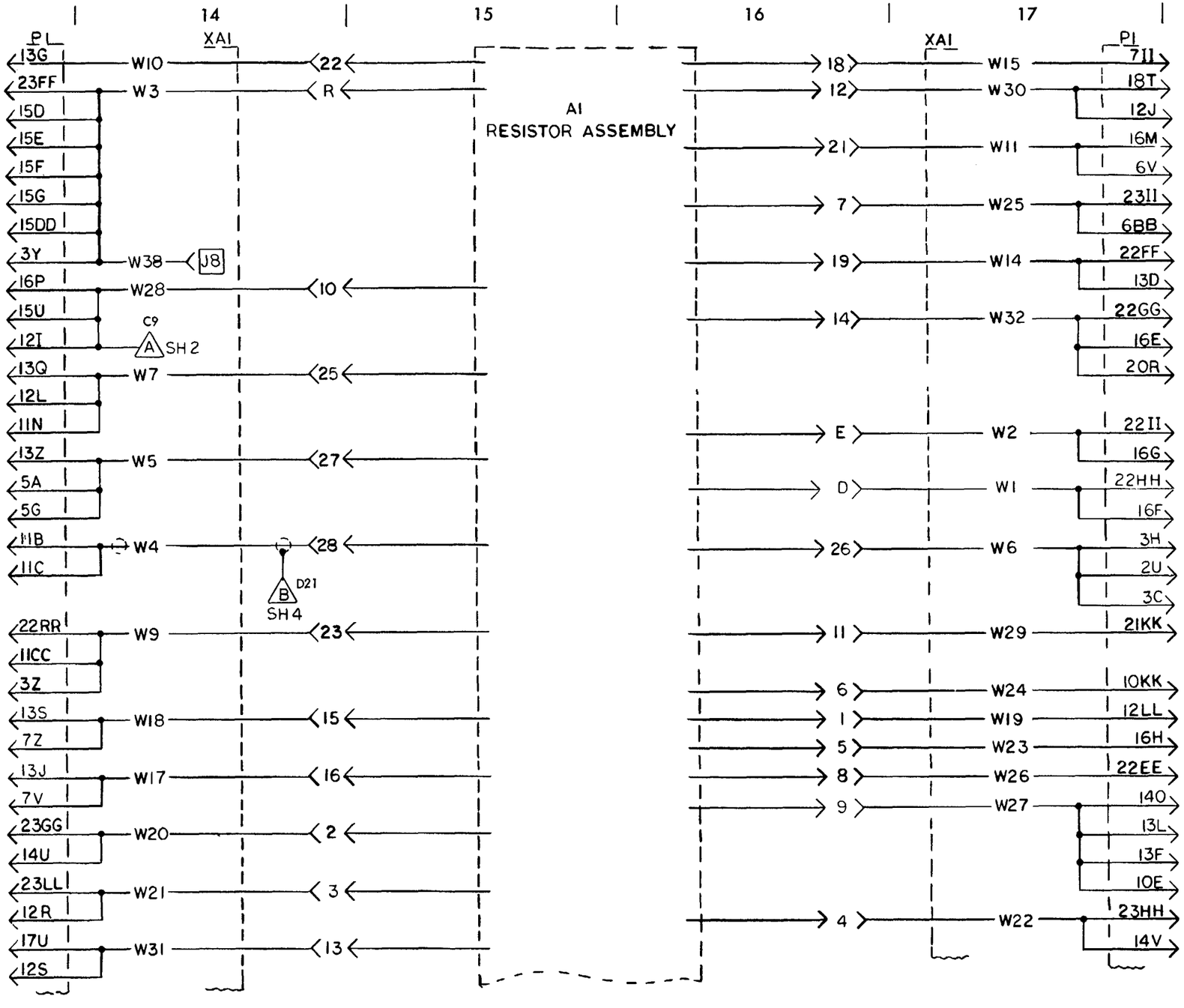


Figure 2-9. (sheet 3 of 4).

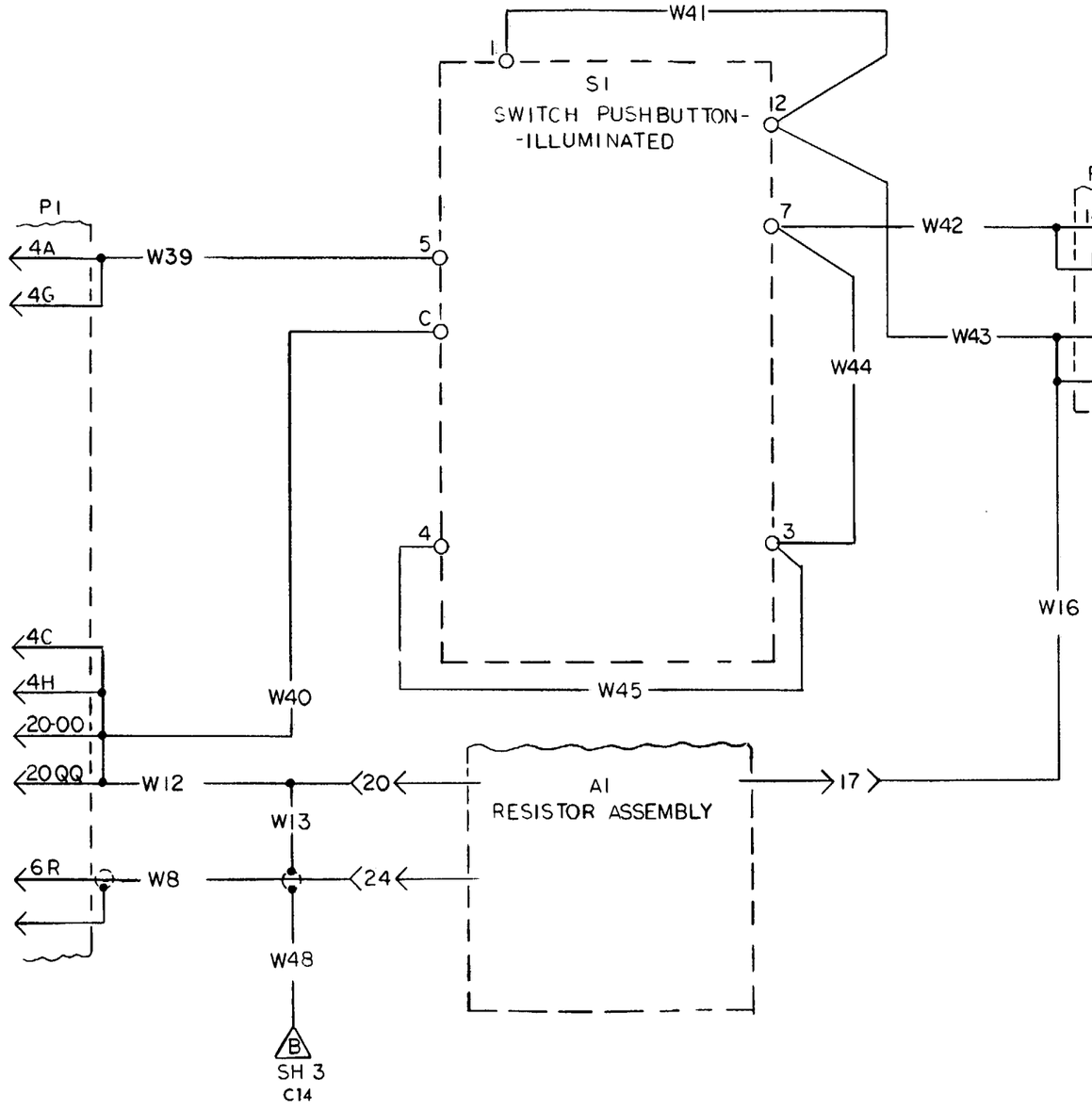
19 | 20 | 21 | 22 | 23 | 24

A

B

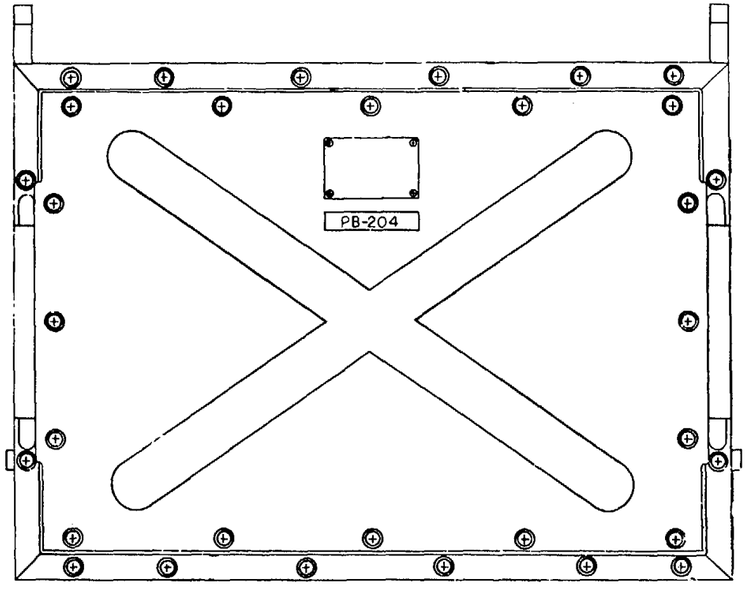
C

D

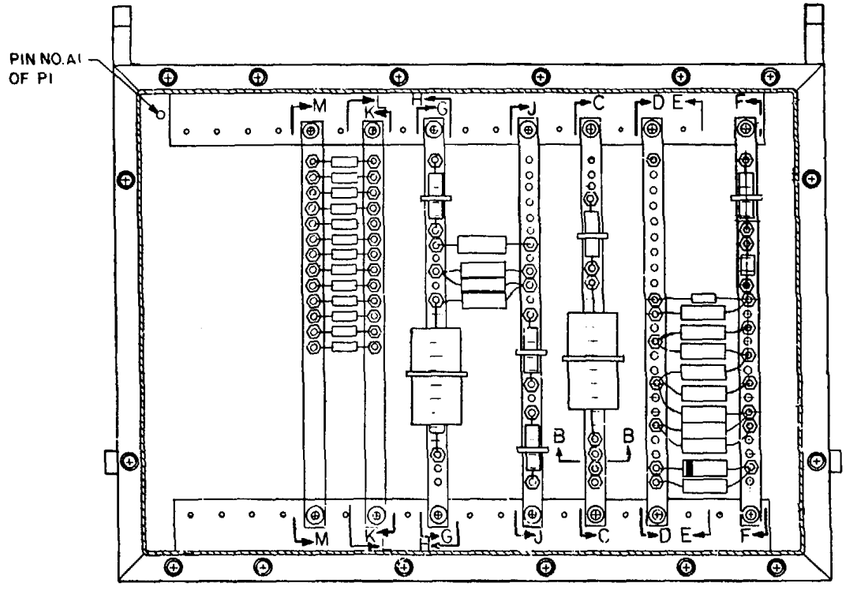


MI 100784B

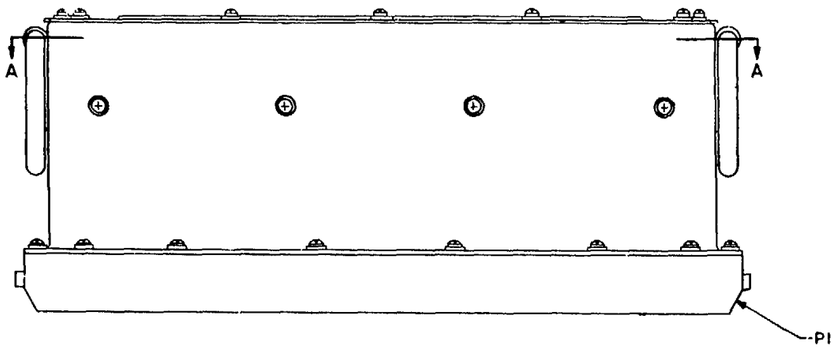
Figure 2-9. (sheet 4 of 4).

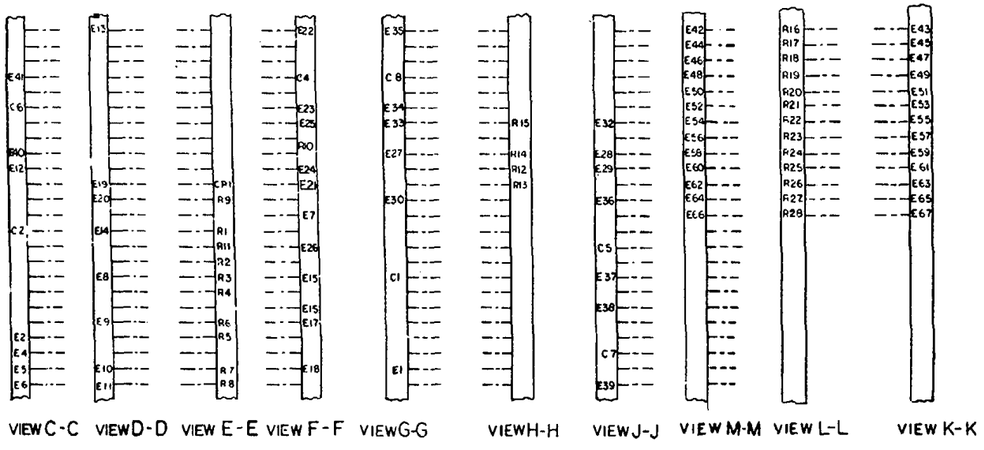


SECTION B - B



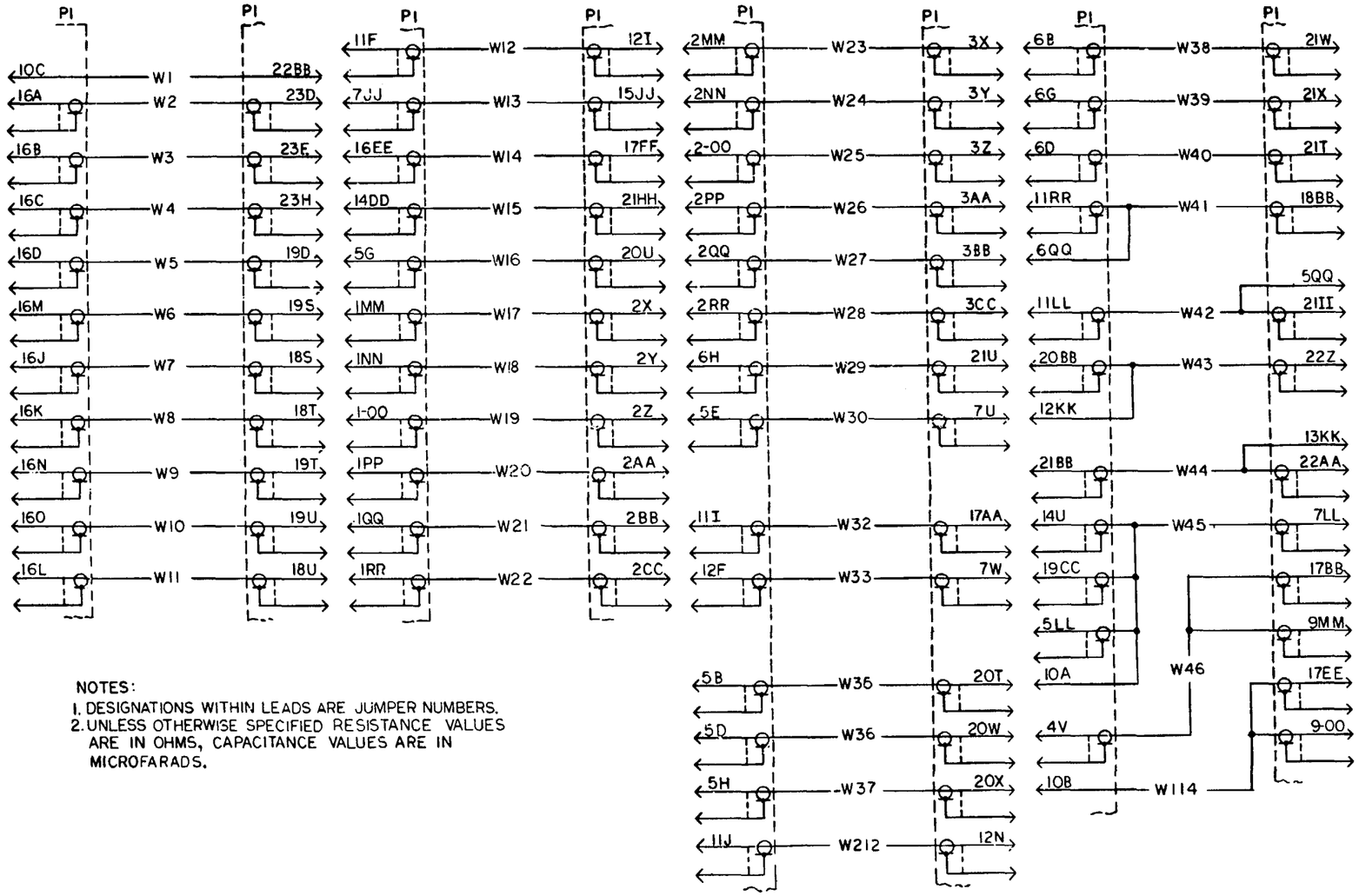
SECTION A-A





MI 101721

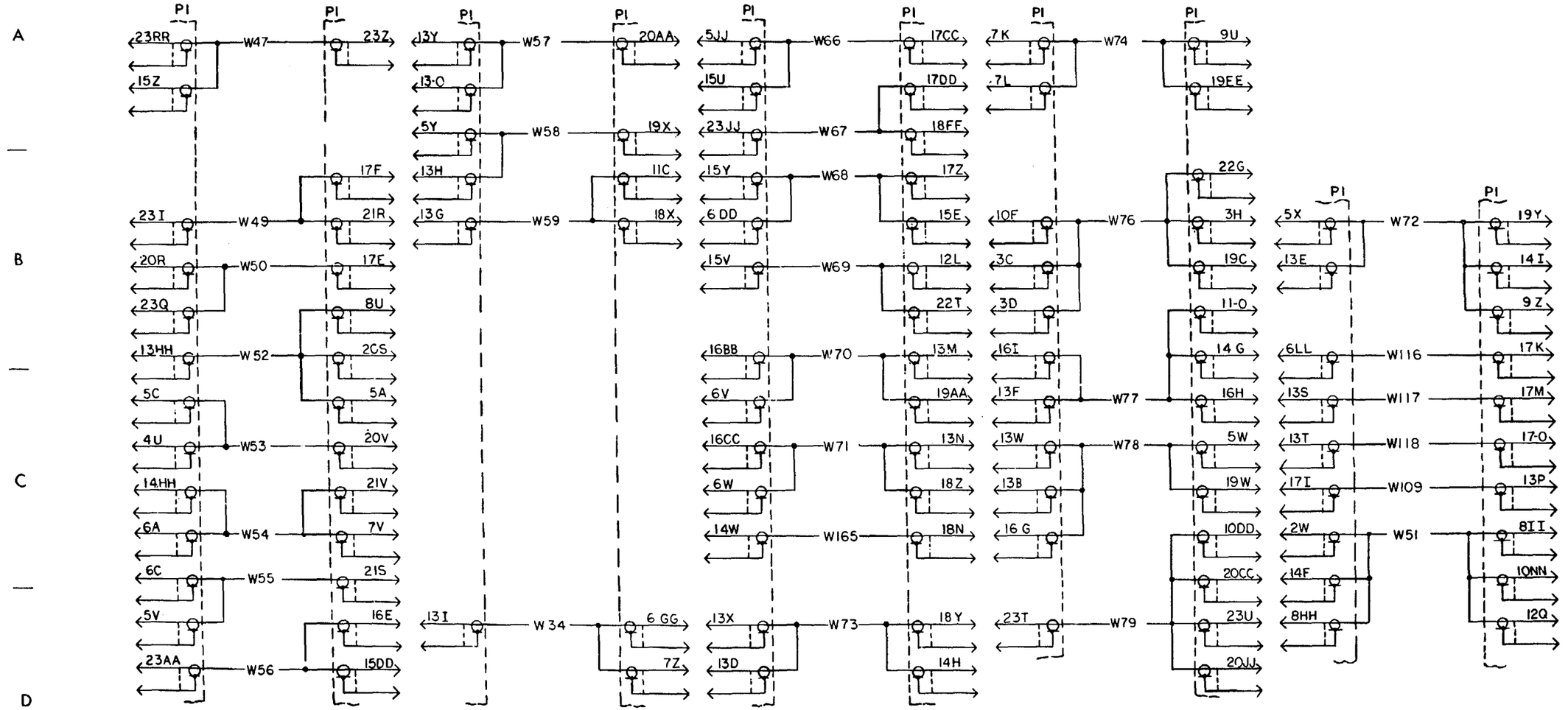
Figure 2-10. PB-204 parts location diagram.



NOTES:
1. DESIGNATIONS WITHIN LEADS ARE JUMPER NUMBERS.
2. UNLESS OTHERWISE SPECIFIED RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS.

MI 101722

Figure 2-11. PB-204, schematic diagram (sheet 1 of 5).



MI 101723

Figure 2-11. (sheet 2 of 5).

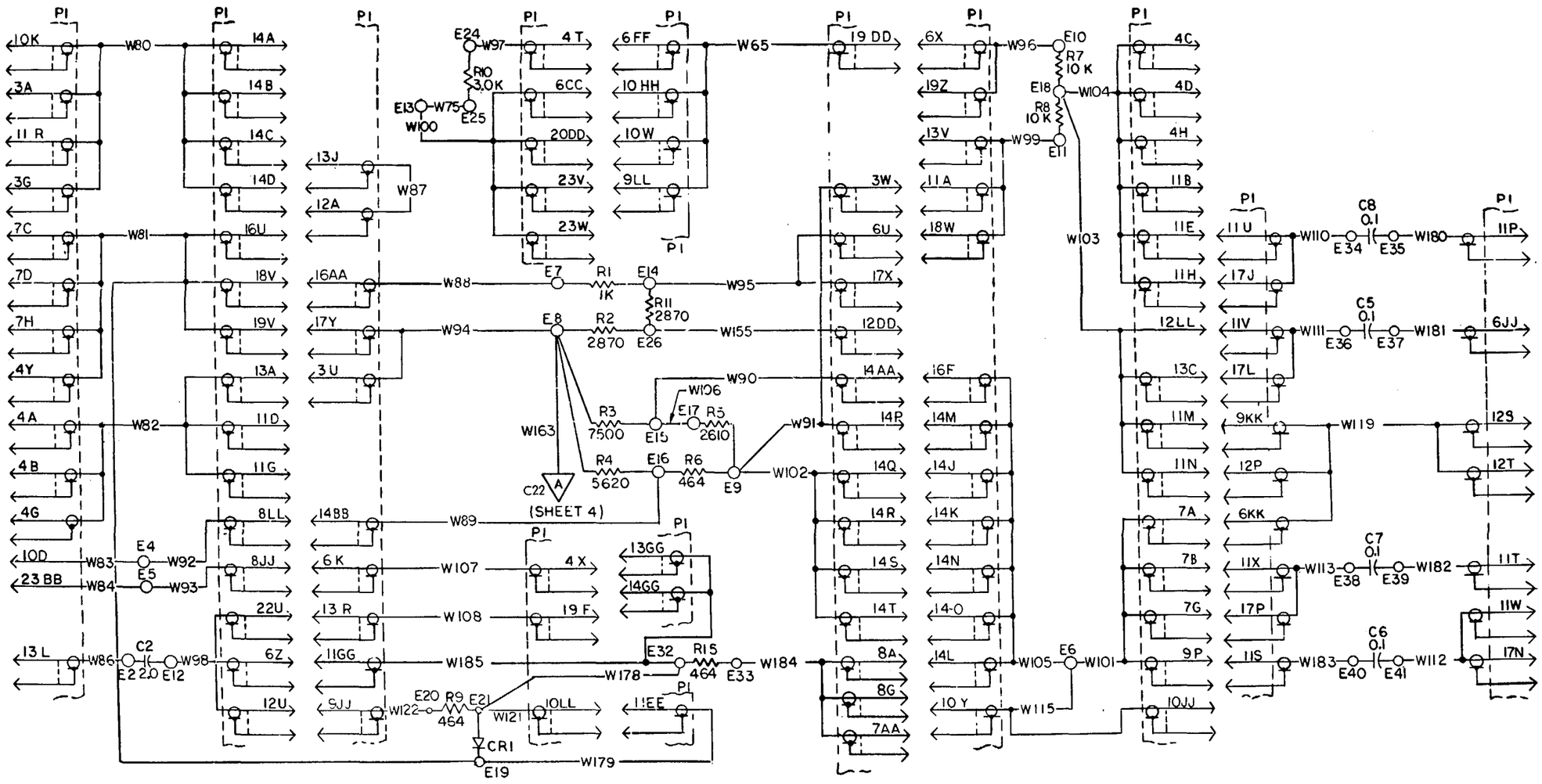
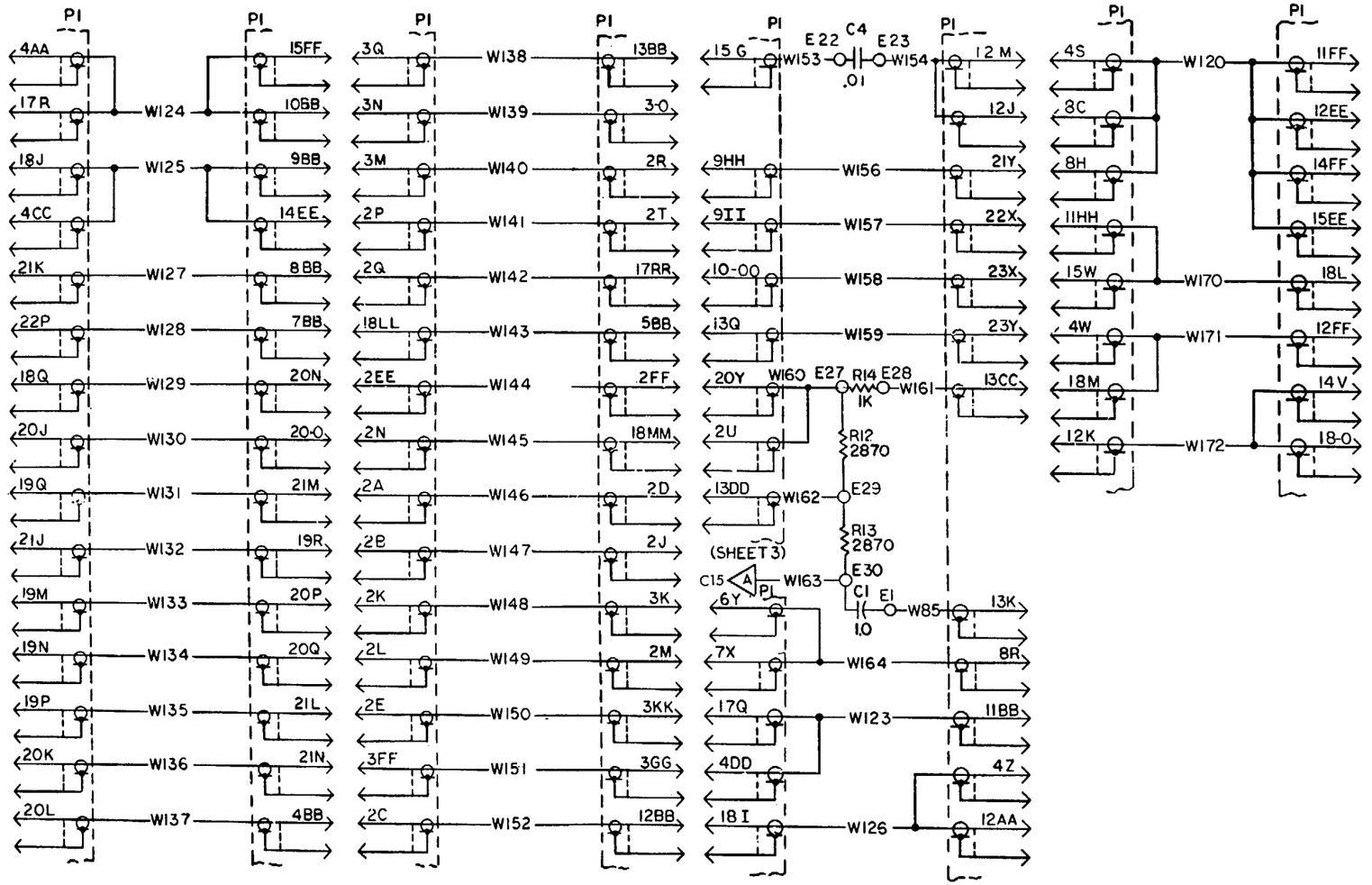


Figure 2-11. (sheet 3 of 5).



MI 101725

Figure 2-11. (sheet 4 of 5).

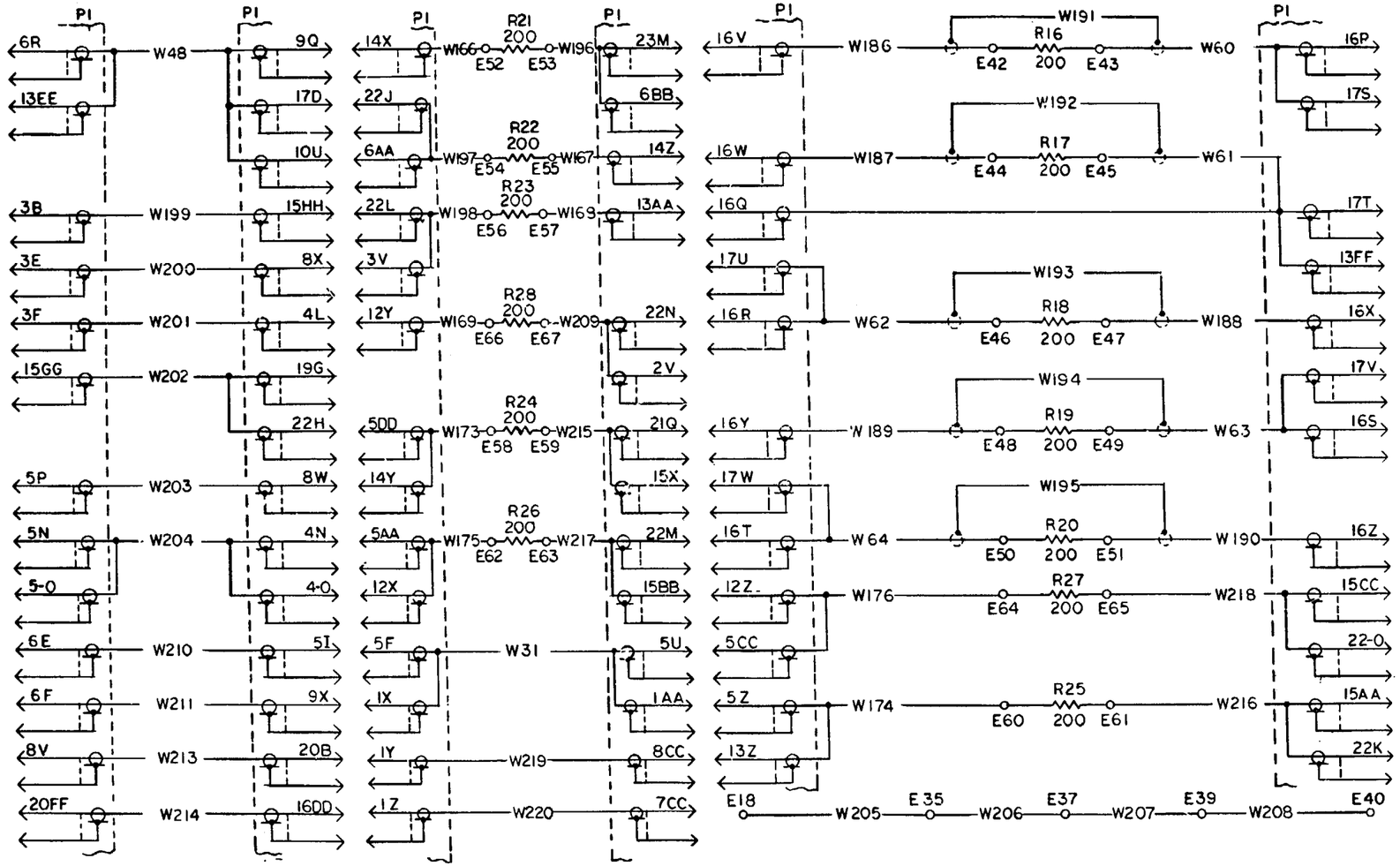
25 | 26 | 27 | 28 | 29 | 30

A

B

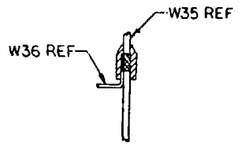
C

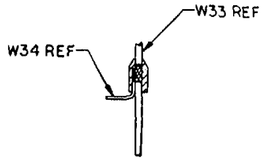
D

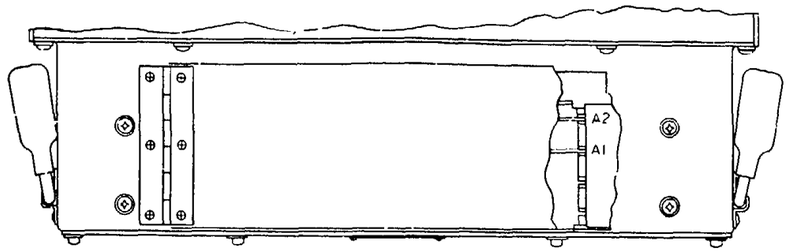


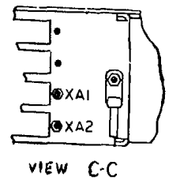
MI 101726

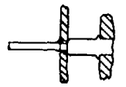
Figure 2-11. (sheet 5 of 5).



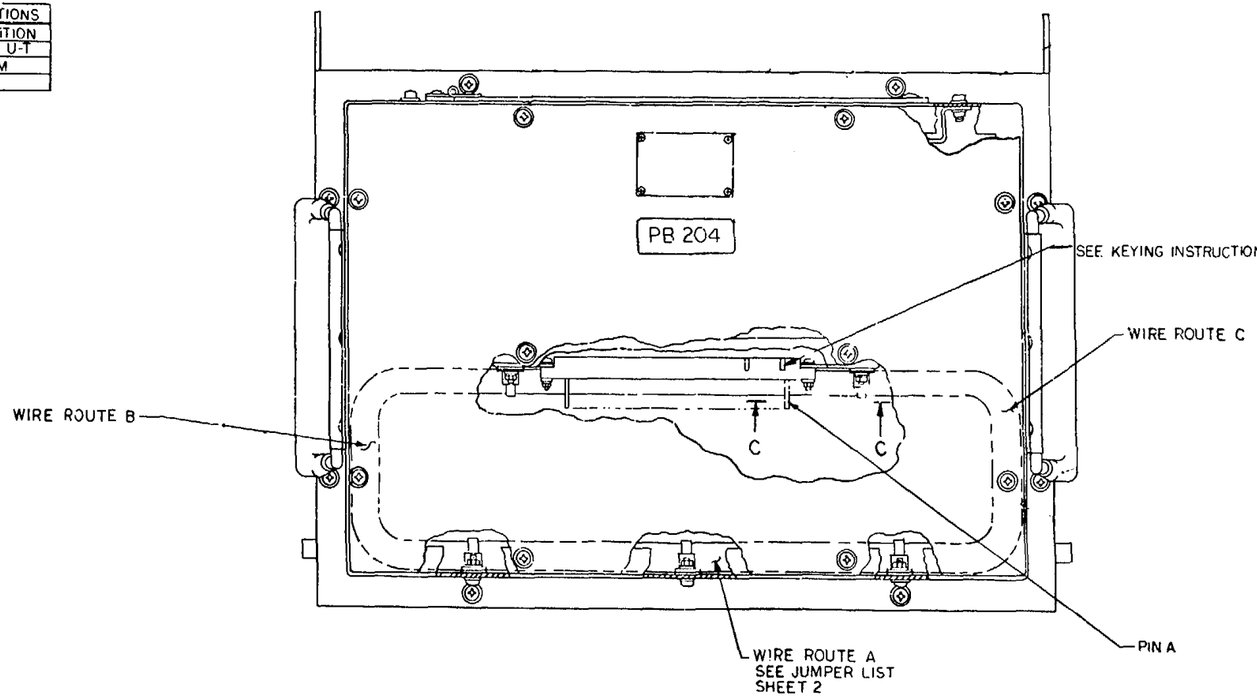


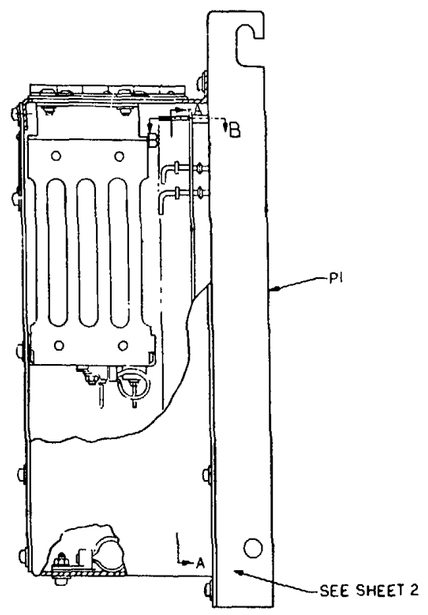






KEYING INSTRUCTIONS	
REF DES	KEY POSITION
XA1	FF-EE & U-T
XA2	E-F & L-M





MI 101727

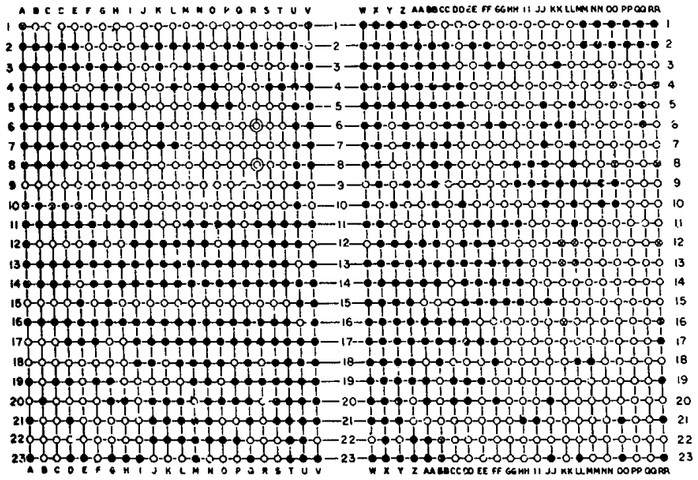
Figure 2-12. PB-204, parts location diagram (sheet 1 of 2).

JUMPER LIST

LEAD IDENT	WIRE ROUTE
W1	BA
W2	CA
W3	CA
W4	CA
W5	BA
W6	↑
W7	
W8	
W9	
W10	
W11	
W12	
W13	
W14	
W15	
W16	
W17	↓
W18	BA
W19	CA
W20	↑
W21	
W22	
W23	
W24	
W25	
W26	
W27	
W28	
W29	
W30	
W31	↓
W32	CA
W33	P
W34	P
W35	P

JUMPER LIST

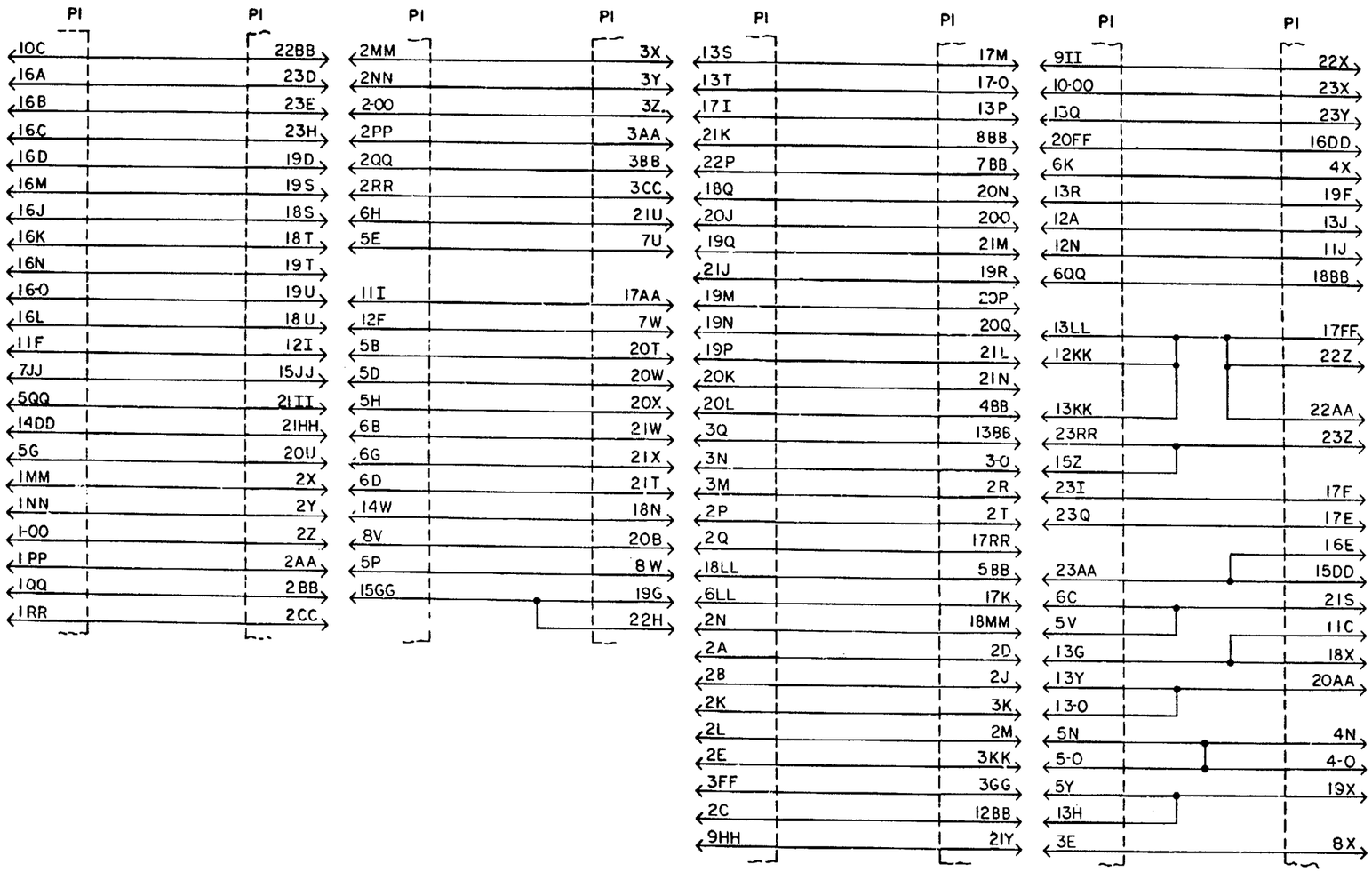
LEAD IDENT	WIRE ROUTE
W36	P
W37	BA
W38	↑
W39	
W40	
W41	
W42	
W43	
W44	
W45	
W46	
W47	↓
W48	BA
W49	CA
W50	↑
W51	
W52	
W53	
W54	
W55	
W56	
W57	
W58	
W59	
W60	
W61	↓
W62	CA



VIEW A-A
SEE SHEET 1

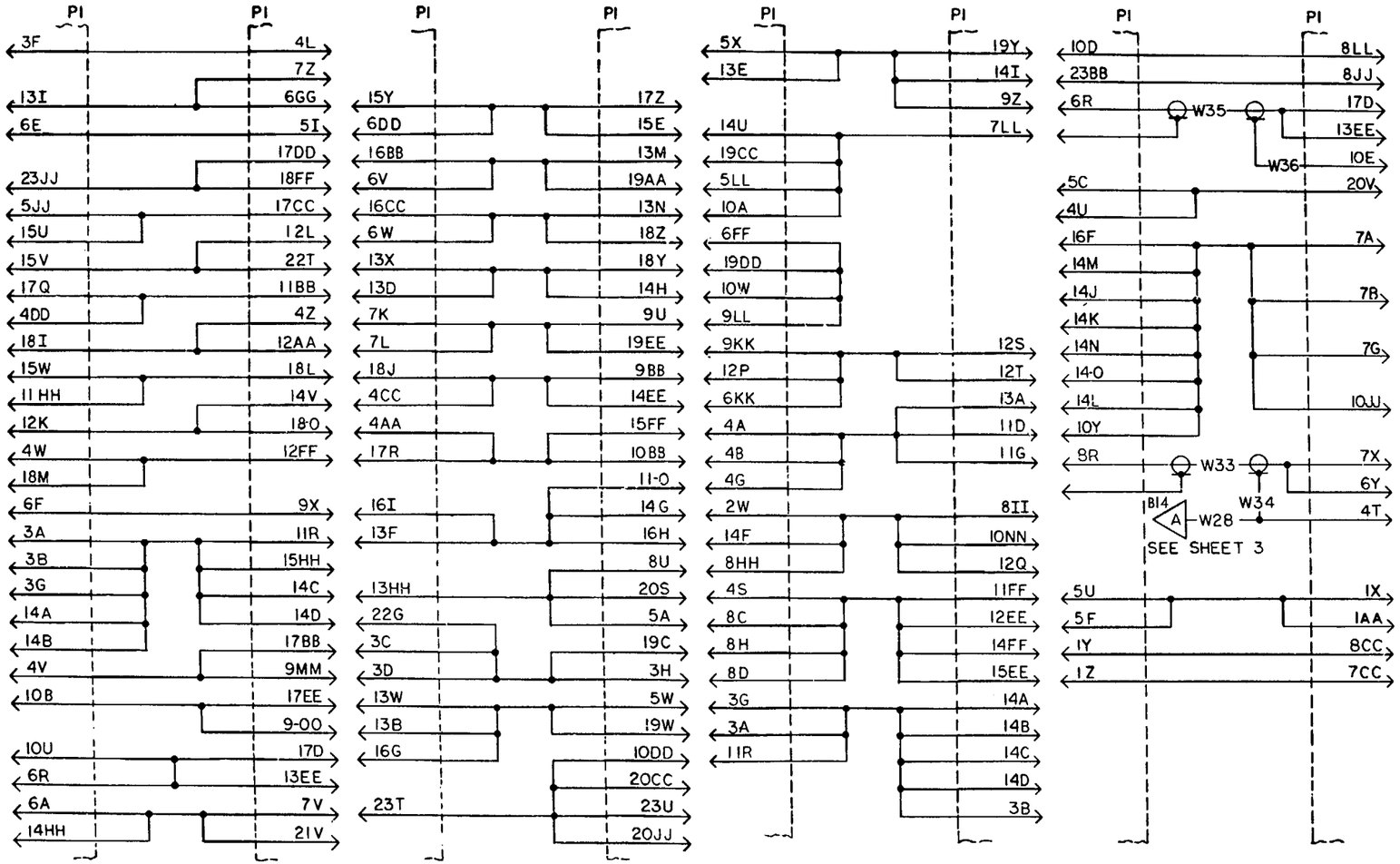
MI 101728

Figure 2-12. (sheet 2 of 2).



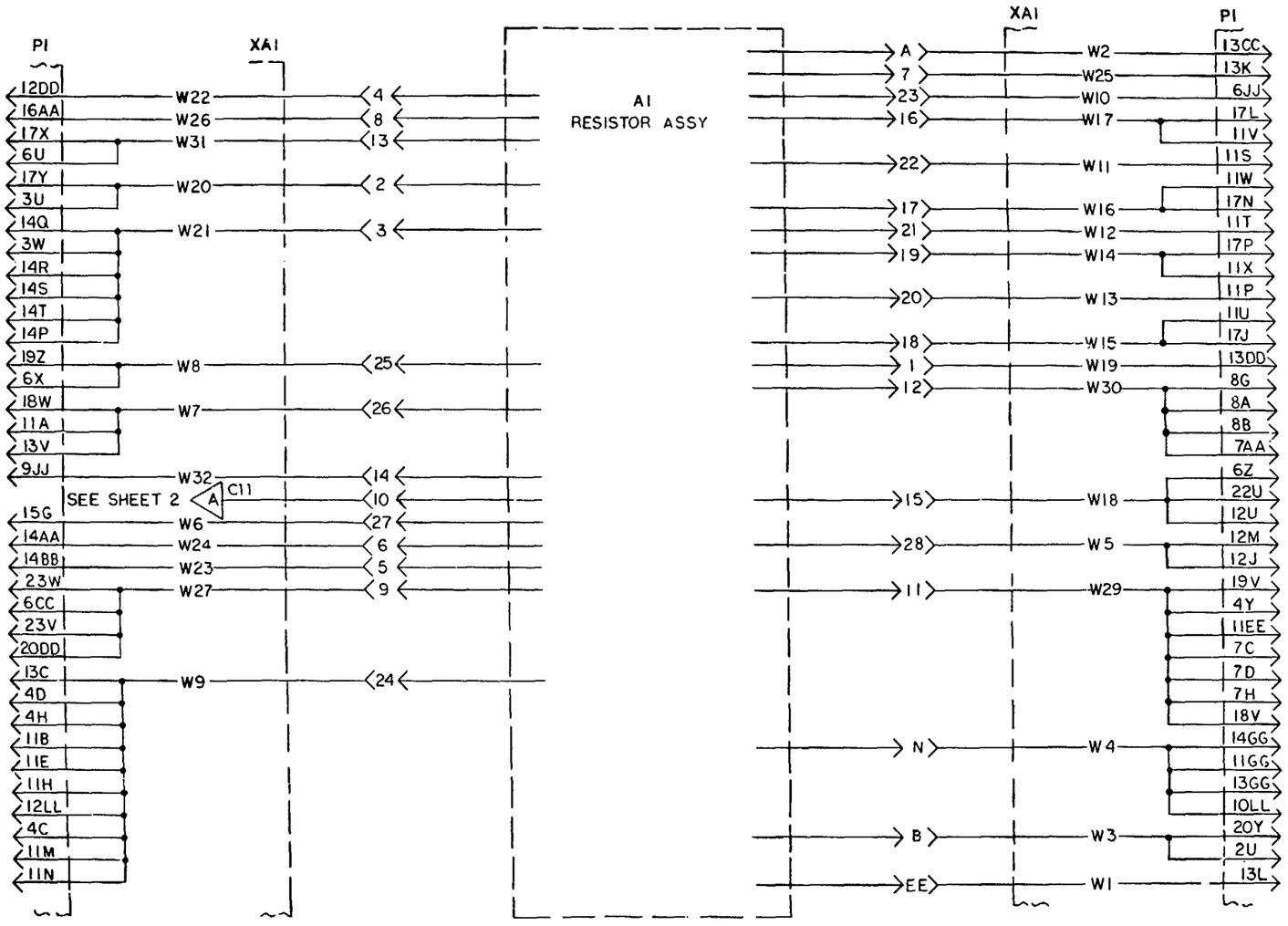
MI 101729

Figure 2-13. PB-204, schematic diagram (sheet 1 of 4).



MI 101730

Figure 2-13. (sheet 2 of 4).



MI 101731

Figure 2-13. (sheet 3 of 4).

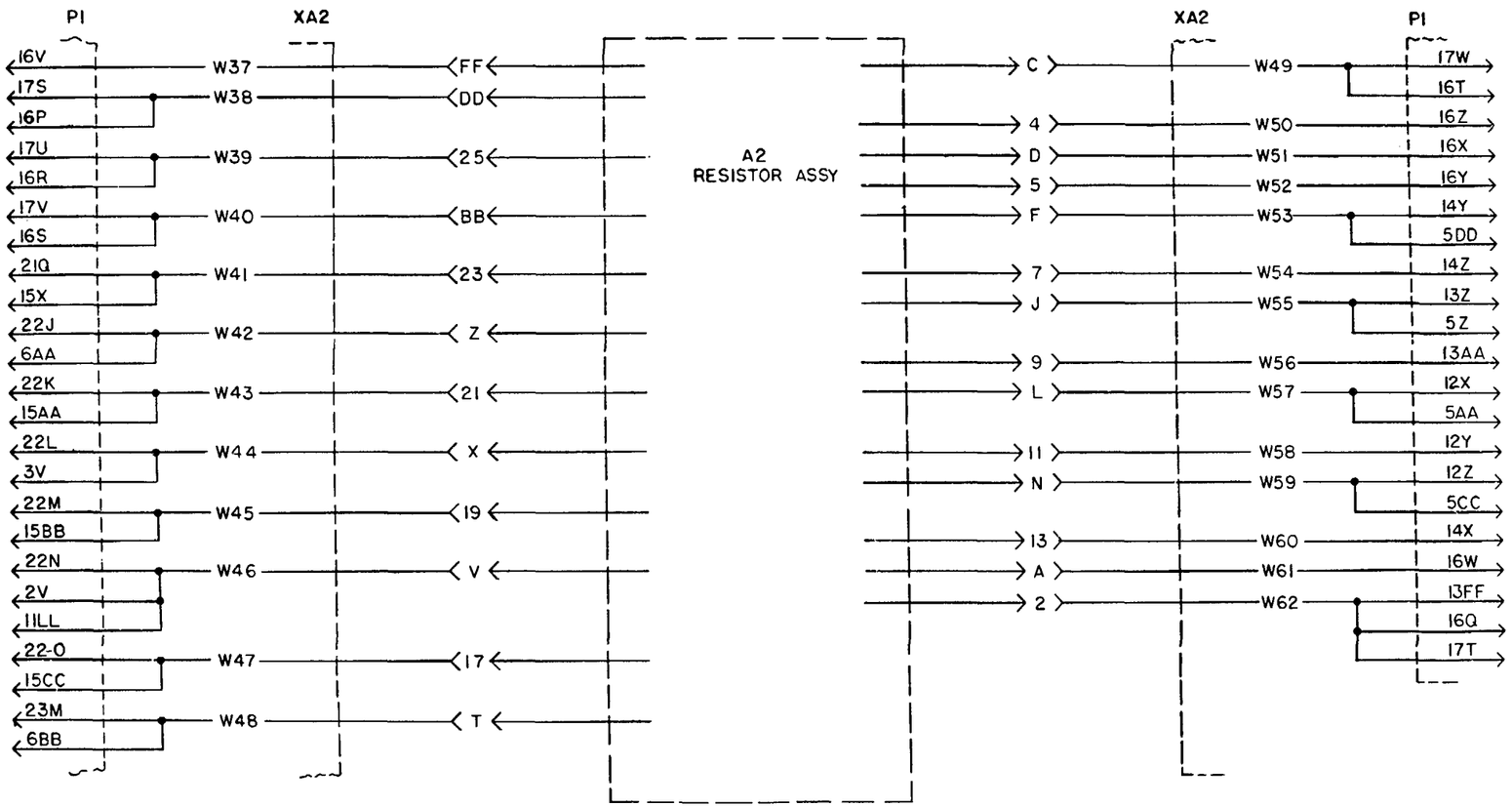
19 | 20 | 21 | 22 | 23 | 24

A

B

C

D



MI 101732

Figure 2-13. (sheet 4 of 4).

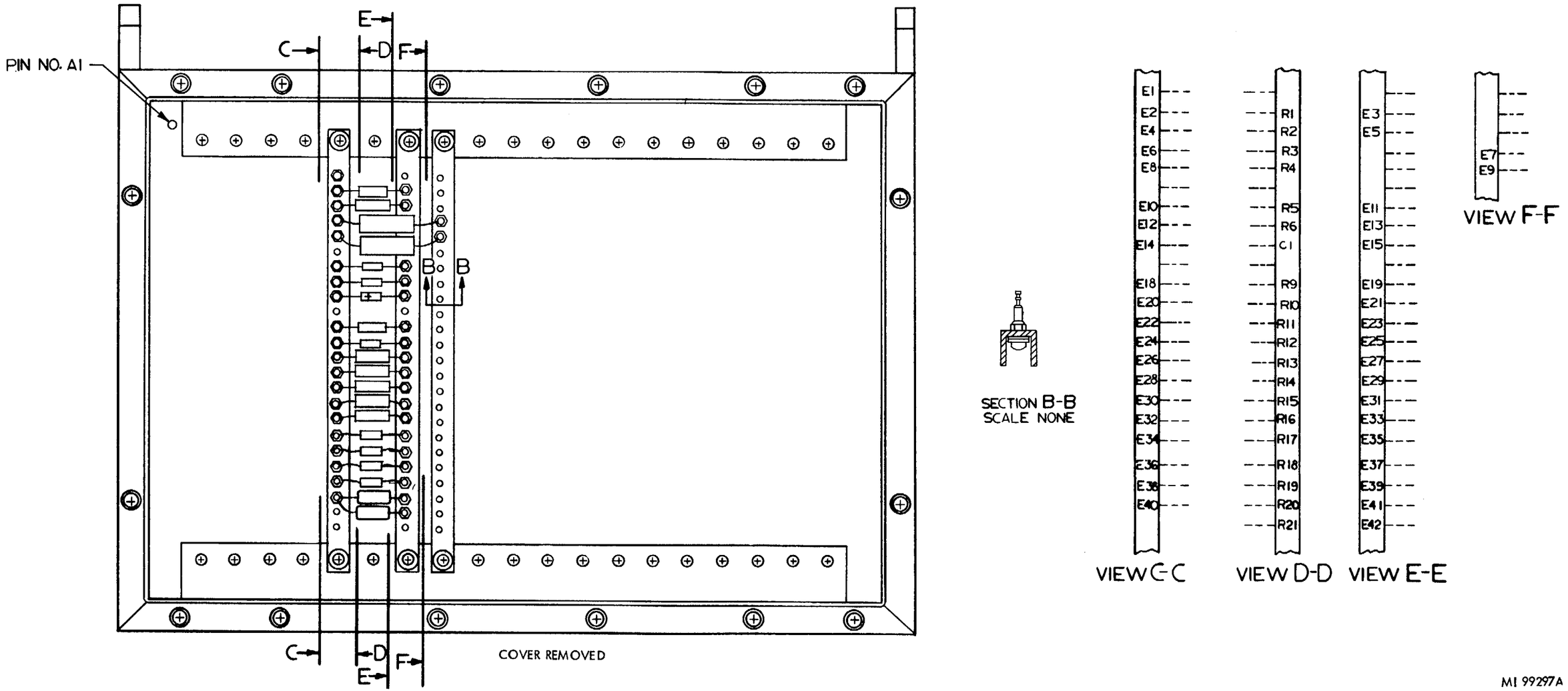
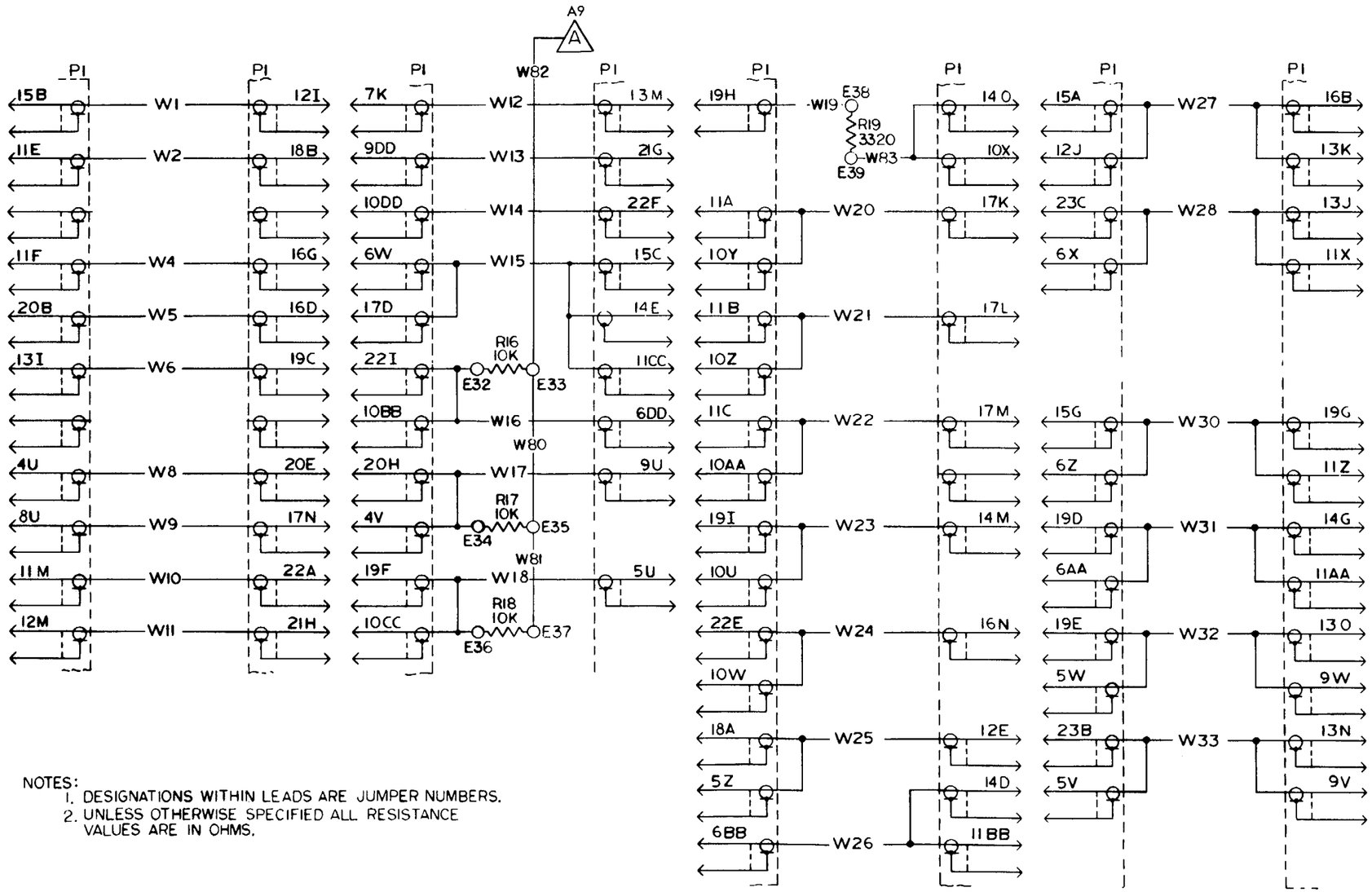
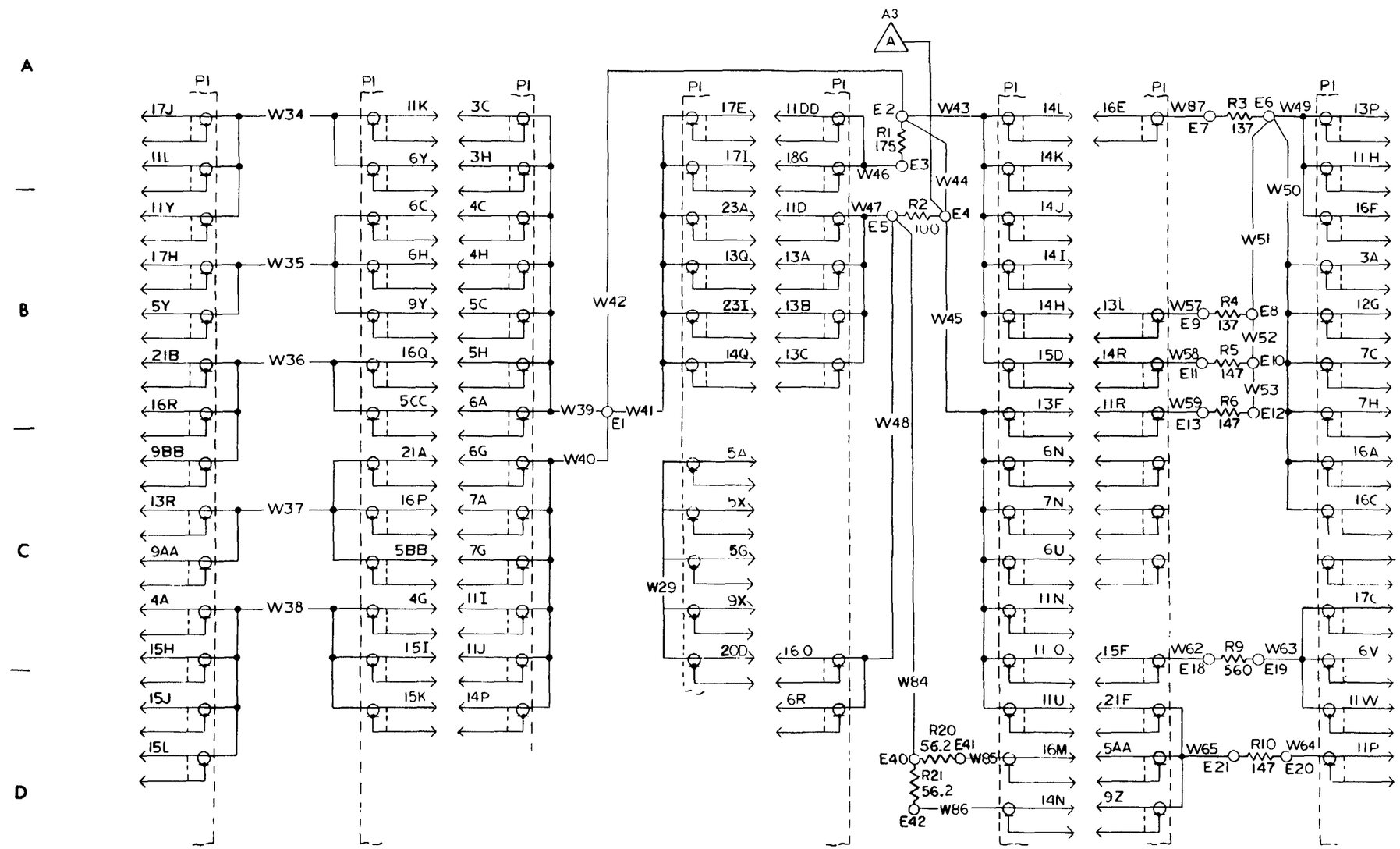


Figure 2-14. PB-205, parts location diagram.



MI 98278 A

Figure 2-15. PB-205, schematic diagram (sheet 1 of 3).



MI 98615A

Figure 2-15. (sheet 2 of 3).

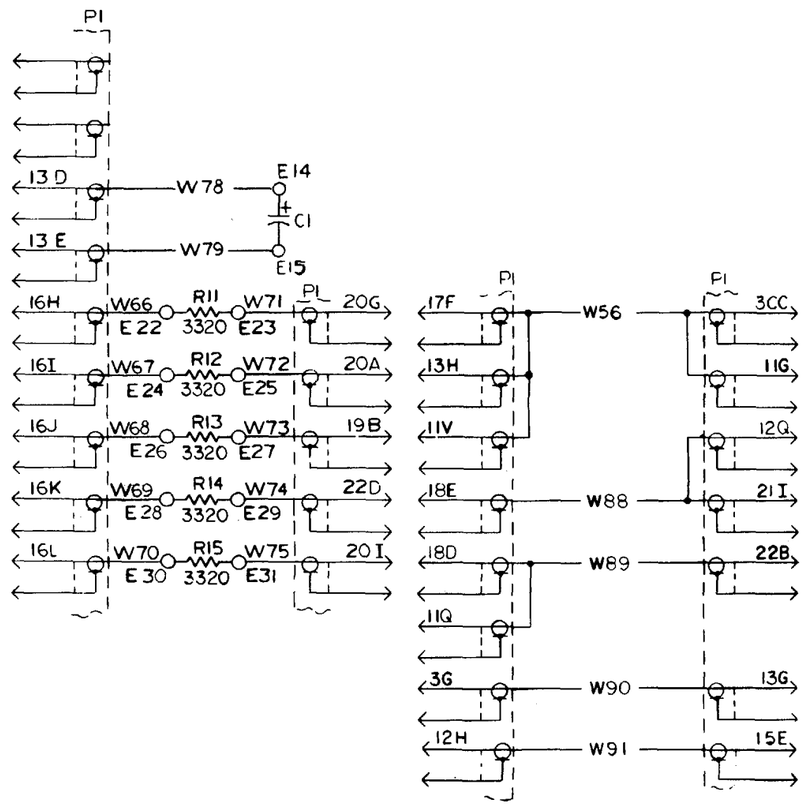
13 | 14 | 15 | 16 | 17 | 18

A

B

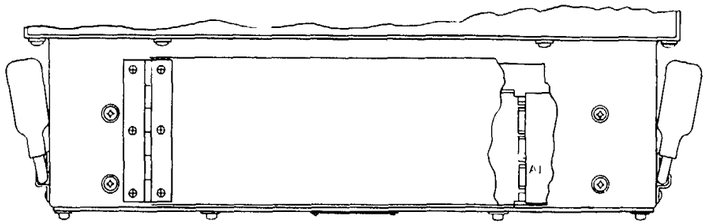
C

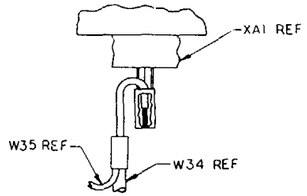
D



MI 98620

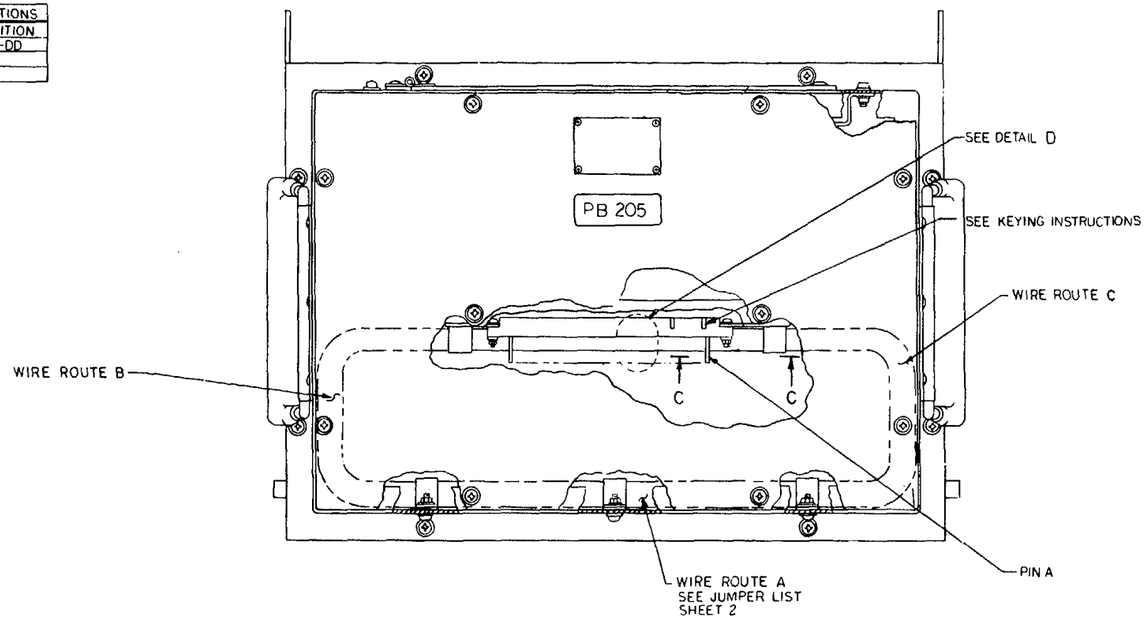
Figure 2-15. (sheet 3 of 3).

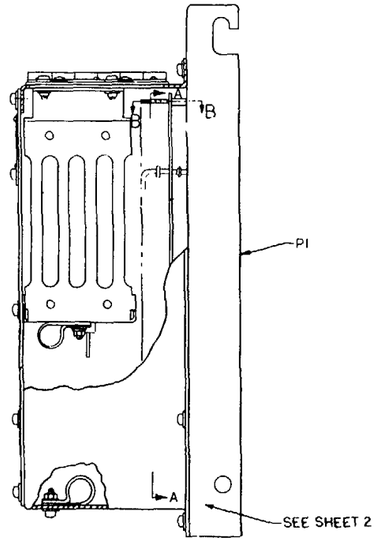


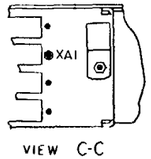


DETAIL D
SCALE : NONE

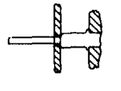
KEYING INSTRUCTIONS	
REF DES	KEY POSITION
XA1	T-U & CC-DD







VIEW C-C



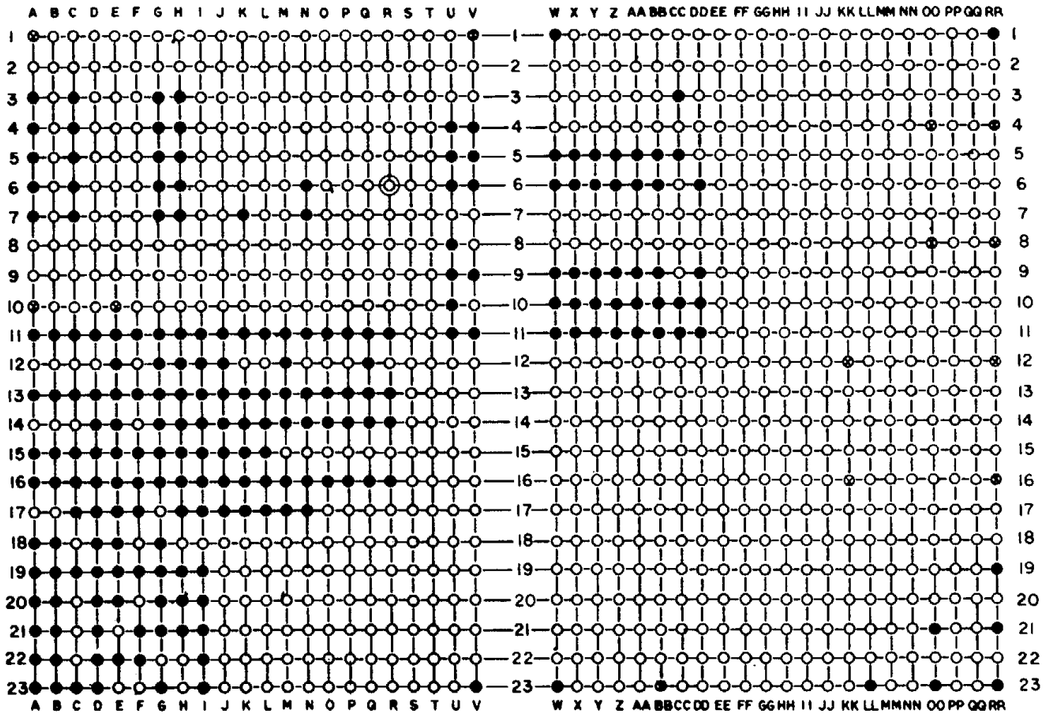
SECTION B-B
SCALE 2/1

MI 100790B

Figure 2-16. PB-205, parts location diagram (sheet 1 of 2).

JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W1	B A
W2	
W3	
W4	B A
W5	C A
W6	B A
W7	
W8	
W9	
W10	
W11	
W12	
W13	
W14	
W15	
W16	
W17	
W18	
W19	B A
W20	C A
W21	
W22	
W23	
W24	
W25	
W26	
W27	
W28	
W29	
W30	
W31	
W32	
W33	
W34	
W35	C A

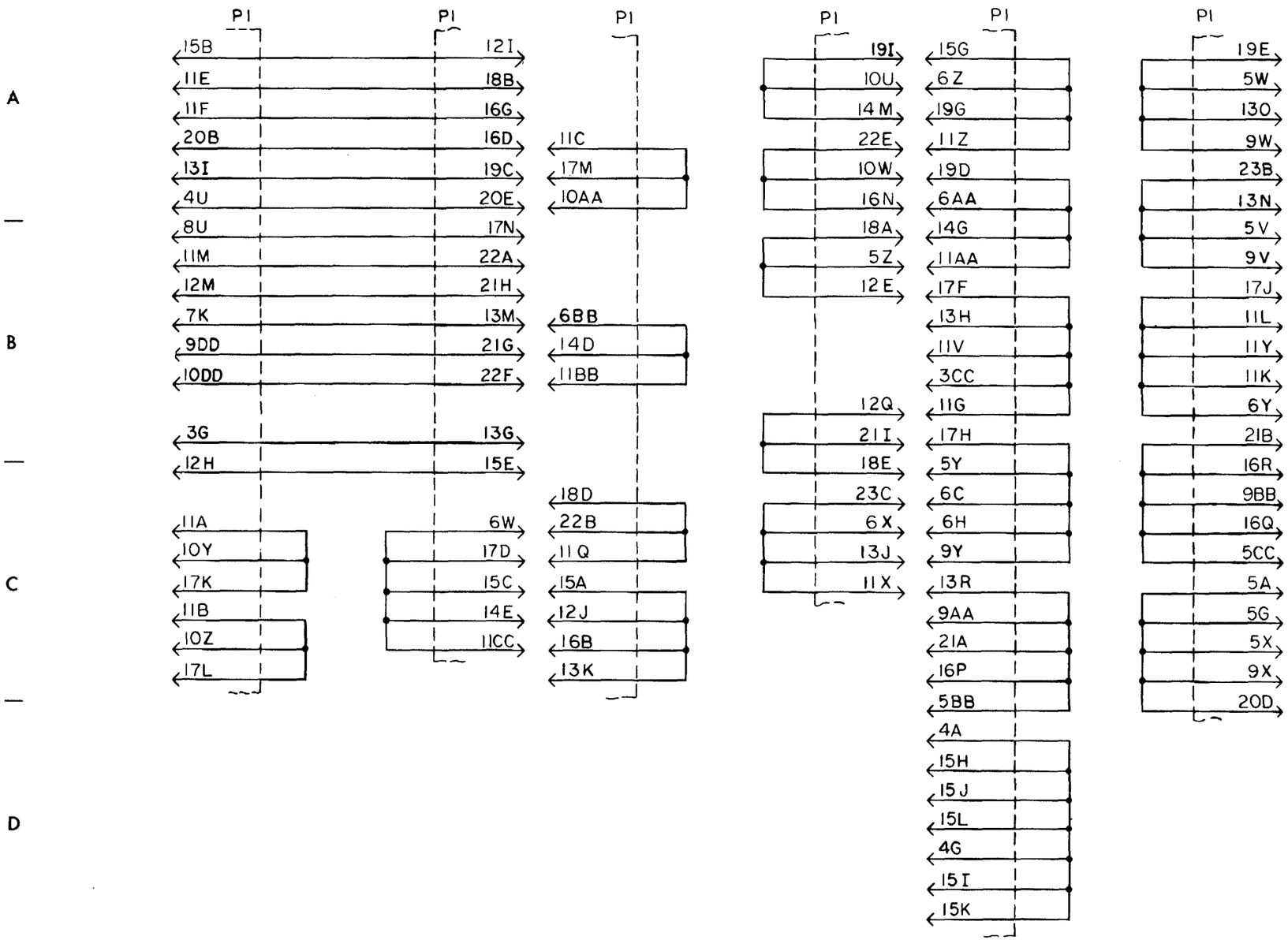
JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W36	P



VIEW A-A
SEE SHEET 1

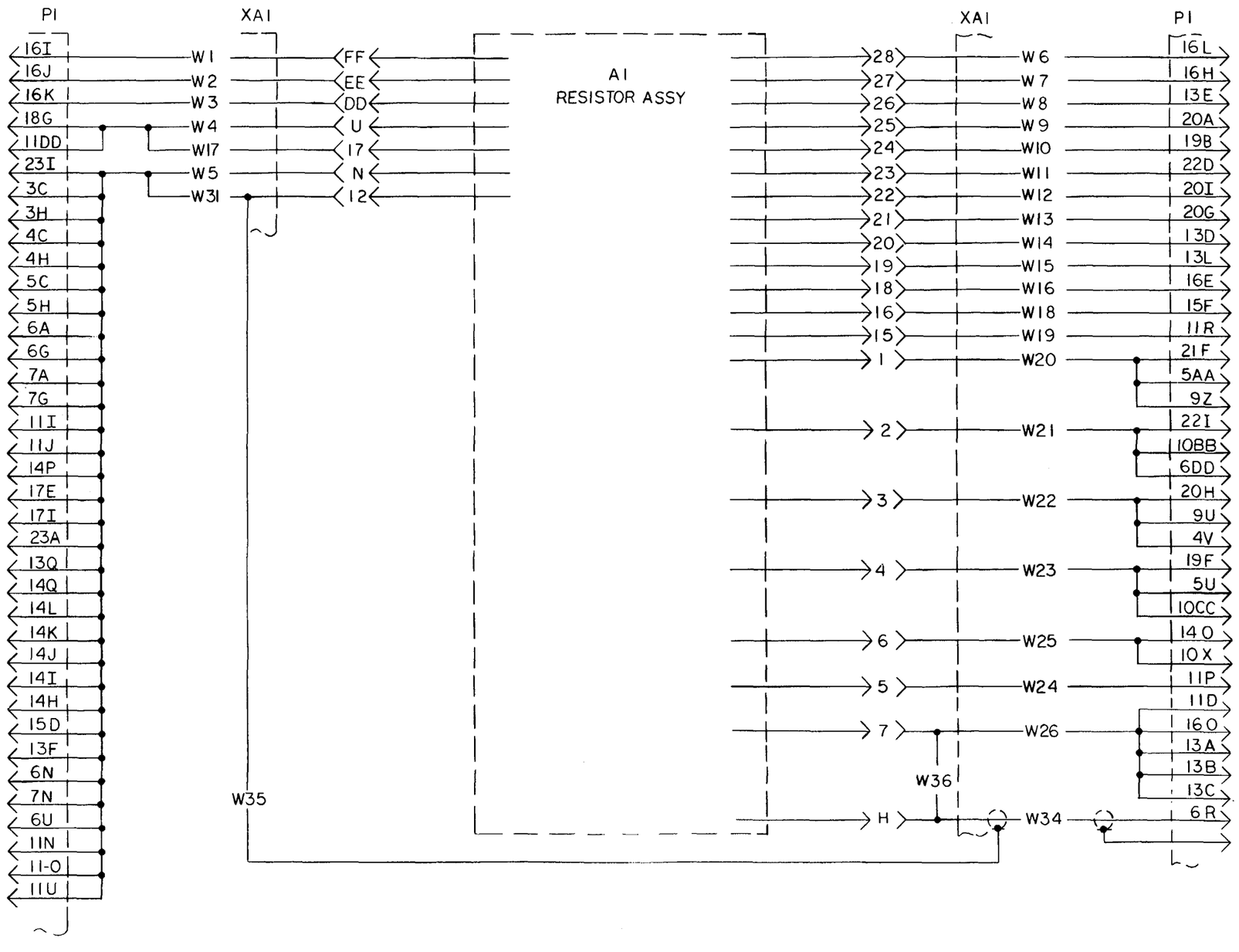
MI 100791A

Figure 2-16. (sheet 2 of 2).



MI 100792B

Figure 2-17. PB-205, schematic diagram (sheet 1 of 3).



MI 100793B

Figure 2-17. (sheet 2 of 3).

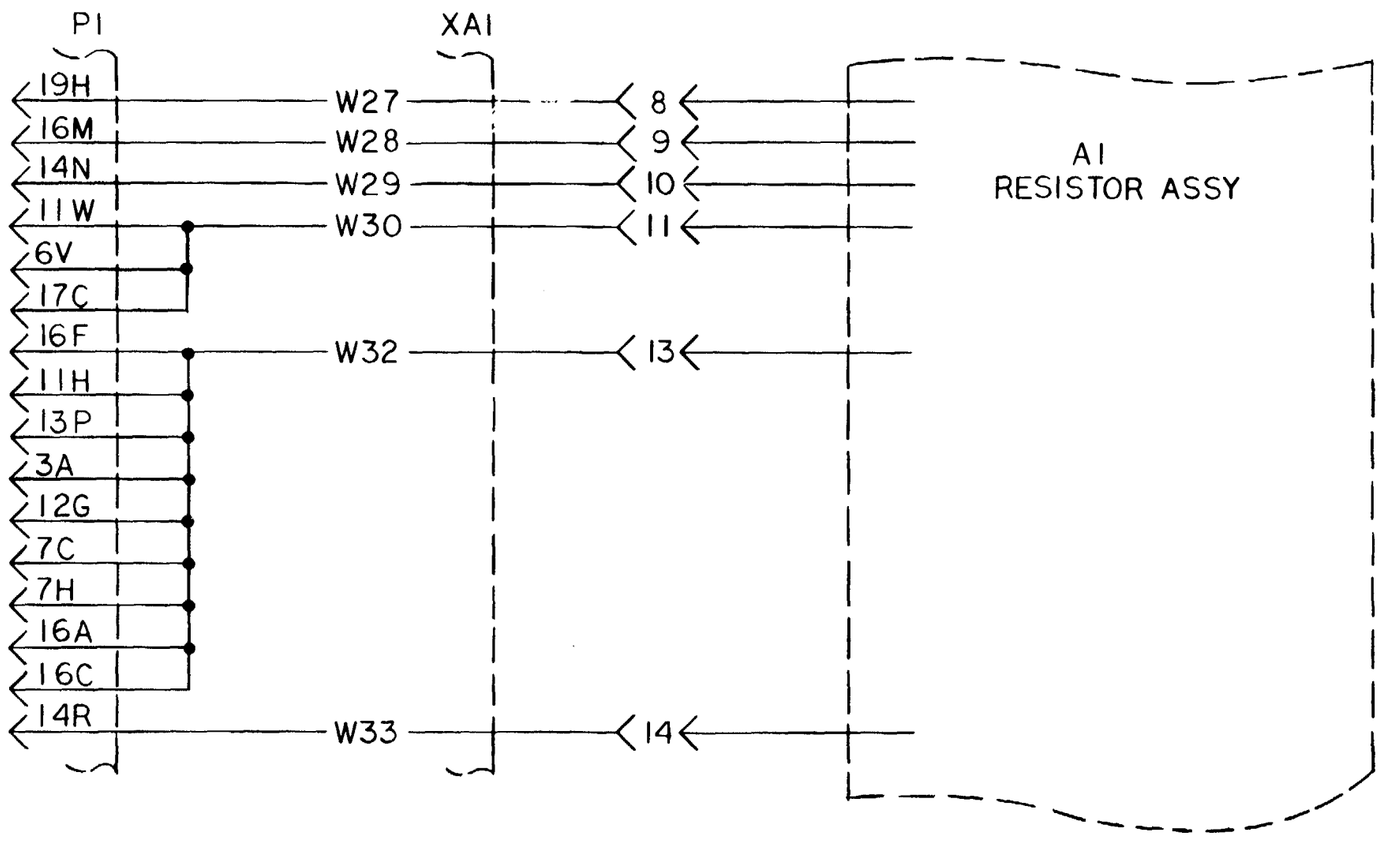
13 | 14 | 15 | 16 | 17 | 18

A

B

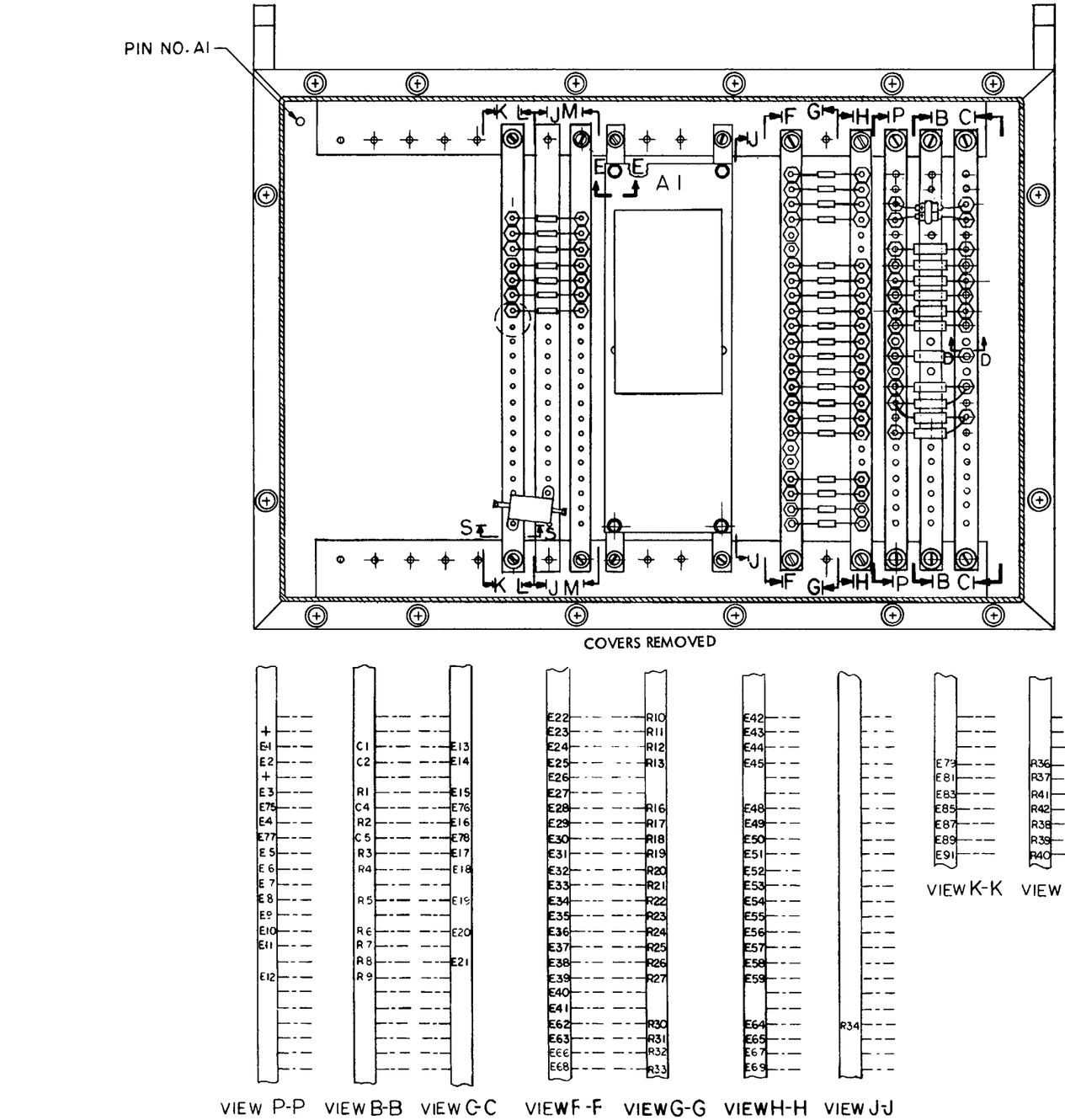
C

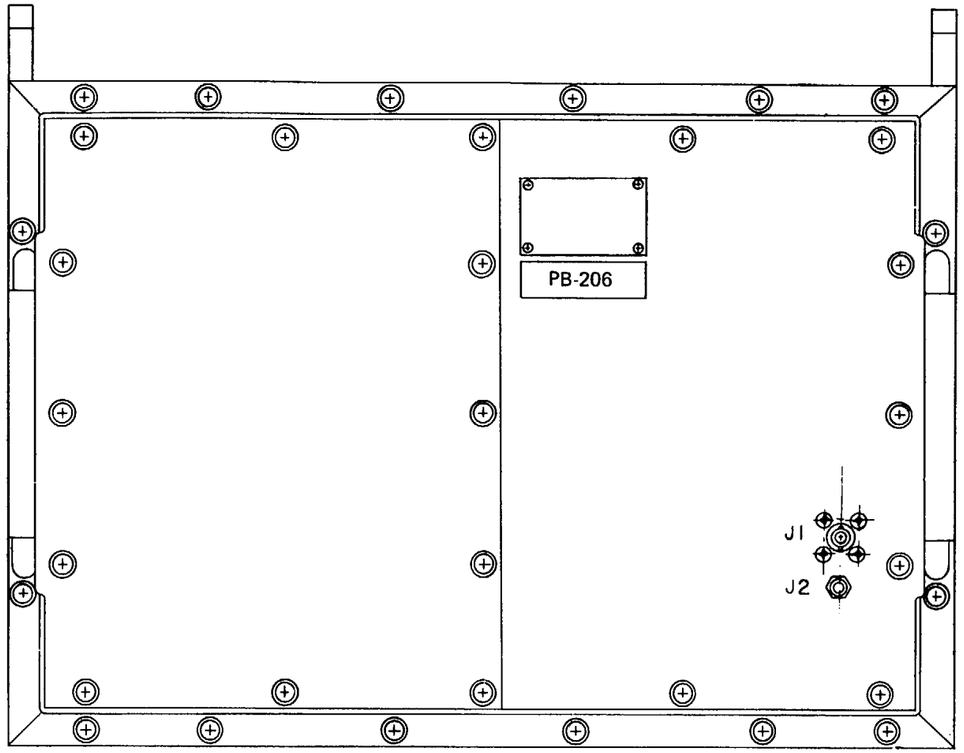
D

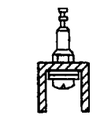


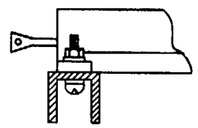
MI 100794B

Figure 2-17. (sheet 3 of 3).



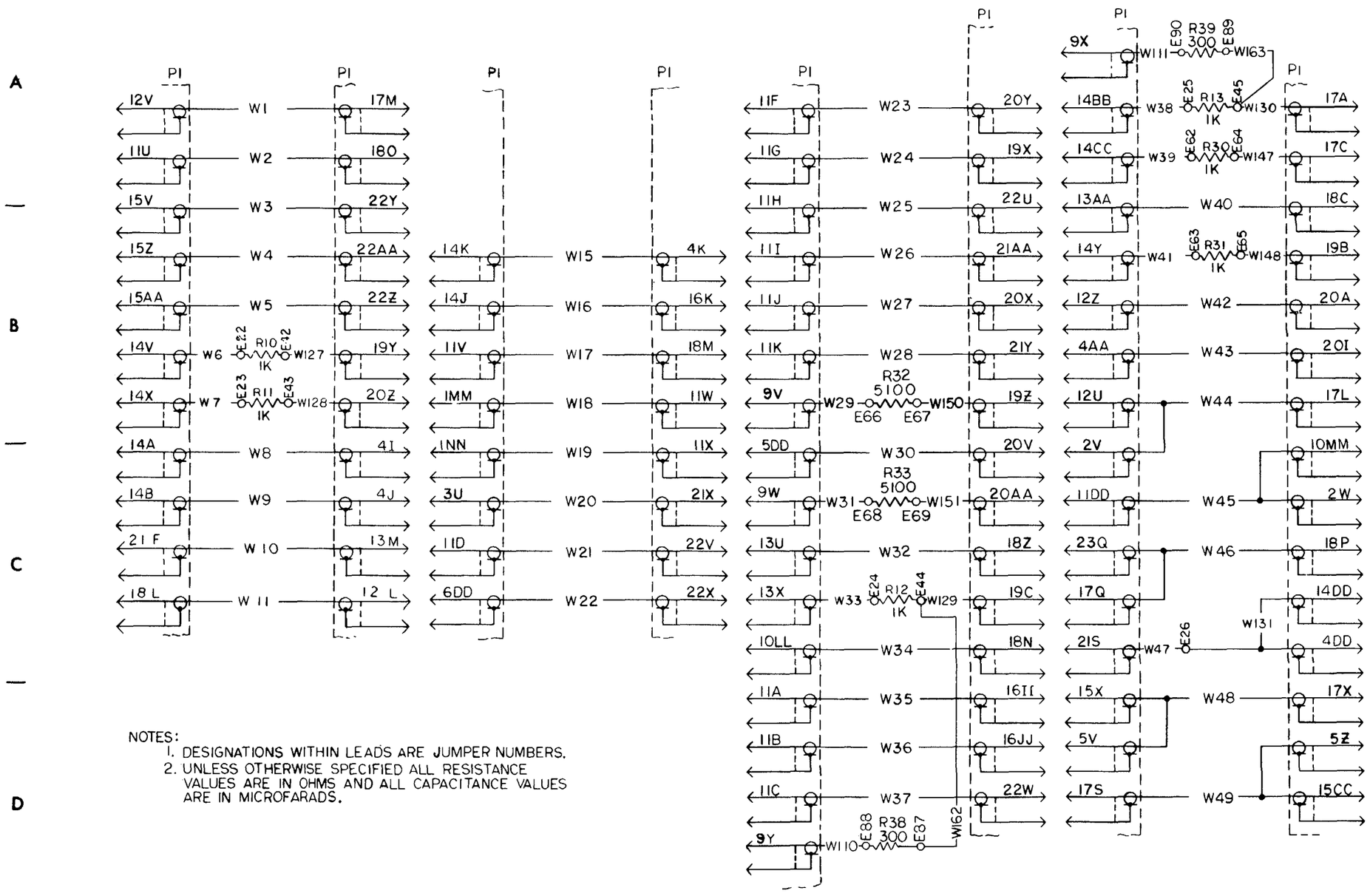






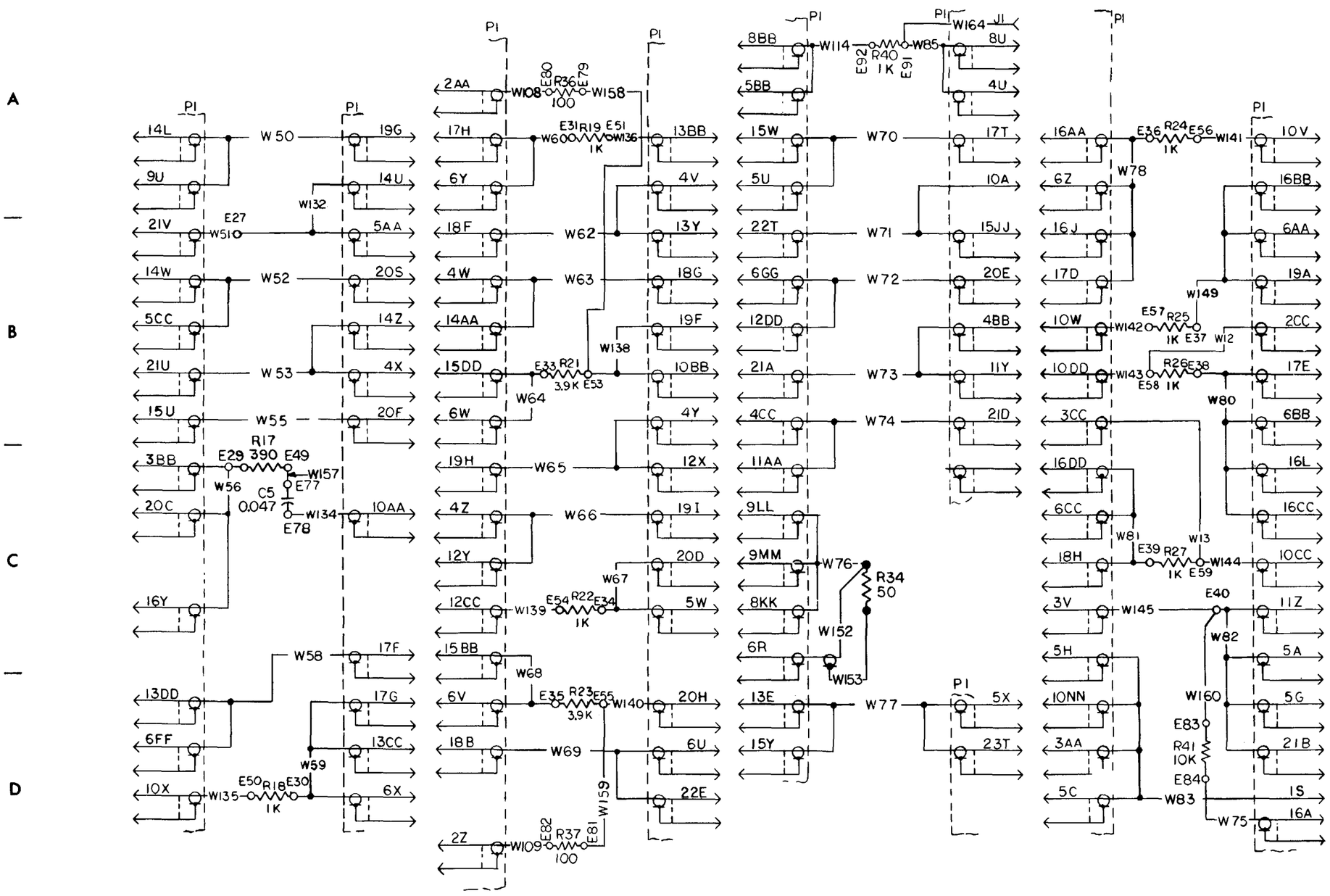
MI 99282 B

Figure 2-18. PB-206, parts location diagram.



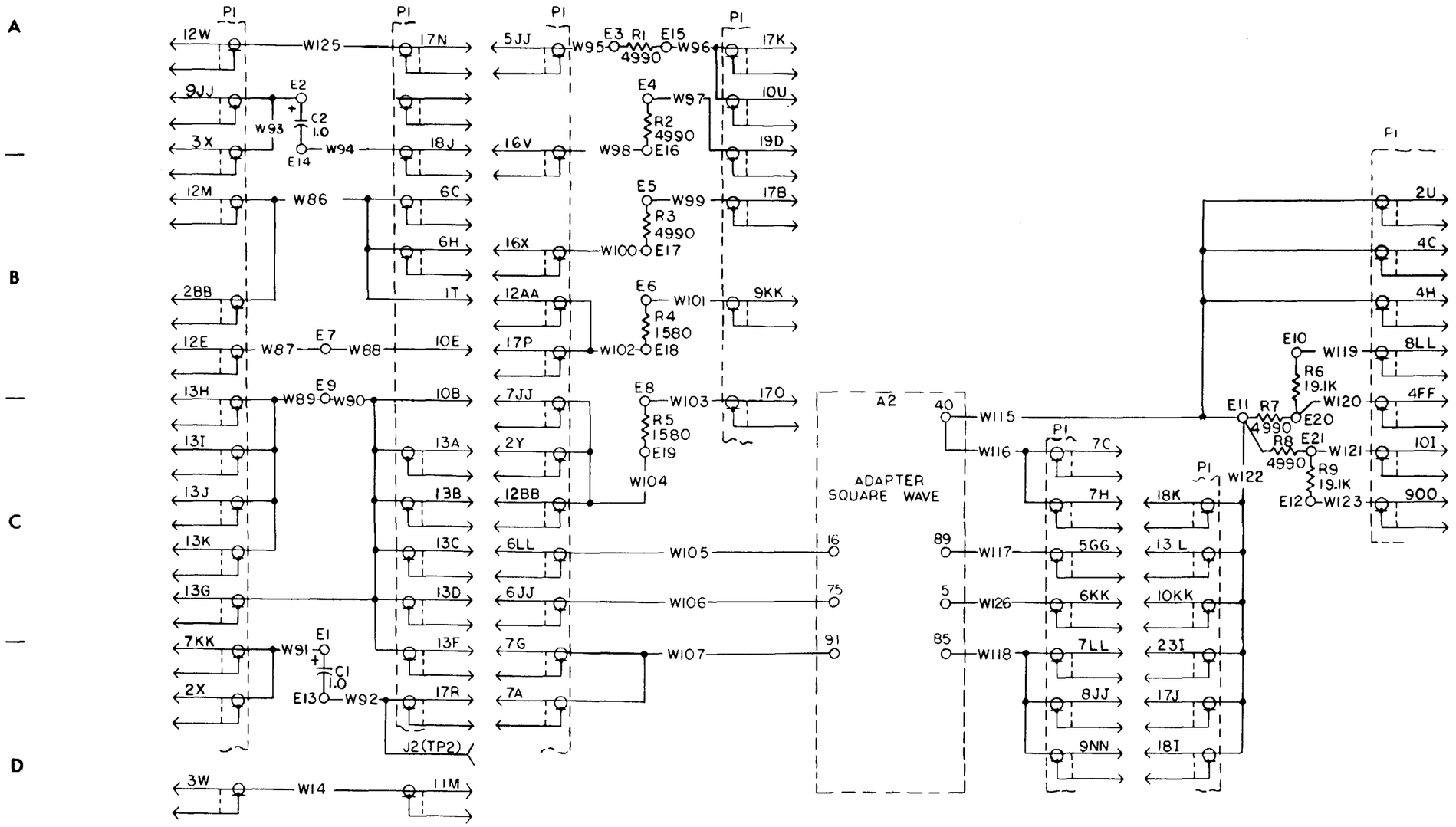
MI 100019 B

Figure 2-19. PB-206, schematic diagram (sheet 1 of 4)



MI 100020B

Figure 2-19. (sheet 2 of 4)



MI 100021A

Figure 2-19. (sheet 3 of 4)

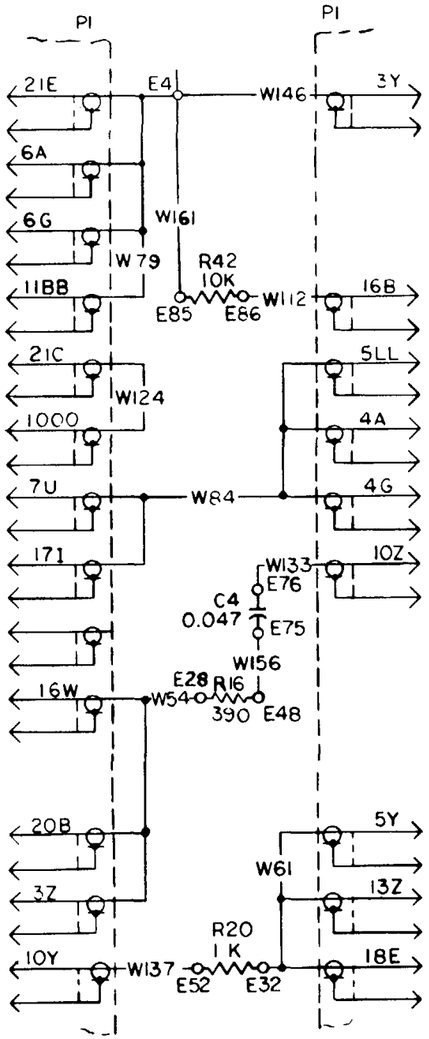
19 | 20 | 21 | 22 | 23 | 24

A

B

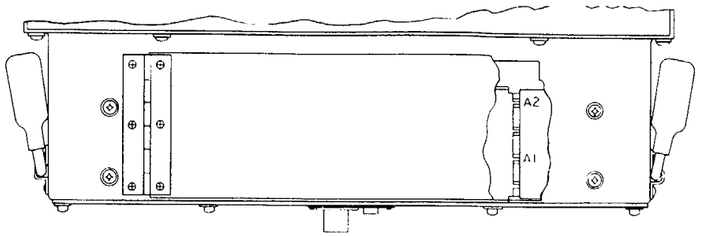
C

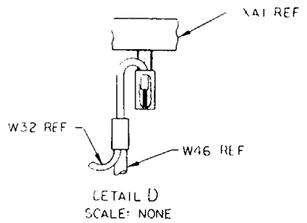
D



MI 100022

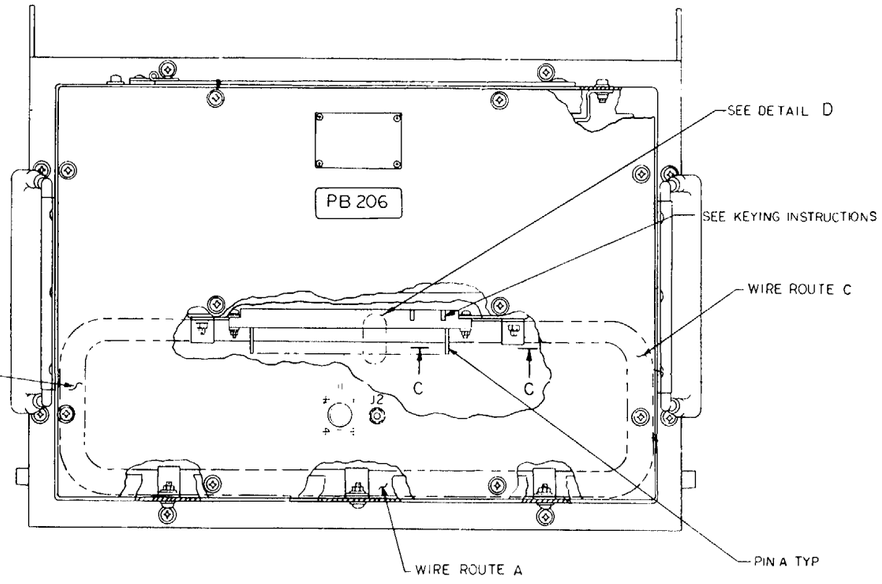
Figure 2-19. (sheet 4 of 4).

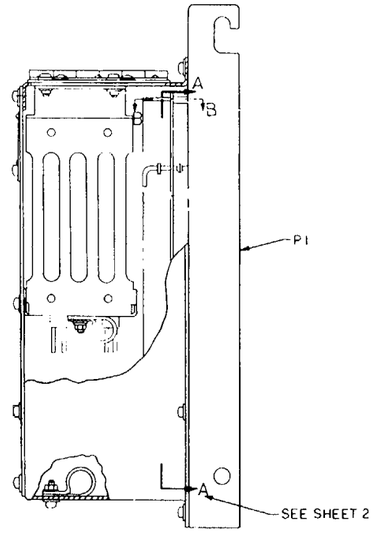


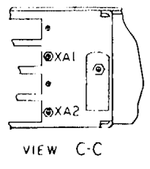


DETAIL D
SCALE: NONE

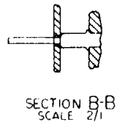
KEYING INSTRUCTIONS	
REF DES	KEY POSITION
XA1	D-E & J-K
XA2	C-D & P-R







VIEW C-C



SECTION B-B
SCALE 2/1

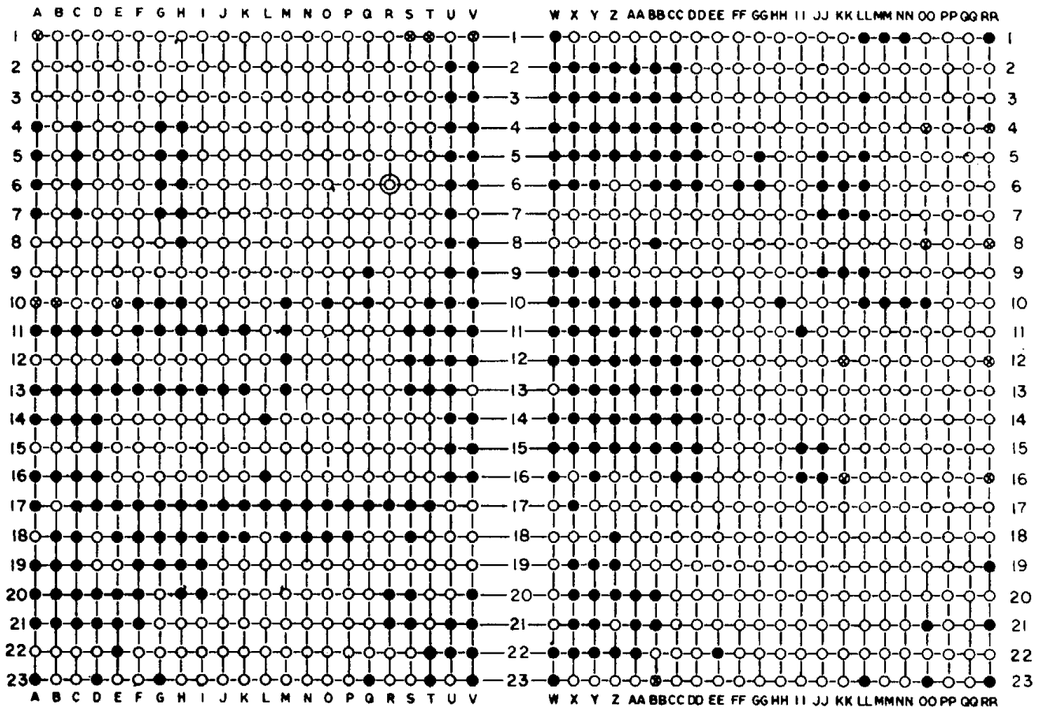
MI 100795 B

Figure 2-20. PB-206, parts location diagram (sheet 1 of 2).

JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W1	BA
W2	
W3	
W4	
W5	
W6	
W7	
W8	
W9	
W10	
W11	BA
W12	CA
W13	3A
W14	
W15	
W16	
W17	
W18	
W19	BA
W20	CA
W21	
W22	
W23	CA
W24	BA
W25	
W26	
W27	
W28	
W29	
W30	
W31	BA
W32	P
W33	BA
W34	BA
W35	BA

JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W36	BA
W37	BA
W38	CA
W39	
W40	
W41	
W42	
W43	
W44	
W45	
W46	
W47	
W48	
W49	
W50	
W51	
W52	CA
W53	BA
W54	
W55	
W56	
W57	
W58	
W59	
W60	
W61	
W62	
W63	
W64	
W65	
W66	BA
W67	CA
W68	CA
W69	CA
W70	CA

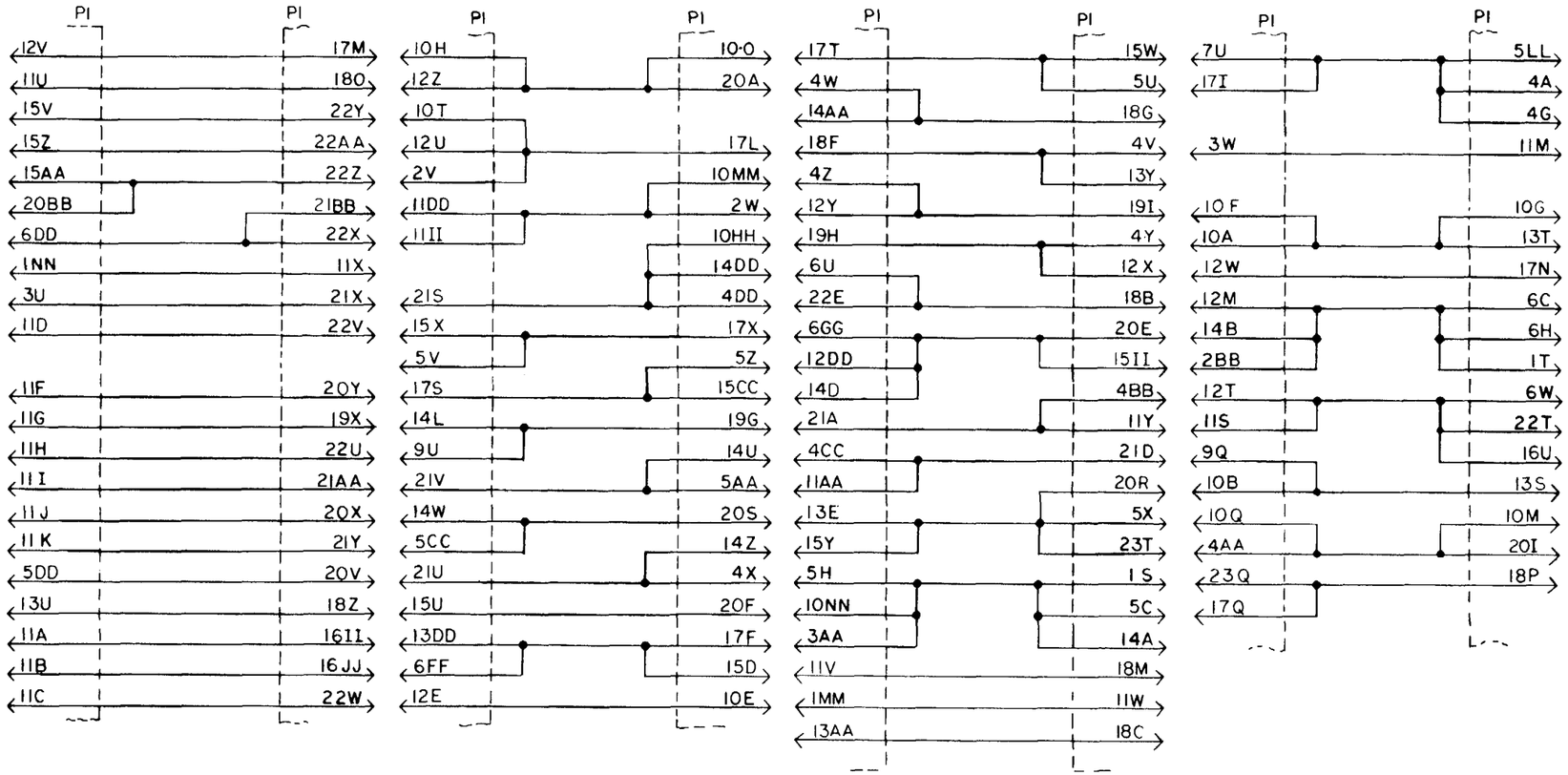
JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W71	CA
W72	
W73	
W74	
W75	
W76	
W77	
W78	
W79	CA
W80	A
W81	A



VIEW A-A
SEE SHEET 1

MI 100796A

Figure 2-20. (sheet 2 of 2).



MI 100797B

Figure 2-21. PB-206, schematic diagram (sheet 1 of 4).

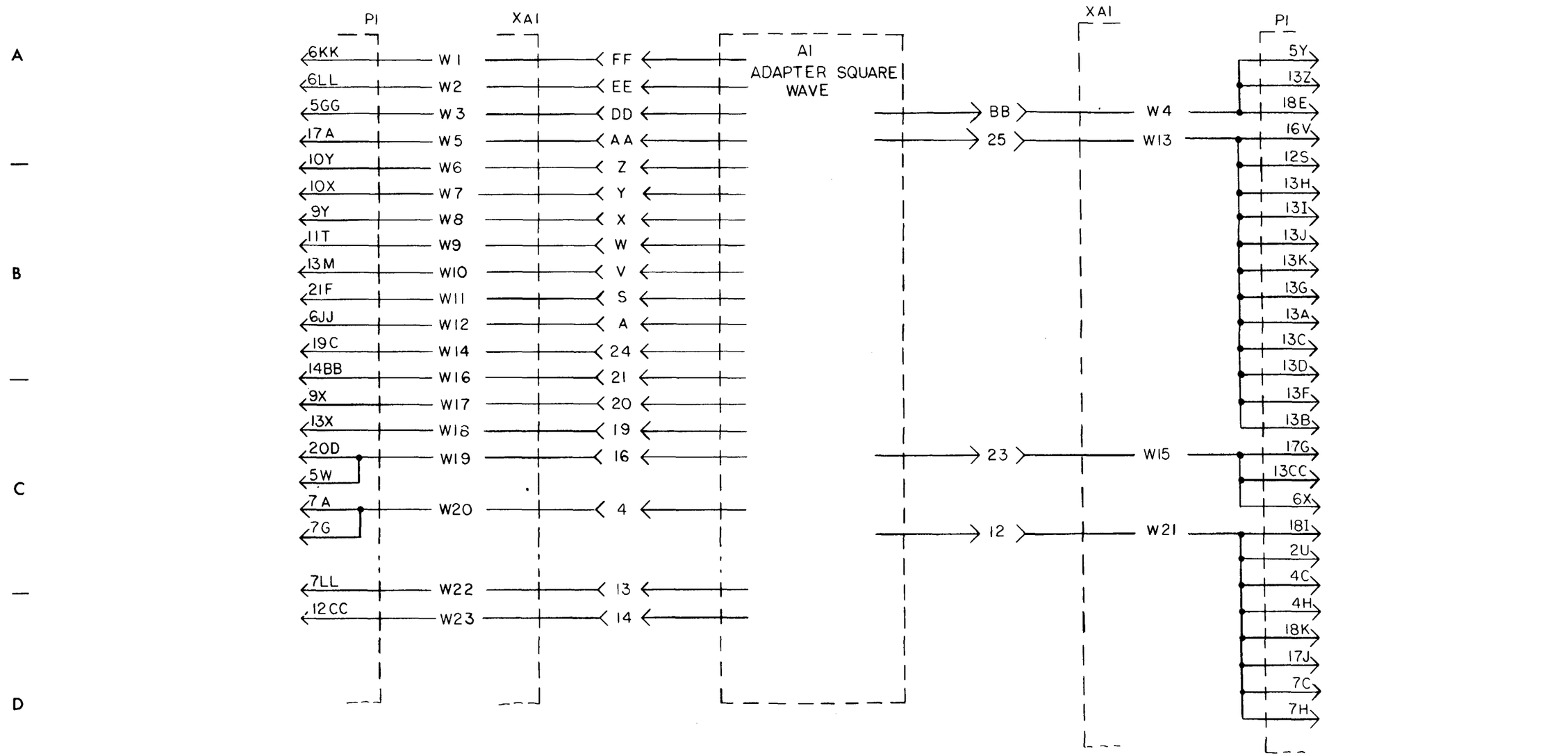


Figure 2-21. (sheet 2 of 4).

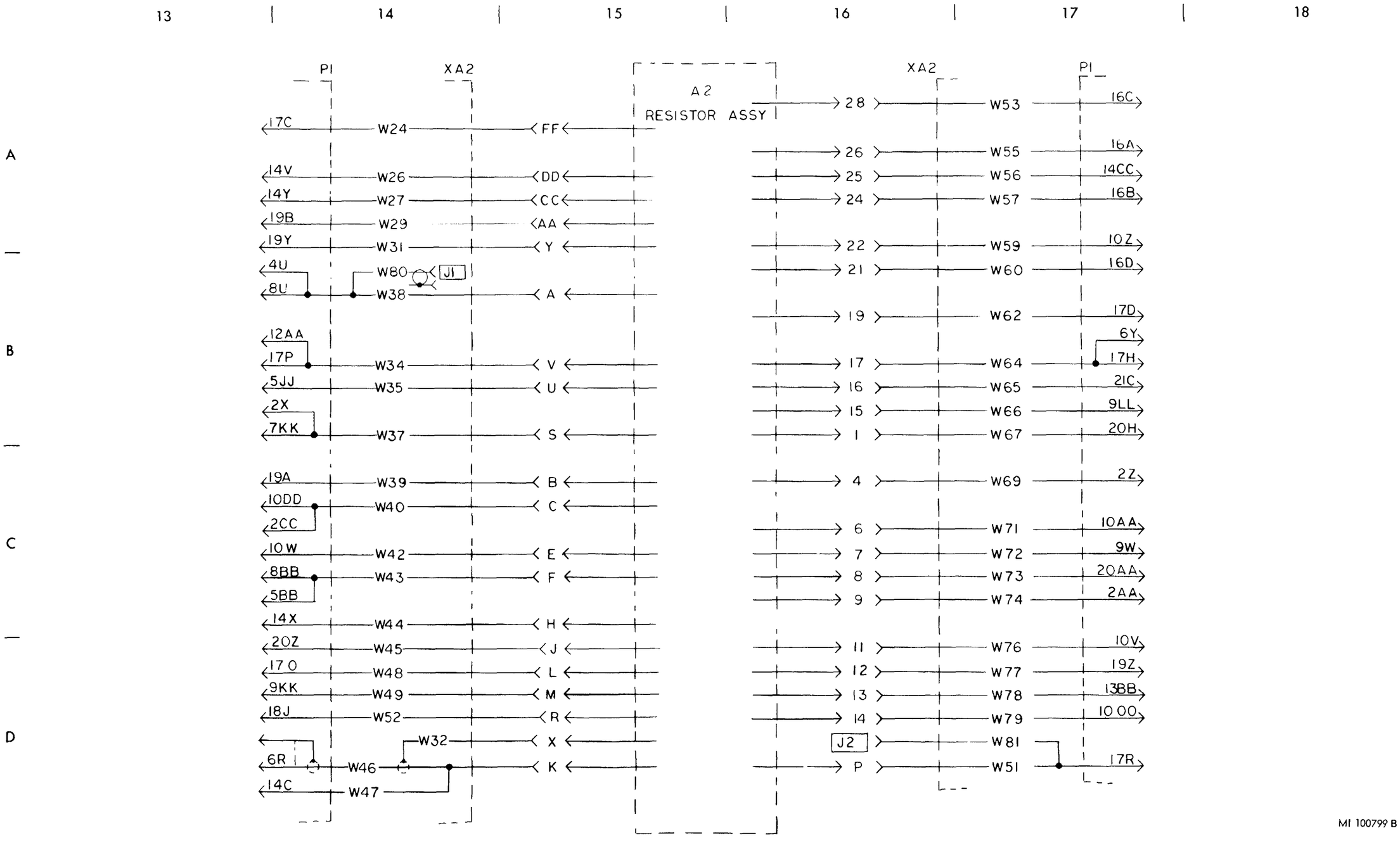
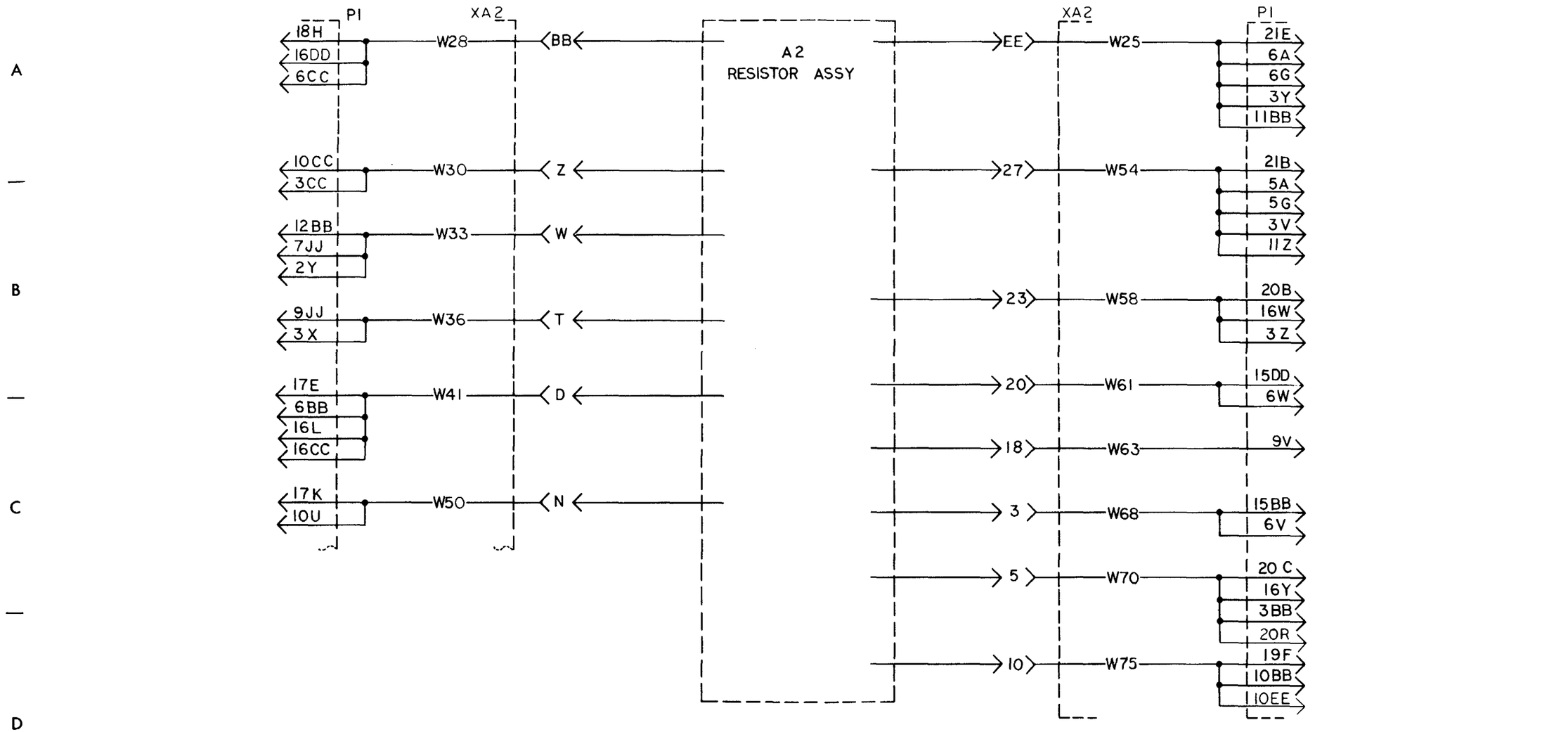
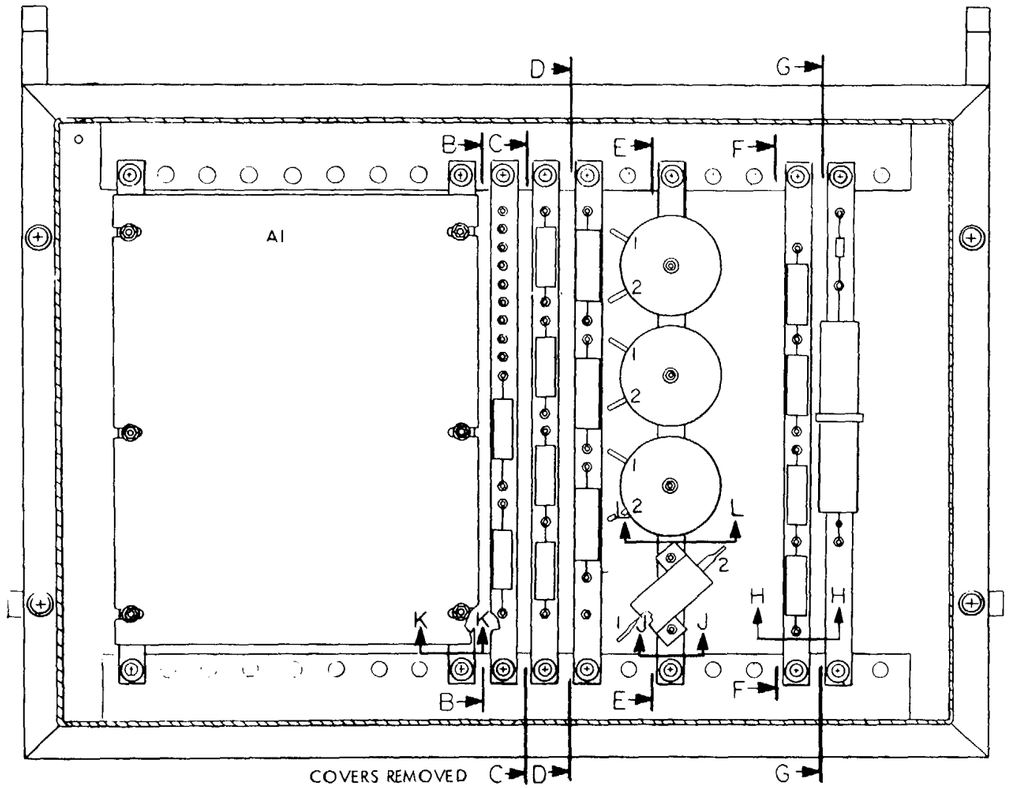


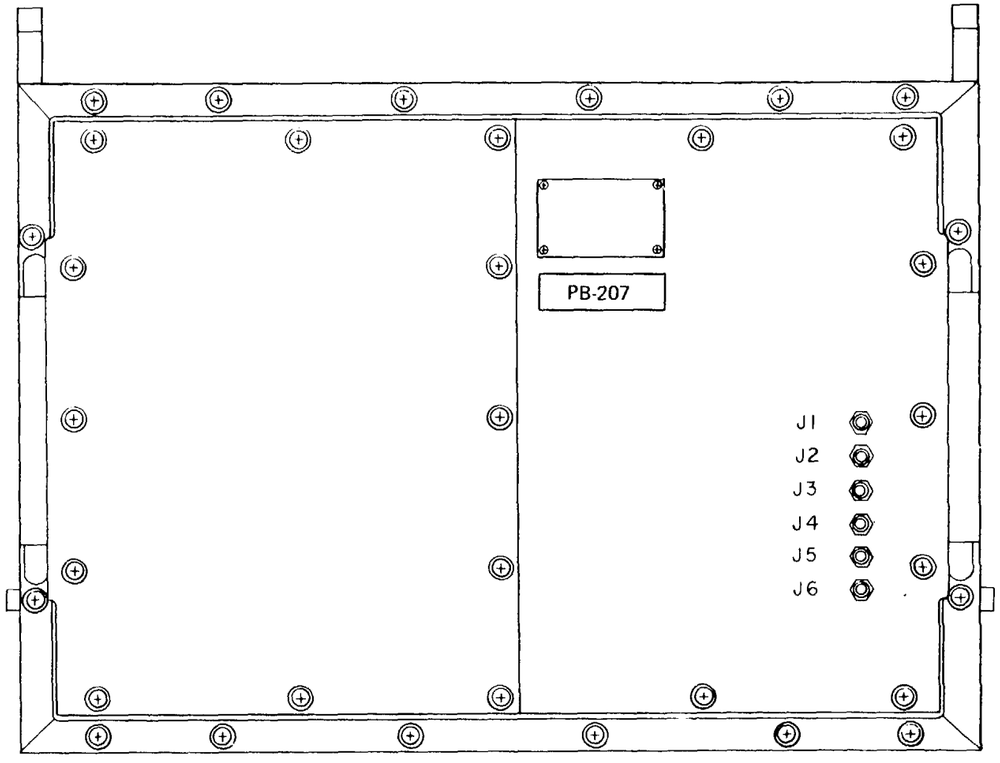
Figure 2-21. (sheet 3 of 4).

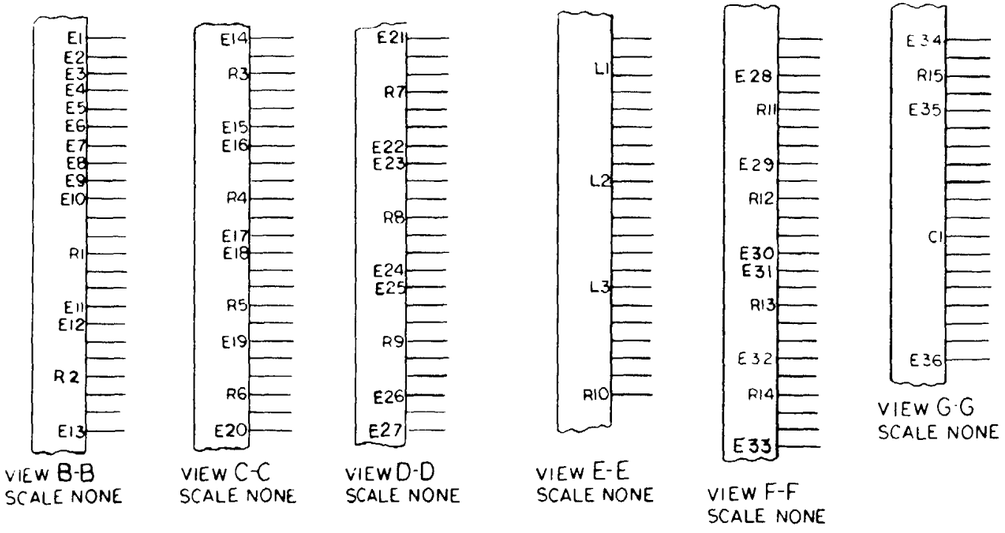


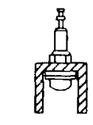
MI 100800 B

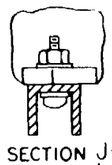
Figure 2-21. (sheet 4 of 4).

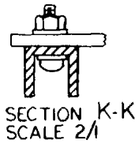


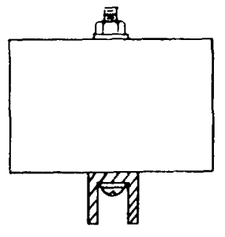






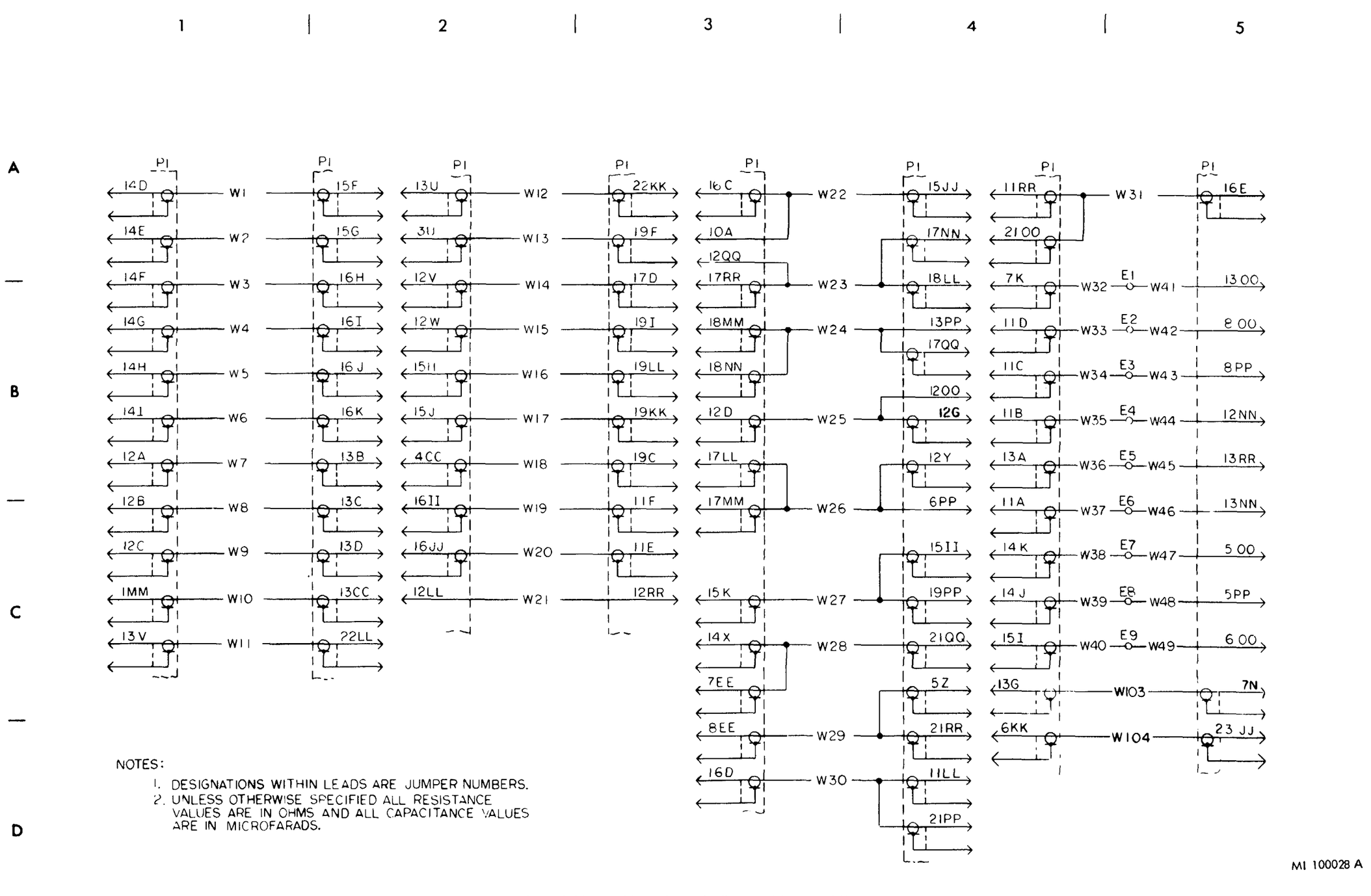






MI 99280 A

Figure 2-22. PB-207, parts location diagram.

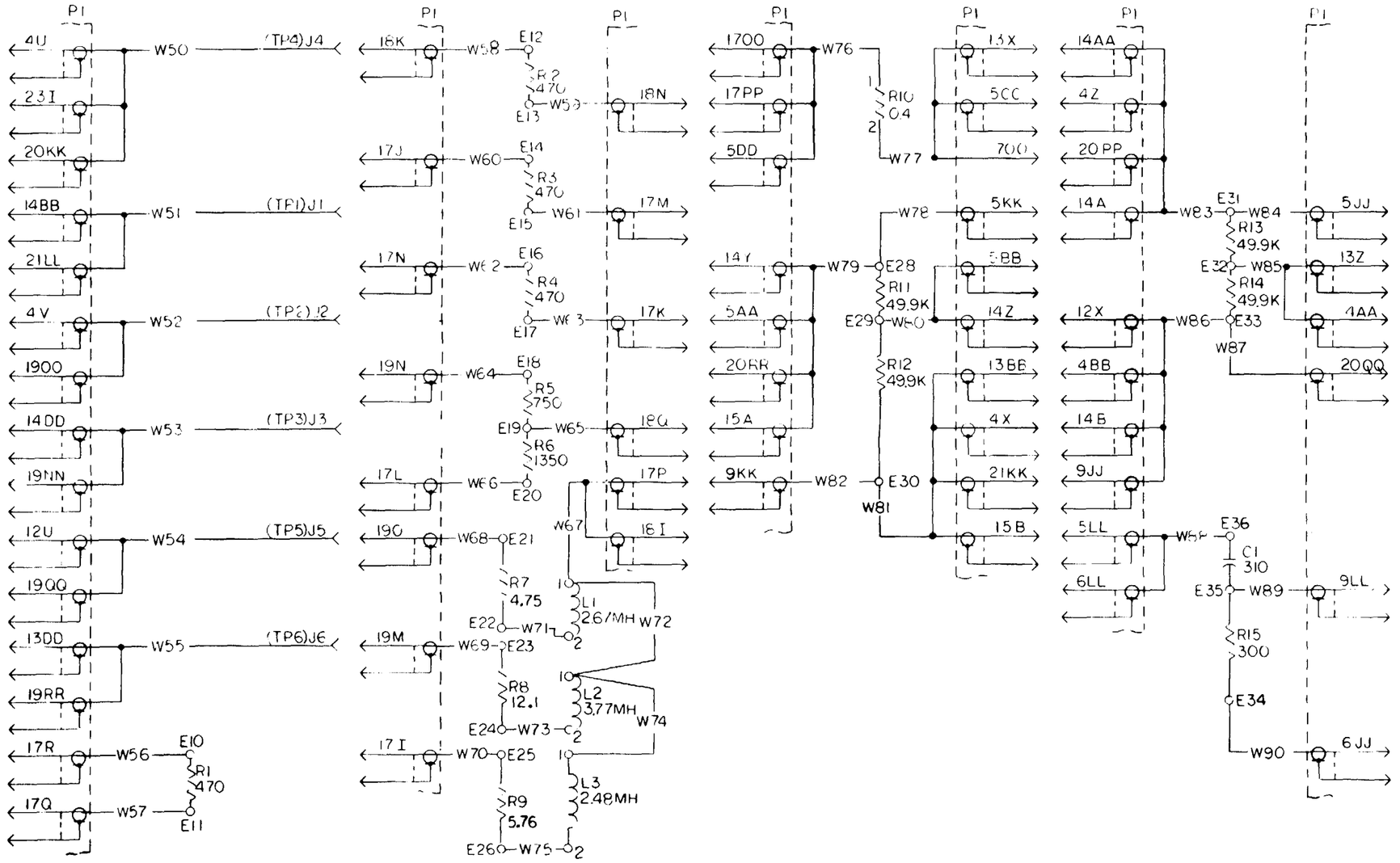


NOTES:

1. DESIGNATIONS WITHIN LEADS ARE JUMPER NUMBERS.
2. UNLESS OTHERWISE SPECIFIED ALL RESISTANCE VALUES ARE IN OHMS AND ALL CAPACITANCE VALUES ARE IN MICROFARADS.

MI 100028 A

Figure 2-23. PB-207, schematic diagram (sheet 1 of 3).



MI 100029 A

Figure 2-23. (sheet 2 of 3).

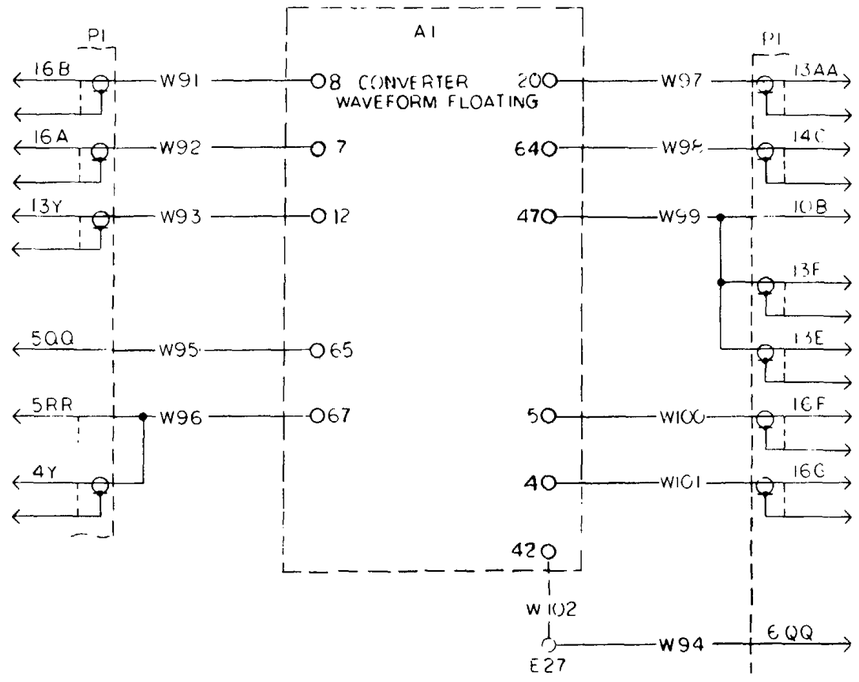
13 | 14 | 15 | 16 | 17 | 18

A

B

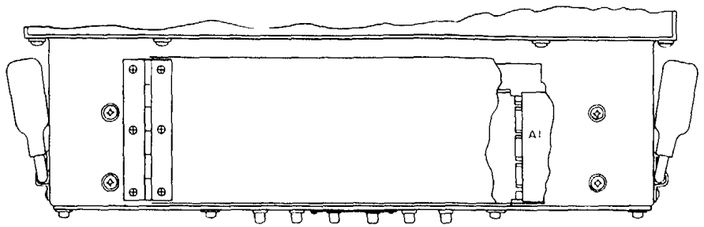
C

D

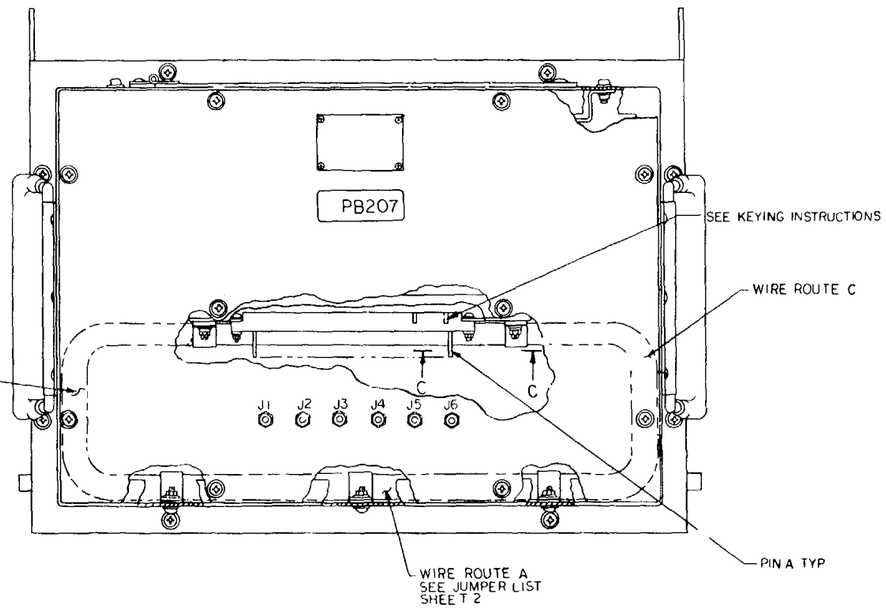


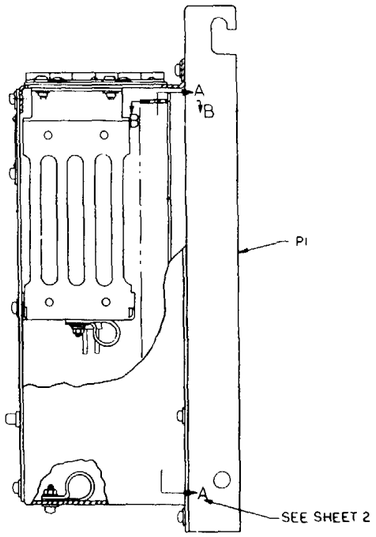
MI 100030 A

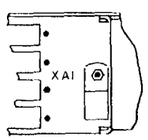
Figure 2-23. (sheet 3 of 3).



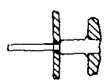
KEYING INSTRUCTIONS	
REF DES	KEY POSITION
XA1	D-E & K-L







VIEW C-C



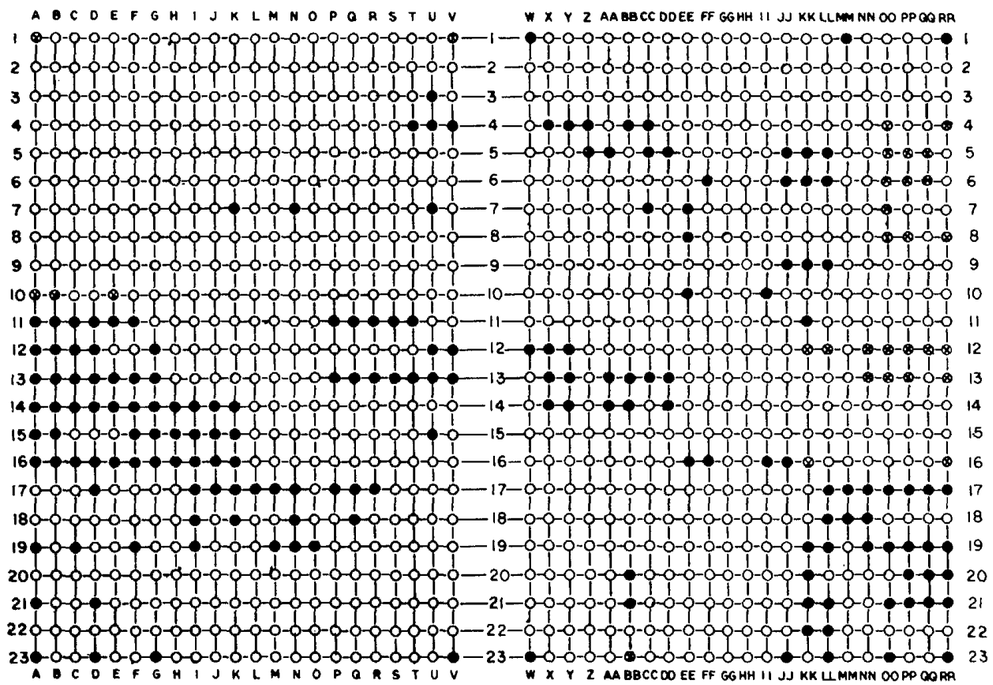
SECTION B-B
SCALE 2/1

MI 100801 B

Figure 2-24. PB-207, parts location diagram (sheet 1 of 2).

JUMPER LIST	
LEAD IDENT	WIRE ROUTE
W1	BA
W2	BA
W3	CA
W4	
W5	
W6	
W7	
W8	
W9	
W10	
W11	
W12	CA
W13	BA
W14	
W15	
W16	
W17	
W18	
W19	
W20	
W21	
W22	
W23	
W24	
W25	BA
W26	CA
W27	
W28	
W29	
W30	
W31	
W32	
W33	
W34	
W35	
W36	CA

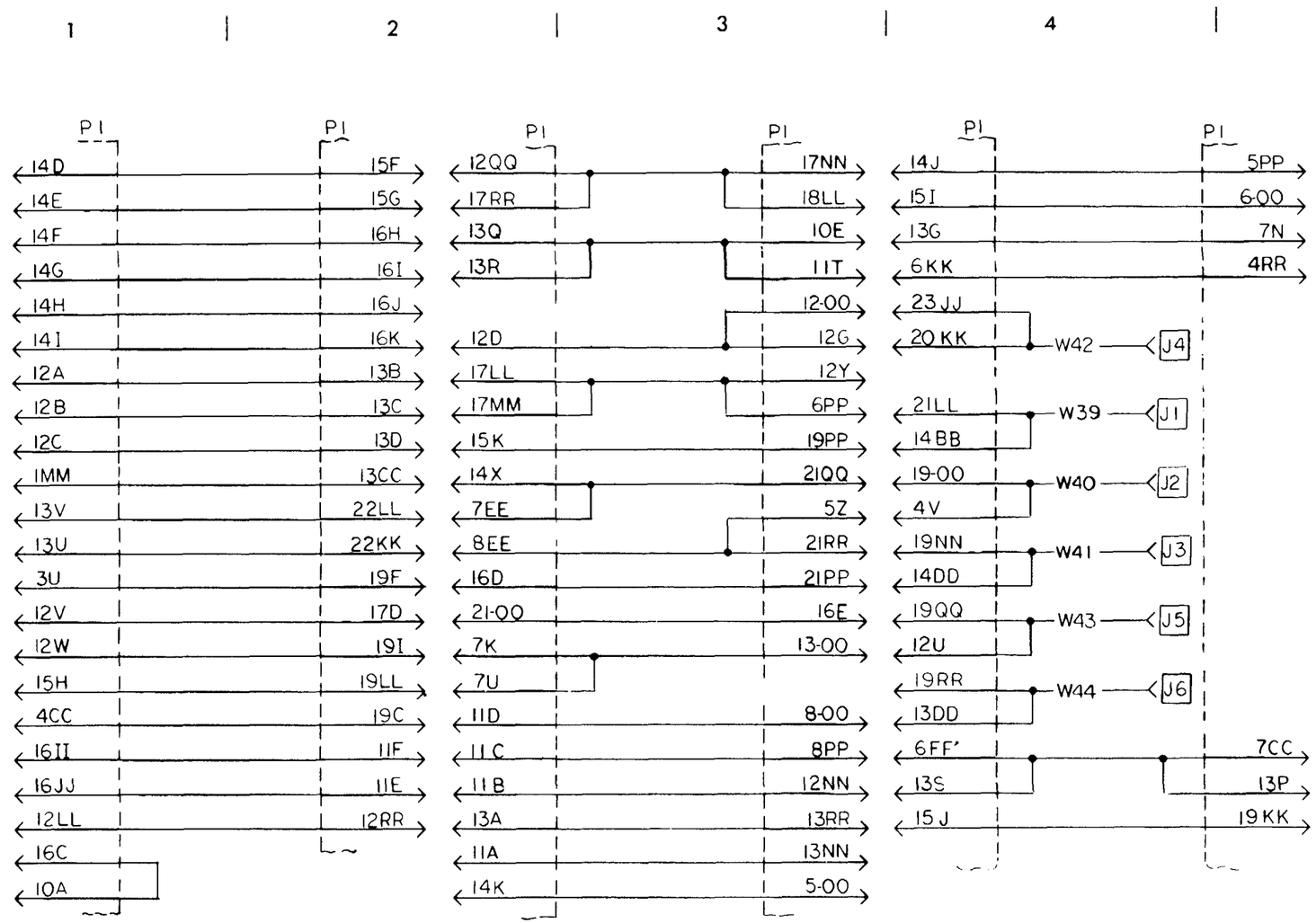
JUMPERLIST	
LEAD IDENT	WIRE ROUTE
W37	CA
W38	CA
W39	P
W40	
W41	
W42	
W43	
W44	P
W45	BA



VIEW A-A
SEE SHEET 1

MI 100802 A

Figure 2-24. (sheet 2 of 2).



MI 100803 B

Figure 2-25. PB-207, schematic diagram (sheet 1 of 2).

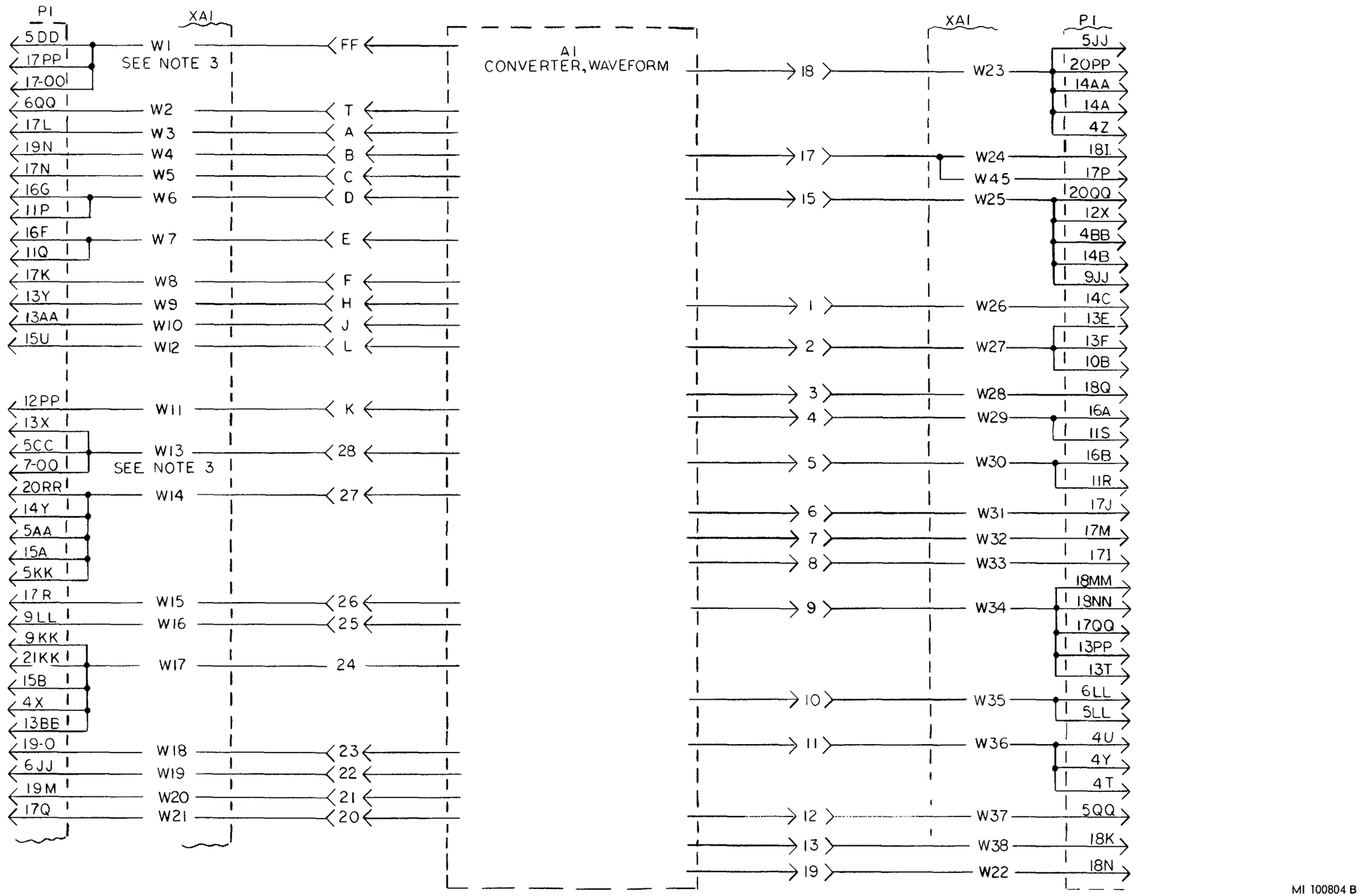


Figure 2-25. (sheet 2 of 2).

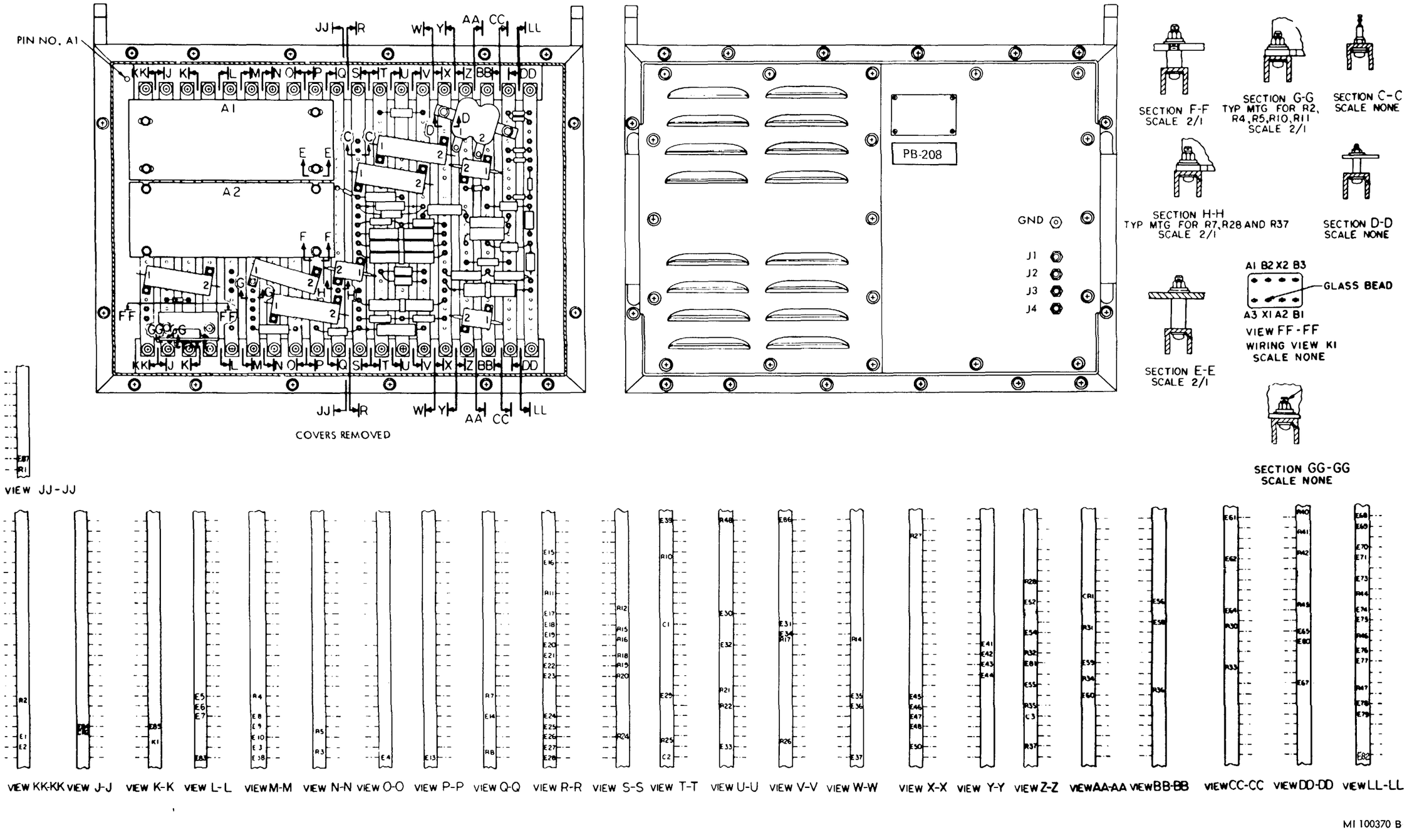
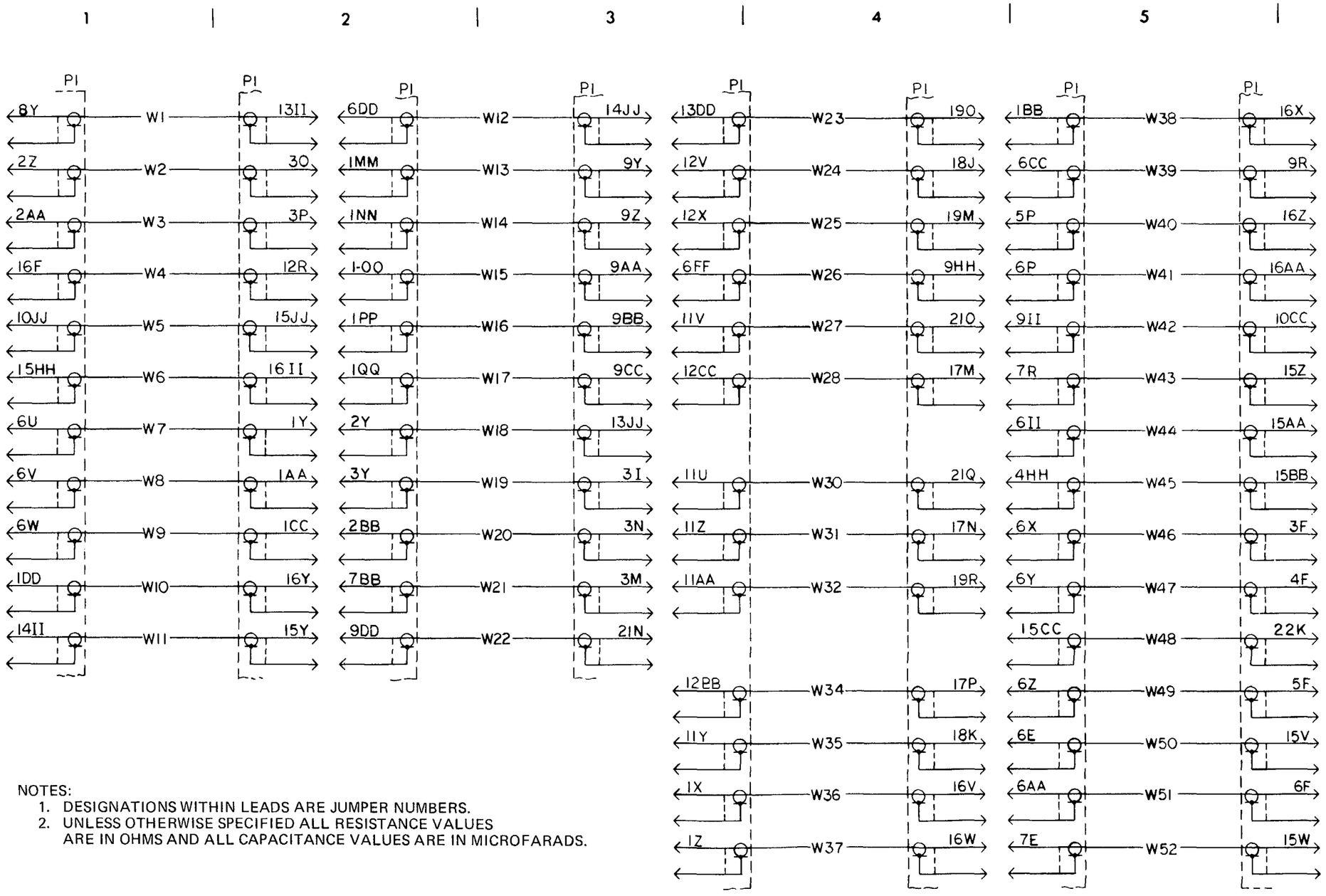


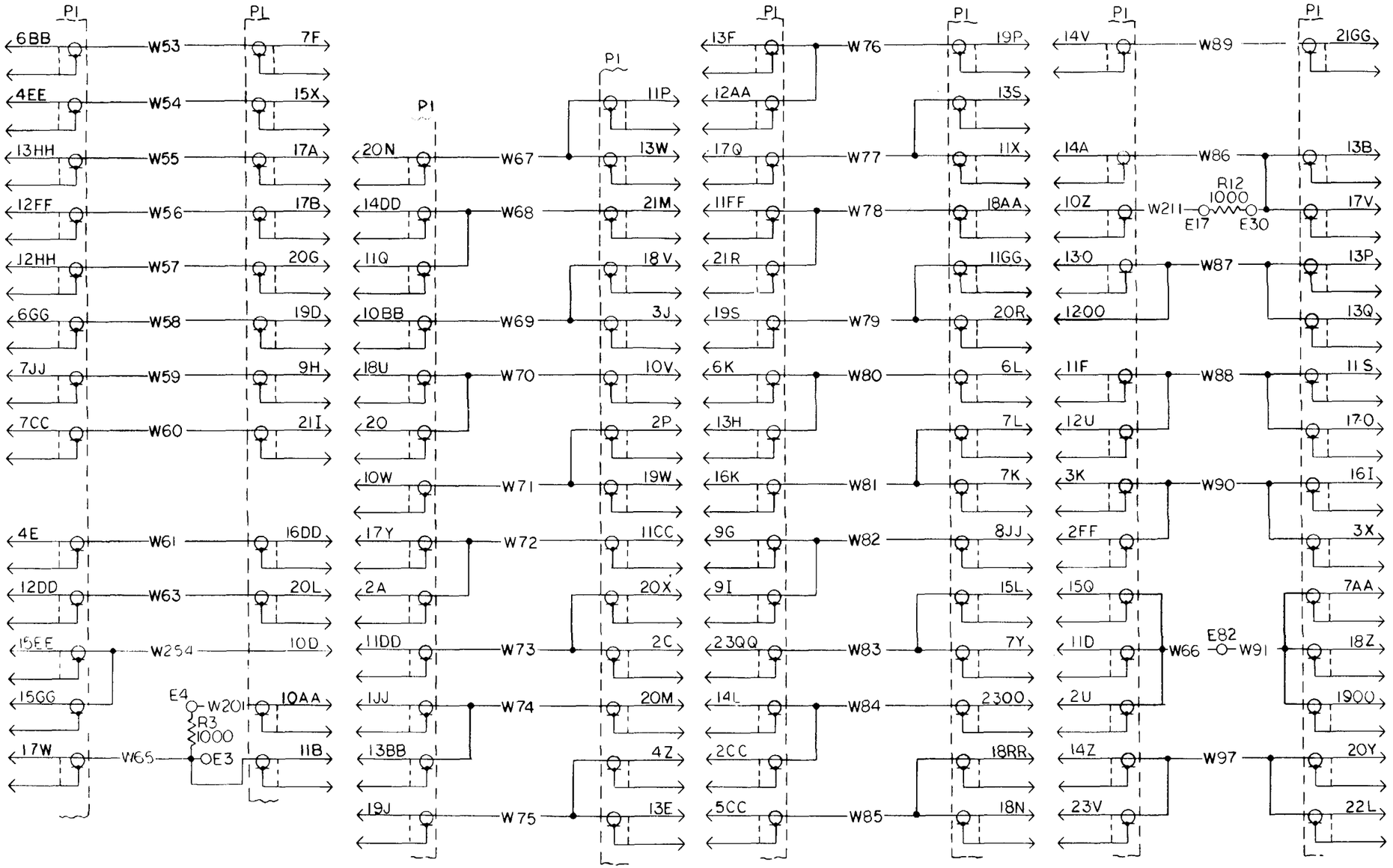
Figure 2-26. PB-208, parts location diagram.



NOTES:
1. DESIGNATIONS WITHIN LEADS ARE JUMPER NUMBERS.
2. UNLESS OTHERWISE SPECIFIED ALL RESISTANCE VALUES ARE IN OHMS AND ALL CAPACITANCE VALUES ARE IN MICROFARADS.

MI 100371B

Figure 2-27. PB-208, schematic diagram (sheet 1 of 7).



MI 100372 A

Figure 2-27. (sheet 2 of 7).

13 | 14 | 15 | 16 | 17 | 18

A

—

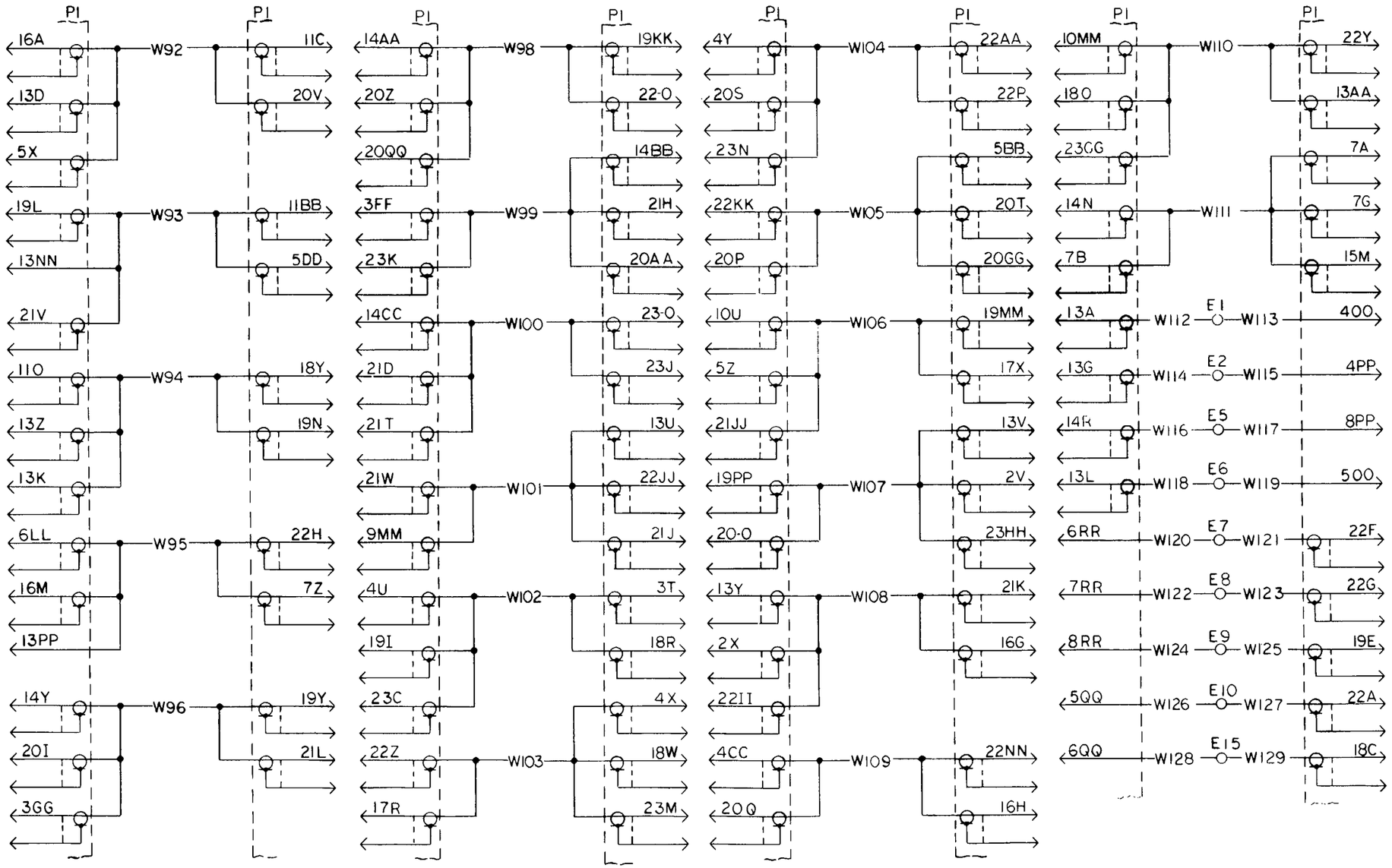
B

—

C

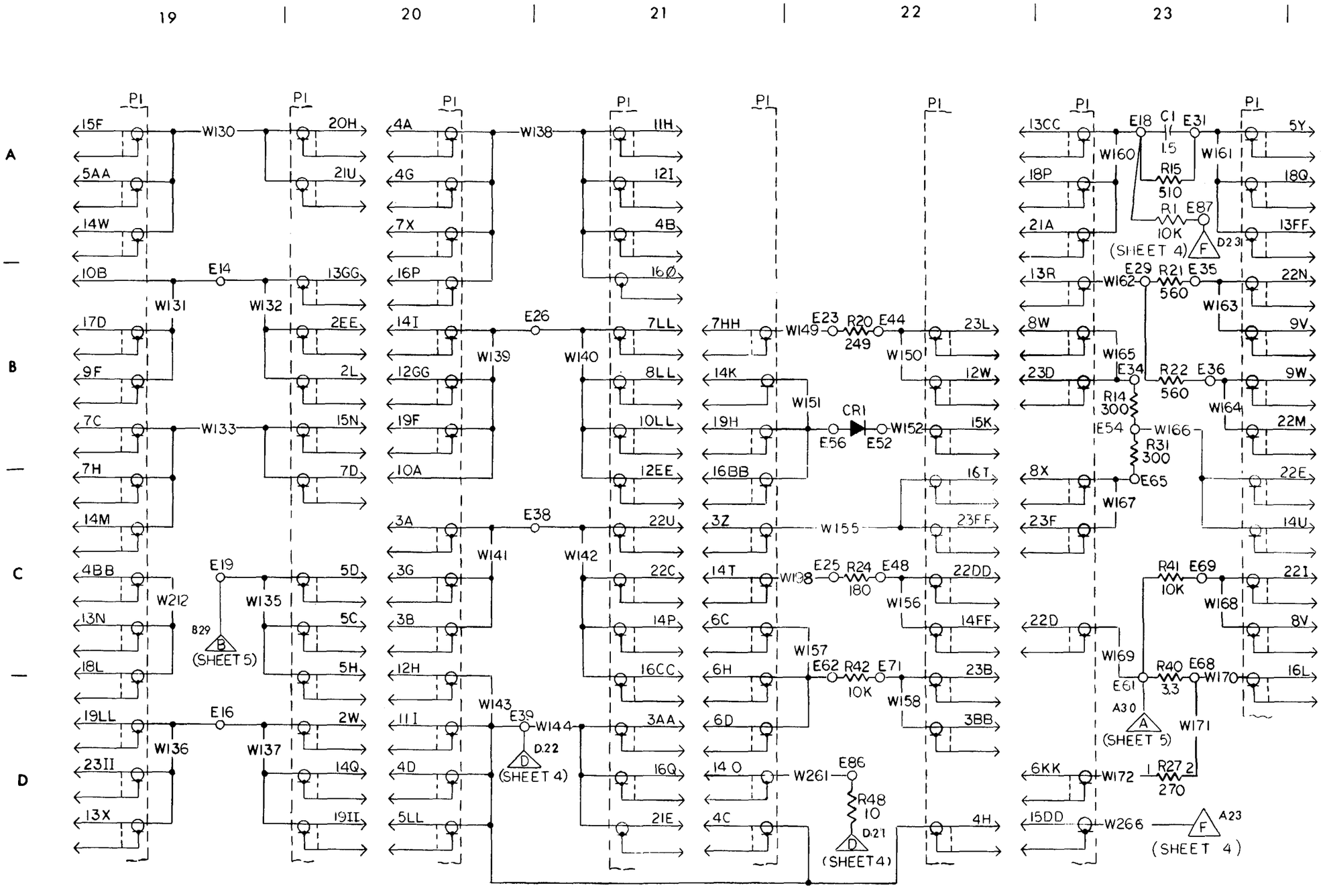
—

D



MI 100373 A

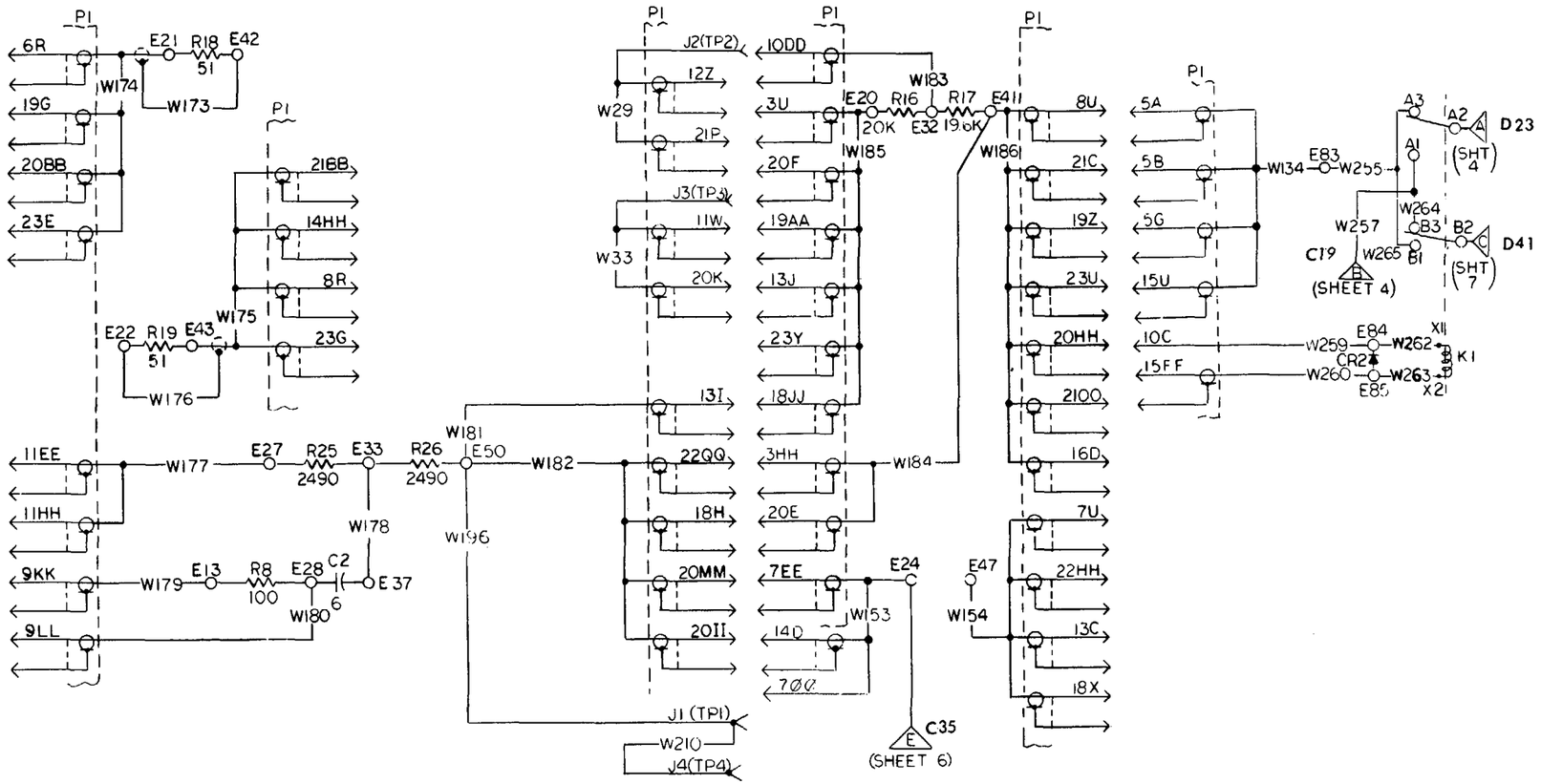
Figure 2-27. (sheet 3 of 7).



MI 100374-A

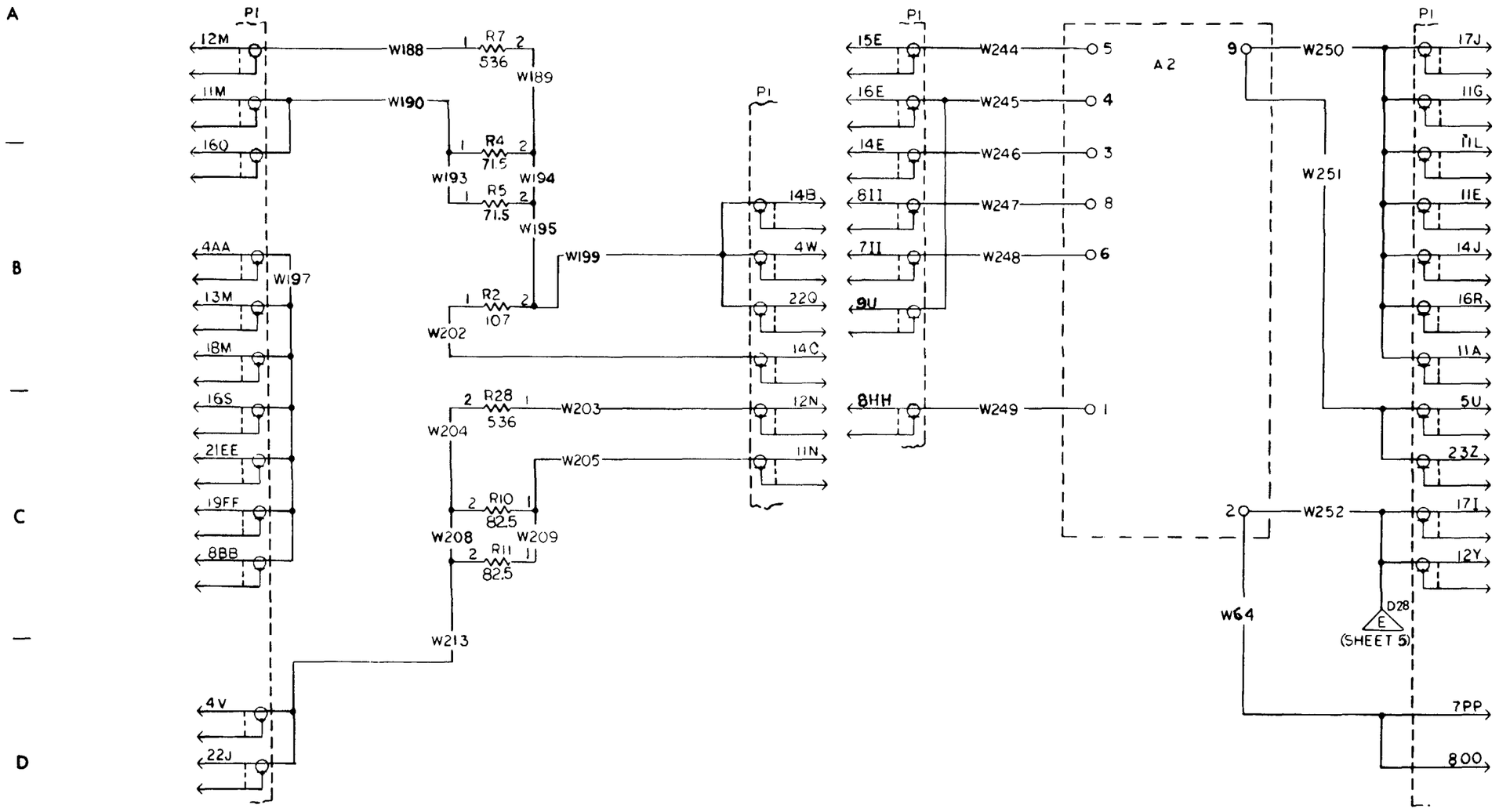
Figure 2-27. (sheet 4 of 7).

25 | 26 | 27 | 28 | 29 | 30



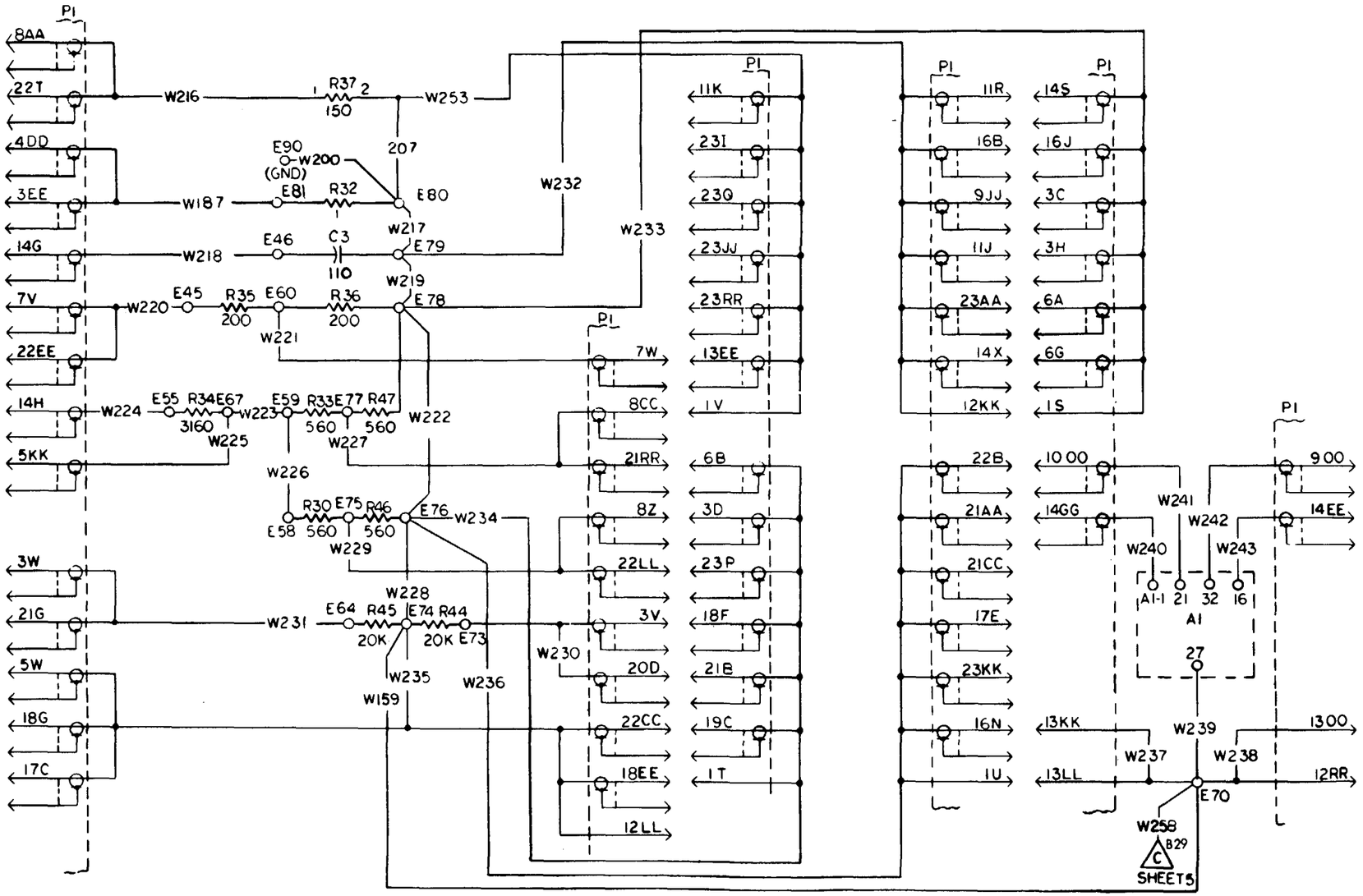
MI 100375A

Figure 2-27. (sheet 5 of 7).



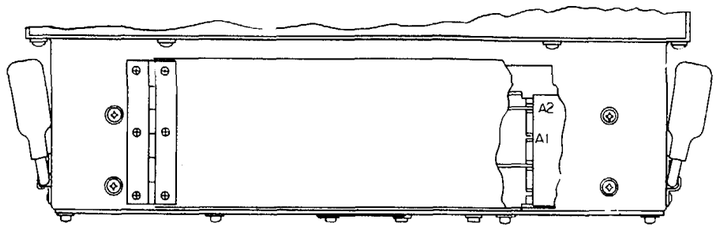
MI 100376 A

Figure 2-27. (sheet 6 of 7).

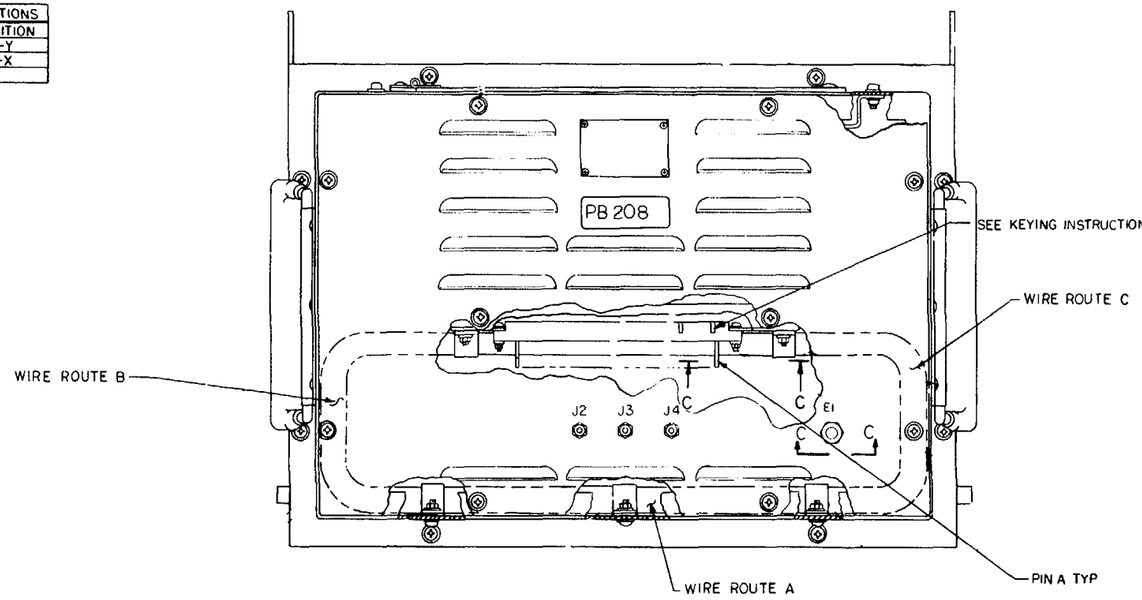


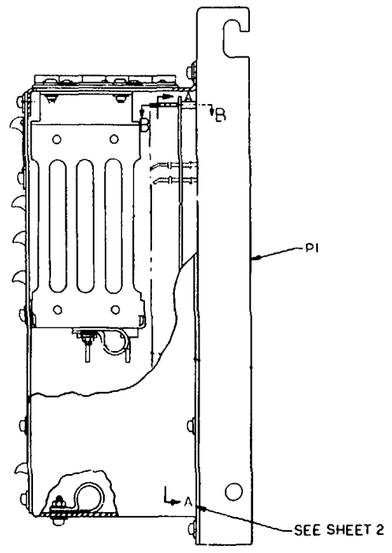
MI 100377.A

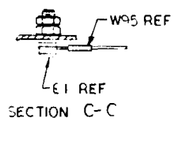
Figure 2-27. (sheet 7 of 7).

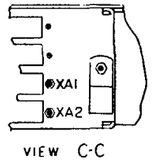


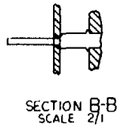
KEYING INSTRUCTIONS	
REF DES	KEY POSITION
A1	T-U, X-Y
A2	T-U, W-X











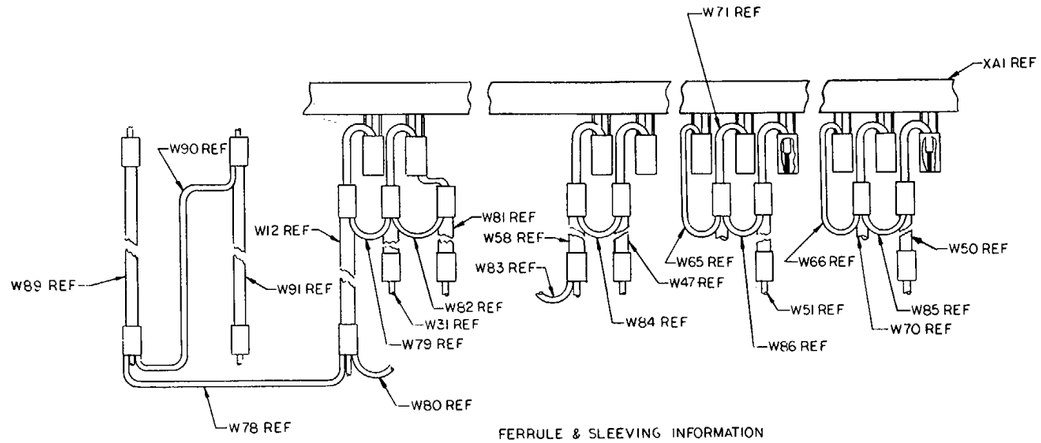
MI 100805 B

Figure 2-28. PB-208, parts location diagram (sheet 1 of 2)

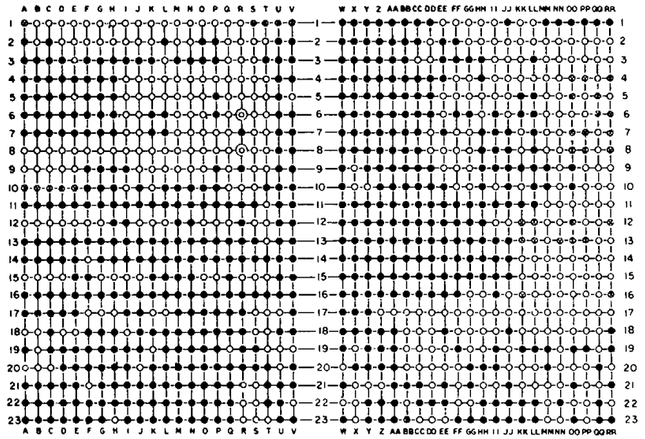
JUMPERLIST	
LEAD IDENT	WIRE ROUTE
W1	B A
W2	↑
W3	
W4	
W5	
W6	
W7	
W8	
W9	↓
W10	B A
W11	C A
W12	C A
W13	C A
W14	B A
W15	↑
W16	
W17	
W18	
W19	
W20	
W21	
W22	
W23	
W24	
W25	↓
W26	B A
W27	C A
W28	↑
W29	
W30	
W31	
W32	
W33	
W34	
W35	C A

JUMPERLIST	
LEAD IDENT	WIRE ROUTE
W36	C A
W37	C A
W38	C A
W39	C A
W40	B A
W41	↑
W42	
W43	
W44	
W45	
W46	
W47	↓
W48	B A
W49	C A
W50	C A
W51	C A
W52	B A
W53	↑
W54	
W55	
W56	
W57	
W58	
W59	
W60	
W61	
W62	
W63	↓
W64	B A
W65	P
W66	P
W67	C A
W68	↑
W69	
W70	C A

JUMPERLIST	
LEAD IDENT	WIRE ROUTE
W71	C A
W72	↑
W73	
W74	
W75	
W76	↓
W77	C A
W78	P
W79	P
W80	P
W81	A
W82	P
W83	↑
W84	
W85	↓
W86	P
W87	A
W88	A
W89	P
W90	↑
W91	
W92	
W93	↓
W94	P
W95	A



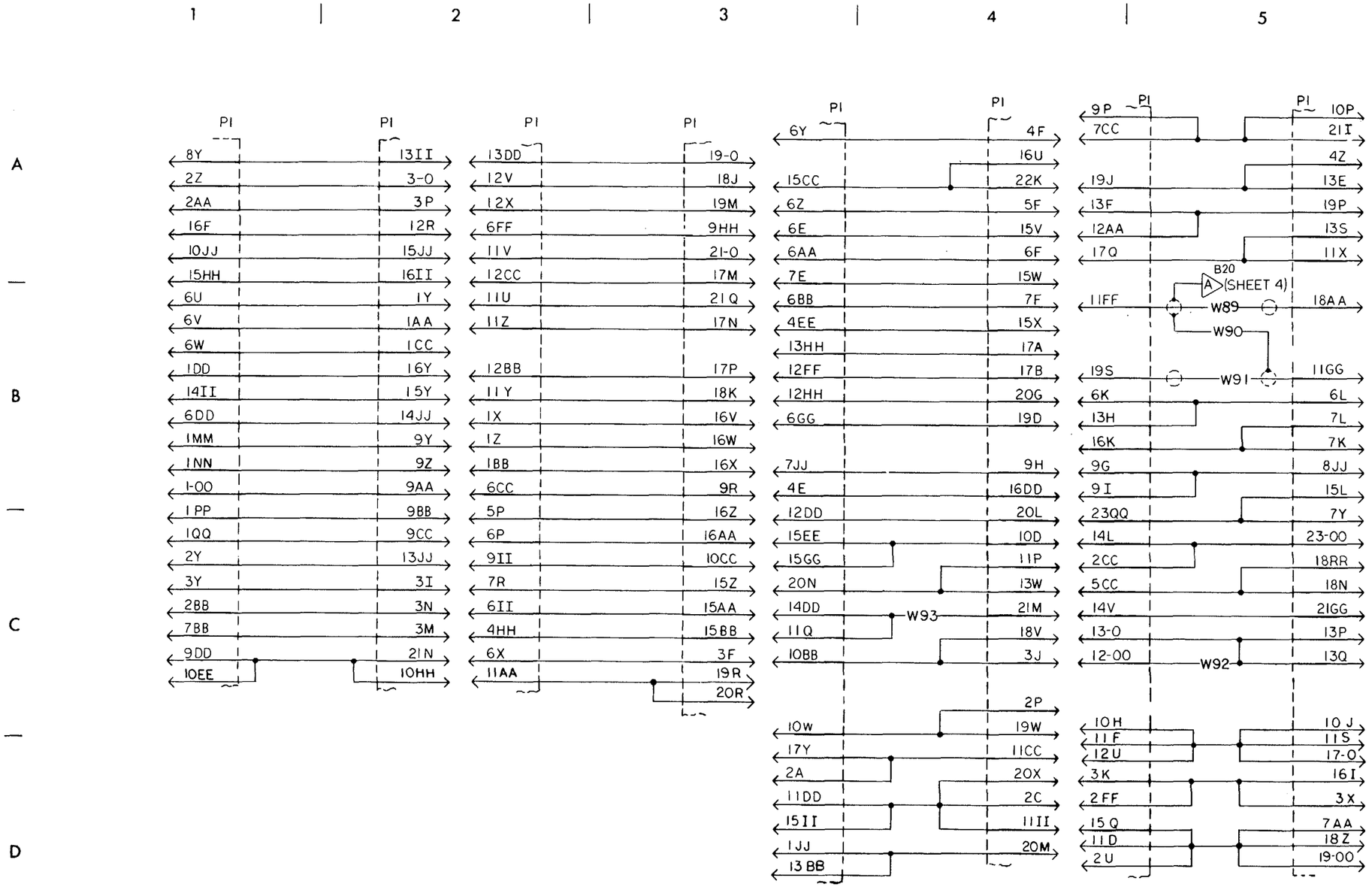
FERRULE & SLEEVING INFORMATION



VIEW A-A
SEE SHEET 1

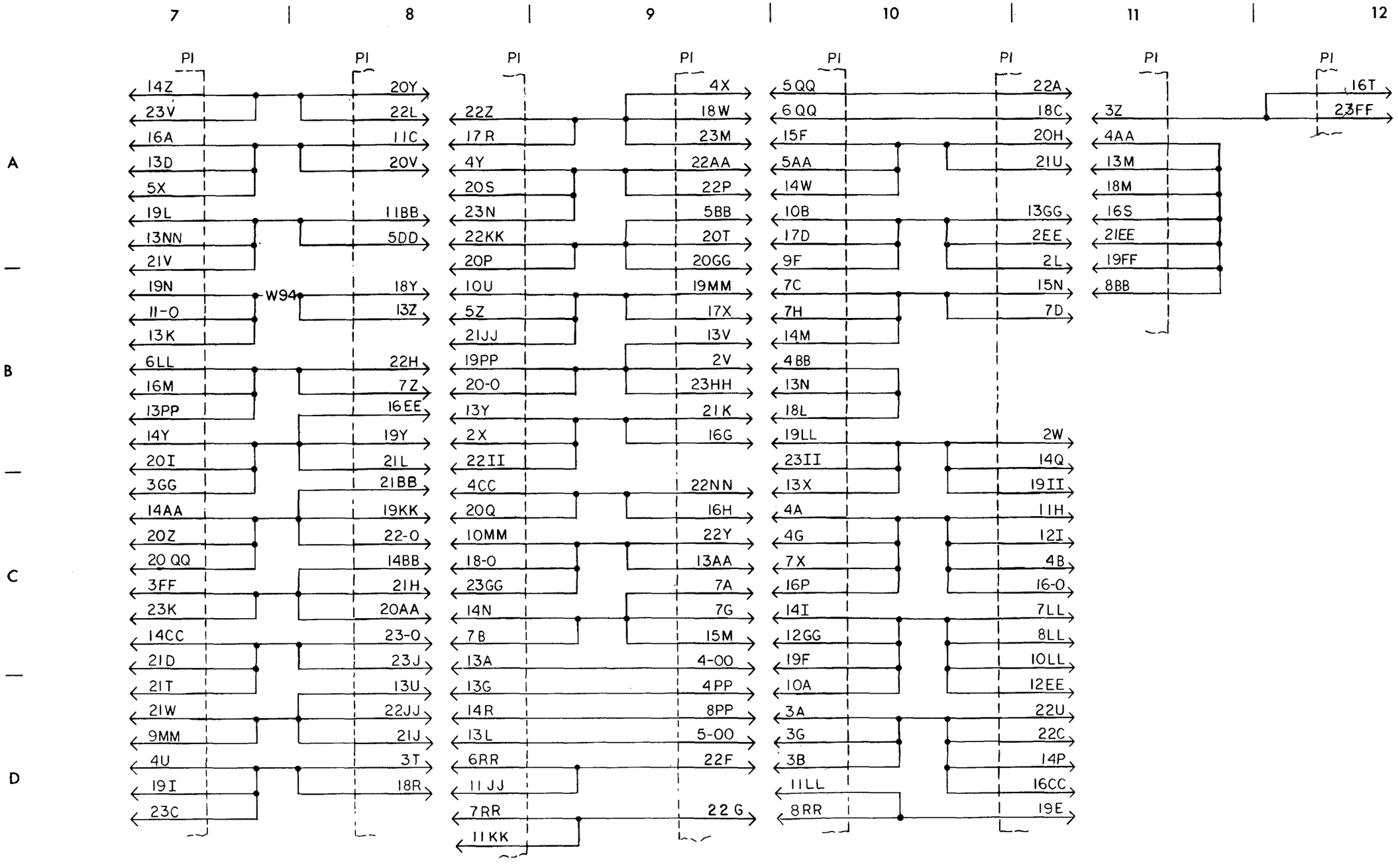
MI 100806 B

Figure 2-28. (sheet 2 of 2).



MI 100812C

Figure 2-29. PB-208, schematic diagram (sheet 1 of 5).



MI 100813A

Figure 2-29. (sheet 2 of 5).

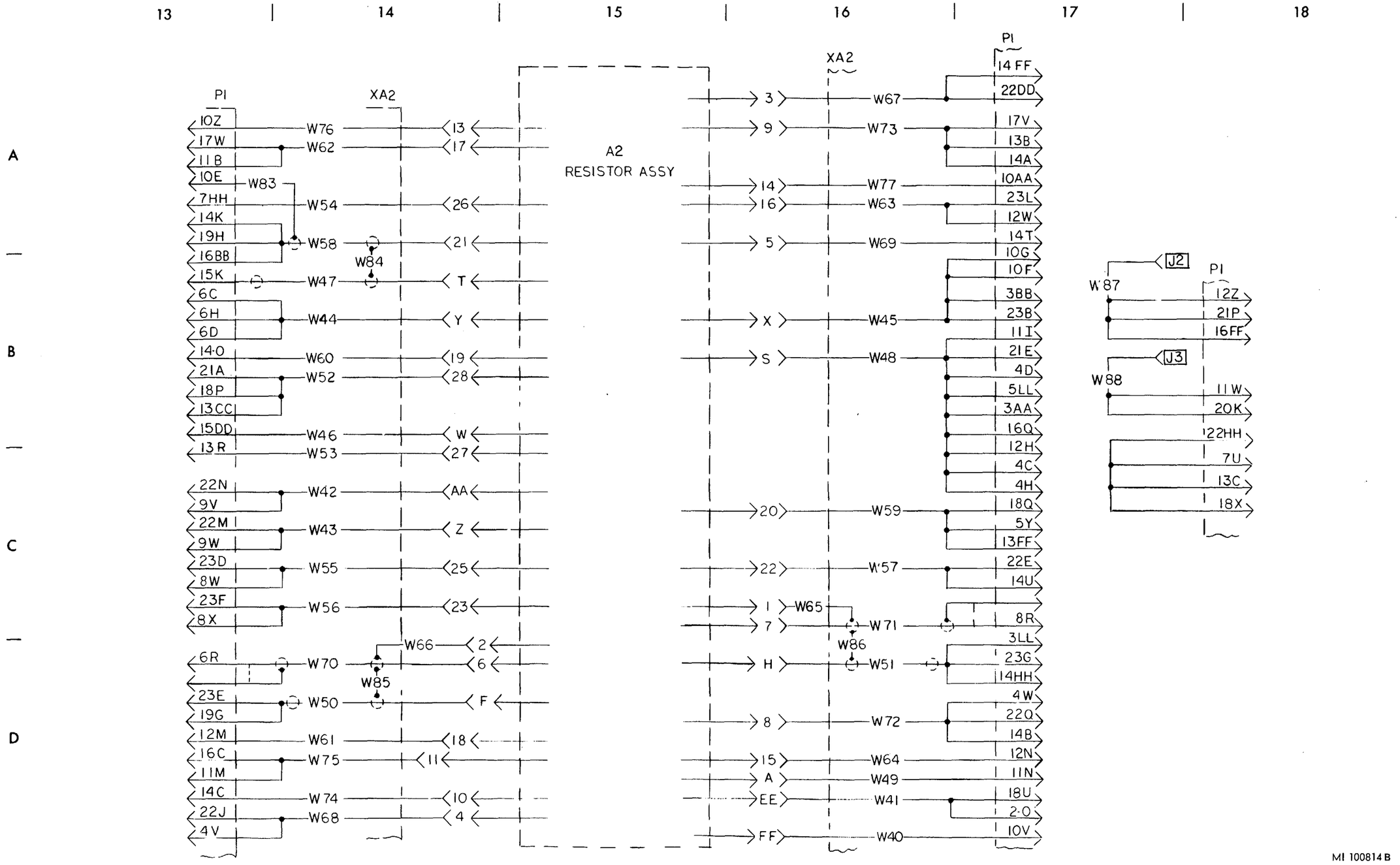


Figure 2-29. (sheet 3 of 5).

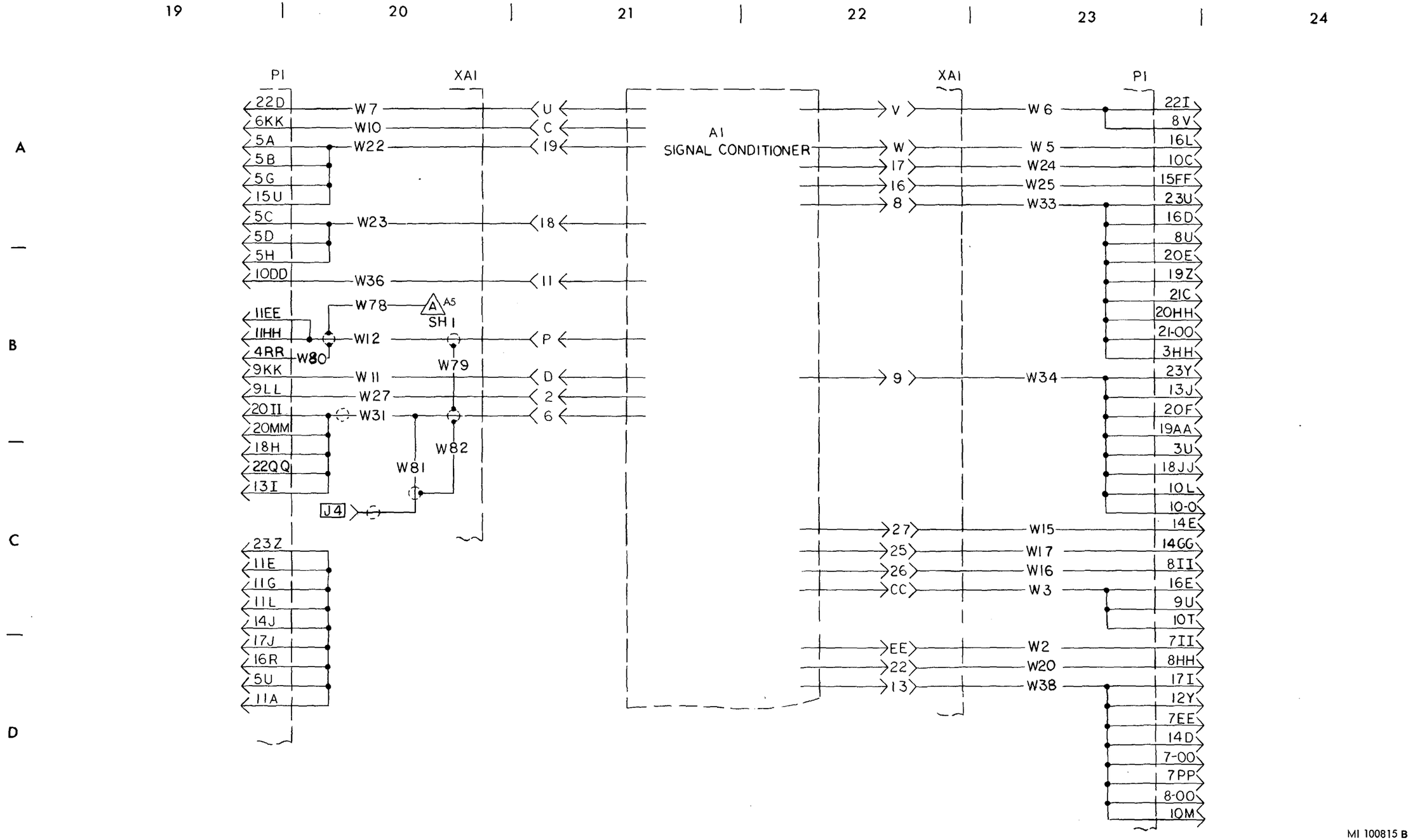
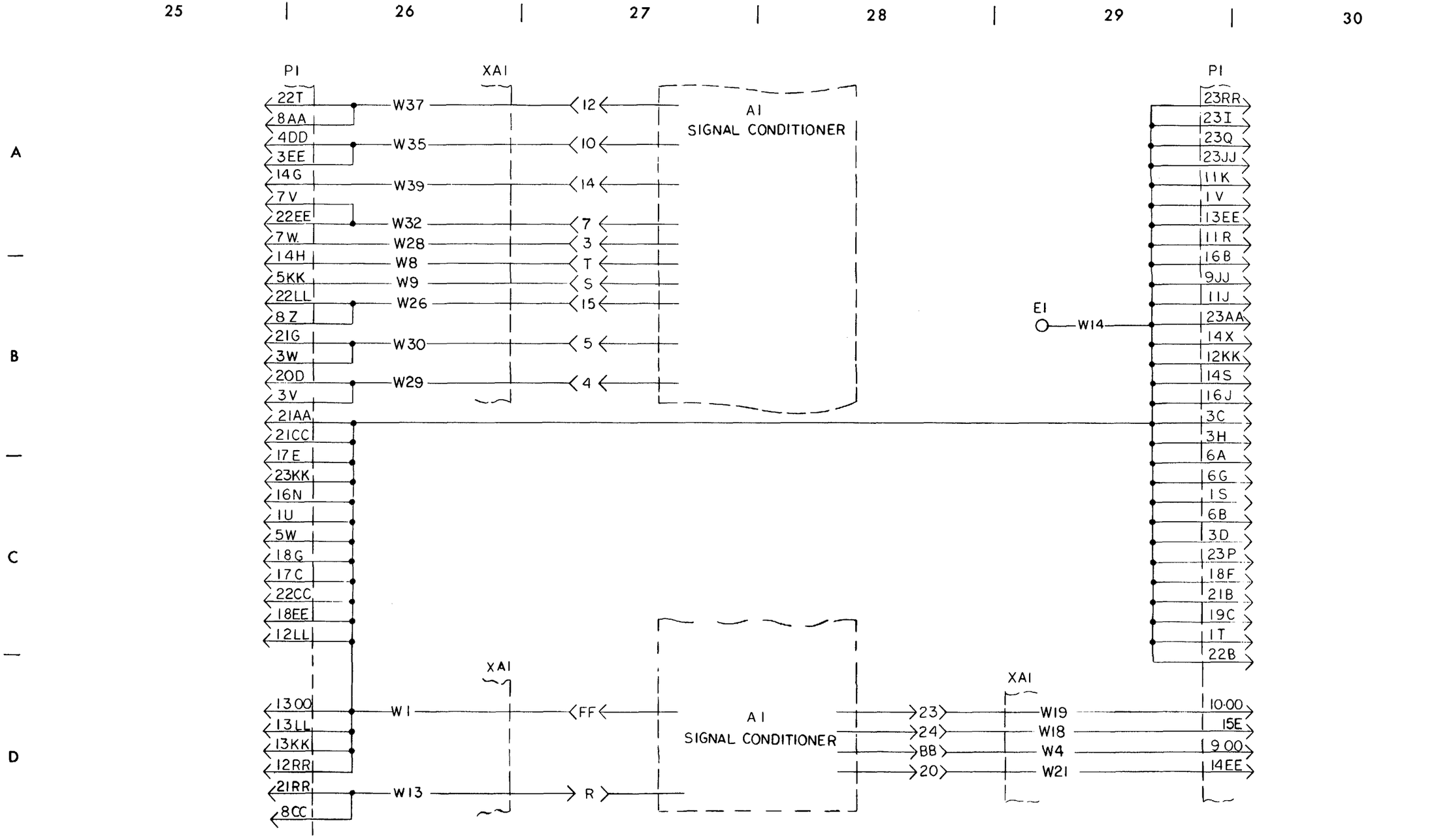


Figure 2-29. (sheet 4 of 5).



MI 100816 B

Figure 2-29. (sheet 5 of 5).

Section II. REPAIR PROCEDURES FOR PATCHBOARDS (PRINTED CIRCUIT BOARD TYPE)

2-4. General - Printed Circuit Board Type Patchboards

a. This section provides repair information for the printed circuit board type patchboards within the scope of DS and GS maintenance personnel. Figure 2-30 shows the three different types of contact used on the patchboards. Type A is used on both the printed circuit board and electrical lead type patchboards. Types B and C are used only on the printed circuit board type patchboard. Figures 2-31 through 2-41 illustrate the disassembly and assembly of the printed circuit board type patchboards and special tools required.

b. Paragraphs 2-5 through 2-8 contain only those procedures peculiar to a printed circuit board type patchboard or not obvious to a trained technician. Since the remaining patchboards are similar in configuration, these repair paragraphs will apply to the remaining patchboards. Paragraph 2-8 contains procedures for unusual conditions for the remaining printed circuit board type patchboards.

c. TM 9-4935-557-34P contains a list of repair parts and special tools authorized for maintenance personnel.

2-5. Patchboard Contact Removal and Installation Procedure

a. Removal

(1) Remove mounting hardware (2 and 3, fig. 2-31) and pull panel (1) away from cover (14) to gain access to J1 through J7 and S1.
(2) Remove mounting hardware (2, 4, and 12) and J1 (11).
(3) Remove the supplied mounting hardware and S1 (13).
(4) Disconnect and tag the leads to J2 through J7.

NOTE
If it is required to move holder (21) to gain access to a patchboard contact located beneath the holder, perform step (5) otherwise proceed to step (6)

(5) Remove mounting hardware (2 and 3) and pull holder (21) away from printed circuit board (16), until access can be made to the patchboard contact to be removed.
(6) Disconnect the leads to the patchboard contact, with unwrapping tool, 5120-131-3233.
(7) With desoldering kit 3439-907-5806, remove the solder from soldered area (1, fig. 2-32) round patchboard contact (3).
(8) With a pair of needle-nose pliers, pull the patchboard contact out of electrical contact (5) and remove the patchboard contact.

b. Installation.

NOTE
Before installing patchboard contact (2, fig. 2-33), be sure that the hole in printed circuit board (5) is free of solder.

(1) Install the patchboard contact from the mating side of P1 (4, fig. 2-33) trough electrical contact (3) with installation tool, 5120-159-9934 (1). Be sure that the patchboard contact is bottomed in the electrical contact and the wire wrapping pin is through the printed circuit board.
(2) Solder the wire wrapping pin area of the patchboard contact to the printed circuit board.
(3) Wrap the leads, removed in step a (6) above, around the wire wrapping pin with wire wrapping tool, 5120-859-3730.

NOTE
If holder (21, fig. 2-31) was moved perform step (4), otherwise proceed to step (5).

(4) Install holder (21, fig. 2-31) with mounting hardware (2 and 3) on cover (14).
(5) Connect the leads to J2 through J7.
(6) Install S1 (13) with the supplied mounting hardware on panel (1).
(7) Install J1 (11) with mounting hardware (2, 4, and 12) on panel (1).
(8) Install panel (1) with mounting hardware (2 and 3) on the cover.

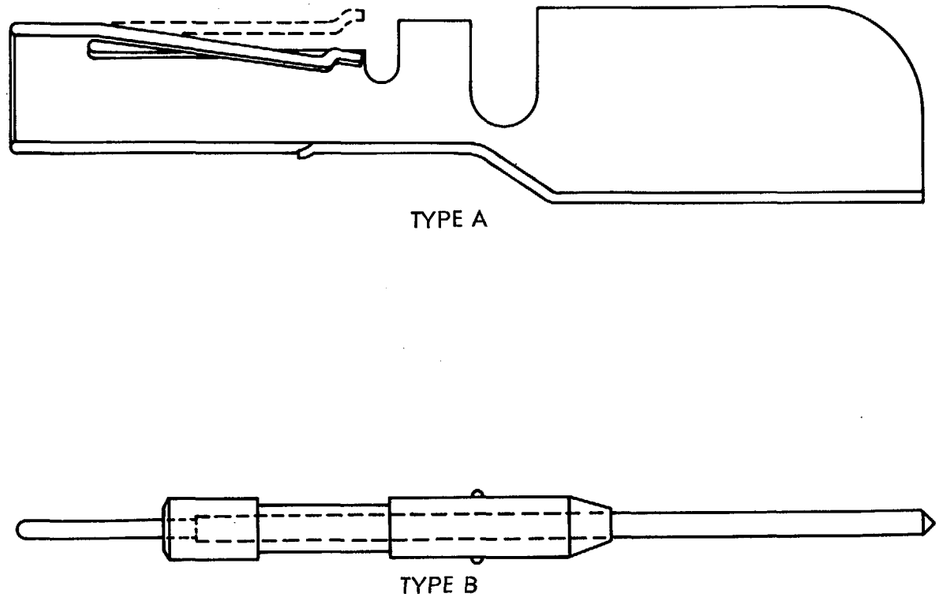
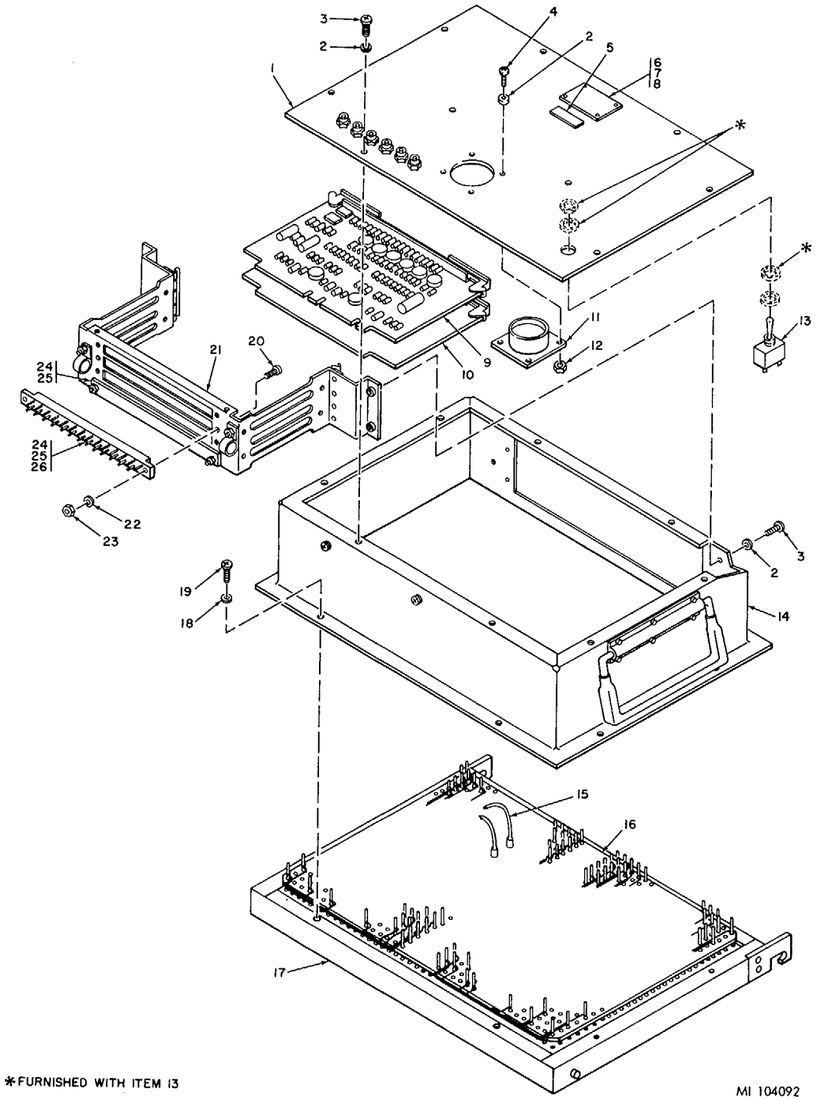


Figure 2-30. Types of patchboard contacts used in LCSS.

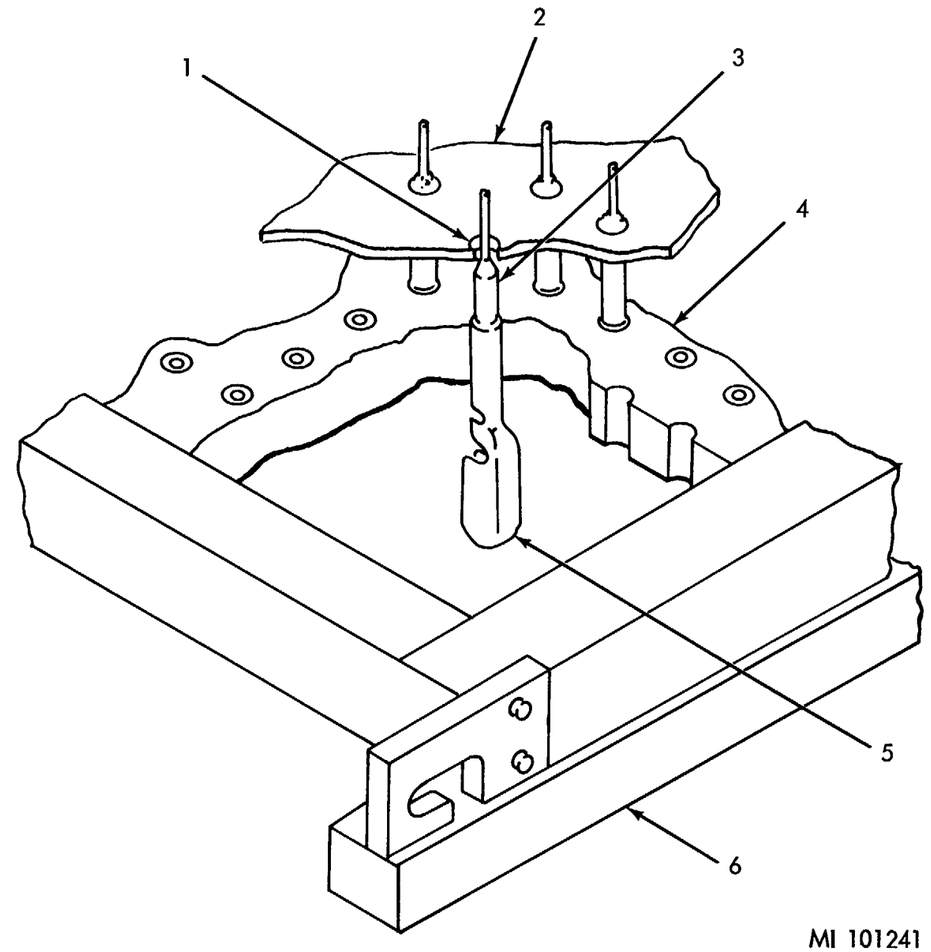


*FURNISHED WITH ITEM 13

MI 104092

1 – Connector panel
2 – Washer
3 – Screw
4 – Screw
5 – Identification plate
6 – Identification plate
7 – Screw
8 – Nut
9 – A1 (Depot repair)
10 – A2 (Depot repair)
11 – J1
12 – Nut
13 – S1
14 – Cover (Depot repair)
15 – Patchcord
16 – Printed circuitboard (Depot only)
17 – P1 (Depot only)
18 – Washer
19 – Screw
20 – Screw
21 – Holder (Depot repair)
22 – Washer
23 – Nut
24 – XA1, XA2
25 – Key
26 – Solder ferrule

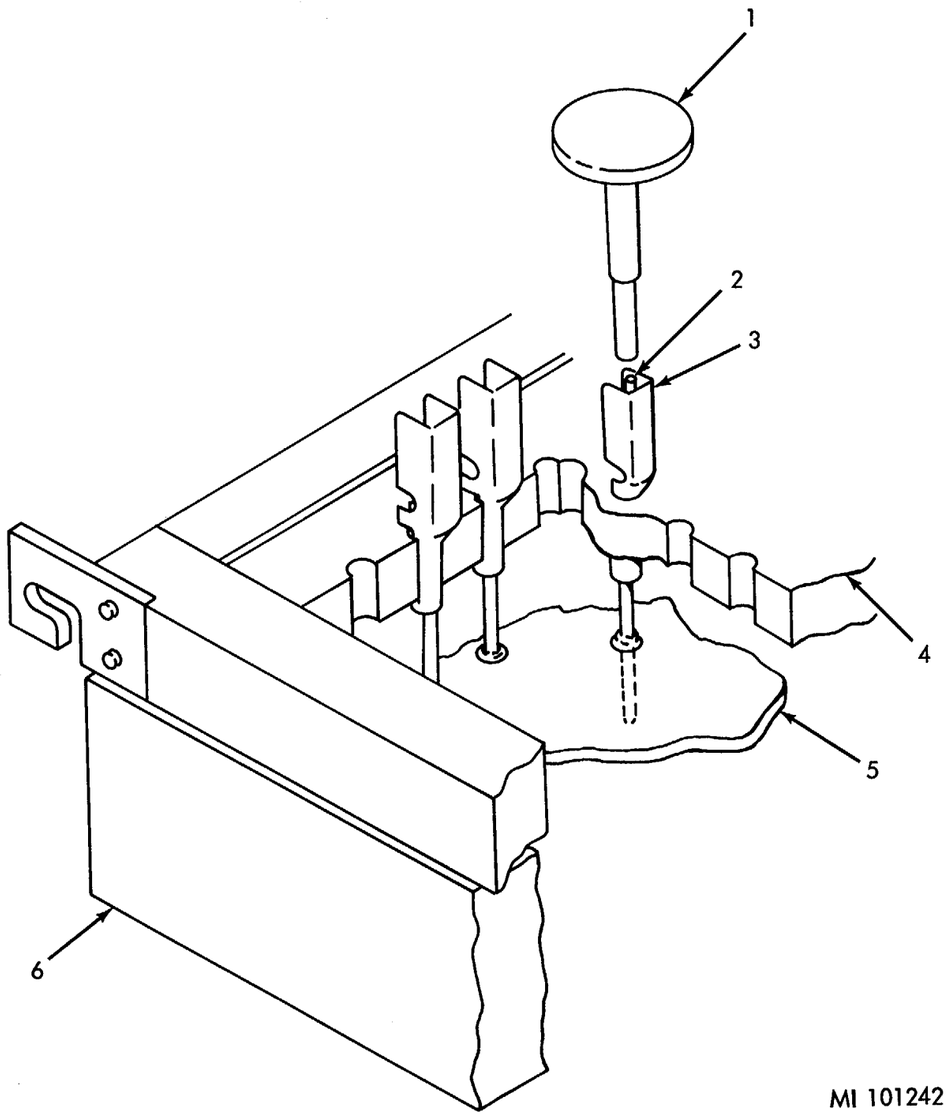
Figure 2-31. Repair of PB-202



MI 101241

1 – Soldered area
2 – Printed circuit board
3 – Patchboard contact
4 – P1
5 – Electrical contact
6 – Support block

Figure 2-32. Replacement of patchboard contact.



1 – Installation tool
2 – Patchboard contact
3 – Electrical contact
4 – P1
5 – Printed circuit board
6 – Support block

Figure 2-33. Installation of patchboard contact.

2-6. Universal Contact Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (2 and 3, fig. 2-31) and pull panel (1) away from cover (14) to gain access to J1 through J7 and S1.
(2) Remove mounting hardware (2, 4, and 12) and J1 (11).
(3) Remove the supplied mounting hardware and S1 (13).
(4) Disconnect and tag the leads to J2 through J7.

NOTE
If it is required to move holder (21) to gain access to a universal contact, located beneath the holder, perform step (5) otherwise proceed to step (6).

(5) Remove mounting hardware (2 and 3) and pull holder (21) away from printed circuit board (16), until access can be made to the universal contact to be removed.
(6) Disconnect the leads to the universal contact with unwrapping tool, 5120-131-3233.
(7) With desoldering kit, 3439-907-5806, remove the solder from soldered area (2, fig. 2-34) around universal contact (6).

NOTE
It may be necessary to apply heat to the universal contact while it is being removed from the printed circuit boards. This can be done by holding a soldering iron to wire wrapping pin (1) of the universal contact while it is being pulled out of P1 (4). Use two men.

(8) With a pair of needlenose pliers, pull the universal contact out of P1 and remove the contact.

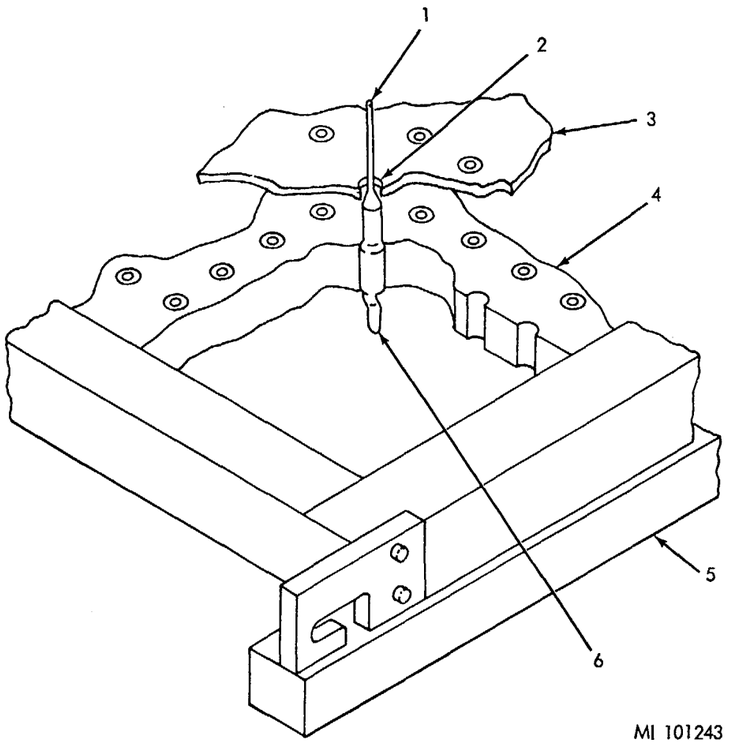
b. Installation.

NOTE
Before installing a universal contact (6, fig. 2-34), be sure that the hole in printed circuit board (3) is free of solder.

(1) Install the universal contact into P1 (4, fig. 2-3), from the mating side, with tool, 5120-159-9934. Be sure that the universal contact is bottomed in P1 and wire wrapping pin (1) is through the printed circuit board.
(2) Solder the wire wrapping pin area of the universal contact to the printed circuit board.
(3) Wrap the lads, removed in step a (6) above, around the wire wrapping area of the universal contact with wrapping tool, 5120.859-3730.

NOTE
If holder (21, fig. 2-31) was moved perform step (4), otherwise proceed to step (5).

(4) Install holder (21, fig. 2-31) with mounting hardware (2 and 3) on cover (14).
(5) Connect the leads to J2 through J7.
(6) Install S1 (13) with the supplied mounting hardware on panel (1).
(7) Install J1 (11) with mounting hardware (2, 4, and 12) on panel (1).
(8) Install panel (1) with mounting hardware (2 and 3) on the cover.



1 – Wire wrapping pin
2 – Soldered area
3 – Printed circuit board
4 – P1
5 – Support block
6 – Universal contact

Figure 2-34. Replacement of universal contact.

2-7. Electrical Contact Removal and Installation Procedure

a. Removal.

(1) Remove the: patchboard contact(par. 2-5a).

NOTE

Some electrical contacts have been installed will epoxy. Should it be necessary to replace one of these contacts, heat it above 200°F by applying a small soldering iron to the exposed end of the electrical contact, prior to removal.

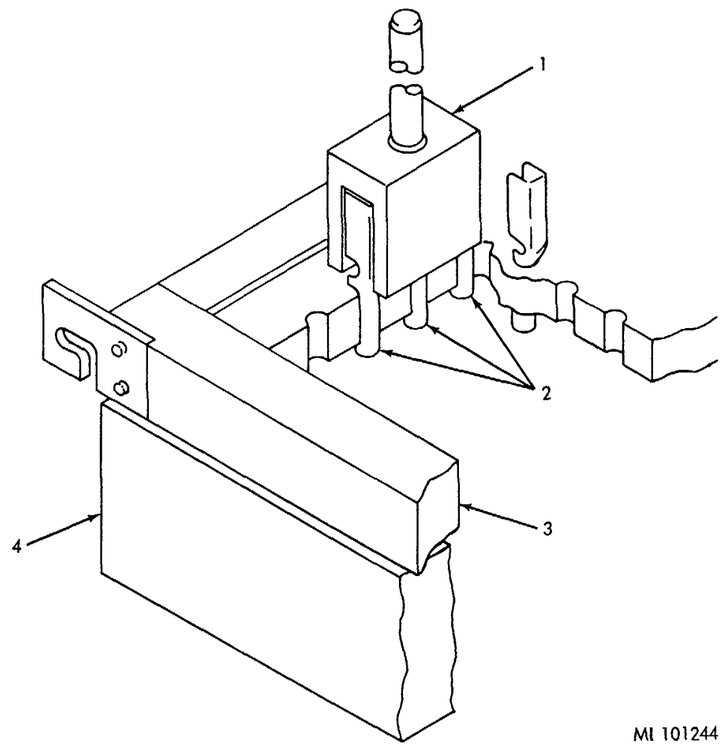
(2) With a pair of needle-nose pliers, pull the electrical contact (3, fig. 2-33) out from the mating side of P1 (4).

b. Installation.

(1) Place P1 (3, fig. 2-35) mating side up, on two support blocks (4). The blocks must be thick enough so that cover (14, fig. 2-31) clears the work surface.

(2) Install electrical contact (2, fig. 2-35) partly in the desired hole in P1. Stop when interference is first encountered, as the electrical contact must be free enough to rotate. Place insertion tool (1) over three electrical contacts (any or all which can be replacements). Use a small hammer and gently tap the electrical contact bottom squarely against P1. Remove the insertion tool.

(3) Install the patchboard contact (par. 2-5b).



1 – Insertion tool
2 – Electrical contact
3 – P1
4 – Support block

Figure 2-35. Installation of electrical contact.

2-8. Switch (S1) (PB-203) Removal and Installation Procedure (Fig. 2-36)

a. Removal.

(1) :Remove mounting hardware (2 and 3) and pull panel (1) away from cover (9) to gain access to S1.
(2) Disconnect and tag the leads to S1.
(3) Pull the lens out of S1 and rotate at 90° CCW. The lens and light assembly can now be removed from the light assembly frame.

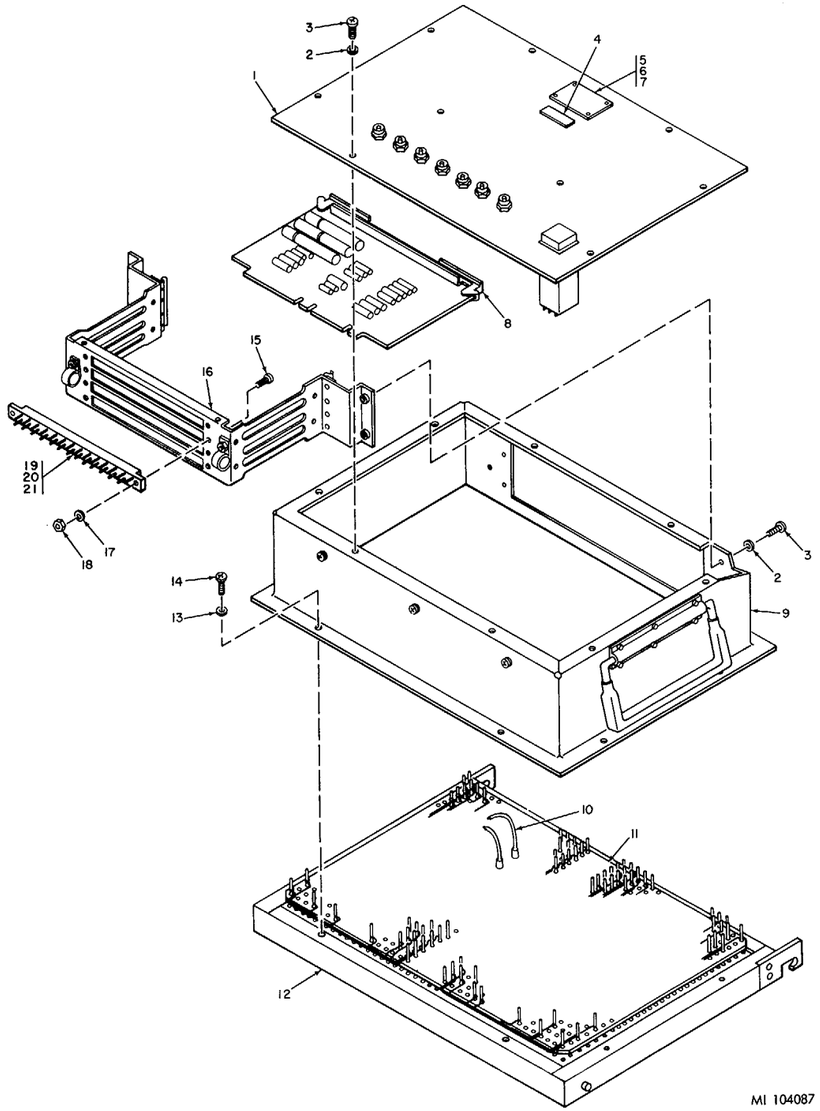
NOTE

At this time, any of the four lamps can be replaced.

(4) Loosen the two screws, located inside the light assembly frame and remove S1 from the panel.

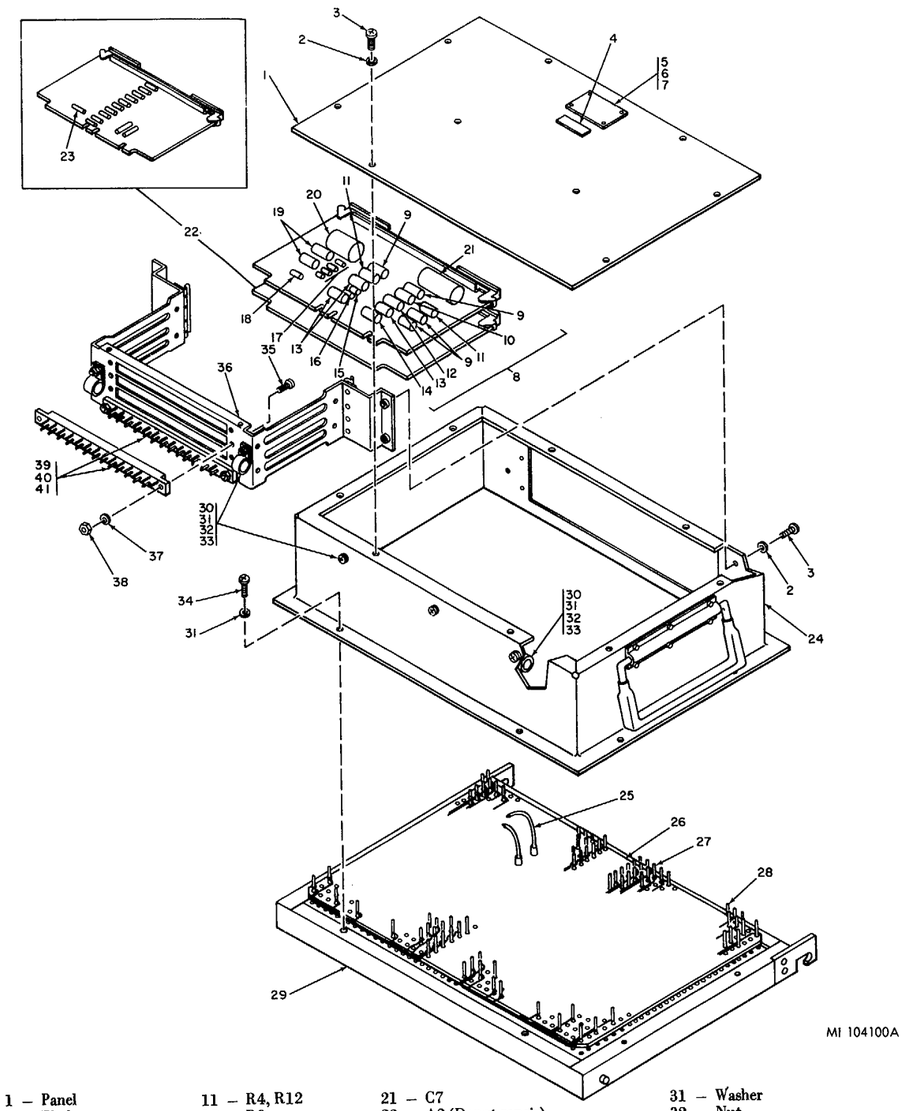
b. Installation.

(1) If a new S1 is to be installed, remove the lens as described in step a (3) above.
(2) Install S1 on panel: (1) and tighten the two screws, located inside the light assembly frame.
(3) Push the lens and light assembly back into the light assembly frame and rotate 90° CW. Push the lens again until it snaps into its retained position.
(4) Connect the leads to S1.
(5) Install panel (1) with mounting hardware (2 and 3) on cover (9).



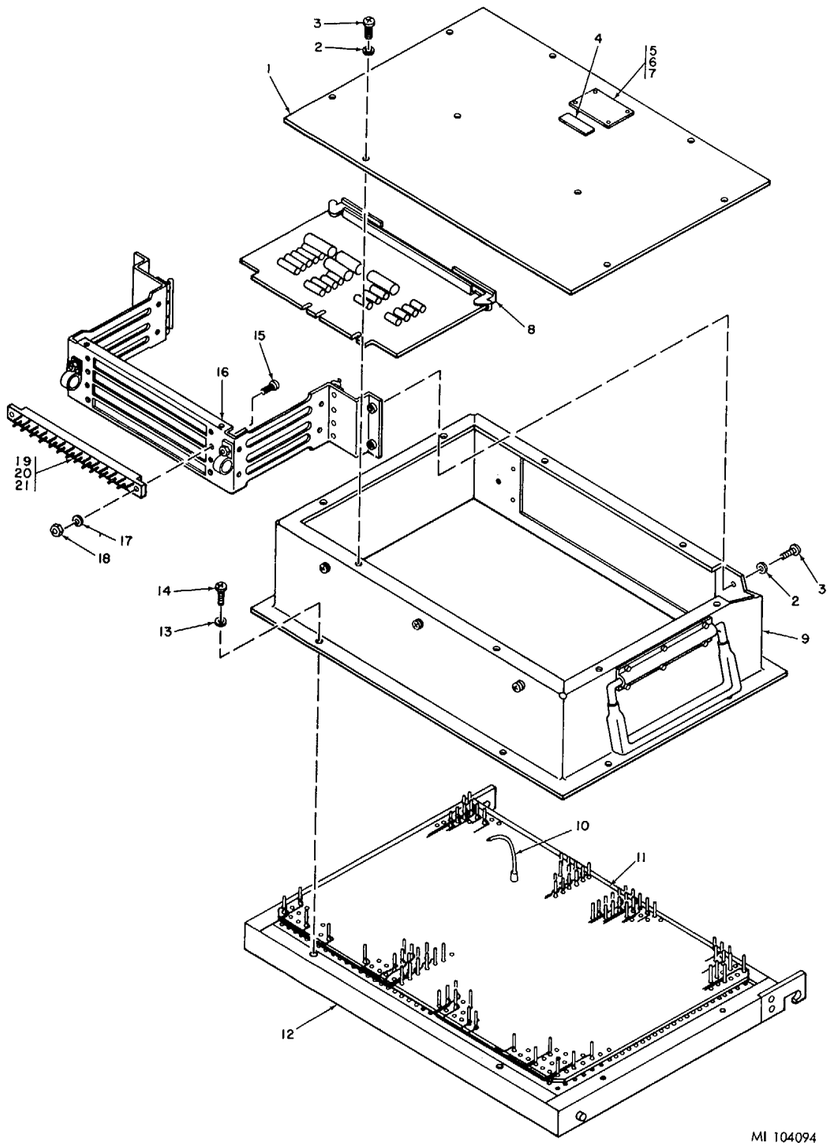
1 – Panel
2 – Washer
3 – Screw
4 – Identification plate
5 – Identification plate
6 – Screw
7 – Nut
8 – A1 (Depot repair)
9 – Cover (Depot repair)
10 – Patchcord
11 – Printed circuit board (Depot only)
12 – P1 (Depot only)
13 – Washer
14 – Screw
15 – Screw
16 – Holder (Depot repair)
17 – Washer
18 – Nut
19 – XA1
20 – Key
21 – Ferrule

Figure 2-36. Repair of PB-203.



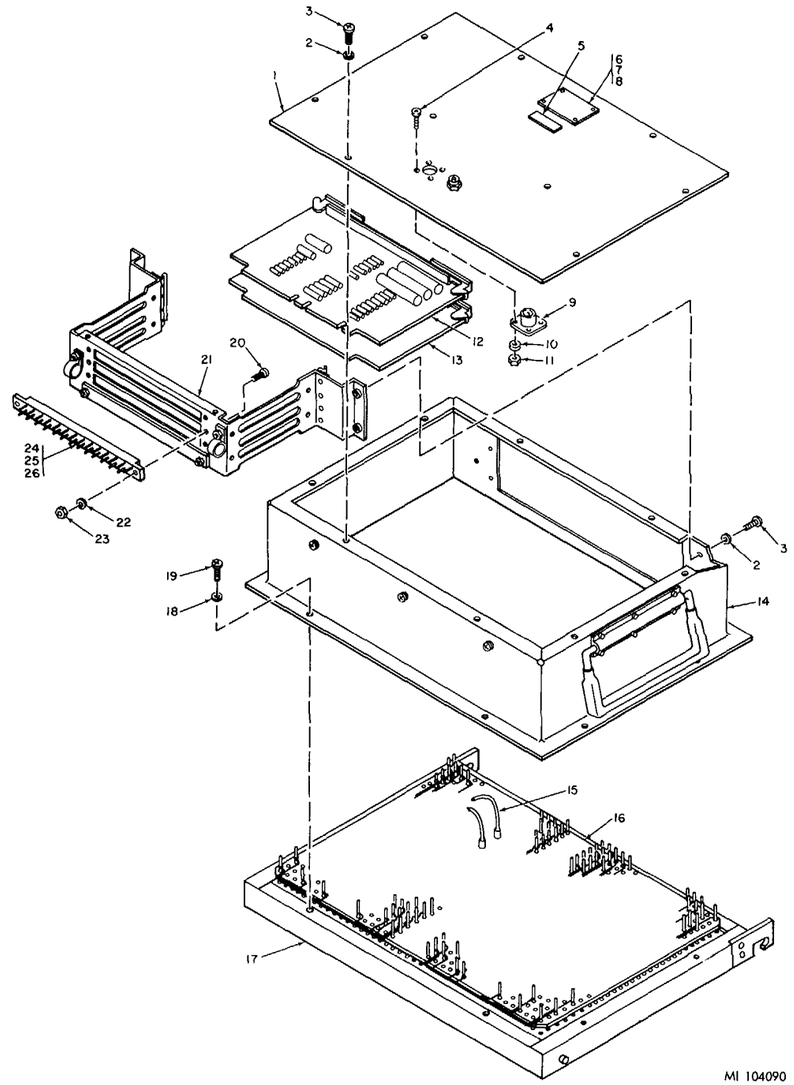
1 – Panel
2 – Washer
3 – Screw
4 – Identification plate
5 – Identification plate
6 – Screw
7 – Nut
8 – A1 (Depot repair)
9 – R3, R7, R13, R14
10 – R8
11 – R4, R12
12 – R9
13 – R5, R6, R10
14 – R11
15 – R15
16 – CR1
17 – C3, C4, C5, C6
18 – C2
19 – R1, R2
20 – C1
21 – C7
22 – A2 (Depot repair)
23 – R1 through R13
24 – Cover (Depot repair)
25 – Patchcord
26 – Printed circuit board (Depot only)
27 – Contact
28 – Contact
29 – P1 (Depot only)
30 – Screw
31 – Washer
32 – Nut
33 – Clamp
34 – Screw
35 – Screw
36 – Holder (Depot repair)
37 – Washer
38 – Nut
39 – XA1, XA2
40 – Key
41 – Ferrule

Figure 2-37. Repair of PB-204.



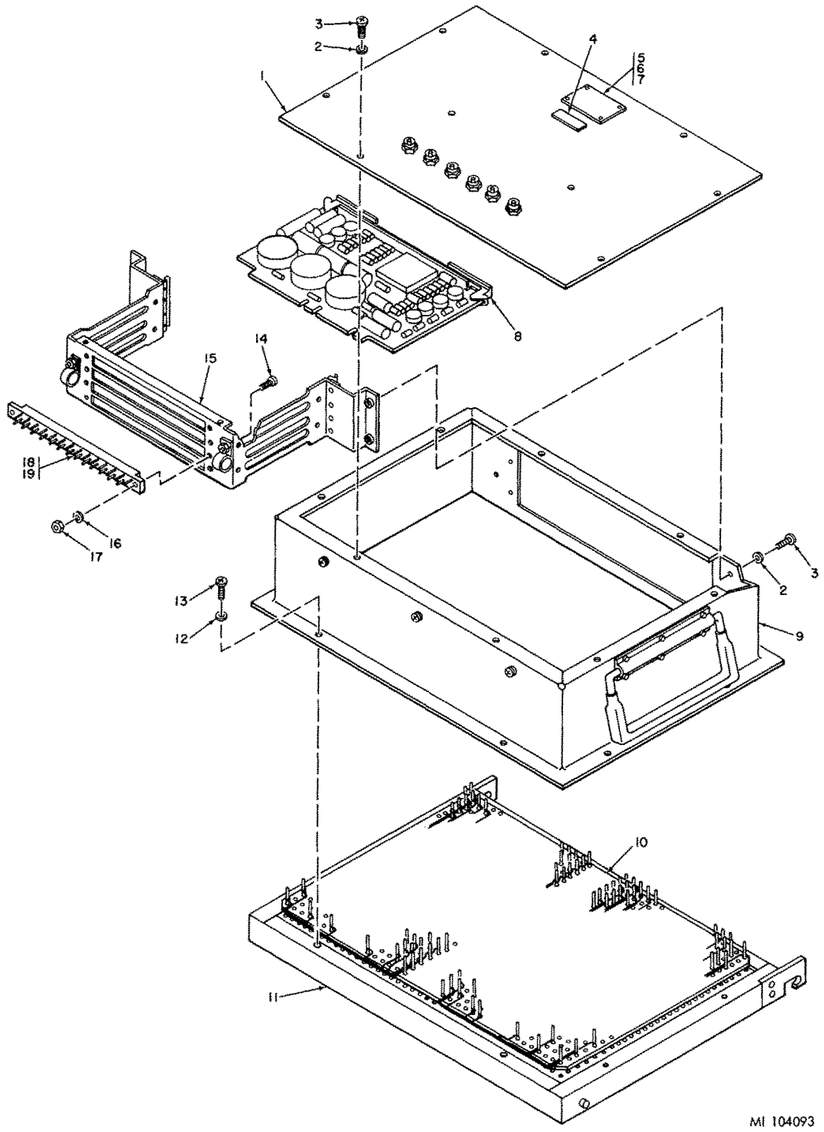
1 – Panel
2 – Washer
3 – Screw
4 – Identification plate
5 – Identification plate
6 – Screw
7 – Nut
8 – A1 (Depot repair)
9 – Cover (Depot repair)
10 – Patchcord
11 – Printed circuit board (Depot only)
12 – P1 (Depot only)
13 – Washer
14 – Screw
15 – Screw
16 – Holder (Depot repair)
17 – Washer
18 – Nut
19 – Key
20 – XA1
21 – Solder ferrule

Figure 2-38. Repair of PB-205



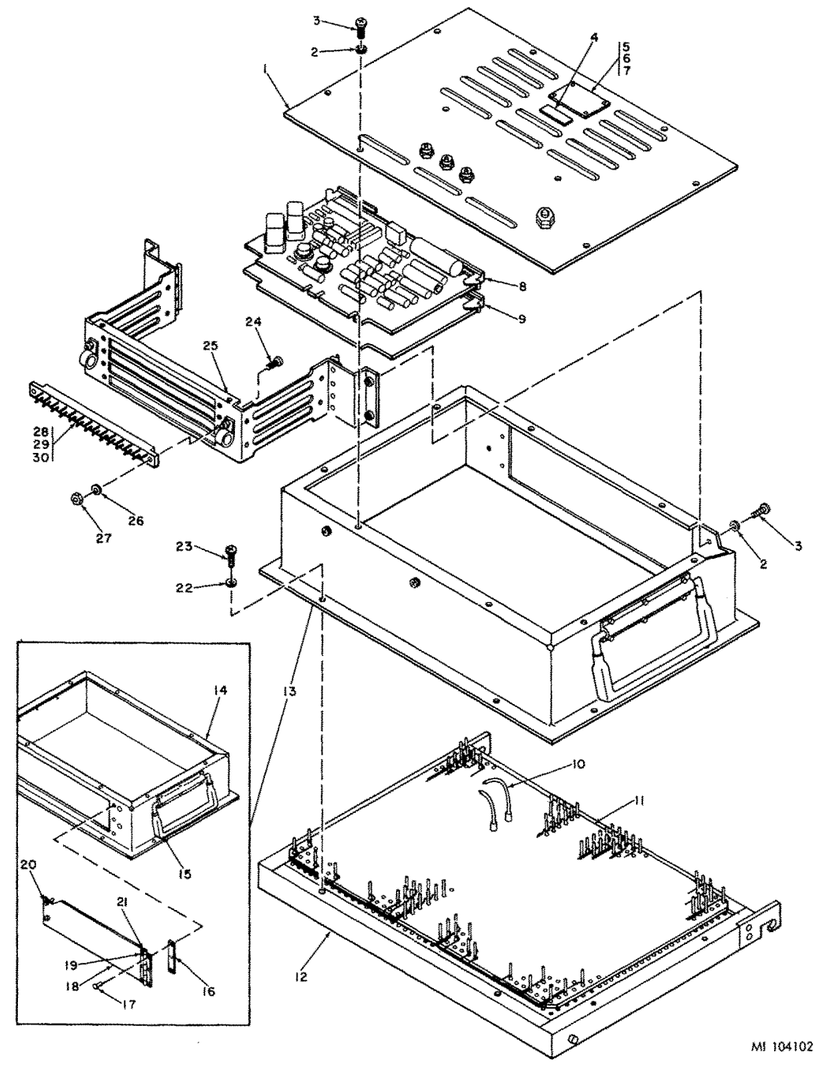
1 – Panel
2 – Washer
3 – Screw
4 – Screw
5 – Identification plate
6 – Identification plate
7 – Screw
8 – Nut
9 – J1
10 – Washer
11 – Nut
12 – A1 (Depot repair)
13 – A2 (Depot repair)
14 – Cover (Depot repair)
15 – Patchcord
16 – Printed circuit board (Depot only)
17 – P1 (Depot only)
18 – Washer
19 – Screw
20 – Screw
21 – Holder (Depot repair)
22 – Washer
23 – Nut
24 – Key
25 – Solder ferrule
26 – XA1, XA2

Figure 2-39. Repair of PB-206.



1 – Panel
2 – Washer
3 – Screw
4 – Identification plate
5 – Identification plate
6 – Screw
7 – Nut
8 – A1 (Depot repair)
9 – Cover (Depot repair)
10 – Printed circuit board (Depot only)
11 – P1 (Depot only)
12 – Washer
13 – Screw
14 – Screw
15 – Holder (Depot repair)
16 – Washer
17 – Nut
18 – Key
19 – XA1

Figure 2-40. Repair of PB-207.



1 – Panel connector
2 – Washer
3 – Screw
4 – Identification plate
5 – Identification plate
6 – Screw
7 – Nut
8 – A1 (Depot repair)
9 – A2 (Depot repair)
10 – Patchcord
11 – Printed circuit board (Depot only)
12 – P1 (Depot only)
13 – Cover (Depot repair)
14 – Cover (Depot only)
15 – Handle (Depot only)
16 – Spacer (Depot only)
17 – Rivet (Depot only)
18 – Access cover (Depot only)
19 – Rivet (Depot only)
20 – Stud (Depot only)
21 – Cover hinge (Depot only)
22 – Washer
23 – Screw
24 – Screw
25 – Holder (Depot repair)
26 – Washer
27 – Nut
28 – Key
29 – XA1, XA2
30 – Solder ferrule

Figure 2-41. Repair of PB-208.

Section III. REPAIR PROCEDURES FOR ELECTRICAL TEST PANELS (ELECTRICAL LEAD TYPE)

2-9. General - Electrical Lead Type Patchboards

a. This section provides repair information for the electrical lead type patchboards within the scope of DS and GS maintenance personnel. Figures 2-42 through 2-53 illustrate the disassembly and assembly of the electrical lead type patchboards and special tools required.

b. Paragraphs 2-10 through 2-13 contain only those procedures peculiar to an electrical lead type patchboard or not obvious to a trained technician. Since the remaining patchboards are similar in configuration, these repair paragraphs will apply to the remaining patchboards. Paragraph 2-13 contains procedures for unusual conditions for the remaining electrical lead type patchboards.

c. TM 9-4935-557-34P contains a list of repair parts and special tools authorized for maintenance personnel.

2-10. Component Removal and Installation Procedure

a. Removal

(1) Remove mounting hardware (1 and 2, fig. 2-42) and access cover (3). Pull panel (7) away from cover (11) to gain access to the component to be removed.

NOTE

If the component is tied down with strap (12, fig. 2-43), cut the strap before removing the component

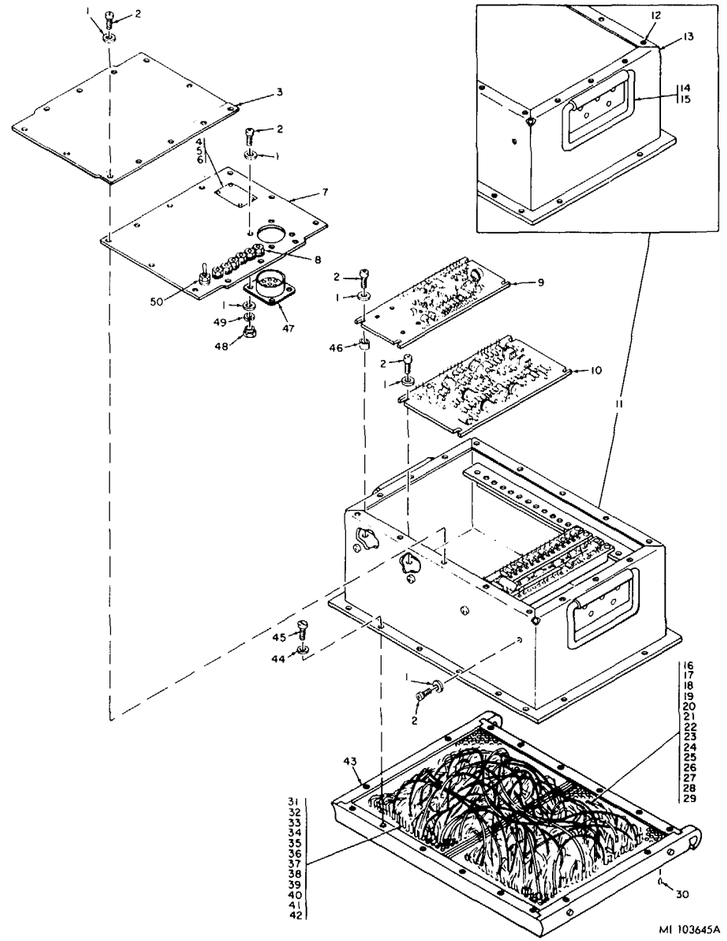
(2) Disconnect the two leads of the component from terminals (7, fig. 2-43) and remove the component.

b. Installation.

NOTE

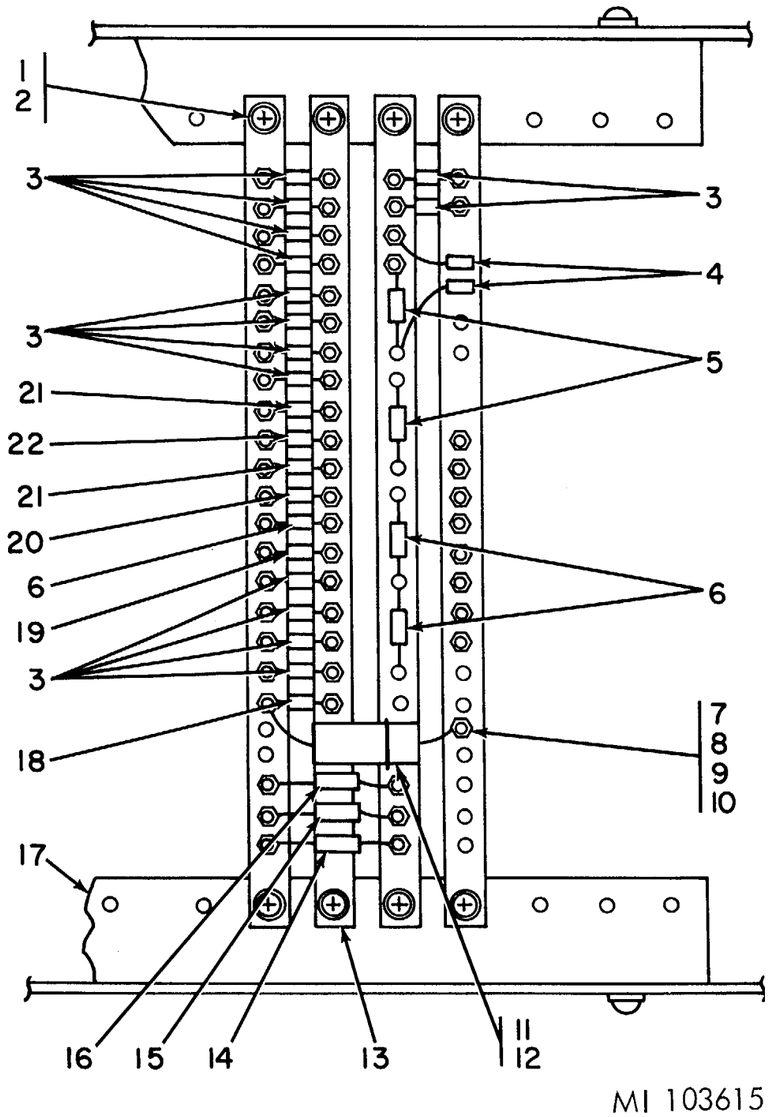
If the component removed in step *a* (2) above, had insulation sleeving on the leads, install insulation sleeving, MIL-I-22129 AWG 20, on the leads of the new component using the removed component as a guide.

(1) Install the new component between the terminals (7, fig. 2-43) and connect the leads.
(2) If required, tie the new component to terminal board (13) with strap (12).
(3) Install panel (7, fig. 2-42) and access cover (3) with mounting hardware (1 and 2) on cover (13).



1 – Washer
2 – Screw
3 – Access cover
4 – Nut
5 – Screw
6 – Identification plate
7 – Panel
8 – J2 through J7
9 – A1 (Depot repair)
10 – A2 (Depot repair)
11 – Patchboard cover (Depot repair)
12 – Nut (Depot only)
13 – Cover (Depot only)
14 – Handle (Depot only)
15 – Rivet (Depot only)
16 – Adapter
17 – Patchcord
18 – Patchcord
19 – Patchcord
20 – Patchcord
21 – Patchcord
22 – Patchcord
23 – Patchcord
24 – Patchcord
25 – Patchcord
26 – Patchcord
27 – Patchcord
28 – Patchcord
29 – Patchcord
30 – Electrical contact
31 – Patchcord
32 – Patchcord
33 – Patchcord
34 – Patchcord
35 – Patchcord
36 – Patchcord
37 – Patchcord
38 – Patchcord
39 – Patchcord
40 – Patchcord
41 – Patchcord
42 – Patchcord
43 – P1 (Depot only)
44 – Washer
45 – Screw
46 – Spacer
47 – J1
48 – Nut
49 – Washer
50 – S1

Figure 2-42. Repair of PB-202 – view 1.



1 – Screw
2 – Washer
3 – R1-R8, R15-R18, R22, R23
4 – C2, C3
5 – R24, R25
6 – R13, R26, R27
7 – E1-E63
8 – Screw
9 – Washer
10 – Washer
11 – C1
12 – Strap
13 – Terminal board
14 – R28
15 – R21
16 – R20
17 – Bracket
18 – R19
19 – R14
20 – R12
21 – R9, R11
22 – R10

Figure 2-43. Repair of PB-202 - view 2.

2-11. Patchcord Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1 and 2, fig. 2-42) and access cover (3). Remove mounting hardware (1, 2, 48 and 49) and J1 (47). Disconnect and tag the leads to J2 through J7 (8) and S1 (50) on panel (7) and remove the panel.
(2) Remove mounting hardware (44 and 45) and (1 and 2) and cover (11) from P1 (43).

NOTE
It may be necessary to remove a number of patchcords (17 through 29 ad 31 through 42) before the one to be replaced is accessible. Before removing the end of a patchcord, tag its location in P1.

(3) Remove all the ends of the patchcord to be removed, from P1 and, if required, disconnect and tag the ends that are connected to terminals E1-E63 (7, fig. 2-43) on terminal boards (13) and remove the patchcord.

b. Installation.

(1) Insert the leads of the new patchcord (17 through 29 and 31 through 42, fig. 2-42) into P1 (43) and, if required, connect the leads to terminals E1-E63 (7, fig. 2-43) on terminal boards (13).
(2) If any other patchcord leads were removed in step *a* (3) above, insert the leads in P1.
(3) Install cover (11, fig. 2-42) to P1 (43) with mounting hardware (44 and 45). Mount brackets (17, fig. 2-43) to the cover with mounting hardware (1 and 2, fig. 2-42).
(4) Reconnect the leads to J2 through J7 (8) and S1 (50).
(5) Install J1 (47) with mounting hardware (1, 2, 48, and 49) on the panel.
(6) Install panel (7) and access cover (3) with mounting hardware (1 and 2).

2-12. Electrical Contact Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (1 and 2, fig. 2-42) and remove access cover (3). Remove mounting hardware (1, 2, 48, and 49) and J1 (47). Disconnect and tag the leads to J2 through J7 (8) and S1 (50) on panel (7) and remove the panel.
(2) Remove mounting hardware (44 and 45) and (1 and 2) and cover (11) from P1 (4).

NOTE
It may be necessary to remove a number of patchcords (17 through 29 and 31 through 42) before the patchcord lead to be removed is accessible. Before removing the end of a patchcord, tag its location in P1.

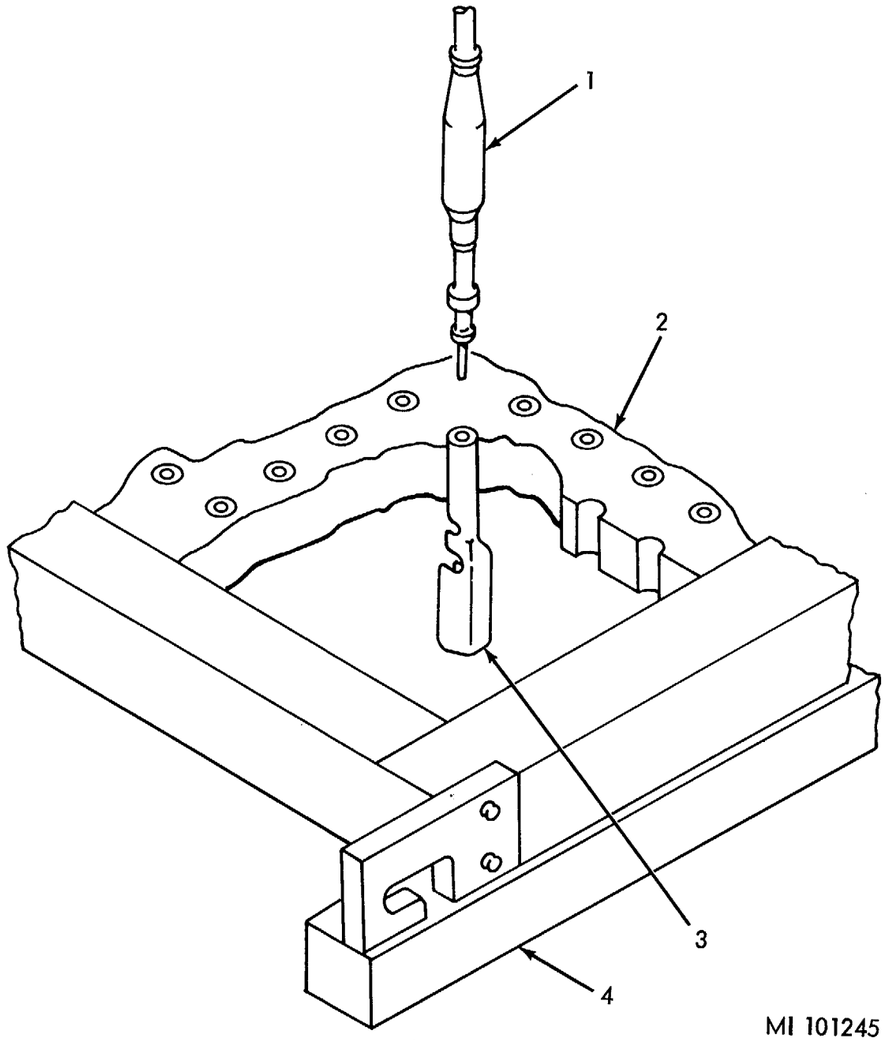
(3) Remove the patchcord lead (1, fig. 2-44) from P1 (2), where electrical contact (3) is to be replaced.

NOTE
Some electrical contacts have been installed with epoxy. Should it be necessary to replace one of these, heat it above 200°F by applying a small soldering iron to the exposed end of the electrical contact prior to removal.

(4) Place P1 on two 3/4-inch support blocks (4), mating side down.
(5) Place the electrical contact extraction tool (1, fig. 2-45) in the round end of the electrical contact (3). Tap the extraction tool gently with a small hammer. When the electrical contact begins to move, use progressively lighter taps until the electrical contact is free of P1. Remove the extraction tool from P1.

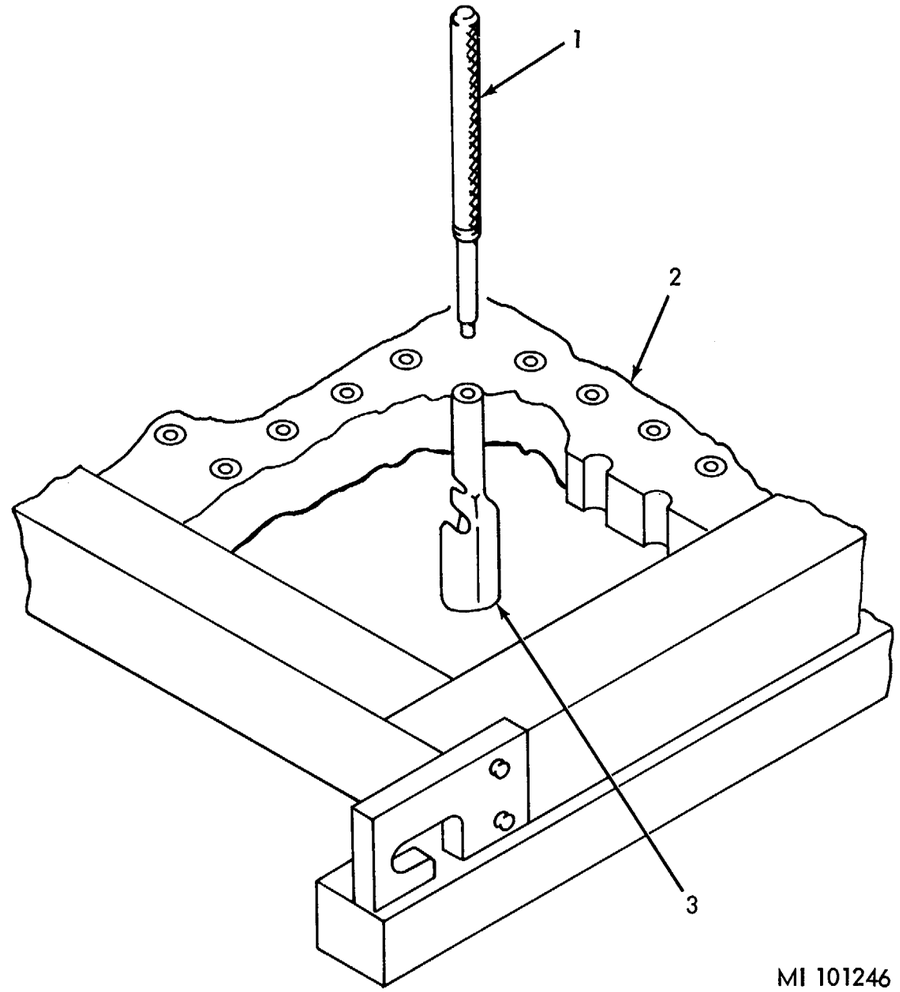
b. Installation.

(1) Place P1 (3, fig. 2-35), mating side up, on two support blocks (4). The blocks must be thick enough so the components mounted on the terminal boards, terminals (7, fig. 2-43) are clear of the work surface.
(2) Place electrical contact (2, fig. 2-35) partly in the desired hole in P1. Stop when interference is first encountered as the electrical contact must be free enough to rotate. Place insertion tool (1) over three electrical contacts (any or all of which can be replacements). Use a small hammer and gently tap the insertion tool until the electrical contact bottoms squarely against P1 (3). Remove the insertion tool.
(3) Place P1, mating side down, on the work surface. Insert leads (1, fig. 2-44) of patchcords (17 through 29 and 31 through 42, fig. 2-42) removed in step *a* (3) above.
(4) Install cover (11) to P1 (43) with mounting hardware (44 and 45). Install bracket (17, fig. 2-43) to the cover with mounting hardware (1 and 2, fig. 2.42).
(5) Reconnect the leads to J2 through J7 (8) and S1 (50).
(6) Install J1 (47) with mounting hardware (1, 2, 48, and 49) on the panel.
(7) Install panel (7) and access cover (3) with mounting hardware (1 and 2).



1 – Patchcord
2 – P1
3 – Electrical contact
4 – Support block

Figure 2-44. Replacement of P1 electrical contacts.



1 – Electrical contact extraction tool
2 – P1
3 – Electrical contact

Figure 2-45. Electrical contact extraction tool.

2-13. DS1 (Patchboard PB-203) Removal and Installation Procedure (Fig. 2-46)

a. Removal.

(1) Remove mounting hardware (7 and 8) and access cover (6). Pull panel (14) away from cover (1) until access can be made to the connection to DS1 (9).
(2) Disconnect and tag the leads to DS1.
(3) Pull the lens (10) out of DS1 and rotate it 90° CCW. The lens and light assembly can now be removed from the light assembly frame.

NOTE
At this time, any of the four bulbs an be replaced.

(4) Loosen the two screws located inside the light assembly frame and remove DS1 from the panel.

b. Installation.

(1) If a new DS1 (9) is to be installed, remove lens (10) as described in step a (3) above.
(2) Install DS1 in panel (14) and tighten the two screws, located inside the light assembly frame.
(3) Push the lens and light assembly back into the light assembly frame and rotate 90° CW. Push the lens again until it snaps into its retained position.
(4) Reconnect the leads removed in step a (2) above.
(5) Install the panel and access cover (6) with mounting hardware (7 and 8).

2-14. Painting

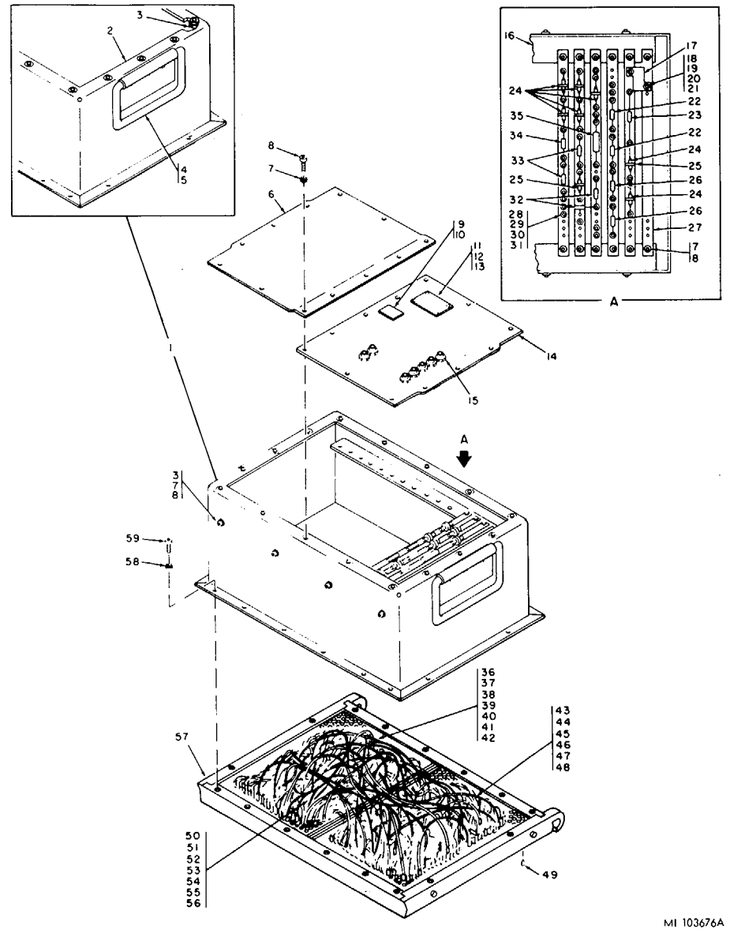
CAUTION
Mask all connectors, lettering, and mounting surfaces before painting the adjoining surfaces.

Inspect and paint the exterior of the UUT.

a. Inspect the exterior surface of the patchboard for scratched, chipped or peeled paint.
b. Smooth the damaged area with sandpaper, wet/dry (120-400 grit).
c. Spot-paint damaged areas with a brush.
d. Use paint, Fed Spec TT-E-515, color no. 37538, for the handles and apply paint, MIL-E-15090, class 2, type II, color no. 26492, to the covers.

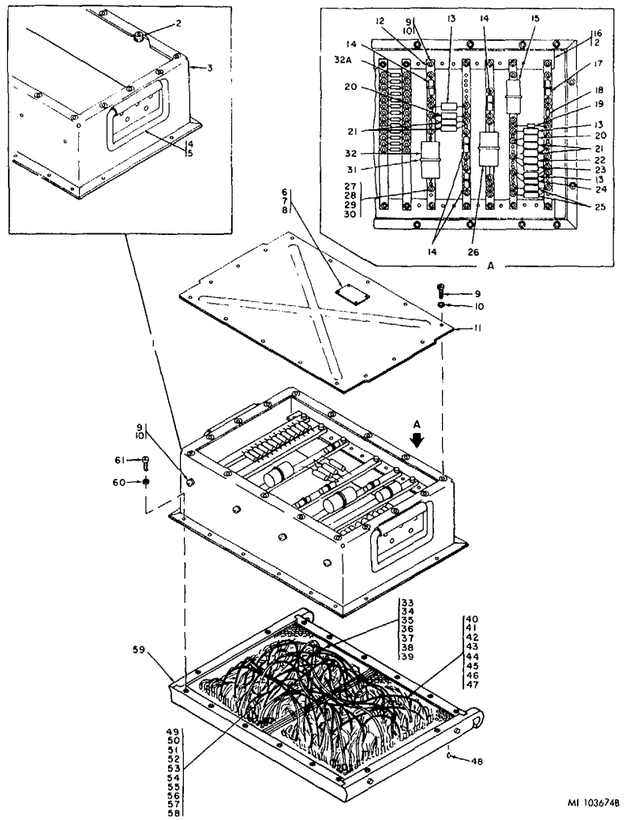
2-15. Packaging

a. When the patchboard is to be shipped to the depot for further testing and repair, package the assembly in accordance with TM 38-230, method IID. Insure that adequate cushioning material and bracing is used to prevent damage to the assembly during shipment.
b. Mark the packages in accordance with local directives.



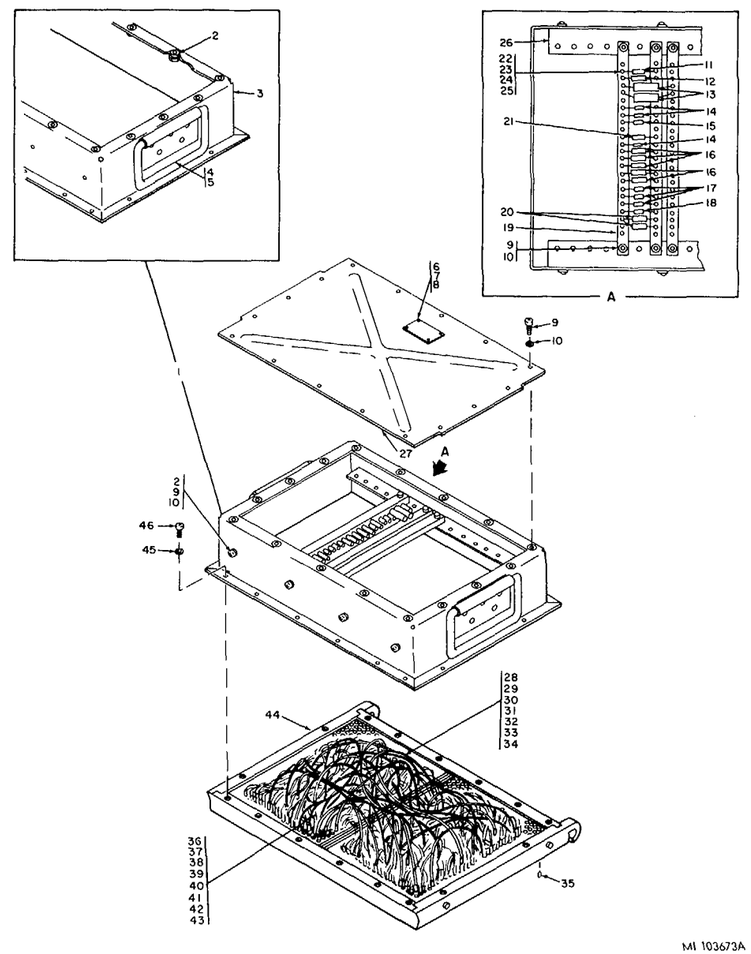
1 – Cover (Depot repair)
2 – Cover (Depot only)
3 – Nut (Depot only)
4 – Rivet (Depot only)
5 – Handle (Depot only)
6 – Access cover
7 – Washer
8 – Screw
9 – DS1
10 – Lens
11 – Identification plate
12 – Screw
13 – Nut
14 – Panel
15 – J2 through J8
16 – Bracket
17 – R6
18 – Screw
19 – Washer
20 – Washer
21 – Nut
22 – R1
23 – R12
24 – C1 through C8
25 – Strap
26 – R4, R5
27 – Terminal board
28 – E1-E5, E11-E29, E31-E48
29 – Screw
30 – Washer
31 – Washer
32 – R7, R8
33 – R10, R11
34 – R9
35 – R1
36 – Patchcord
37 – Patchcord
38 – Patchcord
39 – Patchcord
40 – Patchcord
41 – Patchcord
42 – Patchcord
43 – Patchcord
44 – Patchcord
45 – Patchcord
46 – Patchcord
47 – Patchcord
48 – Patchcord
49 – Electrical contact
50 – Patchcord
51 – Patchcord
52 – Patchcord
53 – Patchcord
54 – Patchcord
55 – Patchcord
56 – Patchcord
57 – P1 (Depot only)
58 – Washer
59 – Screw

Figure 2-46. Repair of PB-203.



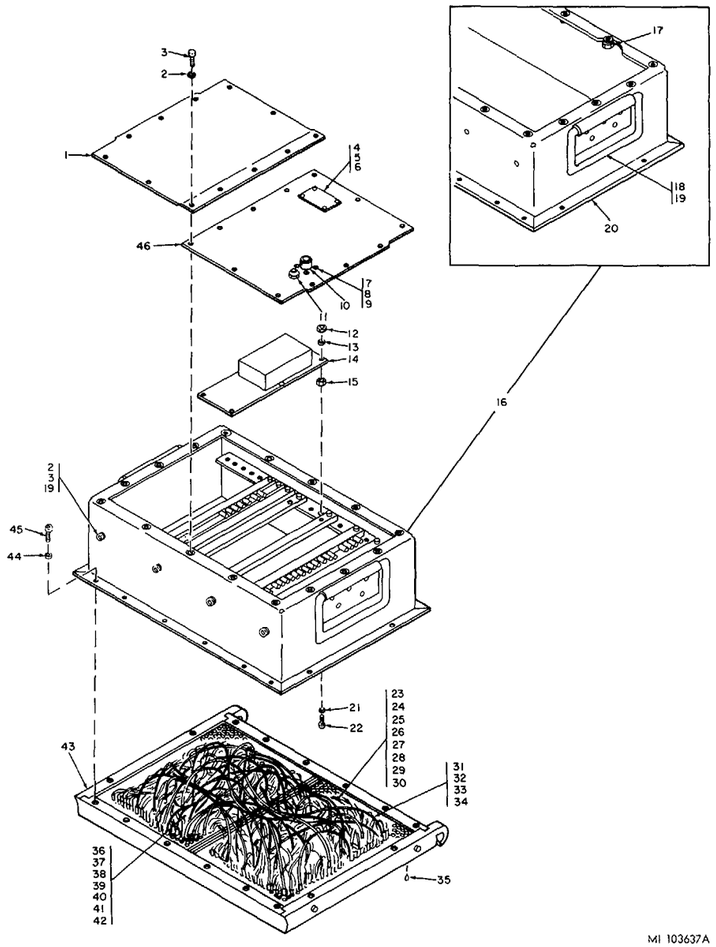
1 – Cover (Depot repair)
2 – Nut (Depot only)
3 – Cover (Depot only)
4 – Rivet (Depot only)
5 – Handle (Depot only)
6 – Screw
7 – Nut
8 – Plate
9 – Screw
10 – Washer
11 – Cover
12 – Terminal board
13 – R6, R9, R15
14 – C5 through C8
15 – C3
16 – Bracket
17 – C4
18 – R10
19 – CR1
20 – R1, R14
21 – R2, R11, R13
22 – R3
23 – R4
24 – R5
25 – R7, R8
26 – C2
27 – E1-E18, E20-E30, E32-E40, E42-E67
28 – Screw
29 – Washer
30 – Washer
31 – Cable strap
32 – C1
32A – R16 through R28
33 – Patchcord
34 – Patchcord
35 – Patchcord
36 – Patchcord
37 – Patchcord
38 – Patchcord
39 – Patchcord
40 – Patchcord
41 – Patchcord
42 – Patchcord
43 – Patchcord
44 – Patchcord
45 – Patchcord
46 – Patchcord
47 – Patchcord
48 – Electrical contact
49 – Patchcord
50 – Patchcord
51 – Patchcord
52 – Patchcord
53 – Patchcord
54 – Patchcord
55 – Patchcord
56 – Patchcord
57 – Patchcord
58 – Patchcord
59 – P1 (Depot only)
60 – Washer
61 – Screw

Figure 2-47. Repair of PB-204.



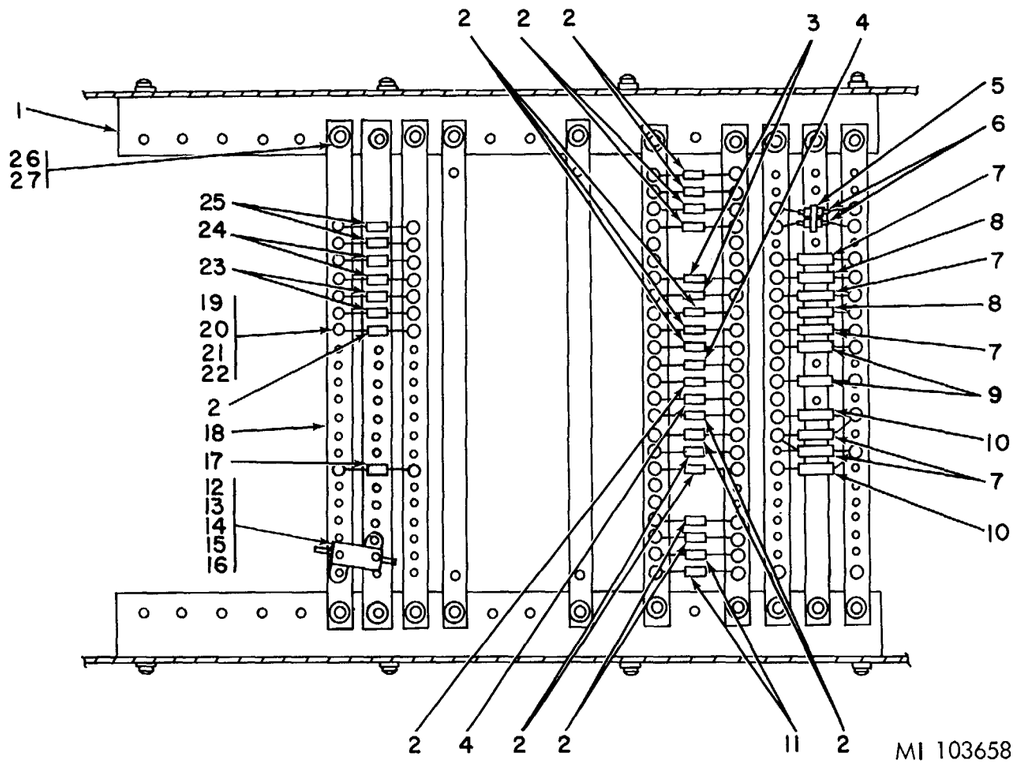
1 – Patchboard cover
2 – Nut (Depot only)
3 – Cover (Depot only)
4 – Rivet (Depot only)
5 – Handle (Depot only)
6 – Screw
7 – Nut
8 – Identification plate
9 – Screw
10 – Washer
11 – R1
12 – R2
13 – R3, R4
14 – R5, R6, R10
15 – C1
16 – R11 thru R15
17 – R16, R17, R18
18 – R19
19 – Terminal board
20 – R20, R21
21 – R9
22 – E1 thru E40
23 – Screw
24 – Washer
25 – Washer
26 – Bracket
27 – Access cover
28 – Patchcord
29 – Patchcord
30 – Patchcord
31 – Patchcord
32 – Patchcord
33 – Patchcord
34 – Patchcord
35 – Electrical contact
36 – Patchcord
37 – Patchcord
38 – Patchcord
39 – Patchcord
40 – Patchcord
41 – Patchcord
42 – Patchcord
43 – Patchcord
44 – P1 (Depot only)
45 – Washer
46 – Screw

Figure 2-48. Repair of PB-205.



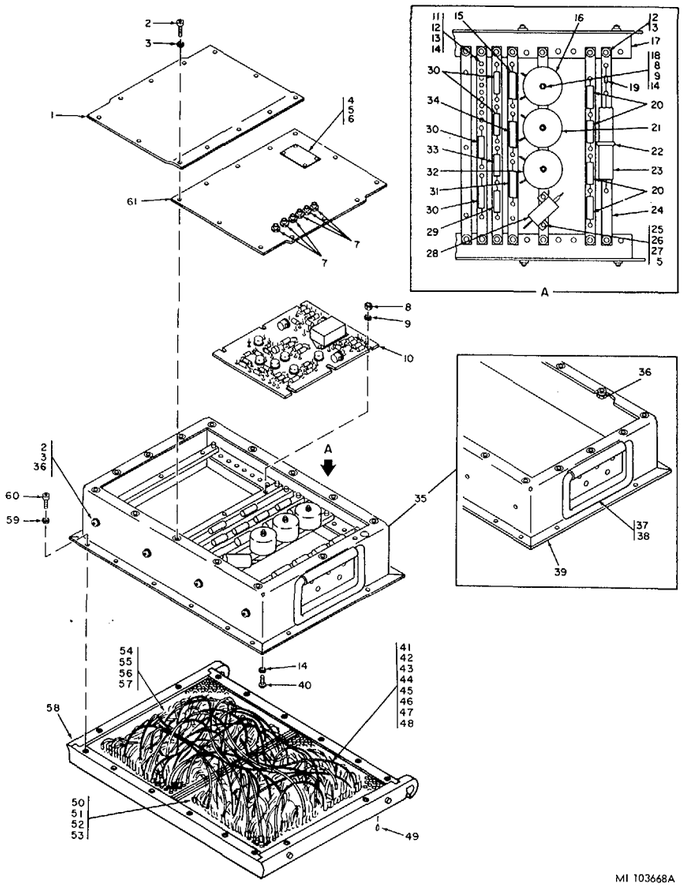
1 – Access cover
2 – Washer
3 – Screw
4 – Screw
5 – Nut
6 – Identification plate
7 – Screw
8 – Washer
9 – Nut
10 – J1
11 – J2
12 – Nut
13 – Washer
14 – A1 (Depot repair)
15 – Nut
16 – Patchboard cover (Depot repair)
17 – Nut (Depot only)
18 – Handle (Depot only)
19 – Rivet (Depot only)
20 – Cover (Depot only)
21 – Washer
22 – Screw
23 – Patchcord
24 – Patchcord
25 – Patchcord
26 – Patchcord
27 – Patchcord
28 – Patchcord
29 – Patchcord
30 – Patchcord
31 – Patchcord
32 – Patchcord
33 – Patchcord
34 – Patchcord
35 – Electrical contact
36 – Patchcord
37 – Patchcord
38 – Patchcord
39 – Patchcord
40 – Patchcord
41 – Patchcord
42 – Patchcord
43 – P1 (Depot only)
44 – Washer
45 – Screw
46 – Connector panel

Figure 2-49. Repair of PB-206 - view 1.



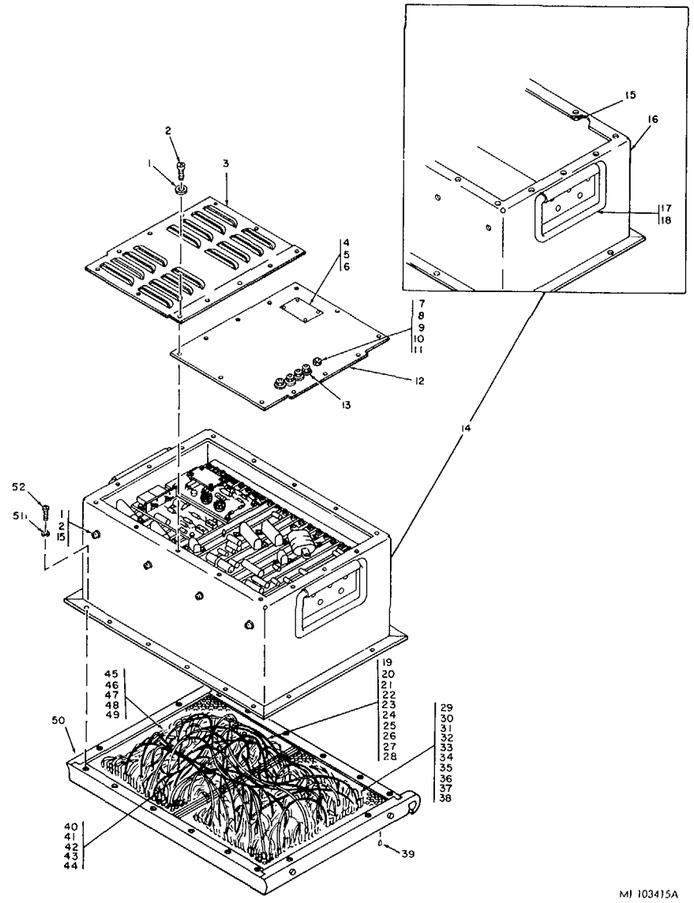
1 – Bracket
2 – R10 thru R13, R18 thru R20, R24 thru R27, R30, R31, R40, R22
3 – R16, R17
4 – R21, R23
5 – Strap
6 – C1, C2
7 – R1, R2, R3, R7, R8
8 – C4, C5
9 – R4, R5
10 – R6, R9
11 – R32, R33
12 – R34
13 – Screw
14 – Washer
15 – Washer
16 – Nut
17 – R35
18 – Terminal board
19 – Terminal
20 – Screw
21 – Washer
22 – Washer
23 – R38, R39
24 – R41, R42
25 – R36, R37
26 – Screw
27 – Washer

Figure 2-50. Repair of PB-206 - view 2.



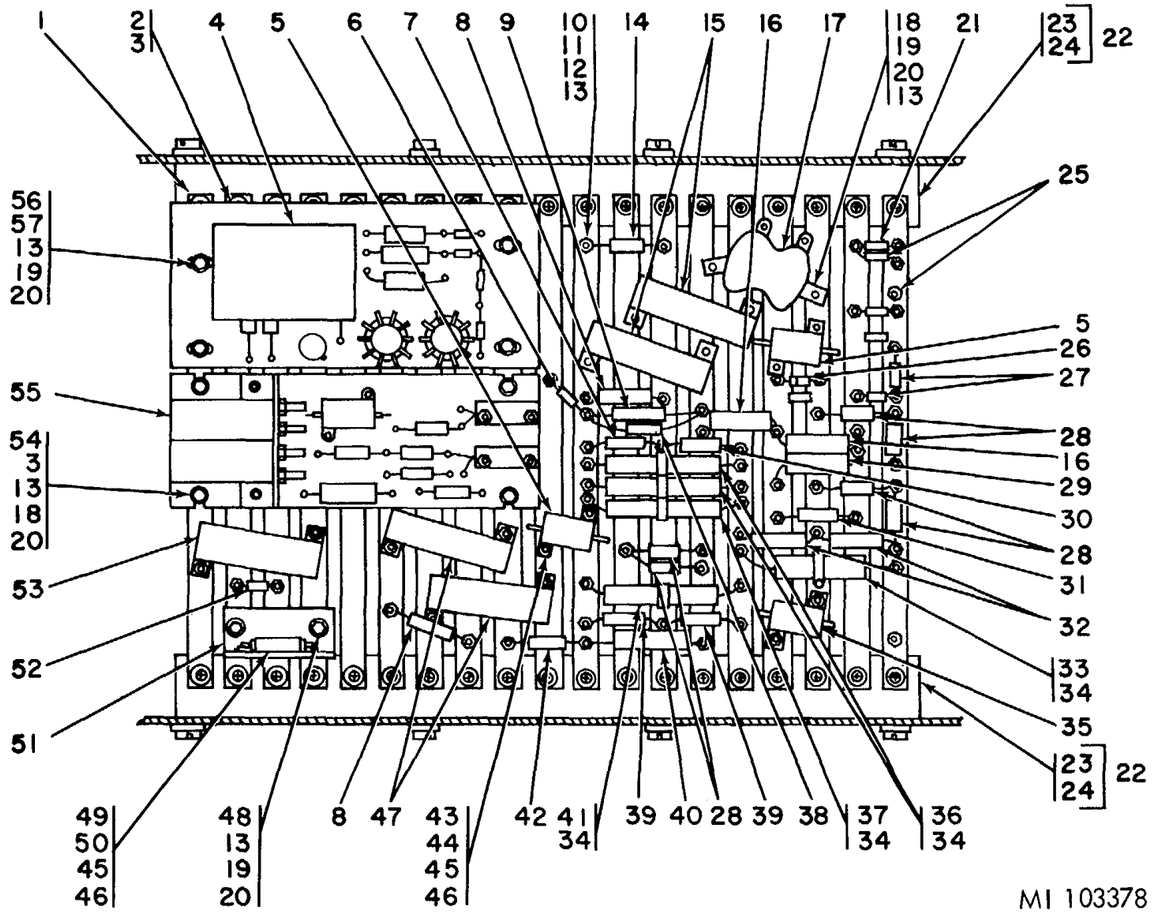
1 – Access cover
2 – Screw
3 – Washer
4 – Screw
5 – Nut
6 – Identification plate
7 – J1 thru J6
8 – Nut
9 – Washer
10 – A1 (Depot repair)
11 – Terminal
12 – Screw
13 – Washer
14 – Washer
15 – R7
16 – L1
17 – Bracket
18 – Screw
19 – R15
20 – R11 thru R14
21 – L2
22 – Strap
23 – C1
24 – Terminal board
25 – Screw
26 – Washer
27 – Washer
28 – R10
29 – R6
30 – R1 thru R4
31 – R9
32 – L3
33 – R5
34 – R8
35 – Cover (Depot repair)
36 – Nut (Depot only)
37 – Handle (Depot only)
38 – Rivet (Depot only)
39 – Cover (Depot only)
40 – Screw
41 – Patchcord
42 – Patchcord
43 – Patchcord
44 – Patchcord
45 – Patchcord
46 – Patchcord
47 – Patchcord
48 – Patchcord
49 – Electrical contact
50 – Patchcord
51 – Patchcord
52 – Patchcord
53 – Patchcord
54 – Patchcord
55 – Patchcord
56 – Patchcord
57 – Patchcord
58 – P1 (Depot only)
59 – Washer
60 – Screw
61 – Panel

Figure 2-51. Repair of PB-207.



1 – Washer
2 – Screw
3 – Cover, access
4 – Identification plate
5 – Screw
6 – Nut
7 – Nut
8 – Washer
9 – Screw
10 – Lug
11 – Washer
12 – Connector panel
13 – J1 through J4
14 – *Patchboard cover (Depot repair)*
15 – Nut (Depot only)
16 – Cover (Depot only)
17 – Handle (Depot only)
18 – Rivet (Depot only)
19 – Patchcord
20 – Patchcord
21 – Patchcord
22 – Patchcord
23 – Patchcord
24 – Patchcord
25 – Patchcord
26 – Patchcord
27 – Patchcord
28 – Patchcord
29 – Patchcord
30 – Patchcord
31 – Patchcord
32 – *Patchcord*
33 – Patchcord
34 – Patchcord
35 – Patchcord
36 – Patchcord
37 – Patchcord
38 – Patchcord
39 – Electrical contact
40 – Patchcord
41 – Patchcord
42 – Patchcord
43 – Patchcord
44 – Patchcord
45 – Patchcord
46 – Patchcord
47 – Patchcord
48 – Patchcord
49 – Patchcord
50 – P1 (Depot only)
51 – Washer
52 – Screw

Figure 2-52. Repair of PB-208 - view 1.



1 – Terminal board
2 – Screw
3 – Washer
4 – A1 (Depot repair)
5 – R7, R28
6 – R1
7 – R16
8 – R3, R12
9 – C1
10 – E1-E10, E13-E39, E41-E48, E50, E52, E54-E56, E58-E62, E64, E65, E67-E71, E73-E87
11 – Screw
12 – Washer
13 – Washer
14 – R48
15 – R10, R11
16 – R14, R31
17 – R27
18 – Screw
19 – Washer
20 – Nut
21 – R40
22 – Bracket
23 – Nut
24 – Bracket
25 – R41, R42
26 – CR1
27 – R44, R45
28 – R21, R22, R30, R33, R46, R47
29 – R32
30 – R17
31 – R34
32 – R35, R36
33 – C3
34 – Strap
35 – R37
36 – R18, R19
37 – R20
38 – R15
39 – R25, R26
40 – C2
41 – R24
42 – R8
43 – Screw
44 – Washer
45 – Nut
46 – Washer
47 – R4, R5
48 – Screw
49 – K1
50 – Screw
51 – Bracket
52 – CR2
53 – R2
54 – Spacer
55 – A2 (Depot repair)
56 – Spacer
57 – Screw

Figure 2-53. Repair of PB-208 - view 2.

CHAPTER 3

CABLES AND PLUGS

Section I. MANUAL TESTS

3-1. General

This chapter provides the information necessary to detect a fault in the cables and plugs associated with AN/TSM-93 programmed tests. Table 3-1 lists the cables and plugs and the figure references for each of the cables and plugs. Figures 3-1 through 3-54 are provided to aid in troubleshooting.

Table 3-1. Cable Figure Reference[1]

short no.	APN	Figure	Short no.	APN	Figure
CA-209	11154137	3-1	CA-232	11153457	3-24
	11157208		CA-233	11153458	3-25
CA-210	11154135	3-2	CA-234	11153845	3-26
CA-211	11154138	3-3	CA-236	11153126	3-27
	11157209		CA-238	11153128	3-28
CA-212	11154491	3-4	CA-240	11154426	3-29
CA-213	11154845	3-5		11157217	
CA-214	11154943	3-6	CA-241	11154472	3-30
	11157206		CA-242	11154485	3-31
CA-215	11153974	3-7	CA-243	11154136	3-32
	11157174		CA-244	11154946	3-33
CA-216	11154067	3-8	CA-245	10683007	3-34
	11157212		TA-205	11154431	3-35
CA-217	11154084	3-9	TA-209	11153347	3-36
	11157211		TA-210	11154496	3-37
CA-218	11154073	3-10	TA-213	11154129	3-38
	11157213		TA-214	11154130	3-39
CA-219	11154085	3-11	TA-215	11154131	3-40
	11157177		TA-217	11154626	3-41
CA-220	13047723	3-12	TA-218	11154627	3-42
CA-221	11154260	3-13	TA-219	11154628	3-43
	11157214		TA-231	11154128	3-44
CA-222	11154261	3-14	TA-234	10683325	3-45
	11157210		TA-235	10683326	3-46
CA-223	11154071	3-15	TA-236	10683327	3-47
	11157185		TA-238	10683329	3-48
CA-224	11153960	3-16	TA-239	10683330	3-49
CA-225	11152475	3-17	TA-240	10683331	3-50
CA-226	11152476	3-18	TA-242	10683328	3-51
CA-227	11152477	3-19	TA-244	11156743	3-52
CA-228	11153841	3-20	---	8894622	3-53
CA-229	11153842	3-21	TA-246	13047718	3-53.1
CA-230	11153843	3-22	TA-247	13047719	3-53.2
CA-231	11153844	3-23			

[1]The tables listed by a single short no. are electrically the same.

3-2. Equipment Required for Manual Tests

The following equipment is required to test the cables and plugs:

a.	Ohmmeter ZM-21A/U	6625-00-581-2466
b.	Multimeter, AN/USM-303 or equivalent	6625-00-933-2406

3-3. Test Instructions

a. Visual Inspection. Examine the cable for cut or broken wires, loose connectors or bent pins.

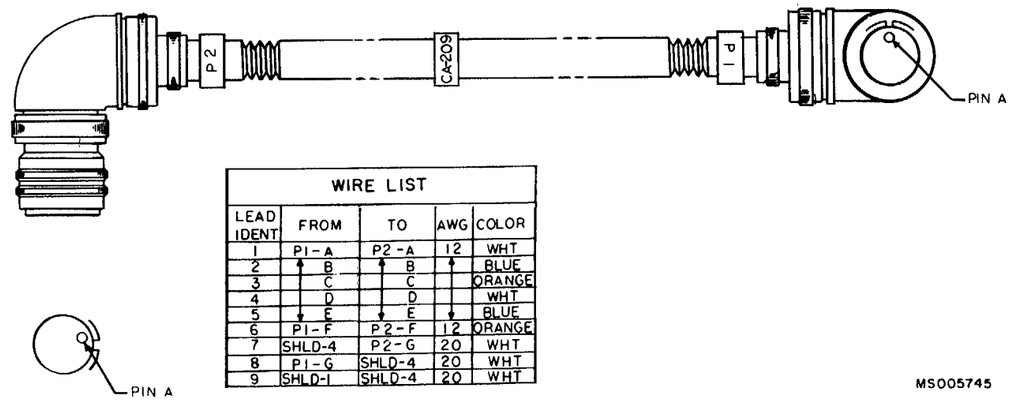
NOTE
An underlined letter on the wire list means a lower case letter.

b. Continuity Check. With the wire list as a guide, connect the multimeter across each wire in the cable and check for negligible resistance.

c. Shield Isolation Check. Connect the multimeter from the shield to each individual pin and check to insure that the shield is not shorted to the pin. A minimum of 100K ohms is acceptable.

d. Lead Isolation Check. Check that shorts do not exist between each wire and every other wire. A minimum of 100K ohms is acceptable.

e. Lead Insulation Check. Connect the megger to each end of the wires with high insulation and check for insulation breakdown. These wires consist of those used to carry stimuli (28 vdc, 120 vac, or 240 vac).

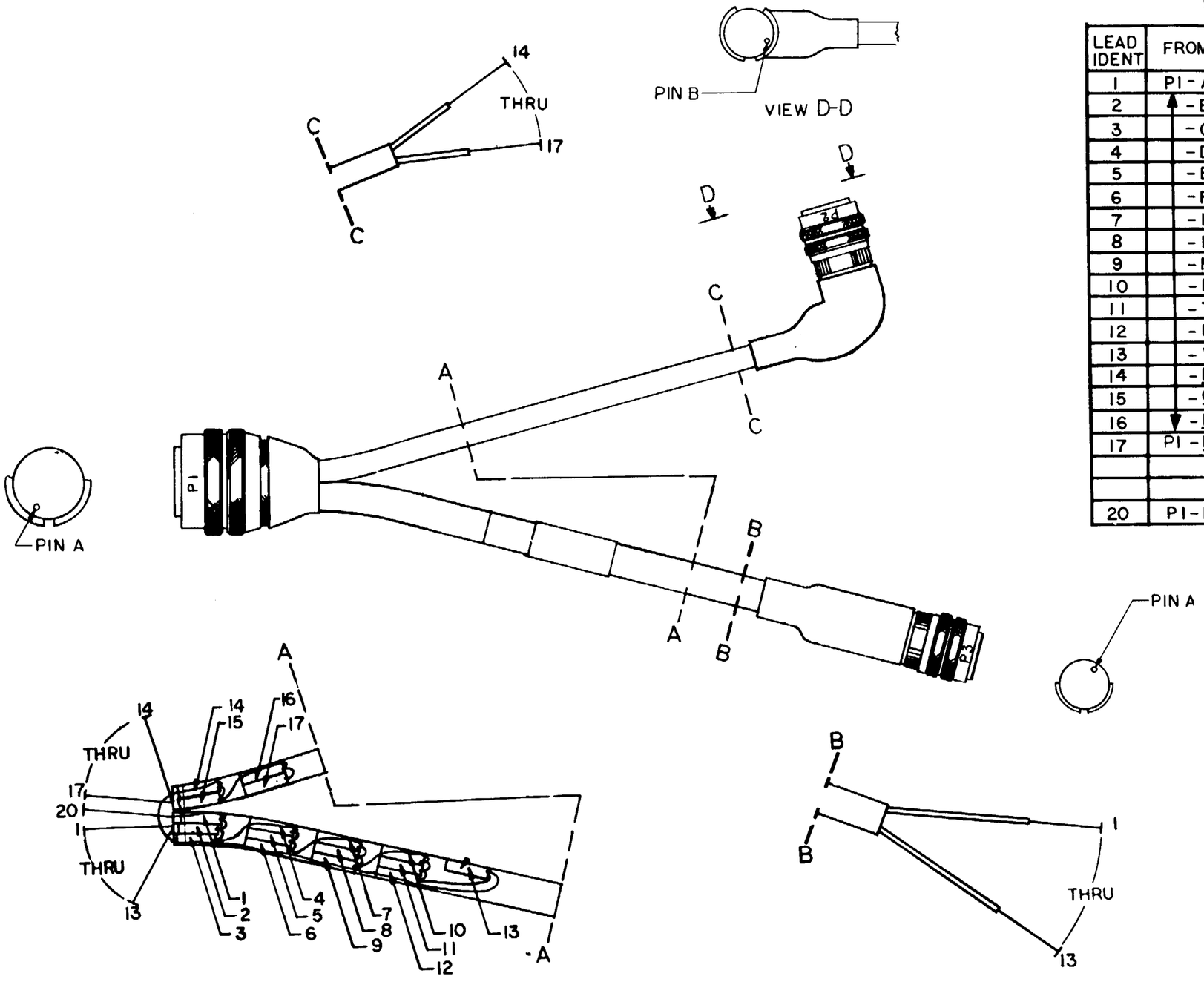


WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-A	P2-A	12	WHT
2	B	B		BLUE
3	C	C		ORANGE
4	D	D		WHT
5	E	E		BLUE
6	P1-F	P2-F	12	ORANGE
7	SHLD-4	P2-G	20	WHT
8	P1-G	SHLD-4	20	WHT
9	SHLD-1	SHLD-4	20	WHT

MS005745

Figure 3-1. CA-209.



WIRE LIST

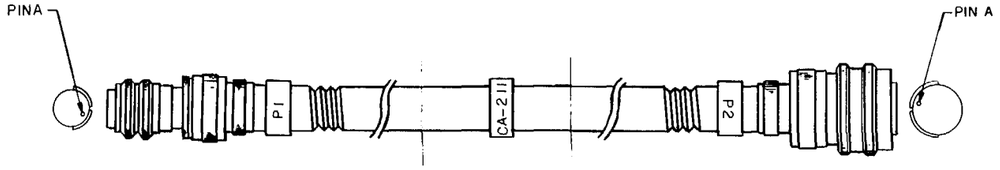
LEAD IDENT	FROM	TO	AWG	COLOR
1	P1 - A	P3 - A	20	WHITE
2	- B	- B		
3	- C	- C		
4	- D	- D		
5	- E	- E		
6	- F	- F		
7	- K	- K		
8	- L	- L		
9	- M	- M		
10	- N	- N		
11	- T	- T		
12	- U	- U		
13	- V	P3 - V		
14	- B	P2 - B		
15	- C	- C		
16	- E	- E		
17	P1 - F	P2 - F	20	WHITE
20	P1 - PP	SHLD - 1	22	WHITE

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
21	SHLD - 1	SHLD - 2	22	WHITE
22	- 2	- 3		
23	- 3	- 4		
24	- 4	- 5		
25	- 5	- 6		
26	- 6	- 7		
27	- 7	- 8		
28	- 8	- 9		
29	- 9	- 10		
30	- 10	- 11		
31	- 11	- 12		
32	- 12	- 13		
33	- 13	- 14		
34	- 14	- 15		
35	- 15	- 16		
36	SHLD - 16	SHLD - 17	22	WHITE

MI 100071

Figure 3-2. CA-210.



WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
1	P1 - A	P2 - Z	20	WHITE
2	B	AA		
3	C	N		
4	D	V		
5	E	X		
6	F	Y		
7	G	R		
8	H	W		
9	J	Q		
10	L	BB		
11	M	DD		
12	N	CC		
13	P	K		
14	R	I		
15	S	S		
16	T	FF		
17	U	T		
18	V	P2 - EE	2	
19	P1 - K	SHLD - 1	22	
20	SHLD - 1	P2 - U		
21	1	SHLD - 2		
22	2	3		
23	3	4		
24	4	5		
25	5	6		
26	6	7		
27	7	8		
28	8	9		
29	9	10		
30	10	11		
31	11	12		
32	12	13		
33	13	14		
34	14	15		
35	15	16		
36	16	17		
37	SHLD - 17	SHLD - 18	22	WHITE

MS005746

Figure 3-3. CA-211.

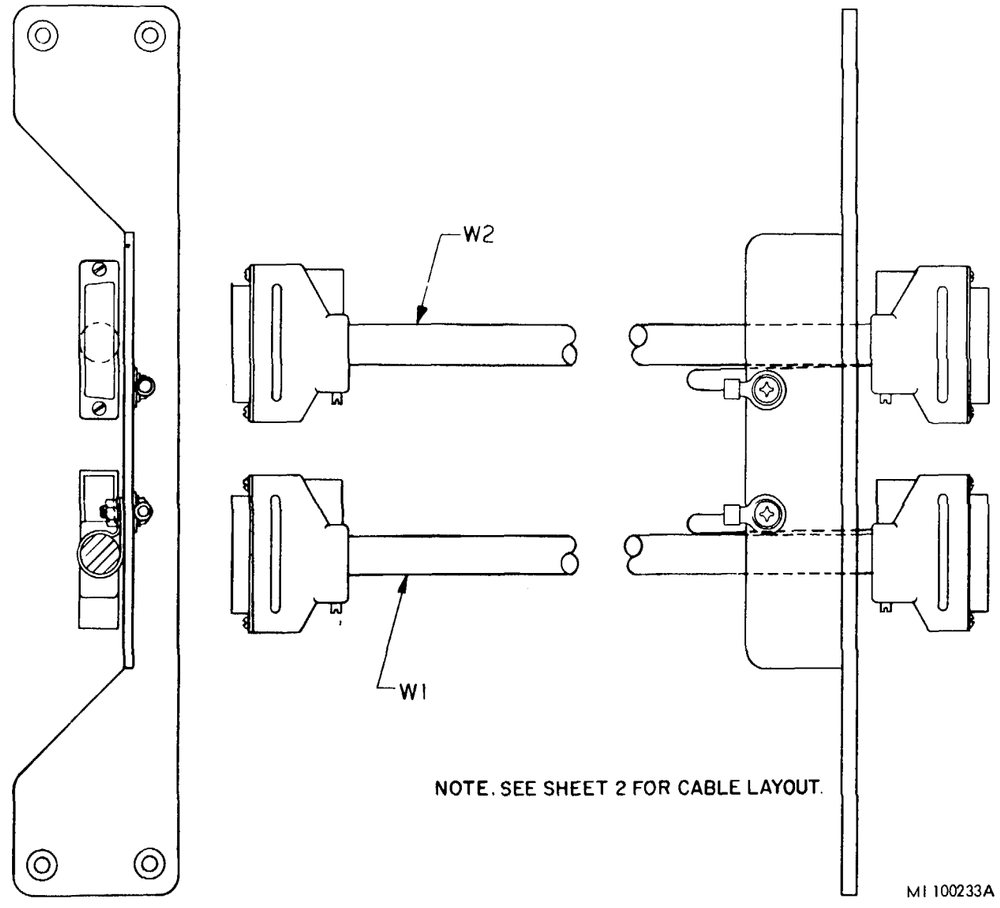


Figure 3-4. CA-212 (sheet 1 of 2).

LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-1	P2-1	22	WHT
2	2	2	20	
3	3	3	20	
4	4	4	22	
5	5	5		
6	6	6		
7	7	7		
8	8	8		
9	9	9		
10	10	10		
11	11	11		
12	12	12		
13	13	13	22	
14	14	14	20	
15	15	15	22	
16	16	16	22	
17	17	17		
18	18	18		
19	19	19		
20	20	20		
21	21	21		
22	22	22		
23	23	23		
24	24	24		
25	P1-25	P2-25		
26	SHLD-1	SHLD-2		
27	SHLD-2	SHLD-3		
28	SHLD-3	SHLD-14		
29	SHLD-14	SHLD-15		
30	SHLD-15	SHLD-16		
31	SHLD-16		22	WHT

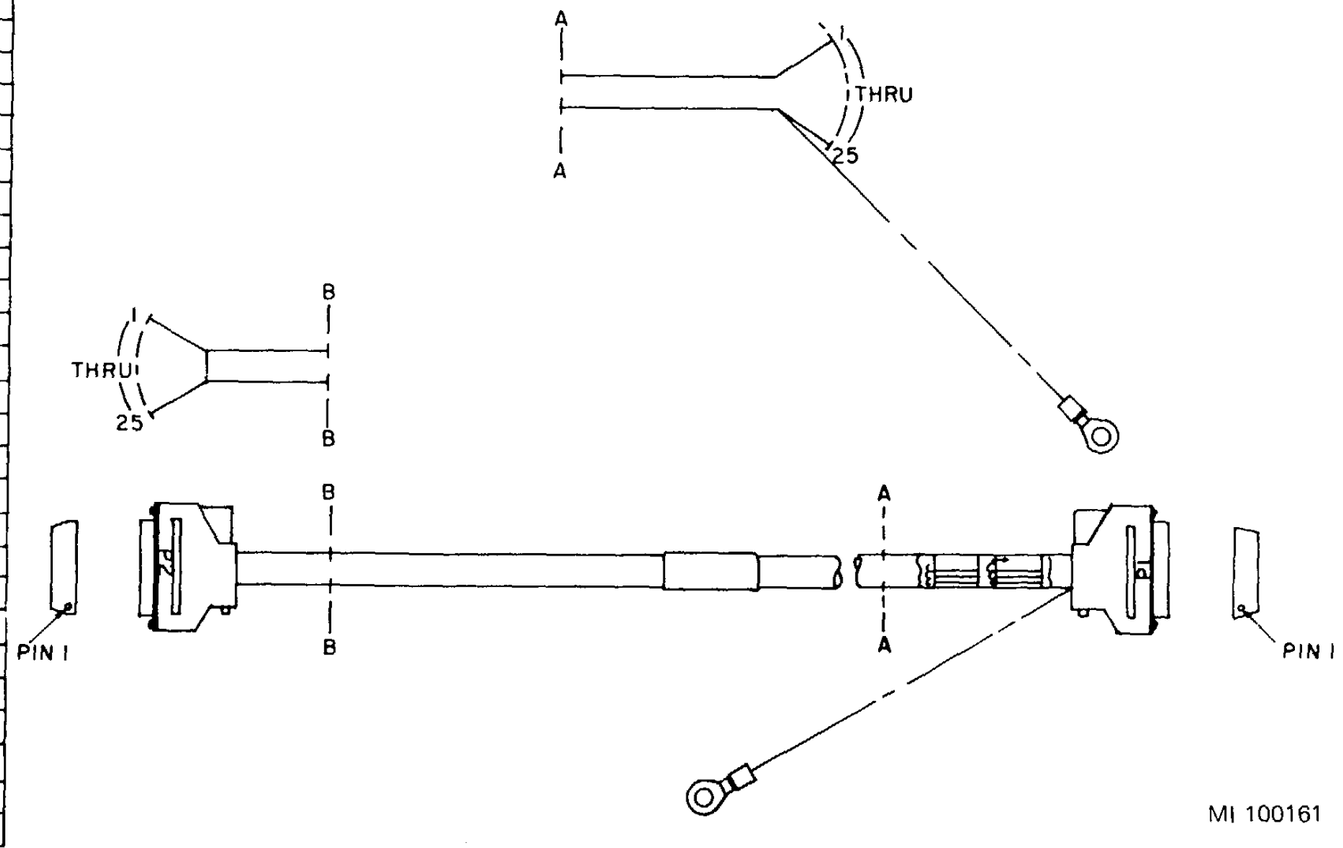


Figure 3-4. (sheet 2 of 2).

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
1	P1- A	P2- AA	20	WHT
2	T	BB		
3	S	CC		
4	U	DD		
5	E	EE		
6	N	KK		
7	A	LL		
8	B	MM		
9	P1- L	P2 - NN		
10	SHLD -1	SHLD-2		
11	2	3		
12	3	4		
13	4	5		
14	5	6		
15	SHLD-6	SHLD-7	20	WHT

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
16	SHLD -7	SHLD -8	20	WHT
17	8	SHLD -9		
18	5	P1 - M		
19	SHLD -9	P2- Z		
20	P1 - J	P1 - K	20	WHT

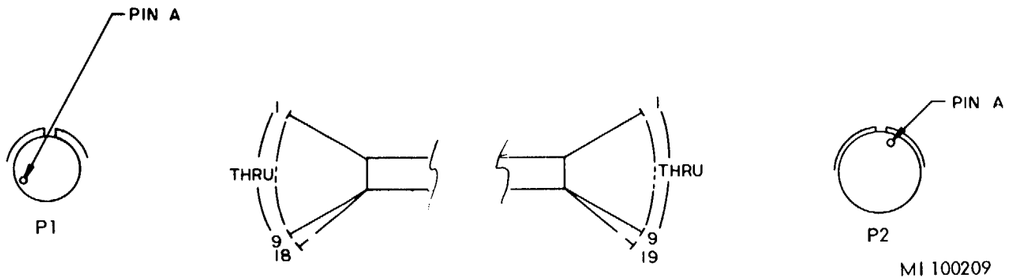
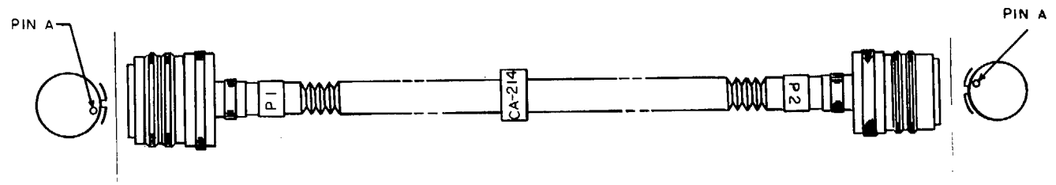


Figure 3-5. CA-213.



WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
1	P1 - A	P2 - A	22	WHT
2	-B	-B		
3	-C	-C		
4	-D	-D		
5	-E	-E		
6	-F	-F		
7	-G	-G		
8	-H	-H		
9	-J	-J		
10	-K	-K		
11	-L	-L		
12	-M	-M		
13	-N	-N		
14	-P	-P		
15	-R	-R		
16	-S	-S		
17	-T	-T		
18	-U	-U		
19	-V	-V		
20	-W	-W		
21	-X	-X		
22	-Y	-Y		
23	-Z	-Z		
24	-A	-A		
25	-B	-B		
26	-C	-C		
27	-D	-D		
28	-E	-E		
29	-F	-F		
30	-G	-G		
31	-H	-H		
32	-J	-J		
33	-K	-K		
34	-L	-L		
35	-M	-M		
36	-P	-P		
37	-R	-R		
38	-S	P2 - S		
39	P1 -PP	SHLD-38		
40	SHLD-2	-11		
41	-11	-15		
42	-15	-20		
43	-20	-26		
44	-26	-34		
45	SHLD-34	SHLD-38		
46	P1 - AA	P2 SHELL		
47	P1- T	P2 - T	22	WHT

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Figure 3-6. CA-214.

WIRE LIST							
LEAD IDENT	FROM		TO		AWG	COLOR	
1	P1-B		P2-B		22	WHT	
2		C		C			
3		D		D			
4		E		E			
5		F		F			
6		G		G			
7		H		H			
8		J		J			
9		K		K			
10		L		L			
11		M		M			
12		N		N			
13		T		T			
14		U		U			
15		V		V			
16		W		W			
17		X		X			
18		Y		Y			
19		Z		Z			
20		A		A			
21		C		C			
22		D		D			
23		E		E			
24		F		F			
25		G		G			
26		H		H			
27		J		J			
28		M		M			
29		P		P			
30		R		R			
31		S		S			
32		U		U			
33		V		V			
34		W		W			
35		X		X			
36		Y		Y			
37		Z		Z			
38		DD		DD			
39		EE		EE			
40		GG		GG			
41	P1-HH		P2-HH		22	WHT	

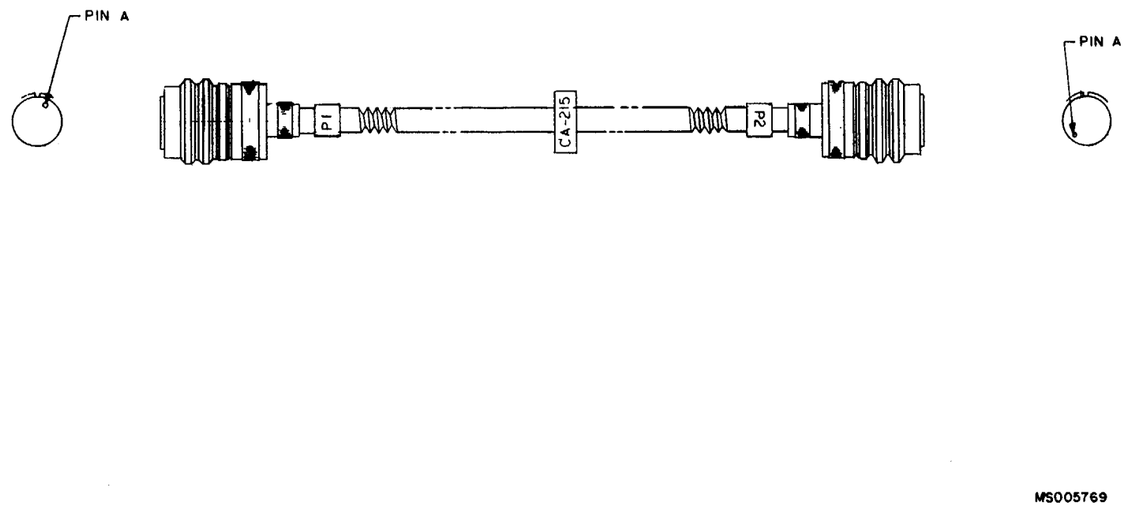


Figure 3-7. CA-215.

WIRE LIST				
LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-B	P2-B	22	WHITE
2	C	C		
3	E	E		
4	F	F		
5	G	G		
6	K	K		
7	L	L		
8	M	M		
9	N	N		
10	P	P		
11	T	T		
12	U	U		
13	W	W		
14	X	X		
15	Y	Y		
16	Z	Z		
17	A	A		
18	B	B		
19	C	C		
20	F	F		
21	G	G		
22	H	H		
23	I	I		
24	J	J		
25	M	M		
26	N	N		
27	R	R		
28	S	S		
29	T	T		
30	U	U		
31	W	W		
32	X	X		
33	P1-Y	P2-Y	22	WHITE

WIRE LIST				
LEAD IDENT	FROM	TO	AWG	COLOR
34	P1-V	P3-V	22	WHITE
35	AA	P		
36	EE	E		
37	FF	F		
38	GG	R		
39	HH	H		
40	JJ	J		
41	KK	K		
42	LL	L		
43	P1-NN	P3-U	22	WHITE

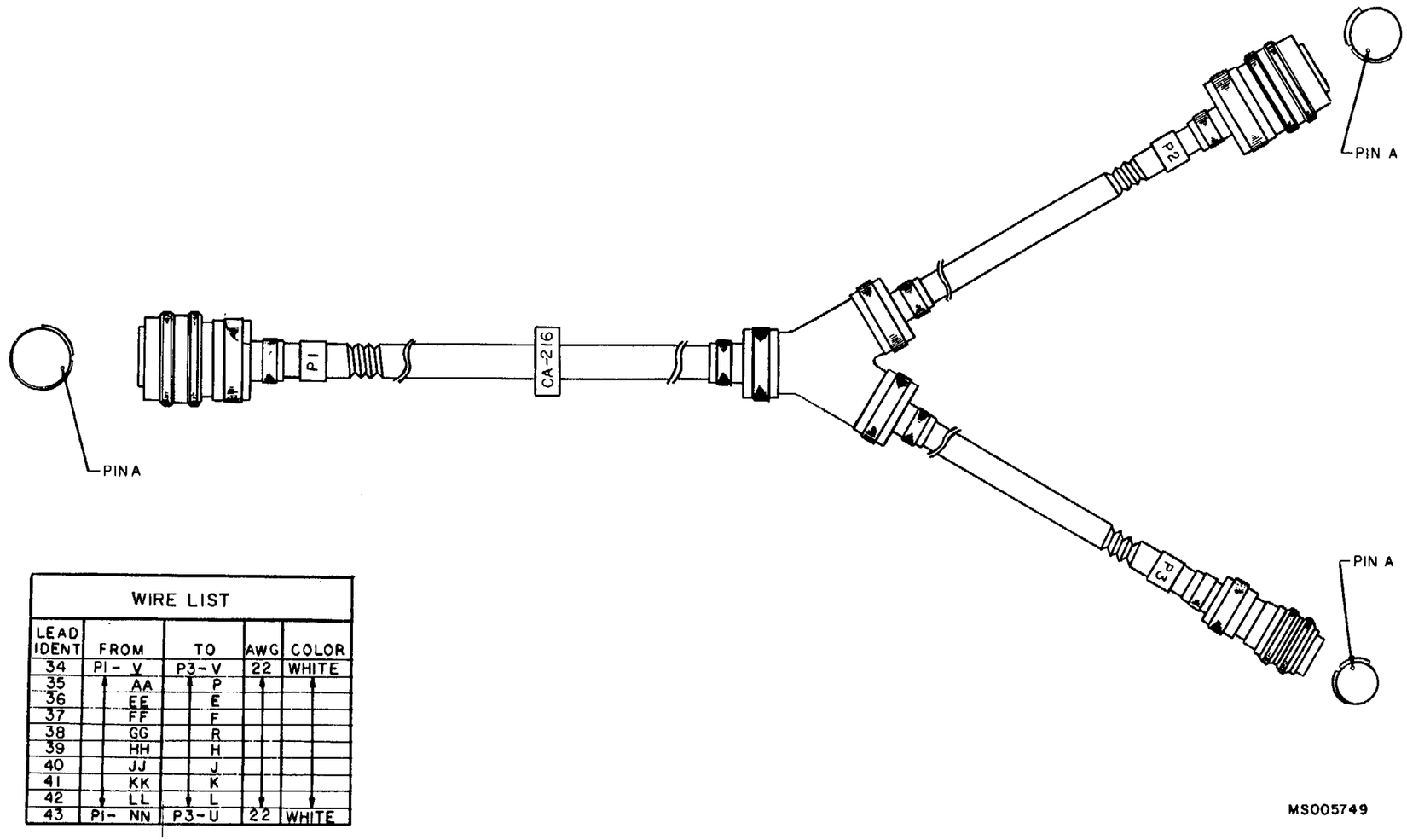
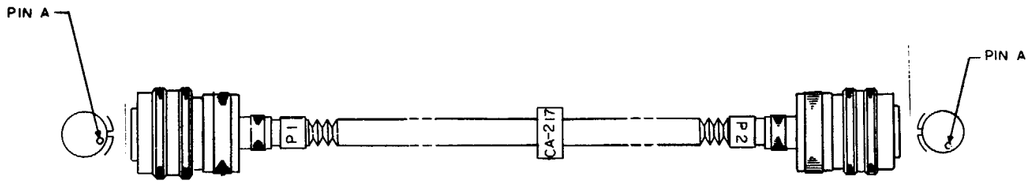


Figure 3-8. CA-216.



WIRE LIST				
LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-C	P2-C	22	WHT
2	-D	-D		
3	-E	-E		
4	-F	-F		
5	-H	-H		
6	-L	-L		
7	-M	-M		
8	-N	-N		
9	-S	-S		
10	-T	-T		
11	-V	-V		
12	-Y	-Y		
13	-Z	-Z		
14	-D	-D		
15	-E	-E		
16	-G	-G		
17	-J	-J		
18	-S	-S		
19	-KK	-T		
20	-U	-U		
21	-W	-W		
22	-V	-V		
23	-X	-X		
24	-BB	-BB		
25	-EE	-EE		
26	-FF	-FF		
27	-GG	-GG		
28	-HH	-HH		
29	P1-DD	P2-DD	22	WHT

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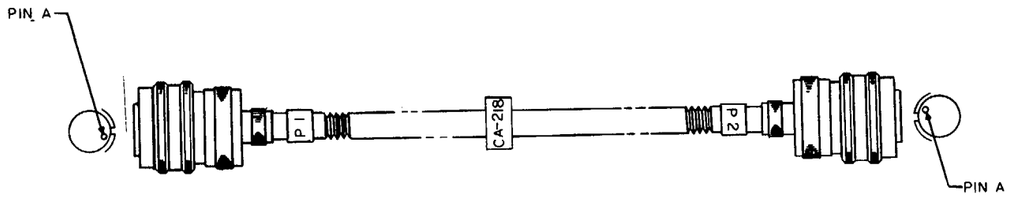
Figure 3-9. CA-217.



WIRE LIST				
LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-Y	P2-Y	22	WHT
2	-N	-N		
3	-V	-V		
4	P1-JJ	P2 JJ	22	WHT

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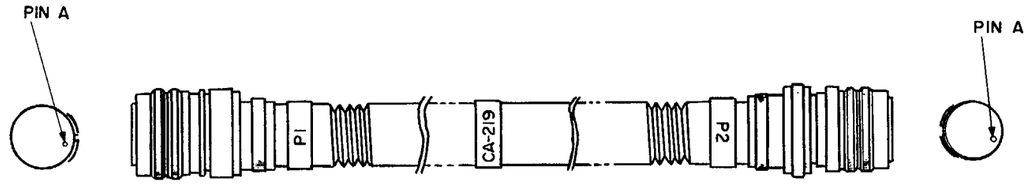
Figure 3-10. CA-218.



WIRE LIST				
LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-A	P2-A	22	WHT
2	B	B		
3	D	D		
4	F	F		
5	G	G		
6	H	H		
7	K	K		
8	L	L		
9	N	N		
10	R	R		
11	T	T		
12	U	U		
13	W	W		
14	W	V		
15	A	A		
16	E	E		
17	F	F		
18	G	G		
19	H	H		
20	H	J		
21	K	K		
22	M	M		
23	N	N		
24	U	U		
25	V	V		
26	W	W		
27	X	X		
28	AA	AA		
29	DD	DD		
30	DD	P2-Z		
31	P1-PP	SHLD-1		
32	SHLD-1	2		
33	2	3		
34	3	4		
35	4	5		
36	5	6		
37	6	7		
38	7	8		
39	8	9		
40	9	10		
41	SHLD-10	SHLD-11	22	WHT

WIRE LIST				
LEAD IDENT	FROM	TO	AWG	COLOR
42	SHLD-11	SHLD-12	22	WHT
43	12	13		
44	13	14		
45	14	15		
46	15	16		
47	16	17		
48	17	18		
49	18	19		
50	19	20		
51	20	21		
52	21	22		
53	22	23		
54	23	24		
55	24	25		
56	25	26		
57	26	27		
58	27	28		
59	28	29		
60	SHLD-29	SHLD-30	22	WHT
61				
62	P1-HH	P2-HH	22	WHT

MS005759

Figure 3-11. CA-219.

WIRE LIST				
LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-B	P2-B	22	WHT
2	C	C		
3	D	D		
4	E	E		
5	S	S		
6	X	X		
7	Y	Y		
8	Z	Z		
9	K	K		
10	P1-P	P2-P		
11	WNI	P3-P		
12	P1 BB	B		
13	CC	C		
14	DD	D		
15	HH	H		
16	P1-MM	P3-S		
17	SHLD-1	SHLD-2		
18	2	3		
19	3	4		
20	4	5		
21	5	6		
22	6	7		
23	7	8		
24	8	9		
25	9	10		
26	10	16		
27	16	12		
28	12	13		
29	13	14		
30	14	15		
31	15	11		
32	SHLD-11	SHLD-33		
33	WNI	P3-E		
34	WNI	P3-F		
35	WNI	P3-R		
36	SHLD-33	SHLD-34		
37	SHLD-34	SHLD-35		
38	SHLD-35	P1-PP		
39	P1-Z	WNI		
40	P1-Q	P2-W		
41	P2-R	P2-A		
42	P1-J	P2-BB	22	WHT
43	P1-H	P2-V	22	WHT

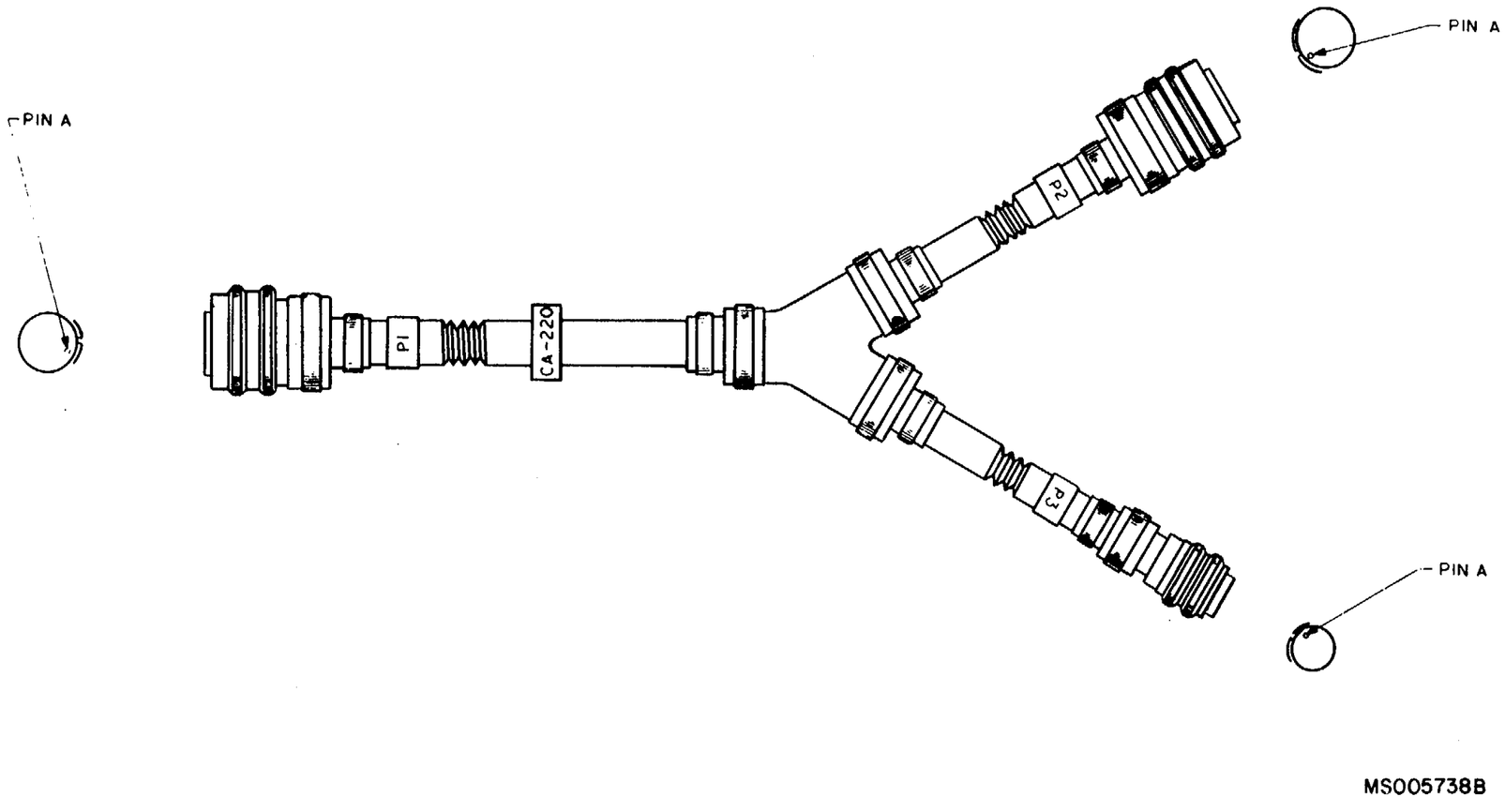
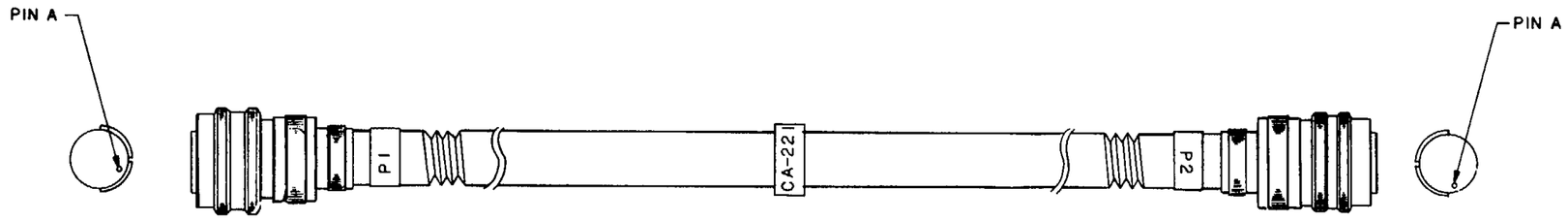


Figure 3-12. CA-220.

WIRE LIST				
LEAD IDENT	FROM	TO	AWG	COLOR
1	P1 - C	P2 - C	22	WHITE
2	J	J		
3	K	K		
4	R	R		
5	U	U		
6	W	W		
7	Y	Y		
8	A	A		
9	B	B		
10	C	C		
11	I	I		
12	J	J		
13	K	K		
14				
15	JJ	S		
16	I	T		
17	GG	GG		
18	Z	Z		
19	AA	AA		
20	BB	BB		
21	EE	EE	22	
22	U	U	24	
23	U	P2 - W	24	
24	P1 - PP	SHLD - 1	22	
25	SHLD - 1	2		
26	2	3		
27	3	4		
28	4	5		
29	5	6		
30	6	7		
31	7	8		
32	8	9		
33	9	10		
34	10	11		
35	11	12		
36	SHLD-12	SHLD-13	22	WHITE

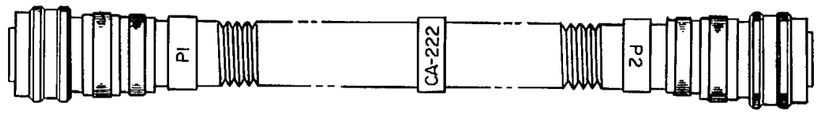


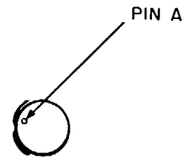
WIRE LIST				
LEAD IDENT	FROM	TO	AWG	COLOR
37	SHLD - 13	SHLD - 15	22	WHITE
38				
39	15	16		
40	16	17		
41	17	18		
42	18	19		
43	19	20		
44	20	21		
45	21	22		
46	SHLD - 22	SHLD - 23	22	WHITE

MS005751

Figure 3-13. CA-221.

WIRE LIST					
LEAD IDENT	FROM		TO	AWG	COLOR
1	P1 - A		P2 - A	22	WHT
2	B		B		
3	C		C		
4	D		D		
5	E		E		
6	F		F		
7	G		G		
8	H		H		
9	J		J		
10	K		K		
11	L		L		
12	M		M		
13	N		N		
14	P		P		
15	R		R		
16	S		S		
17	T		T		
18	U		U		
19	V		V		
20	W		W		
21	X		X		
22	Z		Z		
23	A		A		
24	B		B		
25	C		PP		
26	D		D		
27	E		E		
28	F		F		
29	G		G		
30	H		H		
31	I		I		
32	K		K		
33	M		M		
34	N		N		
35	P		P		
36	R		R		
37	S		S		
38	T		I		
39	U		U		
40	W		W		
41	X		X		
42	Y		Y		
43	Z		Z		
44	AA		AA		
45	BB		BB		
46	CC		CC		
47	DD		DD		
48	EE		EE		
49	FF		FF		
50	GG		GG		
51	HH		HH		
52	KK		KK		
53	LL		LL		
54	MM		MM		
55	NN		NN		
56	J		P2 - J		
57	P1-PP		SHLD-113		
58	SHLD-1		SHLD-2		
59	SHLD-2		SHLD-3	22	WHT





WIRE LIST					
LEAD IDENT	FROM		TO	AWG	COLOR
60	SHLD-3		SHLD-4	22	WHT
61	4		5		
62	5		6		
63	6		7		
64	7		8		
65	8		9		
66	9		10		
67	10		11		
68	11		12		
69	12		13		
70	13		14		
71	14		15		
72	15		16		
73	16		17		
74	17		18		
75	18		19		
76	19		20		
77	20		21		
78	21		22		
79	22		23		
80	23		24		
81	24		25		
82	25		26		
83	26		27		
84	27		28		
85	28		29		
86	29		30		
87	30		31		
88	31		32		
89	32		33		
90	33		34		
91	34		35		
92	35		36		
93	36		37		
94	37		38		
95	38		39		
96	39		40		
97	40		41		
98	41		42		
99	42		43		
100	43		44		
101	44		45		
102	45		46		
103	46		47		
104	47		48		
105	48		49		
106	49		50		
107	50		51		
108	51		52		
109	52		53		
110	53		54		
111	54		55		
112	SHLD-55		SHLD-56		
113	P1 - Q		P2 - Q		
114	SHLD-56		SHLD-113	22	WHT

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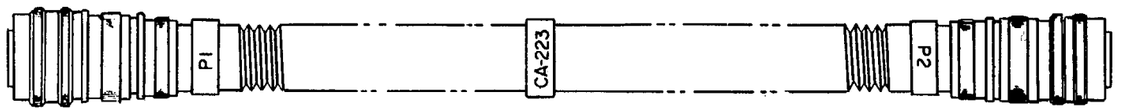
Figure 3-14. CA-222.

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-A	P2-A	22	WHT
2	B	B	↑	↑
3	C	C		
4	D	D		
5	E	E		
6	F	F		
7	G	G		
8	H	H		
9	J	J		
10	K	K		
11	L	L		
12	M	M		
13	N	N		
14	P	P		
15	R	R		
16	S	S		
17	T	T		
18	U	U		
19	V	V		
20	W	W		
21	X	X		
22	Y	Y		
23	Z	Z		
24	A	A		
25	B	B		
26	C	C		
27	D	D		
28	E	E		
29	F	F		
30	G	G		
31	H	H		
32	J	J		
33	K	K		
34	L	L		
35	M	M		
36	N	N		
37	P	P		
38	Q	Q		
39	R	R		
40	S	S		
41	T	T		
42	U	U		
43	V	V		
44	W	W		
45	X	X		
46	Y	Y		
47	Z	Z		
48	AA	AA		
49	BB	BB		
50	CC	CC		
51	DD	DD		
52	EE	EE		
53	FF	FF		
54	GG	GG	↓	↓
55	P1-HH	P2-HH	22	WHT

PIN A



PIN A

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
56	SHLD-1	SHLD-2	22	WHT
57	2	3	↑	↑
58	3	4		
59	4	5		
60	5	6		
61	6	7		
62	7	8		
63	8	9		
64	9	10		
65	10	11		
66	11	12		
67	12	13		
68	13	14		
69	14	15		
70	15	16		
71	16	17		
72	17	18		
73	18	19		
74	19	20		
75	20	21		
76	21	22		
77	22	23		
78	23	24		
79	24	25		
80	25	26		
81	26	27		
82	27	28		
83	28	29		
84	29	30		
85	30	31		
86	31	32		
87	SHLD-32	SHLD-33	22	WHT
88	SHLD-33	SHLD-34	22	WHT
89	34	35	↑	↑
90	35	36		
91	36	37		
92	37	38		
93	38	39		
94	39	40		
95	40	41		
96	41	42		
97	42	43		
98	43	44		
99	44	45		
100	45	46		
101	46	47		
102	47	48		
103	48	49		
104	49	50		
105	50	51		
106	51	52		
107	52	53		
108	53	54		
109	54	SHLD-55	↓	↓
110	SHLD-55	P1-PP	22	WHT

MS005754

Figure 3-15. CA-223.

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR	LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-A	P2-A	22	WHITE	12	SHLD-1	SHLD-2		
2	-B	-B			13	-2	-3		
3	-C	-C			14	-3	-4		
4	-D	-D			15	-4	-5		
5	-E	-E			16	-5	-6		
6	-F	-F			17	-6	-7		
7	-G	-G			18	-7	-8		
8	-H	-H			19	-8	-9		
9	-J	-J			20	-9	-10		
10	-K	-K			21	-10	SHLD-11		
11	P1-L	P2-L			22	SHLD-11	P1-PP	22	WHITE

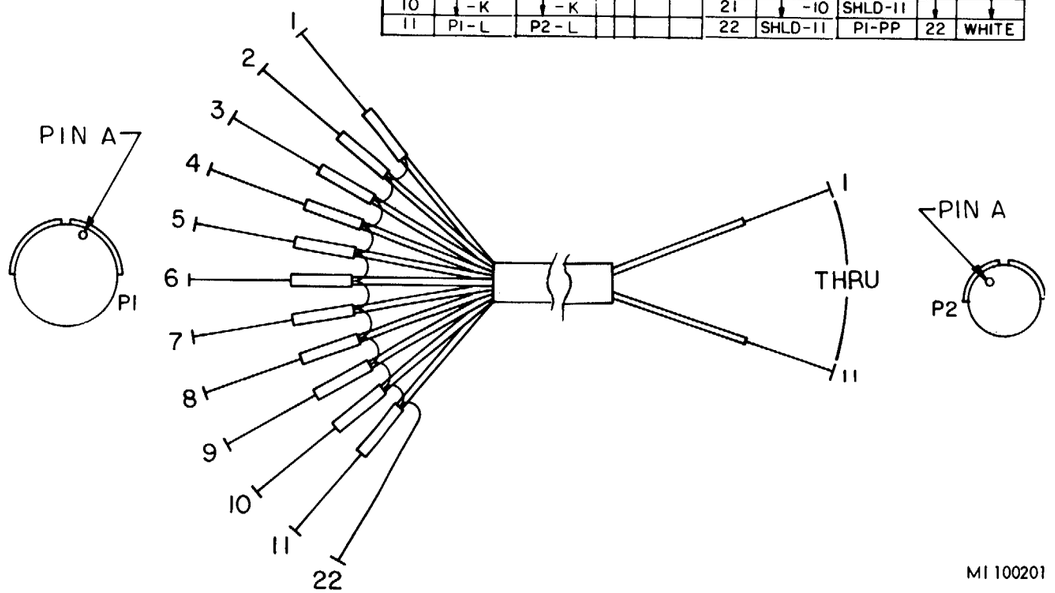


Figure 3-16. CA-224.

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR	LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-A	P2-S	22	WHITE	17	-V	P2-G		WHITE
2	-B	-E		BLUE	18	P1-U	SHLD-1		
3	-C	-C			19	SHLD-1	-7		
4	-D	-D			20	-7	-8		
5	-E	-F			21	-8	-13		
6	-F	-R			22	SHLD-13	-15		
7	-G	-J			23	P1-J	-9		
8	-H	-T			24	SHLD-9	-11		
9	-K	-M		WHITE	25	P2-H	-1		
10	-L	-N		BLUE	26	SHLD-1	-7		
11	-M	-B		WHITE	27	-7	-8		
12	-N	-P		BLUE	28	-8	-13		
13	-P	-K		WHITE	29	SHLD-13	-15		
14	-R	-U		BLUE	30	P2-A	-11		
15	-S	-L		WHITE	31	SHLD-11	SHLD-9	22	WHITE
16	-T	-V		BLUE					

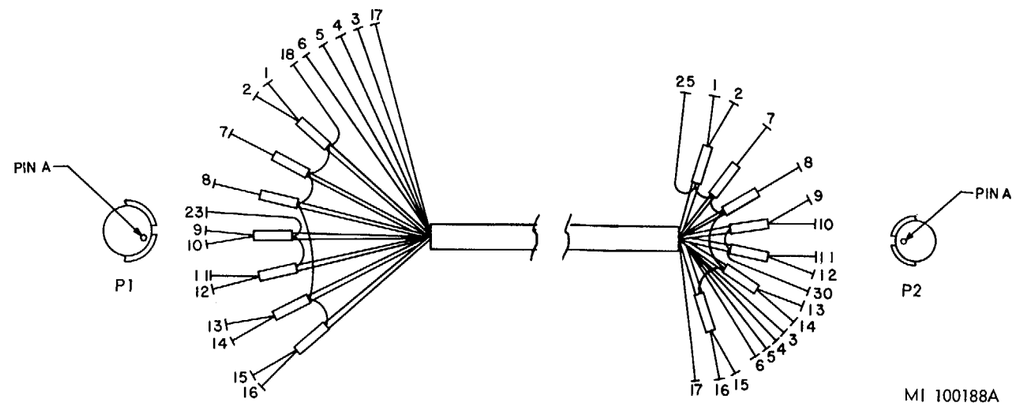
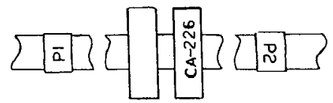
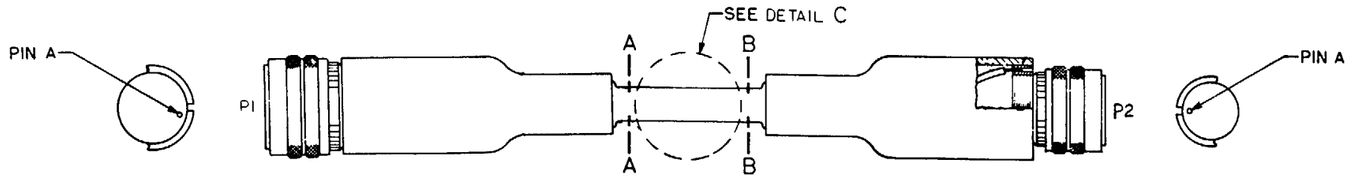


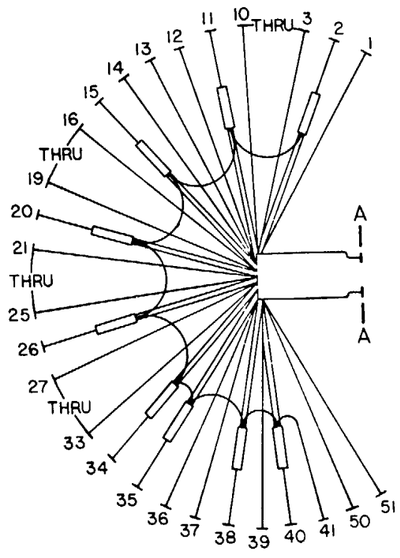
Figure 3-17. CA-225.

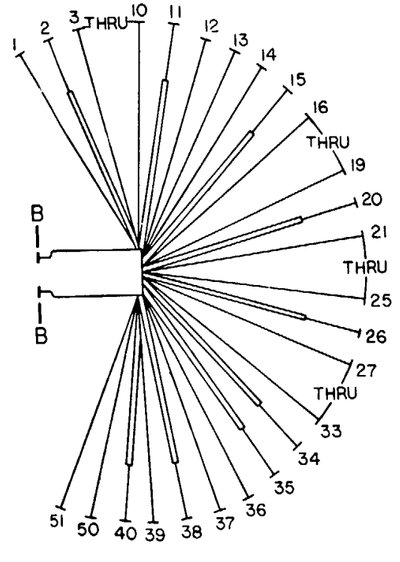
WIRE LIST					
LEAD IDENT	FROM	WIRE ROUTE	TO	AWG	COLOR
1	P1 - A		P2 - A	22	WHITE
2	- B		- B		
3	- C		- C		
4	- D		- D		
5	- E		- E		
6	- F		- F		
7	- G		- G		
8	- H		- H		
9	- J		- J		
10	- K		- K		
11	- L		- L		
12	- M		- M		
13	- N		- N		
14	- P		- P		
15	- R		- R		
16	- S		- S		
17	- T		- T		
18	- U		- U		
19	- V		- V		
20	- W		- W		
21	- X		- X		
22	- Y		- Y		
23	- Z		- Z		
24	- A		- A		
25	- B		- B		
26	- C		- C		
27	- D		- D		
28	- E		- E		
29	- F		- F		
30	- G		- G		
31	- H		- H		
32	- I		- I		
33	- J		- J		
34	- K		- K		
35	P1 - M		P2 - M	22	WHITE
36	P1 - N		P2 - N	22	WHITE
37	- P		- P		
38	- Q		- Q		
39	- R		- R		
40	- S		P2 - S		
41	P1 - PP		SHLD - 40		
42	SHLD - 2		- 11		
43	- 11		- 15		
44	- 15		- 20		
45	- 20		- 26		
46	- 26		- 34		
47	- 34		- 35		
48	- 35		- 38		
49	SHLD - 38		SHLD - 40		
50	P1 - AA		FIND NO. 13		
51	P1 - T		P2 - T	22	WHITE



DETAIL C
SCALE NONE





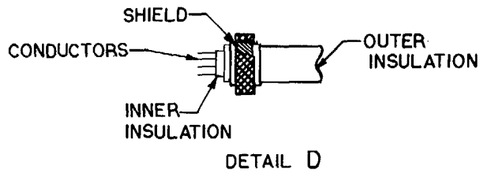


MI 101755

Figure 3-18. CA-226.

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
1	P1 - A	P2 - A	12	WHT
2	- B	- B		ORN
3	- C	- C		BLU
4	- D	- D	12	WHT
5	- E	- E		ORN
6	P1 - F	P2 - F		BLU
7	SHLD - 3	SHLD - 4	20	WHT
8	SHLD - 3	P1 - G	20	WHT
9	SHLD - 4	P2 - G	20	WHT



DETAIL D

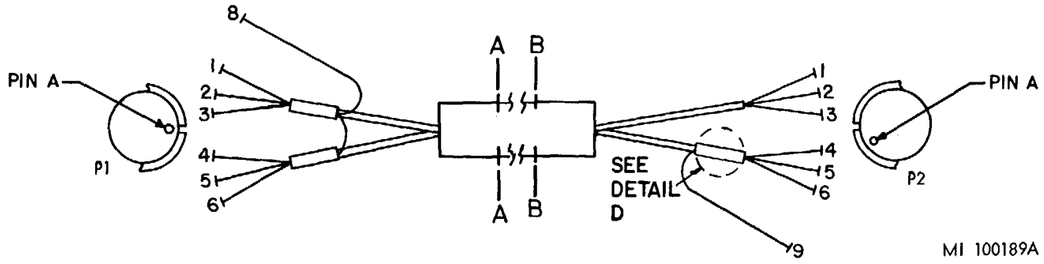


Figure 3-19. CA-227.

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-P	P2-A	20	WHT
2	Q	B		BLU
3	F	F	22	WHT
4	G	G		BLU
5	E	K		WHT
6	F	L		BLU
7	G	M		WHT
8	H	N		BLU
9	C	C		WHT
10	D	D		
11	E	E		
12	H	H		
13	MM	U		
14	LL	V		
15	P1-NN	P2-Y	22	WHT

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
16	P1-HH	P2-Z	22	WHT
17	JJ	A		
18	X	C		
19	Y	D		
20	M	M		
21	N	N		
22	R	R		
23	S	S		
24	T	T		
25	P1-Z	P2-J		
26	SHLD 1	SHLD 3		
27	3	SHLD 5		
28	5	SHLD 7		
29	7	P1-PP		
30	SHLD 1	P2-G	22	WHT

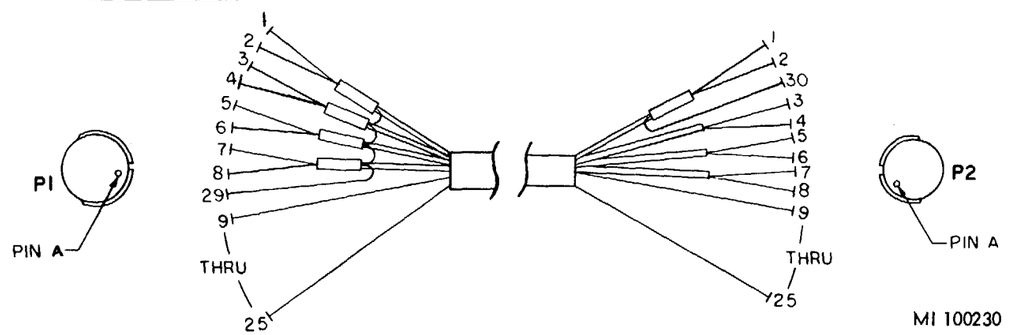


Figure 3-20. CA-228.

WIRE LIST					WIRE LIST				
WIRE IDENT	FROM	TO	AWG	COLOR	WIRE IDENT	FROM	TO	AWG	COLOR
1	P1 - A	P2 - A	22	WHITE	14	P1 - R	P2 - R	22	WHITE
2	- B	- B			15	- S	- S		
3	- C	- C			16	- T	- T		
4	- D	- D			17	- U	- U		
5	- E	- E			18	- V	- V		
6	- F	- F			19	- W	- W		
7	- H	- H			20	- X	- X		
8	- J	- J			21	- Y	- Y		
9	- K	- K			22	- $\underline{A}$	- $\underline{A}$		
10	- L	- L			23	- $\underline{B}$	- $\underline{B}$		
11	- M	- M			24	- $\underline{C}$	- $\underline{C}$		
12	- N	- N			25	- $\underline{D}$	- $\underline{D}$		
13	P1 - P	P2 - P			26	P1 - Z	P2 - Z		

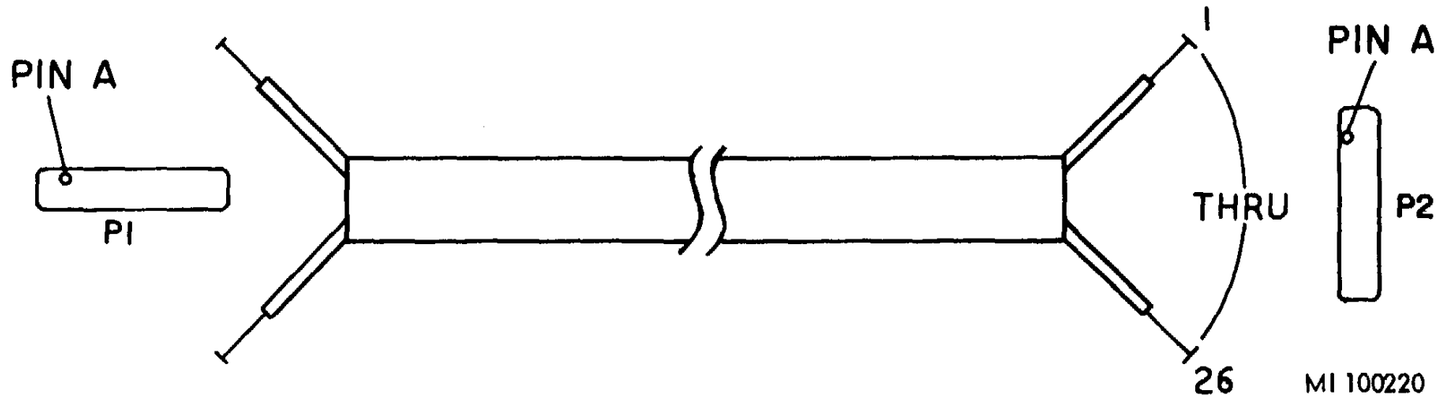


Figure 3-21. CA-229.

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
1	P1 - J	P2 - J	22	WHT
2	K	K		
3	L	L		
4	M	M		
5	N	N		
6	P	P		
7	R	R		
8	S	S		
9	T	T		
10	U	U		
11	W	H		
12	A	E		
13	B	F		
14	C	P2 - G	22	
15	P	P3 - A	20	WHT
16	Q	B		BLU
17	F	L		WHT
18	G	M		BLU
19	E	E		WHT
20	F	F		BLU
21	G	G		WHT
22	H	H		BLU
23	X	C		WHT
24	Y	D		
25	Z	K	20	
26	P1 - V	P3 - SHELL	22	
27	SHLD 15	SHLD 17		
28	17	19		
29	19	21		
30	21	23		
31	23	24		
32	24	SHLD 25		
33	25	P1-PP		
34	SHLD 25	P3-J	22	WHT

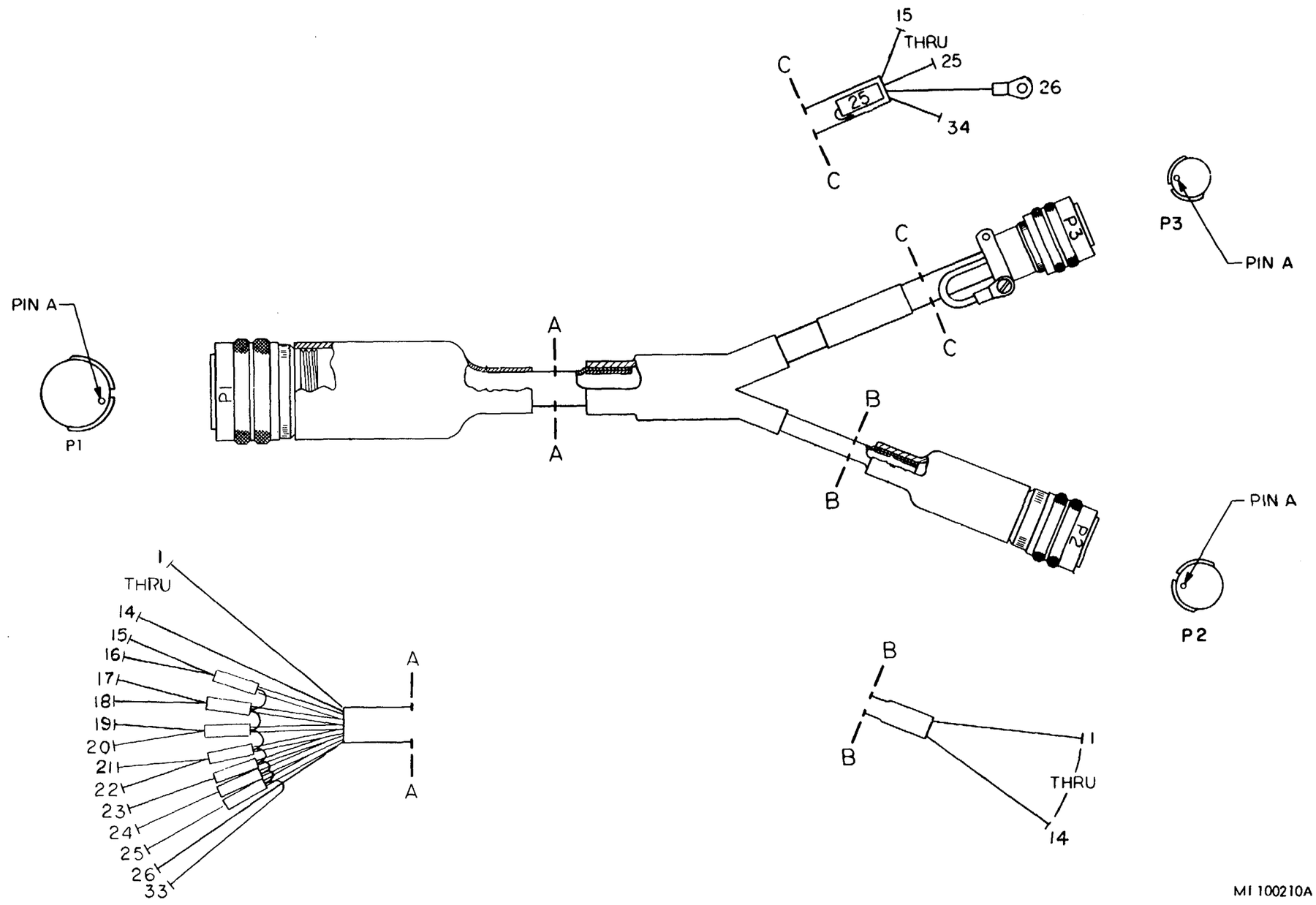


Figure 3-22. CA-230.

WIRE LIST

WIRE IDENT	FROM	TO	AWG	COLOR
1	P1-A	P2-A	20	WHITE
2	-B	-B		BLUE
3	-C	-C		WHITE
4	-D	-D		WHITE
5	-E	-K		WHITE
6	-F	-L		BLUE
7	-G	-M		WHITE
8	-H	-N		BLUE
9	-K	-W		WHITE
10	-L	-F		WHITE
11	-M	P2-G	20	BLUE
12	P1-J	SHLD-1	22	WHITE
13	SHLD-1	-3		
14	-3	-4		
15	-4	-5		
16	-5	-7		
17	-7	-9		
18	-9	SHLD-10		
19	SHLD-10	P2-H	22	WHITE

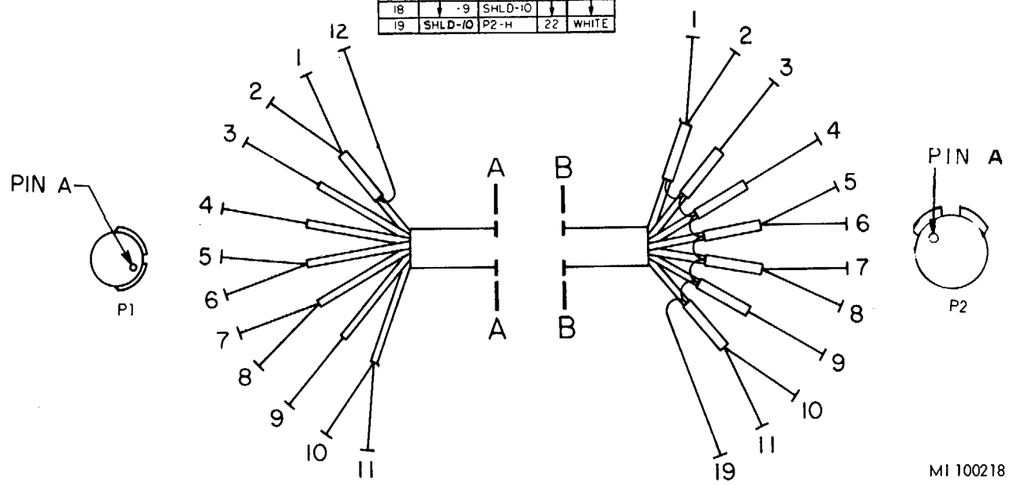


Figure 3-23. CA-231.

WIRE LIST

WIRE IDENT	FROM	TO	AWG	COLOR
1	P1-A	P2-A	22	WHITE
2	B	B		
3	C	C		
4	D	D		
5	E	E		
6	F	F		
7	H	H		
8	J	J		
9	K	K		
10	L	L		
11	M	M		
12	N	N		
13	P	P		
14	R	R		
15	S	S		
16	T	T		
17	U	U		
18	V	V		
19	W	W		
20	X	X		
21	Y	Y		
22	A	A		
23	B	B		
24	C	C		
25	D	P2-D		
26	P1-Z	P2-Z	22	WHITE

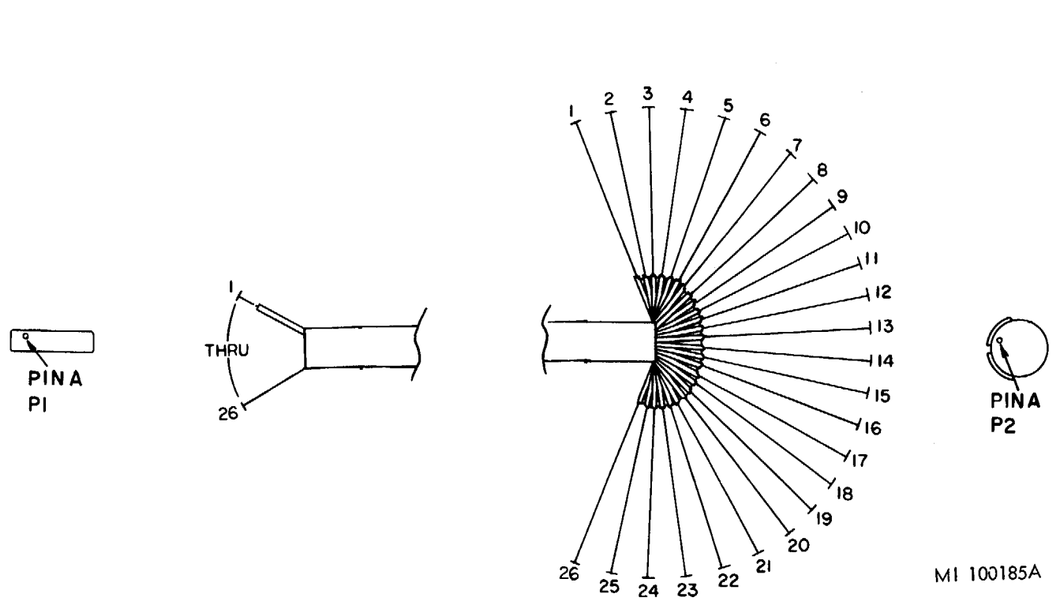


Figure 3-24. CA-232.

WIRE LIST				
WIRE IDENT	FROM	TO	AWG	COLOR
1	P1—A	P2—A	22	WHITE
2	B	B		
3	C	C		
4	D	D		
5	E	E		
6	F	F		
7	H	H		
8	J	J		
9	K	K		
10	L	L		
11	M	M		
12	N	N		
13	P	P		
14	R	R		
15	S	S		
16	T	T		
17	U	U		
18	V	V		
19	W	W		
20	X	X		
21	Y	Y		
22	A	A		
23	B	B		
24	C	C		
25	D	P2—D		
26	P1—Z	P2—Z	22	WHITE

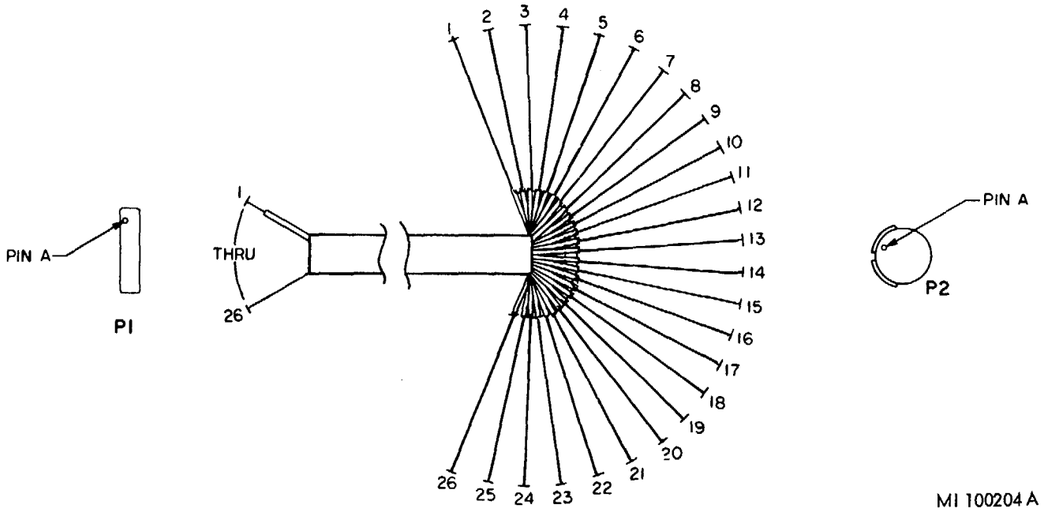


Figure 3-25. CA-233.

WIRE LIST

WIRE IDENT	FROM	TO	AWG	COLOR
1	P1-A	P2-A	20	WHITE
2	-B	-A		
3	-C	-E		
4	-D	-B		
5	-E	-B		
6	-F	-F		
7	-G	-C		
8	-H	-C		
9	-J	-D		
10	P1-K	P2-D	20	
11	SHLD-1	SHLD-2	22	
12	-2	-3		
13	-3	-4		
14	-4	-5		
15	-5	-6		
16	-6	-7		
17	-7	-8		
18	-8	-9		
19	-9	SHLD-10		
20	SHLD-10	P1-PP	22	WHITE

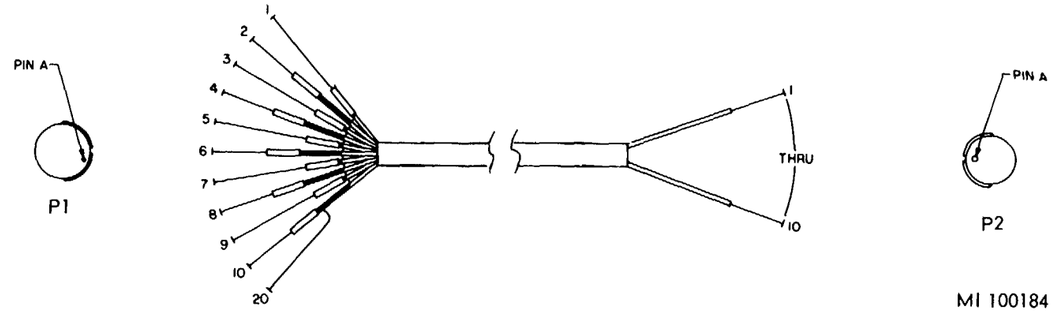


Figure 3-26. CA-234.

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
1	P1-A	P2-A	12	WHT
2	-B	-B		BLU
3	-C	-C	12	WHT
4	-D	-D		BLU
5	-E	-E	12	WHT
6	-F	P2-F		BLU
7	P1-G	SHLD-1	20	WHT
8	SHLD-1	SHLD-3	20	WHT
9	SHLD-3	SHLD-5	20	WHT
10	SHLD-1	P2-G	20	WHT

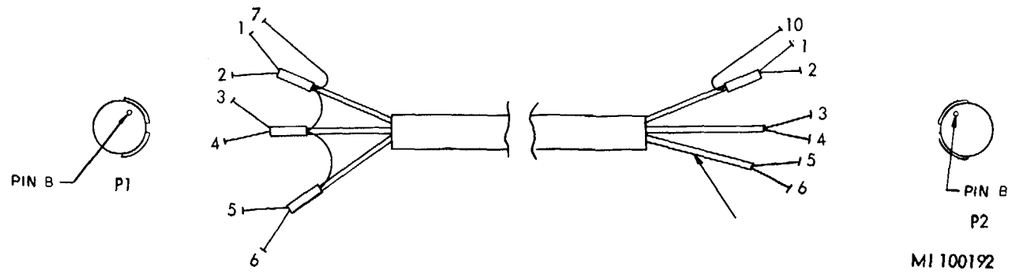


Figure 3-27. CA-236.

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
2	P1-B	P2-B	20	WHITE
3	C	C		
4	D	D		
5	E	E		
6	F	F		
7	P1-G	P2-G	20	WHITE
12	P1-M	P2-M	20	WHITE
13	P1-N	P2-N	20	WHITE
15	P1-R	P2-R	20	WHITE
17	P1-T	P2-T	20	WHITE
18	P1-U	P2-U	20	WHITE
19	P1-V	P2-V	20	WHITE

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
23	P1-Z	P2-Z	20	WHITE
26	P1-C	P2-C	20	WHITE
27	P1-D	P2-D	20	WHITE
31	P1-H	P2-H	20	WHITE
32	P1-J	P2-J		
33	P1-PP	SHLD-2		
34	SHLD-2	3		
35	3	4		
36	4	5		
37	5	15		
38	15	17		
39	17	18		
40	18	19		
41	19	26		
42	SHLD-26	SHLD-27	20	WHITE

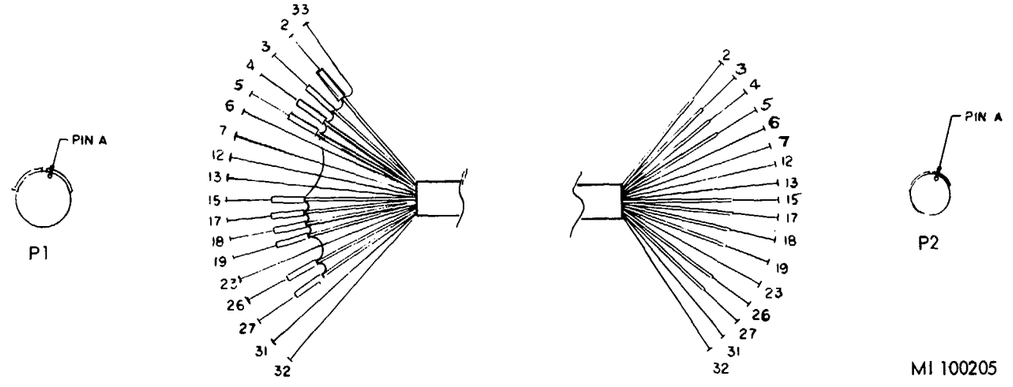
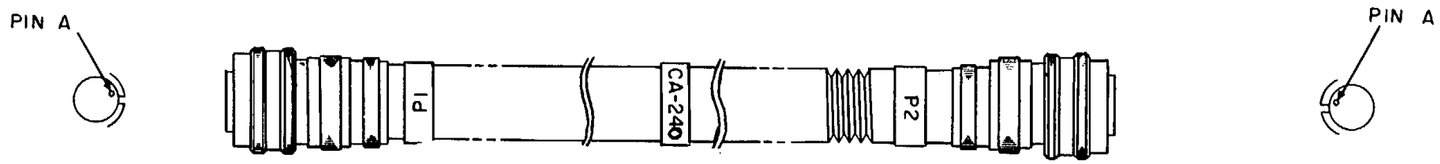


Figure 3-28. CA-238.

WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
1	P1 - A	P2 - A	22	WHT
2	-B	-B		
3	-C	-C		
4	-D	-D		
5	-E	-E		
6	-F	-F		
7	-G	-G		
8	-H	-H		
9	-J	-J		
10	-K	-K		
11	-L	-L		
12	-M	-M		
13	-P	-P		
14	-V	-V		
15	-W	-W		
16	-X	-X		
17	-Y	-Y		
18	-A	-A		
19	-B	-B		
20	-C	-C		
21	-D	-D		
22	-E	-E		
23	-F	-F		
24	-G	-G		
25	-H	-H		
26	-I	-I		
27	-J	-J		
28	-K	-K		
29	-M	-M		
30	-N	-N		
31	-P	-P		
32	-Q	-Q		
33	-R	-R		
34	-S	-S		
35	-T	-T		
36	-U	-U		
37	-V	-V		
38	-GG	-GG		
39	-HH	-HH		
40	-JJ	P2 - JJ		
41	P1 - PP	SHLD - 1		
42	SHLD - 1	-2		
43	-2	-3		
44	-3	-4		
45	-4	-5		
46	-5	-6		
47	-6	-7		
48	-7	-8		
49	-8	-9		
50	SHLD - 9	SHLD - 10	22	WHT



WIRE LIST

LEAD IDENT	FROM	TO	AWG	COLOR
51	SHLD - 10	SHLD - 11	22	WHT
52	-11	-12		
53	-12	-13		
54	-13	-14		
55	-14	-15		
56	-15	-16		
57	-16	SHLD - 17		
58	SHLD - 17	P2 - PP		
59	P1 - EE	SHLD - 18		
60	SHLD - 18	-19		
61	-19	-20		
62	-20	-21		
63	-21	-22		
64	-22	-23		
65	-23	-24		
66	-24	-25		
67	-25	-26		
68	-26	-27		
69	-27	-28		
70	-28	-29		
71	-29	-30		
72	-30	-31		
73	-31	-32		
74	-32	-33		
75	-33	-34		
76	-34	-35		
77	-35	-36		
78	-36	-37		
79	-37	-38		
80	-38	-39		
81	-39	SHLD - 40		
82	SHLD - 40	P2 - EE		
83	P1 SHELL	B1		
84	B1	B2		
85	B2	P2 SHELL	22	WHT

MS005740

Figure 3-29. CA-240.

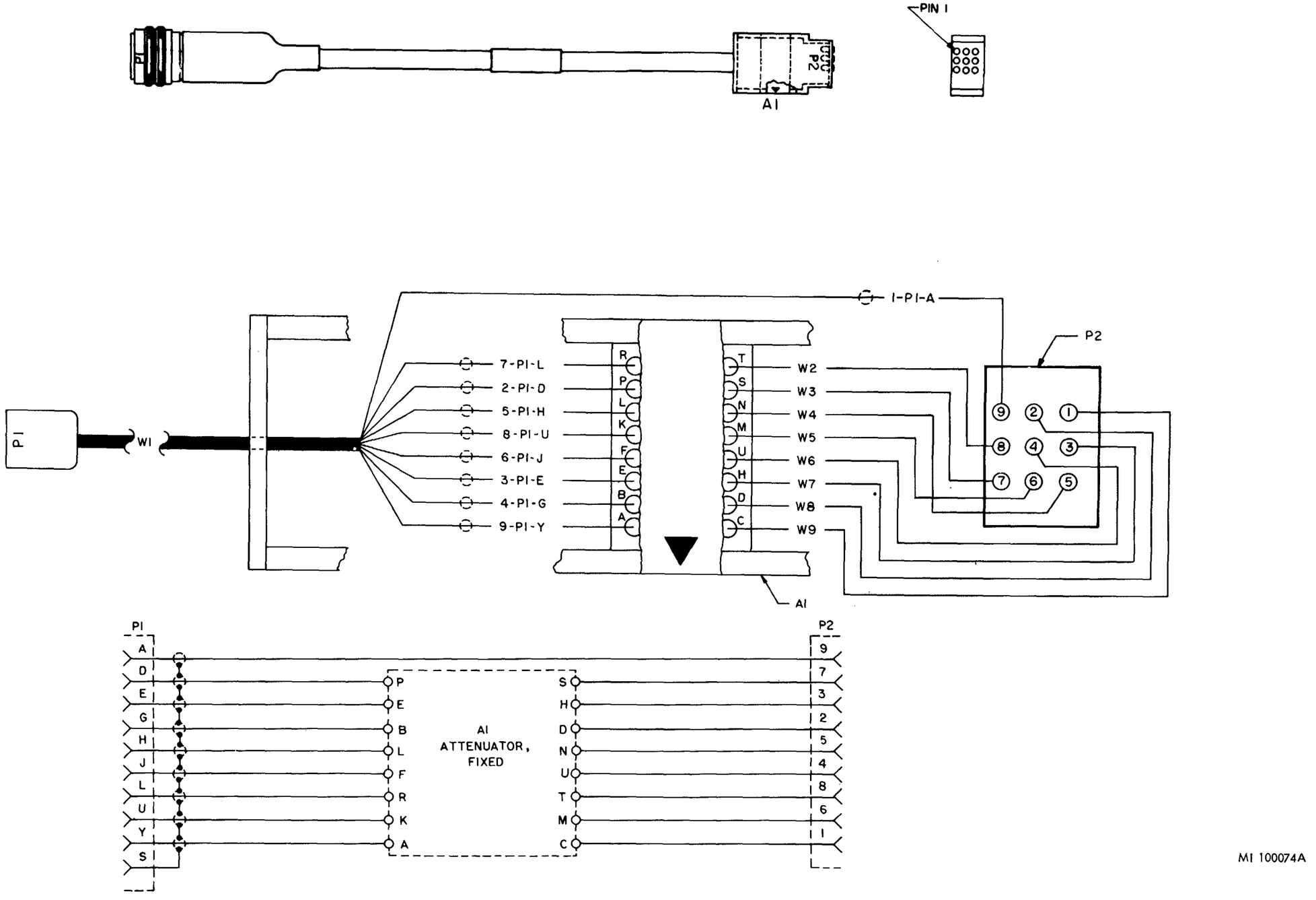
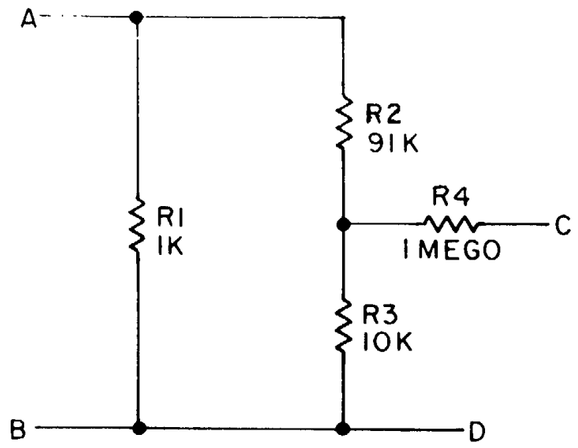
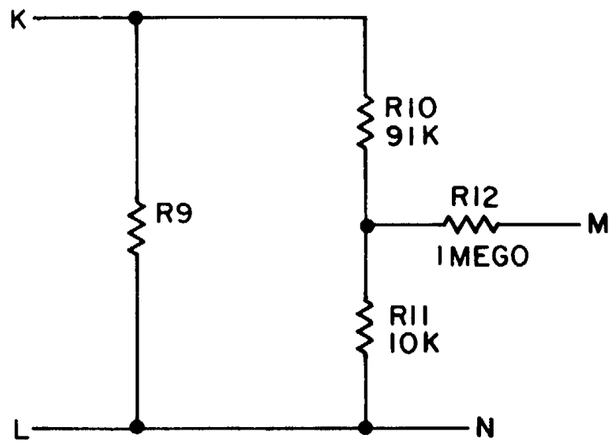
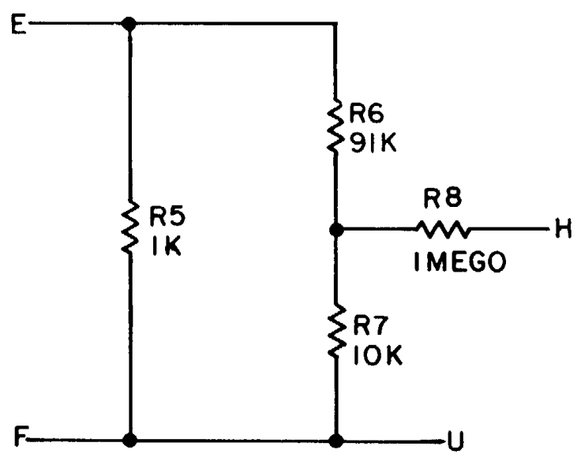


Figure 3-30. CA-241 (sheet 1 of 2).







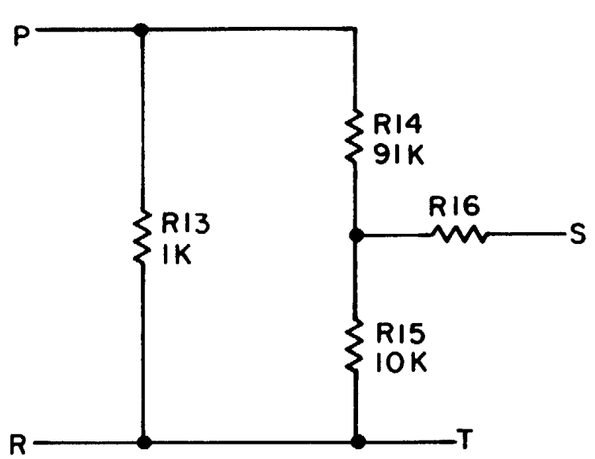


Figure 3-30. (sheet 2 of 2).

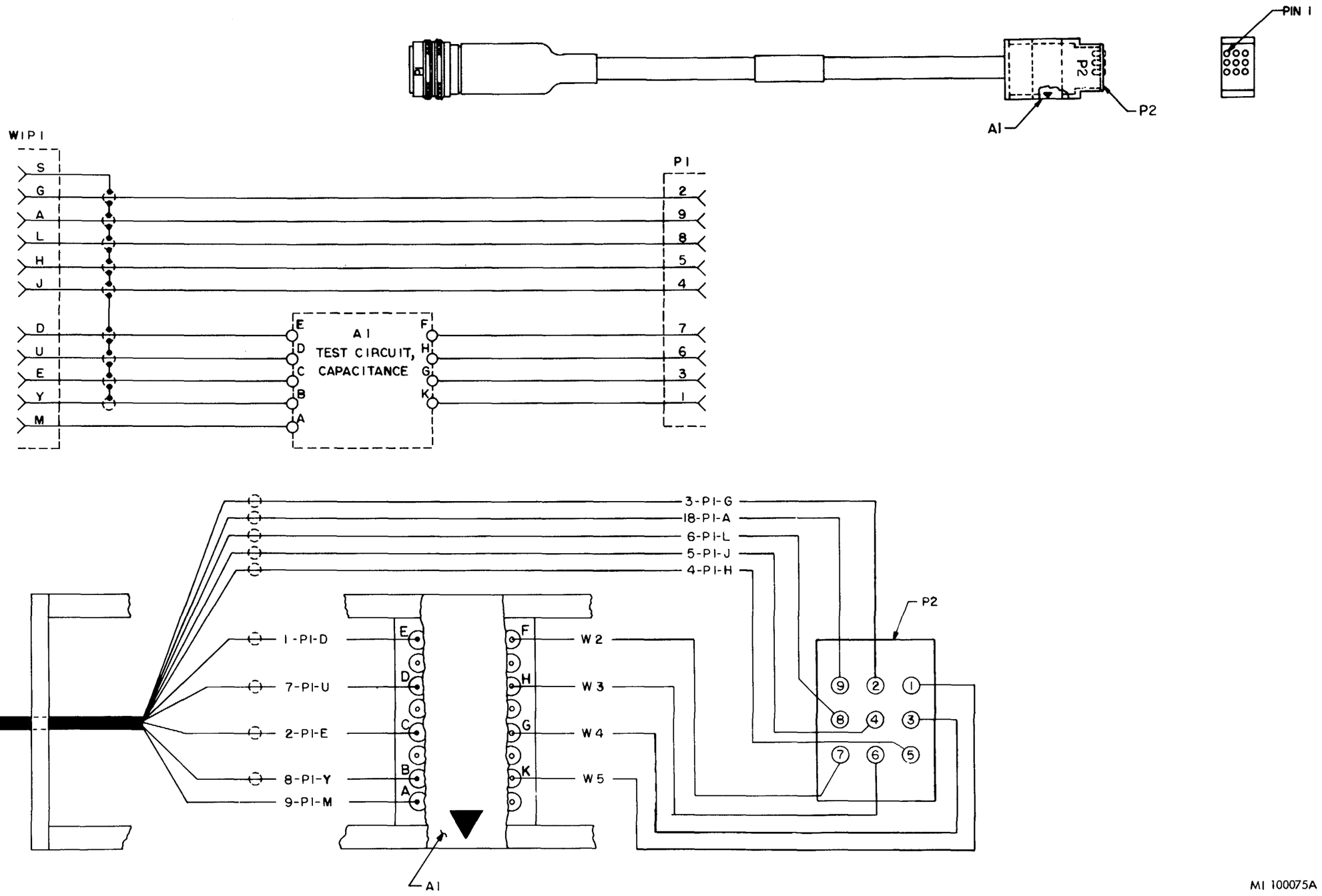
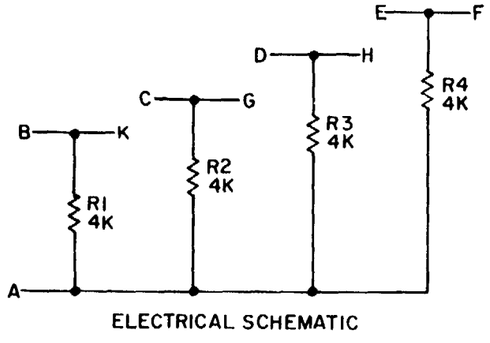
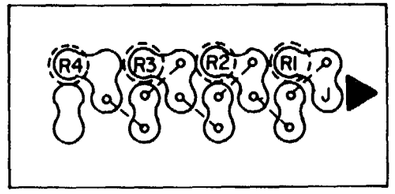
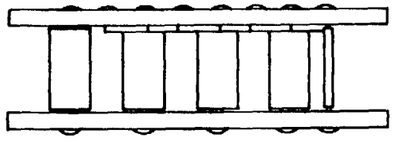


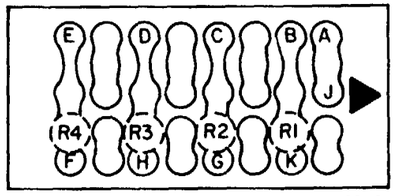
Figure 3-31. CA-242 (sheet 1 of 2).



ELECTRICAL SCHEMATIC





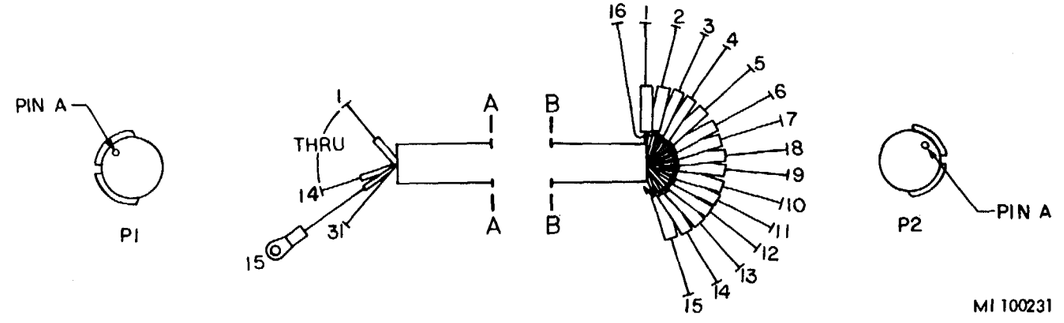


MI 100160A

Figure 3-31. (sheet 2 of 2).

WIRE LIST				
LEAD IDENT	FROM	TO	AWG	COLOR
1	P1 - A	P2 - A	20	WHITE
2	- B	- B		
3	- D	- D		
4	- E	- E		
5	- F	- F		
6	- H	- H		
7	- L	- L		
8	- M	- M		
9	- N	- N		
10	- R	- R		
11	- S	- S		
12	- T	- T		
13	- U	- U		
14	P1 - V	- V		
15	P1-SHELL	- P	20	
16	SHLD - 1	P2 - K	22	WHITE

WIRE LIST				
LEAD IDENT	FROM	TO	AWG	COLOR
17	SHLD - 1	SHLD - 2	22	WHITE
18	- 2	- 3		
19	- 3	- 4		
20	- 4	- 5		
21	- 5	- 6		
23	- 6	- 7		
24	- 7	- 8		
24	- 8	- 9		
25	- 9	- 10		
26	- 10	- 11		
27	- 11	- 12		
28	- 12	- 13		
29	- 13	- 14		
30	- 14	SHLD - 15		
31	SHLD - 15	P1 - K	22	WHITE



MI 100231

Figure 3-32. CA-243.

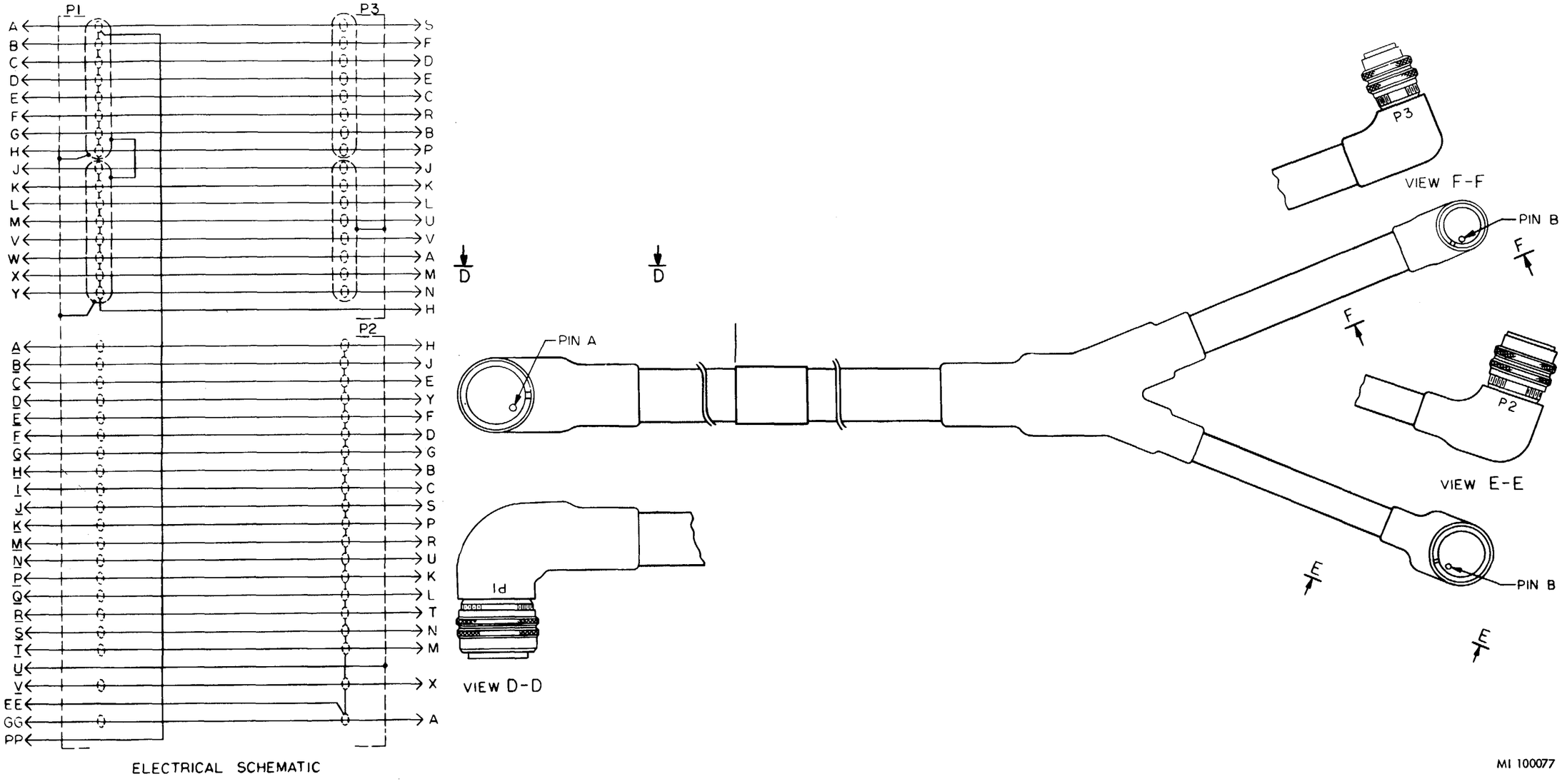
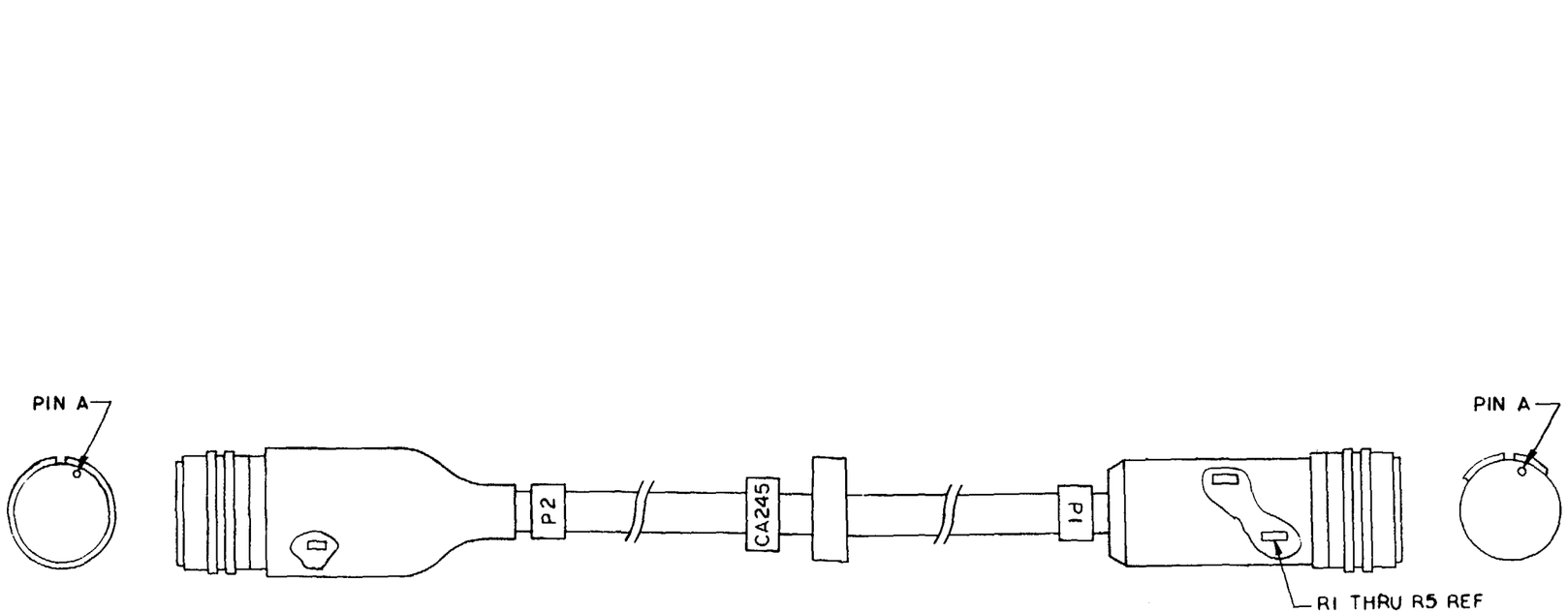


Figure 3-33. CA-244.



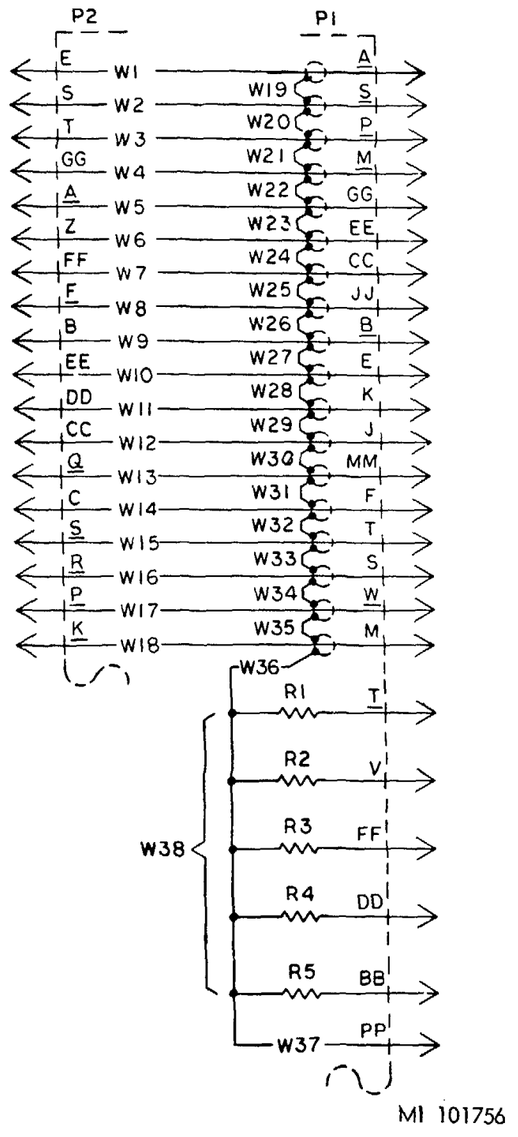


Figure 3-34. CA-245.

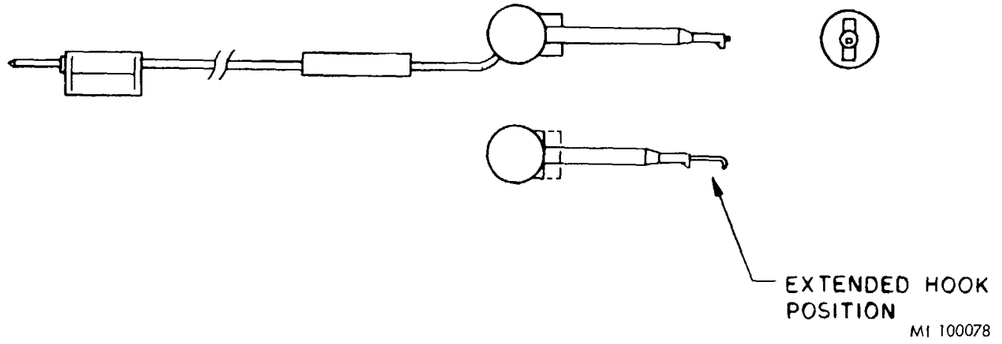


Figure 3-35. TA-205.

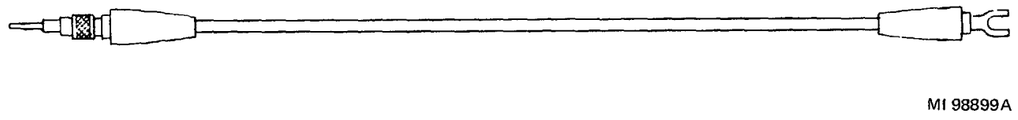


Figure 3-36. TA-209.

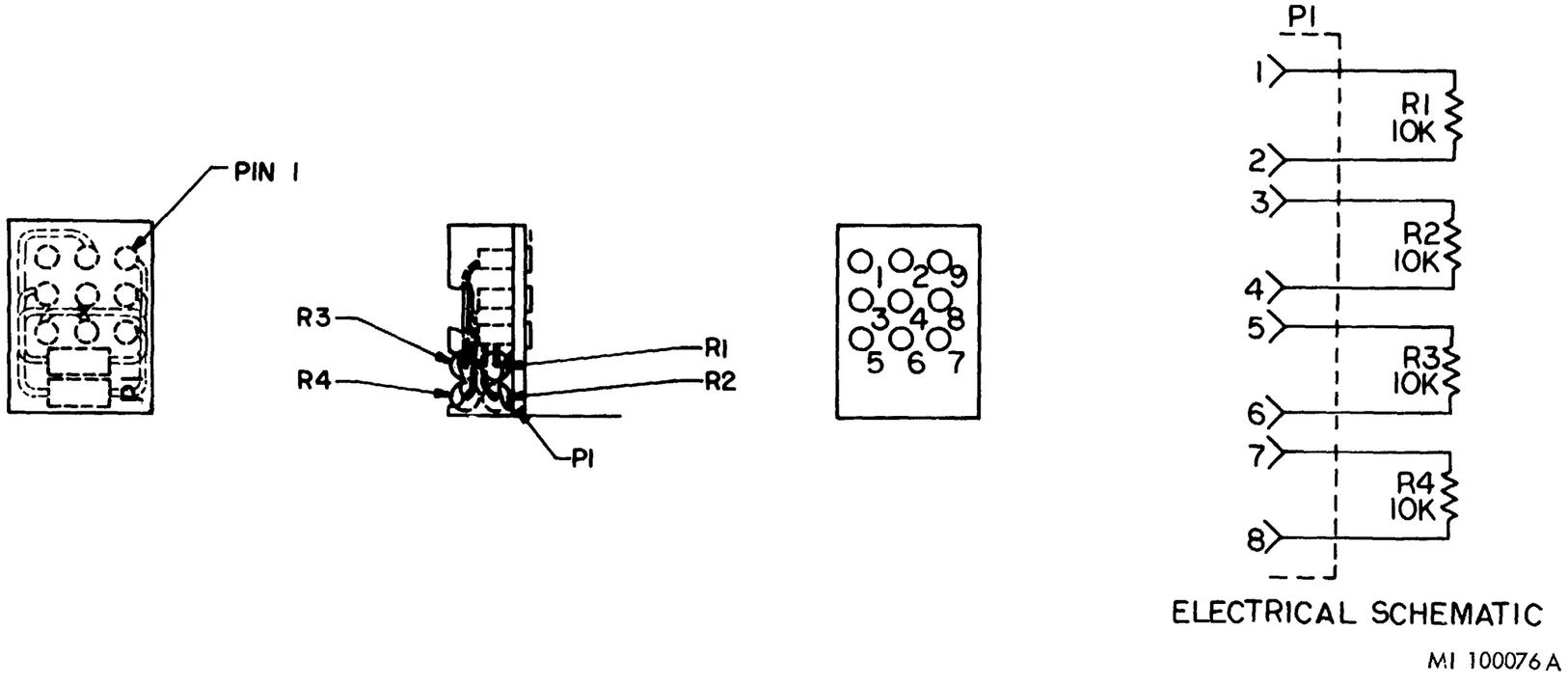


Figure 3-37. TA-210.

JUMPER LIST		
LEAD IDENT	FROM	TO
1	P1-S	P1-P
2	-T	-R
3	-A	-B
4	-F	-G
5	-MM	-NN
6	-J	-H
7	-W	-X
8	-U	-T
9	-JJ	-Z
10	-BB	-CC
11	-EE	-DD
12	-GG	-FF
13	-P	-HH
14	-A	-D
15	-B	-X
16	-C	-M
17	P1-D	P1-E
18		

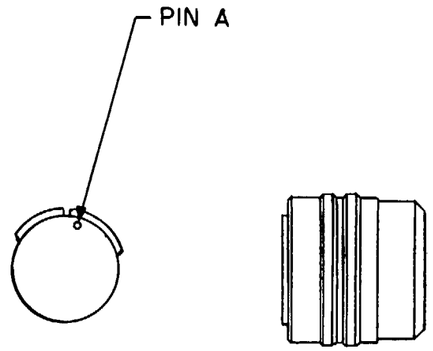


Figure 3-38. TA-213.

JUMPER LIST		
LEAD IDENT	FROM	TO
1	P1-T	P1-EE
2	-EE	-U
3	-U	-V
4	-A	-A
5	-B	-E
6	-B	-C
7	-K	-J
8	-J	-K
9	-K	-L
10	-L	-CC
11	-CC	-Z
12	-C	-D
13	-V	-U
14	-E	-F
15	-M	-N
16	-H	-I
17	-BB	-FF
18	P1-DD	P1-JJ

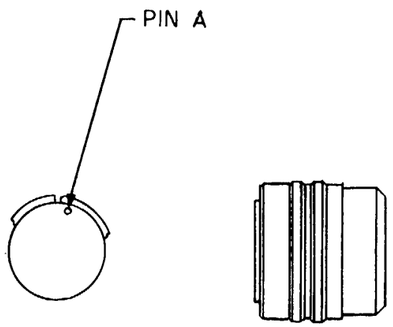


Figure 3-39. TA-214.

JUMPER LIST		
LEAD IDENT	FROM	TO
1	P1-S	P1-T
2	-T	-B
3	-B	-F
4	-F	-MM
5	-MM	-J
6	-J	-K
7	-K	-E
8	-E	-W
9	-W	-V
10	-V	-F
11	-F	-C
12	-C	-S
13	-S	-J
14	-J	-Q
15	-H	-JJ
16	-JJ	-CC
17	-CC	-EE
18	-K	-GG
19	-GG	-M
20	-M	-P
21	-W	-U
22	-Y	-A
23	-A	-B
24	-KK	-LL
25	P1-L	P1-M
26	P1-PP	P1-S

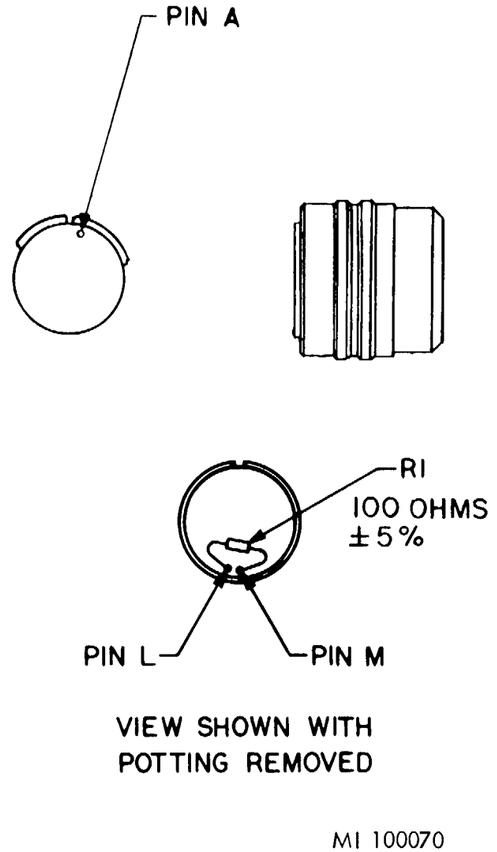


Figure 3-40. TA-215.

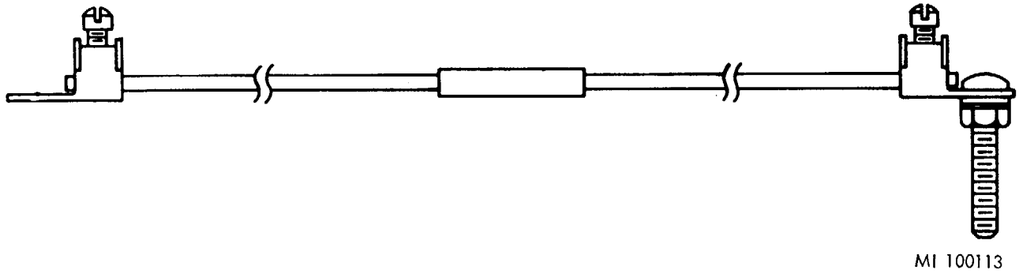


Figure 3-41. TA-217.

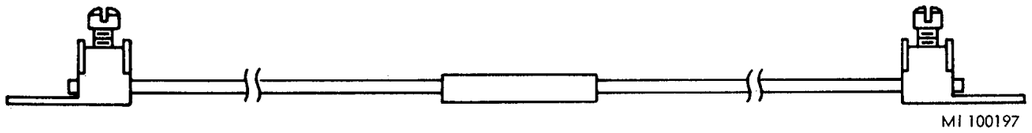


Figure 3-42. TA-218.

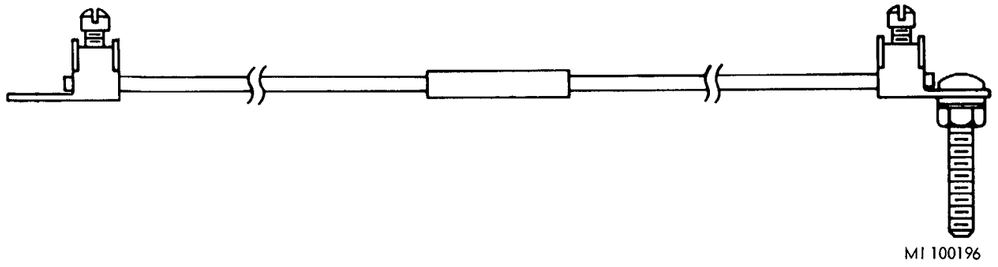


Figure 3-43. TA-219.

JUMPER LIST		
LEAD IDENT	FROM	TO
1	P1-T	P1-U
2	-U	-V
3	-V	-Z
4	-A	-HH
5	-A	-K
6	-B	-R
7	-B	-W
8	-C	-V
9	-C	-X
10	-E	-F
11	-M	-N
12	-Y	-D
13	-H	-G
14	-AA	-CC
15	-BB	-JJ
16	P1-DD	P1-GG

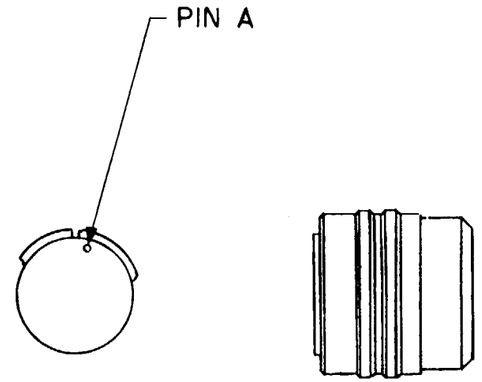


Figure 3-44. TA-231.

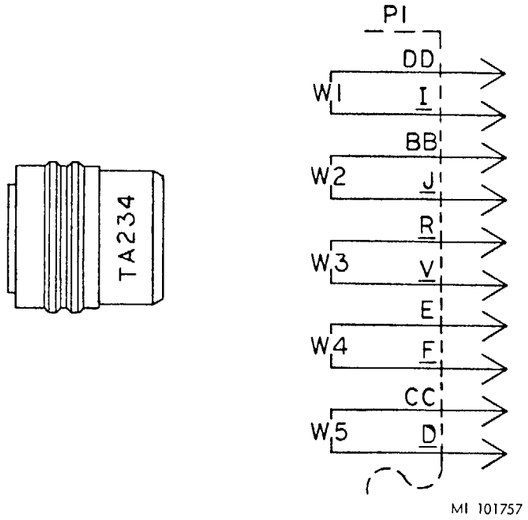


Figure 3-45. TA-234.

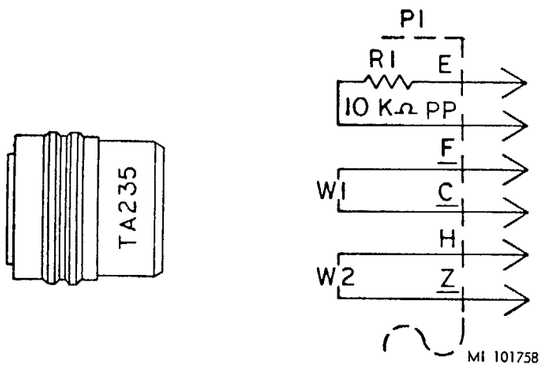


Figure 3-46. TA-235.

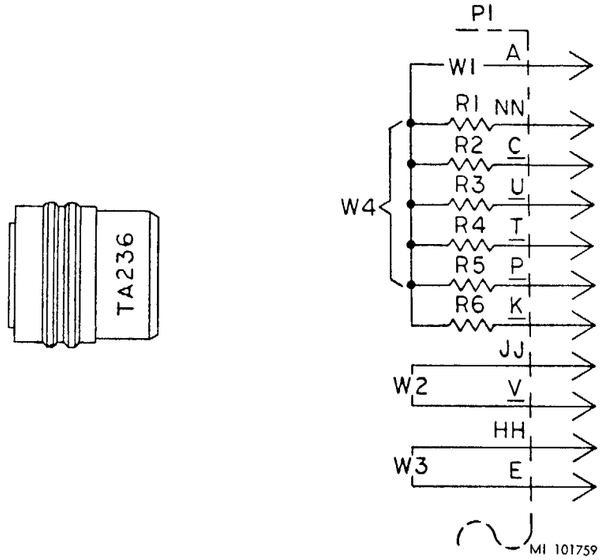


Figure 3-47. TA-236.

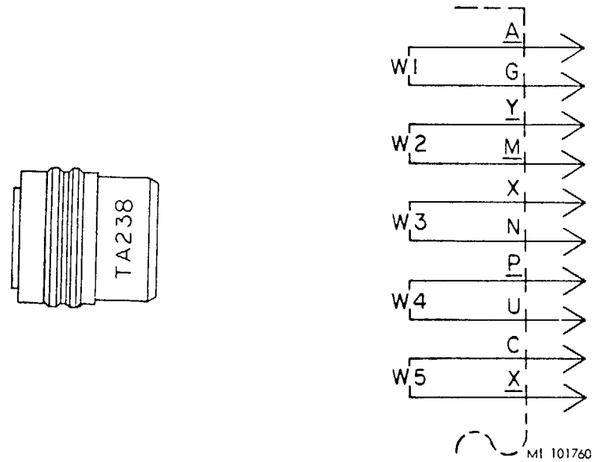


Figure 3-48. TA-238.

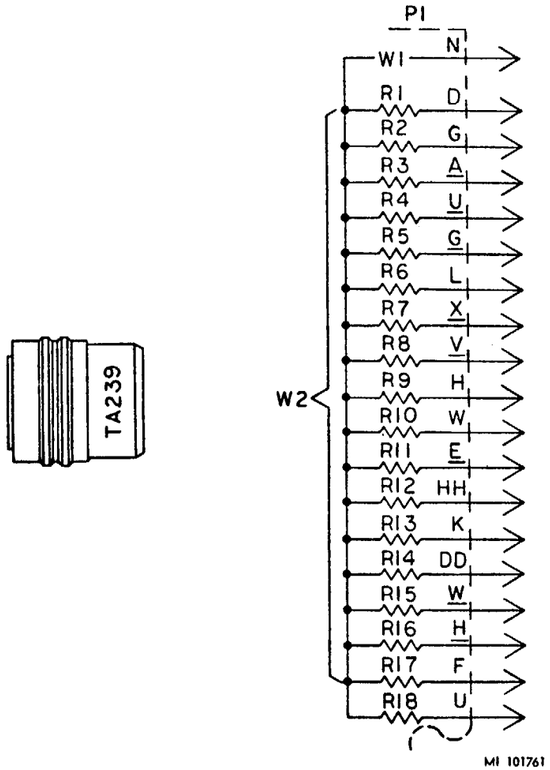


Figure 3-49. TA-239.

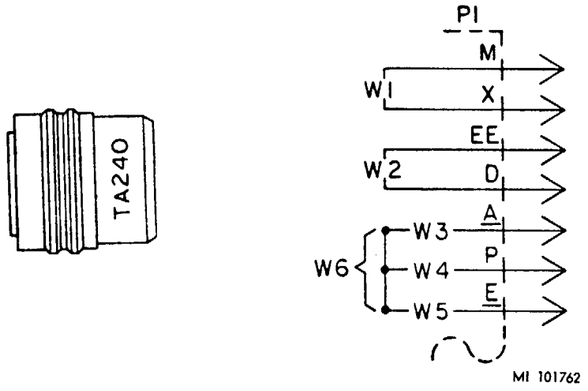


Figure 3-50. TA-240.

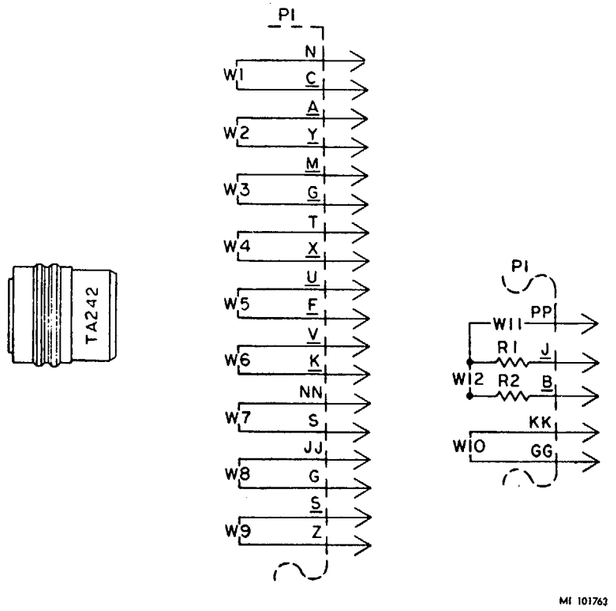


Figure 3-51. TA-242.

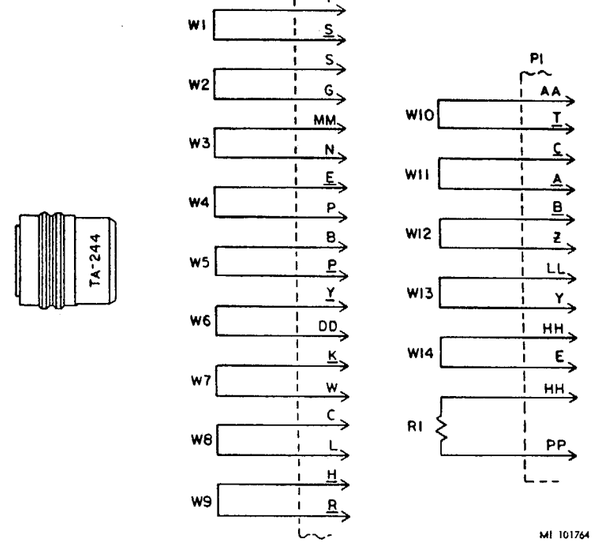


Figure 3-52. TA-244.

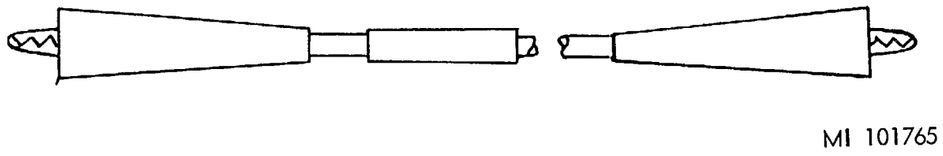
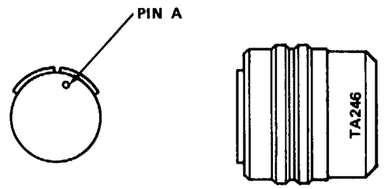


Figure 3-53. Lead 8894622

JUMPER LIST			
LEAD IDENT	FROM	TO	FIND NO
1	P1–S	P1–T	2
2	–T	–B	
3	–B	–F	
4	–F	–MM	
5	–MM	–J	
6	–J	–K	
7	–K	–E	
8	–E	–W	
9	–W	–V	
10	–V	–F	
11	–F	–C	
12	–C	–S	
13	–S	–J	
14	–J	–Q	
15	–H	–JJ	
16	–JJ	–CC	
17	–CC	–EE	
18	–K	–GG	
19	–GG	–M	
20	–M	–P	2
21	–W	–U	3
22	–Y	–A	2
23	–A	–B	2
24	–KK	–LL	3
25	–L	–M	3
26	–PP	–S	2
27	–Q	–J	2
28	–R	–U	3
29	P1–N	P1–Z	2

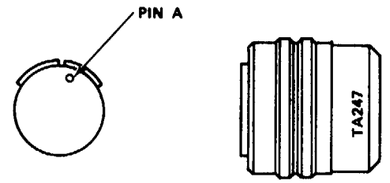


NOTES:
1. IMPRINT WITH .12 HIGH CHARACTERS
   LOCATE APPROX AS SHOWN
2. ELECTRICAL SOLDER CONNECTIONS TO BE SOLDER PER MIL-S-45743 USING SOLDER Sn63,W,RA. PER QQ-S-571
3. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN, FOR COMPLETE DESIGNATION PREFIX WITH SUBASSEMBLY DESIGNATION(S)
4. POT, USING SEALING COMPOUND PER MIL-S-8516, CLASS 1
5. LETTERS UNDERLINED ARE LOWER CASE.
6. WORKMANSHIP TO BE IN ACCORDANCE WITH MIL-STD-454, REQUIREMENT 9.

MS008260

Figure 3-53.1. TA-246

JUMPER LIST			
LEAD IDENT	FROM	TO	FIND NO
1	P1–S	P1–T	2
2	–T	–B	
3	–B	–F	
4	–F	–MM	
5	–MM	–J	
6	–J	–K	
7	–K	–E	
8	–E	–W	
9	–W	–V	
10	–V	–F	
11	–F	–C	
12	–C	–S	
13	–S	–J	
14	–J	–Q	
15	–H	–JJ	
16	–JJ	–CC	
17	–CC	–EE	
18	–K	–GG	
19	–GG	–M	
20	–M	–P	2
21	–W	–U	3
22	–Y	–A	2
23	–A	–B	2
24	–KK	–LL	3
25	–L	–M	3
26	–PP	–S	2
27	–N	–N	2
28	–N	–G	2
29	–R	–Y	3
30	P1–U	P1–AA	3



NOTES:
1. IMPRINT WITH .12 HIGH CHARACTERS
   LOCATE APPROX AS SHOWN.
2. ELECTRICAL SOLDER CONNECTIONS TO BE SOLDER PER MIL-S-45743 USING SOLDER Sn63,W,RA. PER QQ-S-571
3. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN, FOR COMPLETE DESIGNATION PREFIX WITH SUBASSEMBLY DESIGNATION(S)
4. POT, USING SEALING COMPOUND PER MIL-S-8516 CLASS 1.
5. LETTERS UNDERLINED ARE LOWER CASE.
6. WORKMANSHIP TO BE IN ACCORDANCE WITH MIL-STD-454, REQUIREMENT 9.

MS008259

Figure 3-53.2. TA-247

Section II. REPAIR PROCEDURES

3-4. General

a. This section provides repair information for the special purpose (ICORE) cable assemblies within the scope of DS and GS maintenance personnel. Figure 3-54 illustrates the disassembly and assembly of the ICORE cable component. This is a general purpose Illustration that represents the different configurations of the ICORE cable assemblies in the SHILLELAGH Supplemental Equipment.

b. Paragraph 3-5 contains general purpose procedures for repairing the ICORE cable assembles. TM 9-4935-557-34P contains a list of spare parts authorized for maintenance personnel.

3-5. Repair of Special Purpose (ICORE) Cables (Fig. 3-54)

NOTE
Perform only those steps required to remove and install the faulty component.

a. Disassembly.

(1) Unscrew fitting coupling nut (1) from fitting adapter (2) and slide the fitting coupling nut back over the convoluted tubing (3).
(2) Compress the convoluted tubing to expose the terminals in connector (4).
(3) Disconnect and tag the leads. Remove ferrule (5).
(4) Unthread the fitting adapter and fitting collar (6) from the convoluted tubing. Remove the connector and the convoluted tubing.
(5) Remove locking ring (7), transition-T (8), transition-Y (9), and transition-3 way (10), and elbow (11).

b. Assembly.

(1) Replace transition-T (8), transition-Y (9), transition-3 way (10), and elbow (11).
(2) Select new convoluted tubing (3) from the following:

MIS-16691-3
MIS-16691-4
MIS-16691-5
MIS-16691-6
MIS-16691-7
MIS-16691-8

Using a knife, cut the new convoluted tubing to the required length, and slide the convoluted tubing over the leads and cables, as necessary.

CAUTION
Do not allow any sealing compound to contact the convoluted tubing.

(3) Apply sealing compound MIL-S-22473, grade HVV, using surface primer T, to the threads of locking ring (7). Install the locking ring on transition-T (8) and tighten.
(4) Select new leads from the following:
MIL-W-22759-1 1, M22759/11-20-9
MIL-W-22759-11, M22750/11-22-9

Install the new leads by securing one end of the new lead to one end of the old lead, and pull the new lead through the convoluted tubing and the transitions.

(5) Select new shielded cables from the following:
MIL-C-27500, M27500-12EA3S7
MIL-C-27500, M27500-20RCIS6
MIL-C-27500, M27500-22RCIS6
MIL-C-27500, M27500-24RCIS6

Install the new cables by securing one end of the new cables to one end of the old cable, and pull the new cables through the convoluted tubing and the transitions.

(6) Slide fitting coupling nut (1) over the convoluted tubing.
(7) Thread fitting collar (6) over the convoluted tubing.
(8) Slide fitting adapter (2) over the leads and cables.
(9) Install insulation sleeving MIL-I-23053/5, class 1, 1.000-inch ID, white or MIL-I-23053/S, class 1, 1.500-inch ID, white, over the ends of the braided wire Heat-shrink the sleeving at 230°F for a maximum of 10 seconds, using heat gun 4940-00-438-1605.

NOTE
Where two wires are common to one solder cut, insert the wires into the plug tip before attaching the plug tip to the solder cup.

(10) Install insulation sleeving, MIL-I-23053/5, class 1, 0.187-inch ID, white, or MIL-I-23053/4, class 1, 0.187-inch ID, brown, over the leads. The sleeving, when heat-shrunk, must be long enough to cover the soldered joint. Connect the leads to connector (4) and remove the tags. Slide the sleeving over the soldered joint, and heat-shrink at 230°F for a maximum of 10 seconds, using heat gun 4940-00-438-1605.
(11) Install insulation sleeving MIL-I-23053/4, class 1, 0.500-inch ID, brown, MIL-I-23053/5, class 1, 0.187-inch ID, white, or MIL-I-23053/5, class 1, 0500-inch ID, white, over the unterminated ends of the cable shields. Heat-shrink the sleeving at 230°F for a maximum of 10 seconds, using heat gun 4940-00-438-1605.
(12) Install ferrules (5), and heat-shrink at 700°F for a maximum of 20 seconds, using heat gun 4940-00438-1606.
(13) Thread the fitting adapter into the convoluted tubing up to the adapter ferrule as shown in detail A, figure 3-54.
(14) Screw the fitting collar back over the fitting adapter to clinch the convoluted tubing.

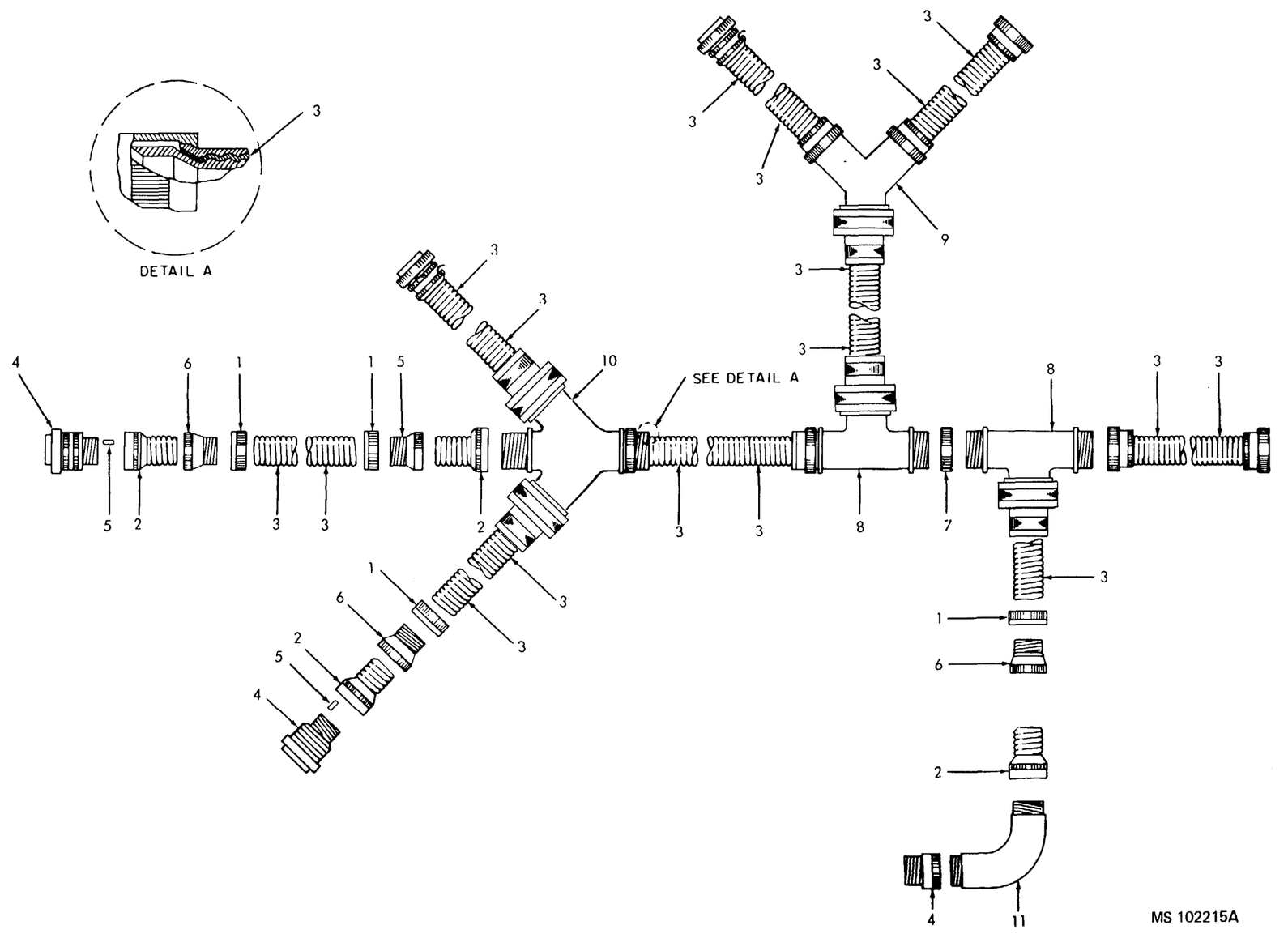
CAUTION
Do not allow any sealing compound to contact the convoluted tubing.

(15) Apply sealing compound, MIL-S-22473, grade HVV, using surface primer grade T, between the threads on fitting adapter.
(16) Screw the fitting coupling nut onto the fitting adapter.

3-6. Packaging

a. When a special purpose cable is to be shipped to the depot for further repair, package the cable in accordance with TM 38-230-1, method IID. Insure that adequate cushioning material and bracing are used to prevent damage to the cable during shipment.

b. Packages should be marked in accordance with local directives.



1–Fitting coupling nut
2–Fitting adapter
3–Convoluted tubing
4–Connector
5–Ferrule
6–Fitting collar
7–Locking ring
8–Transition-T
9–Transition-Y
10–Transition-3 way
11–Elbow

Figure 3-54. Repair of special purpose cables.

CHAPTER 4

RATE GYRO TABLE (TA-220)

Section I. PROGRAMMED TESTS

4-1. General

This chapter provides the information necessary to isolate and repair a fault in the rate gyro table (UUT) to a faulty subassembly or chassis-mounted component. Figures 4-2 through 4-6 are provided as an aid in troubleshooting and testing the UUT.

4-2. Equipment Required for Programmed Tests

The following equipment is required to test the UUT:

a.	Program memory card	See TM 9-1425-550-10
b.	Patchboard	PB-108
c.	Multimeter	
d.	Plug	TA-104
e.	Digital multimeter probe	TA-109
f.	Cable	CA-123
g.	Cable	CA-135
h.	Cable	CA-137

4-3. Test Instructions

a. The UUT is on-bench tested.

WARNING
Voltage is present in the UUT. Use extreme care while performing the manual procedures.

b. Refer to paragraph 4-6 and/or paragraph 4-9 to gain access to the internal probe points for troubleshooting.

4-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT is installed in PLMA 1A15.

b. Set monitor panel 1A11 switches as follows:

(1) Dial 9540000 into the UUT TEST NUMBER switches.

(2) Set TEST MODE switch to TAPE

(3) Set CONTROLLER SUB MODE switch to NORMAL.

(4) Press the START TEST switch.

c. Observe message displayed on SSVD and verify that the UUT is the one described in message.

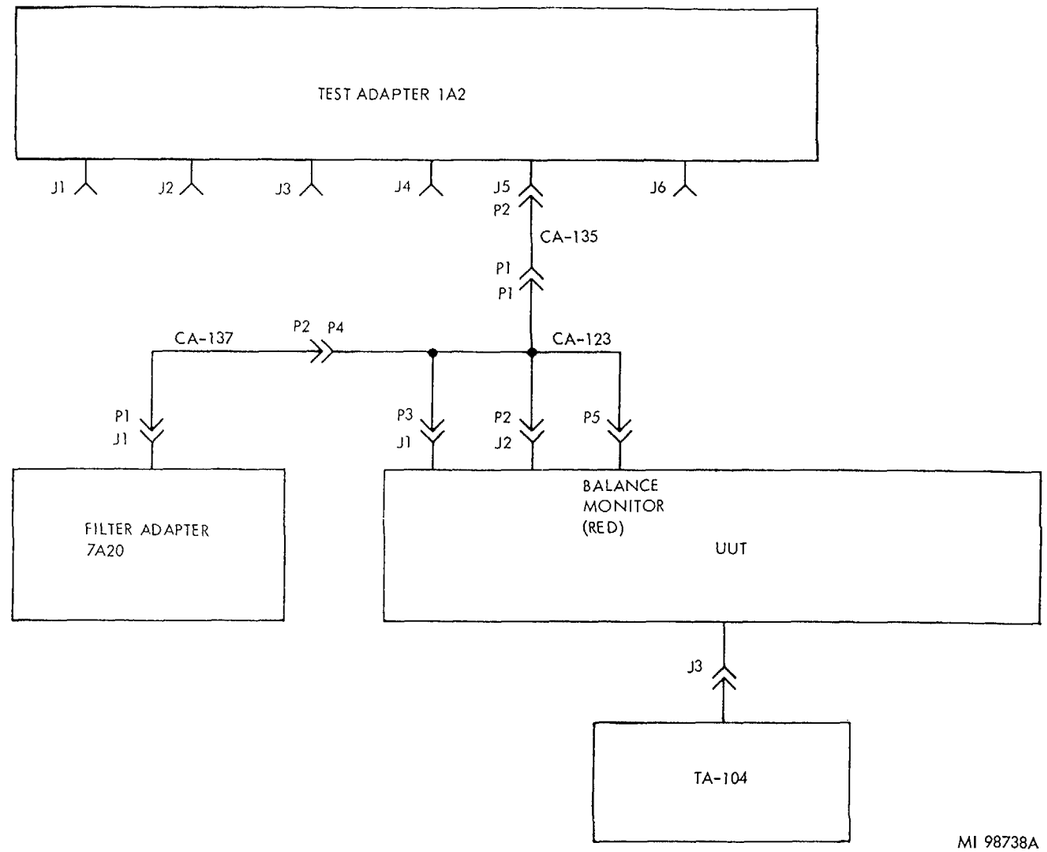


Figure 4-1. Cable hookup diagram.

Table 4-1. Rate Gyro Table Programmed Tests.

Print message ref no.	Action or instructions
REF TM 1 through REF TM 4	Discontinue the UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM 5	*a.* Connect the cables (fig. 4-1). *b.* Position the UUT switches as follows: (1) Set the ON/OFF switch to ON. (2) Set the OPERATION/BALANCE switch to OPERATION. (3) Position the TABLE ROTATION RATE SELECTOR MR/SEC switch to REMOTE. *c.* Press the PROCEED switch.
REF TM 6	AN/TSM-93 resistance measurements indicate less than 10 ohms between J2-T and J2-S. Proceed as follows: *a.* Replace A1 (par. 4-6). If REF TM 6 prints out again, proceed to step *b.* *b.* A hardwire short exists. Use standard troubleshooting procedures to isolate the fault.
REF TM 7	*a.* Install the patchboard. *b.* Connect the RES probe to "9000 OHMS" on 1A7 left/right. *c.* Press the PROCEED switch.
REF TM 8	*a.* Remove DS1 from its socket and measure the resistance of DS1 with the multimeter. (1) If the reading is less than 90 ohms, proceed to step *b*. (2) If the reading is greater than 90 ohms, replace DS 1. *b.* Connect the RES probe between the connections on the socket of DS1. *c.* Press the PROCEED switch.
REF TM 9	*a.* Replace A1 (par. 4-6). *b*. Replace F1.
REF TM 10	Replace the slip-ring assembly (par. 4-7).
REF TM 11	*a.* Set the OPERATION/BALANCE switch to BALANCE. *b.* Measure the resistance between TB1-A and TB1-B (fig. 4-4) on the control motor assembly with the multimeter. (1) If the reading is less than 7 ohms, replace the control motor assembly (par. 4-7). (2) If the reading is greater than 7 ohms, proceed to step *c*.
REF TM 12	*c.* Replace A1 (par. 4-6). Replace F1. Disconnect one end of R22 and measure the resistance of R22 with the multimeter. *a.* If the reading is between 3705 and 4095 ohms, replace C2. *b.* If the reading is not between 3705 and 4095 ohms, replace R22.
REF TM 13	Disconnect one lead of R21 and measure the resistance of R21 with the multimeter. *a.* If the reading is between 110 and 130 ohms, replace C3. *b.* If the reading is not between 110 and 130 ohms, replace R21.
REF TM 14	Replace A1 (par. 4-6).
REF TM 15	Replace the control motor assembly (par. 4-7).
REF TM 16	*a.* Measure the resistance between TP5 (fig. 4-3) and TB1-A (fig. 4-4) with the multimeter. (1) If the reading is less than 6000 ohms, proceed to step *b*. (2) If the reading is greater than 6000 ohms, replace S2 (par. 4-8). *b.* Measure the resistance between TP6 (fig. 4-3) and TB1-B (fig. 4-4) with the multimeter. (1) If the reading is less than 6000 ohms, proceed to step c. (2) If the reading is greater than 6000 ohms, replace S2 (par. 4-8). *c*. Replace the control motor assembly (par. 4-7).

Table 4-1. Rate Gyro Table Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 17	Check the connections to the control motor assembly. *a.* If the connections are incorrect, make tile necessary corrections and rerun the program. *b*. If the connections are correct, replace the control motor assembly (par. 4-7).
REF TM 18	*a.* Remove Al from the UUT (par. 4-6*a*). *b*. Measure the resistance between XA1-4 and XA1-5 (fig. 4-6) with the multimeter. (1) If the reading is between 800 and 1200 K ohms, proceed to step c. (2) If the reading is not between 800 and 1200 K ohms, replace R8 (par. 4-8). *c*. Adjust R8 fully clockwise. Measure the resistance between XA1-6 and XA1-4 (fig. 4-6) with the multimeter. (1) If the reading is between 800 and 1200 K ohms, proceed to step *d.* (2) If the reading is not between 800 and 1200 K ohms, replace R8 (par. 4-8). *d.* Adjust R8 fully counterclockwise. Measure the resistance between XA1-6 and XA1-5 (fig. 4-6) with the multimeter. (1) If the reading is between 800 and 1200 K ohms, proceed to step *e*. (2) If the reading is not between 800 and 1200 K ohms, replace R8 (par. 4-8). *e*. Replace A1 (par. 4-6).
REF TM 19	*a.* Replace F1. *b*. Press the PROCEED switch.
REF TM 20	*a.* Disconnect one end of R5 with the multimeter. (1) If the reading is between 99 and 101 ohms, reconnect the lead of R5 and proceed to step *b*. (2) If the reading is not between 99 and 101 ohms, replace R5. *b*. Disconnect one end of R4 and measure the resistance of R4 with the multimeter. (1) If the reading is between 99 and 101 ohms, reconnect the lead of R4 and proceed to step *c*. (2) If the reading is not between 99 and 101 ohms, replace R4 *c*. Disconnect one lead of R3 and measure the resistance of R3 with the multimeter. (1) If the reading is between 173 and 177 ohms, reconnect the lead of R3. (2) If the reading is not between 173 and 177 ohms, replace R3.
REF TM 21	AN/TSM-93 resistance measurements indicate incorrect wiring to the resistor divider network. Use standard troubleshooting procedures to isolate the fault When the fault is corrected, rerun the program.
REF TM 22	*a.* Reinstall DS1. *b*. Check F1 for continuity. (1) If F1 is good, replace S1 (par. 4-8). (2) If F1 is faulty, replace F1.
REF TM 23	*a.* Loosen the shaft lock nut on R1. **NOTE** **A 1/4 turn of RATE ADJUST resistor R1 will change the period 1200 ms. During the following sequence of tests, the rate will be adjusted for a period between 83,529.9 ms and 84,009.9 ms.** *b*. Press the PROCEED switch.
REF TM 24	Replace R1 (par. 4-8).
REF TM 25	AN/TSM-93 resistance measurements indicate incorrect wiring to the control motor assembly. Use standard troubleshooting procedures to isolate the fault. *a.* If no fault is found, replace A1 (par. 4-6). *b*. If the wiring is incorrect, make the necessary corrections and rerun the program.

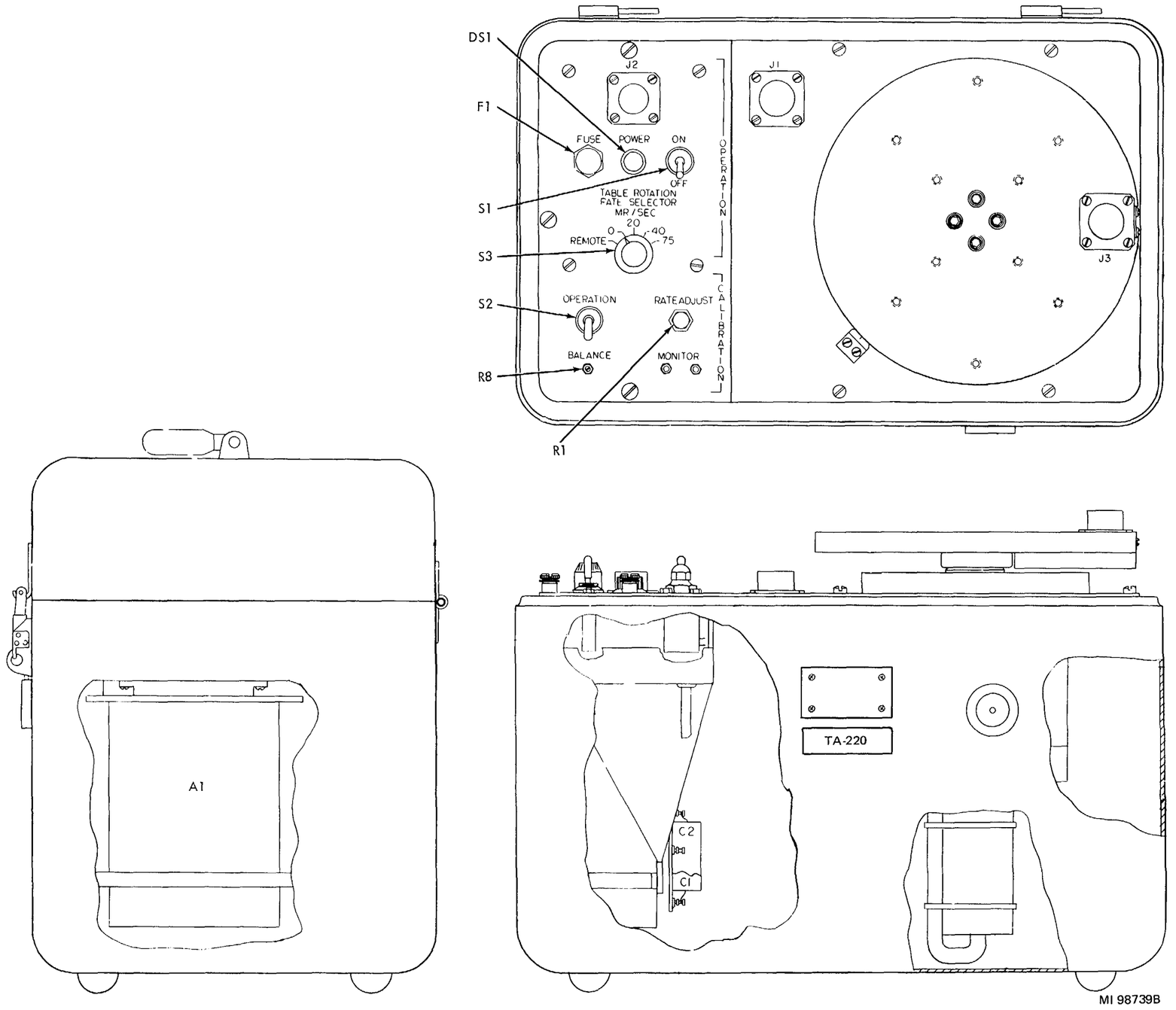
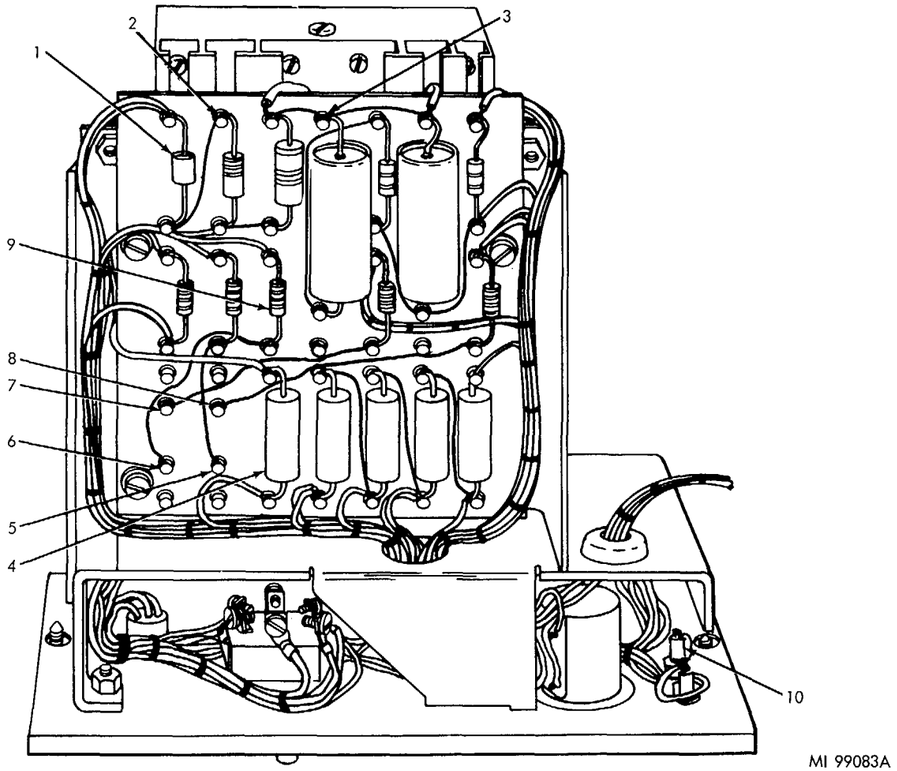
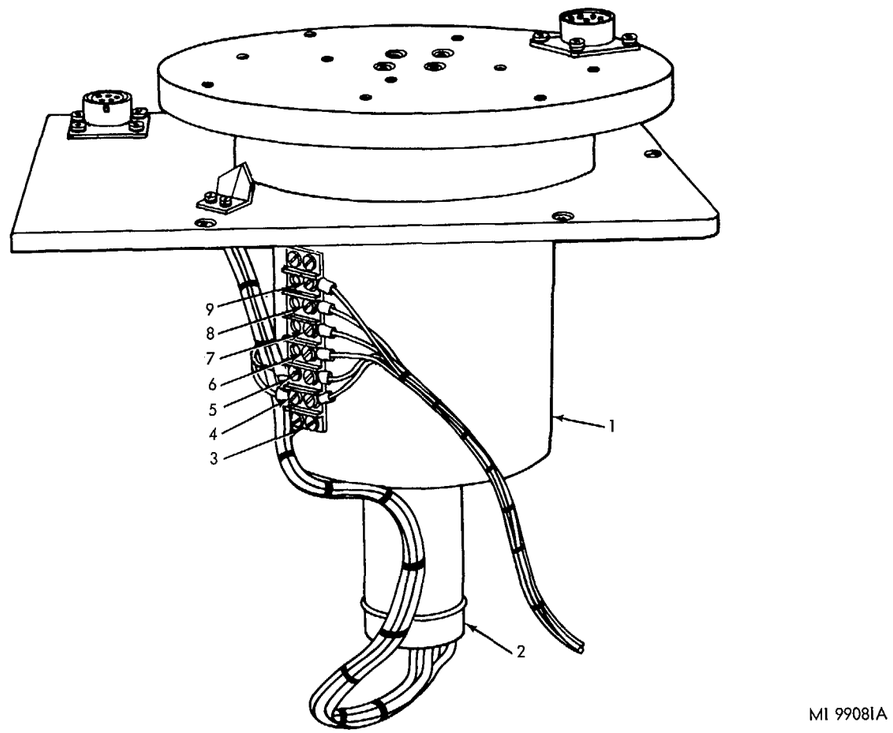


Figure 4-2. TA-220, parts location diagram



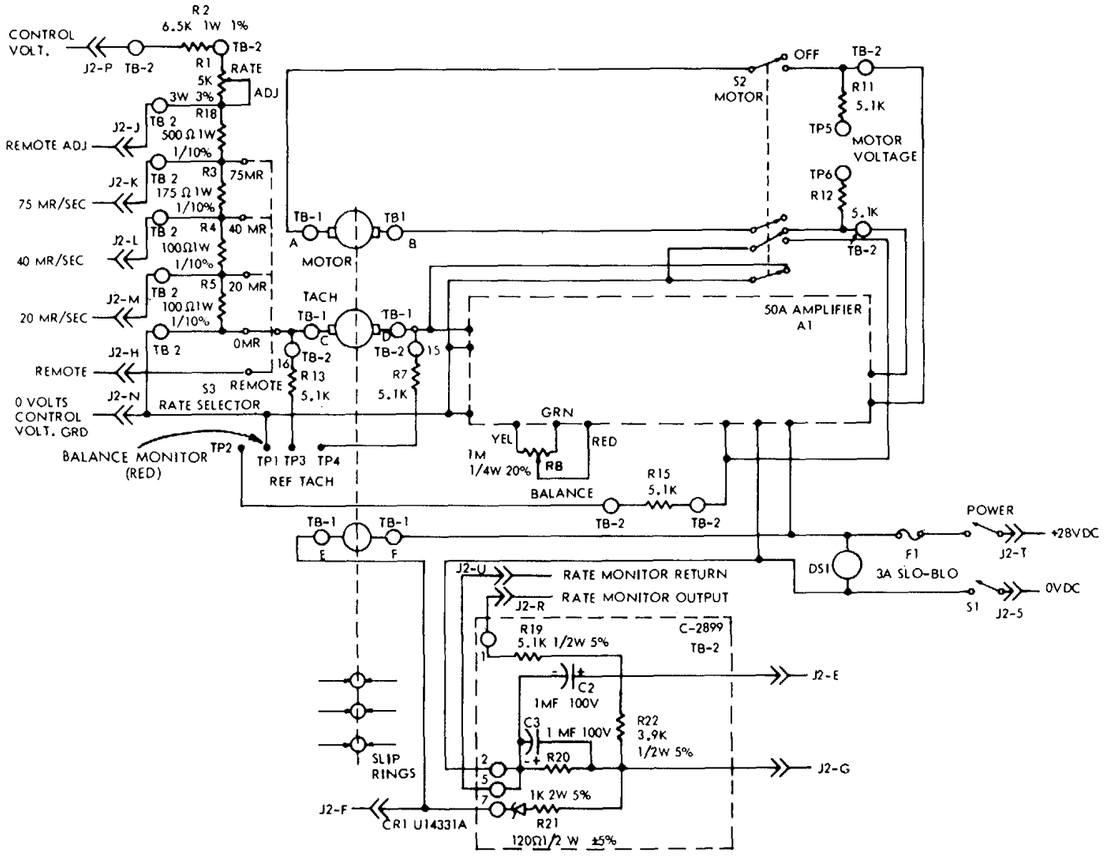
1 – CR1
2 – R21 bottom
3 – C3 top
4 – R2
5 – TP3
6 – TP6
7 – TP5
8 – TP4
9 – R12
10 – TP1

Figure 4-3. Electronic control group, parts location diagram.

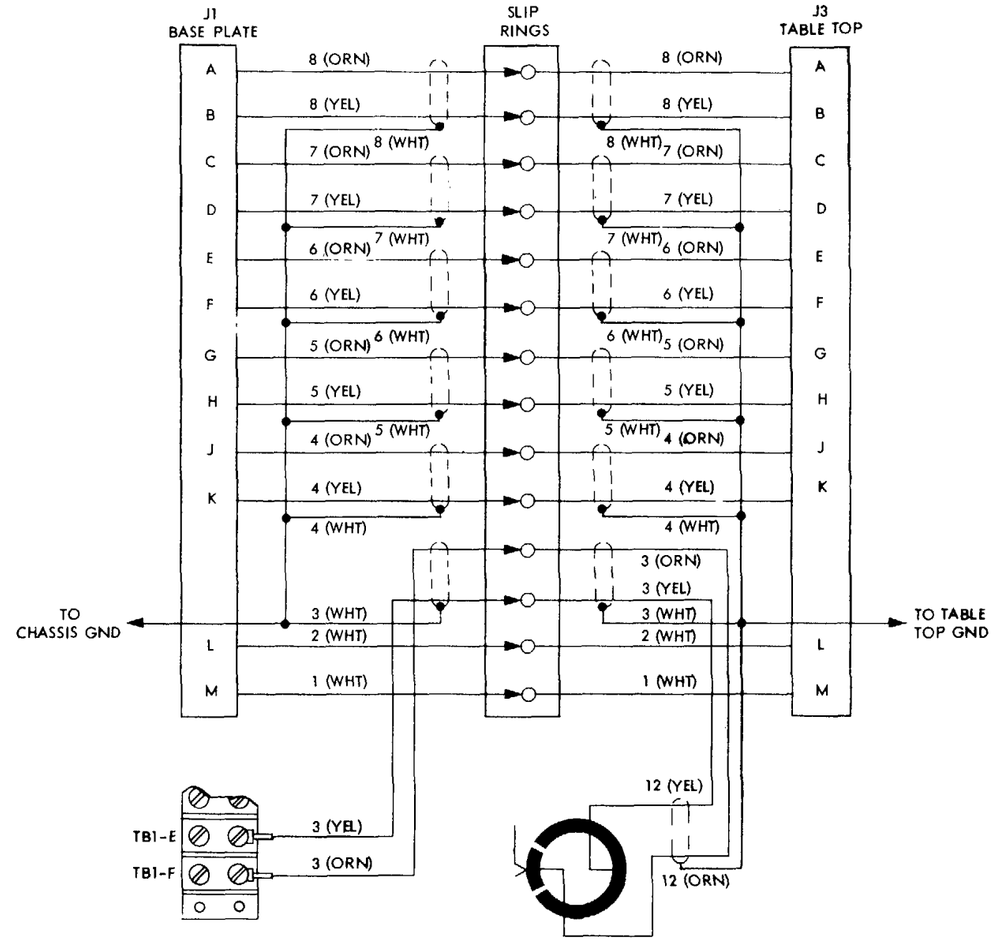


1 – Drive Assembly
2 – Slip ring assembly
3 – TB1
4 – TB1-F
5 – TB1-E
6 – TB1-D
7 – TB1-C
8 – TB1-B
9 – TB1-A

Figure 4-4. Rate table (removed from case), parts location diagram.



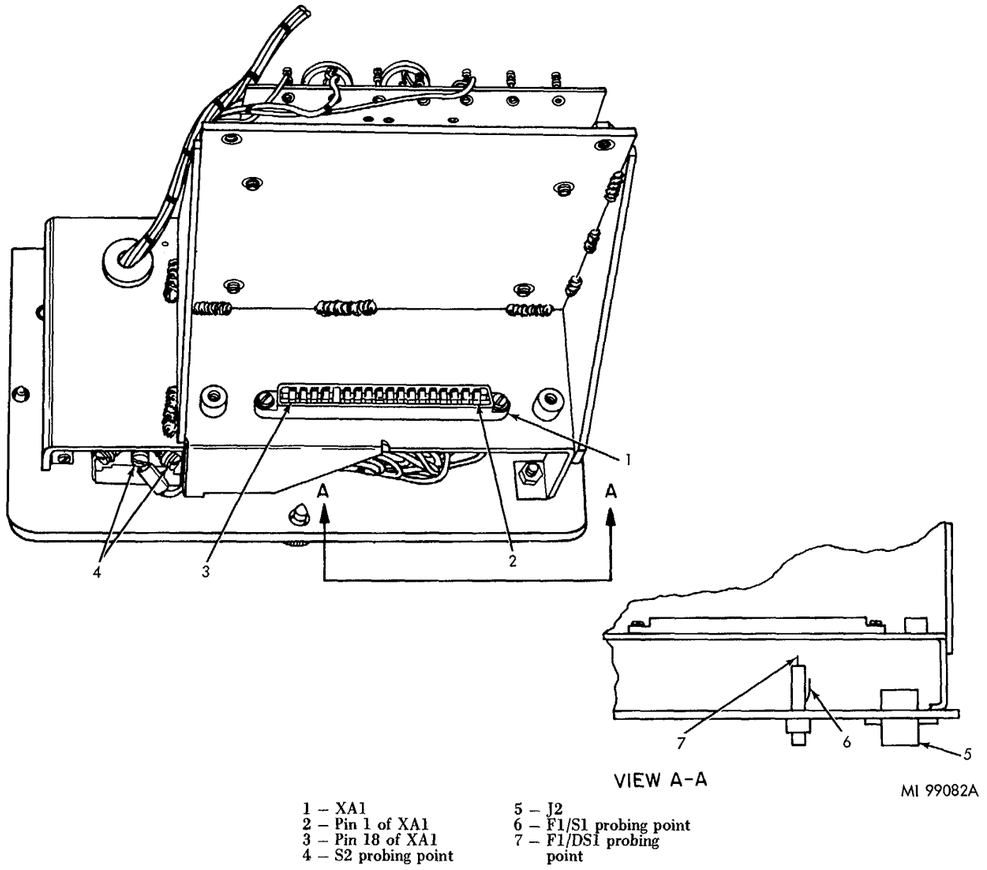
A. OVERALL SCHEMATIC



B. SLIP RING ASSEMBLY

MI 99084B

Figure 4-5. TA-220, schematic diagram.



1 – XA1
2 – Pin 1 of XA1
3 – Pin 18 of XA1
4 – S2 probing point
5 – J2
6 – F1/S1 probing point
7 – F1/DS1 probing point

Figure 4-6. Electronic control group, probing diagram.

Section II. REPAIR PROCEDURES

4-5. General

This section provides repair information for the UUT within the scope of DS and GS maintenance personnel. Figures 4-7 through 4-10 illustrate the disassembly and assembly of the UUT. Paragraphs 4-6 through 4-9 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-4935-557-34P contains a list of repair parts and special tools authorized for maintenance personnel.

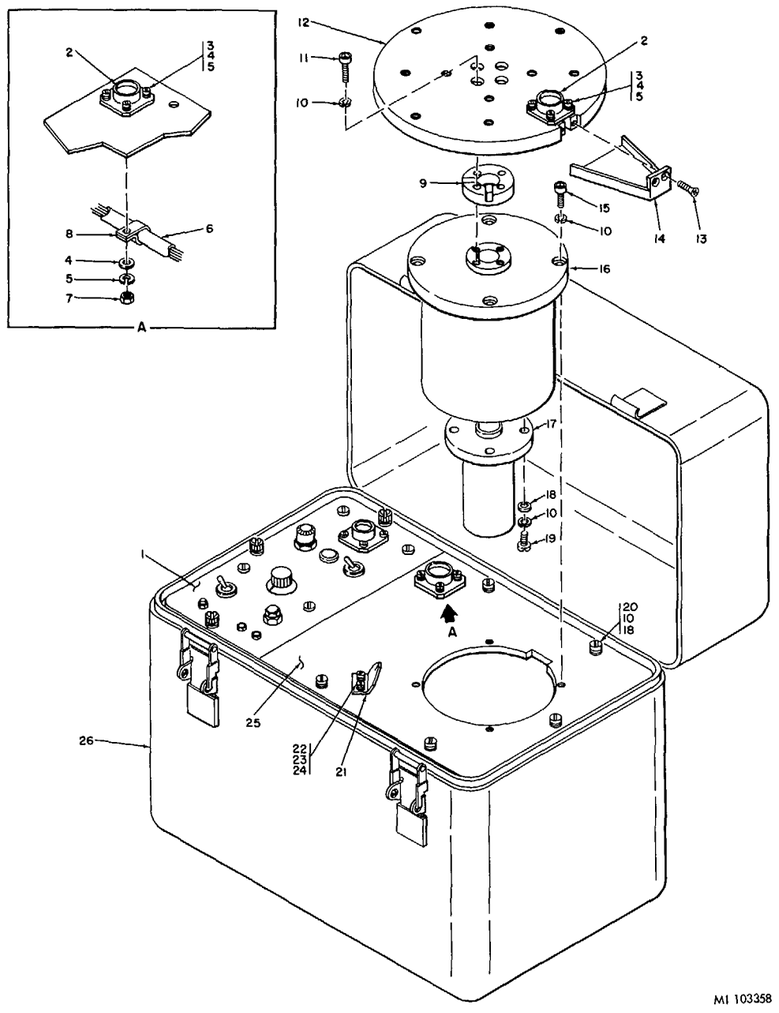
4-6. Amplifier (A1) Removal and Installation Procedure

a. Removal.

(1) Loosen the captive screws and remove front panel (1, fig. 4-7) from case (26).
(2) Loosen captive screw (26, fig. 4-8) and remove U-bracket (25) from Al mounting bracket (10).
(3) Loosen captive screw (27) and remove A1 (22).

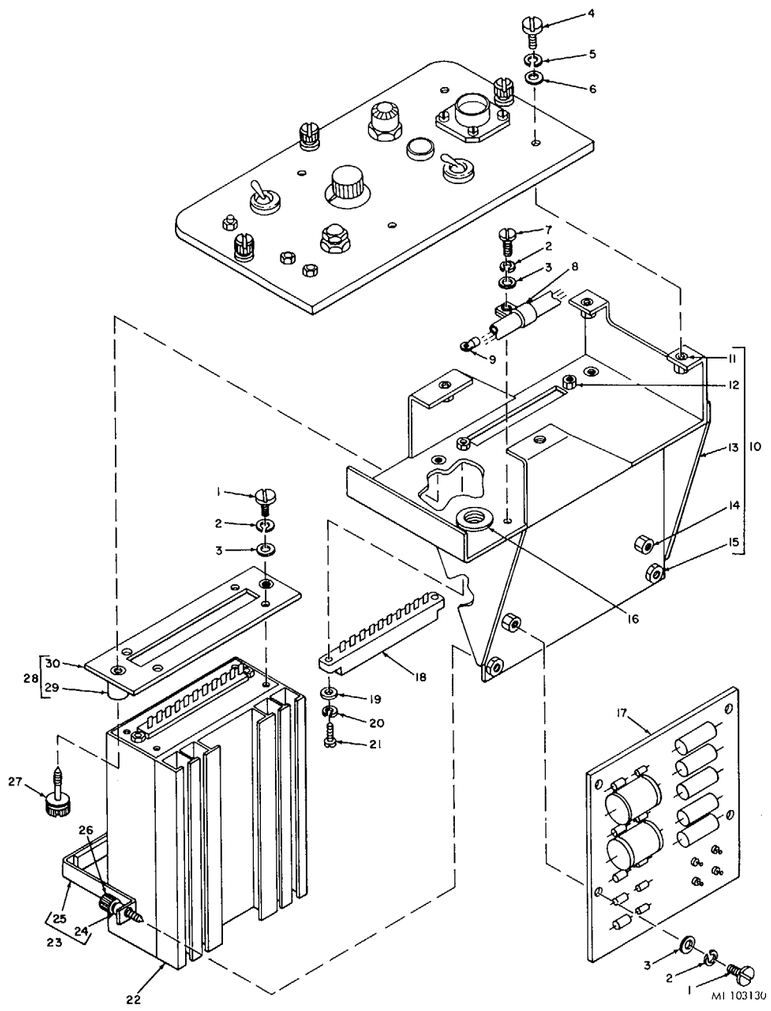
b. Installation.

(1) Install A1 (22, fig. 4-8) in XA1 (18) and tighten captive screw (27).
(2) Install U-bracket (25) and tighten captive screw (26).
(3) Install front panel (1, fi. 4-7) and tighten the captive screws.



1 – Front panel
2 – J1, J3
3 – Screw
4 – Washer
5 – Lockwasher
6 – Wiring harness
7 – Nut
8 – Clamp
9 – Riser ring
10 – Lockwasher
11 – Screw
12 – Table top
13 – Screw
14 – Wire shield
15 – Screw
16 – Control motor
17 – Slip ring assembly
18 – Washer
19 – Lockwasher
20 – Screw
21 – Pointer
22 – Washer
23 – Lockwasher
24 – Screw
25 – Base plate
26 – Case (Depot only)

Figure 4-7. Repair of TA-220 - view 1.



1 – Screw	11 – Captive nut (Depot only)	22 – A1 (Depot repair)
2 – Lockwasher	12 – Captive nut (Depot only)	23 – U-bracket assembly
3 – Washer	13 – Bracket (Depot only)	(Depot repair)
4 – Screw	14 – Captive nut (Depot only)	24 – Panel retainer (Depot only)
5 – Lockwasher	15 – Captive nut (Depot only)	25 – U-bracket (Depot repair)
6 – Washer	16 – Grommet	26 – Captive screw (Depot only)
7 – Screw	17 – Resistor board assembly	27 – Captive screw (Depot only)
8 – Clamp	18 – XA1 (Depot only)	28 – Mounting plate (Depot only)
9 – Terminal lug	19 – Washer (Depot only)	29 – Panel retainer (Depot only)
10 – A1 mounting bracket	20 – Lockwasher (Depot only)	30 – Mounting plate (Depot only)
(Depot repair)	21 – Screw (Depot only)	

Figure 4-8. Repair of TA-220 - view 2.

4-7. Control Motor and Slip Ring Assembly Removal and Installation Procedure (Fig. 4-7)

a. Removal

NOTE
If the slip ring assembly is to be removed perform steps (1) through (7) only.

(1) Remove mounting hardware (10, 18, and 20) and base plate (25) from case (26).
(2) Disconnect and tag the leads to the terminal strip on control motor (16).
(3) Remove screws (13) and wire shield (14) to expose slot in table top (12).
(4) Remove mounting hardware (3 through 5) and slide J3 (2) down through the table top.
(5) Remove mounting hardware (10 and 11), table top (12), and riser ring (9).
(6) Disconnect and tag the leads to J1 and J3 (2).
(7) Remove mounting hardware (10, 18, and 19) and side slip ring (17) and the cable from the control motor.
(8) Remove mounting hardware (10 and 15) and the control motor from the base plate.

b. Installation.

NOTE
If the slip ring assembly is to be installed perform steps (2) through (8) only.

(1) Install control motor (16) with mounting hardware (10 ad 15) to base plate (25).
(2) Install slip ring (17) and the cable with mounting hardware (10, 18, and 19) to the control motor.
(3) Reconnect the leads to J1 and J3 (2) and remove the tags.
(4) Install J3 with mounting hardware (3 through 5) to table top (12).
(5) Install wire shield (14) with screw (13) to the table top.
(6) Reconnect the leads to the terminal strip on the control motor.
(7) Install riser ring (9) and the table top with mounting hardware (10 and 11) to the control motor.
(8) Install base plate (25) with mounting hardware (10, 18, and 20) to case (26). Do not tighten screws (20) until front panel (1) is in place.

4-8. Resistor (R1 and R8) and Switch (S1, S2, or S3) Removal and Installation Procedure

a. Removal

(1) Loosen the captive screws and remove front panel (1, fig. 47) from case (26).
(2) Disconnect and tag the leads to R1, R8, S1, S2, or S3 (fig. 4-9).
(3) Remove the mounting hardware and R1, R8, S1, S2, or S3.

b. Installation.

(1) Install R1, R8, S1, S2, or S3 with the mounting hardware (fig. 4-9).
(2) Connect the leads and remove the tags.
(3) Install front panel (1, fig. 4-7) in case (26) and tighten the captive screws.

4-9. Resistor Board Assembly Components Removal and Installation Procedure

a. Removal.

(1) Loosen the captive screws and remove front panel (1, fig. 4-7) from case (26).
(2) Remove faulty semiconductor, capacitor, or resistor (fig. 4-10).

b. Installation.

(1) Install a new semiconductor, capacitor, or resistor (fig. 4.10).
(2) Install front panel (1, fig. 4-7) in case (26) and tighten the captive screws.

4-10. Painting

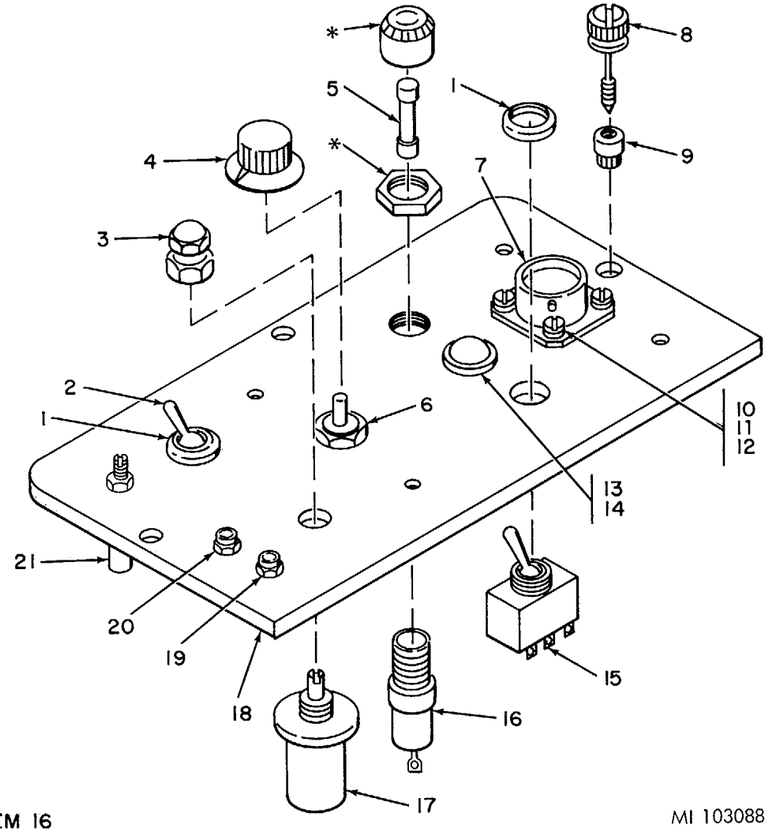
CAUTION
All connectors, lettering, and mounting surfaces will be masked before painting the adjoining surfaces.

Inspect and paint the exterior of the UUT.

a. Inspect the exterior surface of the UUT for scratched, chipped, or peeled paint.
b. Smooth the damaged area with sandpaper, wet/dry (120-400 grit).
c. Spot paint damaged areas with a brush.
d. Use paint MIL-E-15090 type 1081-24578, for the assembly panels and paint, Fed Spec TT-E-529 class A, color no. 24087, for the exterior case of the UUT.

4-11. Packaging

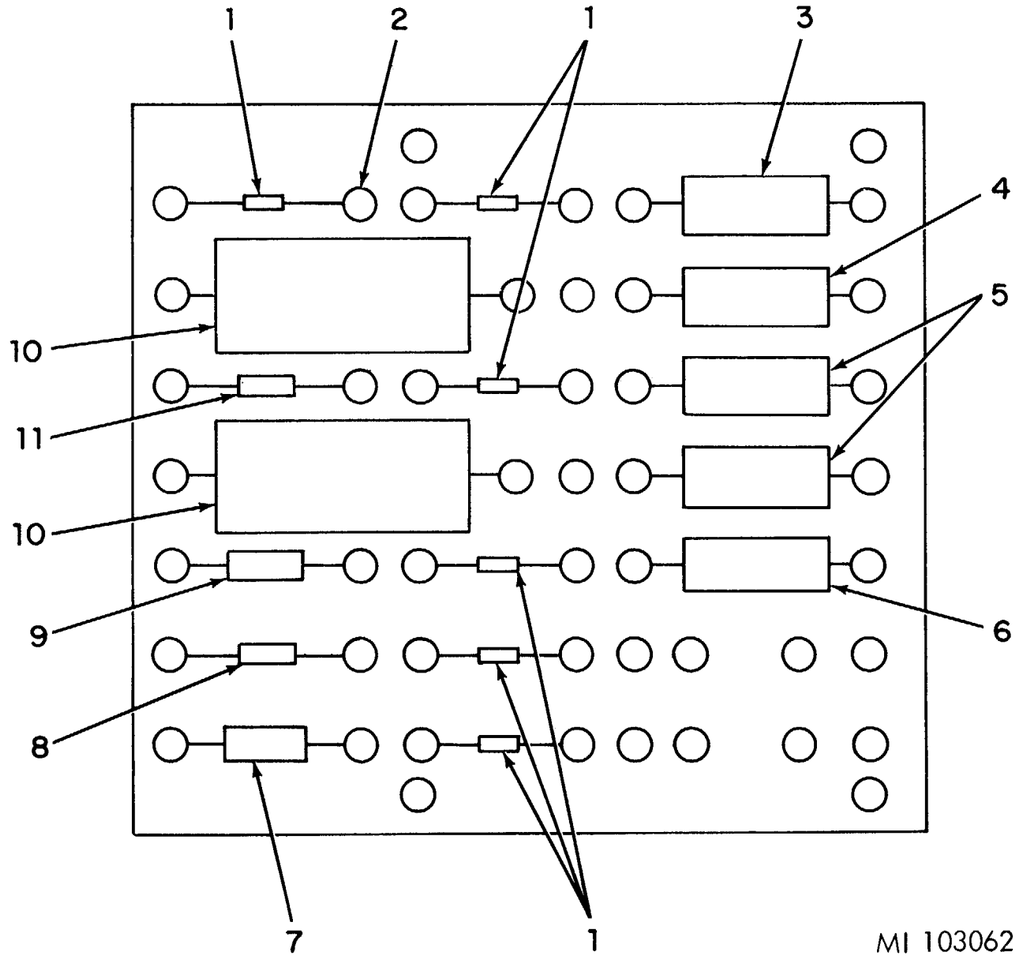
a. When the rate gyro table is to be shipped to the depot for further testing and repair, package the assembly in accordance with TM 38230 method II D, insuring that adequate cushioning material and bracing are used to prevent damage to the assembly during shipment.
b. Packages should be marked in accordance with local directives.



*FURNISHED WITH ITEM 16

1 – Nut
2 – S2
3 – Shaft lock
4 – Knob
5 – F1
6 – S3
7 – J2
8 – Captive screw (Depot only)
9 – Retainer (Depot only)
10 – Lockwasher
11 – Screw
12 – Washer
13 – DS1
14 – Lamp
15 – S1
16 – Fuseholder
17 – R1
18 – Front panel
19 – Jack
20 – Jack
21 – R8

Figure 4-9. Repair of TA-220 - view 3.



1 – R7, R11, R12, R13, R15, R19
2 – Terminal
3 – R18
4 – R3
5 – R4, R5
6 – R2
7 – CR1
8 – R21
9 – R20
10 – C2, C3
11 – R22

Figure 4-10. Repair of resistor board assembly.

CHAPTER 5

HOLD-DOWN TEST FIXTURE(TA-221)

Section I. MANUAL TESTS

5-1. General

This chapter provides the information necessary to isolate and repair a fault in the hold-down test fixture to a single open or shorted wire, or faulty component. Figures 5-1 through 5-6 are provided as an aid in troubleshooting and testing the unit. Use figures 5-1 through 5-3 for serial numbered units 00300-00310 and 00700-00728, and figures 5-4 through 5-6 for serial numbered units 00732 and above.

5-2. Equipment Required for Manual Tests

The multimeter, model 300M, 6625-933-2406, is required to test the unit.

5-3. Test Instructions

The test procedures listed in paragraphs 5-4 through 5-6 are a series of resistance measurements which will indicate any faulty wiring or components. They will check for continuity, open circuits, short circuit to cable shield, and component resistance values. Paragraphs 5-4 through 5-6 list the sequence of test measurements to be made. Use figures 5-1 and 5-6 to locate all connections.

5-4. Short Circuit to Shield Check

The multimeter is used in the SEARCH mode. Connect the multimeter probes, in turn, to the connector pairs listed below. The multimeter must indicate an open circuit (no reading) for all measurements. If a reading is obtained, replace the wire.

a. Connector J1.

(1) A, C
(2) B, C

b. Connector J2.

(

(1) A, N
(2) L, H
(3) M, H
(4) S, H
(5) T, H
(6) V, H

c. Connector J3.

(1) a, t
(2) b, t
(3) c, t
(4) d, t
(5) m, t
(6) n, t
(7) p, t
(8) X, t

d. Connector J4. Measure the resistance from all pins to terminal E1.

e. Connector J7. Measure for an open between all pins, except pin PP, and terminal E1.

f. Connector J8. Measure the resistance from all pins to terminal E1.

g. Connector J11.

(1) A, G
(2) B, G
(3) C, G
(4) E, G

h. Connector J12. Measure the resistance from all pins to terminal E1.

i. Connector J13. Measure for an open between all pins, except pin PP, and terminal E1.

j. Connector J4.

(1) J, Terminal E1
(2) M, Terminal E1

k. Terminal Board TB1.

NOTE

Use step (1) for serial numbered units 00300-00310 and 00700-728. Use step (2) for serial numbered units 00732 and above.

(1) Measure the resistance from all terminals on this board to terminal 7 on this board.

(2) Measure the resistance from all terminals on this board to terminal 4 on this board.

l. Terminal Board TB3. Measure the resistance from all terminals on this board to terminal 3 on this board.

m. Plug P1.

(1) Measure the resistance from J11, pin G to the following pins on P1:

(*a*) 1
(*b*) 2
(*c*) 3
(*d*) 4
(*e*) 5
(*f*) 6
(*g*) 7
(*h*) 8
(*i*) 9
(*j*) 10
(*k*) 11
(*l*) 12
(*m*) 16
(*n*) 19

(2) Measure the resistance from J2, pin A to the following pins on P1:

(*a*) 14
(*b*) 15

(3) Measure the resistance from J2, pin H to the following pins on P1:

(*a*) 17
(*b*) 18

5-5. Continuity Check

The multimeter is used in the SEARCH mode. Connect the multimeter leads, in turn, to the connections listed below. The multimeter must indicate a short circuit (zero ohms) for all measurements. If no reading is obtained, replace the wire.

a. J1 - Measure between.

NOTE

Use steps (1, 2, 3) for serial numbered units 00300-00310 and 00700-00728. Use steps (4, 5, 6) for serial numbered units 00732 and above.

(1) J1-A, TB2-1
(2) J1-B, TB2-2
(3) J1-C, TB2-3
(4) J1-A, (1)
(5) J1-B, (2)
(6) J1-C, (3)

b. J2 - Measure between.

(1) J2-C, P1-22
(2) J2-D, P1-21
(3) J2-E, P1-18
(4) J2-F, P1-23
(5) J2-L, J3-p
(6) J2-L, J2-M
(7) J2-M, P1-14
(8) J2-M, J3-c
(9) J2-M, J11-C
(10) J2-N, P1-15
(11) J2-R, P1-20
(12) J2-S, P1-17
(13) J2-S, J3-X
(14) J2-T, P1-24
(15) J2-V, P1-16
(16) J2-V, J3-d

c. J3 - Measure between.

(1) J3-a, J11-A
(2) J3-a, P1-4
(3) J3-b, J11-B
(4) J3-b, P1-1
(5) J3-k, P1-19
(6) J3-m, TB3-5
(7) J3-n, TB3-1
(8) J3-A, P1-10
(9) J3-B, P1-9
(10) J3-C, P1-7
(11) J3-D, P1-6
(12) J3-E, P1-4
(13) J3-F, P1-3
(14) J3-F, J11-E
(15) J3-G, P1-12
(16) J3-H, P1-11
(17) J3-K, Chassis Ground(E43)
(18) J3-M, P1-22
(19) J3-Y, P1-8
(20) J3-Z, P1-5

d. J4 - Measure between.

(1) J4-A, J19
(2) J4-A, J12-B
(3) J4-A, J7-z
(4) J4-A, J13-b
(5) J4-A, J8-3
(6) J4-B, J18
(7) J4-B, J12-E
(8) J4-B, J7-y
(9) J4-B, J13-S
(10) J4-B, J8-2
(11) J4-D, J21
(12) J4-D, J7-JJ
(13) J4-D, J13-f
(14) J4-D, J8-5
(15) J4-E, J23
(16) J4-E, J14-J
(17) J4-E, J7-HH
(18) J4-E, J8-7
(19) J4-E, J13-m

e. J5 -Measure between.

(1) J5-A, J9-2
(2) J5-B, J9-15
(3) J5-C, J9-3
(4) J5-D, J9-16
(5) J5-E, J9-4
(6) J5-F, J9-1
(7) J5-G, J9-18
(8) J5-H, J9-17
(9) J5-J, J9-5
(10) J5-K, J9-6
(11) J5-L, J9-14
(12) J5-M, J9-7
(13) J5-N, J9-9
(14) J5-P, J9-10
(15) J5-R, J10-2
(16) J5-S, J10-15
(17) J5-T, J10-3
(18) J5-U, J10-16
(19) J5-V, J10-4
(20) J5-W, J10-1
(21) J5-X, J10-18
(22) J5-Y, J10-17
(23) J5-Z, J10-5
(24) J5-a, J 10-6
(25) J5-b, J 10-14
(26) J5-c, J 10-7
(27) J5-d, J 10-9
(28) J5-e, J10-10

NOTE

Steps (29) through (43) only apply to units serial numbered 00300-00310 and 00700-00728.

(29) J5-f, J15-1C
(30) J5-h, J15-4B
(31) J5-i, J15-1A
(32) J5-j, J25-2A
(33) J5-k, J15-4A
(34) J5-m, J15-1B
(35) J5-n, J15-2B
(36) J5-p, J15-3A
(37) J5-q, J15-3B
(38) J5-r, J15-2C
(39) J5-s, J15-3C
(40) J5-t, J15-4C
(41) J5-BB, J15-8C
(42) J5-CC, J15-8B
(43) J5-DD, J15-9B

f. J6 - Measure between.

(1) J6-A, TB1-1
(2) J6-B, TB-2
(3) J6-C, TB-3

Use steps (4, 5, 6) for serial numbered units 00300-00310 and 00700-00728. Use steps (7, 8, 9) for serial numbered units 00732 and above.

(4) J6-D, TB1-4
(5) J6-E, TB1-5
(6) J6-F, TB1-6
(7) J6-D, TB1-5
(8) J6-E, TB1-6
(9) J6-F, TB1-7

g. J7 - Measure between.

(1) J7-PP, J13-PP
(2) J7-x, J13-P
(3) J7-x, J12-D
(4) J7-x, J17
(5) J7-x, J8-1
(6) J7-AA, J13-e
(7) J7-AA, J8-4
(8) J7-AA, J20
(9) J7-DD, J13-q
(10) J7-DD, J-25
(11) J7-DD, J8-9
(12) J7-EE, J13-r
(13) J7-EE, J8-10
(14) J7-EE, J26
(15) J7-FF, J13-s
(16) J7-FF, J8-11
(17) J7-FF, J27
(18) J7-GG, J13-n
(19) J7-GG, J8-8
(20) J7-GG, J12-F
(21) J7-GG, J24
(22) J7-KK, J13-k
(23) J7-KK, J8-6
(24) J7-KK, J22
(25) J7-LL, J13-t
(26) J7-LL, J8-12
(27) J7-LL, J28
(28) J7-MM, J13-u
(29) J7-MM, J8-13
(30) J7-MM, J12-A
(31) J7-MM, J14-M
(32) J7-MM, J29
(33) J7-NN, J13-V
(34) J7-NN, J8-14
(35) J7-NN, J12-C
(36) J7-NN, J30

5-6. Component Resistance Check

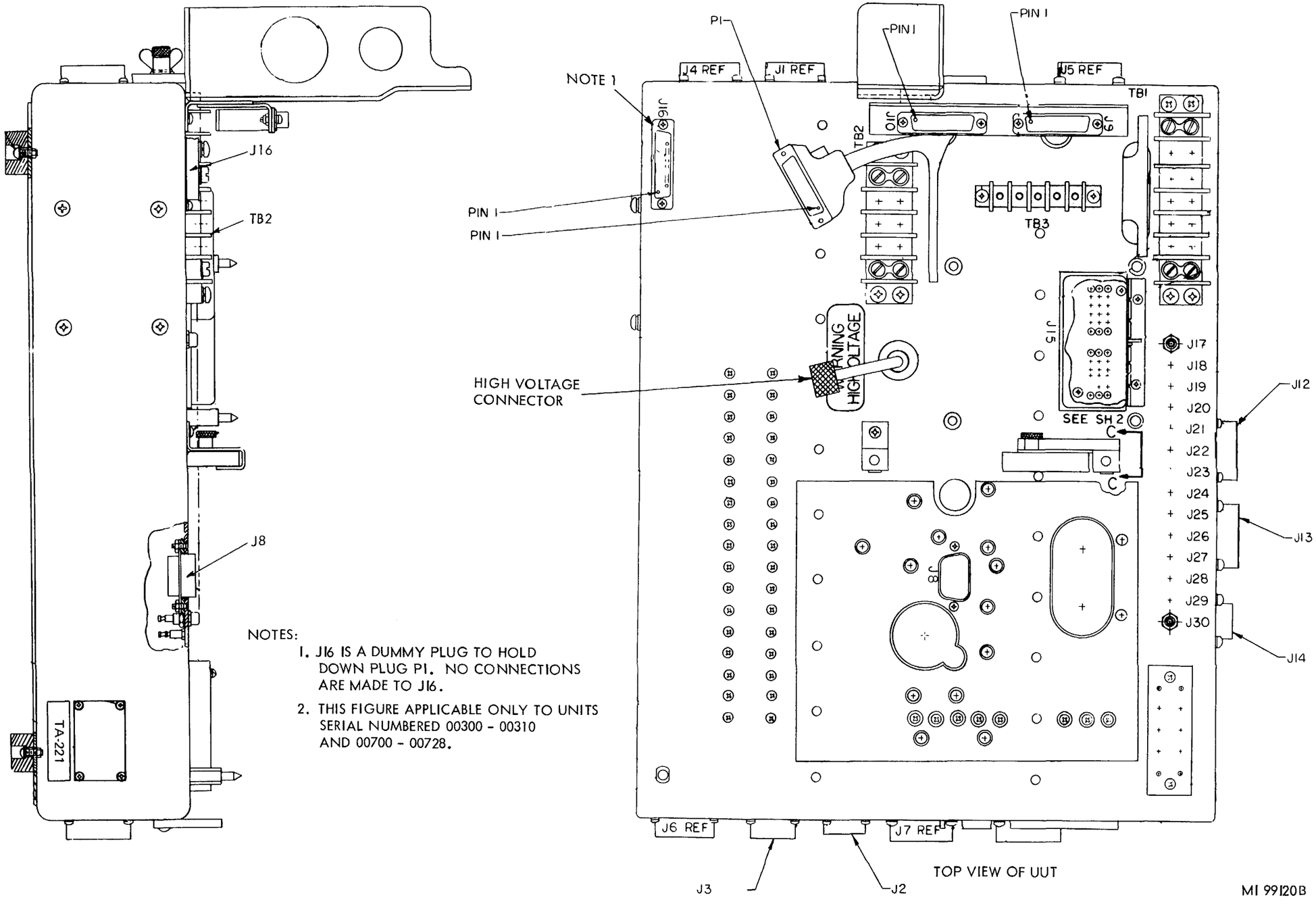
The multimeter is used in the DIGITAL mode. If any resistance readings are not as specified, replace the component, as indicated.

a. R1 Test.

Measure the resistance between TB3-1 and TB3-2. The reading should be between 1455 and 1485 ohms. If the reading is not between these values, replace R1.

b. T1 Test.

(1) Measure the resistance between TB3-4 and TB3-5. The reading should be less than 0.5 ohm.
(2) Measure the resistance between TB3-4 and the high-voltage connector (fig. 5-1). The reading should be between 500 and 700 K ohms.
(3) If the reading is not as specified in step (1) or (2), replace T1.



NOTES:

1. J16 IS A DUMMY PLUG TO HOLD DOWN PLUG P1. NO CONNECTIONS ARE MADE TO J16.
2. THIS FIGURE APPLICABLE ONLY TO UNITS SERIAL NUMBERED 00300 - 00310 AND 00700 - 00728.

Figure 5-1. TA-221, parts location diagram (sheet 1 of 2).

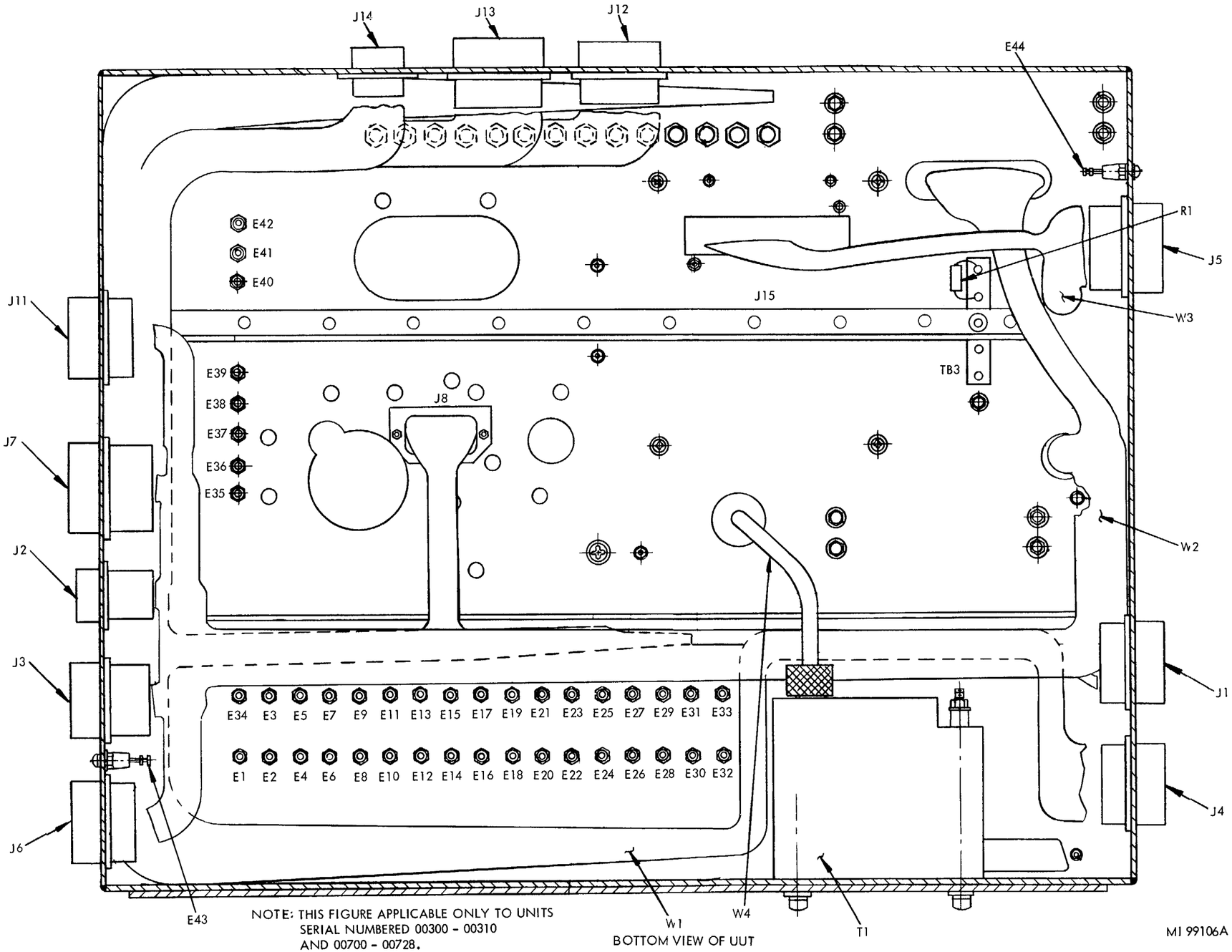
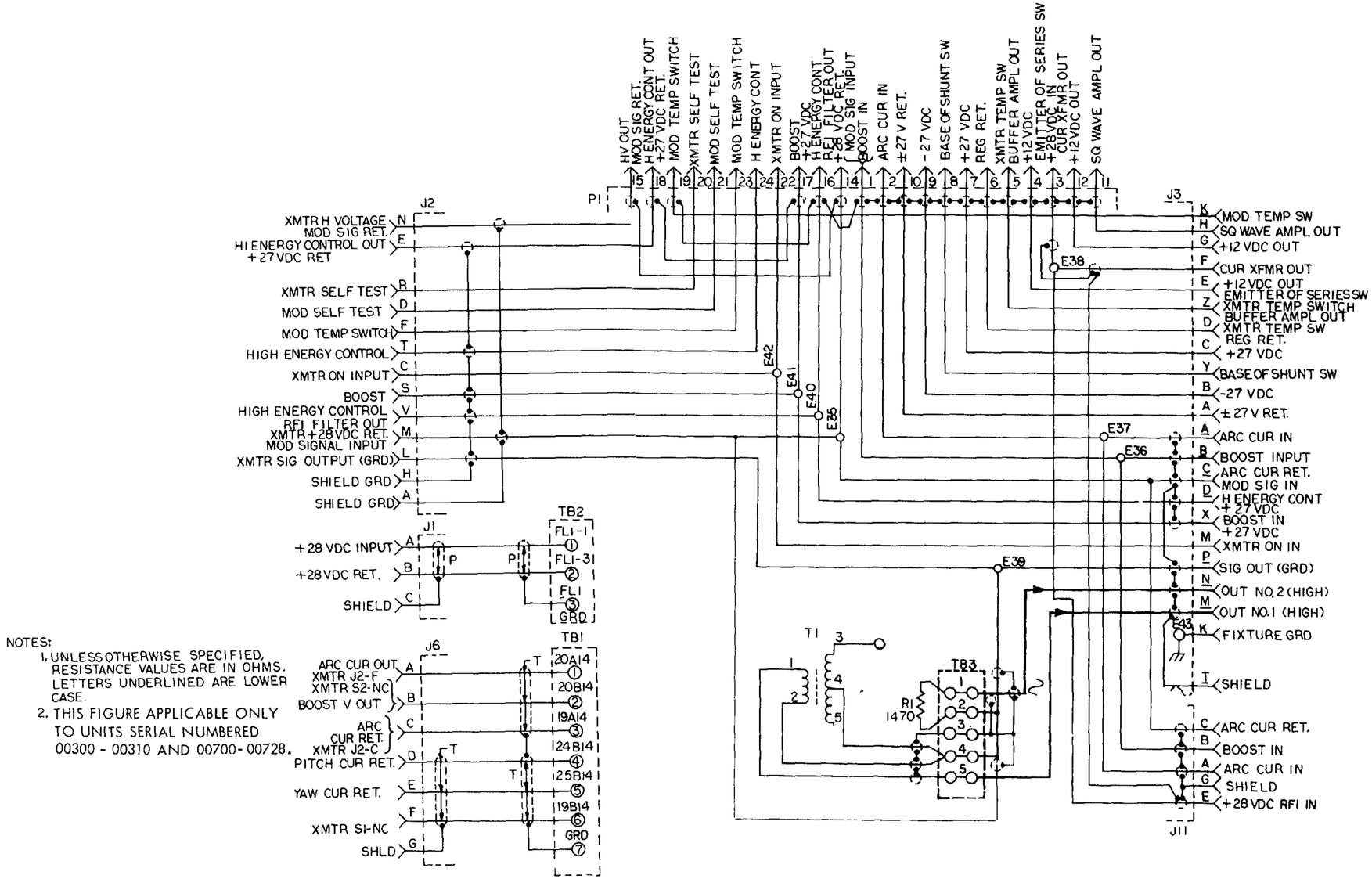


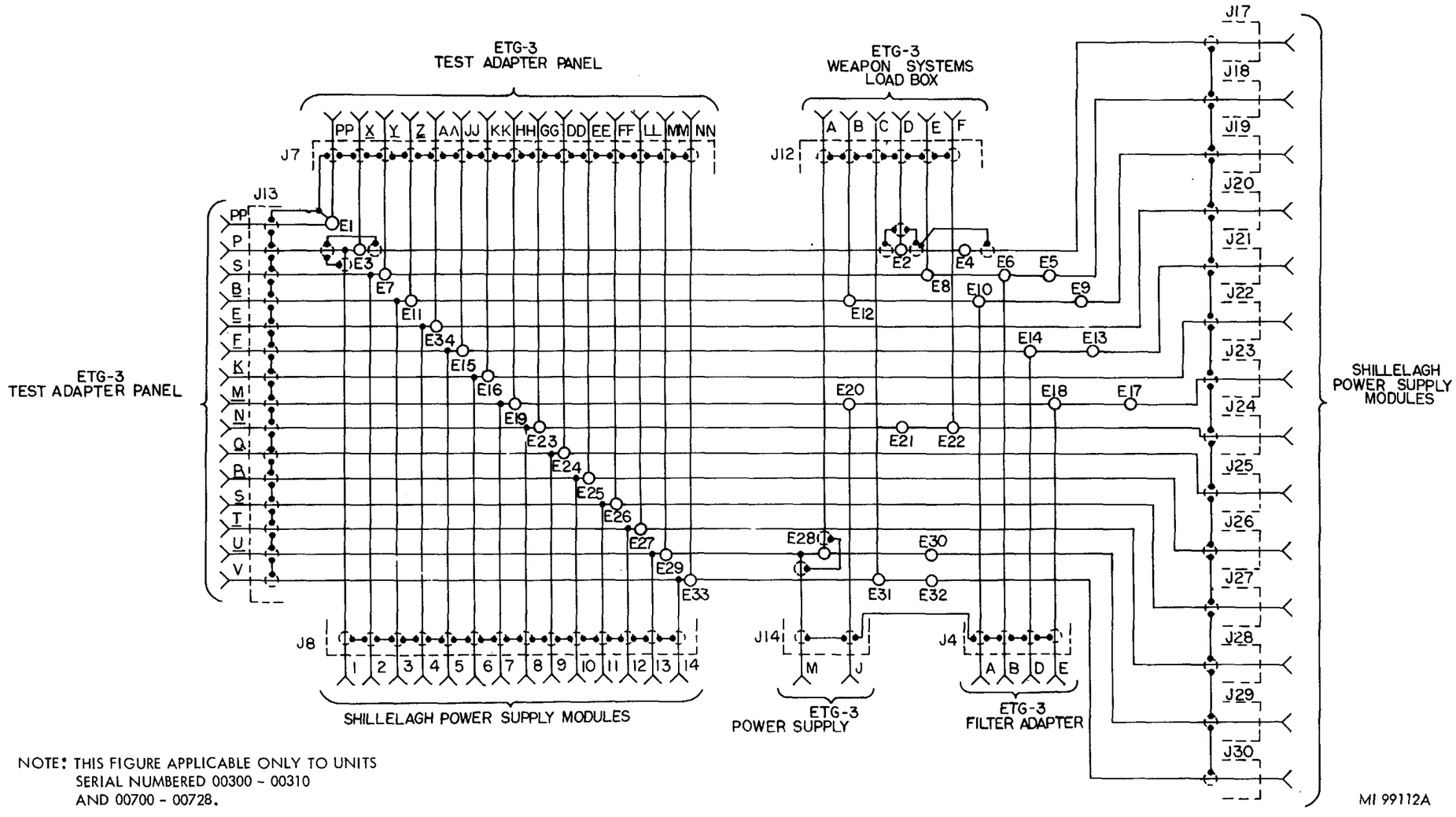
Figure 5-1. (sheet 2 of 2).



NOTES:
1. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS. LETTERS UNDERLINED ARE LOWER CASE.
2. THIS FIGURE APPLICABLE ONLY TO UNITS SERIAL NUMBERED 00300 - 00310 AND 00700 - 00728.

MI 99116B

Figure 5-2. TA-221, schematic diagram (sheet 1 of 3).



NOTE: THIS FIGURE APPLICABLE ONLY TO UNITS SERIAL NUMBERED 00300 - 00310 AND 00700 - 00728.

Figure 5-2. (sheet 2 of 3).

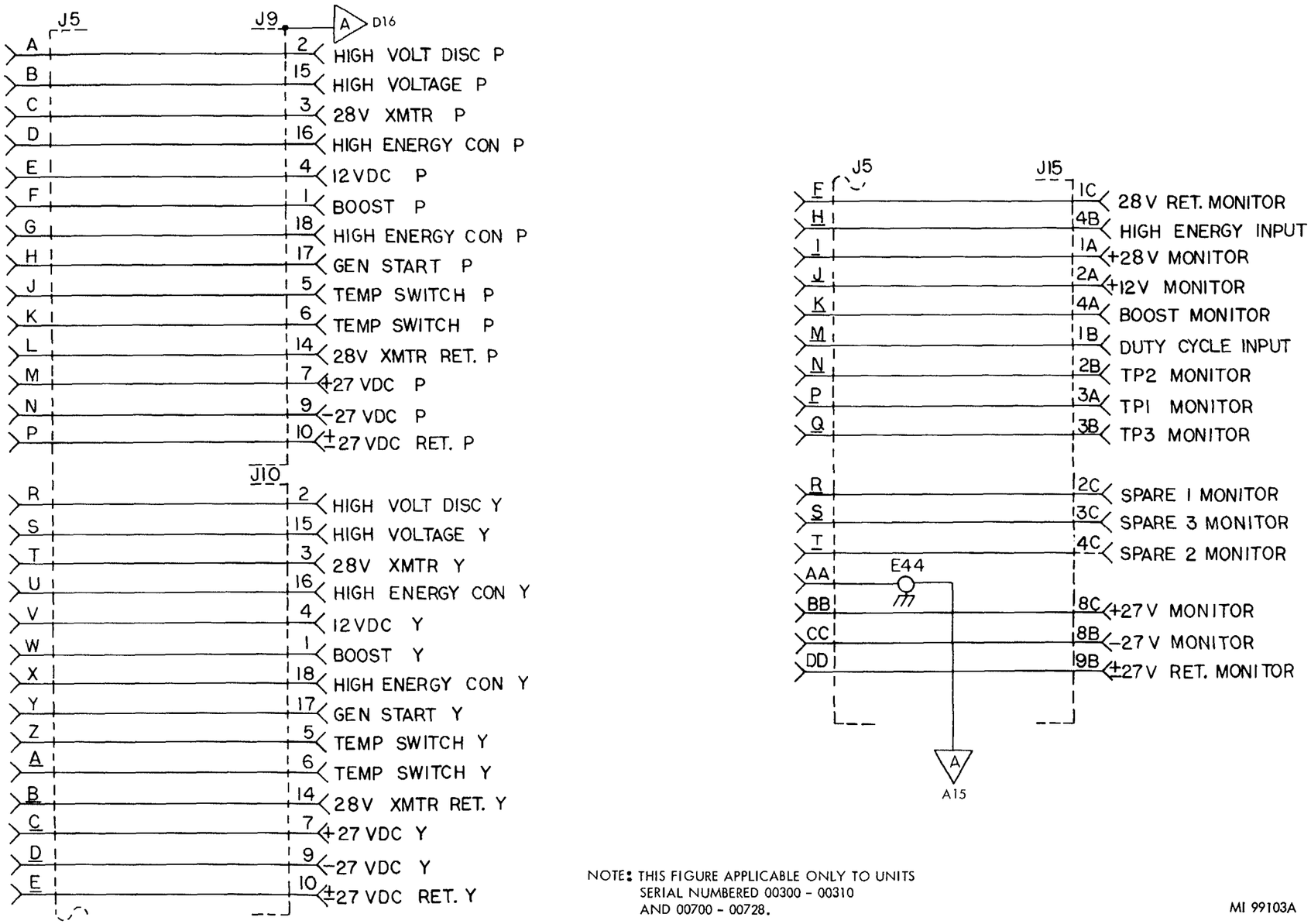
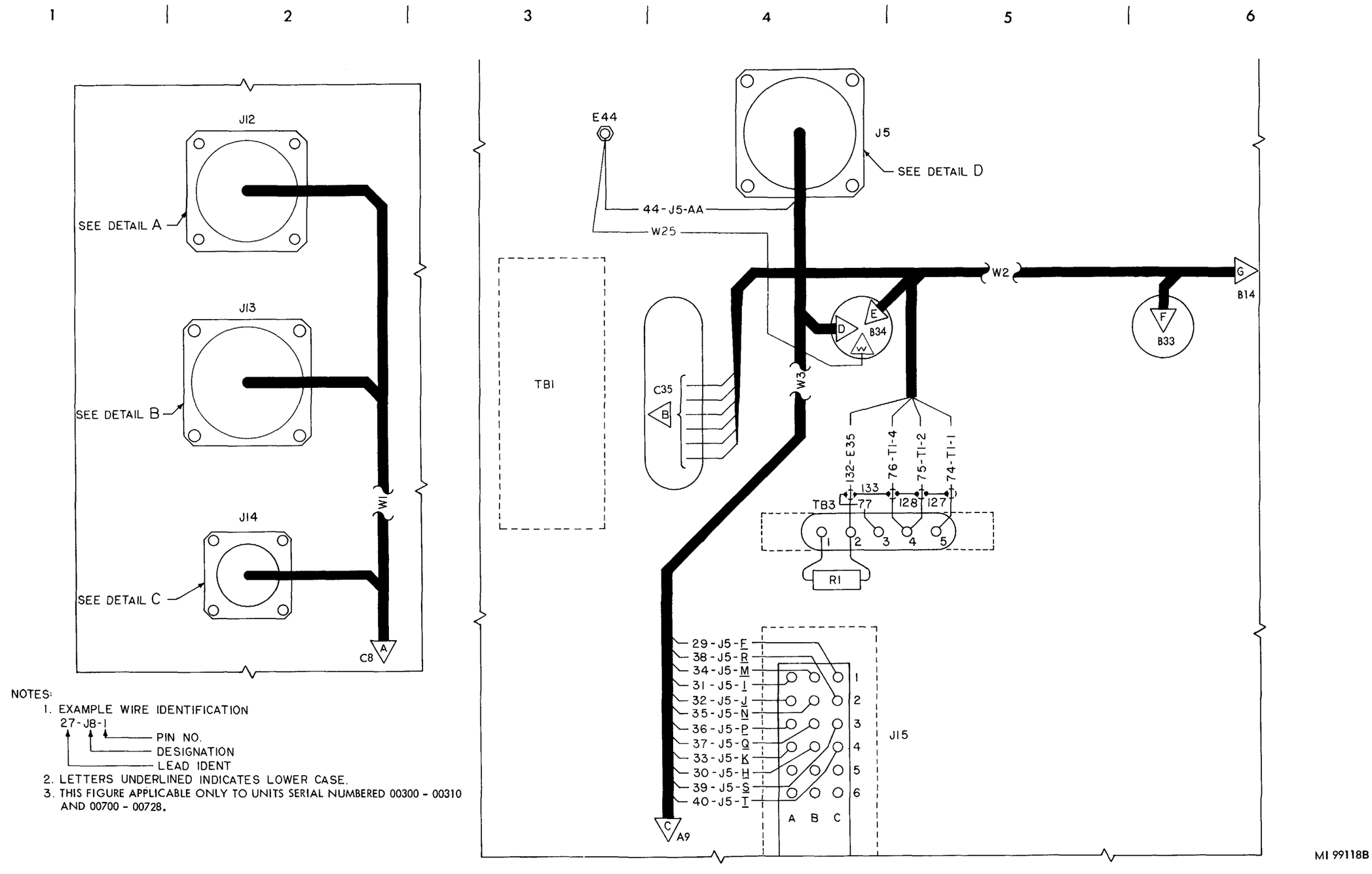


Figure 5-2. (sheet 3 of 3).



NOTES:

1. EXAMPLE WIRE IDENTIFICATION
   27-J8-1
   - 1 — PIN NO.
   - J8 — DESIGNATION
   - 27 — LEAD IDENT
2. LETTERS UNDERLINED INDICATES LOWER CASE.
3. THIS FIGURE APPLICABLE ONLY TO UNITS SERIAL NUMBERED 00300 - 00310 AND 00700 - 00728.

Figure 5-3. TA-221, wiring diagram (sheet 1 of 9).

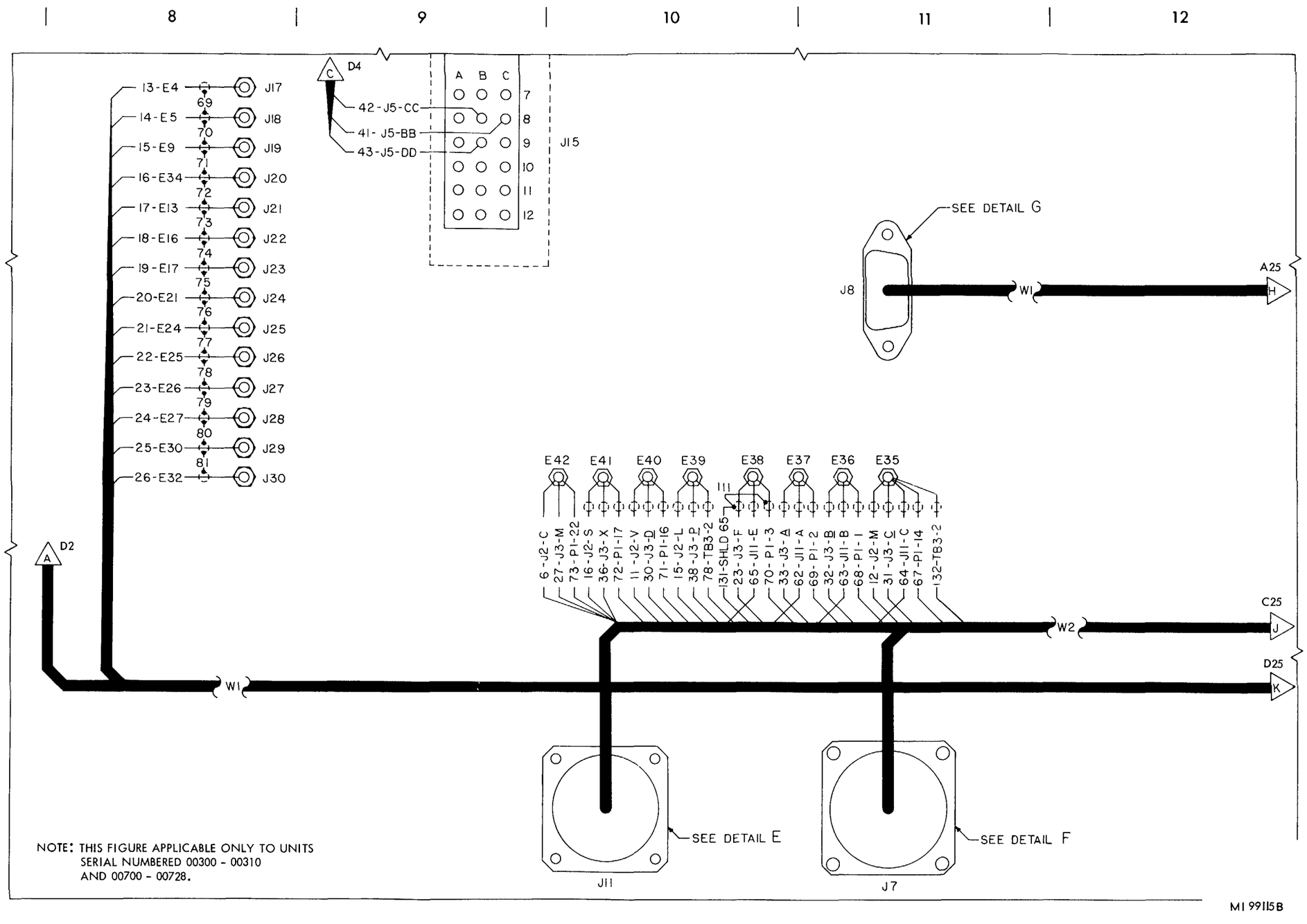


Figure 5-3. (sheet 2 of 9).

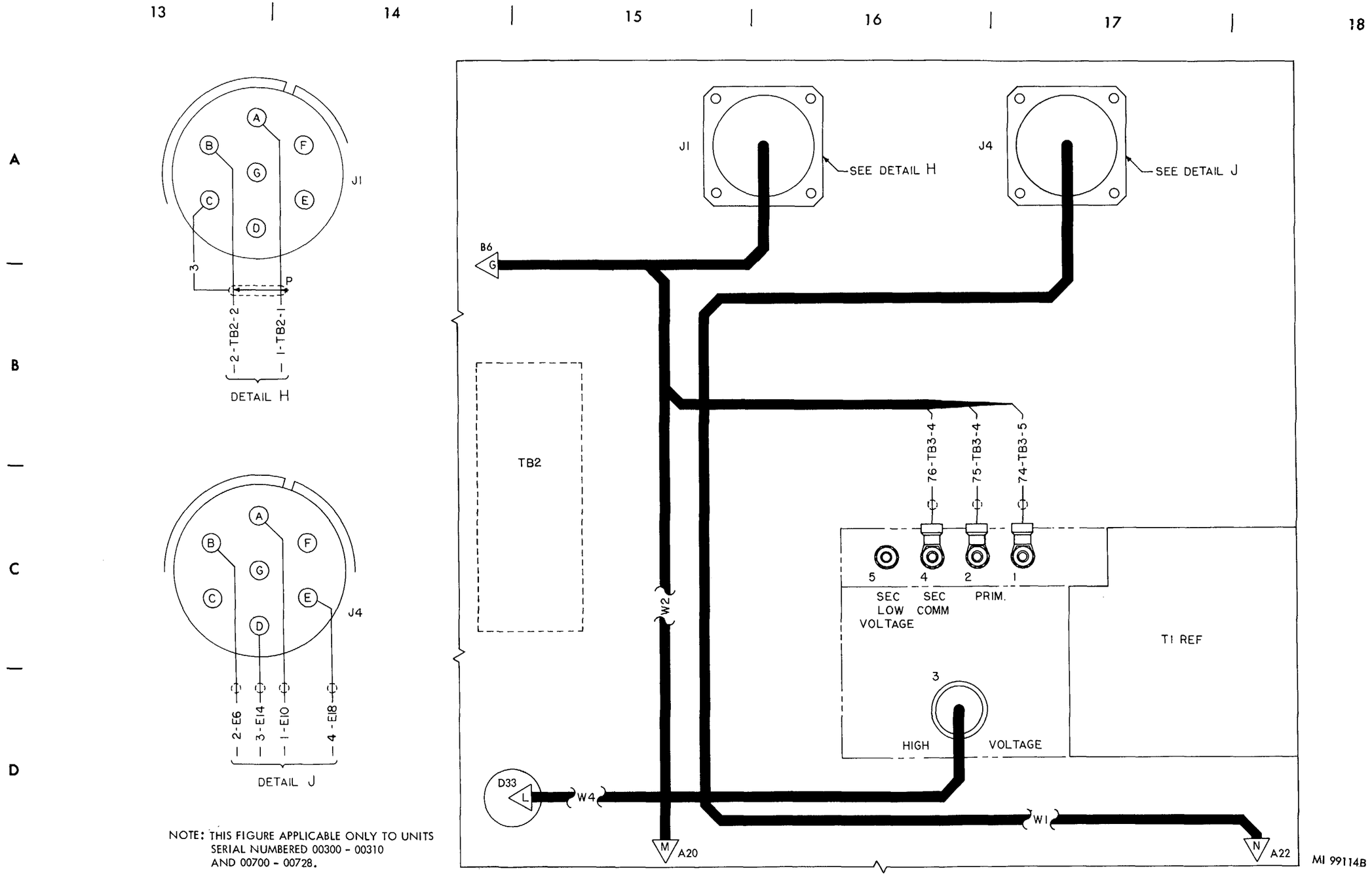
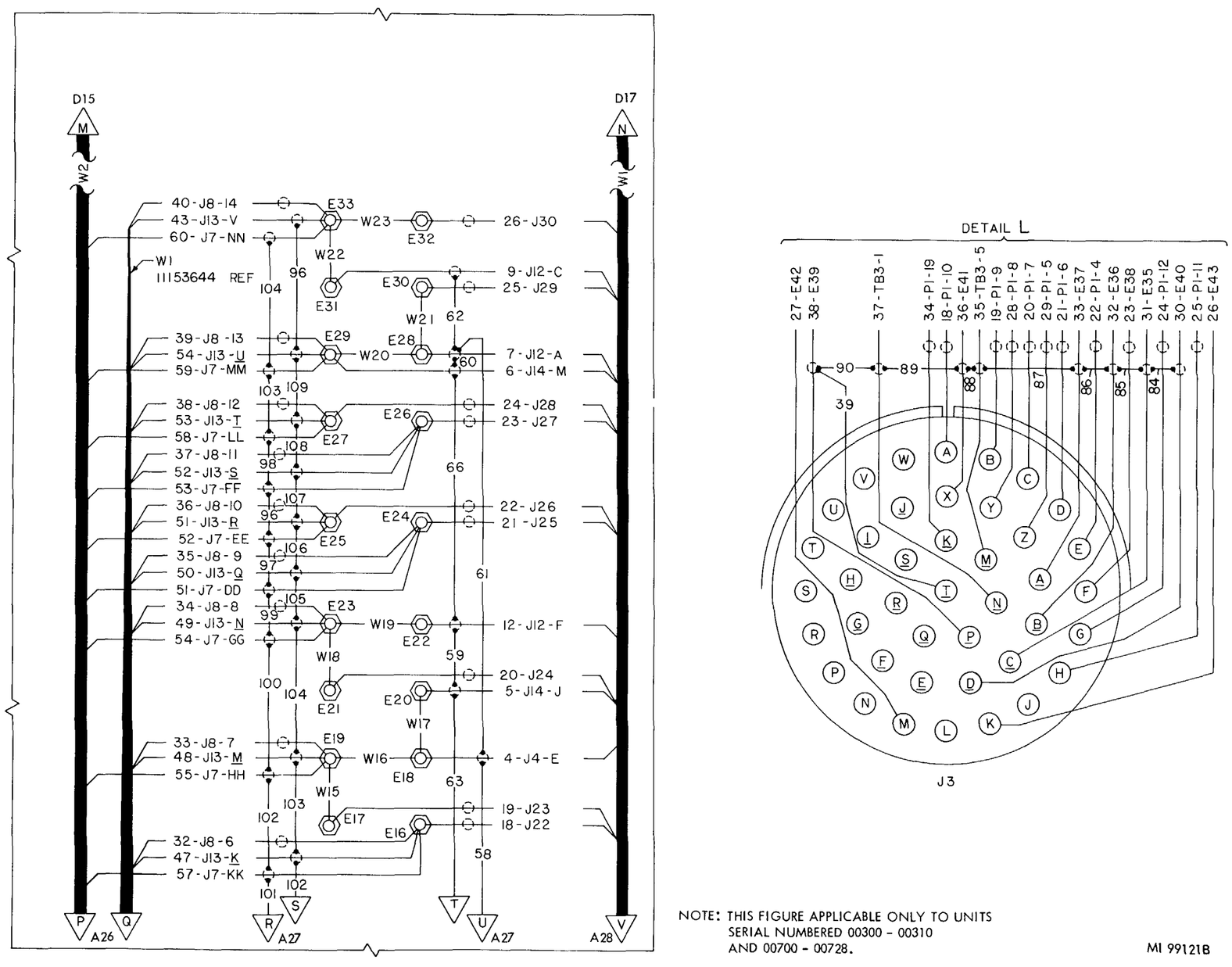


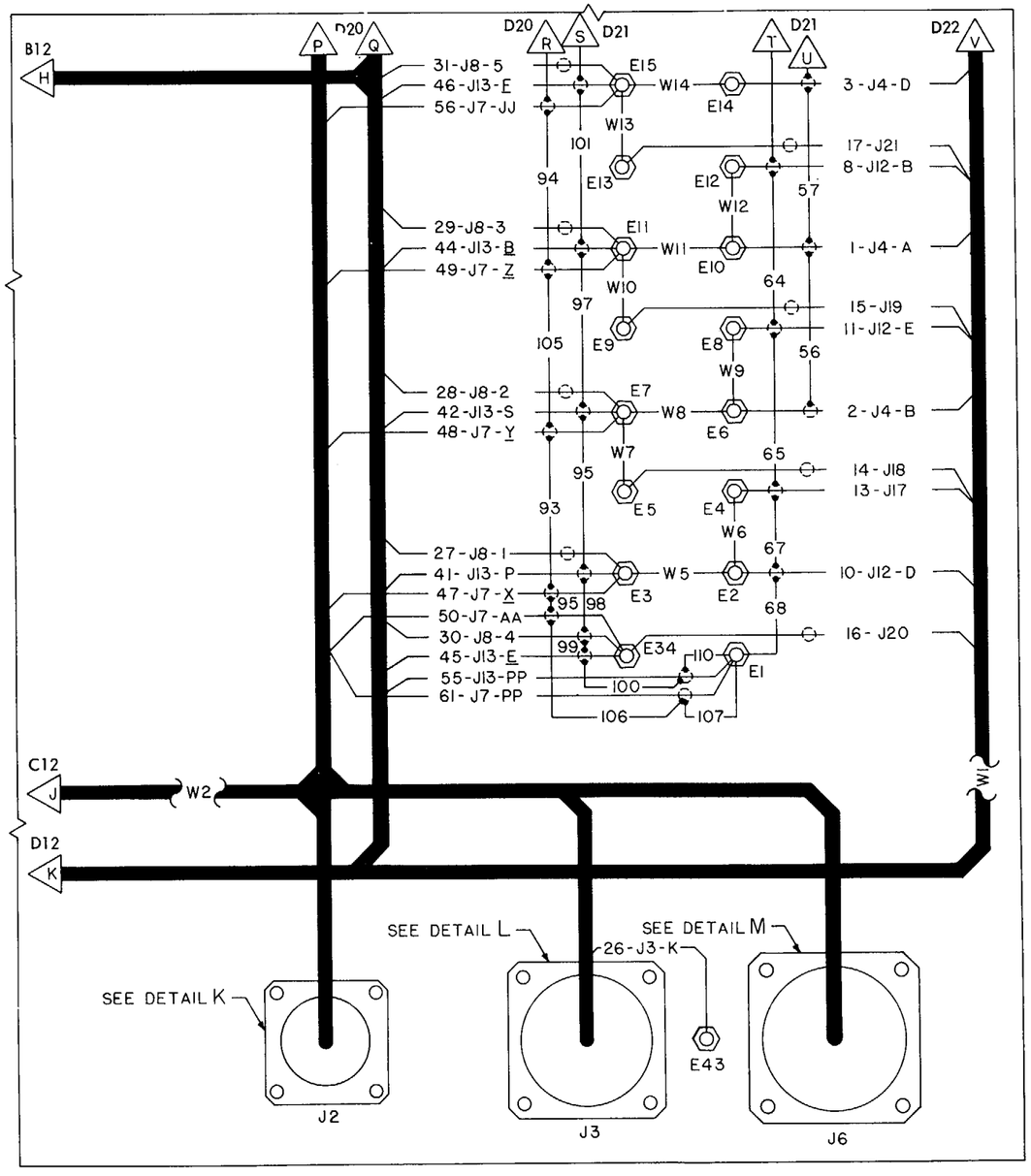
Figure 5-3. (sheet 3 of 9).

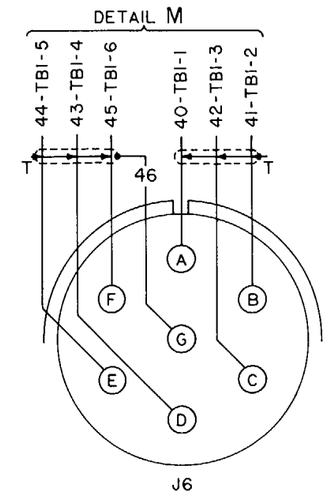


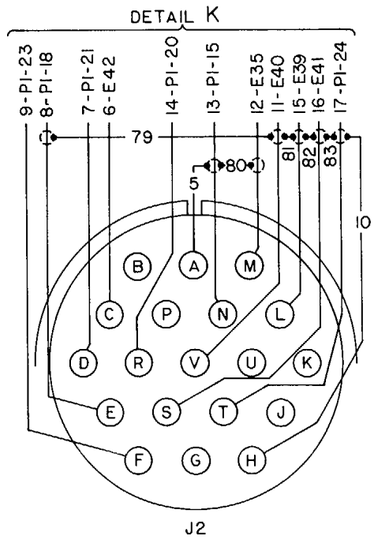
NOTE: THIS FIGURE APPLICABLE ONLY TO UNITS SERIAL NUMBERED 00300 - 00310 AND 00700 - 00728.

MI 991218

Figure 5-3. (sheet 4 of 9).







NOTE: THIS FIGURE APPLICABLE ONLY TO UNITS SERIAL NUMBERED 00300 - 00310 AND 00700 - 00728.

MI 99117.B

Figure 5-3. (sheet 5 of 9).

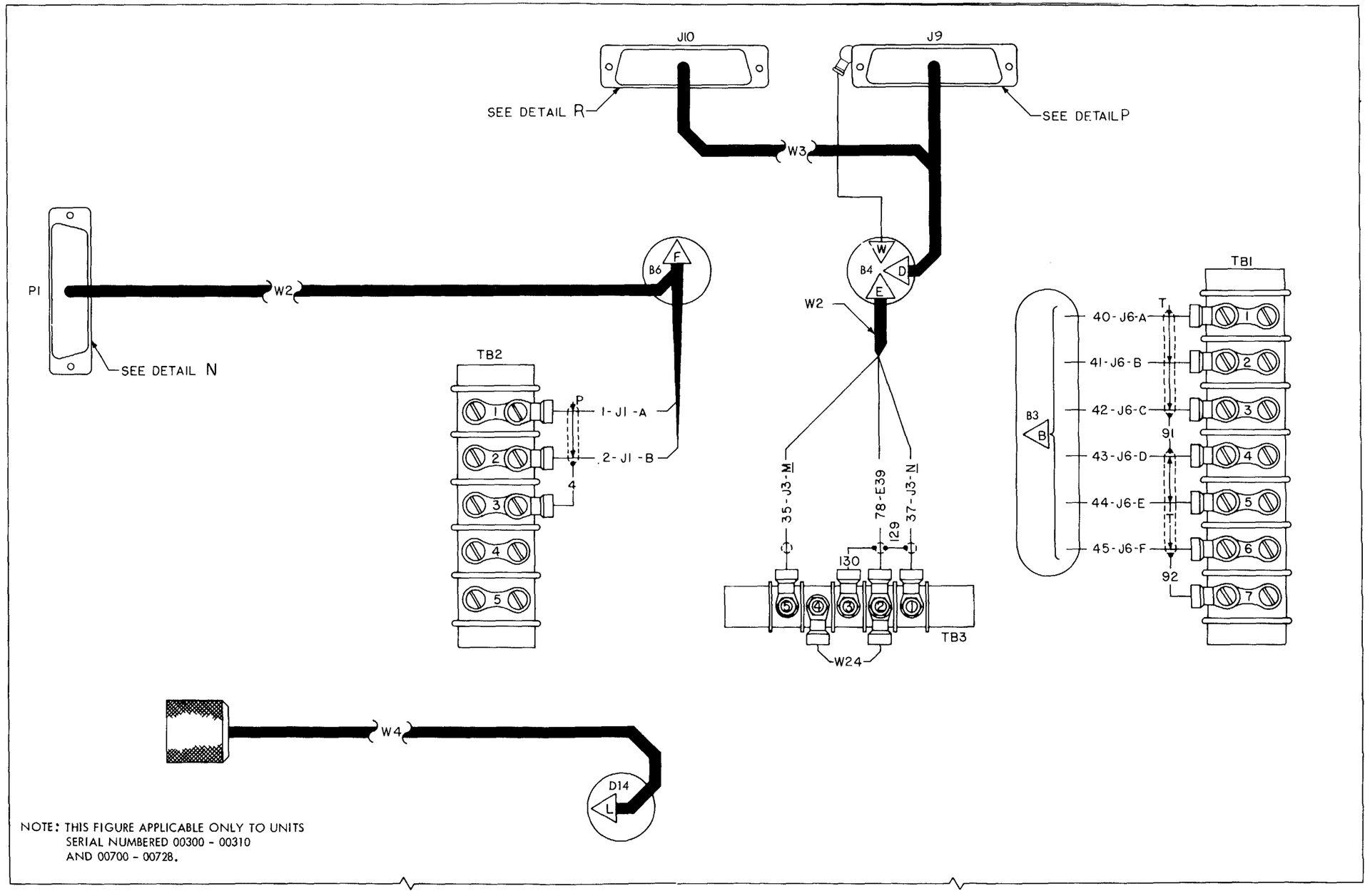
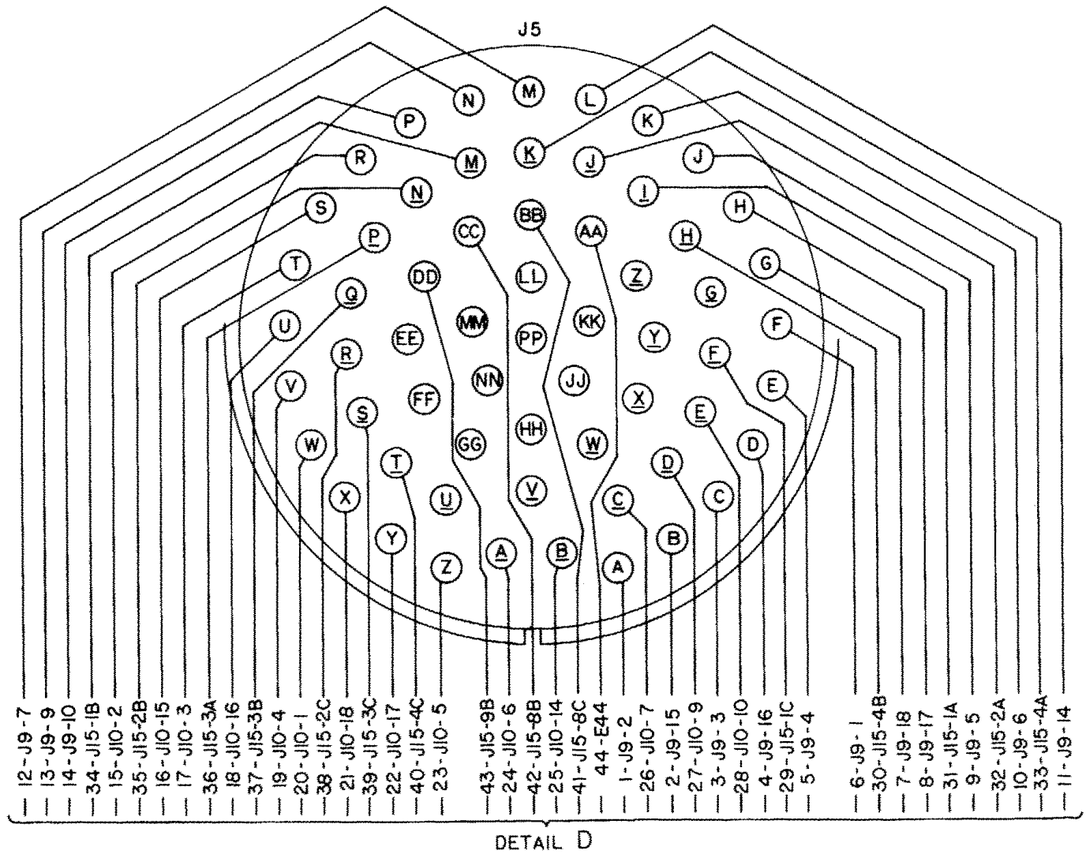
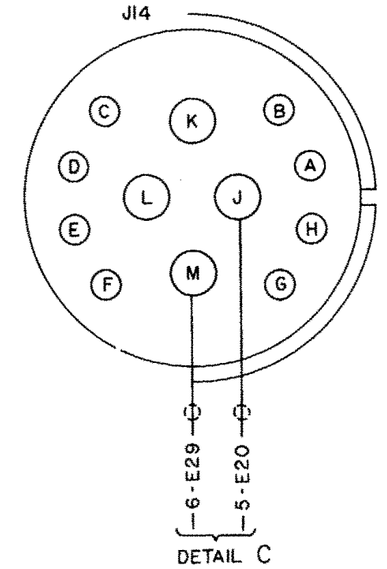
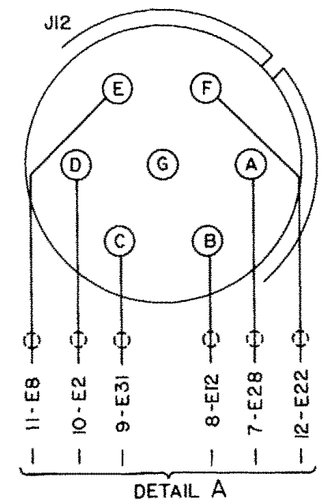


Figure 5-3. (sheet 6 of 9).



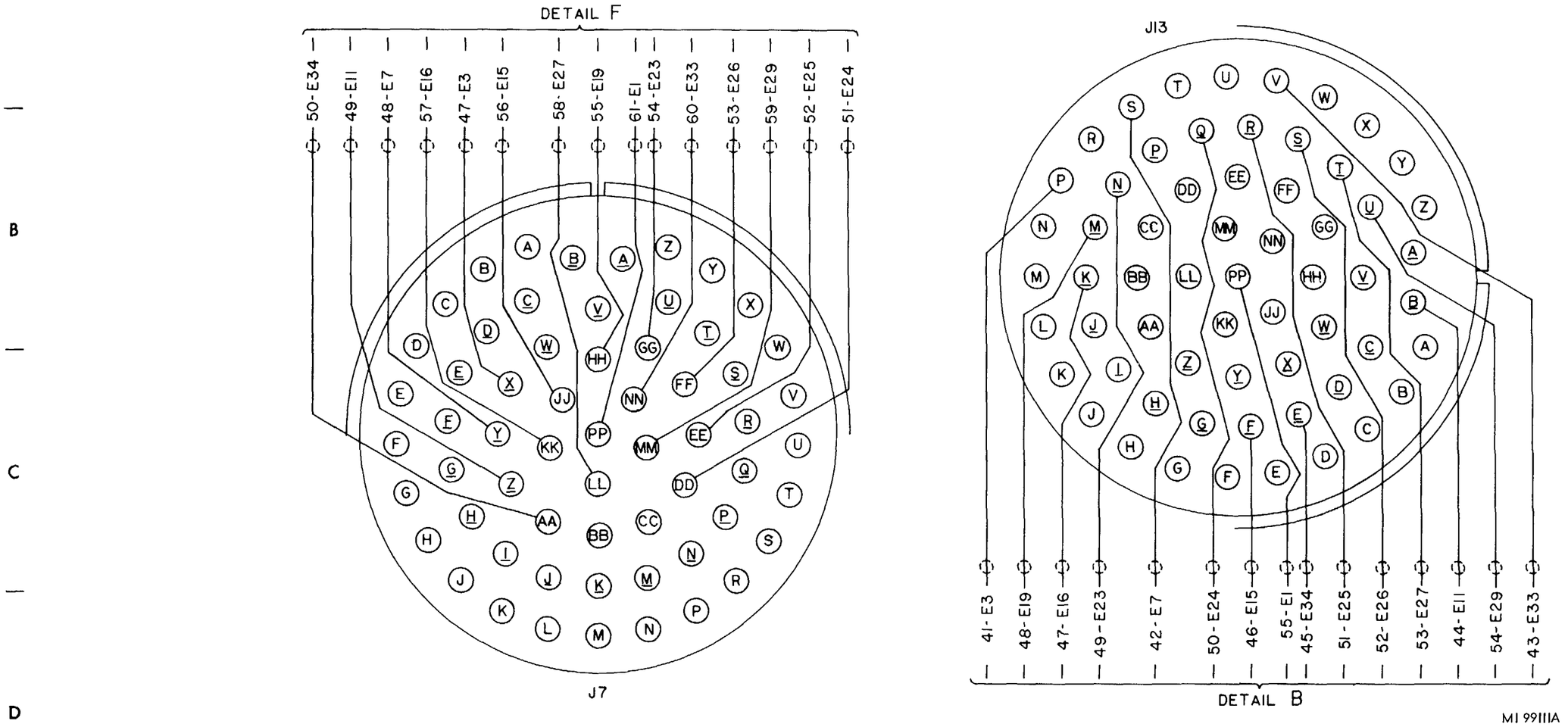




NOTE: THIS FIGURE APPLICABLE ONLY TO UNITS SERIAL NUMBERED 00300 - 00310 AND 00700 - 00728.

MI 99119A

Figure 5-3. (sheet 7 of 9).



NOTE: THIS FIGURE APPLICABLE ONLY TO UNITS SERIAL NUMBERED 00300 - 00310 AND 00700 - 00728.

Figure 5-3. (sheet 8 of 9).

49 | 50 | 51 | 52 | 53 | 54

A

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B

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C

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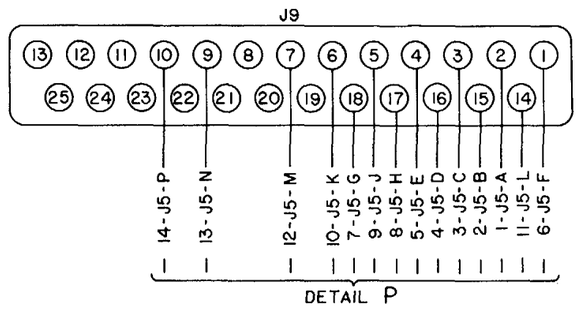
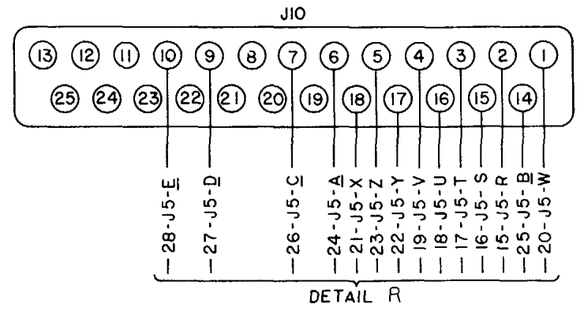
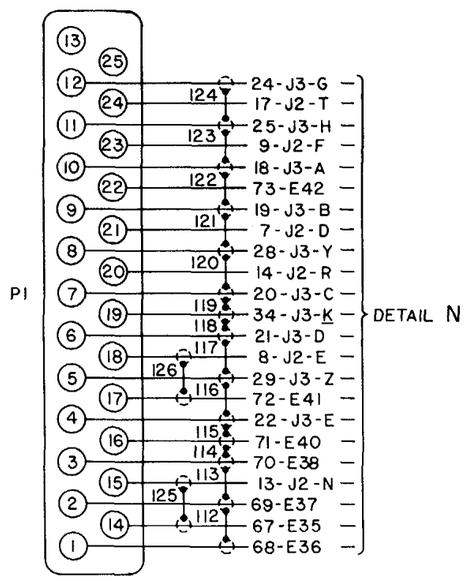
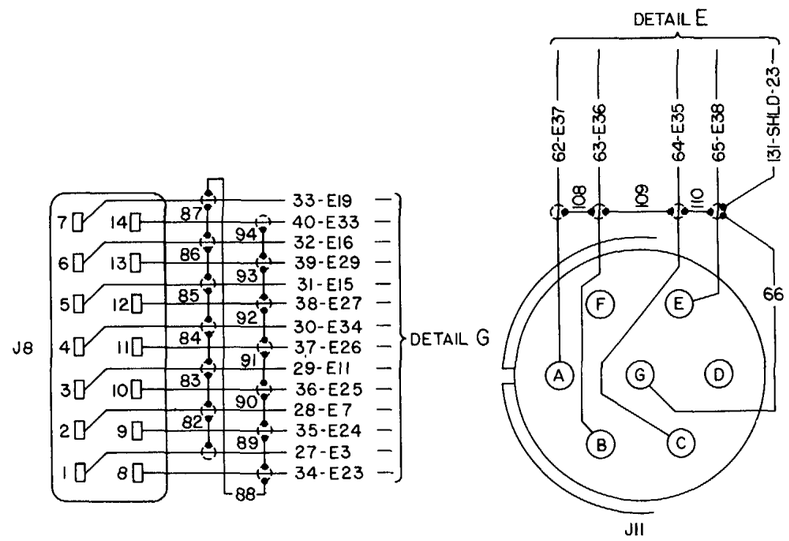
D







NOTE: THIS FIGURE APPLICABLE ONLY TO UNITS SERIAL NUMBERED 00300 - 00310 AND 00700 - 00728.



MI 99109A

Figure 5-3. (sheet 9 of 9).

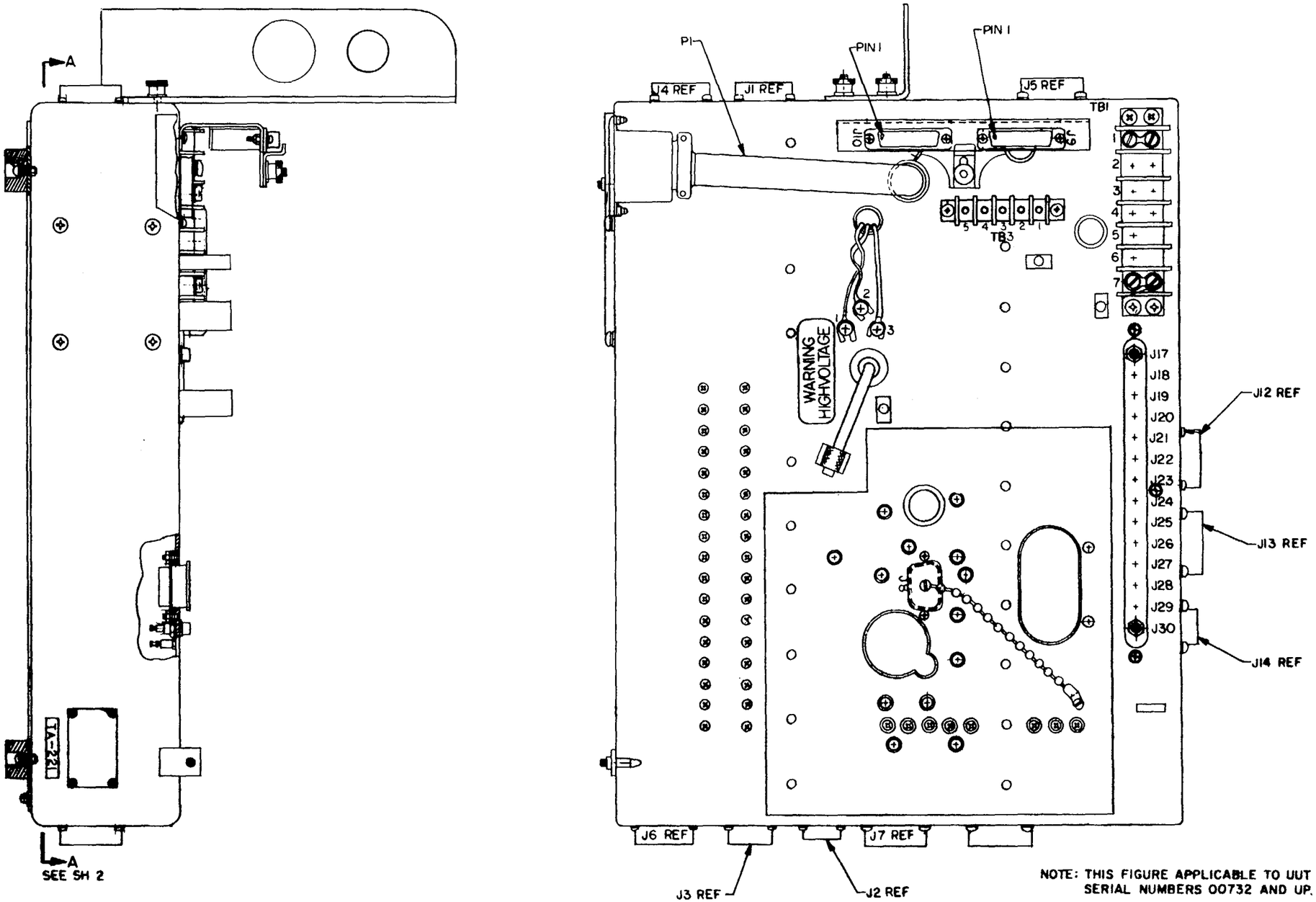
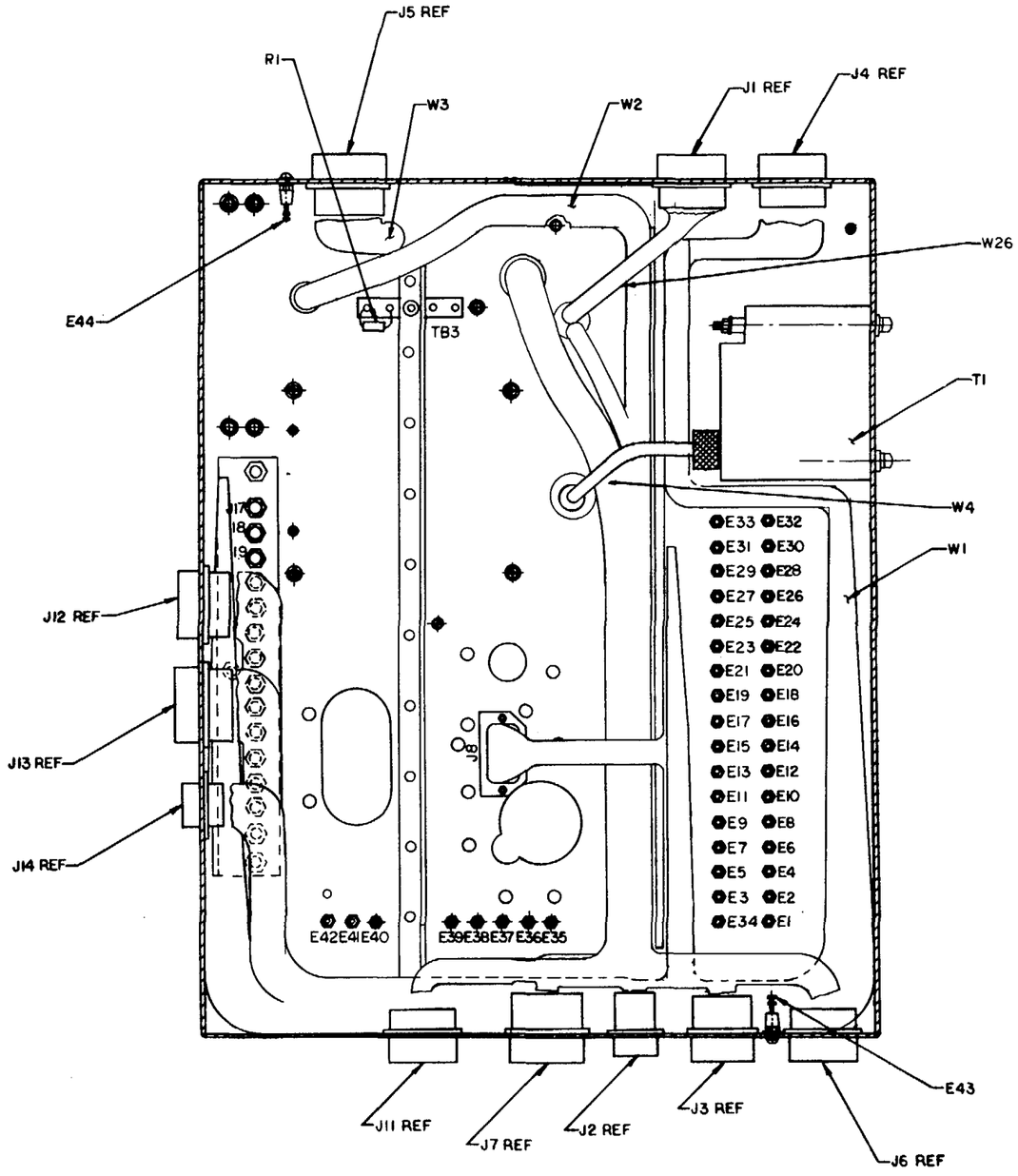


Figure 5-4. TA-221, parts location diagram (sheet 1 of 2).

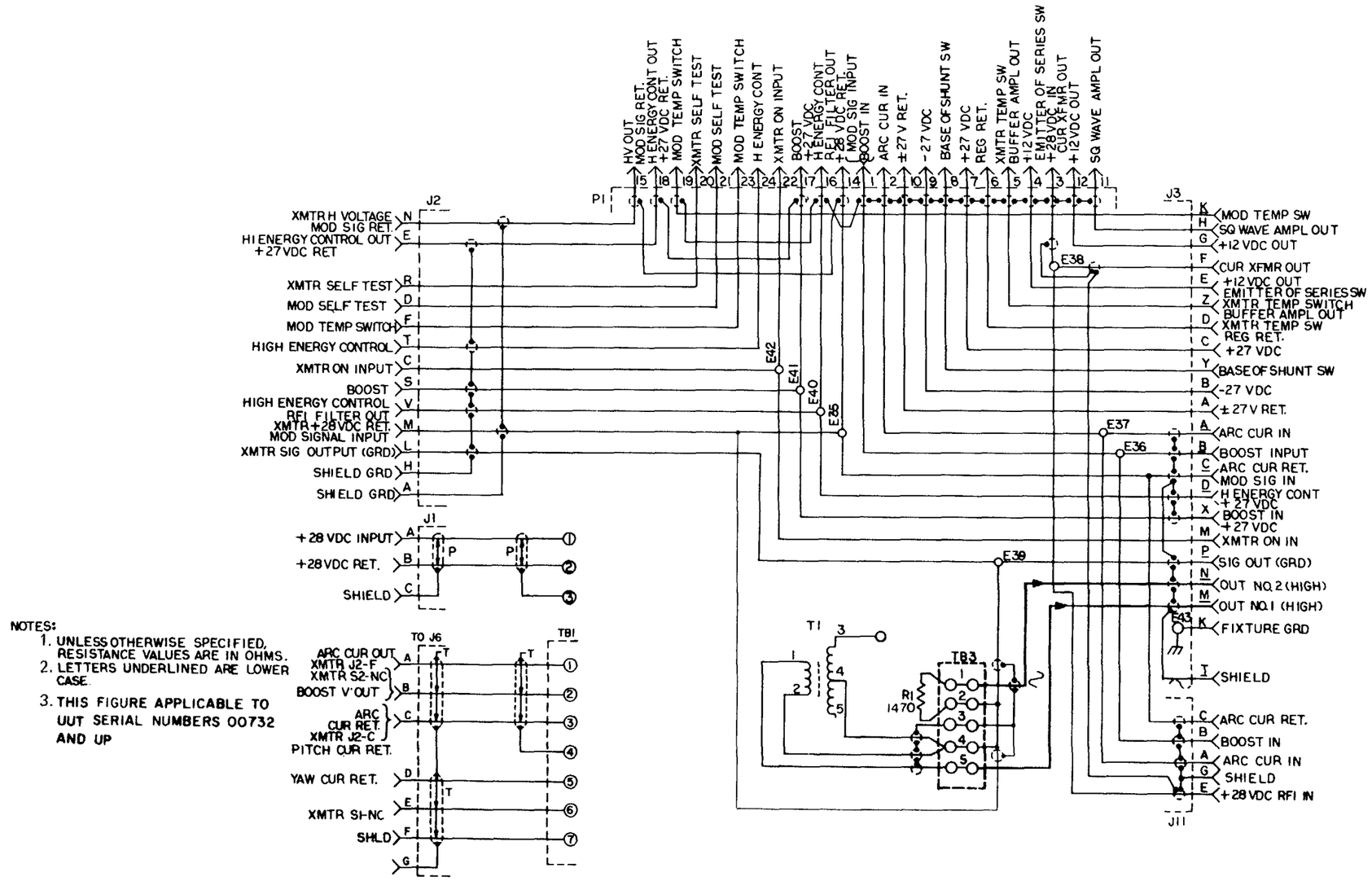


SECTION A-A
SEE SHEET 1

NOTE: THIS FIGURE APPLICABLE TO UUT SERIAL NUMBERS 00732 AND UP.

MI 101146

Figure 5-4. (sheet 2 of 2).



NOTES:
1. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS.
2. LETTERS UNDERLINED ARE LOWER CASE.
3. THIS FIGURE APPLICABLE TO UUT SERIAL NUMBERS 00732 AND UP

MI 101147A

Figure 5-5. TA-221, schematic diagram (sheet 1 of 2).

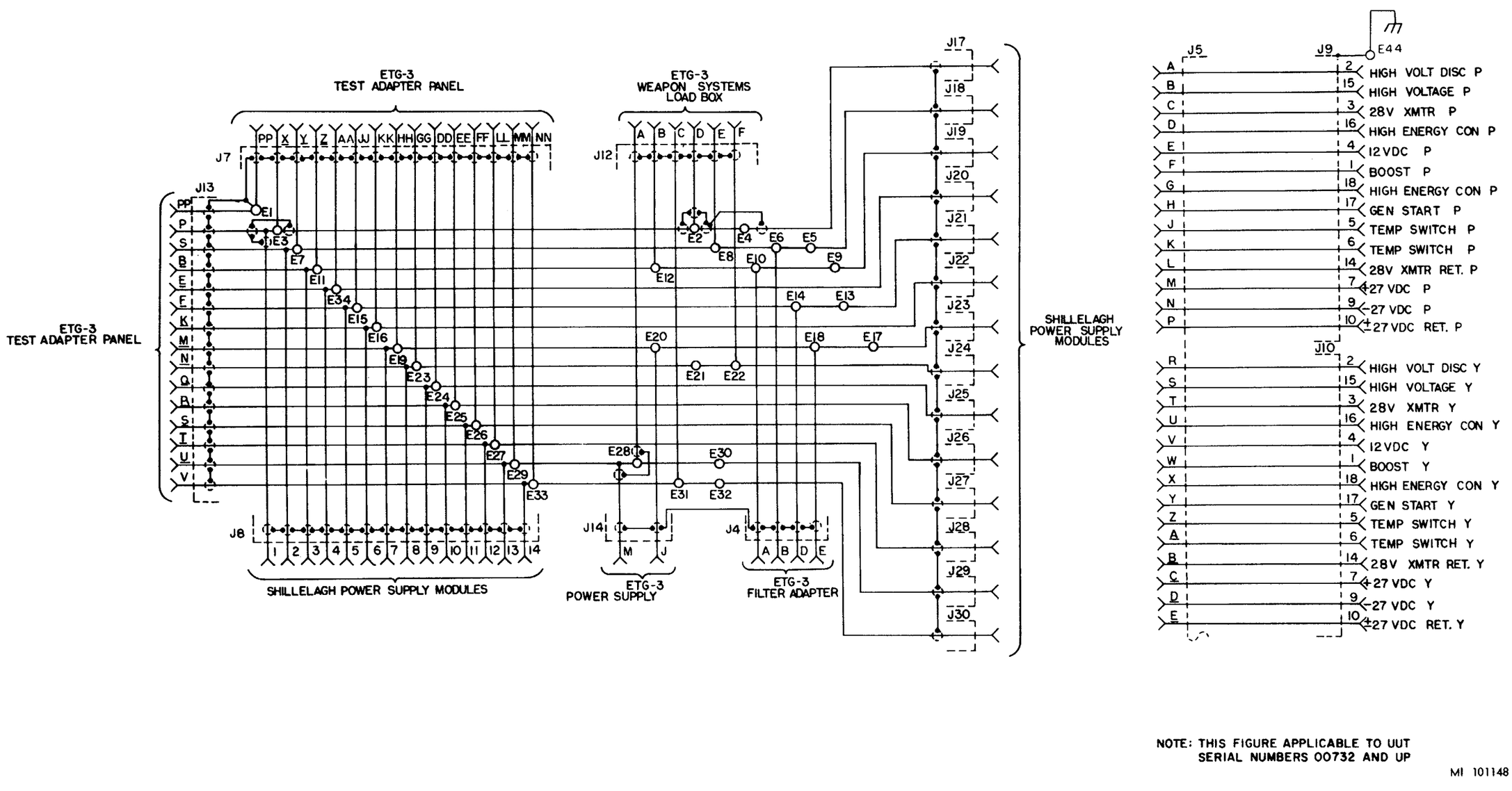
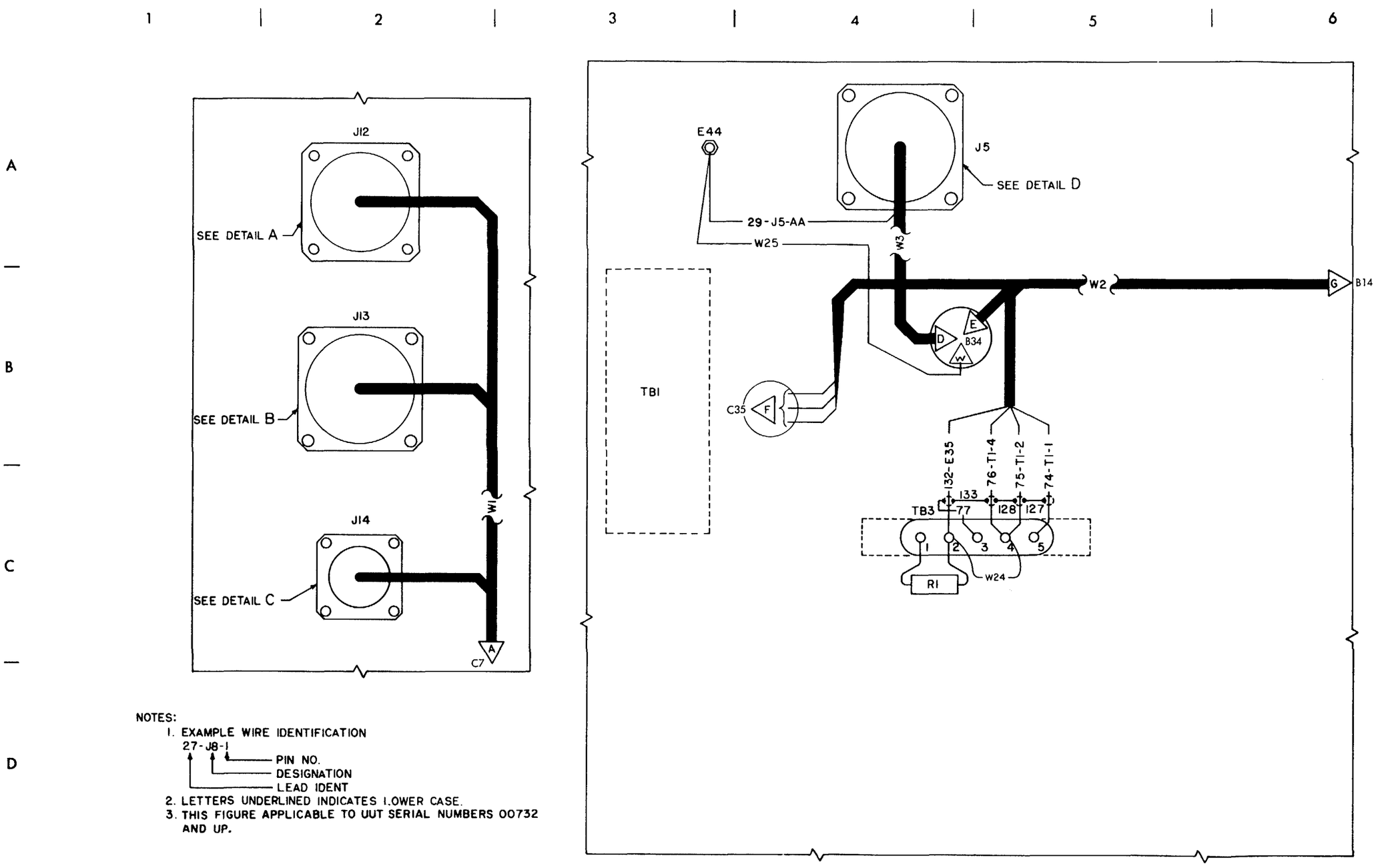


Figure 5-5. (sheet 2 of 2).



NOTES:

1. EXAMPLE WIRE IDENTIFICATION
   27-J8-1
   - 27 — LEAD IDENT
   - J8 — DESIGNATION
   - 1 — PIN NO.
2. LETTERS UNDERLINED INDICATES LOWER CASE.
3. THIS FIGURE APPLICABLE TO UUT SERIAL NUMBERS 00732 AND UP.

MI 101149A

Figure 5-6. TA-221, wiring diagram (sheet 1 of 9).

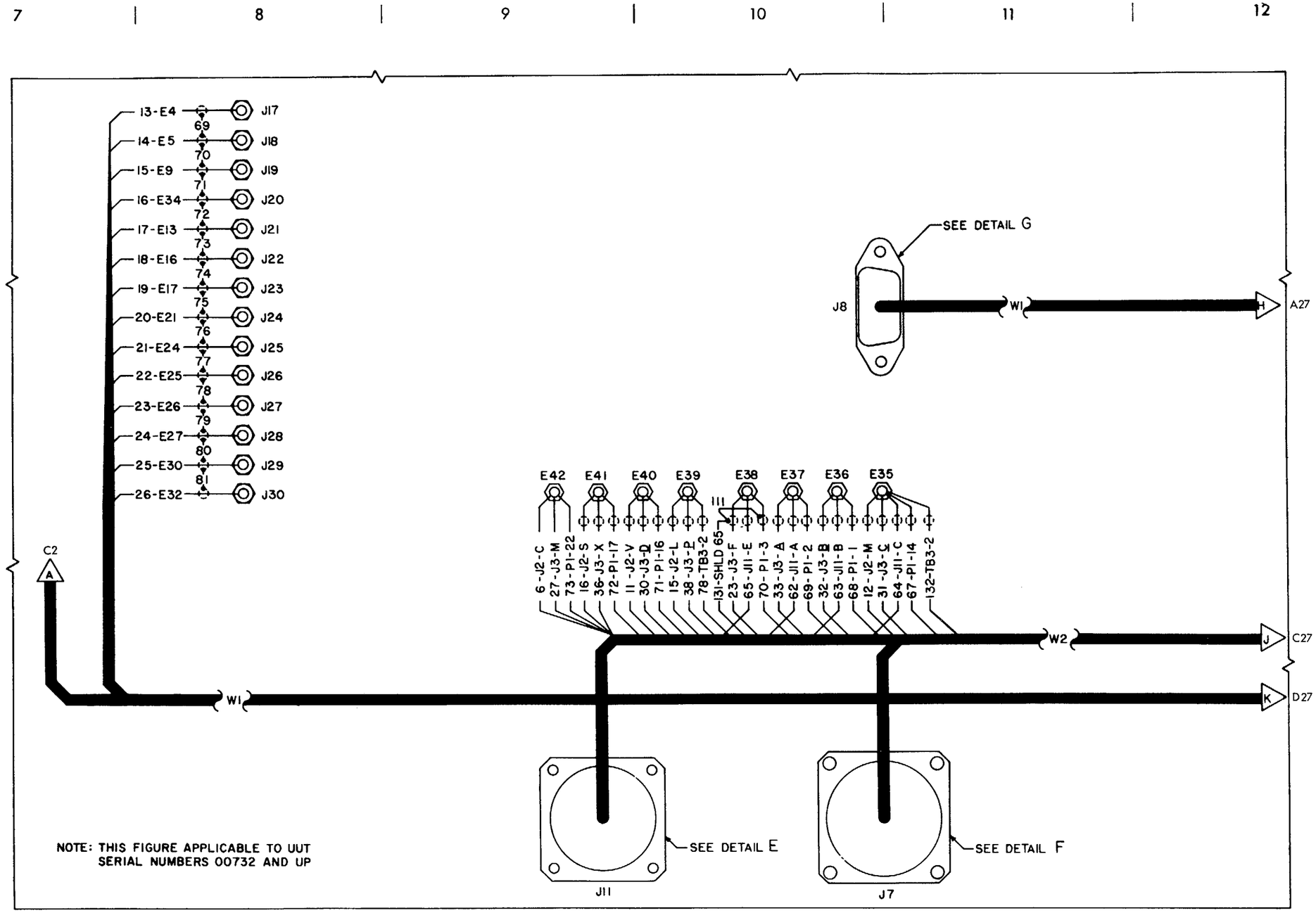


Figure 5-6. (sheet 2 of 9).

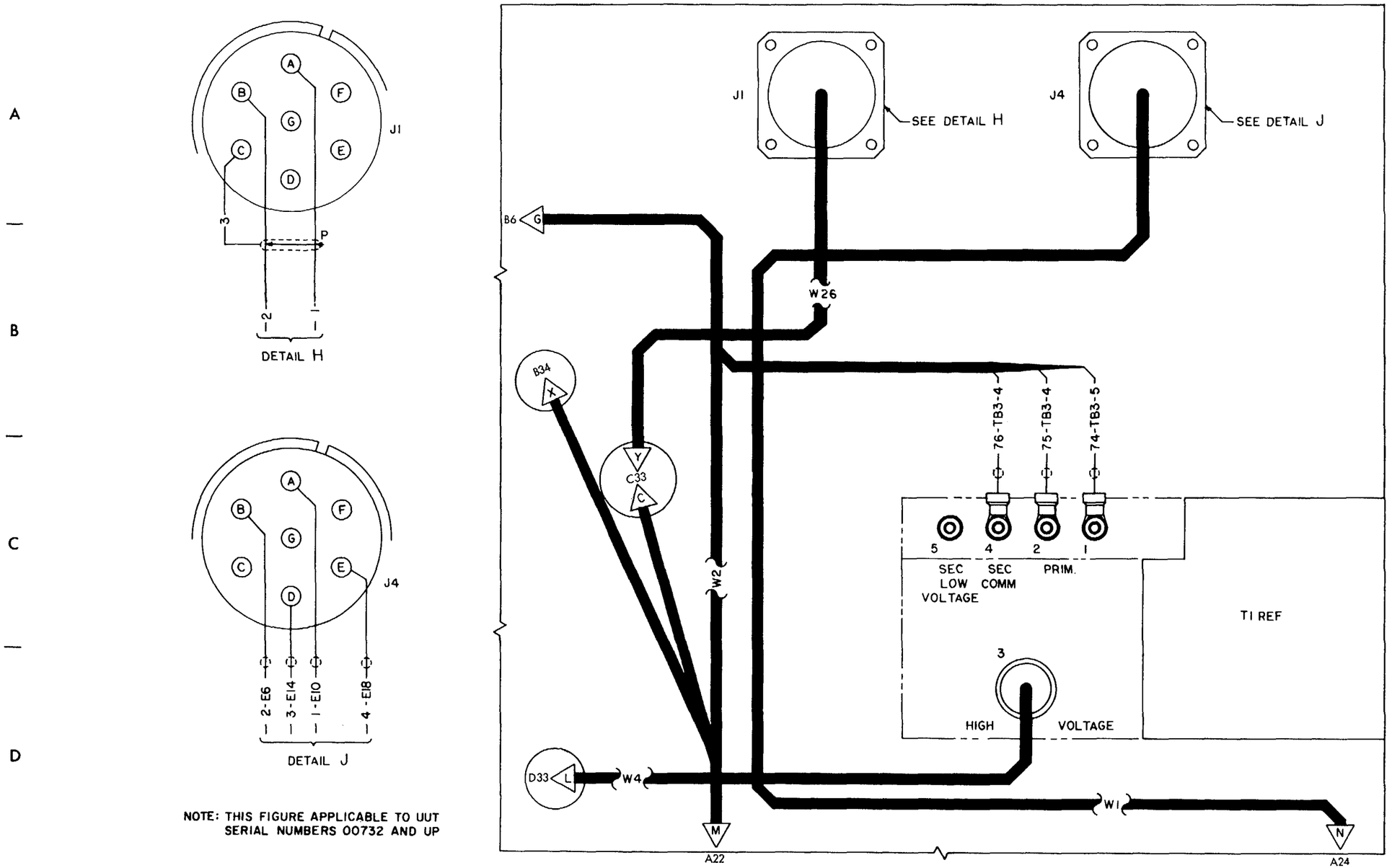


Figure 5-6. (sheet 3 of 9).

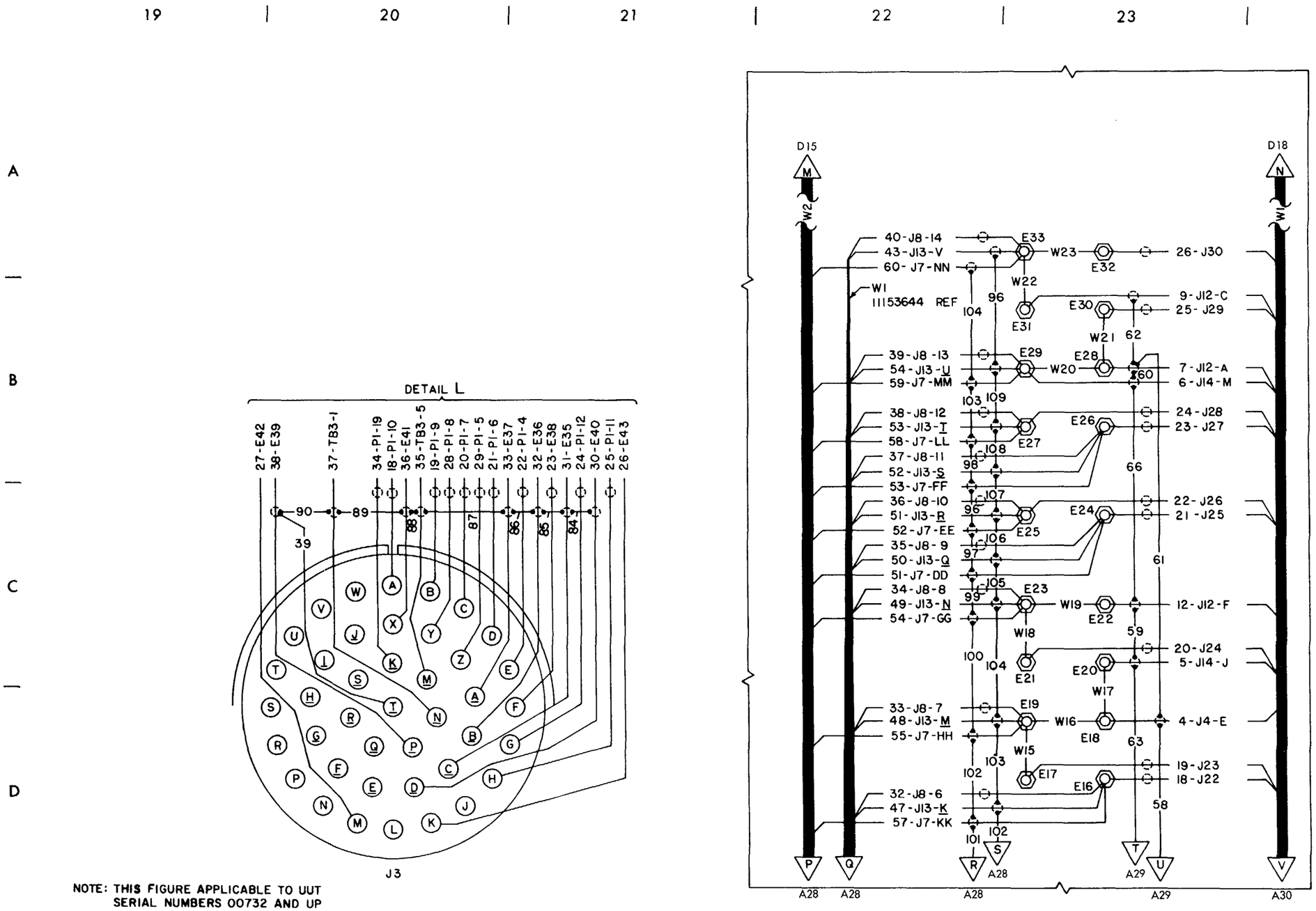


Figure 5-6. (sheet 4 of 9).

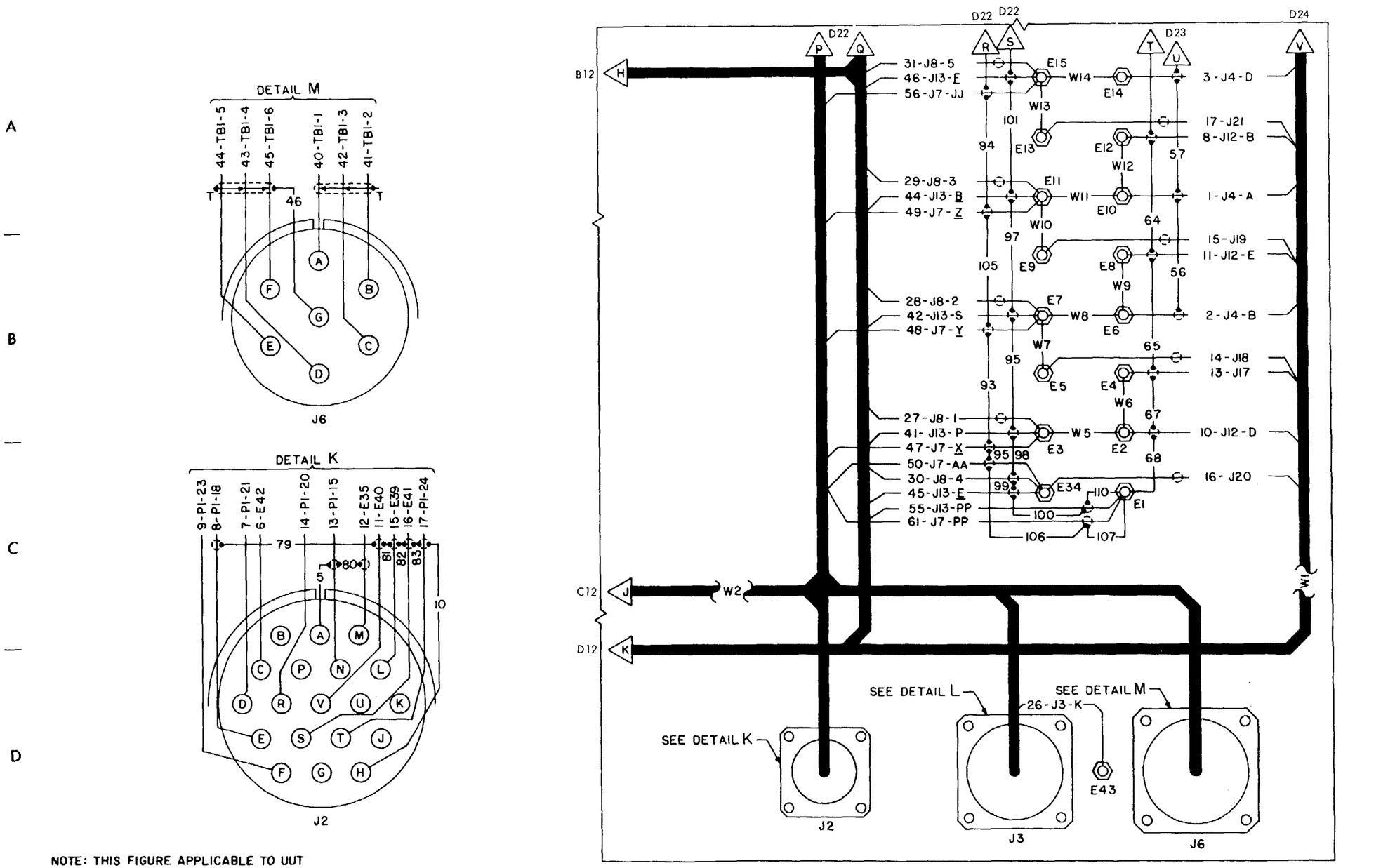
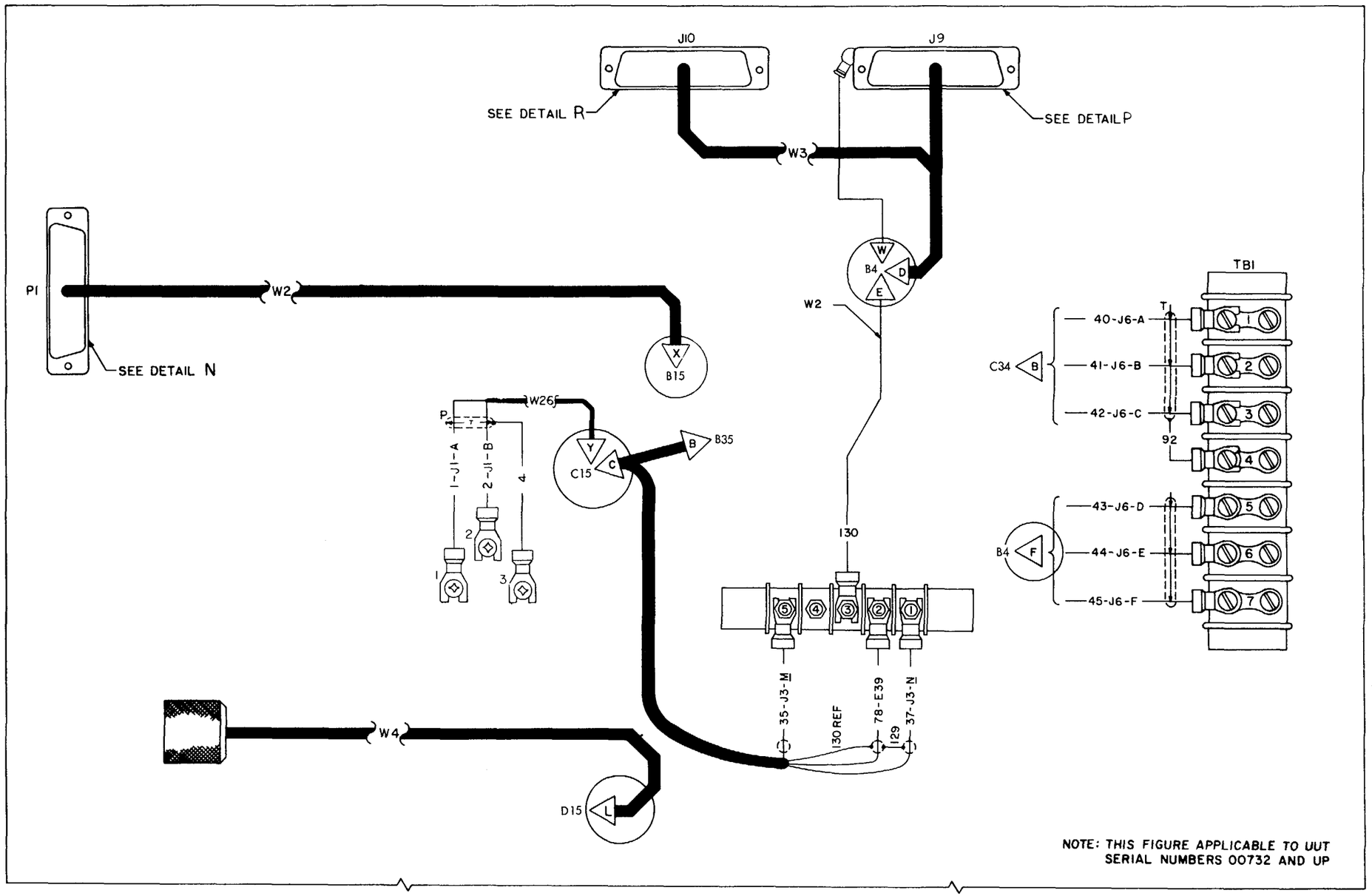


Figure 5-6. (sheet 5 of 9).



MI 101154A

Figure 5-6. (sheet 6 of 9).

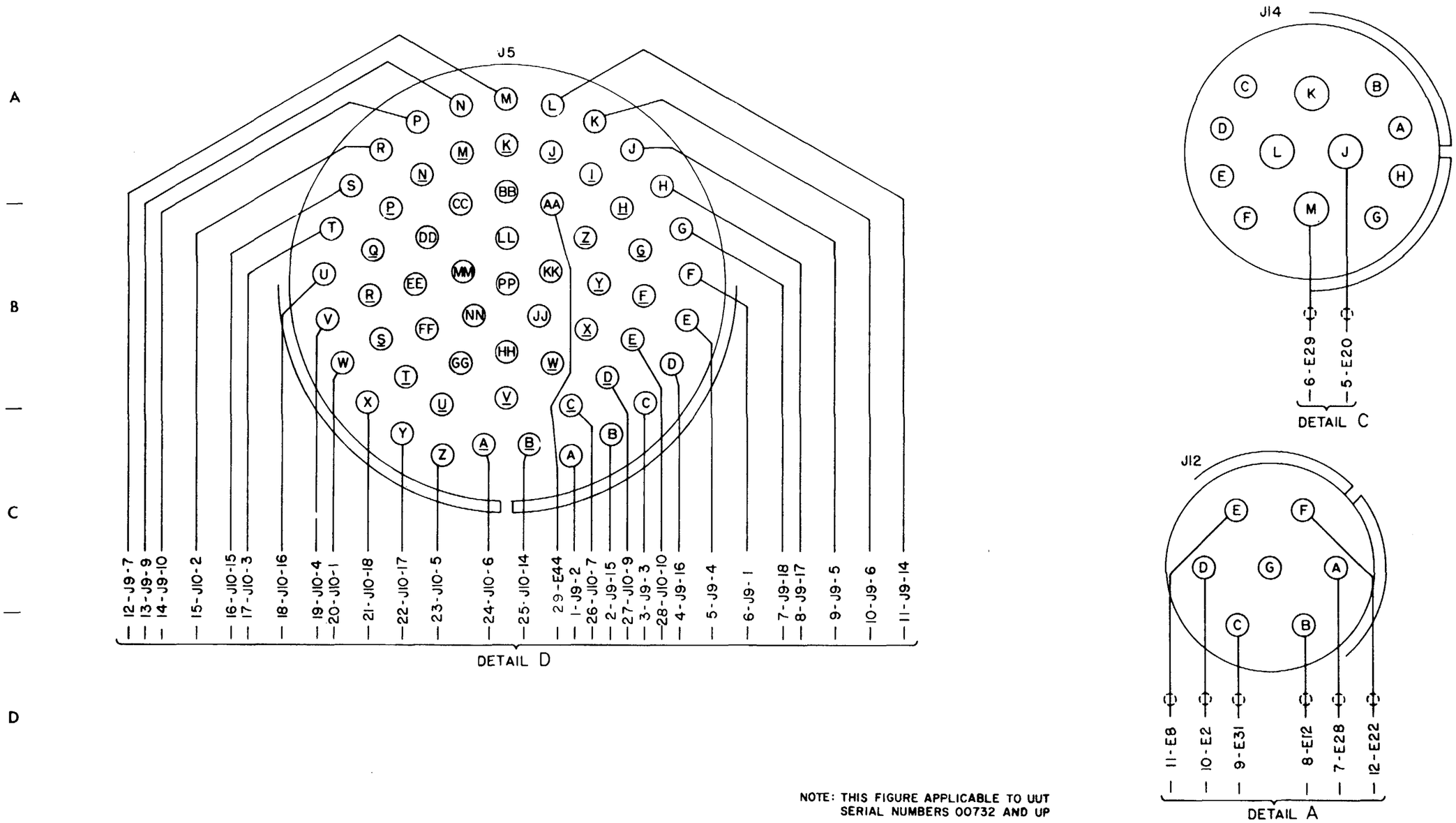


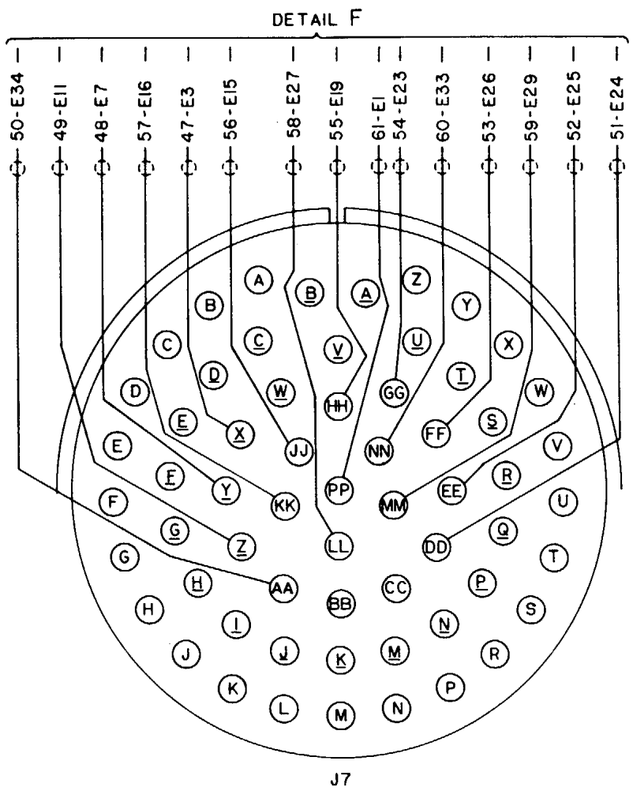
Figure 5-6. (sheet 7 of 9).

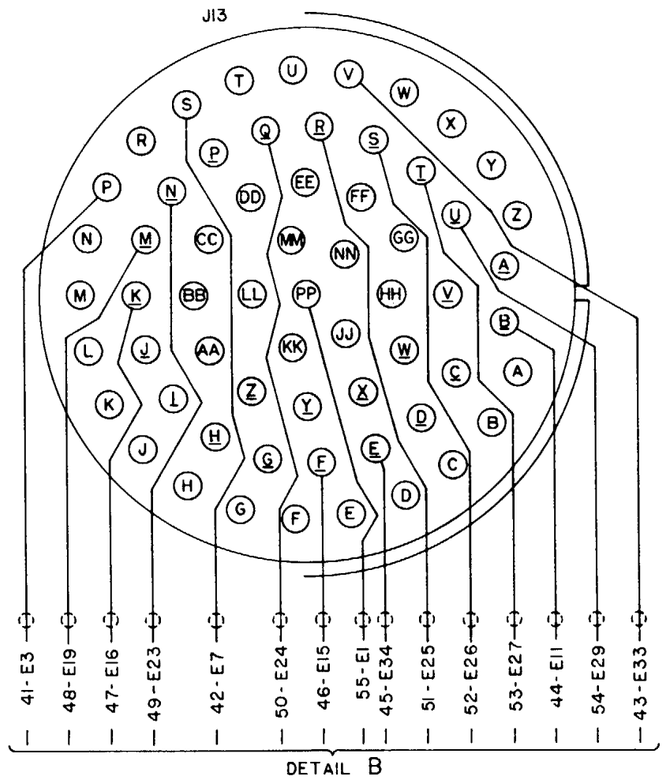
A

B

C

D

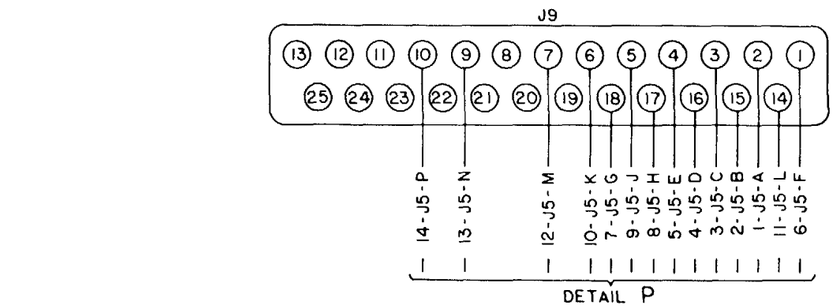


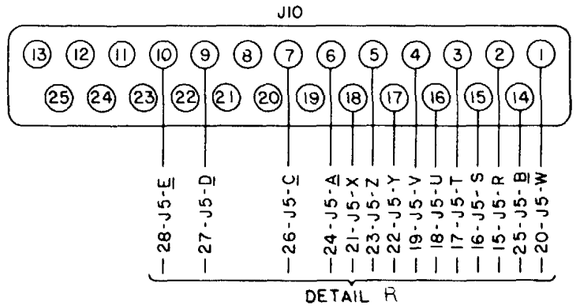


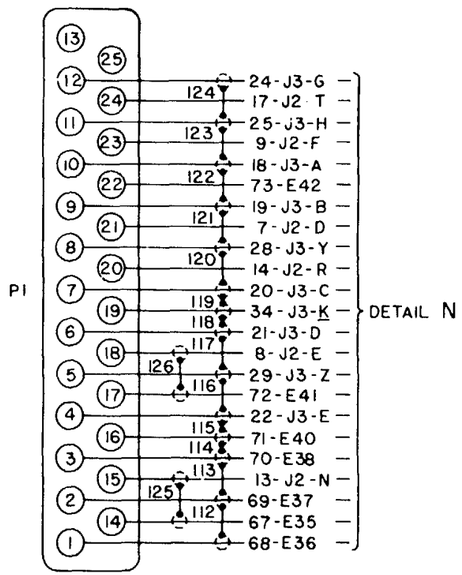
NOTE: THIS FIGURE APPLICABLE TO UUT SERIAL NUMBERS 00732 AND UP

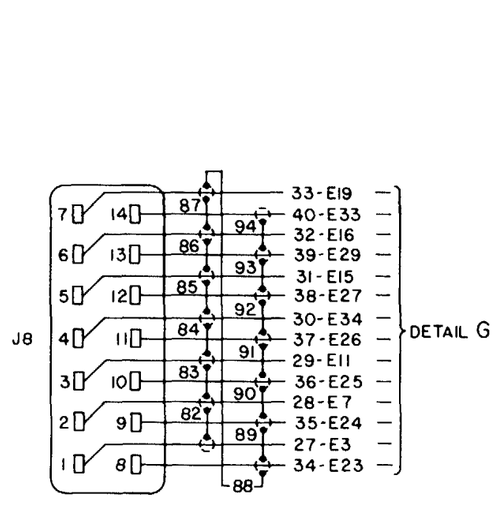
MI 101156

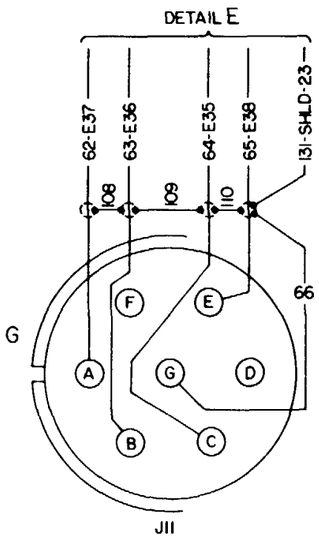
Figure 5-6. (sheet 8 of 9).











NOTE: THIS FIGURE APPLICABLE TO UUT SERIAL NUMBERS 00732 AND UP

MI 101157

Figure 5-6. (sheet 9 of 9).

Section II. REPAIR PROCEDURES

5-7. General

This section provides repair information for the UUT within the scope of DS and GS maintenance personnel. Figures 5-7 through 5-9 illustrate the disassembly and assembly of the UUT. Paragraphs 5-8 and 5-9 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-4935-557-34P contains a list of repair parts and special tools authorized for maintenance personnel.

5-8. Terminal (E1 through E42) Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (21, 22, and 27 fig. 5-7) and cover (20).
(2) Disconnect and tag the leads to E1 through E42 (20, fig. 5-8).
(3) Remove screw (4) and the terminal.

b. Installation.

(1) Apply sealing compound, MIL-S-22473, grade H, to the threads of screw (4, fig. 5-8), and install E1 through E42 (20) with the screw.
(2) Connect the leads and remove the tags.
(3) Install cover (20, fig. 5-7) with mounting hardware (21, 22 and 27).

5-9. Terminal Board (TB3) Removal and Installation Procedure

a. Removal

(1) Remove mounting hardware (21, 22, and 27, fig. 5-7) and cover (20).
(2) Disconnect and tag the leads to TB3 (12, fig. 5-9).
(3) Remove mounting hardware (14 through 16) and TB3.

b. Installation.

(1) Apply sealing compound, MIL-S-22473, grade H, to the threads of screw (14, fig. 5-9).
(2) Install TB3 (12) with mounting hardware (14 through 16).
(3) Connect the leads and remove the tags.
(4) Install cover (20, fig. 5-7) with mounting hardware (21, 22, and 27).

5-10. Painting

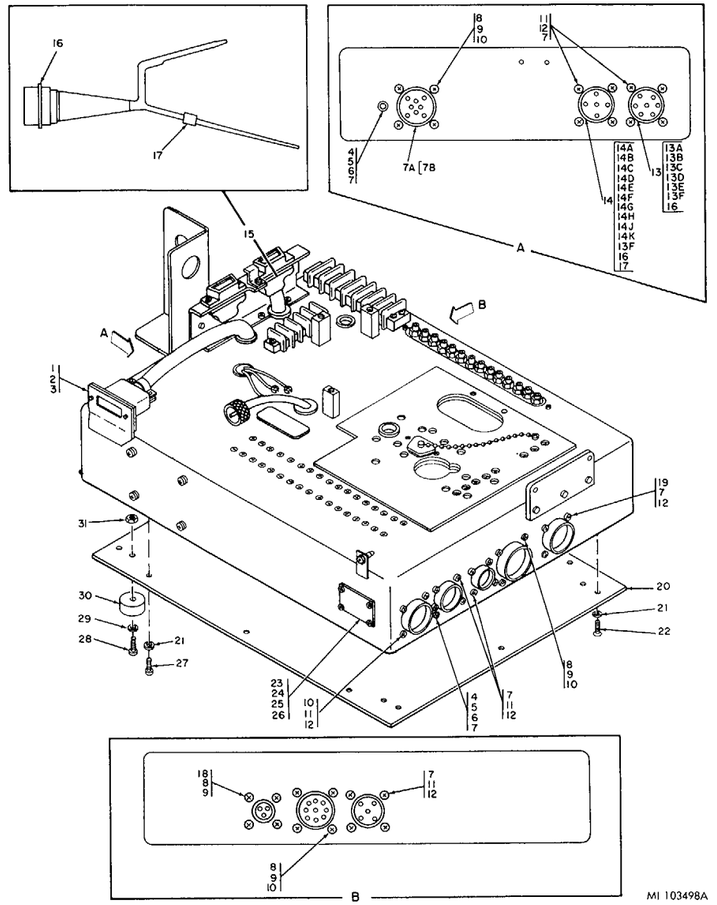
CAUTION
Mask all connectors, lettering, and mounting surfaces before painting the adjoining surfaces.

Inspect and pint the exterior of the UUT.

a. Inspect the exterior surface of the UUT for scratched, chipped or peeled pint.
b. Smooth the damaged area with sandpaper, wet/dry (12400 grit).
c. Spot-paint damaged areas with a brush.
d. Use paint, Fed Spec TT-E-529, class A, color no. 24410, for the chassis.

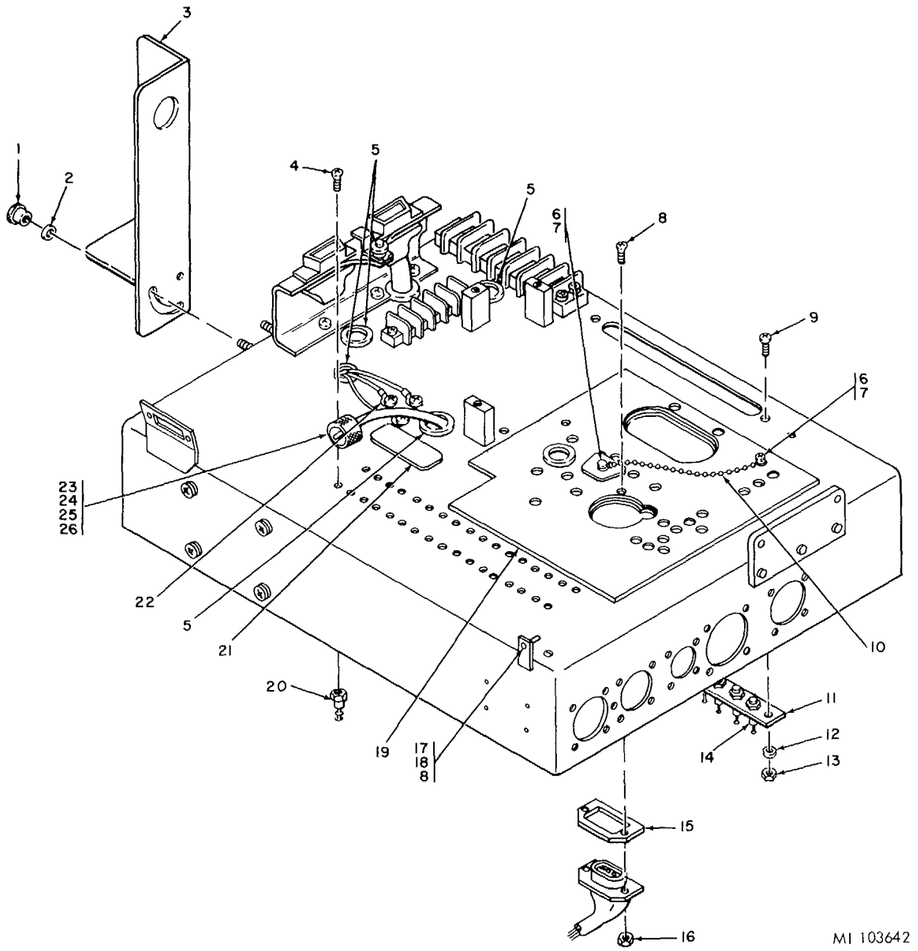
5-11. Packaging

a. When the hold-down test fixture is to be shipped to the depot for further testing and repair, package the assembly in accordance with TM 38-230, method II D, insuring that adequate cushioning material and bracing are used to prevent damage to the assembly during shipment.
b. Packages should be marked in accordance with local directives.



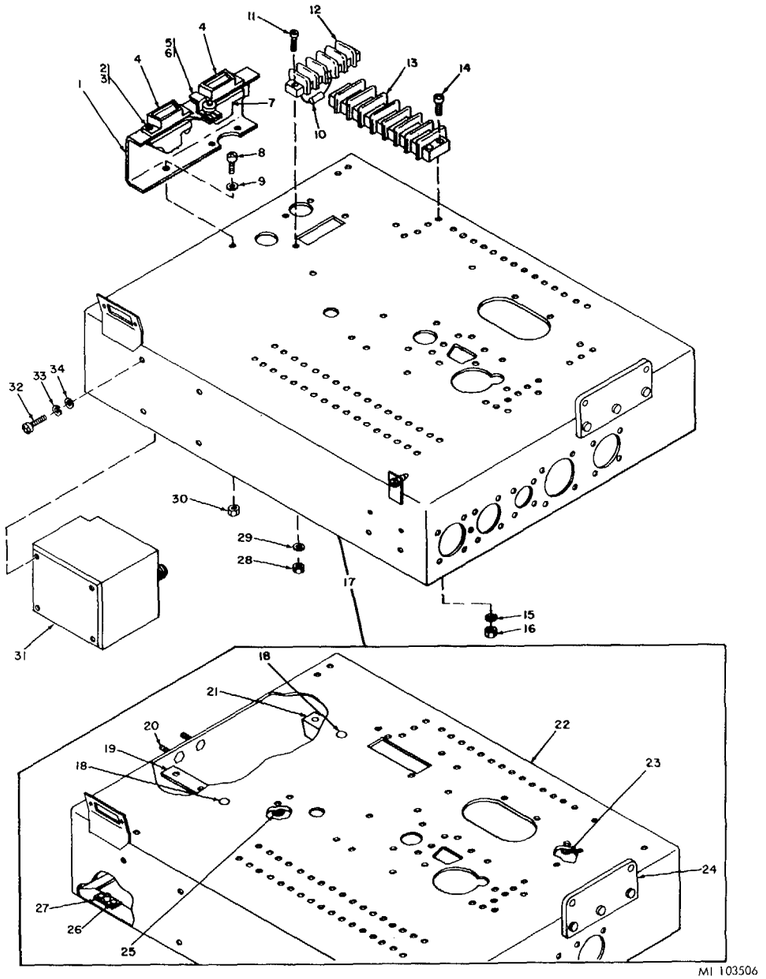
1 – Backshell
2 – Screw
3 – Nut
4 – Terminal
5 – Screw
6 – Washer
7 – Washer
7A – Harness
7B – Connector
8 – Nut
9 – Washer
10 – Screw
11 – Screw
12 – Nut
13 – W1
13A – Connector
13B – Strap
13C – Connector
13D – Connector
13E – Connector
13F – Ferrule
14 – W2
14A – Terminal
14B – Terminal
14C – Terminal
14D – Terminal
14E – Ferrule
14F – Connector
14G – Connector
14H – Connector
14J – Connector
14K – Terminal
15 – W3
16 – W3J5
17 – Strap
18 – Screw
19 – Screw
20 – Cover
21 – Washer
22 – Screw
23 – Identification plate (Depot repair)
24 – Screw
25 – Nut
26 – Washer
27 – Screw
28 – Screw
29 – Washer
30 – Bumper
31 – Nut

Figure 5-7. Repair of TA-221 - view 1.



1 – Nut
2 – Washer
3 – Bracket
4 – Screw
5 – Grommet
6 – Screw
7 – Washer
8 – Screw
9 – Screw
10 – Chain
11 – Plate
12 – Washer
13 – Nut
14 – J17 through J30
15 – Spacer
16 – Nut
17 – Guide pin
18 – Nut
19 – Insulator
20 – E1 through E42
21 – Plate
22 – Screw
23 – Clip
24 – Screw
25 – Washer
26 – Nut

Figure 5-8. Repair of TA-221 – view 2.



1 – Bracket
2 – Screw
3 – Spacer
4 – J9, J10
5 – Bracket
6 – Nut
7 – Backshell
8 – Screw
9 – Washer
10 – R1
11 – Screw
12 – TB3
13 – TB1
14 – Screw
15 – Washer
16 – Nut
17 – Chassis fixture (Depot repair)
18 – Rivet (Depot only)
19 – Bracket (Depot only)
20 – Stud (Depot only)
21 – Bracket (Depot only)
22 – Chassis (Depot only)
23 – Nut (Depot only)
24 – Bracket (Depot only)
25 – Nut (Depot only)
26 – Rivet (Depot only)
27 – Nut (Depot only)
28 – Nut
29 – Washer
30 – Nut
31 – T1
32 – Screw
33 – Washer
34 – Washer

Figure 5-9. Repair of TA-221 – view 3.

CHAPTER 6

AMPLIFIER FILTER ADAPTER(TA-211)

Section I. PROGRAMMED TESTS

6-1. General

This chapter provides the information necessary to isolate and repair a fault in the amplifier filter adapter (UUT) to a single faulty subassembly or chassis mounted component. Figures 6-2 through 6-4 are provided as an aid in troubleshooting and testing the UUT.

6-2. Equipment Required for Programmed Tests

The following equipment is required to test the UUT:

a.	Program memory card	See TM 9-1425-550-10
b.	Patchboard	PB-204
c.	Multimeter	
d.	Digital multimeter probe	TA-109
e.	Cable	TA-205 (2 required)
f.	Cable	CA-135 (2 required)
g.	Cable	CA-136
h.	Cable	CA-222
i.	Cable	8894622 (2 required)

6-3. Test Instructions

WARNING

Voltage may be present in the UUT. Use extreme care when performing manual operations including probing.

a. Successful completion of the programmed tests represents maintenance calibration of the UUT.
b. The UUT is on-bench tested.
c. When the test program or a REF TM specifies the replacement of C1 through C10, replace the capacitor (par. 6-7).
d. When the operator is directed to make an adjustment in accordance with the last displayed number value, the following example shows how to interpret the displayed message.

Example from Displayed Message	Nominal Value of Adjustment
+496842 G VAC 1	4.968 VAC

The 1 indicates tile decimal point placement as counted from the left side (ignoring the + sign) of the value in the SSVD displayed message.

6-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT is installed in PLMA 1A15.
b. Set monitor panel 1A11 switches as follows:

(1) Dial 9510000 into the UUT TEST NUMBER switches.
(2) Set TEST MODE switch to TAPE.
(3) Set CONTROLLER SUB MODE switch to NORMAL
(4) Press the START TEST switch.

c. Observe Message displayed on SSVD and verify that the UUT is the one described in the message.

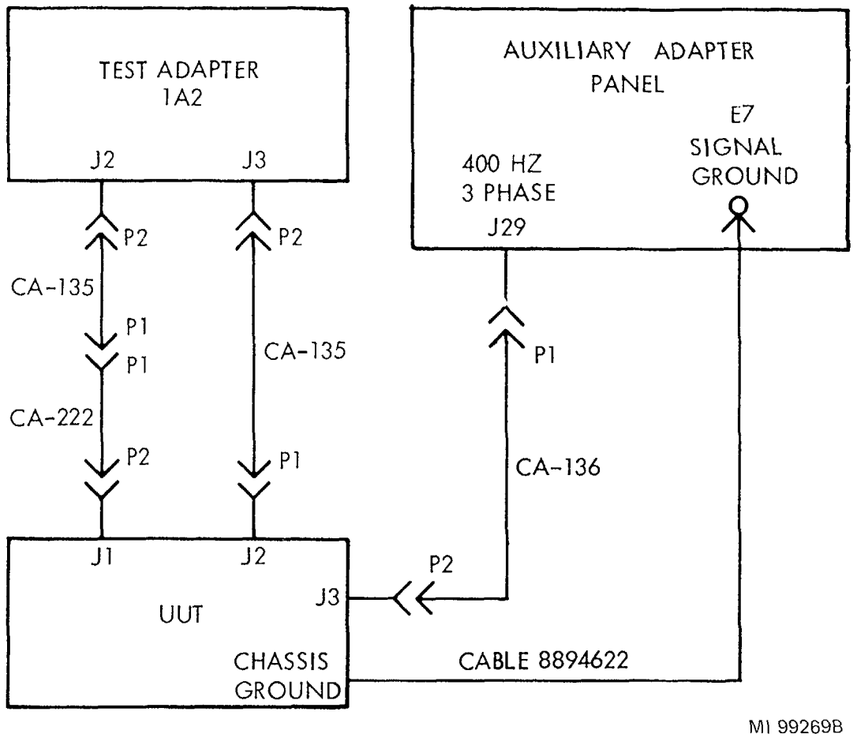


Figure 6-1. Cable hookup diagram.

Table 6-1. Amplifier Filter Adapter Programmed Tests

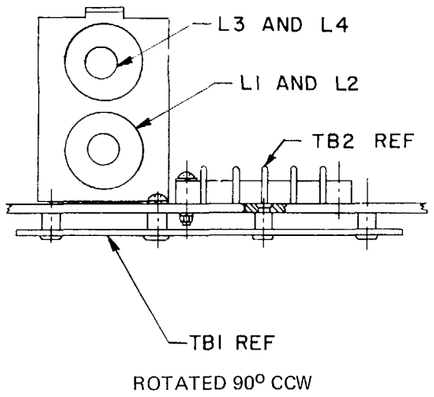
Print message ref no.	Action or instructions
REF TM 1 through REF TM 4	Discontinue the UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2
REF TM 5	*a.* Connect the cables (fig. 6-1). *b.* Set CB1 on the UUT to ON. *c.* Connect the RES probe between TB1-29 and TB1-30 using the two TA-205's *d.* Press the PROCEED switch.
REF TM 6	Replace PS2 (par. 6-9).
REF TM 7	Reconnect W2-5 to PS2-1 if previously removed. Replace PS1 (par. 6-9).
REF TM 8	Replace K1 (par. 6-8).
REF TM 9	Replace K2 (par. 6-8).
REF TM 10	Replace K3 (par. 6-8).

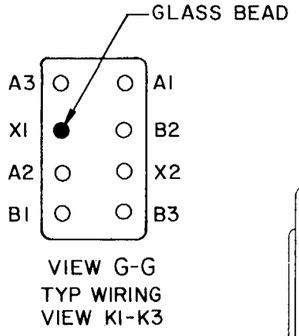
Table 6-1. Amplifier Filter Adapter Programmed Tests - Continued.

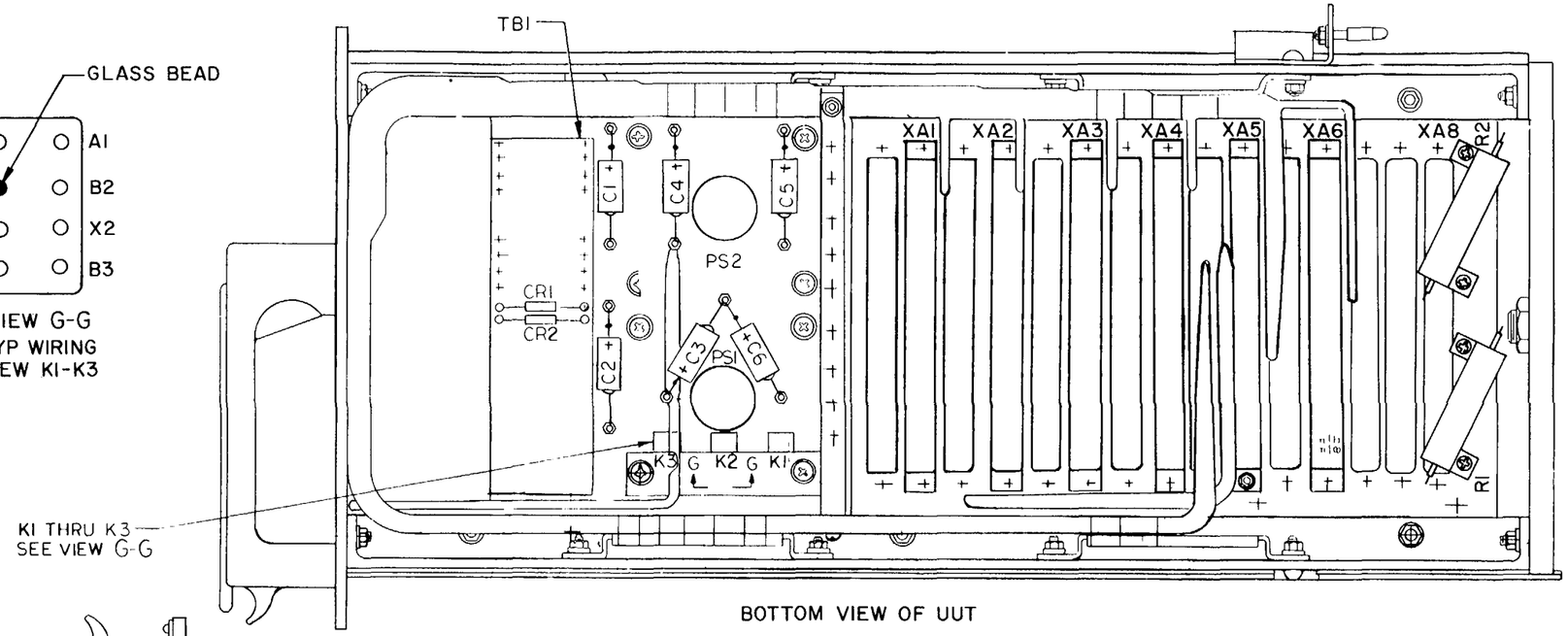
Print message ref no.	Action or instructions
REF TM 11	*a.* Remove PS1 adjustment pot cover. *b*. Adjust PS1 for a reading of -25 volts ± 0.1 vdc on 1A10. (1) If the adjustment can be made, install the pot cover and press the PROCEED switch. (2) If the adjustment cannot be made, proceed to step *c*. *c*. Press the PROCEED switch and REF TM 11 will be displayed on SSVD again. Make a second attempt at the adjustment in step *b*. (1) If the second adjustment can be made, install the pot cover and press the PROCEED switch. (2) If the second adjustment cannot be made, install the pot cover, press the PROCEED switch, and monitor the SSVD displays.
REF TM 12	*a.* Remove PS2 adjustment pot cover. *b*. Adjust PS2 for a reading of +25 volts ± 0.1 vdc on 1A10. (1) If the adjustment can be made, install the pot cover and press the PROCEED switch. (2) If the adjustment cannot be made, proceed to step *c*. *c*. Press the PROCEED switch and REF TM 12 will be displayed on SSVD again. Make a second attempt at the adjustment in step 6. (1) If the second adjustment can be made, install the pot cover and press the PROCEED switch. (2) If the second adjustment cannot be made, install the pot cover, press the PROCEED switch, and monitor the SSVD displays.
REF TM 13	**WARNING** **Use care when placing the jumper cable across C7, and avoid contact with the side of the chassis.** Connect the jumper cable across C7, and press the PROCEED switch.
REF TM 14	Replace L1 (par. 6-10).
REF TM 15	Replace L3 (par. 6-10).
REF TM 16	Replace L2 (par. 6-10).
REF TM 17	Replace L4 (par. 6-10).
REF TM 18	*a.* Set CB1 on the UUT to OFF. *b*. Disengage the patchboard on 1A2. *c*. Disconnect W2-5 from PS-1. *d.* Engage the patchboard. *e.* Set CB1 on the UUT to ON. *f.* Press the START TEST switch.
REF TM 19	*a.* Reinstall all removed boards. *b*. Disconnect the cathode lead of CR1 from TB1-31. Connect the positive lead of the multimeter to TB1-31 and the negative lead to TB1-32. Measure the resistance with the multimeter. (1) If the reading is 50 ohms or less, replace K1 (par. 6-8), and reconnect the CR1 cathode lead. (2) If the reading is greater than 50 ohms, replace CR1.
REF TM 20	*a.* Disconnect the cathode lead of CR2 from TB 1-29. Connect the positive lead of the multimeter to TB1-29 and the negative lead to TB1-30. Measure the resistance with the multimeter. (1) If the reading is greater than 50 ohms, replace CR2. (2) If the reading is 50 ohms or less, reconnect the cathode lead to TB1-29, and proceed to step b. *b*. Disconnect W3-144 from TB1-29. Connect the positive lead of the multimeter to TB1-29 and the negative lead to TB 1-0. Measure the resistance with the multimeter. (1) If the reading is greater than 50 ohms, replace K2 (par. 6-8), and reconnect W3-144 to TB1-29. (2) If the reading is 50 ohms or less, replace K3 (par. 6-8). Reconnect W3-144 to TB 1-29.
REF TM 21	*a.* Set CB1 on the UUT to OFF. *b*. Disengage the patchboard on 1A2.

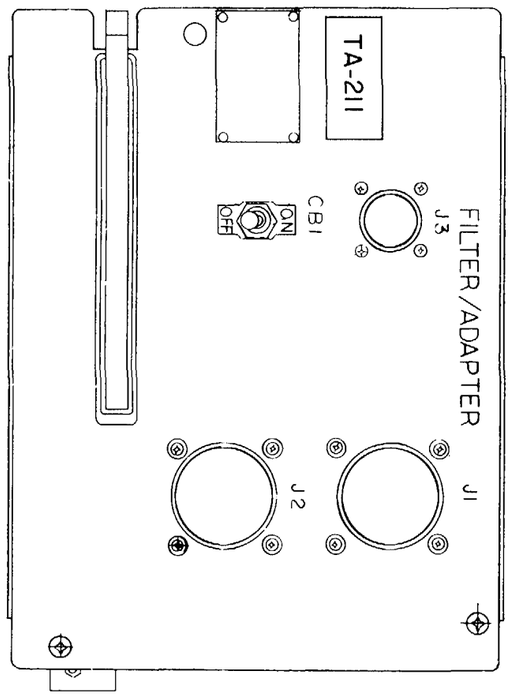
Table 6-1. Amplifier Filter Adapter Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 21 Continued	*c*. Disconnect the lead of C2 from E7. *d.* Engage the patchboard. *e.* Set CB1 on the UUT to ON. *f.* Press the START TEST switch.
REF TM 22	*a.* Set CB1 on the UUT to OFF. *b*. Disengage the patchboard on 1A2. *c*. Disconnect the lead of C5 from E6. *d.* Engage the patchboard. *e.* Set CB on the UUT to ON. *f.* Press the START TEST switch.
REF TM 23	*a.* Set CB on the UUT to OFF. *b*. Disengage the patchboard on 1A2. *c*. Disconnect the lead of C1 from E1. *d.* Engage the patchboard. *e.* Set CB1 on the UUT to ON. *f.* Press the START TEST switch.
REF TM 24	*a.* Set CB1 on the UUT to OFF. *b*. Disengage the patchboard on 1A2. *c*. Disconnect the lead of C4 from E4. *d.* Engage the patchboard. *e.* Set CB1 on the UUT to ON. *f.* Press the START TEST switch.
REF TM 25	**WARNING** **Use care when placing the jumper cable across C8, and avoid contact with the side of the chassis.** Connect the jumper cable across C8, and press the PROCEED switch.
REF TM 26	**WARNING** **Use care when placing the jumper cable across C9, and avoid contact with the side of the chassis.** Connect the jumper cable across C9, and press the PROCEED switch.
REF TM 27	**WARNING** **Use care when placing the jumper cable across C10, and avoid contact with the side of the chassis.** Connect the jumper cable across C10, and press the PROCEED switch.
REF TM 28	*a.* Reinstall A1 through A6, if previously removed. *b*. Disconnect W31 from R2. *c*. Measure the resistance of R2, with the multimeter. (1) If the reading is not between 58 and 78 ohms, replace R2. (2) If the reading is between 58 and 78 ohms, replace PS2 (par. 6-9), and reconnect W31 to R2.
REF TM 29	*a.* Reinstall A1 through A6, if previously removed. *b*. Disconnect W29 from R1. *c*. Measure the resistance of R1, with the multimeter. (1) If the reading is not between 58 and 78 ohms, replace R1. (2) If the reading is between 58 and 78 ohms, replace PS1 (par. 6-9), and reconnect W29 to R1.
REF TM 30	*a.* Connect the RES probe to 9000 OHMS on 1A7. *b*. Install the patchboard. *c.* Press the PROCEED switch.









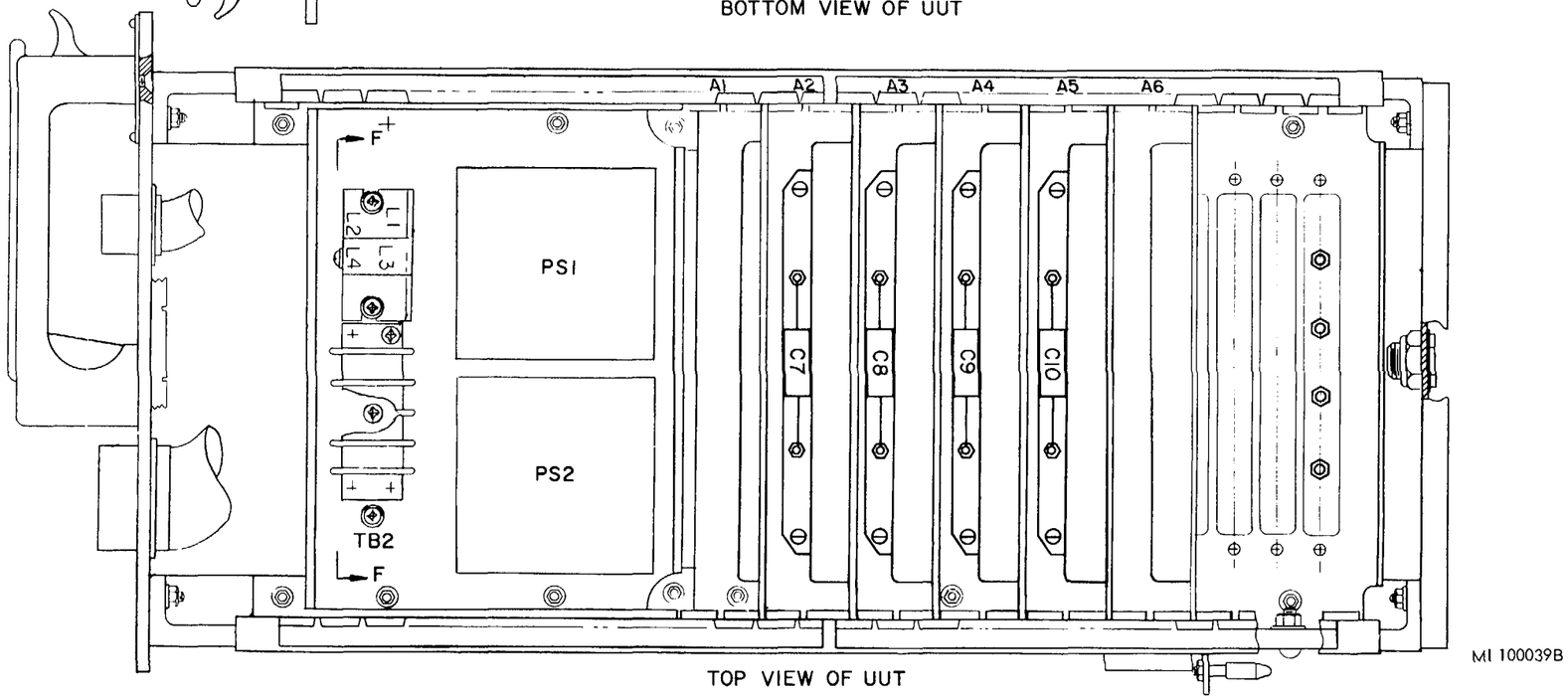
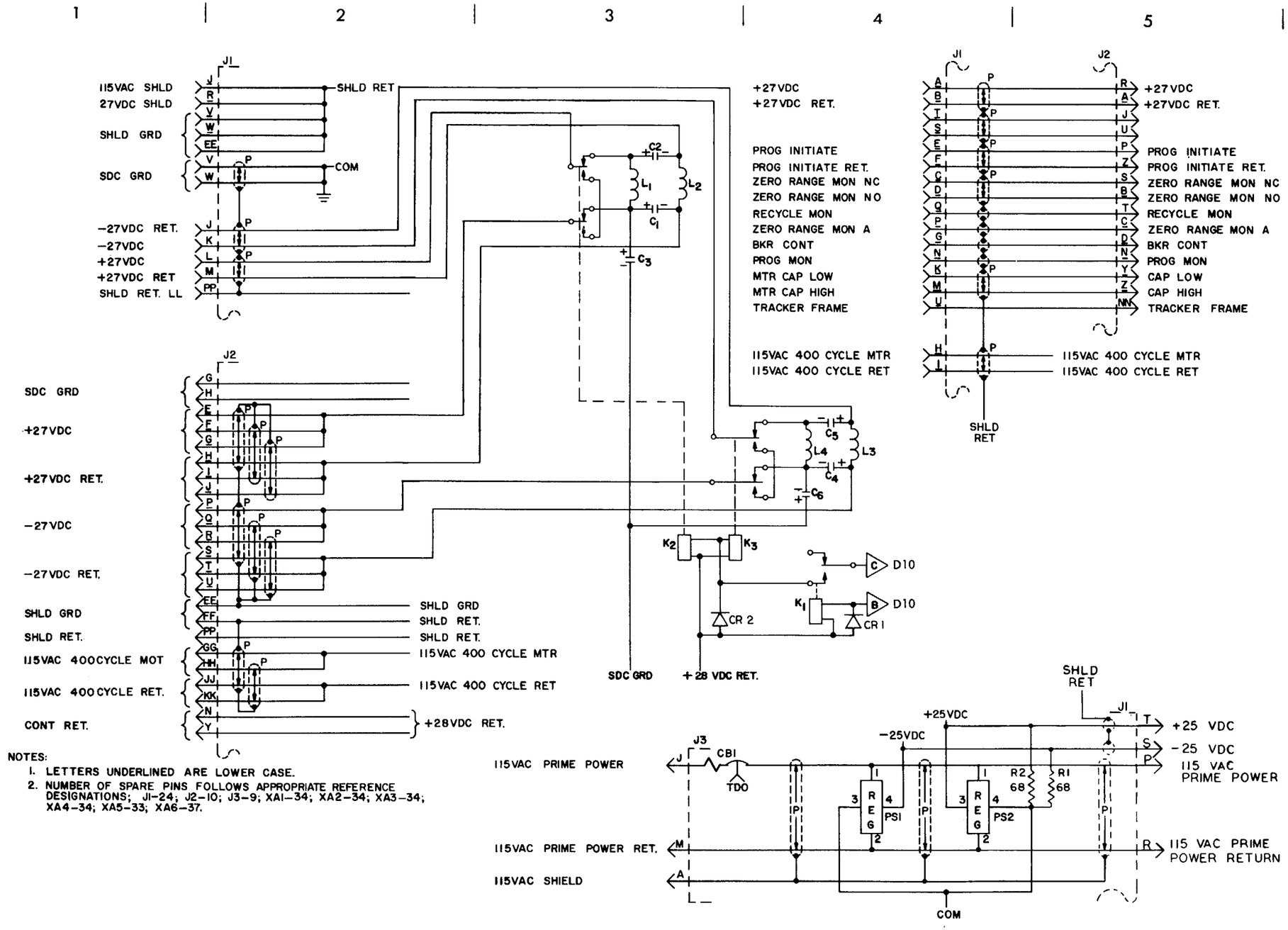
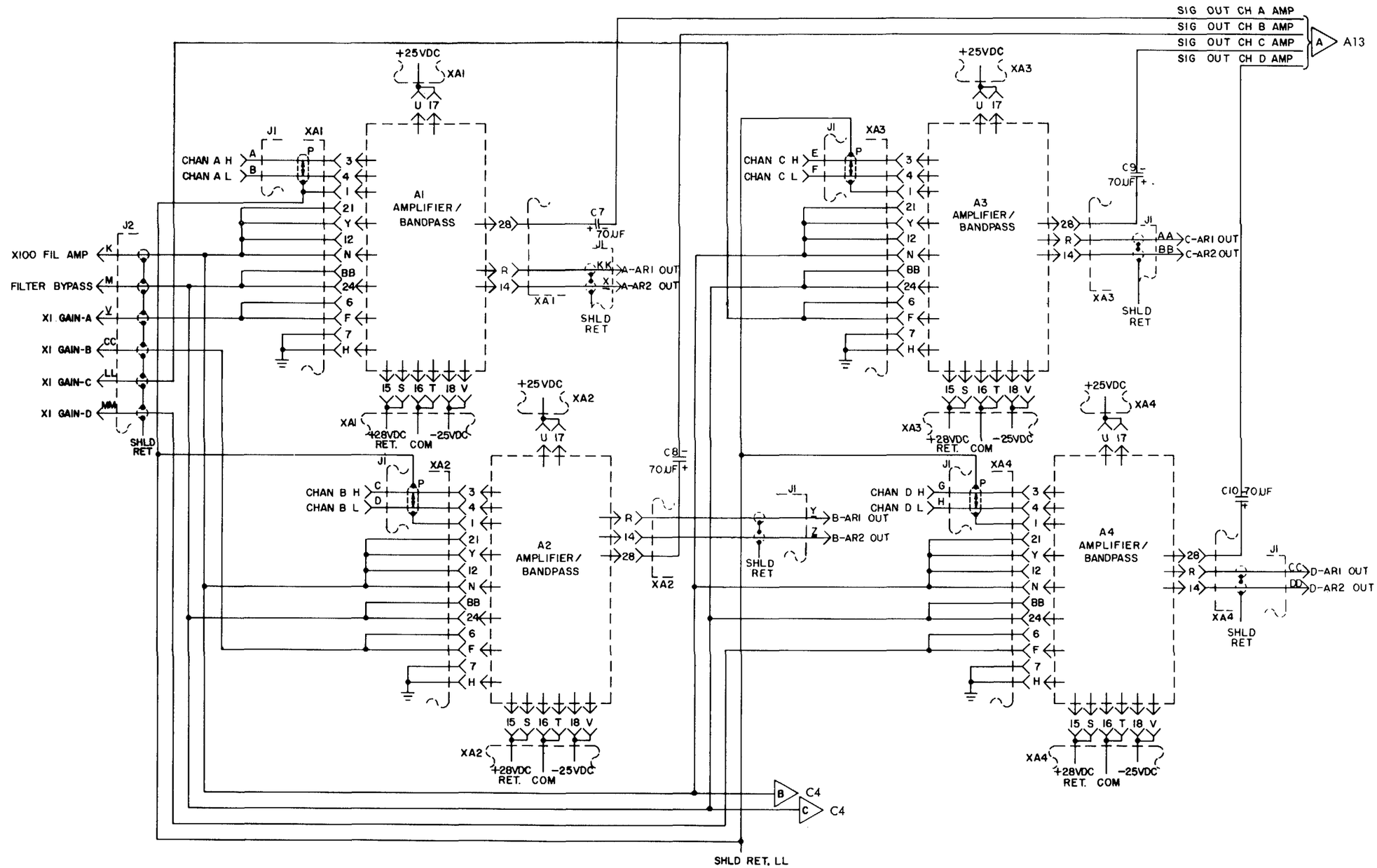


Figure 6-2. TA-211, parts location diagram.



MI 99270B

Figure 6-3. TA-211, schematic diagram (sheet 1 of 3).



MI 99271A

Figure 6-3. (sheet 2 of 3).

13 | 14 | 15 | 16 | 17 | 18

A

B

C

D

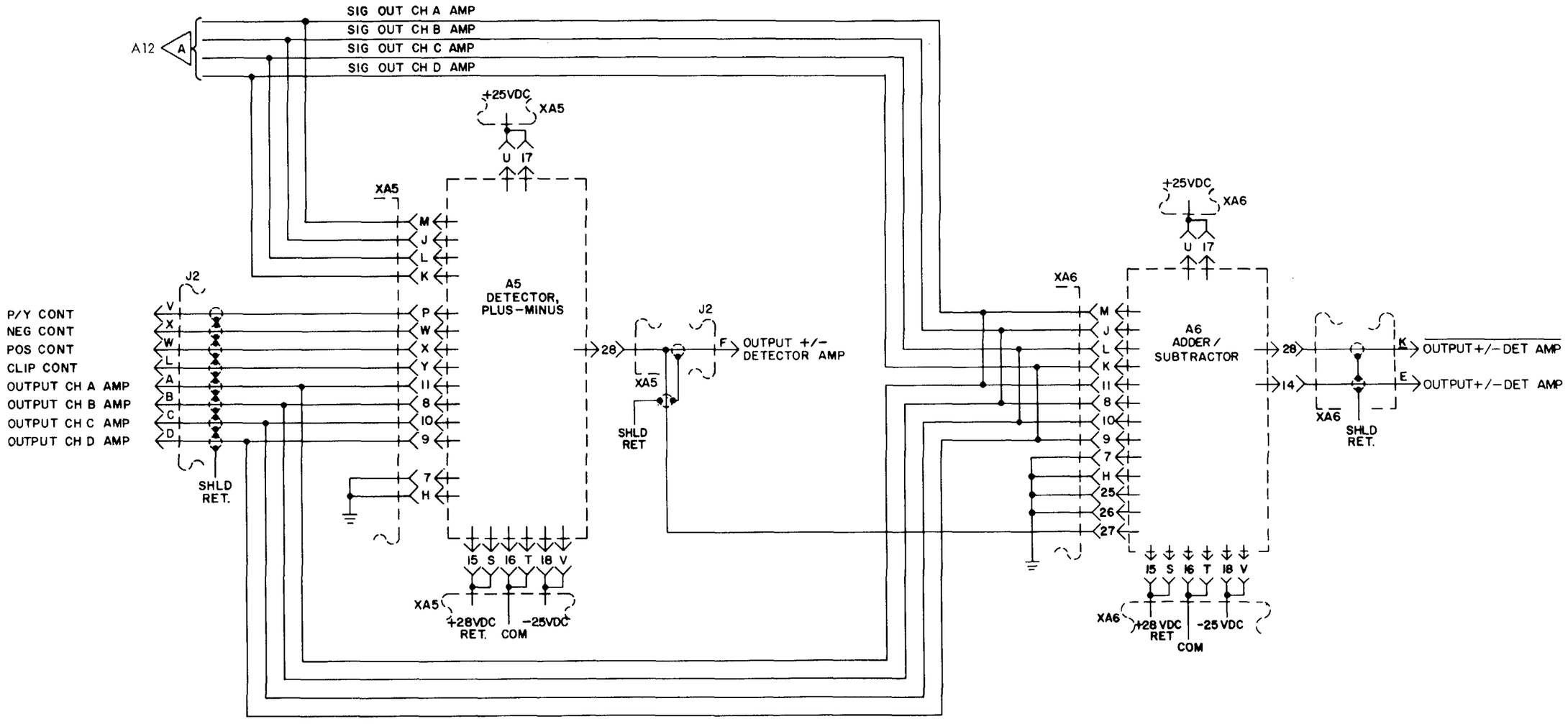


Figure 6-3. (sheet 3 of 3).

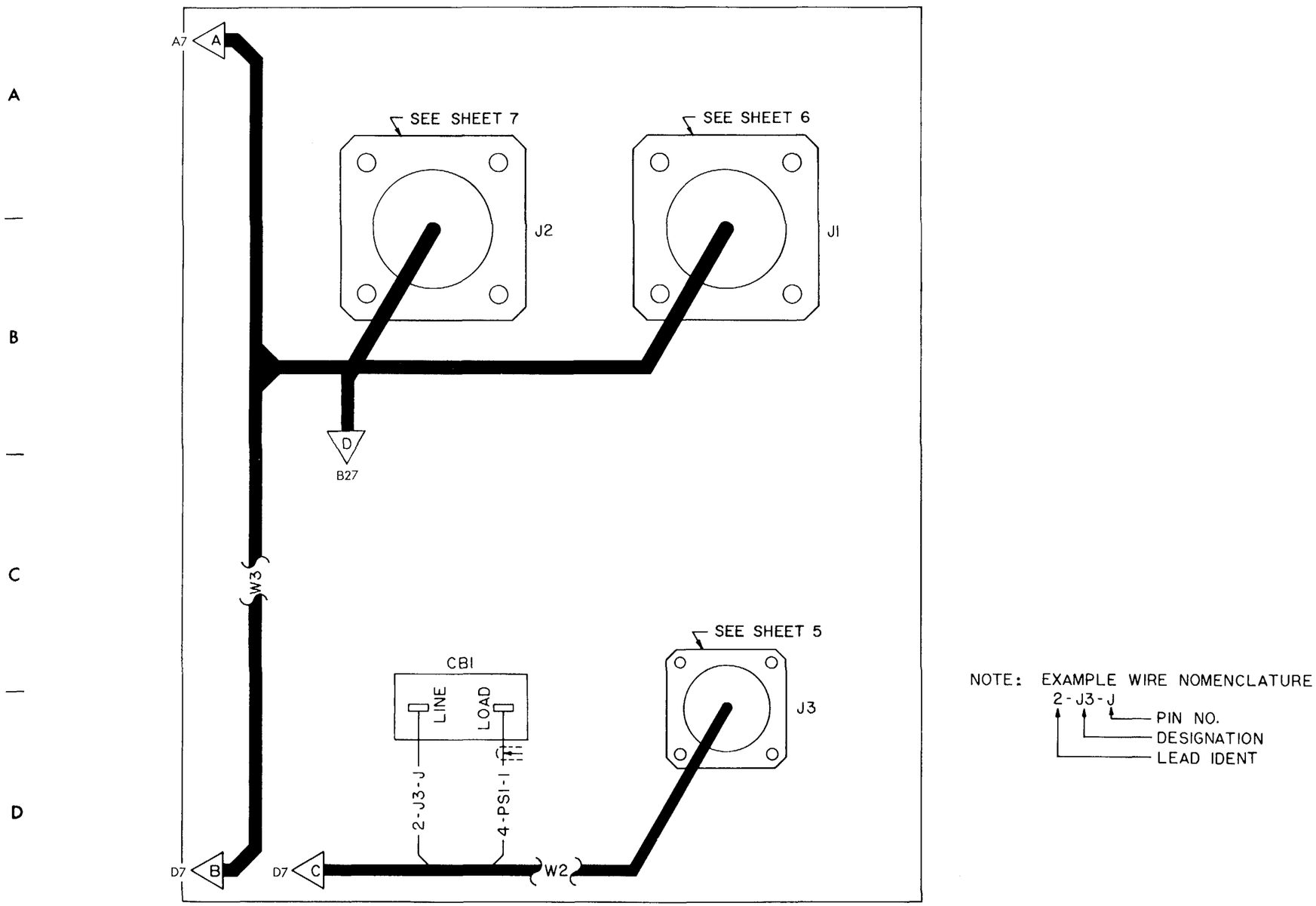


Figure 6-4. TA-211, wiring diagram (sheet 1 of 7).

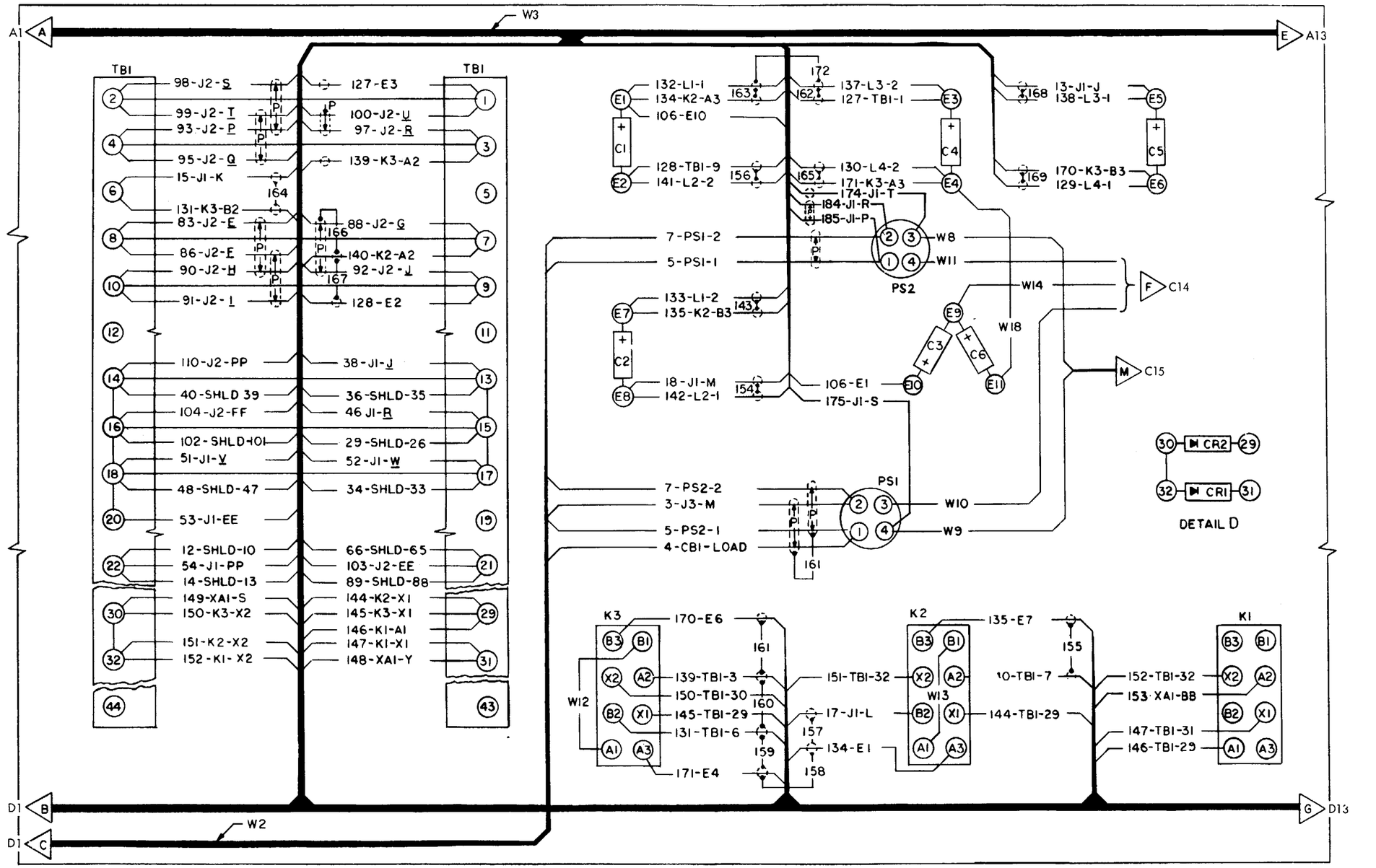


Figure 6-4. (sheet 2 of 7).

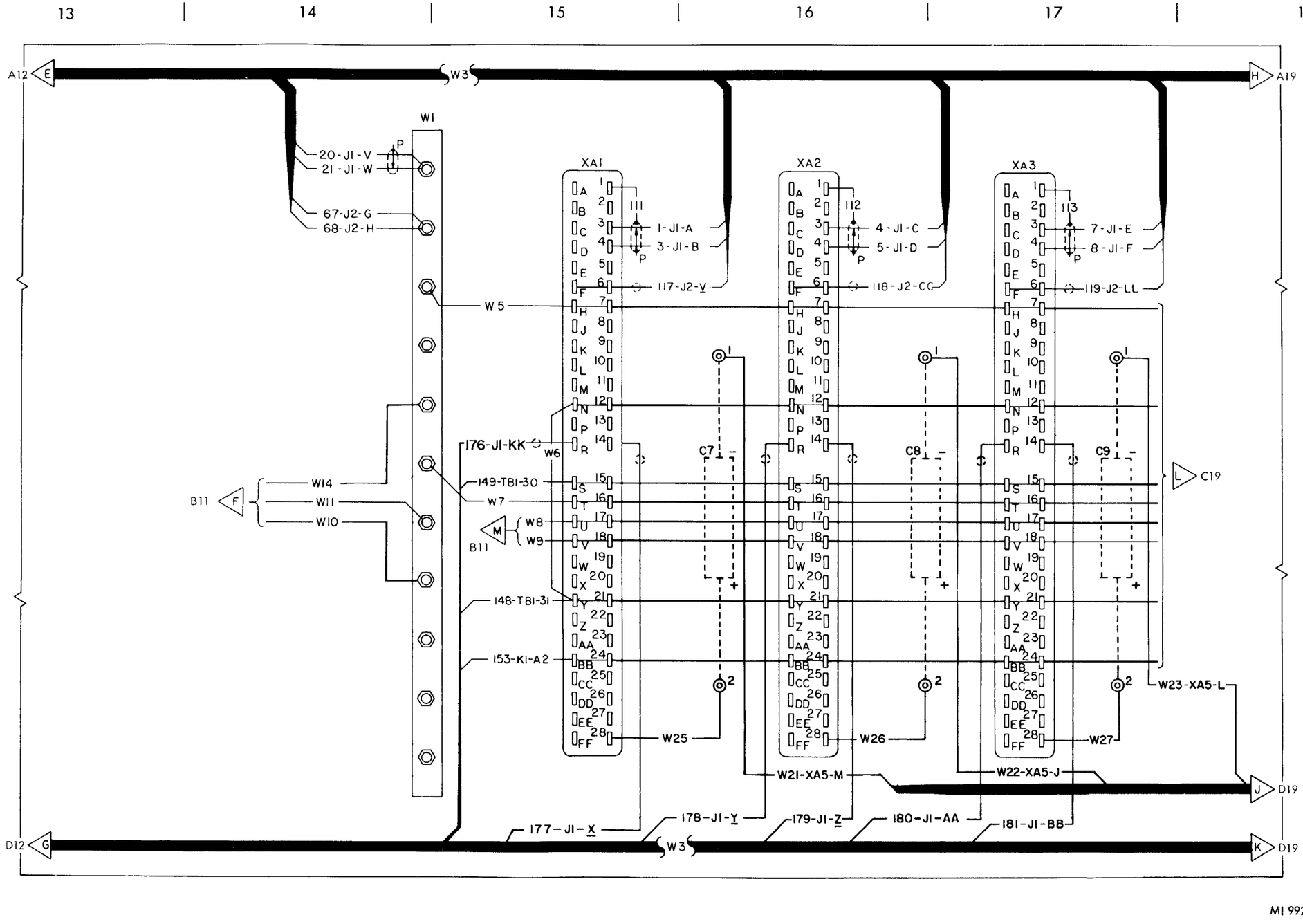


Figure 6-4. (sheet 3 of 7).

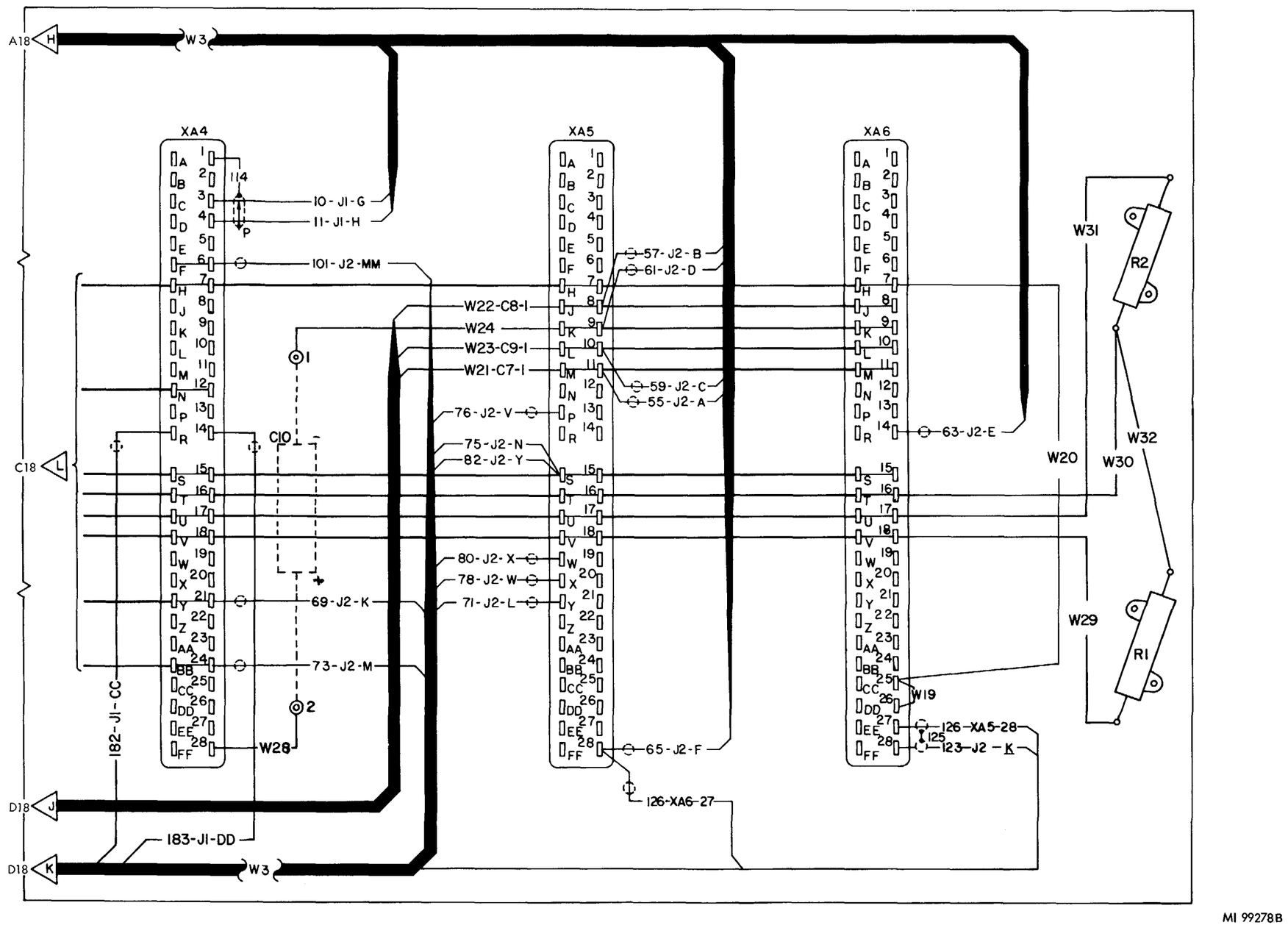
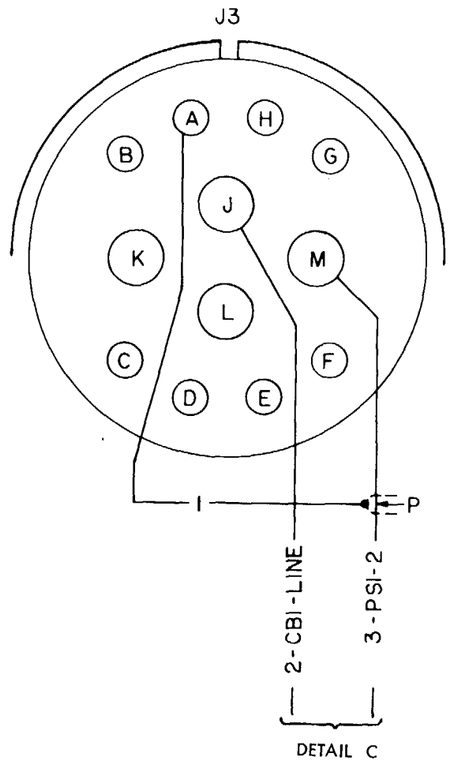


Figure 6-4. (sheet 4 of 7).



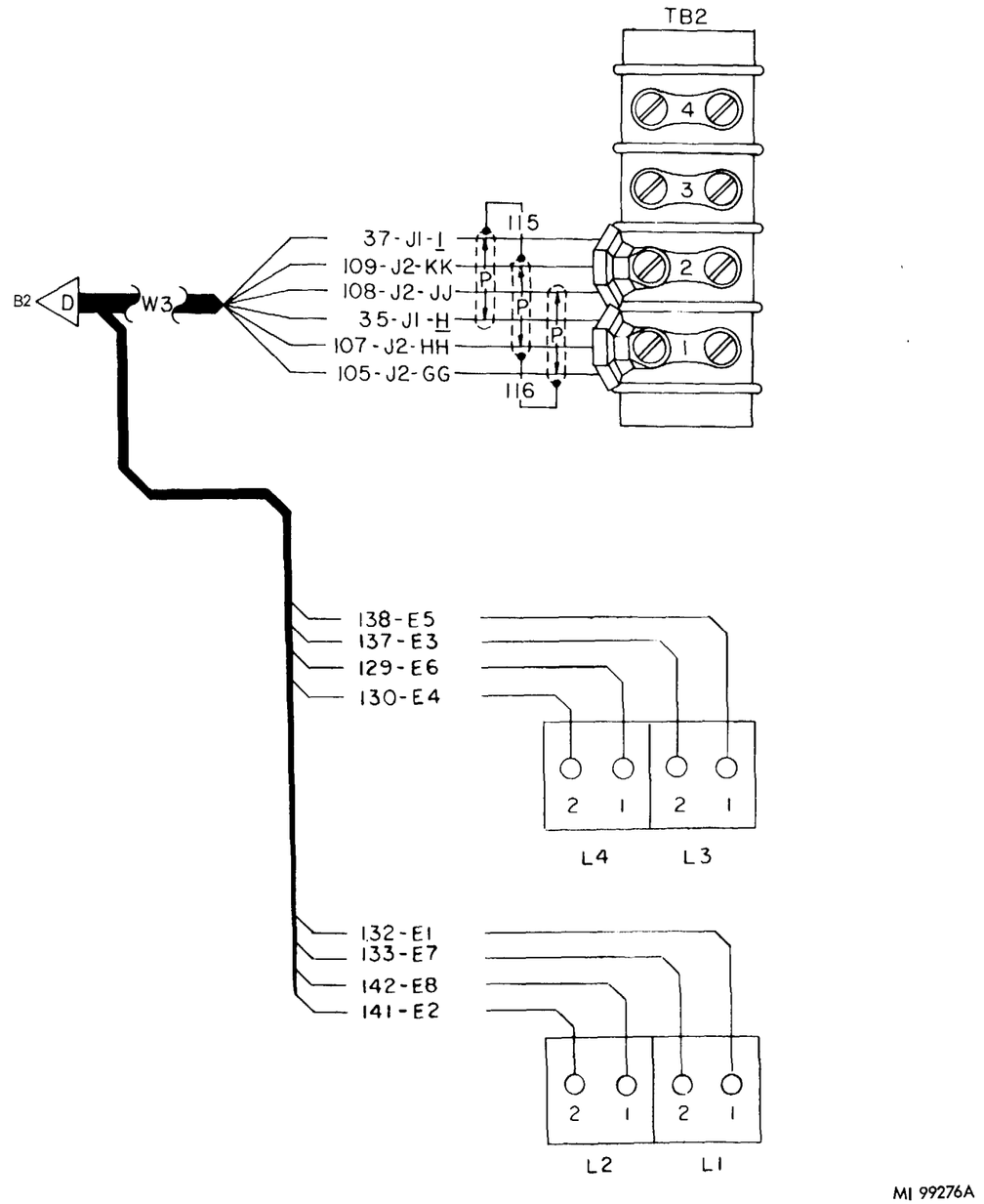


Figure 6-4. (sheet 5 of 7).

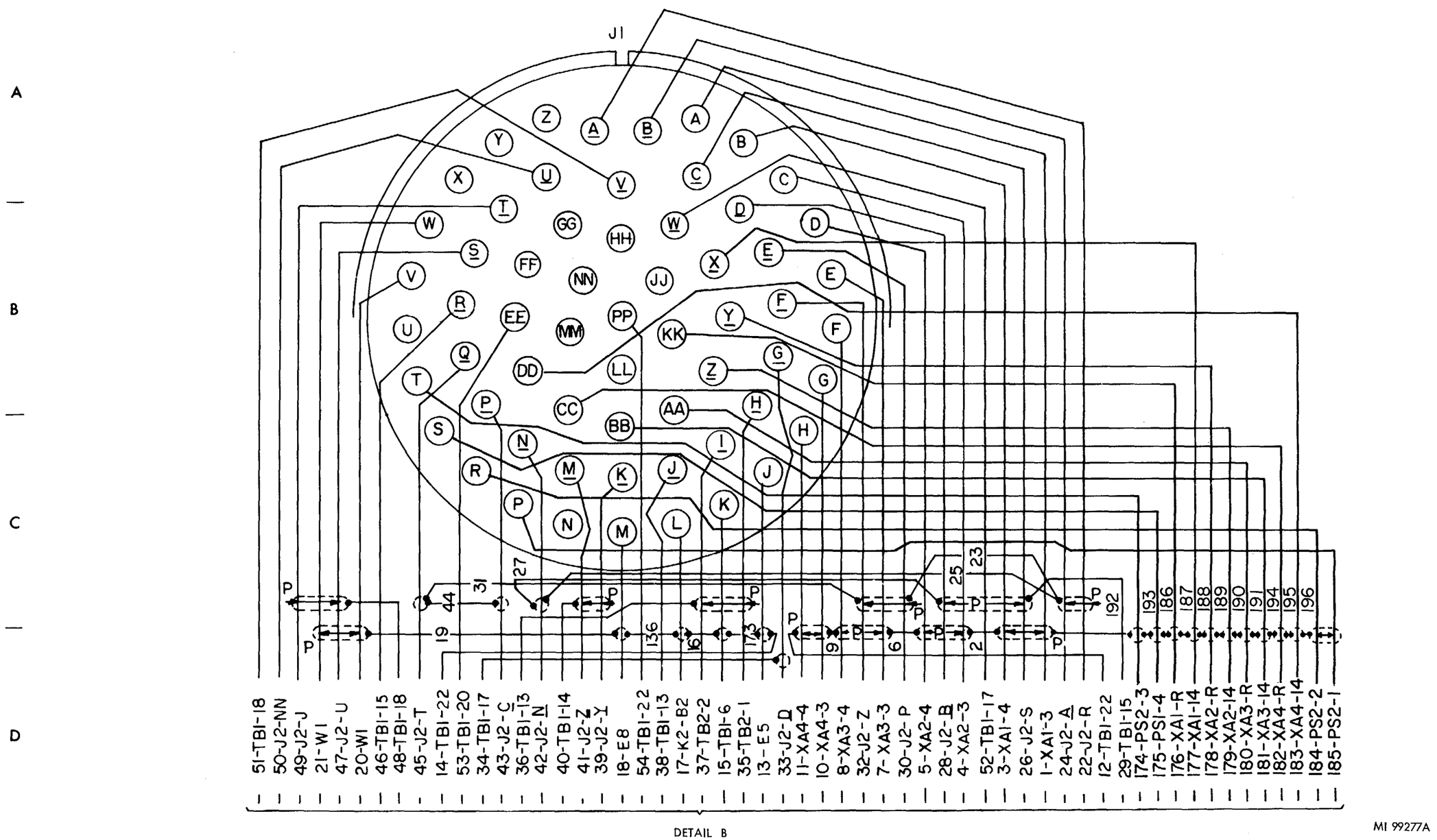


Figure 6-4. (sheet 6 of 7).

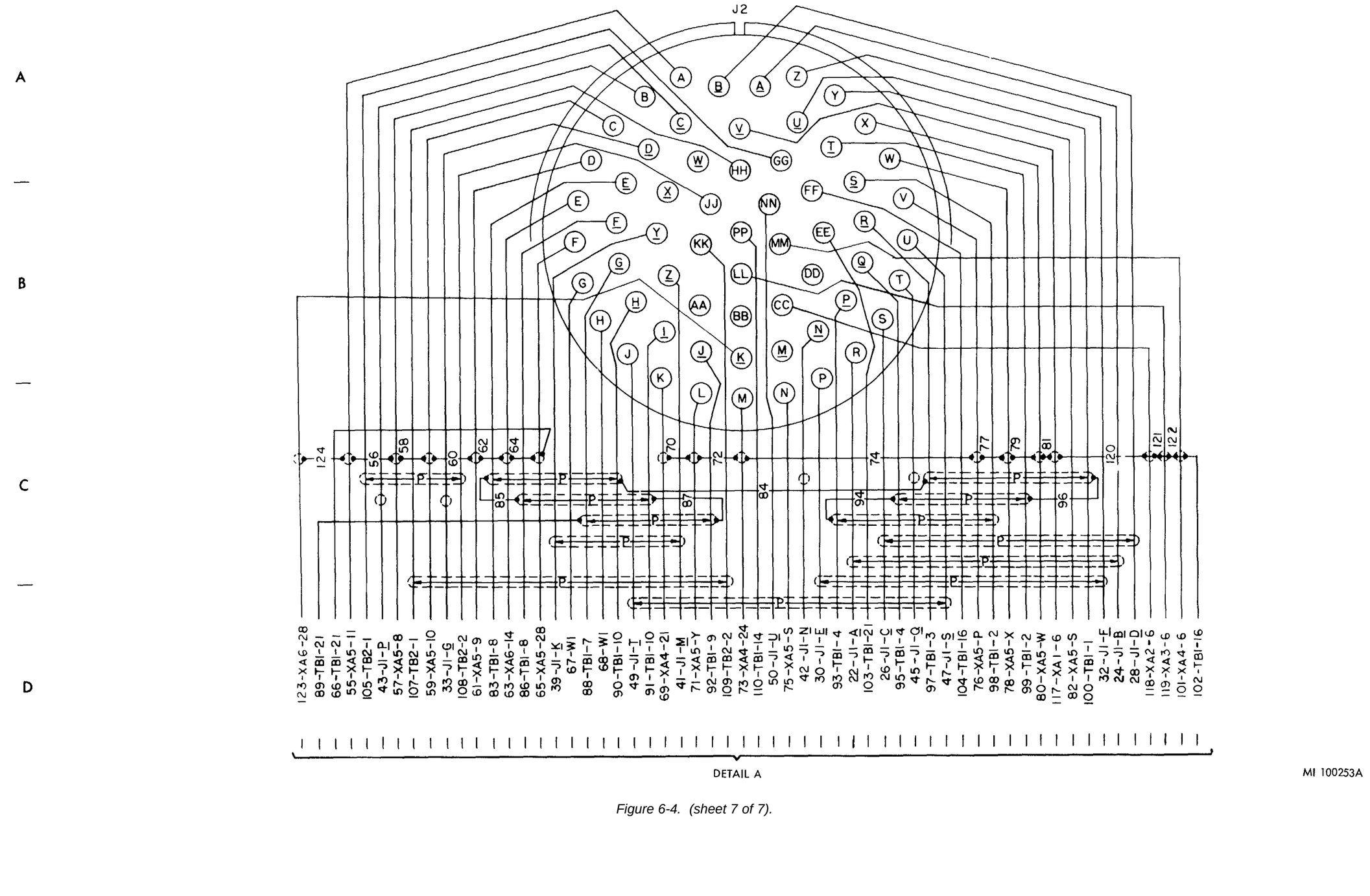


Figure 6-4. (sheet 7 of 7).

Section II. REPAIR PROCEDURES

6-5. General

a. This section provides repair information for the UUT within the scope of DS and GS maintenance personnel. Figures 6-5 and 6-6 illustrate the disassembly and assembly of the UUT. Paragraphs 6-6 through 6-11 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-4935-557-34 contains a list of repair parts and special tools authorized for maintenance personnel.

b. The following warning applies throughout this section.

WARNING

The solvents and dry-cleaning solutions used in the repair procedures are toxic and flammable. Be careful. Avoid prolonged or repeated breathing of the vapor. Keep away from heat and open flames. Use only in well ventilated areas.

6-6. Decal Removal and Installation Procedure (Fig. 6-5)

a. Removal

(1) Remove the decal from front panel (28) with a knife.
(2) Clean the mounting area with MEK, Fed Spec TT-M-261.

b. Installation.

(1) Mark the new decal with the same information that appeared on the old decal without bending or distorting the decal.
(2) Apply acetone, Fed Spec O-A-51, to the back of the decal.
(3) When the adhesive side is sticky, install the decal on front panel (28) and press flat.

6-7. Capacitor (C1 through C10) Removal and Installation Procedure (Fig. 6-5)

a. Removal.

NOTE

If C1 through C6 are to be removed, perform steps (2) through (5). If C7 through C10 are to be removed, perform steps (1) through (5). Remove only the capacitors that are faulty.

(1) Remove A1 through A4 (15), A5 (14), or A6 (13) as needed to gain access to C7 through C10 (10).
(2) Disconnect the leads from C1 through C6 (45) or C7 through C10.
(3) Peel back the silicone compound and remove the capacitor.
(4) Remove the silicone compound from plate (8 or 11) with a knife.
(5) Clean the exposed area with alcohol, Fed Spec 0-E-760 grade 3.

b. Installation.

NOTE

If C1 through C6 was removed, perform steps (1) and (2). If C7 through C10 was removed, perform steps (1) through (3).

(1) Install insulation tubing, MIL-122129 AWG 22, on the leads of C1 through C6 (45) or C7 through C10 (10) and connect the leads.
(2) Apply adhesive sealant silicone RV, MIL-A 46106, to the capacitor and plate (8 or 11).
(3) If previously removed, install Al through A4 (15), A5 (14), or A6 (13).

6-8. Relay (K1, K2, or K3) Removal and Installation Procedure (Fig. 6-5)

a. Removal

(1) Disconnect and tag the leads to K1, K2, or K3 (47).
(2) Remove mounting hardware (48 through 50) and the relay from bracket (51).

b. Installation.

(1) Install K1, K2, or K3 (47) with mounting hardware (48 through 50) on bracket (51).
(2) Connect the leads to the relay and remove the tags.

6-9. Power Supply (PS1 and PS2) Removal and Installation Procedure (Fig. 6-5)

a. Removal.

(1) Disconnect and tag the leads to PS1 or PS2.

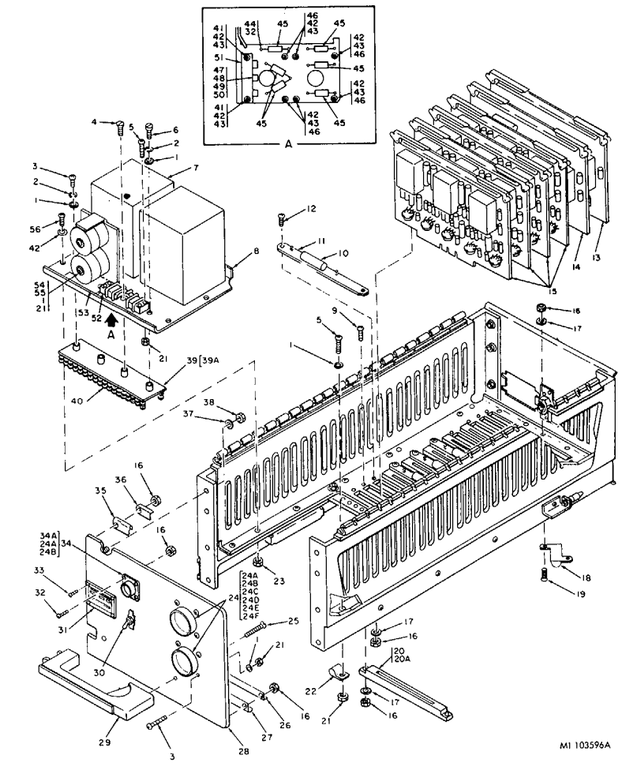
NOTE

Do not remove mounting hardware (41) unless PS1 is being removed.

(2) Remove mounting hardware (41 through 43, and 46), bracket (51), and PS1 or PS2 from plate (8).

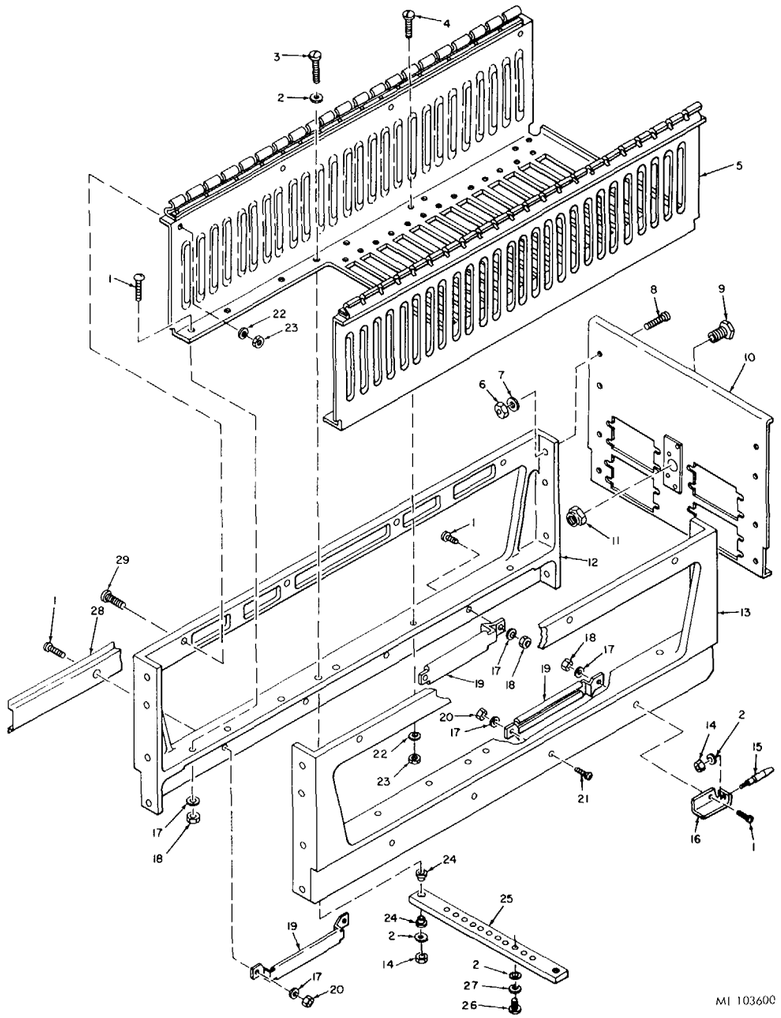
b. Installation.

(1) Install PS1 or PS2 (7) and bracket (51) with mounting hardware (41 through 43, and 46) on plate (8).
(2) Connect the leads and remove the tags.



1 – Washer
2 – Washer
3 – Screw
4 – Screw
5 – Screw
6 – Screw
7 – PS1, PS2
8 – Plate
9 – Screw
10 – C7 through C10
11 – Plate
12 – Screw
13 – A6 (Depot repair)
14 – A5 (Depot repair)
15 – A1 through A4 (Depot repair)
16 – Nut
17 – Washer
18 – R1, R2
19 – Screw
20 – XA1 through XA6
20A – Key
21 – Nut
22 – Clamp
23 – Nut
24 – W3
24A – Ferrule
24B – Strap
24C – Connector
24D – Connector
24E – Ferrule
24F – Terminal lug
25 – Screw
26 – Retainer
27 – Contact strip
28 – Front panel (Depot only)
29 – Handle
30 – CB1
31 – Identification plate (Depot repair)
32 – Screw
33 – Screw
34 – W2
34A – W2J3
35 – Contact strip
36 – Retainer
37 – Washer (Depot only)
38 – Nut (Depot only)
39 – Terminal board
39A – Stud (Depot only)
40 – CR1, CR2
41 – Screw
42 – Washer
43 – Washer
44 – E1 through E11
45 – C1 through C6
46 – Screw
47 – K1 through K3
48 – Screw
49 – Washer
50 – Nut
51 – Bracket
52 – Terminal board
53 – Bracket
54 – L1 through L4
55 – Screw
56 – Screw

Figure 6-5. Repair of TA-211 - view 1.



1 – Screw (Depot only)
2 – Washer
3 – Screw
4 – Screw (Depot only)
5 – Holder (Depot only)
6 – Nut (Depot only)
7 – Washer (Depot only)
8 – Screw (Depot only)
9 – Bushing
10 – Rear panel (Depot only)
11 – Nut
12 – Frame (Depot only)
13 – Frame (Depot only)
14 – Nut
15 – Pin
16 – Bracket
17 – Washer (Depot only)
18 – Nut (Depot only)
19 – Bracket (Depot only)
20 – Nut (Depot only)
21 – Screw (Depot only)
22 – Washer (Depot only)
23 – Nut (Depot only)
24 – Bushing
25 – Terminal bar
26 – Screw
27 – Washer
28 – Center track (Depot only)
29 – Screw (Depot only)

Figure 6-6. Repair of TA-211 - view 2.

6-10. Reactor (L1 through L4) Removal and Installation Procedure (Fig. 6-5)

NOTE
L1 is mounted under L2 and L3 is mounted under L4. Remove only the items necessary for replacement of a fault component.

a. Removal.

(1) Disconnect and tag the leads to L1 through L4 (54).
(2) Remove mounting hardware (1, 21, and 55) and L1 through L4 from bracket (53).

b. Installation.

(1) Install L1 through L4 (54) with mounting hardware (1, 21, and 55) on bracket (53).
(2) Connect the leads and remove the tags.

6-11. Terminal (E1 through E11) Removal and Installation Procedure (Fig. 6-5)

a. Removal

(1) Disconnect and tag the leads to PS1 ad PS2 (7).
(2) Remove mounting hardware (41 through 43, and 46), bracket (51), and PS1 and PS2.
(3) Disconnect the leads to C1 through C6 (45), but do not remove the capacitor from plate (8).
(4) Remove screw (32) and E1 through E11 (4).

b. Installation.

(1) Apply sealing compound, MIL-S-22473 grade EE to E1 through E11 (44) and install the terminal with screw (32).
(2) Connect the leads from C1 through C6 (45) to the terminal.
(3) Install PS1 and PS2 (7) and bracket (51) with mounting hardware (41 through 43, and 46).
(4) Connect the leads to PS1 and PS2 and remove the tags.

6-12. Painting

CAUTION
Mask all connectors, lettering, and mounting surfaces before painting the adjoining surfaces.

Inspect and paint the exterior of the UUT.

a. Inspect the exterior surface of the UUT for scratched, clipped, or peeled paint.
b. Smooth the damaged area with sandpaper, wet/dry (120-400 grit).
c. Spot-paint damaged areas with a brush.
d. Use paint, Fed Spec TT-E-527, color no. 37038, for the handles, and paint, MIL-E-15090, type 1081-24578, for the assembly panels.

6-13. Packaging

a. When the amplifier filter adapter is to be shipped to the depot for further testing and repair, package the assembly in accordance with TM 38-230, method II D, insuring that adequate cushioning material and bracing are used to prevent damage to the assembly during shipment.
b. Packages should be marked in accordance with local directives.

CHAPTER 7

WEAPON SYSTEM LOAD BOX(TA-204)

Section I. MANUAL TESTS

7-1. General

This chapter provides the information necessary to isolate and repair a fault in the weapon system load box (UUT) to a single open or shorted wire or faulty component. Figures 7-1 through 7-3 are provided as an aid in troubleshooting and testing the UUT.

7-2. Equipment Required for Manual Tests

The multimeter is required to test the UUT.

7-3. Test Instructions

a. Fault isolation in this UUT is accomplished while running the SHILLELAGH UUT programs. Suspected failures are specified in the messages displayed on the SSVD. Where a relay is listed as one of the components that has failed, check the diode associated with the relay first. If the diode is faulty, replace the diode. If the diode is not faulty, check the relay. If the relay is faulty replace both the diode and relay.

b. The test procedures listed in tables 7-1 through 7-6 are a series of resistance measurements which will indicate any faulty wiring or components. Check for continuity, open circuits, short circuits, short circuit to cable shield, and component resistance values using standard manual procedures

Table 7-1. Weapon System Load Box Continuity Tests.

Continuity test		Meter reading	Corrective action
From	To		
J13-B	J14-B	Continuity	Repair broken wire
J13-C	J14-C	Continuity	Repair broken wire
J13-D	J14-D	Continuity	Repair broken wire
J13-E	J14-3	Continuity	Repair broken wire
J13-K	J14-K	Continuity	Repair broken wire
J13-L	J14-L	Continuity	Repair broken wire
J13-M	J14-M	Continuity	Repair broken wire
J13-N	J14-M	Continuity	Repair broken wire
J13-T	J14-T	Continuity	Repair broken wire
J11-r	J1-C	Continuity	Repair broken wire
J11-s	J12-s	Continuity	Repair broken wire
J11-t	J12-t	Continuity	Repair broken wire
J11-u	J12-u	Continuity	Repair broken wire
J11-v	J12-v	Continuity	Repair broken wire
J11-w	J12-w	Continuity	Repair broken wire
J11-FF	J12-FF	Continuity	Repair broken wire
J11-GG	J12-GG	Continuity	Repair broken wire
J11-HH	J12-HH	Continuity	Repair broken wire
J11-LL	J12-LL	Continuity	Repair broken wire
J11-MM	J12-MM	Continuity	Repair broken wire
J11-NN	J12-NN	Continuity	Repair broken wire
J1-G	J1-H	Continuity	Repair broken wire
J1-G	J1-J	Continuity	Repair broken wire
J8-B	J7-D	Continuity	Repair broken wire
J8-C	J7-G	Continuity	Repair broken wire
J8-E	J7-E	Continuity	Repair broken wire
J8-F	J7-H	Continuity	Repair broken wire
J9-A	J7-J	Continuity	Repair broken wire
J9-B	J7-K	Continuity	Repair broken wire
J9-C	J7-L	Continuity	Repair broken wire
J9-D	J6-B	Continuity	Repair broken wire
J9-D	J7-B	Continuity	Repair broken wire
J9-E	J6-E	Continuity	Repair broken wire
J9-E	J7-F	Continuity	Repair broken wire
J9-F	J7-M	Continuity	Repair broken wire
J2-A	J11-DD	Continuity	Repair broken wire
J2-G	J1-G	Continuity	Repair broken wire
J2-G	J7-T	Continuity	Repair broken wire
J5-A	J6-A	Continuity	Repair broken wire
J5-A	J7-FF	Continuity	Repair broken wire
J5-C	J5-E	Continuity	Repair broken wire
J5-C	J6-D	Continuity	Repair broken wire
J5-C	J7-EE	Continuity	Repair broken wire
J5-D	J5-F	Continuity	Repair broken wire
J5-D	J7-A	Continuity	Repair broken wire

Continuity test		Meter reading	Corrective action
From	To		
J6-C	J7-GG	Continuity	Repair broken wire
J7-N	J12-JJ	Continuity	Repair broken wire
J10-A	J11-BB	Continuity	Repair broken wire
J13-U	J14-U	Continuity	Repair broken wire
J13-V	J14-V	Continuity	Repair broken wire
J13-PP	J14-PP	Continuity	Repair broken wire
J11-A	J12-A	Continuity	Repair broken wire
J11-B	J12-B	Continuity	Repair broken wire
J11-C	J12-C	Continuity	Repair broken wire
J11-D	J12-D	Continuity	Repair broken wire
J11-E	J12-E	Continuity	Repair broken wire
J11-F	J12-F	Continuity	Repair broken wire
J11-G	J12-G	Continuity	Repair broken wire
J11-H	J12-H	Continuity	Repair broken wire
J11-J	J12-J	Continuity	Repair broken wire
J11-K	J12-K	Continuity	Repair broken wire
J11-L	J12-L	Continuity	Repair broken wire
J11-M	J12-M	Continuity	Repair broken wire
J11-N	J12-N	Continuity	Repair broken wire
J11-PP	J12-PP	Continuity	Repair broken wire
J11-T	J12-T	Continuity	Repair broken wire
J11-c	J12-c	Continuity	Repair broken wire
J11-d	J12-d	Continuity	Repair broken wire
J11-e	J12-e	Continuity	Repair broken wire
J11-f	J12-f	Continuity	Repair broken wire
J11-g	J12-g	Continuity	Repair broken wire
J11-h	J12-h	Continuity	Repair broken wire
J11-i	J12-i	Continuity	Repair broken wire
J11-j	J12-j	Continuity	Repair broken wire
J11-k	J12-k	Continuity	Repair broken wire
J11-m	J12-m	Continuity	Repair broken wire
J11-n	J12-z	Continuity	Repair broken wire
J11-n	J11-z	Continuity	Repair broken wire
J11-p	J11-AA	Continuity	Repair broken wire
J11-p	J12-AA	Continuity	Repair broken wire
J11-p	J1-M	Continuity	Repair broken wire
J10-E	J11-z	Continuity	Repair broken wire
J12-KK	J7-y	Continuity	Repair broken wire
J11-q	J11-x	Continuity	Repair broken wire
J11-q	J12-x	Continuity	Repair broken wire
J11-r	J11-y	Continuity	Repair broken wire
J11-r	J12-y	Continuity	Repair broken wire
J11-BB	J1-N	Continuity	Repair broken wire
J11-DD	J2-A	Continuity	Repair broken wire
J11-AA	J2-C	Continuity	Repair broken wire

Table 7-2. Weapon System Load Box Resistance Tests

Item	Resistor test		Meter reading	Corrective action
	From	To		
R9	J1-G	J1-K	Between 104 and 106 ohms	If the meter reading is not between 104 and 106 ohms, replace R19 (par. 7-6).
R10	J1-M	J1-N	Between 14.85 and 15.15 ohms	If the meter reading is not between 14.85 and 15.15 ohms, replace R10 (par. 7-6).
R26	J7-DD	J7-CC	Less than 1 ohm	If the meter reading is greater than 1 ohm, replace R26 (par. 7-6).
R27	J5-A	J8-B	Between 4.95 and 5.05 ohms	If the meter reading is not between 4.95 and 5.05 ohms, replace R27 (par. 7-6).
R28	J5-C	J8-E	Between 4.95 and 5.05 ohms	If tile meter reading is not between 4.95 and 5.05 ohms, replace R28 (par. 7-6).
R29	J11-Y	J12-Y	Between 41.77 K and 42.62 K ohms	If the meter reading is not between 41.77 K and 42.62 K ohms, replace R29 (par. 7-6).
R30	J1-Z	J12-Z	Between 41.77 K and 42.62 K ohms	If the meter reading is not between 41.77 K and 42.62 K ohms, replace R30 (par. 7-6).
R31	J11-p	J12-Z	Between 9.9 K and 10.1 K ohms	If the meter reading is not between 9.9 K and 10.1 K ohms, replace R31 (par. 7-6).
R32	J11-r	J12-Y	Between 9.9 K and 10.1 K ohms	If the meter reading is not between 9.9 K an d 10.1 K ohms, replace R32 (par. 7-6).
R33	J11-p	J13-B	Between 1.98 K and 2.02 K ohms	If the meter reading is not between 1.98 K and 2.02 K ohms, replace R33 (par. 7-6).
R34	J11-r	J13-K	Between 1.98 K and 2.02 K ohms	If the meter reading is not between 1.98 K and 2.02 K ohms, replace R34 (par. 7-6).
R35	J13-A	J14-A	Between 2187 and 2673 ohms	If the meter reading is not between 2187 and 2673 ohms, replace R35 (par. 7-6).
R36	J13-F	J14-F	Between 2187 and 2673 ohms	If the meter reading is not between 2187 and 2673 ohms, replace R36 (par. 7-6).
R37	J2-B	J7-r	Between 950 and 1050 ohms	If the meter reading is not between 950 and 1050 ohms, replace R37 (par. 7-6).
R38	J2-F	J7-u	Between 950 and 1050 ohms	If the meter reading is not between 950 and 1050 ohms, replace R38 (par. 7-6).
R39	J2-D	J7-p	Between 285 and 315 ohms	If the meter reading is not between 285 and 315 ohms, replace R39 (par. 7-6).
R41	J8-A	J7-n	Between 950 and 1050 ohms	If the meter reading is not between 950 and 1050 ohms, replace R41 (par. 7-6).
R42	J2-C	J7-h	Between 950 and 1050 ohms	If the meter leading is not between 950 and 1050 ohms, replace R42 (par. 7-6).
R43	J8-D	J7-c	Between 950 and 1050 ohms	If the meter reading is not between 950 and 1050 ohms, replace R43 (par. 7-6).
R45	J2-E	J7-e	Between 950 and 1050 ohms	If the meter reading is not between 950 and 1050 ohms, replace R45 (par. 7-6).
R46	J2-A	J7-s	Between 285 and 315 ohms	If the meter reading is not between 285 and 315 ohms, replace R46 (par. 7-6).

Table 7-2. Weapon System Load Box Resistance Tests - Continued

Item	Resistor test		Meter reading	Corrective action
	From	To		
				NOTE **On the remaining resistor tests, the cover of the UUT must be removed.**
R44	J7-b	E9	Between 950 and 1050 ohms	If the meter reading is not between 950 and 1050 ohms, replace R44 (par. 7-6).
	J7-m	E1	Between 950 and 1050 ohms	If the meter reading is not between 950 and 1050 ohms, replace R40 (par. 7-6).
R40	E1	E2	Between 0.99 and 1.01 ohms	If the meter reading is not between 0.99 and 1.01 ohms, replace R24 (par. 7-6).
	E20	K12-A2	Between 194 and 206 ohms	If the meter reading is not between 194 and 206 ohms, replace R25 (par. 7-6).
R24	E9	CR4-A	Between 14.85 and 15.15 ohms	If the meter reading is not between 14.85 and 15.15 ohms. replace R20 (par 7-6).
R25	E9	E3	Between 0.99 and 1.01 ohms	If the meter reading is not between 0.99 and 1.01 ohms, replace R21 (par. 7-6).
R20	E7	K11-A2	Between 194 and 206 ohms	If the meter reading is not between 194 and 206 ohms, replace R22 (par. 7-6).
R21	E1	CR6-K	Between 14.85 and 15.15 ohms	If the meter reading is not between 14.85 and 15.15 ohms, replace 123 (par. 7-6).
R22				**NOTE** **In the following resistor tests, a lead must be disconnected from the resistor to eliminate parallel path.**
R23			Between 12.57 and 12.82 ohms	*a.* Disconnect and tag the leads from one end of R11 through R16. *b*. Measure the resistance of R11 with the multimeter. (1) If the reading is between 12.57 and 12.82 ohms, proceed to step *c*. (2) If the reading is not between 12.57 and 12.82 ohms, replace R11 (par. 7-6), and proceed to step *c*. *c*. Repeat step b for R12 through R16, and then proceed to step *d.*
R11 R12 R13 R14 R15 R16				*d.* Reconnect all disconnected leads.
			Between 39.79 and 40.60 ohms	*a.* Disconnect and tag the leads from one end of R6 through R8. *b*. Measure the resistance of R6 with the multimeter. (1) If the reading is between 39.79 and 40.60 ohms, proceed to step *c*. (2) If the reading is not between 39.79 and 40.60 ohms, replace R6 (par. 7-6), and proceed to step c. *c.* Repeat step b for R7 and R8, and then proceed to step *d.* *d.* Reconnect all disconnected leads.
R6 R7 R8				

Table 7-2. Weapon System Load Box Resistance Tests - Continued.

Item	Resistor test		Meter reading	Corrective action
	From	To		
R18 R19			Between 12.27 and 12.52 ohms	*a.* Disconnect and tag the leads from one end of R18 and R19. *b*. Measure the resistance of R18 with the multimeter. (1) If the reading is between 12.27 and 12.52 ohms, proceed to step *c*. (2) If the meter reading is not between 12.27 and 12.52 ohms, replace R18 (par. 7-6) and proceed to step *c*. *c*. Repeat step *b* for R19, and then proceed to step *d*. *d.* Reconnect all disconnected leads.
R17			Between 20.79 and 21.21 ohms	Disconnect the lead from one end of R17, and measure the resistance with the multimeter. *a.* If the reading is between 20.79 and 21.21 ohms, reconnect the lead. *b*. If the reading is not between 20.79 and 21.21 ohms, replace R17 (par. 7-6).
R1			Between 160.3 and 163.6 ohms	Disconnect the lead from one end of R1, and measure the resistance with the multimeter. *a.* If the reading is between 160.3 and 163.6 ohms, reconnect the lead. *b*. If the reading is not between 160.3 and 163.6 ohms, replace R1 (par. 7-6).
R2			Between 167.31 and 170.69 ohms	Disconnect the lead from one end of R2, and measure the resistance with the multimeter *a.* If the reading is between 167.31 and 170.69 ohms, reconnect the lead. *b*. If the reading is not between 167.31 and 170.69 ohms, replace R2 (par. 7-6).
R3			Between 172.2 and 175.7 ohms	Disconnect the lead from one end of R3, and measure the resistance with the multimeter. *a.* If the reading is between 172.2 and 175.7 ohms, reconnect the lead. *b*. If the reading is not between 172.2 and 175.7 ohms, replace R3 (par. 7-6).
R4 R5			Between 11.68 and 11.91 ohms	*a.* Disconnect and tag the leads from end of R4 and R5. *b*. Measure the resistance of R4 with the multimeter. (1) If the reading is between 11.68 and 11.91 ohms, proceed to step *c*. (2) If the reading is not between 11.68 and 11.91 ohms, replace R4 (par. 7-6), and proceed to step *c*. *c*. Repeat step *b* for R5, and then proceed to step *d.* *d.* Reconnect all disconnected leads.

Table 7-3. Weapon System Load Box Diode Tests.

Item	Diode test		Meter reading	Corrective action
	From	To		
CR4 CR5 CR6 CR7				*a.* Test CR4 with the multimeter. (1) If the readings indicate CR4 to be good, proceed to step *b*. (2) If the readings indicate CR4 to be faulty, replace CR4 (par. 7-7). Proceed to step *b*. *b*. Repeat step *a* from CR5 through CR7.
CR1 CR2 CR3 CR8 Through CR17				*a.* Disconnect one lead of CR1, and test the diode with the multimeter. (1) If the reading indicates CR1 to be good, reconnect the lead of CR1, and proceed to step *b*. (2) If the reading indicates CR1 to be faulty, replace CR1, and proceed to step *b*. *b*. Repeat step *a* for CR2, CR3, and CRT-through CR17.

Table 7-4. Weapon System Load Box Inductor Tests

Item	Inductor test		Meter reading	Corrective action
	From	To		
L2	J-1B	J1-L	Less than 2 ohms	If the meter reading is greater than 2 ohms, replace L2 (par. 7-6).
				NOTE **On the remaining inductor test, the cover of the UUT must be removed.**
L1	J1-A	L1-2	Less than 2 ohms	If the meter reading is greater than 2 ohms, replace L1.

Table 7-5. Weapon System Load Box Relay Test

Item	Relay tests		Meter reading	Corrective action
	From	To		
K1	J3-A	J3-B	Between 100 and 350 ohms	If the meter reading is not between 100 and 350 ohms, replace K1 (par. 7-6).
K4	J7-y	J7-x	Between 200 and 900 ohms	If the meter reading not between 200 and 900 ohms, replace K4 (par. 7-6).
K5	J7-y	J7-z	Between 200 and 900 ohms	If the meter reading is not between 200 and 900 ohms, replace K5 (par. 7-6).
K6	J7-y	J7-BB	Between 200 and 900 ohms	If the meter reading is not between 200 and 900 ohms, replace K6 (par. 7-6).
K7	J7-y	J7-AA	Between 200 and 900 ohms	If the meter reading is not between 200 and 900 ohms, replace K7 (par. 7-6).
K8	J7-y	J7-C	Between 200 and 900 ohms	If the meter reading not between 200 and 900 ohms, replace K8 (par. 7-6).
K9	J7-y	J7-k	Between 200 and 900 ohms	If the meter reading not between 200 and 900 ohms, replace K9 (par. 7-6).
K10	J7-y	J7-a	Between 200 and 900 ohms	If the meter reading b not between 200 and 900 ohms, replace K10 (par. 7-6).
K11	J7-y	J7-j	Between 200 and 900 ohms	If the meter reading is not between 200 and 900 ohms, replace K11 (par. 7-6).
K12	J7-y	J7-v	Between 200 and 900 ohms	If the meter reading is not between 200 and 900 ohms, replace K12 (par. 7-6).
K13	J7-y	J7-N	Between 200 and 900 ohms	If the meter reading is not between 200 and 900 ohms, replace K13(par. 7-6).
				NOTE **On the remaining relay tests, the cover of the UUT must be removed.**
K2	J4-F	K2-X2	Between 200 and 900 ohms	If the meter reading is not between 200 and 900 ohms, replace K2 (par. 7-6).
K3	J4-F	K3-14	Between 200 and 900 ohms	If the meter reading is not between 200 and 900 ohms, replace K3 (par. 7-6).

Table 7-6. Weapon System Load Box Relay Contact Tests.

Item	Relay contact test		Meter reading	Corrective action
	From	To		
K1	J3-E	J4-B	Greater than 100 K ohms	If the meter reading is less than 100 K ohms, replace K1 (par. 7-6).
				NOTE **On the remaining relay contact tests, the over of the UUT must be removed.**
K2	K2-A2	K2-A1	Greater than 100 K ohms	If the meter reading is less than 100 K ohms, replace K2 (par. 7-6).
K3	J4-E	K3-4	Greater than 100K ohm	If any of the meter readings were less than 100 K ohms, replace K3 (par. 7-6).
	J4-D	K3-3		
	J4-A	K3-2	Between 5 and 10 ohms	If the meter reading is less than 6 or greater than 10 ohms, replace K3 (par. 7-6)
	J3-D	K3-1		
K4	J2-D	K4-2	Greater than 100 K ohms	If either meter reading was less than 100 K ohms, replace K4 (par. 7-6).
	J2-F	K4-1		
K5	J2-A	K5-2	Greater than 100 K ohms	If either meter reading was less than 100K ohms, replace K5 (par. 7-6).
	J2-C	K5-1		
K6	J6-B	K6-2	Greater than 100 K ohms	If either meter reading was less than 100 K ohms, replace K6 (par. 7-6).
	J5-B	K6-1		
K7	J6-E	K7-2	Greater than 100 K ohms	If either meter reading was less than 100 K ohms, replace K7 (par. 7-6).
	J5-D	K7-1		
K9	J2-E	K9-A1	Greater than 100 K ohms	If the meter reading was less than 100 K ohms, replace K9 (par. 7-6).
K10	K10-A2	K10-A1	Greater than 100 K ohms	If the meter reading was less than 100 K ohms, replace K10 (par. 7-6).
K11	K11-A2	K11-A1	Greater than 100 K ohms	If the meter reading was less than 100 K ohms, replace K11 (par. 7-6).
K12	K12-A2	J2-E	Greater than 100 K ohms	If the meter reading was less than 100 K ohms, replace K12 (par. 7-6)
K13	J11-EE	J11-CC	Greater than 100 K ohms	If any of the meter readings were less than 100 K ohms, replace K13 (par. 7-6).
	J2-A	J10-A		
	J2-B	J10-B		
	J2-C	J10-C		
K1	J4-B	K1-A2	Less than 5 ohms	If the meter reading is greater than 5 ohms, replace K1 (par. 7-6).
K2	K2-A2	K2-A3	Less than 5 ohms	If the meter reading is greater than 5 ohms, replace K2 (par. 7-6).
K6	J6-B	J5-B	Less than 5 ohms	If the meter reading is greater than 5 ohms, replace K6 (par. 7-6).
K7	J6-E	J5-D	Less than 5 ohms	If the meter reading is greater than 5 ohms, replace K7 (par. 7-6).

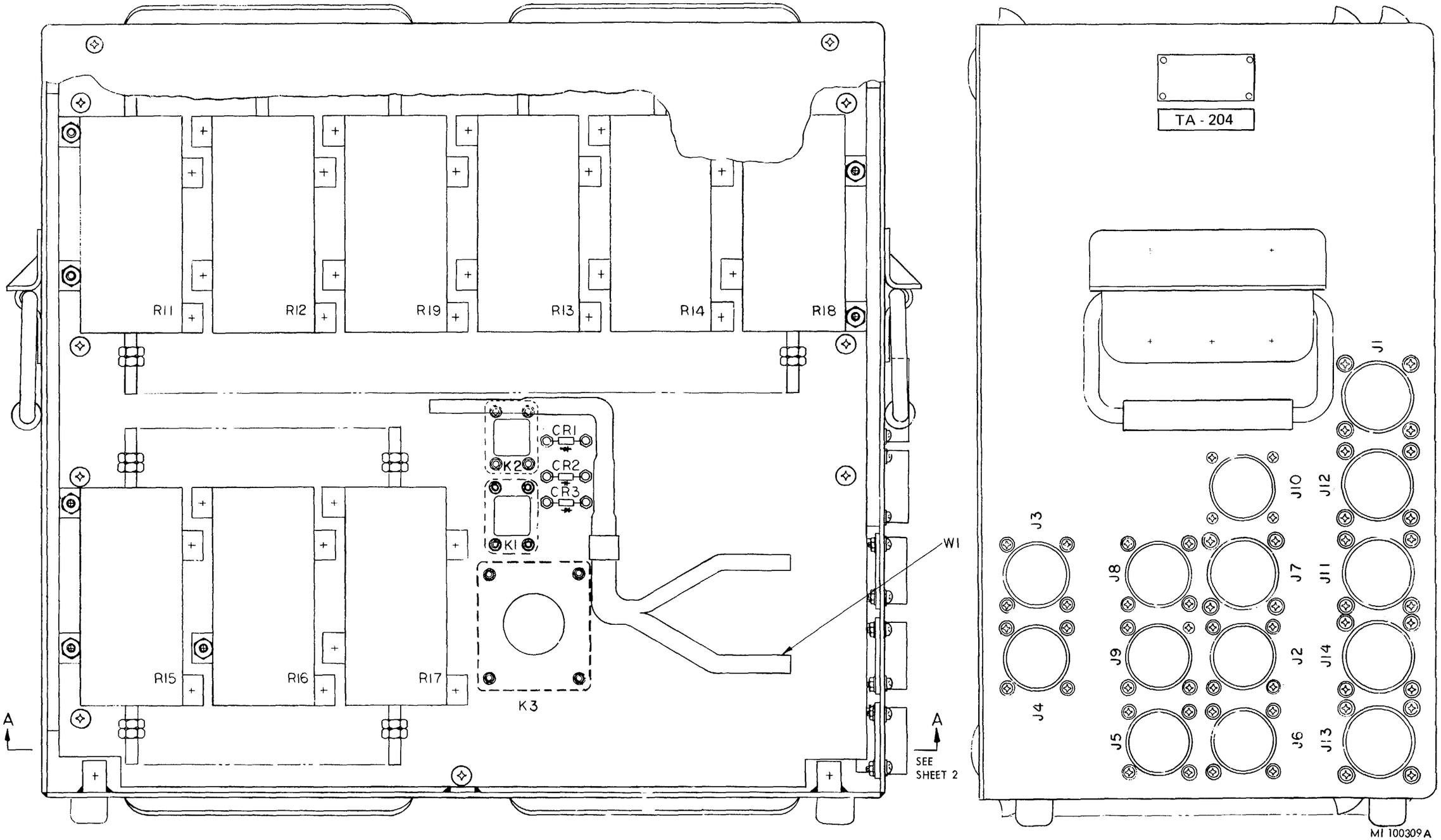


Figure 7-1. TA-204, parts location diagram (sheet 1 of 4).

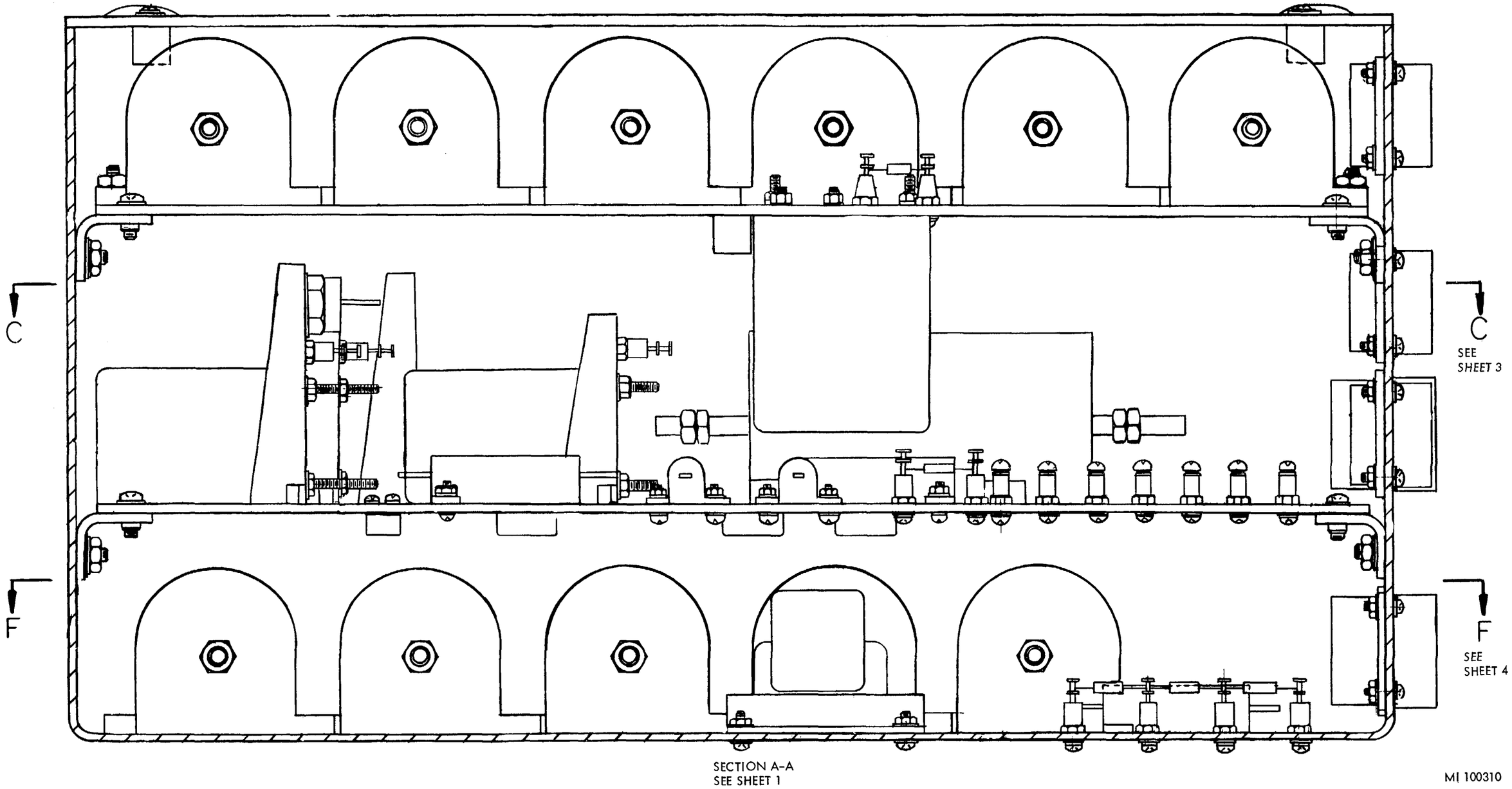


Figure 7-1. (sheet 2 of 4).

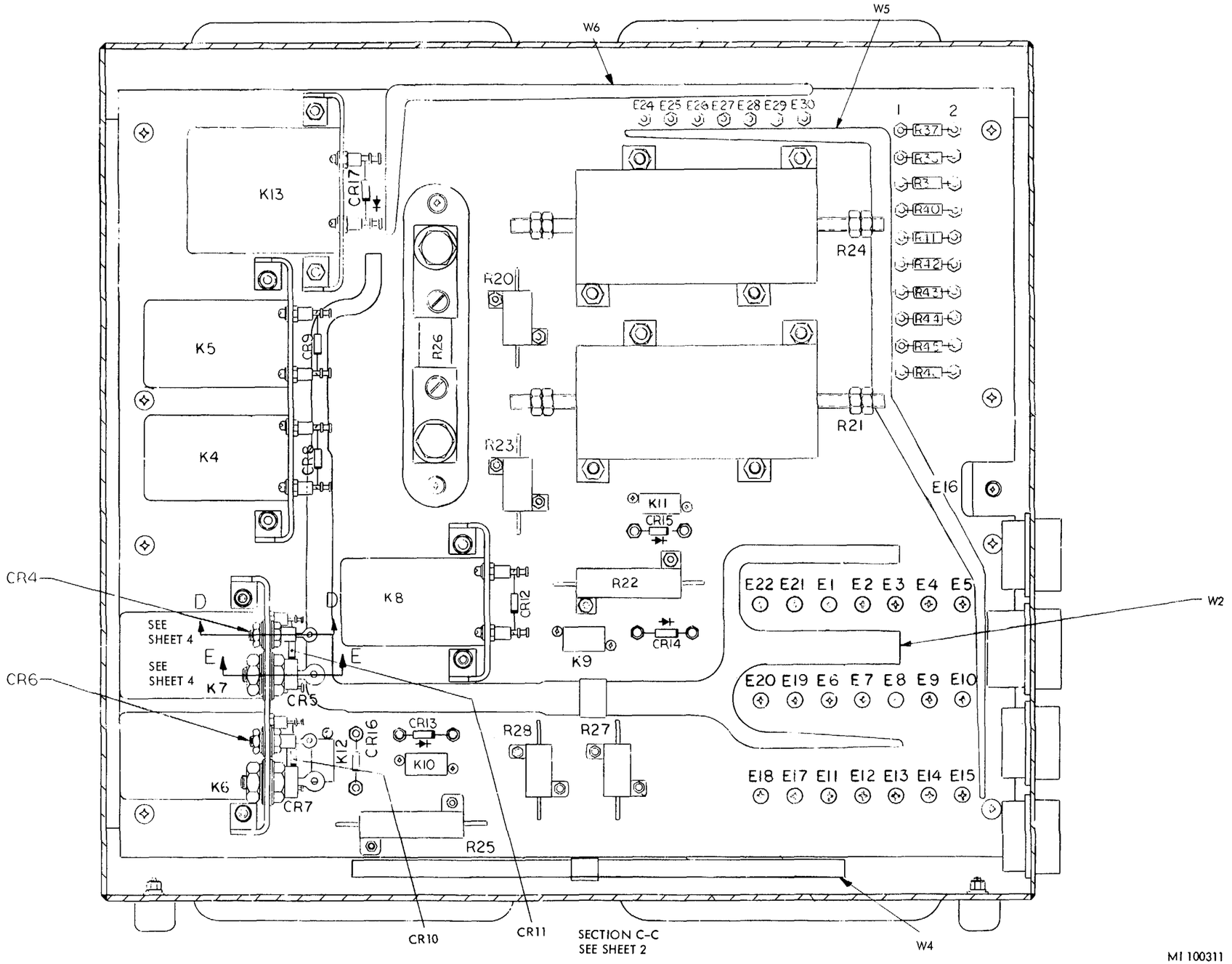
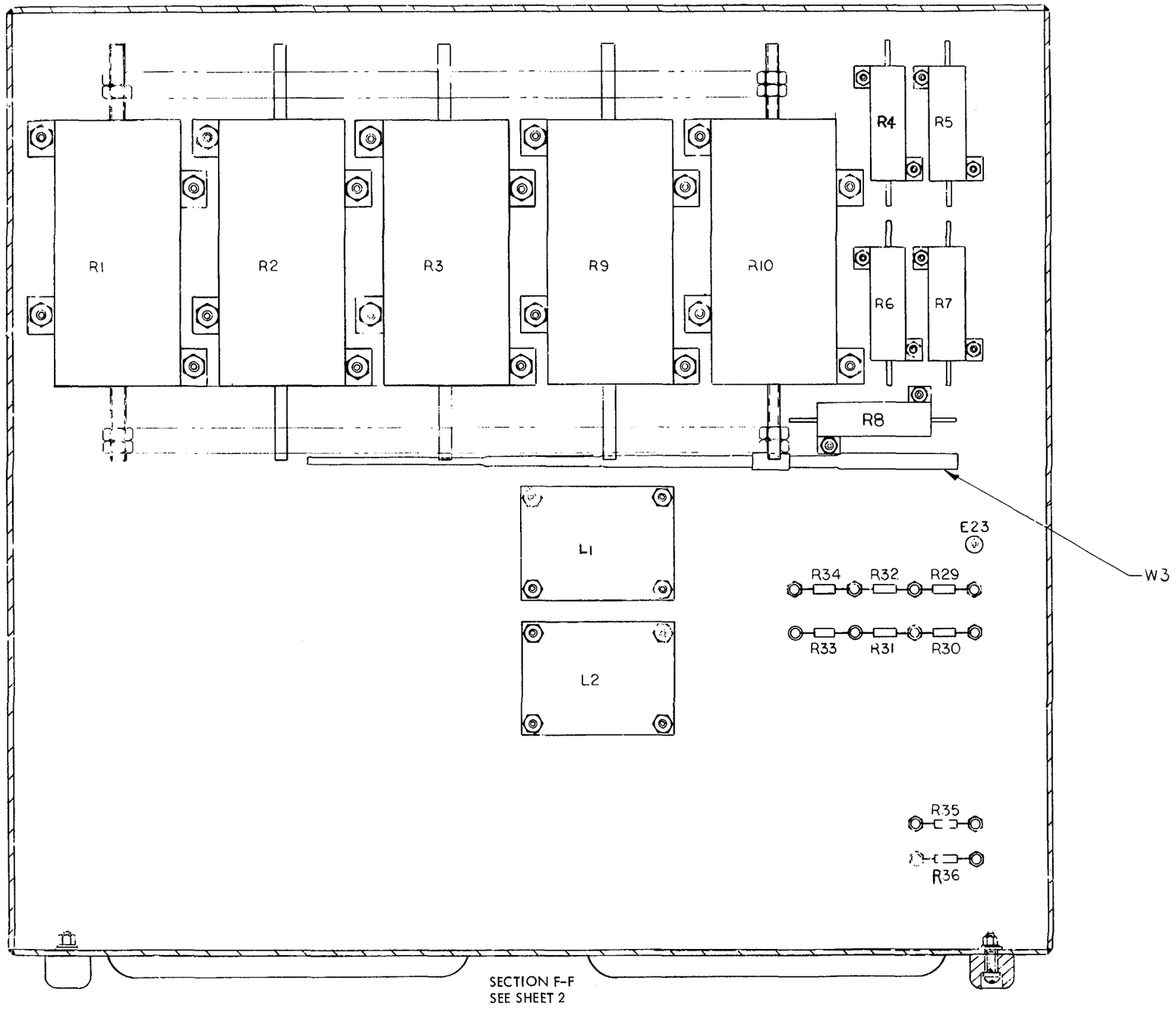
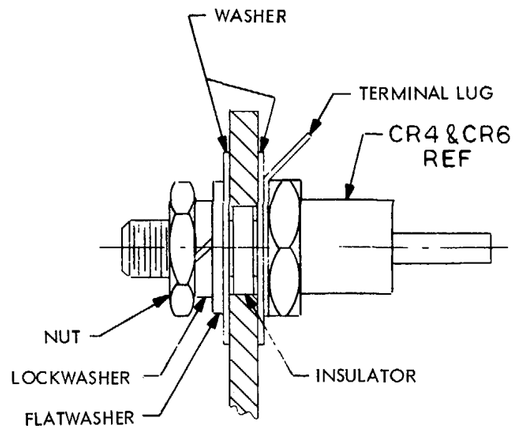


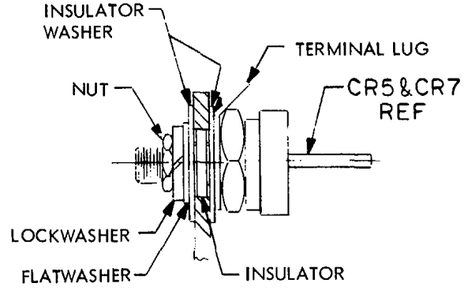
Figure 7-1. (sheet 3 of 4).





SECTION D-D
SCALE 4/1
2 PLACES

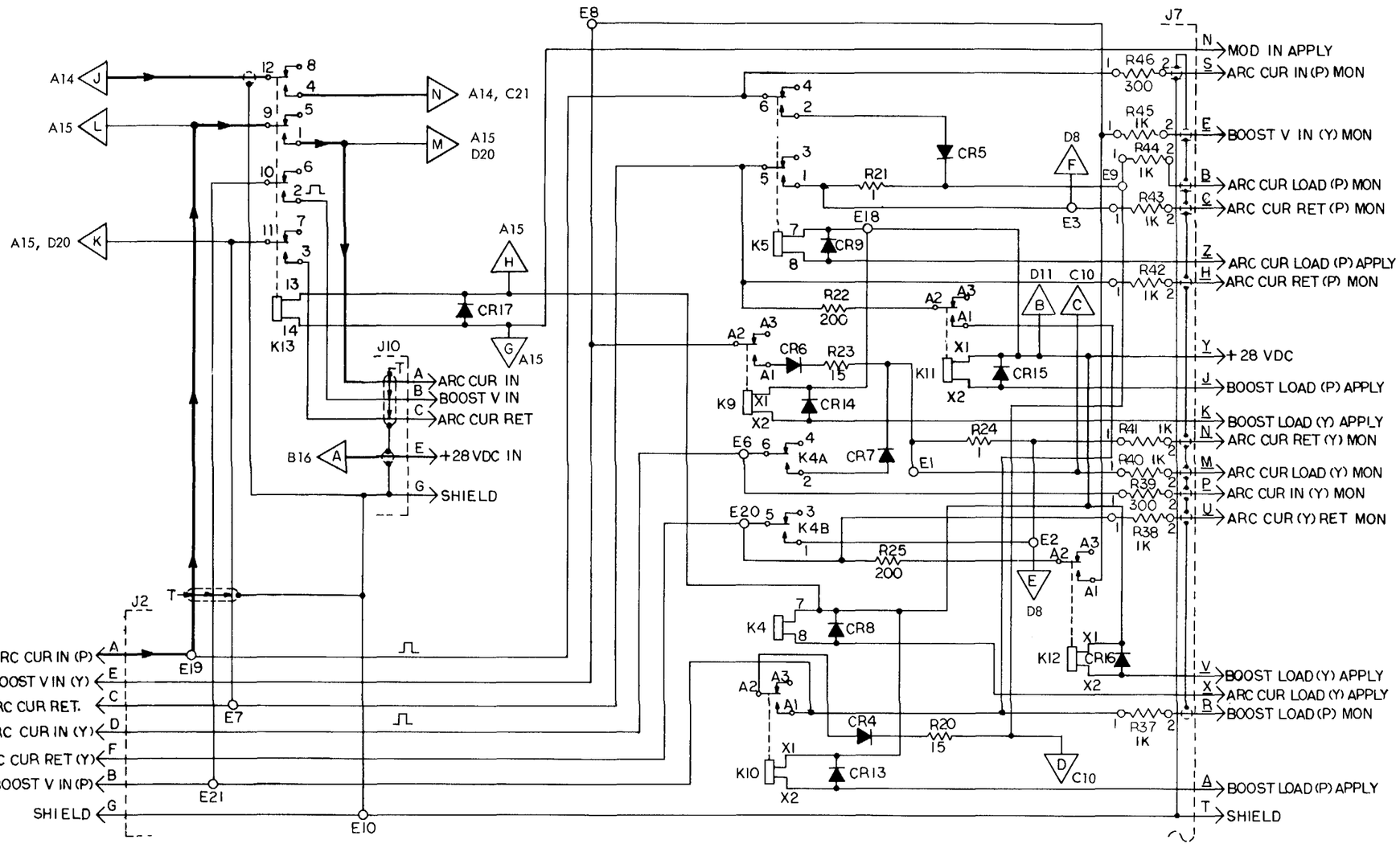
SEE SHEET 3



SECTION E-E
SCALE 2/1
2 PLACES

MI 100312

Figure 7-1. (sheet 4 of 4).



NOTES:
1. UNLESS OTHERWISE SPECIFIED RESISTANCE VALUES ARE IN OHMS INDUCTANCE VALUES ARE IN MILLIHENRIES.
2. LETTERS UNDERLINED ARE LOWER CASE.

MI100313 A

Figure 7-2. TA-204, schematic diagram (sheet 1 of 4).

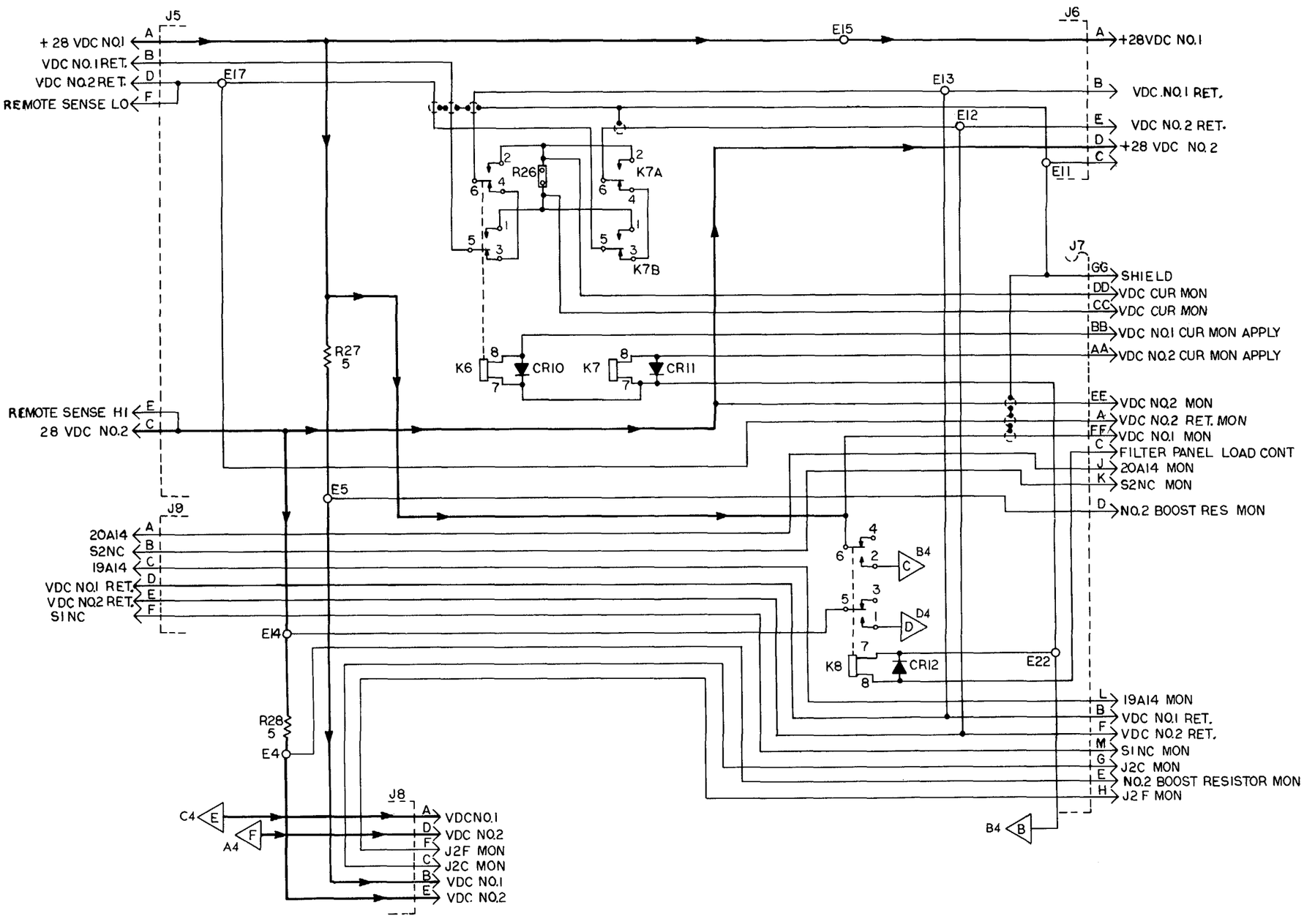


Figure 7-2. (sheet 2 of 4).

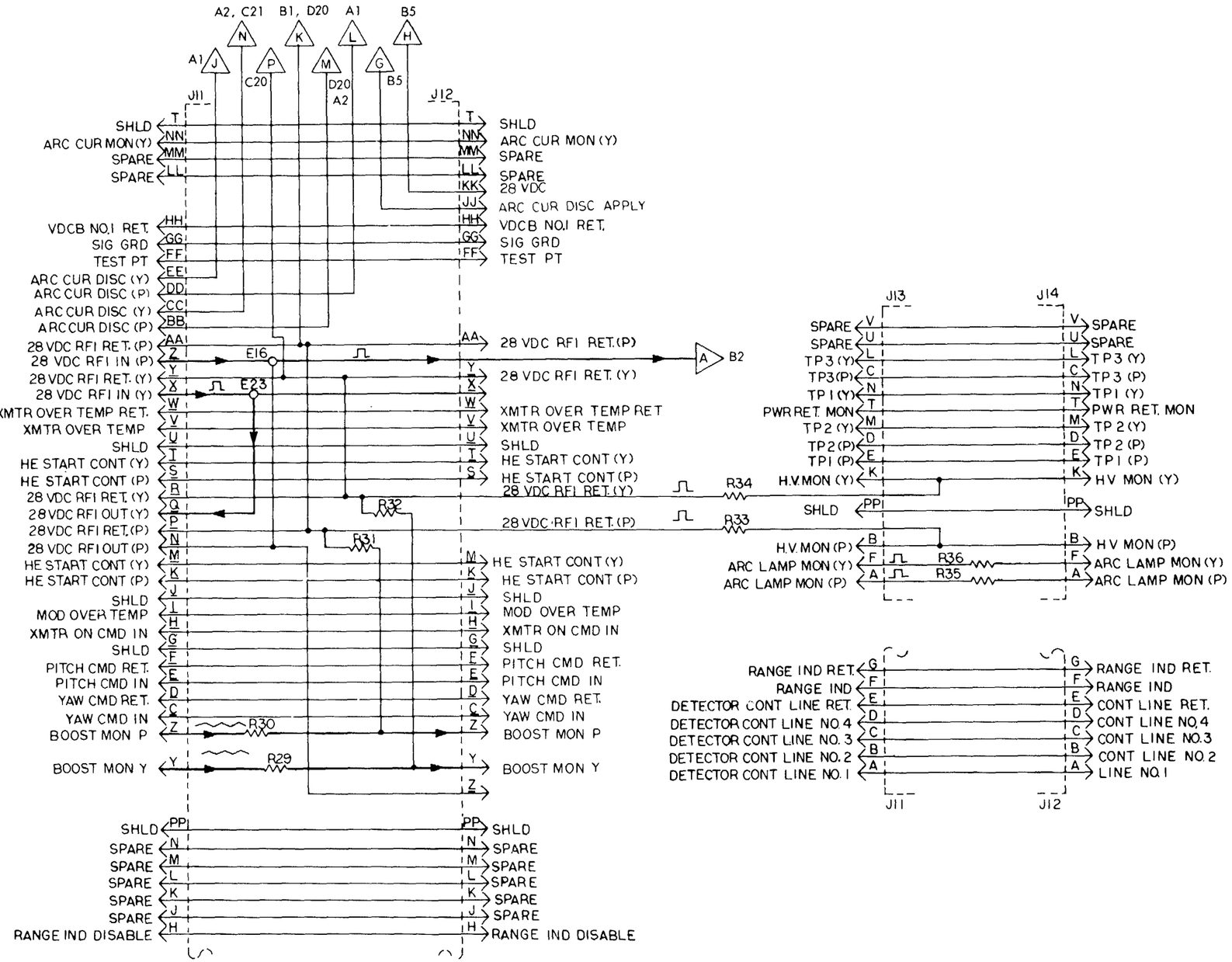
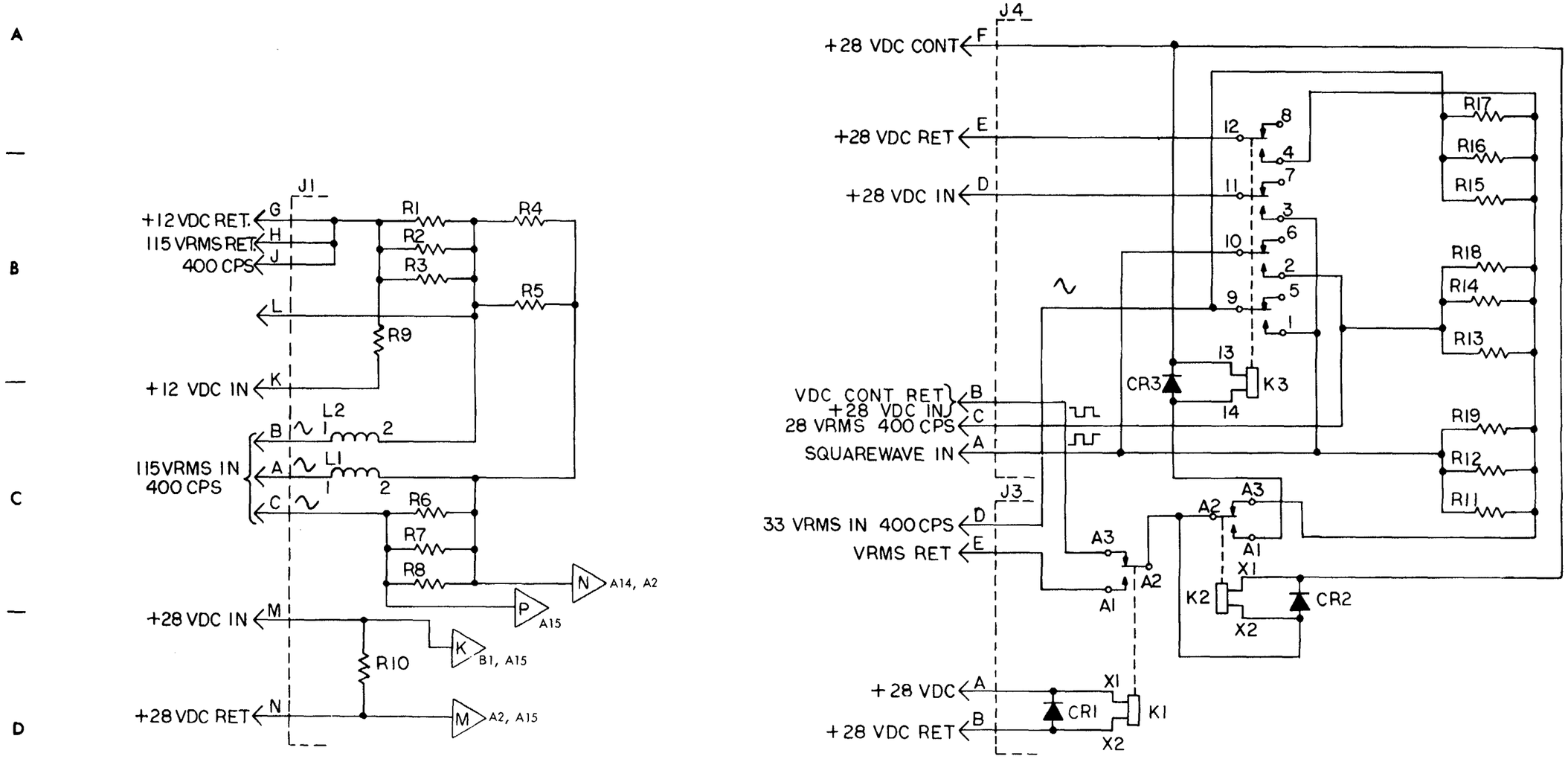


Figure 7-2. (sheet 3 of 4).

19 | 20 | 21 | 22 | 23 | 24



MI 100316A

Figure 7-2. (sheet 4 of 4).

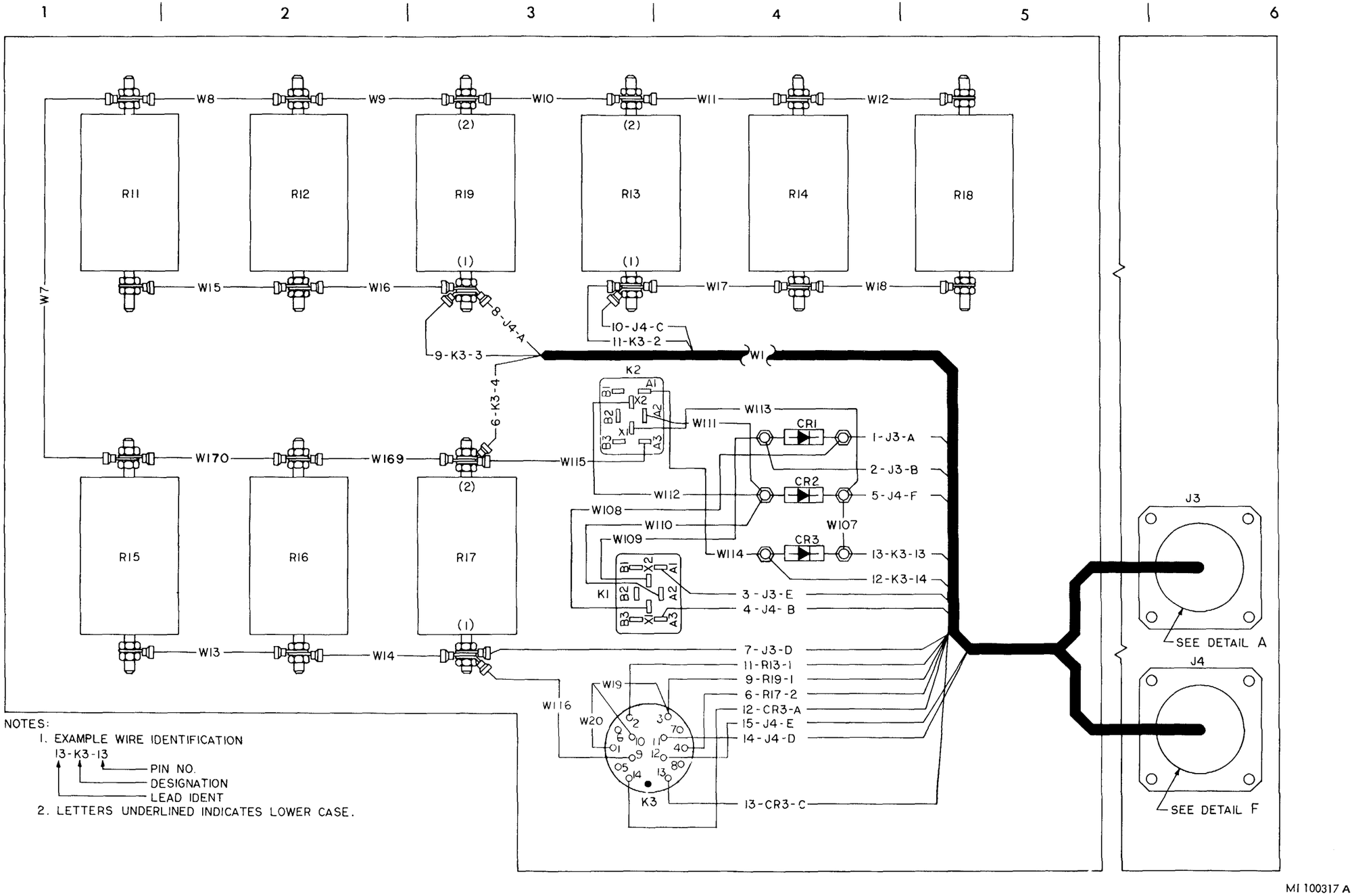


Figure 7-3. TA-204, wiring diagram (sheet 1 of 10).

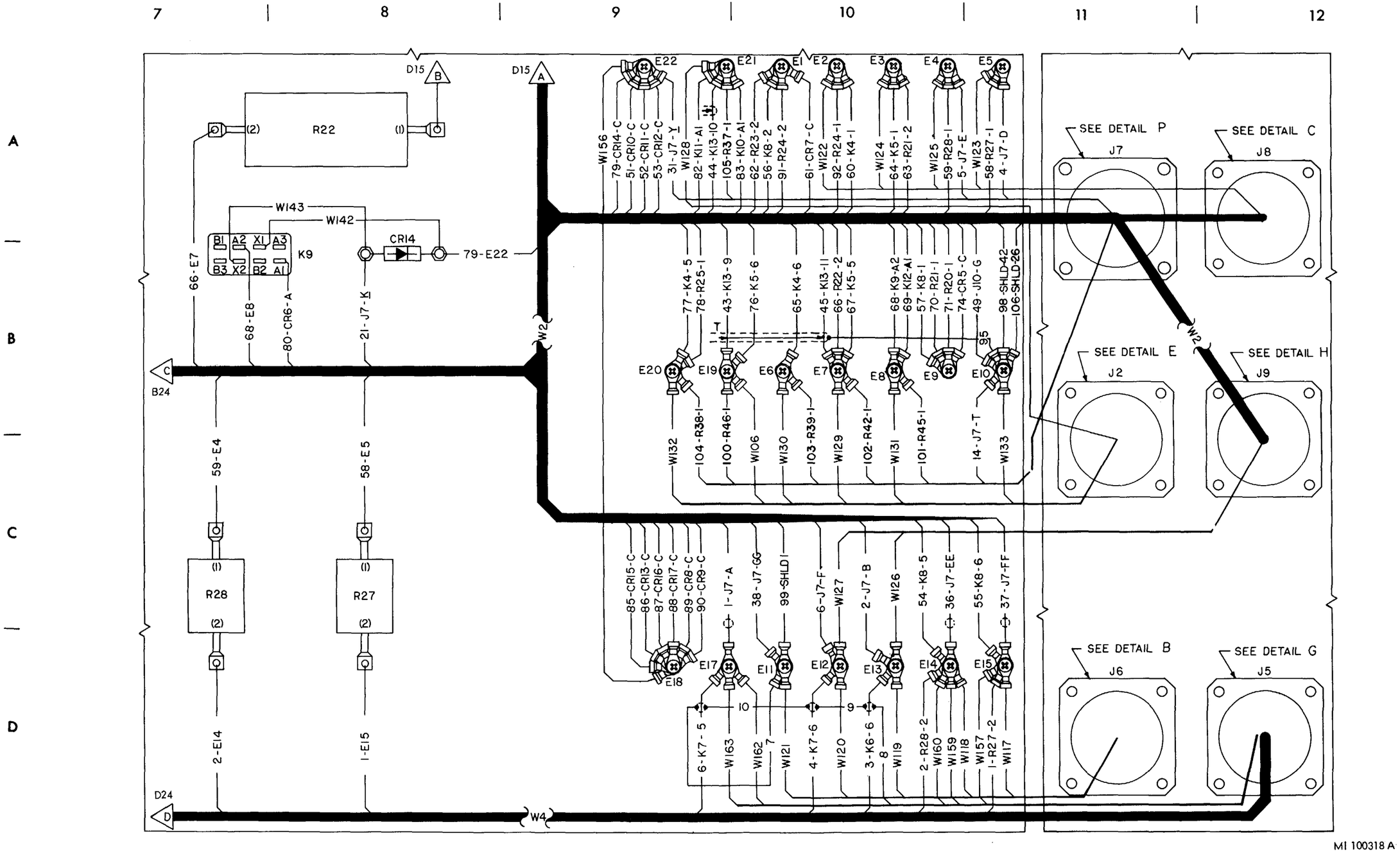


Figure 7-3. (sheet 2 of 10).

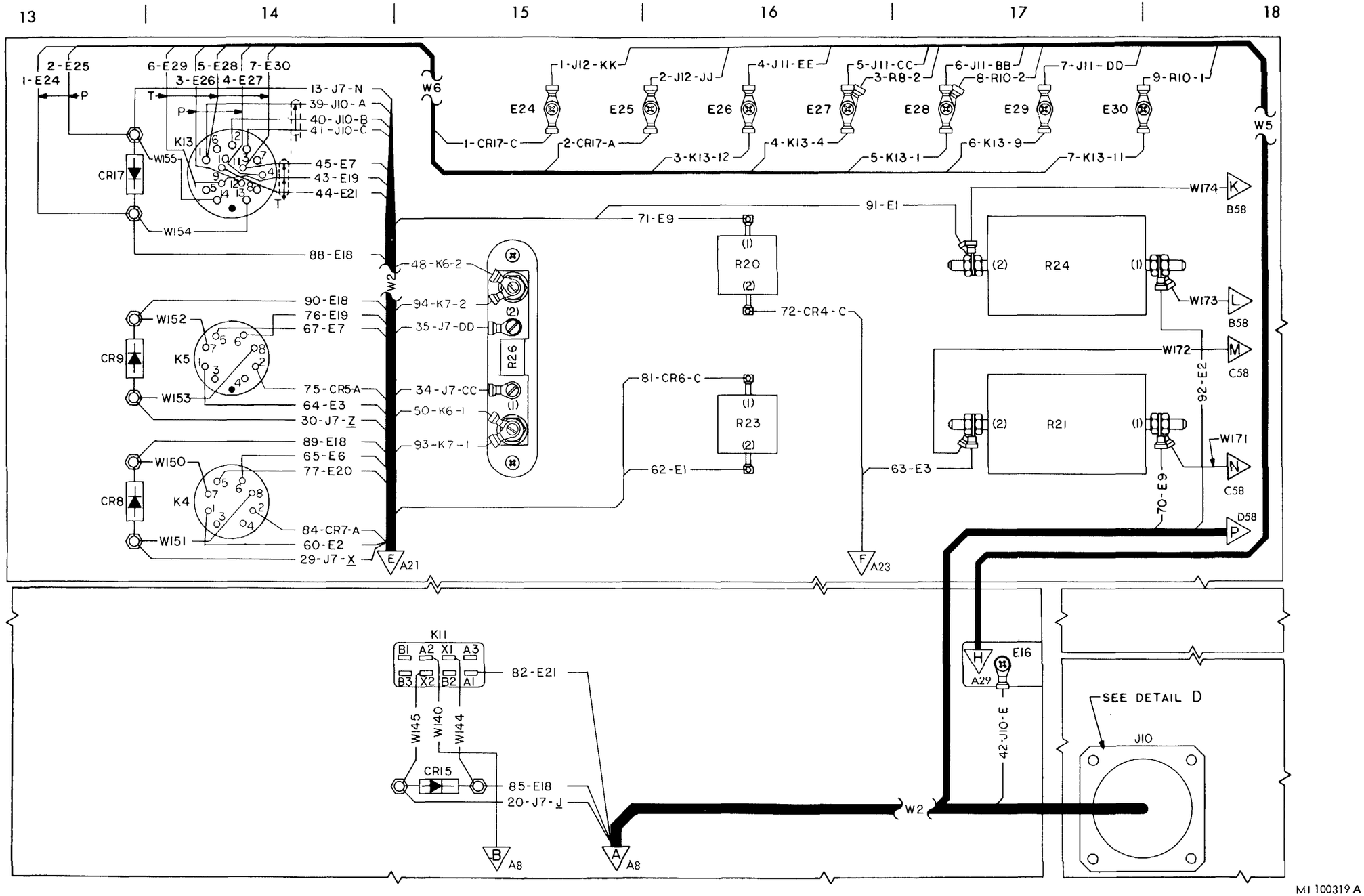
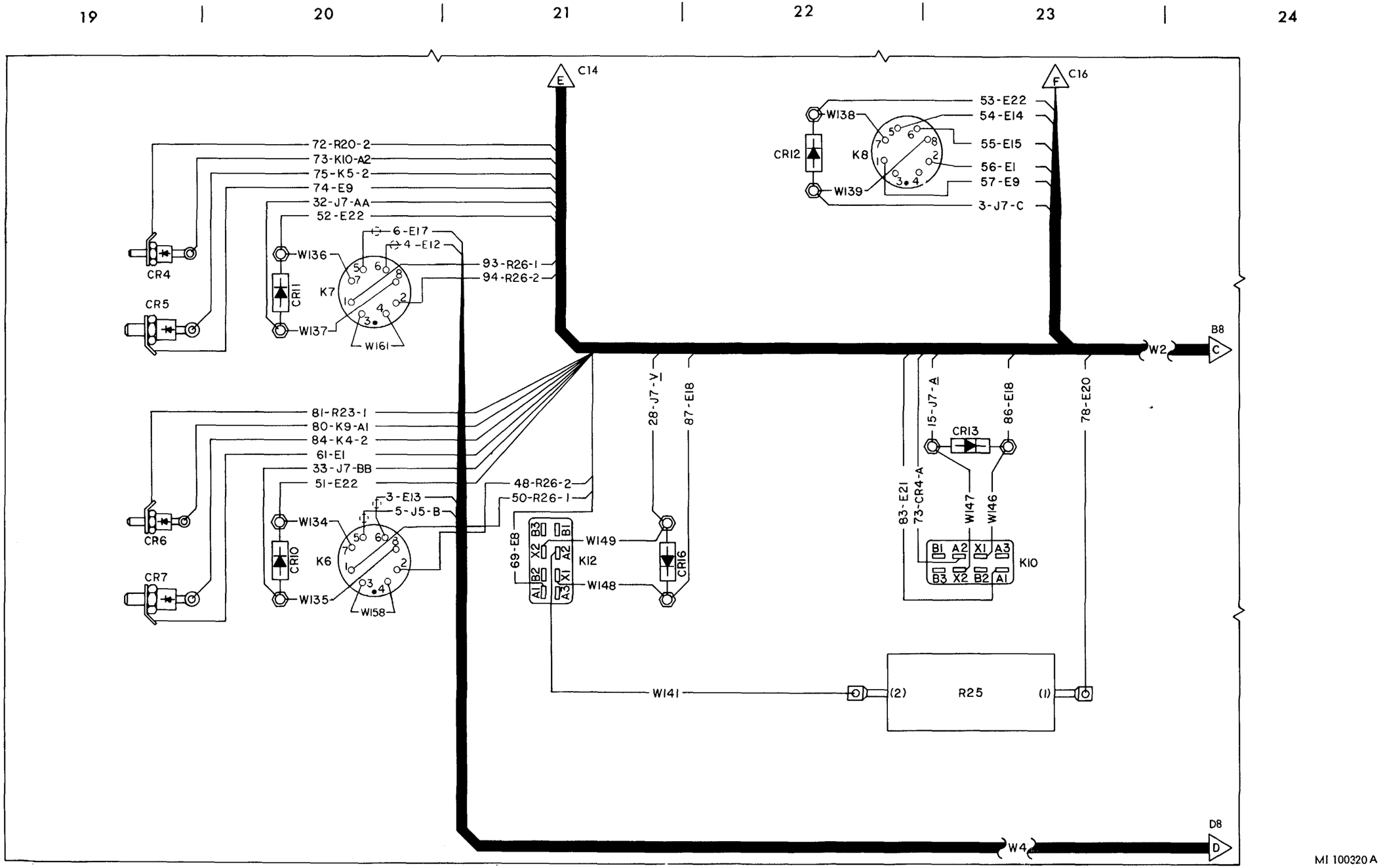


Figure 7-3. (sheet 3 of 10).



MI 100320 A

Figure 7-3. (sheet 4 of 10).

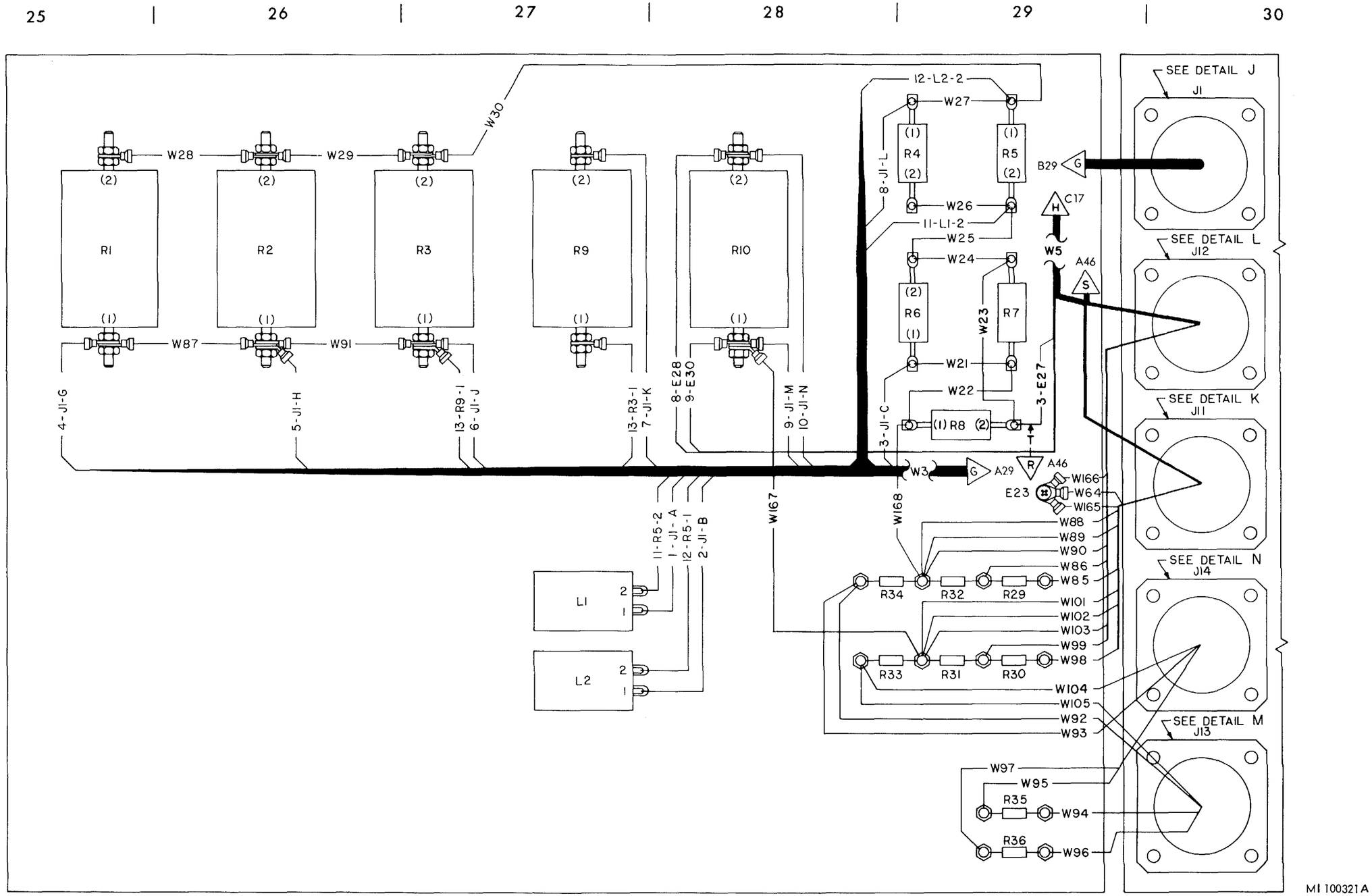
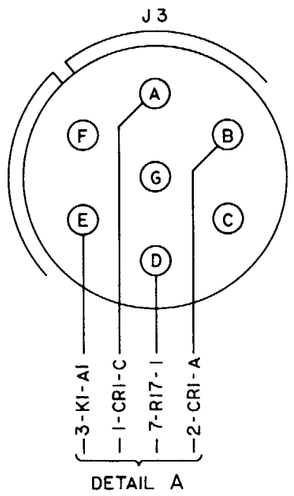
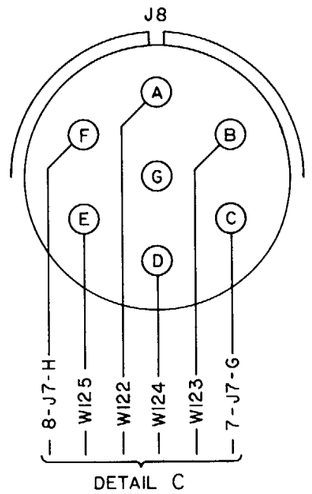
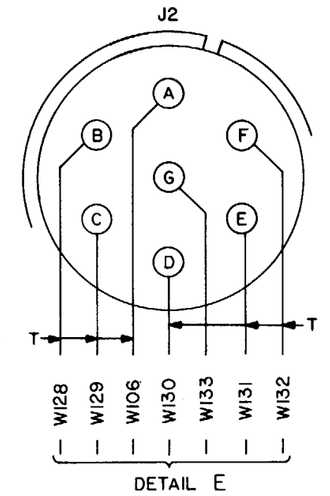
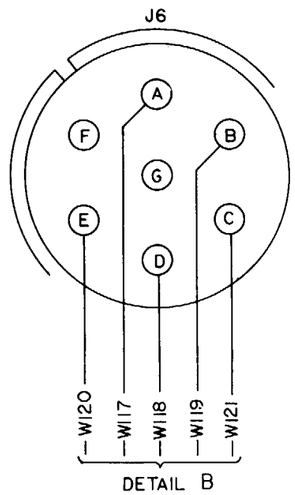


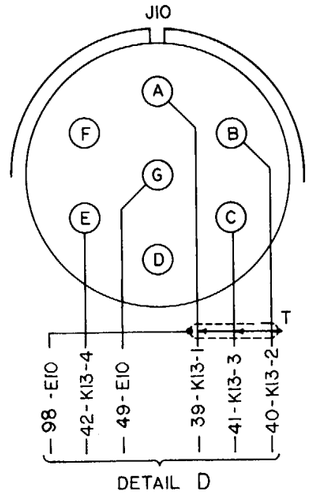
Figure 7-3. (sheet 5 of 10).

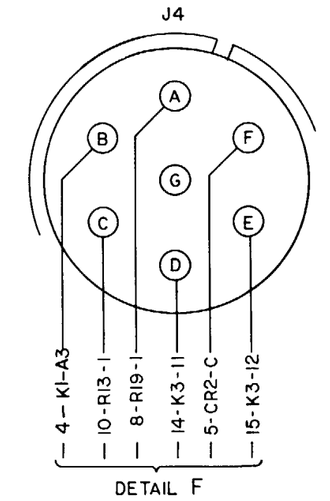












MI 100322

Figure 7-3. (sheet 6 of 10).

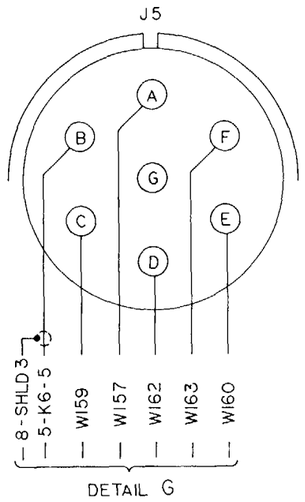
37 | 38 | 39 | 40 | 41 | 42

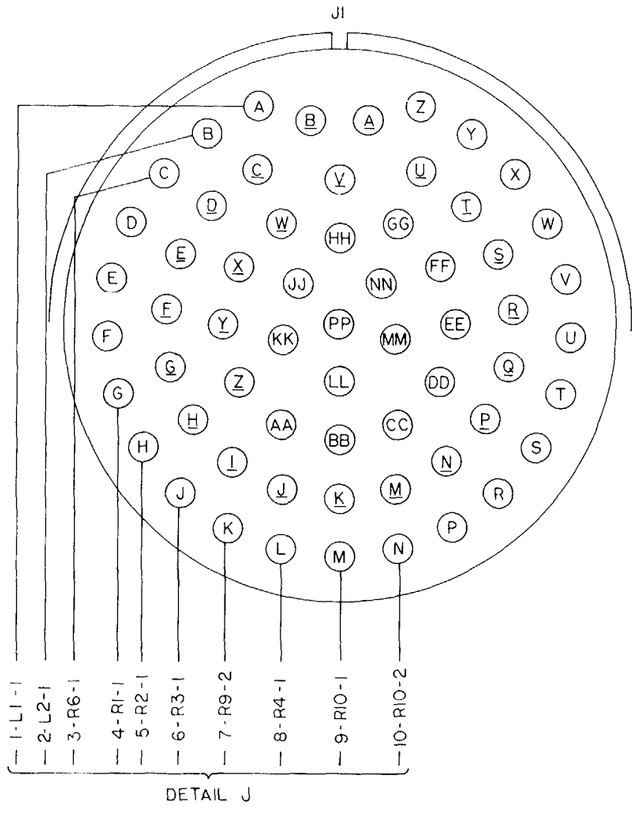
A

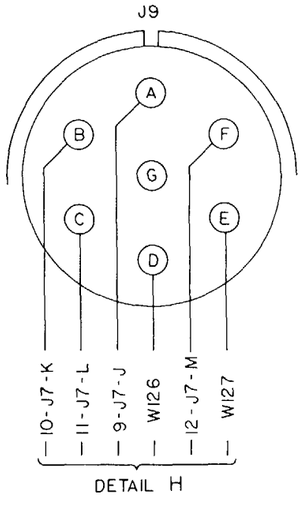
B

C

D







MI 100323

Figure 7-3. (sheet 7 of 10).

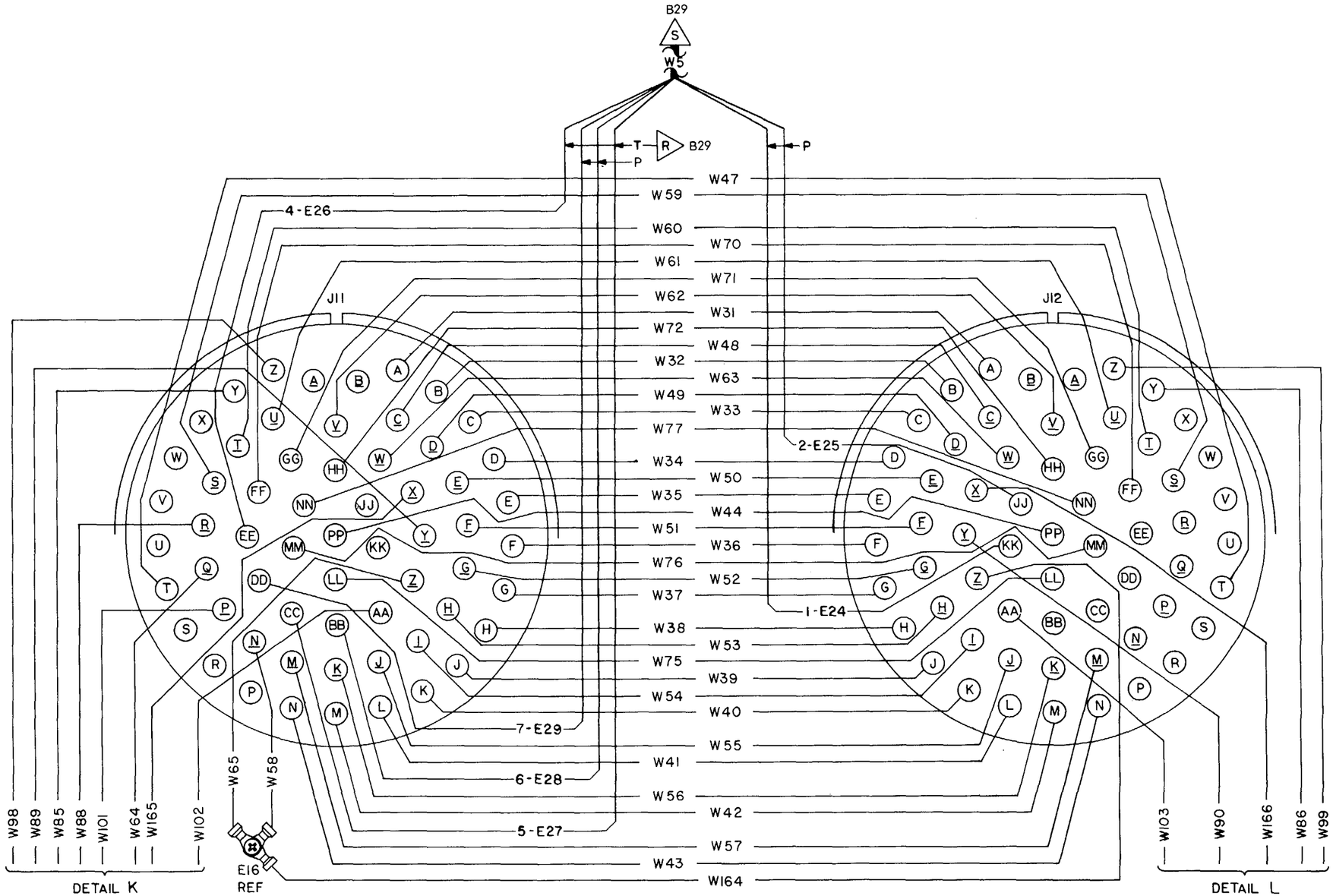


Figure 7-3. (sheet 8 of 10).

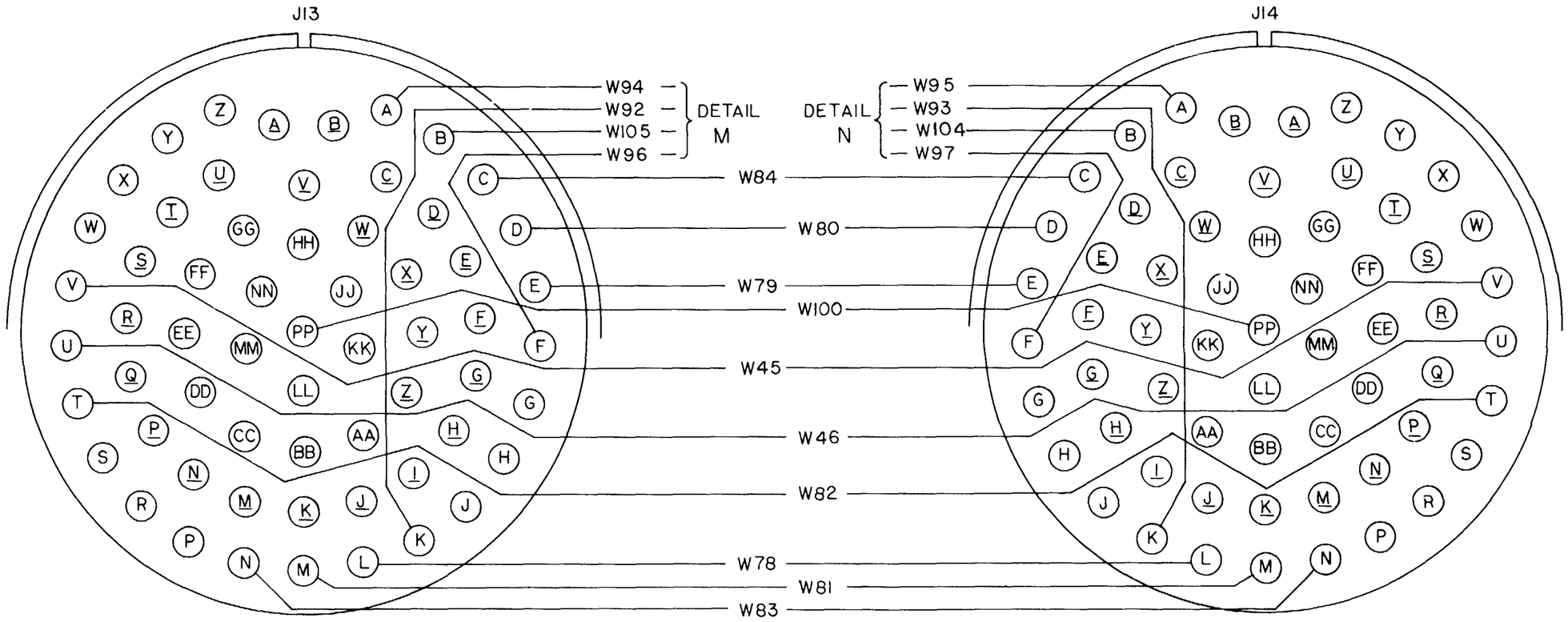
49 | 50 | 51 | 52 | 53 | 54

A

B

C

D



MI 100325

Figure 7-3. (sheet 9 of 10).

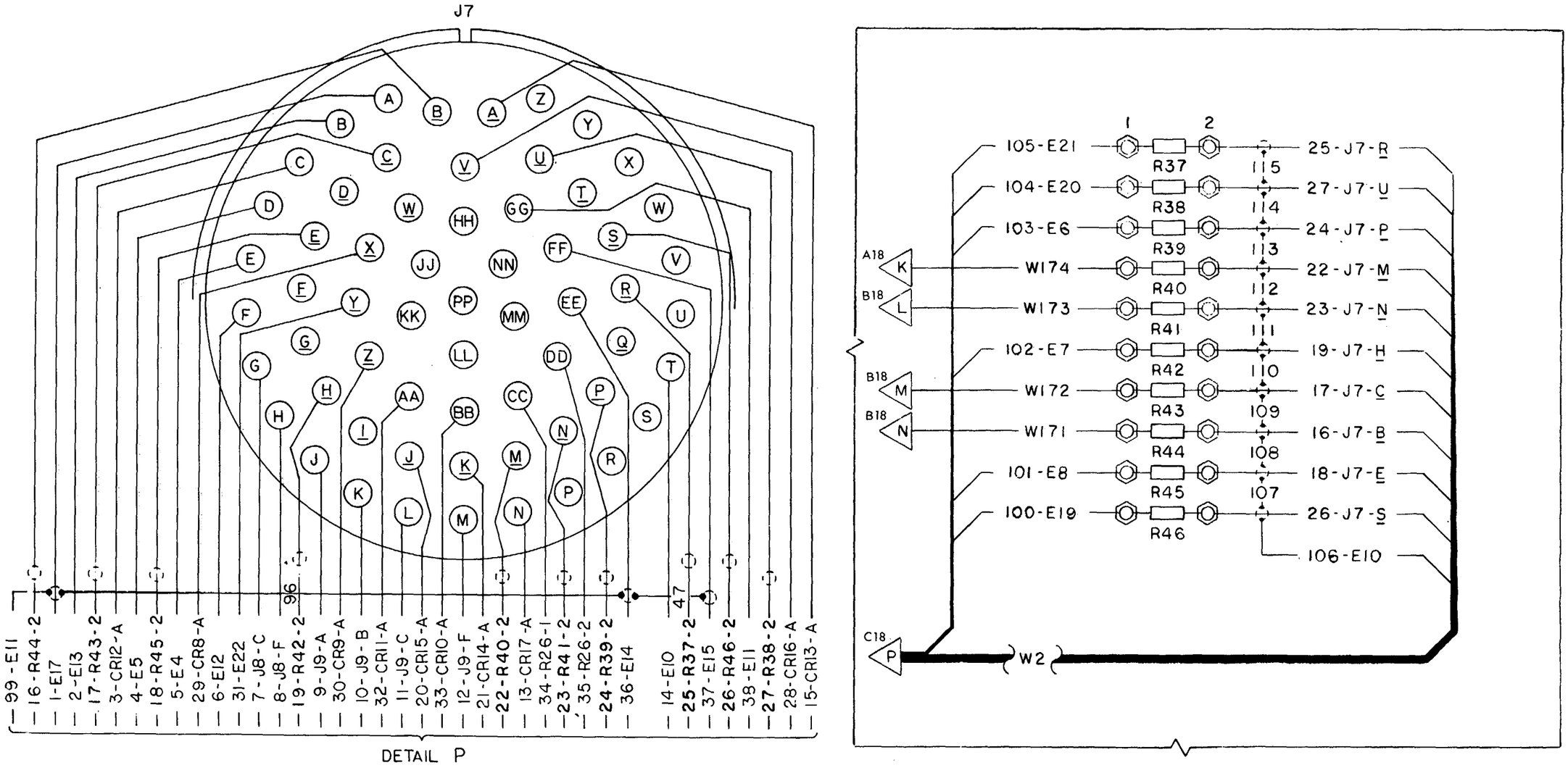
55 | 56 | 57 | 58 | 59 | 60

A

B

C

D



MI 100326A

Figure 7-3. (sheet 10 of 10).

Section II. REPAIR PROCEDURES

7-4. General

This section provides repair information for the UUT within the scope of DS and GS maintenance personnel. Figures 7-4 through 7-8 illustrate the disassembly and assembly of the UUT. Paragraphs 7-5 through 7-7 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-4935-557-34P contains a list of repair parts and special tools authorized for maintenance personnel.

7-5. Panel Removal and Installation Procedure

a. Removal.

NOTE

If panel (4, fig. 7-5) is to be removed, perform steps (1) through (3). If panel (1, fig. 7-8) is to be removed, perform steps (1) through (6)

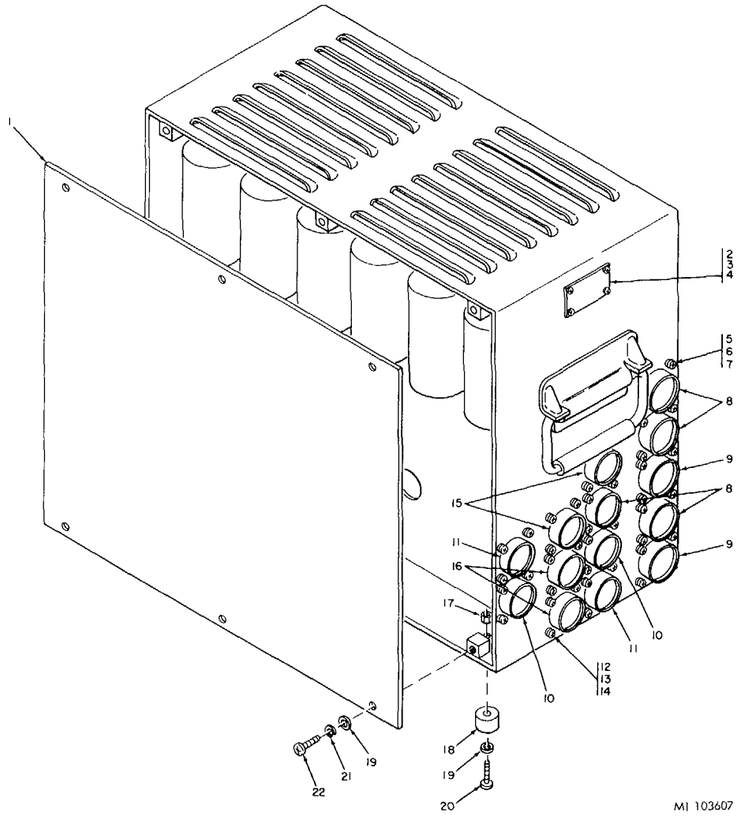
(1) Remove mounting hardware (19, 21, and 22, fig. 7-4) and cover (1).
(2) Remove mounting hardware (12 through 14), tag J3 (11) and J4 (10), and slide the connectors from the mounting holes.
(3) Remove mounting hardware (12 and 15, fig. 7-5) and panel (4).
(4) Remove mounting hardware (10 through 12) and brackets (5 and 14).
(5) Remove mounting hardware (12 through 14, fig. 7-4), tag J2 (10), J5 and J9 (16), J6 (11), J7 (8), and J8 and J10 (15), and slide the connectors from the mounting holes
(6) Remove mounting hardware (16 and 17, fig. 7-7) and panel (1, fig. 7-8).

b. Installation.

NOTE

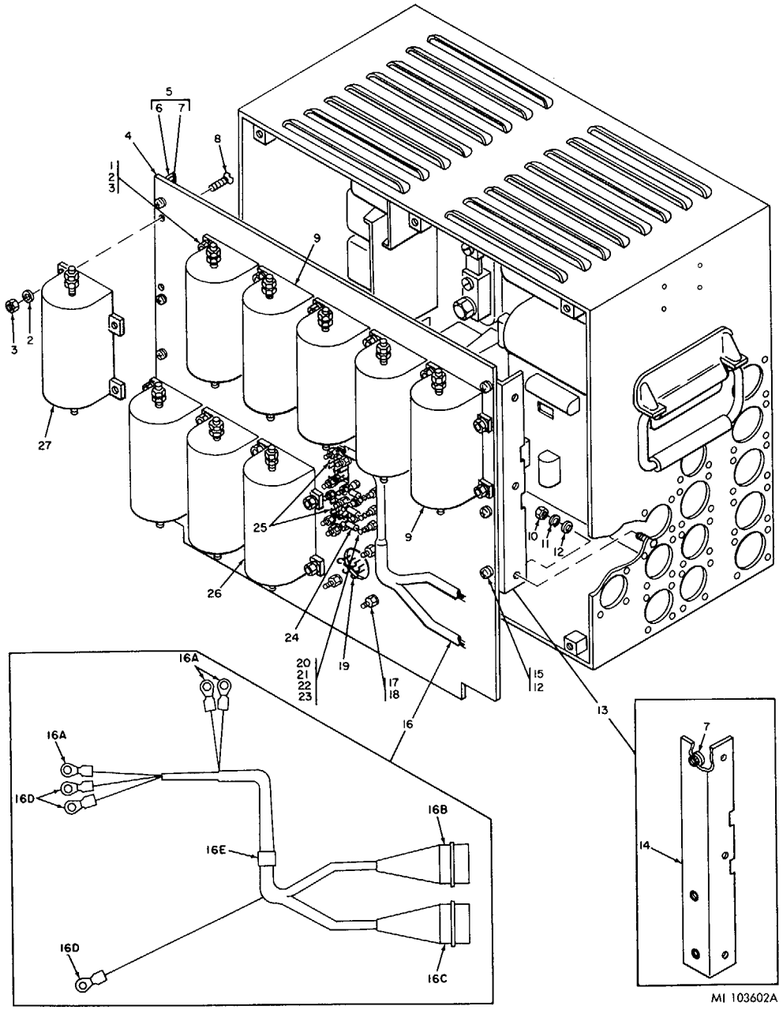
If panel (1, fig. 70) was removed, perform steps (1) through (6). If panel (4, fig. 7-5) was removed, perform steps (4) through (6).

(1) Install panel (1, fig. 7-8) with mounting hardware (16 and 17, fig. 7-7).
(2) Install J2 (10, fig. 7-4), J5 and J9 (16), J6 (11), J7 (8), and J8 and J10 (15) with mounting hardware (12 through 14) in the mounting holes.
(3) Install brackets (5 and 14, fig. 7-5) with mounting hardware (10 through 12).
(4) Install panel (4) with mounting hardware (12 and 15).
(5) Install J3 (11, fig. 7-4) and J4 (10) with mounting hardware (12 through 14) in the mounting holes.
(6) Install cover (1) with mounting hardware (19, 21, and 22).



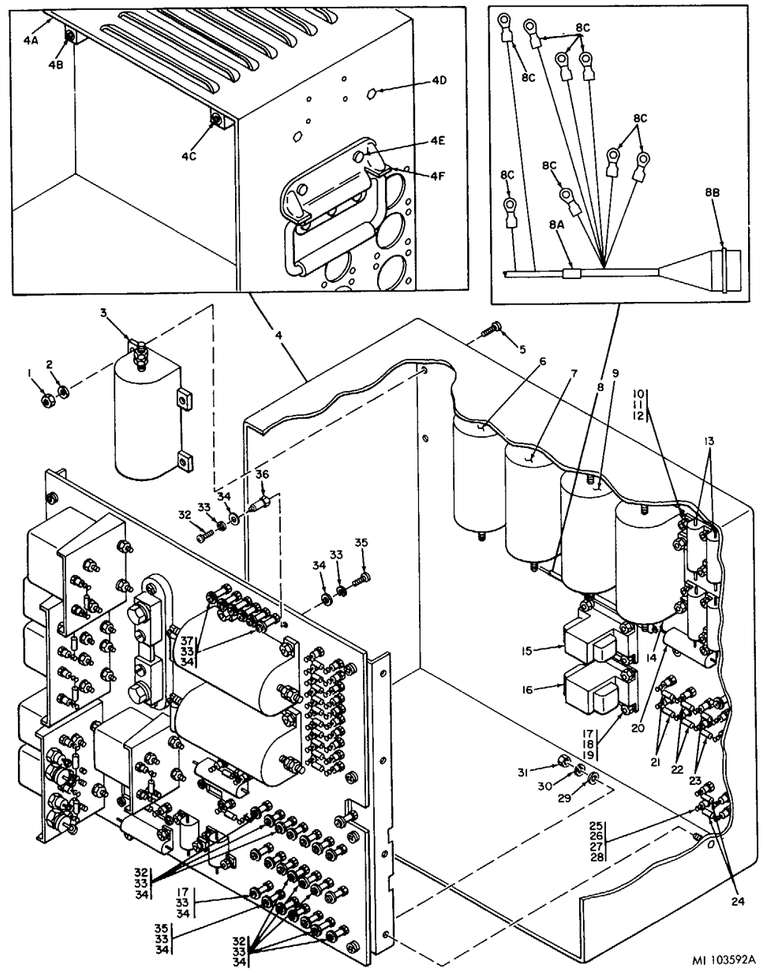
1 – Cover
2 – Screw
3 – Nut
4 – Plate (Depot repair)
5 – Screw
6 – Washer
7 – Nut
8 – J1, J12, J7, J14
9 – J11, J13
10 – J2, J4
11 – J6, J3
12 – Screw
13 – Washer
14 – Nut
15 – J8, J10
16 – J5, J9
17 – Nut
18 – Bumper
19 – Washer
20 – Screw
21 – Lockwasher
22 – Screw

Figure 7-4. Repair of TA-204 - view 1.



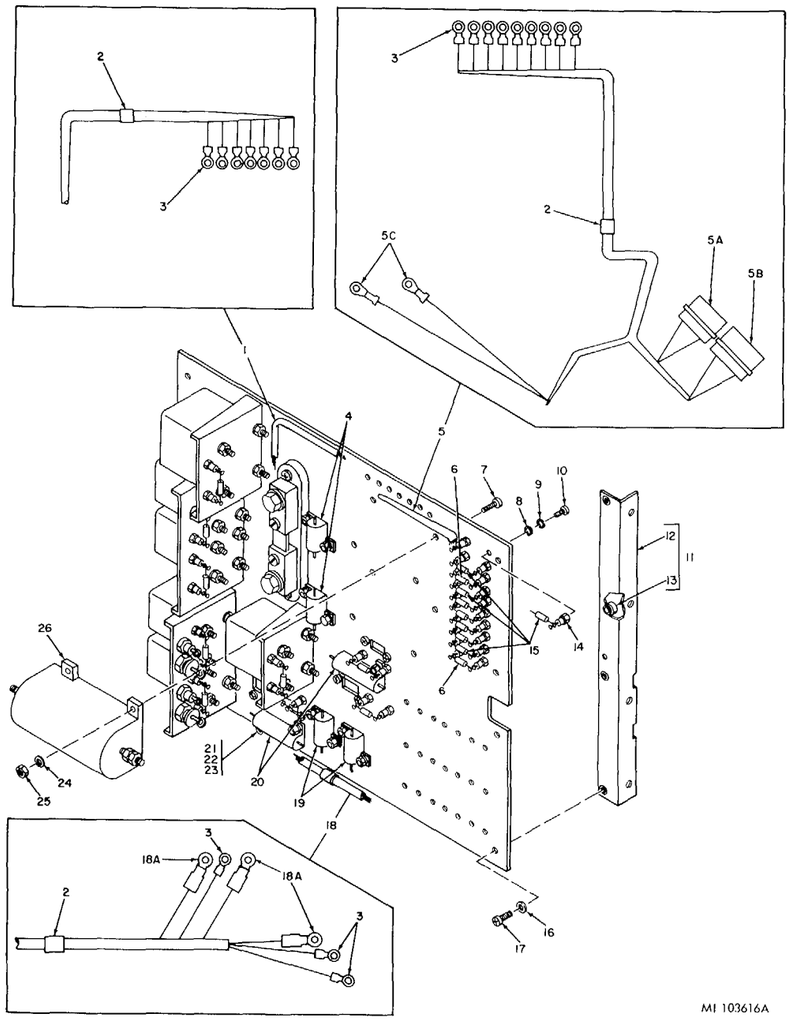
1 – Screw
2 – Washer
3 – Nut
4 – Panel
5 – Bracket assembly
6 – Bracket
7 – Nut
8 – Screw
9 – R18, R19
10 – Nut
11 – Lockwasher
12 – Washer
13 – Bracket assembly
14 – Bracket
15 – Screw
16 – W1 (Depot only)
16A – Terminal (Depot only)
16B – Connector (Depot only)
16C – Connector (Depot only)
16D – Terminal (Depot only)
16E – Strap (Depot only)
17 – Nut
18 – Washer
19 – K3
20 – Screw
21 – Lockwasher
22 – Washer
23 – Terminal
24 – CR1, CR2, CR3
25 – K1, K2
26 – R17
27 – R11, R12, R13, R14, R15, R16

Figure 7-5. Repair of TA-204 - view 2.



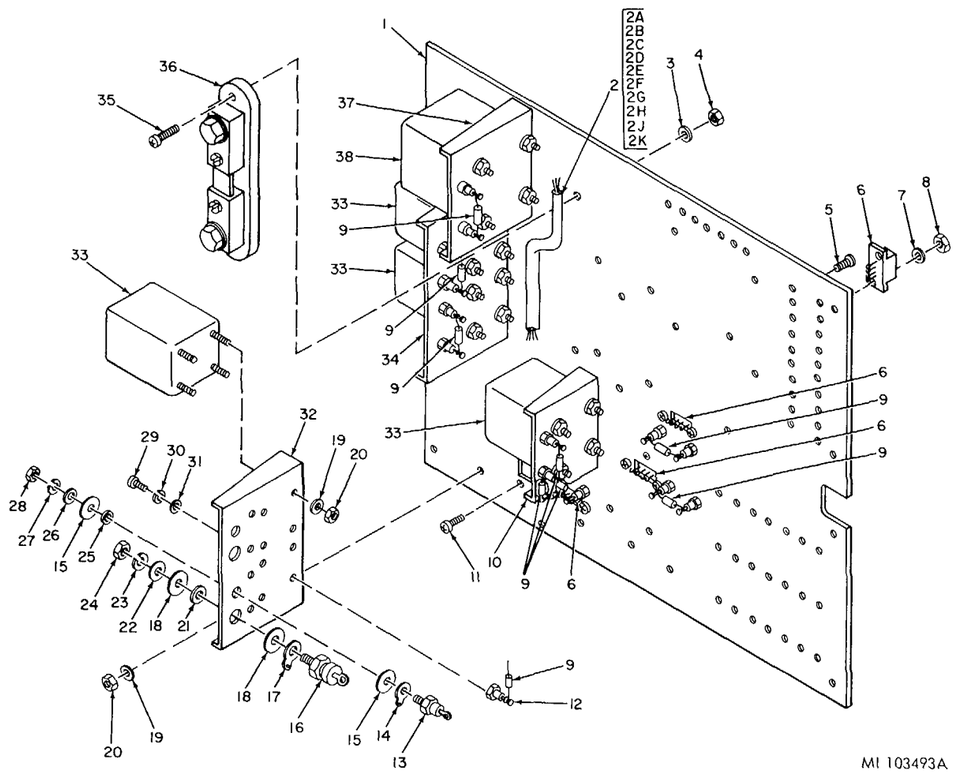
1 – Nut
2 – Washer
3 – R1
4 – Case (Depot repair)
4A – Case (Depot only)
4B – Insert (Depot only)
4C – Insert (Depot only)
4D – Stud (Depot only)
4E – Rivet (Depot only)
4F – Handle (Depot only)
5 – Screw
6 – R2
7 – R3
8 – W3 (Depot only)
8A – Strap
8B – Connector
8C – Terminal lug
9 – R9
10 – Screw
11 – Washer
12 – Nut
13 – R4, R5
14 – R10
15 – L1
16 – L2
17 – Screw
18 – Washer
19 – Nut
20 – R6, R7, R8
21 – R33, R34
22 – R31, R32
23 – R29, R30
24 – R35, R36
25 – Terminal
26 – Lockwasher
27 – Washer
28 – Screw
29 – Washer
30 – Lockwasher
31 – Nut
32 – Screw
33 – Lockwasher
34 – Washer
35 – Screw
36 – Insulator
37 – Screw

Figure 7-6. Repair of TA-204 - view 3



1 – W6 (Depot only)
2 – Strap
3 – Terminal
4 – R20, R23
5 – W5 (Depot only)
5A – Connector (Depot only)
5B – Connector (Depot only)
5C – Terminal (Depot only)
6 – R39, R46
7 – Screw
8 – Washer
9 – Washer
10 – Screw
11 – Bracket assembly
12 – Bracket
13 – Nut (Depot only)
14 – Terminal
15 – R37, R38, R40 through R45
16 – Washer
17 – Screw
18 – W4 (Depot only)
18A – Terminal (Depot only)
19 – R27, R28
20 – R22, R25
21 – Screw
22 – Washer
23 – Nut
24 – Washer
25 – Nut
26 – R21, R24

Figure 7-7. Repair of TA-204 - view 4.



1 – Panel
2 – W2 (Depot only)
2A – Terminal (Depot only)
2B – Terminal (Depot only)
2C – Terminal (Depot only)
2D – Terminal (Depot only)
2E – Connector (Depot only)
2F – Ferrule (Depot only)
2G – Terminal (Depot only)
2H – Ferrule (Depot only)
2J – Connector (Depot only)
2K – Strap (Depot only)
3 – Washer
4 – Nut
5 – Screw
6 – K9 through K12
7 – Washer
8 – Nut
9 – CR8 through CR17
10 – Bracket
11 – Screw
12 – Terminal
13 – CR4, CR6
14 – Terminal
15 – Insulator
16 – CR5, CR7
17 – Terminal
18 – Insulator
19 – Washer
20 – Nut
21 – Washer
22 – Washer
23 – Lockwasher
24 – Nut
25 – Washer
26 – Washer
27 – Lockwasher
28 – Nut
29 – Screw
30 – Lockwasher
31 – Washer
32 – Bracket
33 – K4 through K8
34 – Bracket
35 – Screw
36 – R26
37 – Bracket
38 – K3, K13

Figure 7-8. Repair of TA-204 - view 5.

7-6. Component Removal and Installation Procedure

a. Removal

(1) Remove mounting hardware (19, 21, and 22, fig. 7-4) and cover (1).
(2) If necessary, remove the panels (par. 7-5a (2) through (6)) to gain access to the component (figs. 7-4 through 7-8).
(3) Disconnect and tag the leads to the component

b. Installation

(1) Connect the leads to the component (figs. 7-4 through 7-8), and remove the tags.
(2) If necessary, install the panels (par. 7-5b (1) through (5)).
(3) Install cover (1, fig. 7-4) with mounting hardware (19, 21, and 22).

7-7. Diode (CR4 through CR7) Removal and Installation Procedure

a. Removal

(1) Remove mounting hardware (19, 21, and 22, fig. 7-4) and cover (1).
(2) Remove mounting hardware (12 through 14), tag J3 (11) and J4 (10), and slide the connectors from the mounting holes.
(3) Remove mounting hardware (12 and 15, fig. 7-5) and panel (4).
(4) Disconnect and tag the leads to CR4 (13, fig. 7-8), CR5 (16), CR6 (13), or CR7 (16).
(5) Remove mounting hardware (18 and 21 through 24), terminal (17) and CR5 or CR7, or mounting hardware (15 and 25 through 28), terminal (14) and CR4 or CR6.

b. Installation.

(1) Apply sealing compound, MIL-S-22473, grade H, to insulators (15 or 18, fig. 7-8).
(2) Install CR4 or CR6 (13) and terminal (14) with mounting hardware (15 and 25 through 28), or CR5 or CR7 (16) and terminal (17) with mounting hardware (18 and 21 through 24).
(3) Connect the leads to the diode.
(4) Install panel (4, fig. 7-5) with mounting hardware (12 and 15).
(5) Install J3 (11, fig. 7-4) and J4 (10) with mounting hardware (12 through 14 in the mounting holes.
(6) Install cover (1) with mounting hardware (19, 21, and 22).

7-8. Painting

CAUTION
Mask all connectors, lettering, and mounting surfaces before painting the adjoining surfaces.

Inspect and paint the exterior of the UUT.

a. Inspect the exterior surface of the UUT for scratched, chipped, or peeled paint.
b. Smooth the damaged area with sandpaper, wet/dry (120-400 grit).
c. Spot-paint damaged areas with a brush. Use paint, Fed Spec TT-E-529, class A, color no. 24410, for the exterior of the UUT.

7-9. Packaging

a. When the weapon system load box is to be shipped to the depot for further testing and repair, package the assembly in accordance with TM 38-230, method II D, insuring that adequate cushioning material and bracing are used to prevent damage to the assembly during shipment.
b. Packages should be marked in accordance wit local directives.

CHAPTER 8

SIGNAL CONDITIONER(TA-206)

Section I. PROGRAMMED TESTS

8-1. General

This chapter provides the information necessary to isolate and repair a fault in the signal conditioner (UUT) to a faulty subassembly or chassis mounted component. Figures 8-3 through 8-5 are provided as; an aid in troubleshooting and testing the UUT.

8-2. Equipment Required for Programmed Tests

The following equipment is required to test the UUT:

a.	Program memory card	See TM 9-1425-550-10
b.	Patchboard	PB-202
c.	Oscilloscope	
d.	Multimeter	
e.	Extender board	TA-107
f.	Passive probe	TA-108
g.	Digital multimeter probe	TA-109
h.	Test probe	TA-208
i.	Lead	TA-232
j.	Plug	TA-234
k.	Plug	TA-235
l.	Plug	TA-236
m.	Plug	TA-238
n.	Plug	TA-239
o.	Plug	TA-240
p.	Plug	TA-242
q.	Plug	TA-244
r.	Cable	CA-J27
s.	Cable	CA-135 (2 required)
t.	Cable	CA-245

8-3. Test Instructions

WARNING

Voltage is present in the UUT. Use extreme care when performing the manual procedures.

a. When a SSVD display message calls for probing a point in the UUT, connect the probe to the corresponding point on TA-107 as shown in figure 1-1. When an SSVD message specifies a connection to GRD, the connection will be made to SIGNAL GROUND E7 on the auxiliary adapter panel. When probing a point on TA-107, use TA-208.

b. Ensure that the test probes remain connected to the applicable points during the test program.

c. The UUT is on-bench tested.

8-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT is installed in PLMA 1A15.

b. Set monitor panel 1A11 switches as follows:

(1) Dial 9630000 into the UUT TEST NUMBER switches.
(2) Set TEST MODE switch to TAPE.
(3) Set CONTROLLER SUB MODE switch to NORMAL.
(4) Press the START TEST switch.

c. Observe message displayed on SSVD and verify that the UUT is the one described in the message.

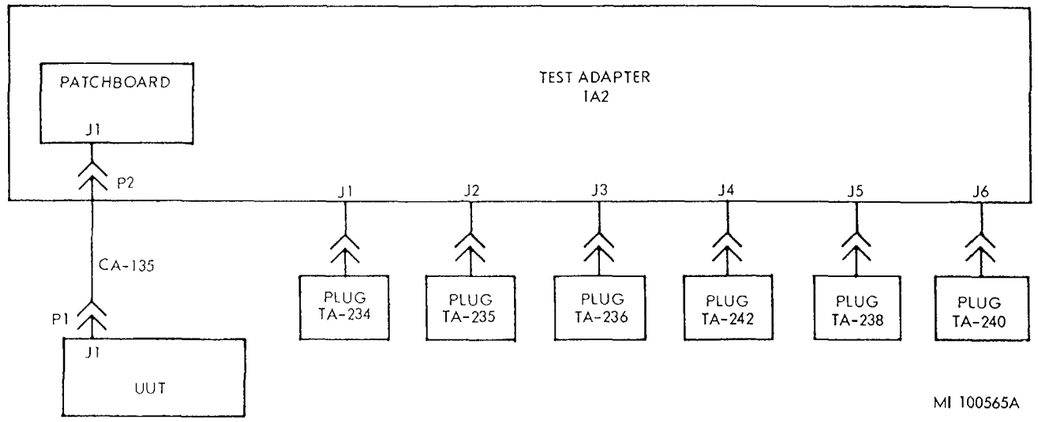


Figure 8-1. Cable hookup diagram.

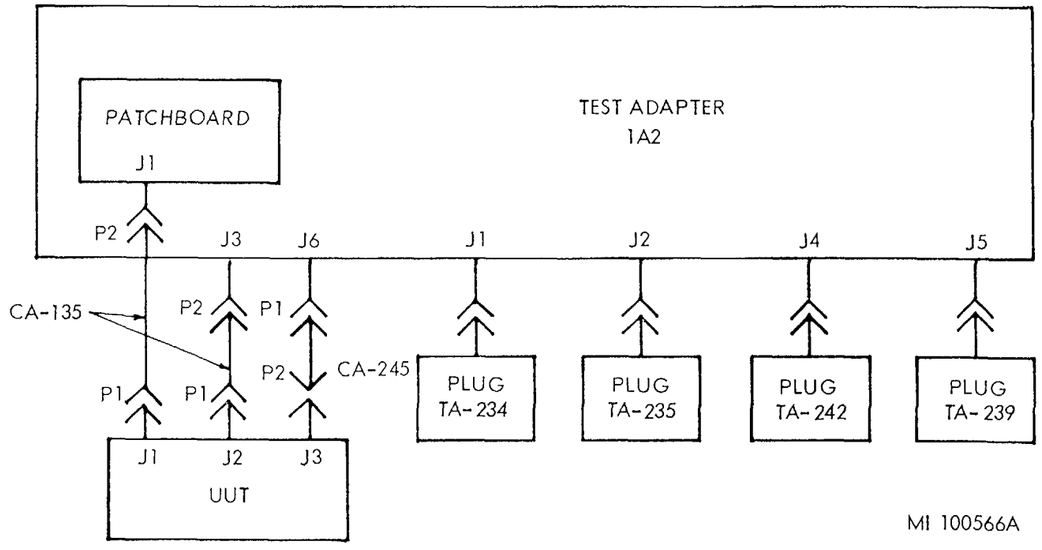


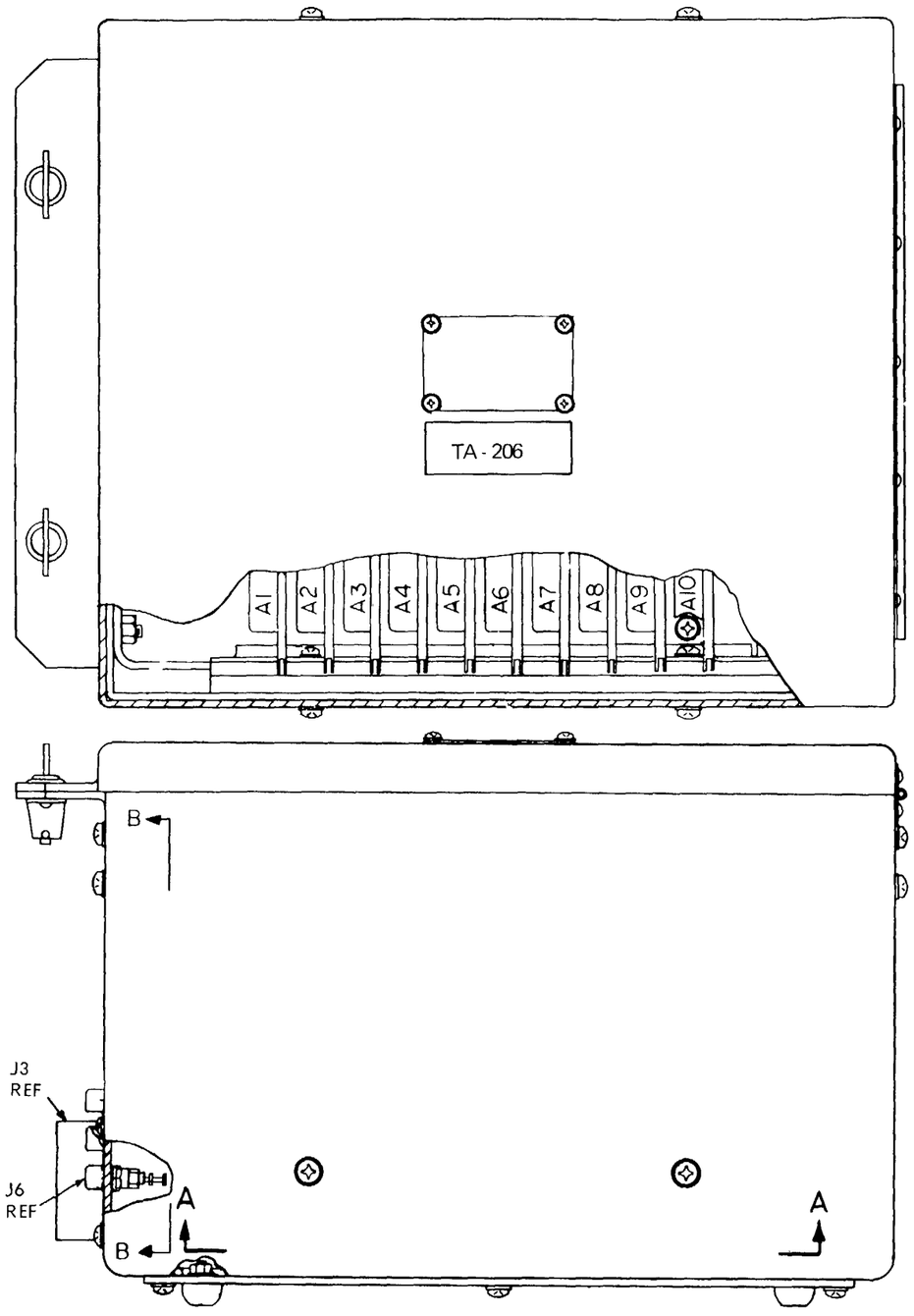
Figure 8-2. Cable hookup diagram.

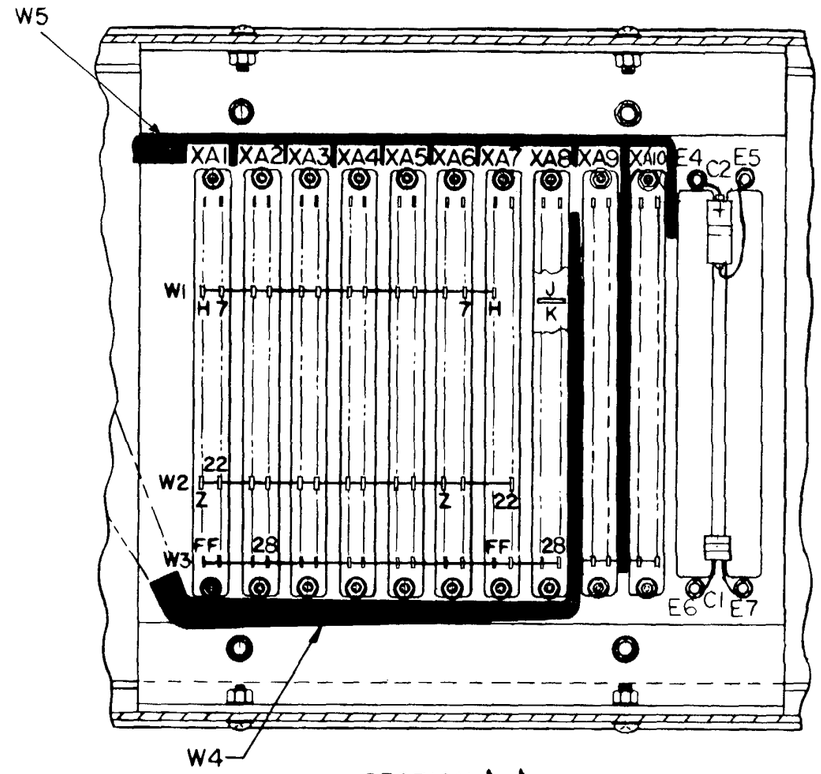
Table 8-1. Signal Conditioner Programmed Tests.

Print message ref no.	Action or instructions
REF TM 1	Not used.
REF TM 2	Discontinue the UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.
REF TM 3	Discontinue the UUT test and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2. If ALL TESTS GO is obtained, PB-202 is faulty.
REF TM 4	Not used.
REF TM 5	*a*. Install the patchboard. *b*. Set S1 on the patchboard to OFF. *c*. Press the PROCEED switch.
REF TM 6	*a*. Connect the cables and plugs (fig. 8-1). *b*. Disconnect all probes. *c*. Press the PROCEED switch.
REF TM 7	**NOTE** **Insert TA-107 with the lettered side of the connector toward the connector end of the UUT.** *a*. Install TA-107 in the position vacated by the board removed in accordance with the SSVD display. *b*. Connect the probe to the points on TA-107 specified by the SSVD display. *c*. Press the PROCEED switch.
REF TM 8	*a*. Position the oscilloscope controls as follows: CH 1 VOLTS/DIV Set Volts/DIV (gray) to 1 Set VARIABLE-CAL (red) to CAL AC-GND-DC Set to DC MODE TRIGGER Set MODE (gray) to CH 1 Set TRIGGER (red) to CH 1 ONLY INVERT Push in A SWEEP MODE Set to AUTO TRIG A TRIGGERING SLOPE Set to + COUPLING Set to AC SOURCE Set to INT A SWEEP LENGTH Set to FULL A and B TIME/DIV and DELAY TIME TIME/DIV (gray) set to 1 mSEC A VARIABLE CAL (red) set to CAL HORIZ DISPLAY MAG HORIZ DISPLAY (gray) set to A MAG (red) set to OFF POWER switches Set to ON A TRIGGERING LEVEL and HF STAB

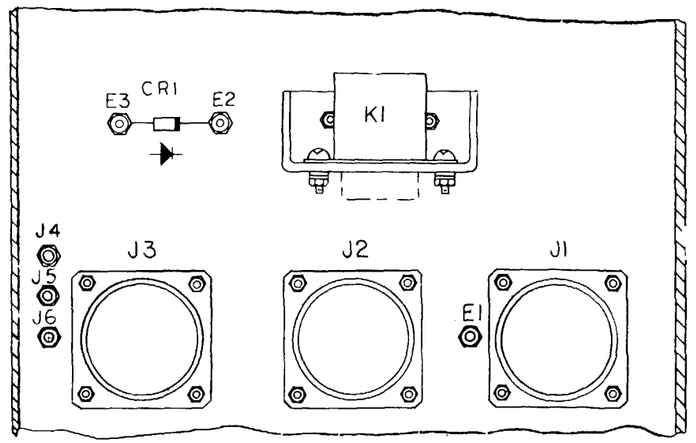
Table 8-1. Signal Conditioner Programmed Tests - Continued

Print message ref no.	Action or instructions
REF TM 8 Continued	**NOTE** **Adjust for stable waveform after connecting signal source to scope.** *b*. Connect CA-127 between 1A2J9 and CH 1 INPUT on the oscilloscope. **NOTE** **The waveform will consist of a lowly moving horizontal line.** *c*. Observe the oscilloscope waveform and perform the adjustment specified in the SSVD display. Adjust to obtain an amplitude that is closest to the amplitude specified by the SSVD display. *d*. Disconnect CA-127 from 1A2J9. Press the PROCEED switch.
REF TM 9	*a*. Observe and record the last measured value displayed on the SSVD. *b*. Select one of the following ranges which contains the value recorded in step *a* above. Perform the indicated adjustment **Range** — **A7R21(.75V)** ±0.00 to 0.05 VDC — 7 turns CW ±0.05 to 0.10 VDC — 6 turns CW ±0.10 to 0.15 VDC — 5 turns CW ±0.15 to 0.20 VDC — 4 turns CW ±0.20 to 0.25 VDC — 3 turns CW ±0.25 to 0.30 VDC — 2 turns CW ±0.30 to 0.35 VDC — 1 turn CW ±0.40 to 0.45 VDC — 1 turn CCW ±0.45 to 0.50 VDC — 2 turns CCW ±0.50 to 0.55 VDC — 3 turns CCW ±0.55 to 0.60 VDC — 4 turns CCW ±0.60 to 0.65 VDC — 5 turns CCW ±0.65 to 0.70 VDC — 6 turns CCW ±0.70 to 0.75 VDC — 7 turns CCW ±0.75 to 0.80 VDC — 8 turns CCW ±0.80 to 0.85 VDC — 9 turns CCW ±0.85 to 0.90 VDC — 10 turns CCW ±0.90 to 0.95 VDC — 11 turns CCW ±0.95 to 1.00 VDC — 12 turns CCW
REF TM 10	*a*. Connect the cables and plugs (fig. 8-2). *b*. Press the PROCEED switch.
REF TM 11	Reinstall A7. Replace C1 (Par. 8-7).
REF TM 12	*a*. Disconnect the lead of K1 from E3. *b*. Measure the resistance between the disconnected lead and E2. (1) If the meter reading is less than 100 ohms, replace K1. (2) If the meter reading is greater than 100 ohms, replace CR1. Reconnect the lead of K 1.
REF TM 13	*a*. Remove A10 and measure the resistance between A10-9 and A10-28 with the multimeter. (1) If the meter reading is between 65.1 K ohms and 71.1 K ohms, proceed to step *b*. (2) If the meter reading is not between the above limits, replace A10. *b*. Measure the resistance between A10-9 and A10-11 with the multimeter. (1) If the meter reading is between 53.6 K ohms and 58 8 K ohms, reinstall A10 and replace A8. (2) If the meter reading is not between the above limits, replace A 10.





SECTION A-A



SECTION B-B

MI 100352A

Figure 8-3. TA-206, parts location diagram.

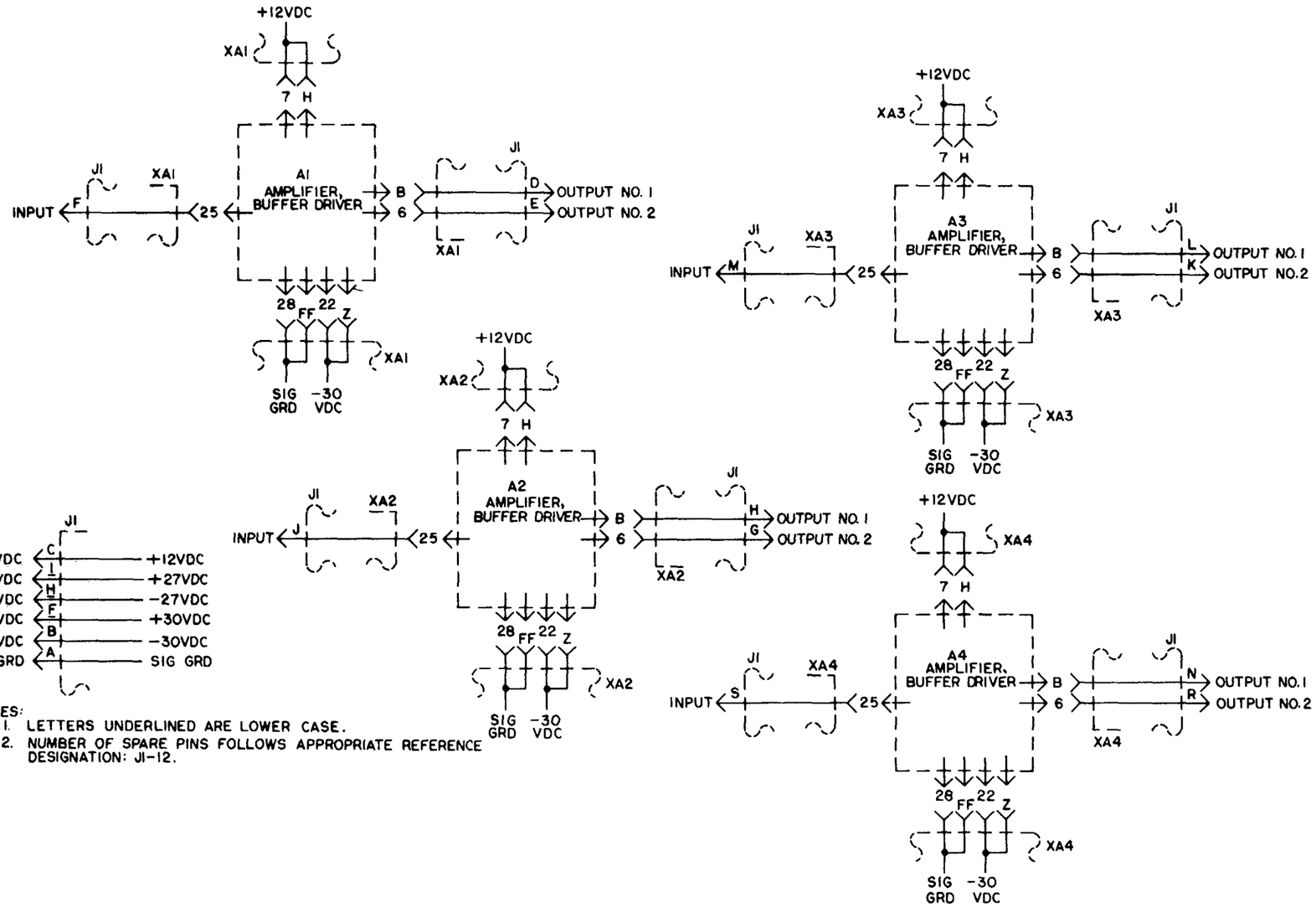


Figure 8-4. TA-206, schematic diagram (sheet 1 of 3).

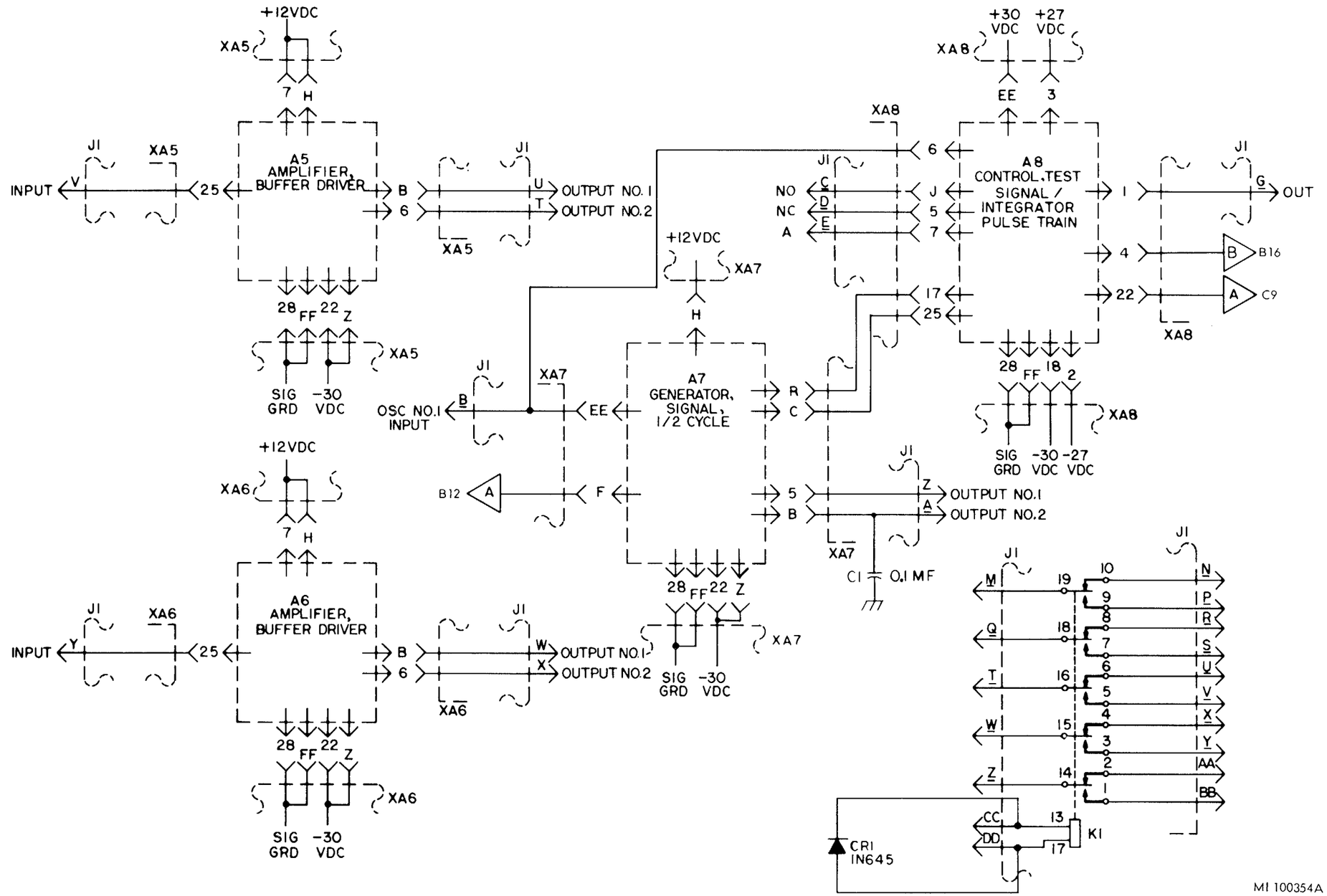


Figure 8-4. (sheet 2 of 3).

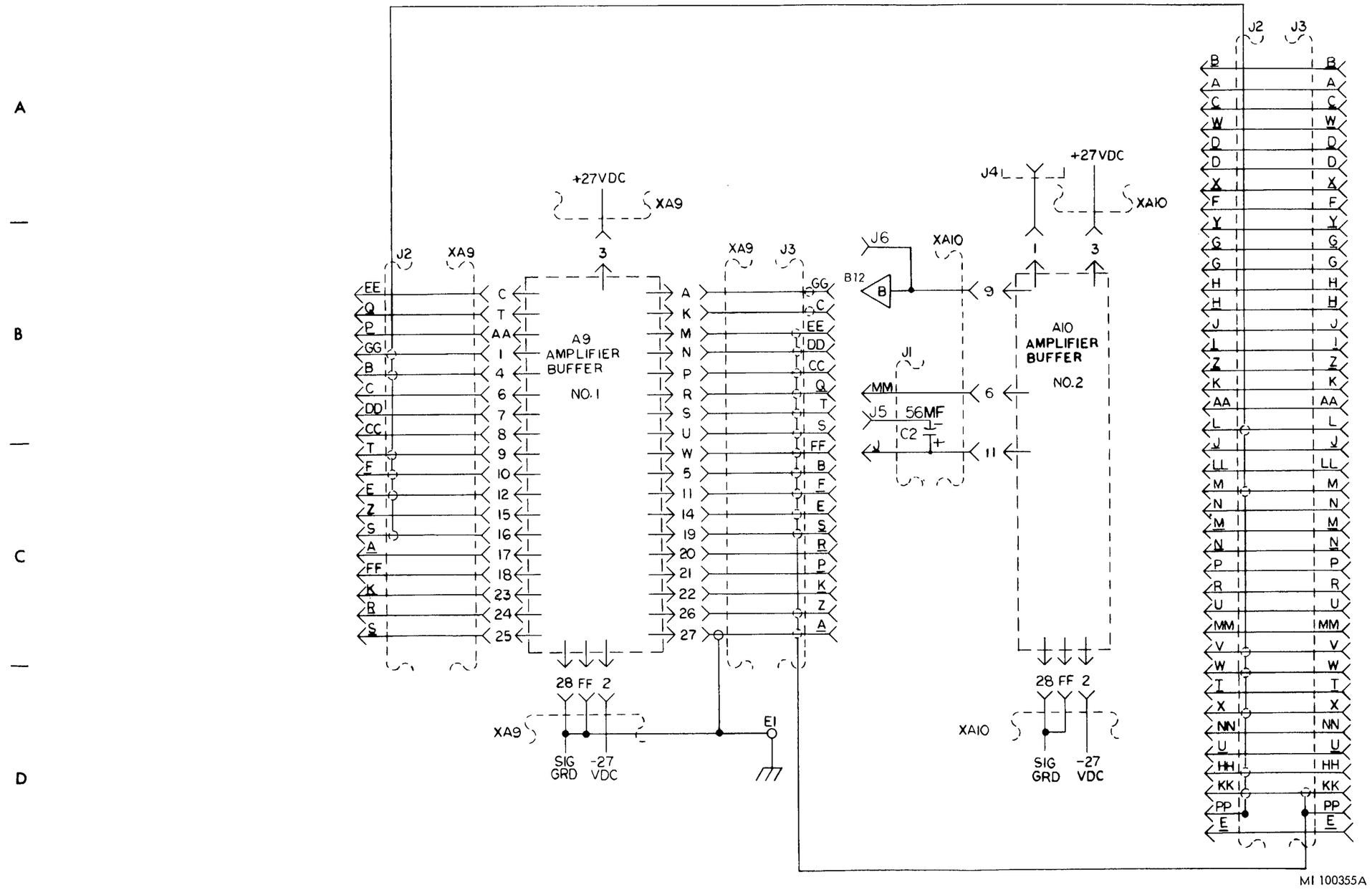


Figure 8-4. (sheet 3 of 3).

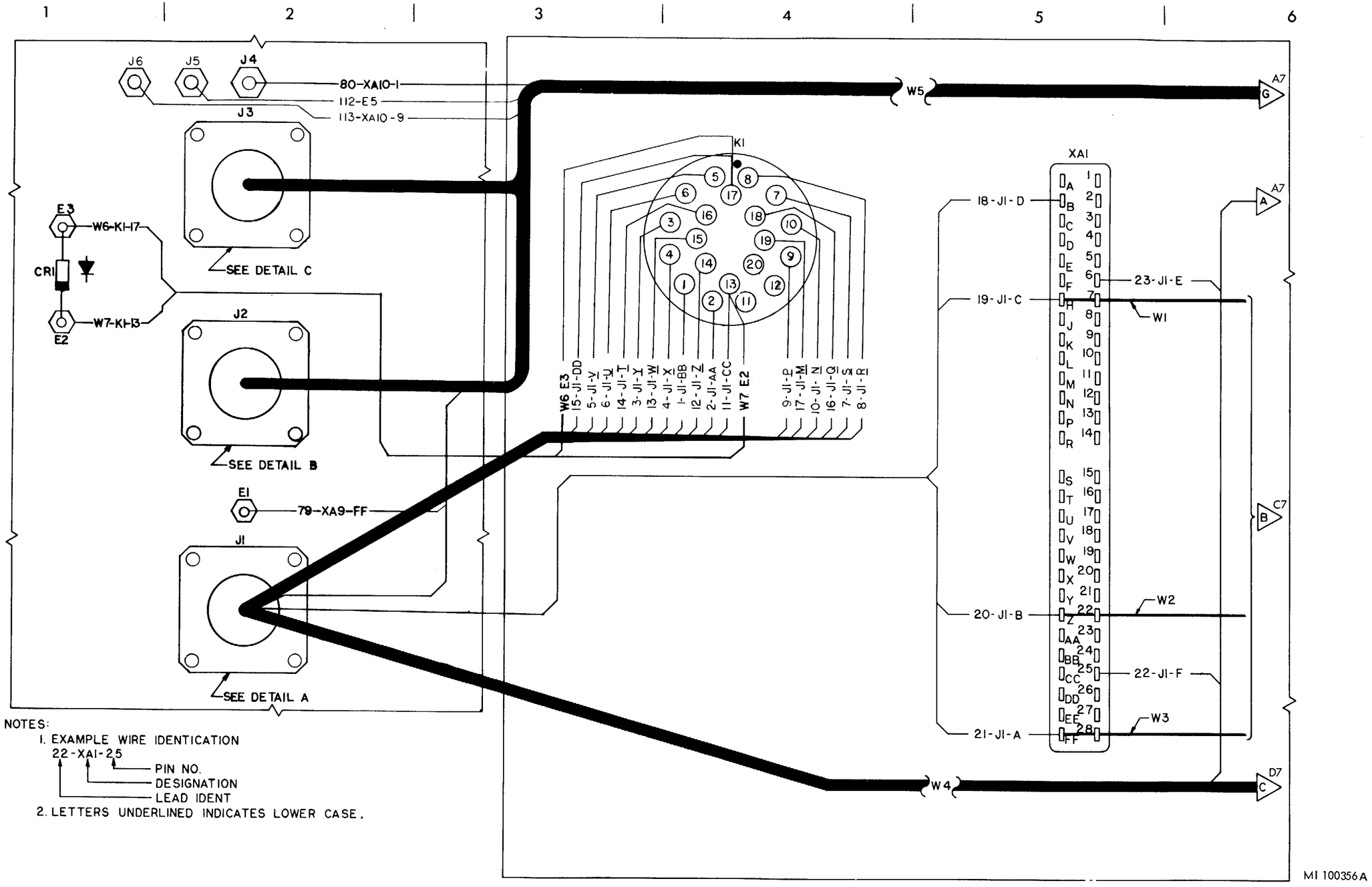


Figure 8-5. TA-206, wiring diagram (sheet 1 of 7).

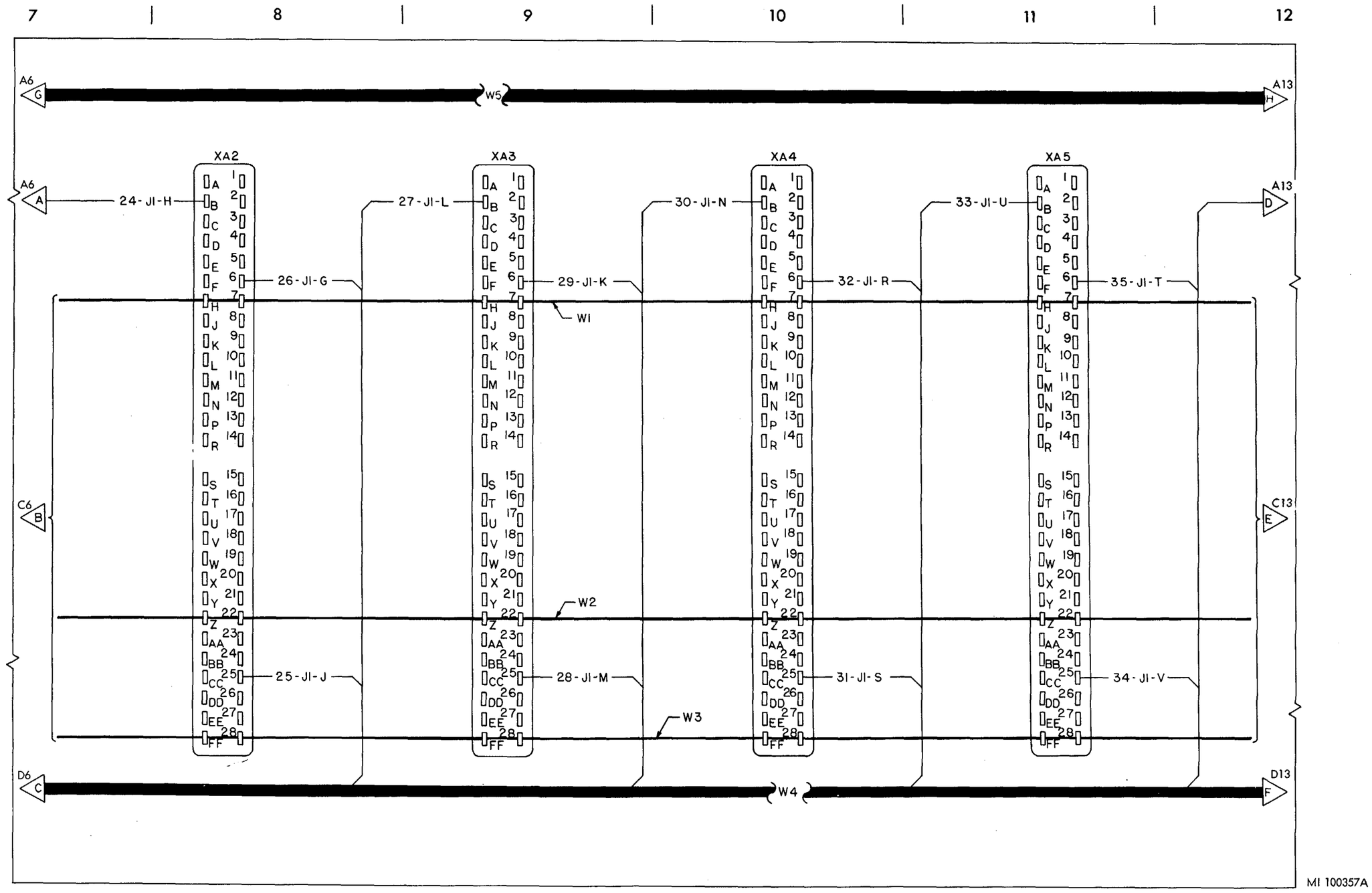


Figure 8-5. (sheet 2 of 7).

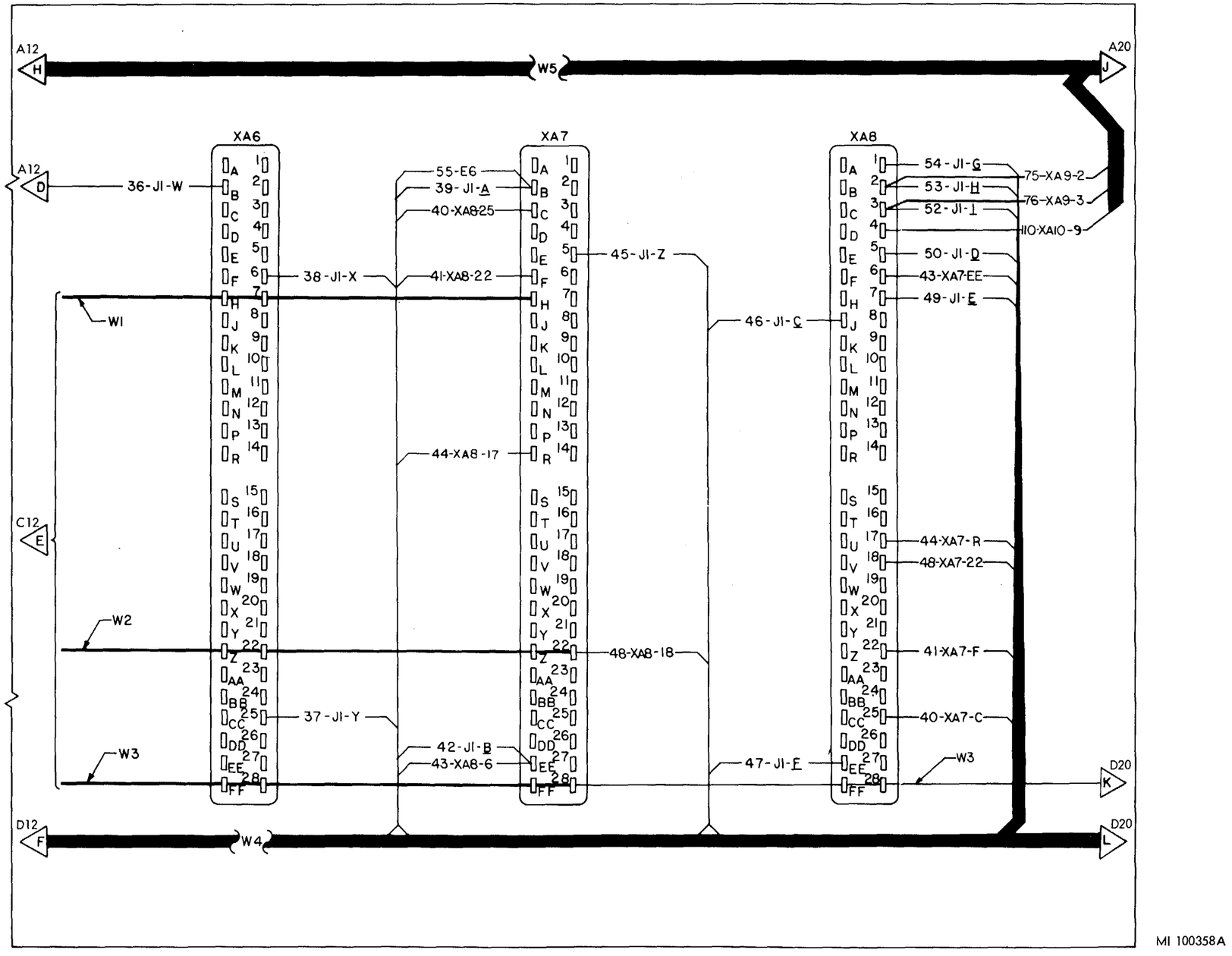


Figure 8-5. (sheet 3 of 7).

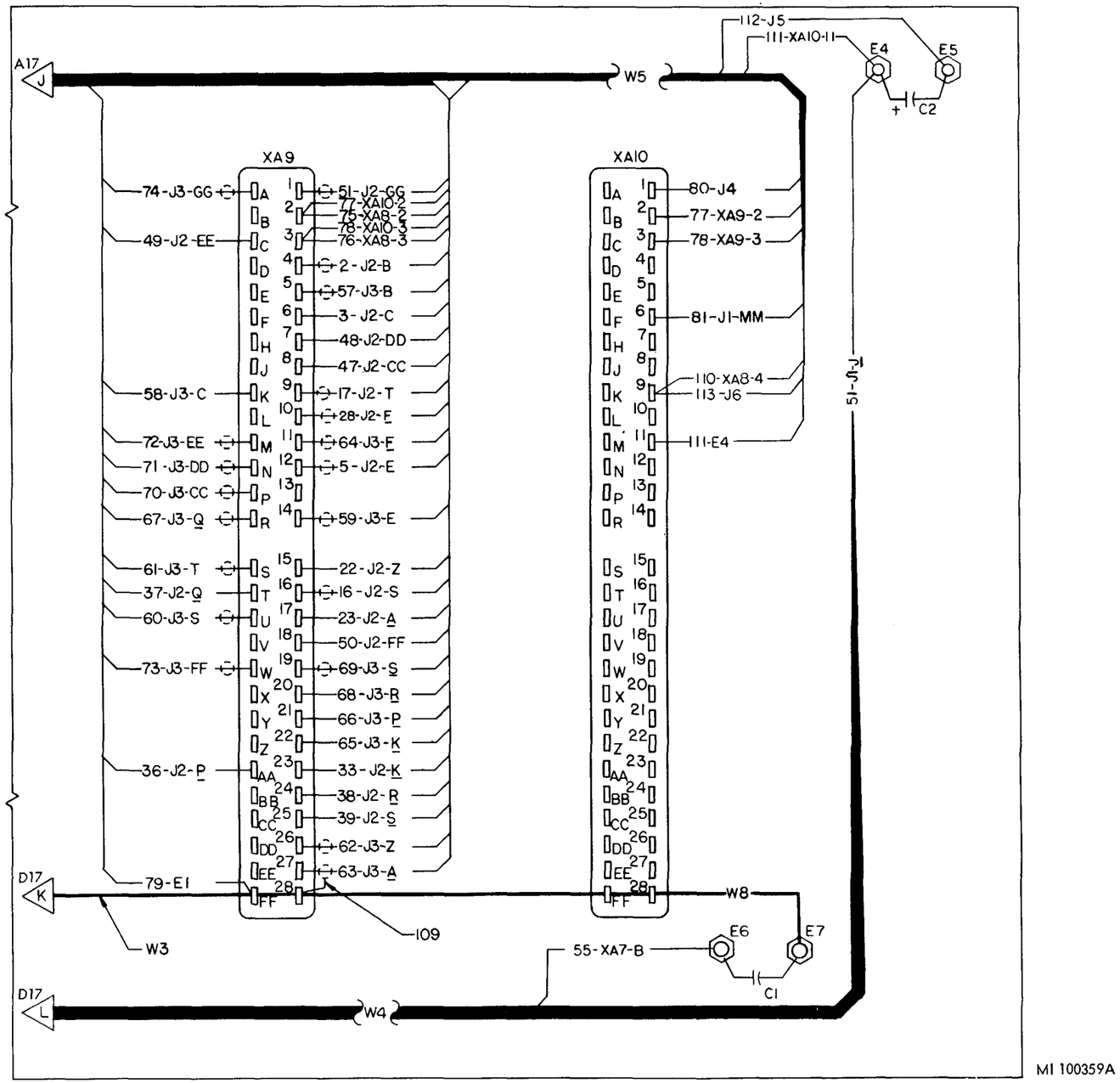


Figure 8-5. (sheet 4 of 7).

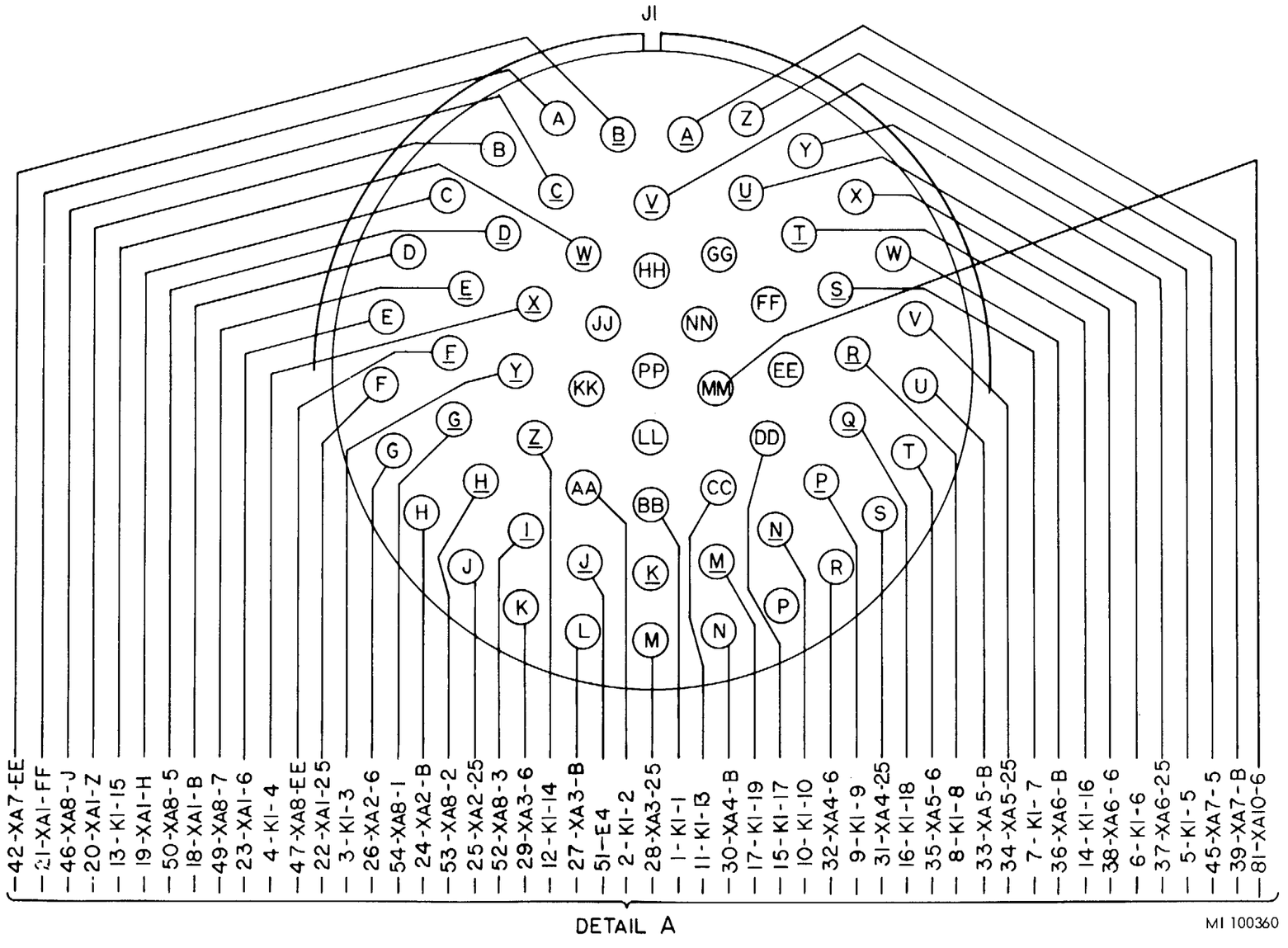


Figure 8-5. (sheet 5 of 7).

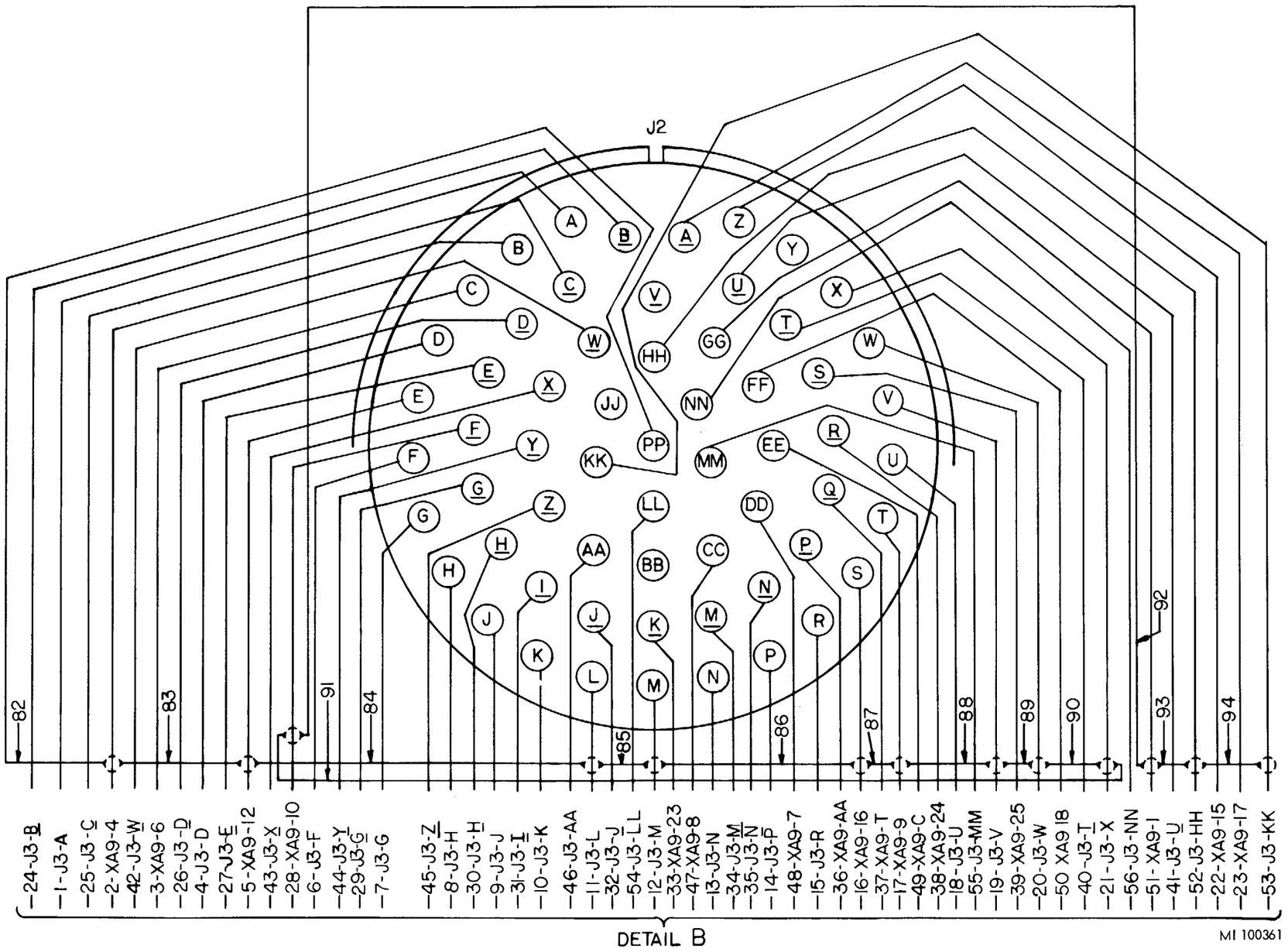


Figure 8-5. (sheet 6 of 7).

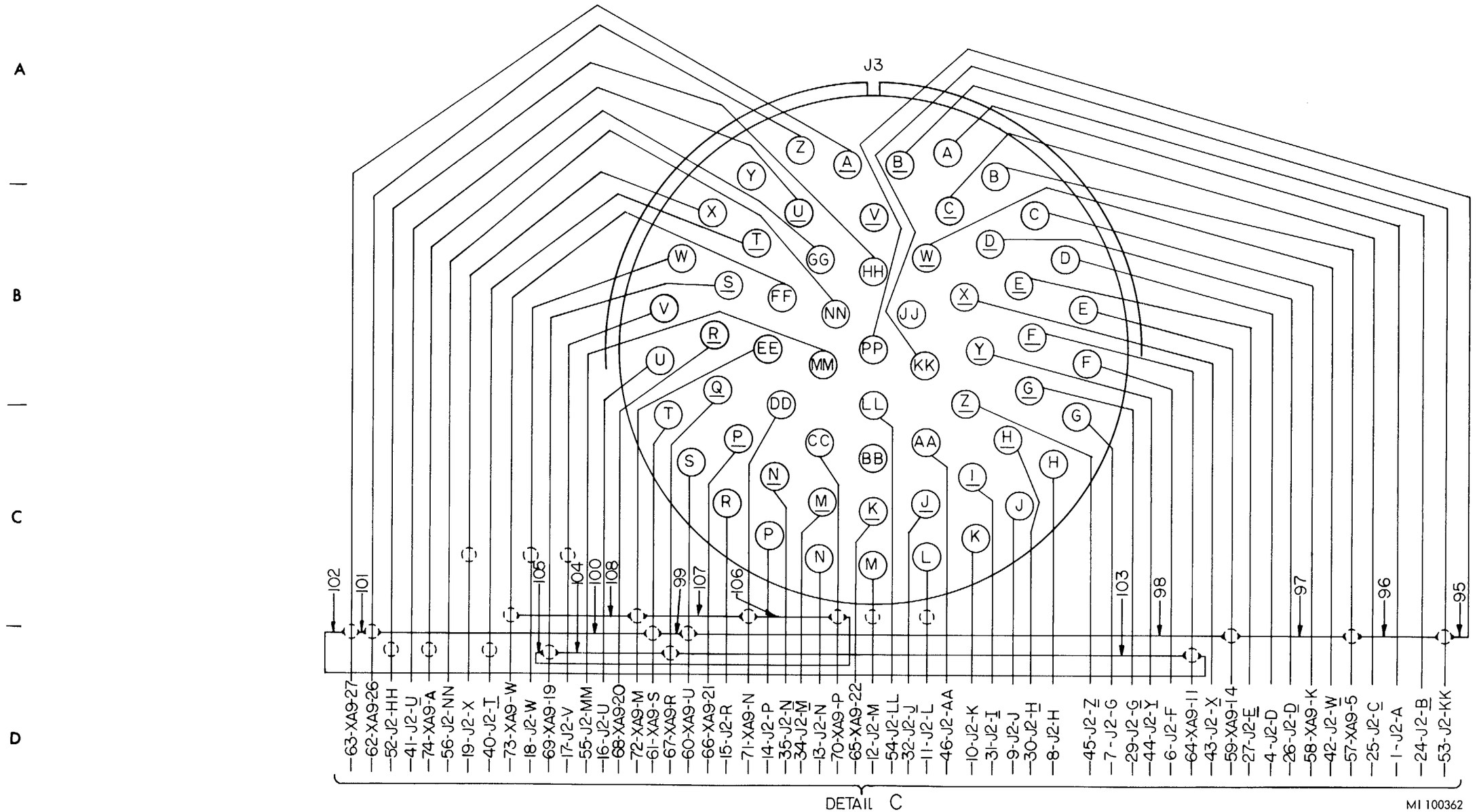


Figure 8-5. (sheet 7 of 7).

Section II. REPAIR PROCEDURES

8-5. General

a. This section provides repair information for the UUT within the scope of DS and GS maintenance personnel. Figures 8-6 and 8-7 illustrate the disassembly and assembly of the UUT. Paragraphs 8-6 through 8-8 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-4935-557-34P contains a list of repair parts and special tools authorized for maintenance personnel.

b. The following warning applies throughout this section.

WARNING

The solvent and cleaning solutions used in the repair procedures are toxic and flammable. Be careful. Avoid prolonged or repeated breathing of the vapor. Keep away from the heat and open flames. Use only in well ventilated area.

8-6. Decal Removal and Installation Procedure (Fig. 8-6)

a. Removal

(1) Remove decal (22) with a knife.

(2) Clean the mounting area with MEK, Fed Spec TT-M-261.

b. Installation.

(1) Mark new decal (22) with the same information that appeared on the old decal without bending or distorting the decal.

(2) Apply acetone, Fed Spec O-A-51, to the back of the decal.

(3) When the adhesive side is sticky, install the decal on cover assembly (23) and press flat.

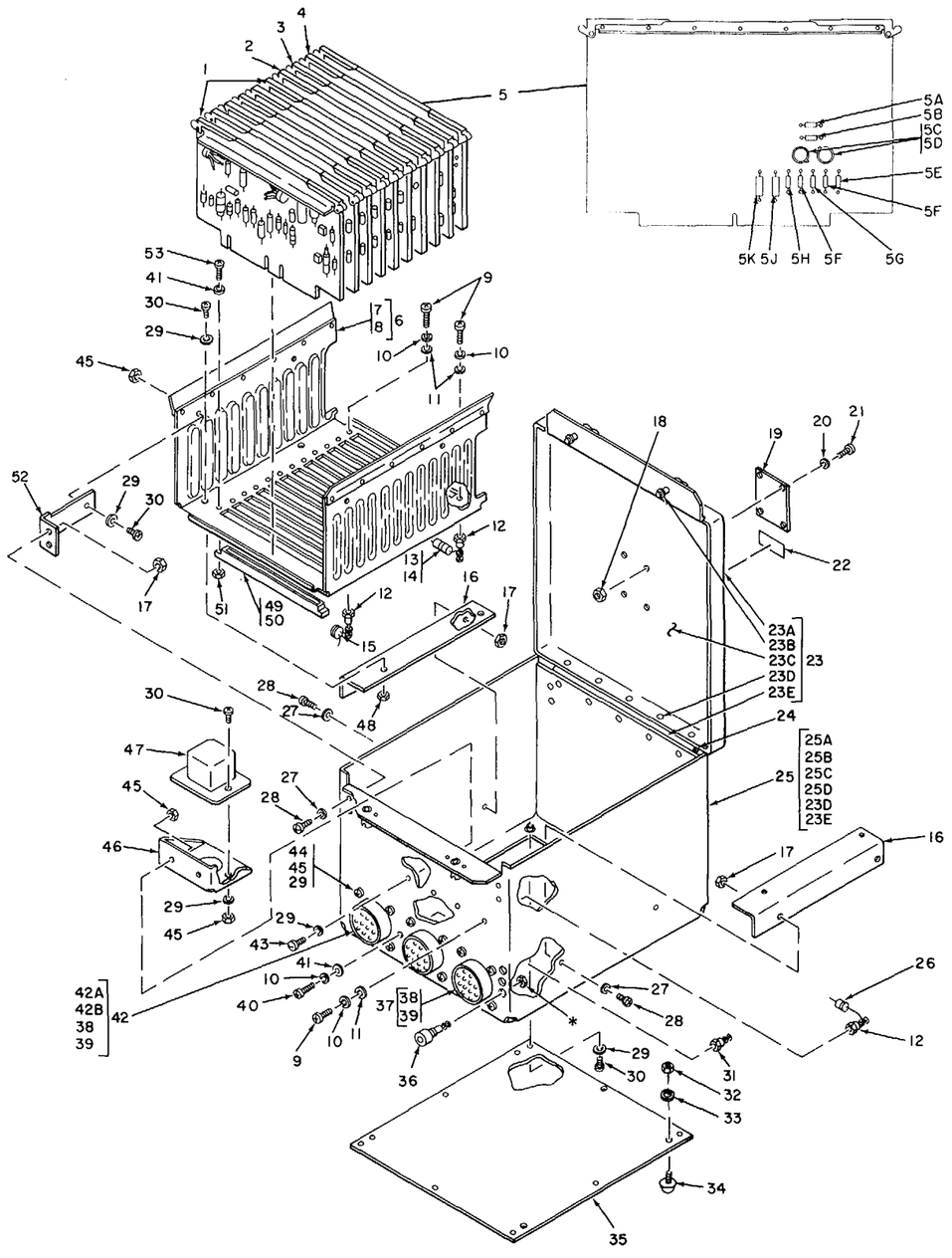


Figure 8-6. Repair of TA-206 - view 1.

1 – A1 through A6 (Depot repair)
2 – A7 (Depot repair)
3 – A8 (Depot repair)
4 – A9 (Depot repair)
5 – A10 (Depot repair)
5A – A10R1 (Depot only)
5B – A10R4 (Depot only)
5C – A10Q1, A10Q2 (Depot only)
5D – Insulator (Depot only)
5E – A10R2 (Depot only)
5F – A10R3, A10R6 (Depot only)
5G – A10R5 (Depot only)
5H – A10R7 (Depot only)
5J – A10R8 (Depot only)
5K – A10R9 (Depot only)
6 – Holder assembly (Depot repair)
7 – Retainer clip (Depot only)
8 – Rivet (Depot only)
9 – Screw
10 – Lockwasher
11 – Washer
12 – E2 through E7
13 – Strap
14 – C2
15 – C1
16 – Support (Depot repair)
17 – Nut
18 – Nut
19 – Identification plate (Depot repair)
20 – Washer
21 – Screw
22 – Decal
23 – Cover assembly
23A – Cover (Depot only)
23B – Stud assembly
23C – Gasket
23D – Hinge (Depot only)
23E – Rivet (Depot only)
24 – Pin
25 – Case assembly (Depot repair)
25A – Container (Depot only)
25B – Spline nut (Depot only)
25C – Receptacle (Depot only)
25D – Rivet (Depot only)
26 – CR1
27 – Washer
28 – Screw
29 – Washer
30 – Screw
31 – E1
32 – Nut
33 – Washer
34 – Bumper
35 – Bottom plate (Depot repair)
36 – J4, J5, J6
37 – W5 (Depot only)
38 – Strap
39 – W5J3, W5J2
40 – Screw
41 – Washer
42 – W4 (Depot only)
42A – Connector (Depot only)
42B – Ferrule (Depot only)
43 – Screw
44 – Screw
45 – Nut
46 – Bracket (Depot repair)
47 – K1
48 – Nut
49 – Key
50 – XA1 through XA10
51 – Nut
52 – Bracket (Depot repair)
53 – Screw

8-7. Capacitor (C1 or C2) Removal and Installation Procedure (Fig. 8-6)

a. Removal

(1) Remove mounting hardware (29 and 30) and bottom plate (35).
(2) Disconnect the leads from C1 (15) or C2 (14) and remove the capacitor.
(3) Clean the mounting area with alcohol, Fed Spec O-E-760, grade 3. Allow the area to dry for at least five minutes.

b. Installation.

(1) Install C1 (15) or C2 (14) and connect the leads.
(2) Bond the capacitor to holder assembly (6) with silicone adhesive sealant, MIL-A46106.
(3) Install bottom plate (35) with mounting hardware (29 and 30) on case assembly (25).

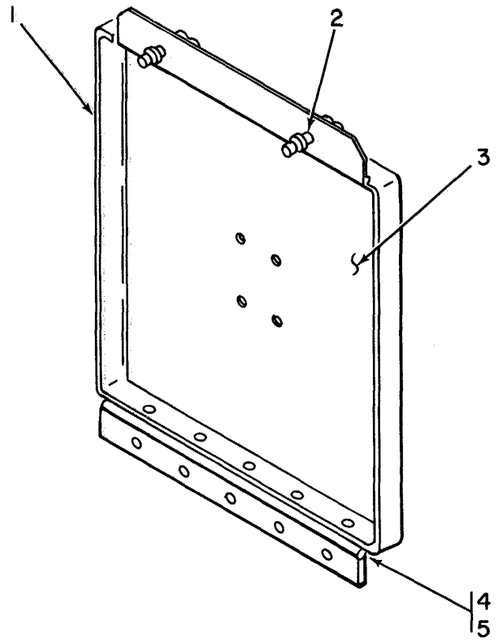
8-8. Gasket Removal and Installation Procedure (Fig. 8-7)

a. Removal

(1) Remove gasket (3) from cover (1).
(2) Clean the mounting area with alcohol, Fed Spec O-E-760, grade 3.

b. Installation.

(1) Apply adhesive, MIL-A-25457, to the mounting surface on cover (1).
(2) Install gasket (3) on the cover.



1 – Cover (Depot only)
2 – Stud assembly
3 – Gasket
4 – Hinge (Depot only)
5 – Rivet (Depot only)

Figure 8-7. Repair of TA-206 - view 2.

8-9. Painting

CAUTION
Mask all connectors, light assembly panels, lettering and mounting surfaces before painting the adjoining surfaces.

Inspect and paint the exterior of the UUT.

a. Inspect the exterior surface of the UUT for scratched, chipped, or peeled paint.
b. Smooth the damaged area with sandpaper, wet/dry (120-400 grit).
c. Spot-paint damaged areas with a brush.
d. Use paint, Fed Spec TT-E-529, class A, color no. 24410 for the exterior of the UUT.

8-10. Packaging

a. When the signal conditioner is to be shipped to the depot for further testing and repair, package the assembly in accordance with TM 38-230-1, method IID, insuring that adequate cushioning material and bracing are used to prevent damage to the assembly during shipment.
b. Packages should be marked in accordance with local directives.

CHAPTER 9

AC POWER SUPPLY/SIGNAL CONDITIONER(TA-222)

Section I. PROGRAMMED TESTS

9-1. General

This chapter provides the information necessary to isolate and repair a fault in the ac power supply/signal conditioner (UUT) to a faulty subassembly or chassis-mounted component. Figures 9-2 through 9-5 are provided as an aid in troubleshooting and testing the UUT.

9-2. Equipment Required for Programmed Tests

The following equipment is required to test the UUT:

a.	Program memory card	See TM 9-1425-550 10
b.	Patchboard	PB-208
c.	Oscilloscope	
d.	Multimeter	
e.	Extender board	TA-107
f.	Passive probe	TA-108
g.	Digital multimeter probe	TA-109
h.	Weapon system load box	TA-204
i.	Lead	TA-205
j.	Test probe	TA-208
k.	Lead	TA-216
l.	Lead	TA-232
m.	Cable	CA-111
n.	Cable	CA-122
o.	Cable	CA-135
p.	Cable	CA-235
q.	Cable	8894622 (2 required)

9-3. Test Instructions

WARNING

Voltage is present in the UUT. Use extreme care when performing the manual tests.

CAUTION

If the program is interrupted for more than 20 seconds, and the PROGRAM INTERRUPT or the LONG TEST IN PROGRESS are not on, press the HALT switch and perform the instructions in REF TM 43.

a. When an SSVD display message or a REF TM calls for probing a point in the UUT. connect the probe to the corresponding point shown in figures 9-2 and 9-3. If required, remove the six screws securing the top cover on the UUT and remove the cover or loosen the eight screws securing the bottom cover to the UUT and remove the cover to obtain access to the probing points.

b. Ensure that the test probes remain connected to the applicable points during the test program.

c. At the completion of programmed tests or when the UUT is to be shipped to depot for further testing or repair, install the bottom cover and tighten the eight screws. If the top cover was removed, position the top cover on the UUT and install the six screws.

d. If CB1 or CR2 trips on 7A12 during the test program, dial 9640001 into the UUT TEST NUMBER switches and press the START TEST switch. If required, set CB1 or CB2 on 7A12 to ON.

e. The UUT is on-bench tested.

f. Use test lead TA-208 when an SSVD display message directs a probe connection to XA1, P3, or P5.

9-4. Preparation for Programmed Tests

a. Ensure that PMC for this UUT is installed in PLMA 1A15.

b. Set monitor panel 1A11 switches as follows:

(1) Dial 9640000 into the UUT TEST NUMBER switches.
(2) Set TEST MODE switch to TAPE.
(3) Set CONTROLLER SUB MODE switch to NORMAL.
(4) Press the START TEST switch.

c. Observe message displayed on SSVD and verify that the UUT is the one described in the message.

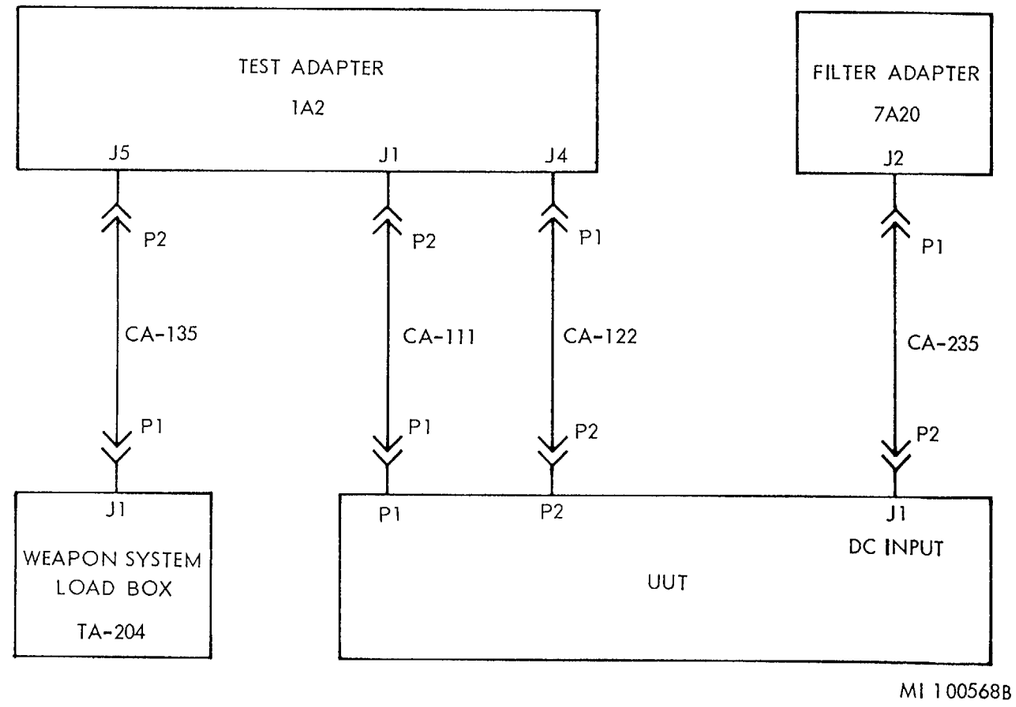


Figure 9-1. Cable hookup diagram.

Table 9-1. AC Power Supply/Signal Conditioner Programmed Test.

Print message ref no.	Action or instructions
REF TM 1	*a*. Install the patchboard. b. Press the PROCEED switch.
REF TM 2	Discontinue the UUT test, and run the confidence and maintenance test program in accordance with TM 9-4935-5521-14/2.
REF TM 3	*a*. Discontinue the UUT test, and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2. *b*. If ALL TESTS GO is obtained, refer to TM 9-1425-550-10 for further fault isolation of PB-208.
REF TM 4	Not used
REF TM 5	*a*. Connect the cables (fig. 9-1). *b*. Adjust R1 fully counterclockwise. *c*. Press the RESET switch (S1) on the UUT. *d*. Press the PROCEED switch.
REF TM 6	Not used
REF TM 7	Replace S1 (par. 9-19).
REF TM 8	*a*. Remove mounting hardware (17, 4, and 3, fig. 9-6) and cover (14). *b*. Disconnect and tag the leads to Q 1 and Q2. *c*. Attach the insulated alligator clips (supplied with the multimeter) to the multimeter clip leads as aids in test connections. Test Q1 in accordance with steps *d* through *i* in the following chart. When a transistor requires replacement, replace Q 1 or Q2 (par. 9-7), and proceed to next step.

Step	Positive lead	Negative lead	Meter reading	Action
d.	Base	Emitter	Less than 100 K ohms	Proceed to step *e*.
			Greater than 100 K ohms	Replace Q1.
e.	Emitter	Base	Greater than 1000 K ohms	Proceed to step *f.*
			Less than 1000 K ohms	Replace Q1.
f.	Base	Collector	Less than 100 K ohms	Proceed to step *g*.
			Greater than 100 K ohms	Replace Q1.
g.	Collector	Base	Greater than 1000 K ohms	Proceed to step *h*.
			Less than 1000 K ohms	Replace Q1.
h.	Collector	Emitter	Greater than 1000 K ohms	Proceed to step *i*.
			Less than 1000 K ohms	Replace Q1.
i.	Emitter	Collector	Greater than 1000 K ohms	Proceed to step *j*.
			Less than 1000 K ohms	Replace Q1.

Table 9-1. AC Power Supply/Signal Conditioner Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 8 Continued	*j*. Repeat steps *d* through *i* above for Q2, and proceed to step *k*. *k*. Reconnect the leads to Q1 and Q2, and proceed to step *i*. *l*. Loosen screws (29, fig. 9-6), and remove cover (32). *m*. Disconnect the cathode lead from CR2, and test the diode with the multimeter. (1) If the meter reading indicates CR2 to be good, reconnect the lead to CR2, and proceed to step *n*. (2) If the meter reading indicates CR2 to the faulty, replace CR2 (par. 9-8), and proceed to step *n*. *n*. Repeat step m for CR3. and proceed to step *o*. *o*. Install cover (32), and tighten screws (29). *p*. Install cover (14) with mounting hardware (3, 4, and 17).
REF TM 9	*a*. Loosen screws (29, fig. 9-6), and remove cover (32). *b*. Replace C14 (par. 9-22), and rerun the program. *c*. If REF TM 9 is displayed on SSVD again, replace C16 (par. 9-22), and rerun the program. *d*. If REF TM 9 is displayed on SSVD for the third time, replace C12, and rerun the program. *e*. If REF TM 9 is displayed on SSVD for the fourth time, replace C15, and rerun the program. *f*. If subsequent SSVD displays of REF TM 9 occur, selection of C14 and/or C16 must be performed. Proceed as follows: (1) Replace C14 and or C16 with a different value capacitor from the kit (par. 9-22), and rerun the program. Repeat selection of C14 and/or C16 until the failed test passes or selection values of C14 and C16 is exhausted. (2) If the selection values of C14 and C16 is exhausted and the test continues to fail, return the UUT to the depot *g*. Install the cover and tighten the screws.
REF TM 10	*a*. Position the oscilloscope controls as follows: CH 1 VOLTS/DIV Set VOLTS/DIV (gray) to 1 Set VARIABLE-CAL (red) to CAL AC-GRD-DC Set to DC MODE TRIGGER Set MODE (gray) to CH 1 Set TRIGGER (red) to CH 1 ONLY INVERT Push in A SWEEP MODE Set to AUTO TRIG A TRIGGERING SLOPE Set to + COUPLING Set to AC SOURCE Set to INT A SWEEP LENGTH Set to FULL A and B TIME/DIV and DELAY TIME TIME/DIV (gray) set to .5 mSEC A VARIABLE CAL (red) set to CAL, HORIZ DISPLAY MAG HORIZ DISPLAY (gray) set to A MAG (red) set to OFF

Table 9-1. AC Power Supply/Signal Conditioner Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 10 (Continued	POWER Switch Set to ON A TRIGGERING LEVEL, and HF STAB Adjust for a stable wave form after connecting the signal source to the scope **WARNING** **Voltage is applied to the UUT. Exercise extreme care while performing the following procedures.** *b*. Loosen screws (29, fig. 9-6), mid remove cover (32). Connect the oscilloscope X10 probe between CH1 INPUT and E55 on the UUT. *c*. Observe the waveform on the oscilloscope to be as shown below: **NOTE** **Disregard the spikes on the leading and trailing edges of the waveform.** (1) If the waveform is as shown above, proceed to step *d*. (2) If unable to obtain the waveform as shown above, disconnect the probe, and press the PROCEED switch. *d*. Connect the oscilloscope X10 probe to E56 on the UUT. (1) If the waveform is as shown in step *c*, replace T2 (par. 9-14). (2) If unable to obtain the waveform as shown in step c, disconnect the probe, and press the PROCEED switch.
REF TM 11	*a*. Remove mounting hardware (17, 4, and 3, fig 9-6) and cover (14). *b*. Disconnect and tag the leads to Q1 and Q2. *c*. Attach the insulated alligator clips (supplied with the multimeter) to the multimeter clip leads as aids in test connections. Test Q1 in accordance with steps *d* through *i* in the following chart. When a transistor requires replacement, replace Q1 or Q2 (par. 9-7), and proceed to the next step.

Table 9-1. AC Power Supply/Signal Conditioner Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 11 Continued	

Step	Positive lead	Negative lead	Meter reading	Action
d.	Base	Emitter	Less than 100 K ohms	Proceed to step *e*.
			Greater than 100 K ohms	Replace Q1.
e.	Emitter	Base	Greater than 1000 K ohms	Proceed to step *f.*
			Less than 1000 K ohms	Replace Q1.
f.	Base	Collector	Less than 100 K ohms	Proceed to step *g*.
			Greater than 100 K ohms	Replace Q1.
g.	Collector	Base	Greater than 1000 K ohms	Proceed to step *h*.
			Less than 1000 K ohms	Replace Q1.
h.	Collector	Emitter	Greater than 1000 K ohms	Proceed to step *i*.
			Less than 1000 K ohms	Replace Q1.
i.	Emitter	Collector	Greater than 1000 K ohms	Proceed to step *j*
			Less than 1000 K ohms	Replace Q1.

j. Repeat steps d through *i* above for Q2, and proceed to step *k*.
k. Reconnect the leads to Q1 and Q2, and proceed to step *l*.
l. Loosen screws (29), and remove cover (32).
m. Disconnect the cathode lead from CR2, and test the diode with the multimeter.
(1) If the meter reading indicates CR2 to be good, reconnect the lead to CR2, and proceed to step *n*.
(2) If the meter reading indicates CR2 to be faulty, replace CR2 (par. 9-8), and proceed to step *n*.
n. Repeat step m for CR3, and proceed to step *o*.
o. Disconnect one lead of C11, and test the capacitor for a short with the multimeter.
(1) If the meter reading indicates C11 to be good, reconnect the lead of C11, and proceed to step *p*.
(2) If the meter reading indicates C11 to be shorted, replace C11 (par. 9-9), and proceed to step *p*.
p. Install cover (32), and tighten screws (29).
q. Install cover (14) with mounting hardware (3, 4, and 17).

REF TM 12	*a*. Remove A5 from the UUT, and disassemble A5 to obtain access to the terminals of A5T1 and A5CR1 (par. 9- 18 steps a (2) through (4)). *b*. Disconnect one lead of A5CR1, and test the diode with the multimeter. (1) If the meter reading indicates A5CR1 to be faulty, replace A5CR1, and proceed to step *c*.

Table 9-1. AC Power Supply/Signal Conditioner Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 12 Continued	(2) If the meter reading indicates A5CR1 to be good, reconnect the lead of A5CR1, and proceed to step c. *c*. Measure the resistance between terminals A5T1-1 and A5T1-2; and A5T1-3 and A5T1-4 with the multimeter. (1) If both of the meter readings are less than 20 ohms, replace A5K1 (par. 9-16). (2) If either of the meter readings were greater than 20 ohms, replace A5T1 (par. 9-18).
REF TM 13	*a*. Press the HALT switch. *b*. Remove mounting hardware (17, 4, and 3, fig. 9-6) and cover (14). *c*. Loosen screws (29), and remove cover (32). *d*. Disconnect one lead of C3, and test the capacitor for a short with the multimeter. the meter reading indicates C3 to be good, reconnect the lead of C3 and proceed to step *e*. (1) If the meter reading indicates C3 to be good, reconnect the lead of C3 and proceed to step *e*. (2) If the meter reading indicates C3 to be shorted, replace C3, and proceed to step *e*. *e*. Repeat step *d* for C2, C4, C5, C6, and C13. If C2, C4, C5, C6, and C13 are all good, proceed to step *f*. *f*. Perform the instructions of REF TM 8. (1) If Q1, Q2, CR2, or CR3 were found to be faulty, make the replacement in accordance with REF TM 8, and proceed to step *g*. (2) If Q1, Q2, CR2, and CR3 all tested good, replace T2 (par. 9-14), and proceed to step *g*. *g*. Install cover (32), and tighten screws (29). *h*. Install cover (14) with mounting hardware (3, 4, and 17).
REF TM 14	Replace A5CR1 (par. 9-17).
REF TM 15	*a*. Loosen screws (29, fig. 9-6), and remove cover (32). Remove mounting hardware (17, 4, and 3), and cover (14). *b*. Disconnect the lead from CR1, and test the diode with the multimeter. (1) If the meter reading indicates CR1 to be faulty, replace CR1, and proceed to step *m*. (2) If the meter reading indicates CR1 to be good, reconnect the lead to CR1, and proceed to step *c*. *c*. Connect one lead of C1, and test the capacitor for a short with the multimeter. (1) If the meter reading indicates C1 to be faulty, replace C1, and proceed to step *m*. (2) If the meter reading indicates C1 to be good, reconnect the lead of C1, and proceed to step *d*. *d*. Disconnect and tag the leads to Q1. *e*. Attach the insulated alligator clips (supplied with the multimeter) to the multimeter clip leads as aids in test connections. Test Q1 in accordance with steps *f* through *k* in the following chart. When Q1 requires replacement, replace Q 1 (par. 9-7), and proceed to step *m*.

Step	Positive lead	Negative lead	Meter reading	Action
f.	Base	Emitter	Less tan 100 K ohms Greater than 100 K ohms	Proceed to step *g*. Replace Q1.
g.	Emitter	Base	Greater than 1000 K ohms Less than 1000 K ohms	Proceed to step *h*. Replace Q1.
h.	Base	Collector	Less than 100 K ohms Greater than 100 K ohms	Proceed to step *i*. Replace Q1.

Table 9-1. AC Power Supply/Signal Conditioner Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 15 Continued	

Step	Positive lead	Negative lead	Meter reading	Action
i.	Collector	Base	Greater than 1000 K ohms Less than 1000 K ohms	Proceed to step *j.* Replace Q1.
j.	Collector	Emitter	Grater than 1000 K ohms Less than 1000 K ohms	Proceed to step *k.* Replace Q1.
k.	Emitter	Collector	Greater than 1000 K ohms Less than 1000 K ohms	Proceed to step *l.* Replace Q1.

l. Reconnect the leads to Q1. Replace Q2 (par. 9-7), and proceed to step *m*.
m. Install cover (32), and tighten screws (29).
n. Install cover (14) with mounting hardware (3, 4, and 17).

REF TM 16	Deleted
REF TM 17	Replace A5T1 (par. 9-18).
REF TM 18	Replace C8 (par. 9-9).
REF TM 19	Deleted
REF TM 20	*a*. Loosen screws (29, fig. 9-6), and remove cover (32). *b*. Disconnect one lead of CR5, and test the diode with the multimeter. (1) If the meter reading indicates CR5 to be faulty, replace CR5, and replace K1 (par. 9-10). (2) If the meter reading indicates CR5 to be good, reconnect the lead of CR5, and replace K1 (par. 9-10). *c*. Install cover (32), and tighten screws (29).
REF TM 21	*a*. Loosen screws (29, fig. 9-6), and remove cover (32). *b*. Disconnect one lead of CR6, and test the diode with the multimeter. (1) If the meter reading indicates CR6 to be faulty, replace CR6, and replace K2 (par. 9-10). (2) If the meter reading indicates CR6 to be good, reconnect the lead of CR6, and replace K2 (par. 9-10). *c*. Install cover (32), and tighten screws (29).
REF TM 22	*a*. Loosen screws (29, fig. 9-6), and remove cover (32). *b*. Disconnect one lead of CR7, and test the diode with the multimeter. (1) If the meter reading indicates CR7 to be faulty, replace CR7, and replace K3 (par. 9-13). (2) If the meter reading indicates CR7 to he good, reconnect the lead of CR7, and replace K3 (par. 9-13). *c*. Install cover (32), and tighten screws (29).
REF TM 23	Replace T1 (par. 9-11).
REF TM 24	Replace T2 (par. 9-14).
REF TM 25	Deleted
REF TM 26	Deleted

Table 9-1. AC Power Supply/Signal Conditioner Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 27	*a*. Remove A5 (par. 9-6*a*). Disassemble A5 to obtain access to A5CR1 (par. 9-17, steps *a*(2) through (4)). *b*. Disconnect one lead of A5CR1, and test the diode with the multimeter. (1) If the meter reading indicates A5CR1 to be faulty, replace A5CR1 (par. 9-17), and replace A5K1 (par. 9-16). (2) If the meter reading indicates A5CR1 to be good, reconnect the lead of A5CR1, and replace A5K1 (par. 9-16).
REF TM 28	*a*. Remove mounting hardware (17, 4, and 3. fig 9-6) and cover (14). *b*. Disconnect and tag the leads to Q1 and Q2. *c*. Attach the insulated alligator clips (supplied with time multimeter) to the multimeter clip leads as aids in test connections. Test Q1 in accordance with steps *d* through *i* in the following chart. When a transistor requires replacement, replace Q1 or Q2 (par. 9-7), and proceed to next step.

Step	Positive lead	Negative lead	Meter reading	Action
d.	Base	Emitter	Less than 100 K ohms	Proceed to step *e*.
			Greater than 100 K ohms	Replace Q1.
e.	Emitter	Base	Greater than 1000'K ohms	Proceed to step *f.*
			Less than 1000 K ohms	Replace Q1.
f.	Base	Collector	Less than 100 K ohms	Proceed to step *g*.
			Greater than 100 K ohms	Replace Q1.
g.	Collector	Base	Greater than 1000 K ohms	Proceed to step *h*.
			Less than 1000 K ohms	Replace Q1.
h.	Collector	Emitter	Greater than 1000 K ohms	Proceed to step *i*.
			Less than 1000 K ohms	Replace Q1.
i.	Emitter	Collector	Greater than 1000 K ohms	Proceed to step *j*.
			Less than 1000 K ohms	Replace Q1.

j. Repeat steps *d through* i above for Q2, and proceed to step *k*.
k. Reconnect the leads to Q1 and Q2, and proceed to step *k*.
l. Loosen screws (29, fig. 9-6), and remove cover (32).
m. Disconnect the cathode lead from CR2, and test the diode with the multimeter.
(1) If the meter reading indicates CR2 to be good, reconnect tie lead to CR2, and proceed to step *n*.

Table 9-1. AC Power Supply/Signal Conditioner Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 28 Continued	(2) If the meter reading indicates CR2 to be faulty, replace CR2 (par. 9-8), and proceed to step *n*. *n*. Repeat step *m* for CR3, and proceed to step *o*. *o*. Remove mounting hardware (35, 27, and 2, fig. 9-8) and bracket (6) containing T1, L2, and L3. Disconnect and tag the leads to T1-4, -6, -8, and -10. Measure the resistance between the terminals listed below, with the multimeter. T1-4 and T1-5 T1-6 and T1-8 T1-9 and T1-10 (1) If all the meter readings were less than 100 ohms, reconnect the leads to T1. Install bracket (6) to the UUT with mounting hardware (35, 27, and 2), and proceed to step *p*. (2) If any meter reading was greater than 100 ohms, replace T1 (par. 9-11), and proceed to step *q*. *p*. Remove mounting hardware (1, 2 and 6, fig. 9-7), securing C2 (18) to the rear panel. Disconnect and tag the leads to T2-1 and T2-3. Measure the resistance between T2-1 and T2-3 with the multimeter. (1) If the meter reading is less than 100 ohms, reconnect the leads to T2. Install C2 (18) to the rear panel with mounting hardware (1, 2, and 6). Replace A4, and proceed to step *q*. (2) If the meter reading is grater than 100 ohms, replace T2 (par. 9-14), and proceed to step *q*. *q*. Install cover (32, fig. 9-6), and tighten screws (29). *r*. Install cover (14) with mounting hardware (3, 4 and 17).
REF TM 29	AN/TSM-93 measurements between P1-7 and chassis ground indicate a short exists. Test the circuit for hardwire shorts using standard troubleshooting procedures.
REF TM 30	*a*. Loosen screws (29, fig. 9-6), and remove cover (32). *b*. Disconnect one lead of CR5, and test the diode with the multimeter. (1) If the meter reading indicates CR5 to be good, reconnect the lead of CR5, and proceed to step *c*. (2) If the meter reading indicates CR5 to be faulty, replace CR5, and proceed to step *c.* *c*. Disconnect one lead of C7, and test the capacitor for an open with the multimeter. (1) If the meter reading indicates C7 to be good, reconnect the lead of C7, and proceed to step *d*. (2) If the meter reading indicates C7 to be open, replace C7, and proceed to step *d*. *d*. Install cover (32), and tighten screws (29).
REF TM 31	*a*. Loosen screws (29, fig. 9-6), and remove cover (32). Remove mounting hardware (17, 4, and 3) and cover (14). *b*. Measure the resistance between E10 and chassis ground with the multimeter. (1) If the meter reading is greater than 9 K ohms, proceed to step *c*. (2) If thc meter reading is less than 9 K ohms, replace A5T1 (par. 9-18). *c*. Disconnect and separate both leads to L1-2, and measure the resistance between E13 and chassis ground with the multimeter. (1) If the meter reading is less than 9 K ohms, proceed to step *d*. (2) If the meter reading is greater than 9 K ohms, proceed to step *g*. *d*. Disconnect the cathode lead to CR4, and measure the resistance between E13 and chassis ground with the multimeter. (1) If the meter reading is greater than 9 K ohms, proceed to step *e*. (2) If the meter reading is less than 9 K ohms, proceed to step *f.* *e*. Disconnect the anode lead to CR4, and measure the resistance between tile cathode and anode of CR4 with the multimeter.

Table 9-1. AC Power Supply/Signal Conditioner Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 31 Continued	(1) If the meter reading is less than 9 K ohms, replace CR4, and proceed to step *q*. (2) If the meter reading is greater than 9 K ohms, replace the insulating washers on CR4 and proceed to step *t*. *f*. Disconnect one lead of C10, and test the capacitor for a short with the multimeter. (1) If the meter reading indicates C10 to be good, reconnect the lead of C10, and replace L1 (par. 9-15). (2) If the meter reading indicates C10 to be shorted, replace C10, and proceed to step *t*. *g*. Disconnect one lead of C9, and test the capacitor for a short with the multimeter. (1) If the meter reading indicates C9 to be good, proceed to step *h*. (2) If the meter reading indicates C9 to be shorted, replace C9, and proceed to step *t*. *h*. Disconnect the cathode lead of CR2, and measure the resistance between T2-2 and chassis ground with the multimeter. (1) If the meter reading is greater than 9 K ohms, replace CR2 (par. 9-8), proceed to step *q*. (2) If the meter reading is less than 9 K ohms, reconnect the lead to CR2, and proceed to step *i*. *i*. Disconnect the collector lead to Q1, and measure the resistance between T2-2 and chassis ground with the multimeter. (1) If the meter reading is greater than 9 K ohms, proceed to step *j*. (2) If the meter reading is less than 9 K ohms, reconnect the lead to Q 1, and proceed to step *k*. *j*. Disconnect and tag the leads to the emitter and base of Q1, and measure the resistance between the collector of Q1 and chassis ground with the multimeter (1) If the meter reading is less than 90 K ohms, replace the insulating washer of Q1 (par. 9-7), and proceed to step *t*. (2) If the meter reading is greater than 90 K ohms, replace Q1 (par. 9-7) and proceed to step *o*. *k*. Disconnect the cathode lead to CR3, and measure the resistance between T2-2 and chassis ground with the multimeter. (1) If the meter reading is greater than 9 K ohms, replace CR3 (par. 9-8), and proceed to step *q*. (2) If the meter reading is less than 9 K ohms, reconnect the lead of CR3, and proceed to step *l*. *l*. Disconnect the collector lead of Q2, and measure the resistance between T2-2 and chassis ground with the multimeter. (1) If the meter reading is greater than 9 K ohms, proceed to step *m*. (2) If the meter reading is less than 9 K ohms, reconnect the lead to Q1, and proceed to step *n*. *m*. Disconnect and tag the leads to the emitter and base of Q2, and measure the resistance between the collector and chassis ground with the multimeter. (1) If the meter reading is less than 90 K ohms, replace the insulating washers of Q2 (par. 9-7), and proceed to step *t*. (2) If the meter reading is greater than 90 K ohms, replace Q2 (par. 9-7), and proceed to step *p*. *n*. Disconnect and tag the leads to T2-1 and T2-3. Measure the resistance between T2-2 and chassis ground with the multimeter. (1) If the meter reading is less than 90 K ohms, replace T2 (par. 9-14), and proceed to step *t*. (2) If the meter reading is greater than 90 K ohms, replace T1 (par. 9-11), and proceed to step *t*. *o*. Disconnect one lead to CR2, and test the diode with the multimeter. (1) If the multimeter indicates CR2 to be good, reconnect the lead to CR2, and proceed to step *q*. (2) If the meter reading indicates CR2 to be faulty, replace CR2 (par. 9-8), and proceed to step *q*. *p*. Disconnect one lead to CR3, and test the diode with the multimeter. (1) If the meter reading indicates CR3 to be good, reconnect the lead to CR3, and proceed to step *q*. (2) If the meter reading indicates CR3 to be faulty, replace CR3 (par. 9-8) and proceed to step *q*. *q*. Disconnect one lead of CR1, and test the diode with the multimeter. (1) If the meter reading indicates CR1 to be good, reconnect the lead to CR1, and proceed to step *r*. (2) If the meter reading indicates CR1 to be faulty, replace CR1, and proceed to step *r*.

Table 9-1. AC Power Supply/Signal Conditioner Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 31 Continued	*r*. Disconnect one lead of C1, and test the capacitor for an open or a short with the multimeter. (1) If the meter reading indicates C1 to be good, reconnect the lead of C1, and proceed to step *s*. (2) If the meter reading indicates C1 to be open or shorted, replace C1, and proceed to step *s*. *s*. Repeat step r for C9 and C10, and proceed to step *t*. *t*. Reconnect all disconnected leads, and reinstall A4. Install cover (32, fig. 9-6), and tighten screws (29). Install cover (14) with mounting hardware (3, 4, and 17).
REF TM 32	*a*. Remove mounting hardware (17, 4, and 3, fig. 9-6) and cover (14). *b*. Disconnect the lead from L1-3, and measure the resistance between L1-3 and L1-1 with the multimeter. (1) If the meter reading is greater than 10 ohms, replace L1, and proceed to step *c*. (2) If the meter reading is less than 10 ohms, replace CR4, reconnect L1 leads, and proceed to step *c*. *c*. Install cover (14) with mounting hardware (17, 4 and 3).
REF TM 33	*a*. Remove mounting hardware (17, 4 and 3, fig. 9-6) and cover (14). *b*. Disconnect the lead from L3-2, and measure the resistance between 1,3-2 and L3-1 with the multimeter. (1) If the meter reading is greater than 10 ohms, replace L3 (par. 9-12). (2) If the meter reading is less than 10 ohms, reconnect the lead to L3-2, and proceed to step *c*. *c*. Disconnect one lead of C3, and test the capacitor for open with the multimeter. (1) If the meter reading indicates C3 to be good, reconnect the lead of C3, and proceed to step *d*. (2) If the meter reading indicates C3 to be open, replace C3, and proceed to step *d*. *d*. Repeat step c for C4 and C5, and proceed to step *e*. *e*. If C3, C4, and C5 all tested good, replace L3 (par. 9-12).
REF TM 34	*a*. Remove mounting hardware (17, 4 and 3, fig. 9-6) and cover (14). *b*. Disconnect the lead from L2-2, and measure the resistance between 1,2-1 and L2-2 with the multimeter. (1) If the meter reading is greater than 10 ohms, replace L2 (par. 9-12). (2) If the meter reading is less than 10 ohms, reconnect the lead to L2-2, and proceed to step *c*. *c*. Disconnect one lead of C6, and test the capacitor for an open with the multimeter. (1) If the meter reading indicates C6 to be good, reconnect the lead of C6, and replace L2 (par. 9-12). (2) If the meter reading indicates C6 to be open, replace C6, and proceed to step *d*. *d*. Install cover (14) with mounting hardware (17, 4 and 3).
REF TM 35	**NOTE** **If the UUT does not have a C13, connect a 0.47 uf capacitor (par. 9.22) between E59 and E66.** *a*. Replace C13 (par. 9-22), and rerun the program. *b*. if REF TM 35 is displayed on SSVD again, replace C2, and rerun the program. *c*. If REF TM 35 is displayed on SSVD for the third time, selection of C13 must be performed. Replace C 13 with a different value capacitor from the kit (par. 9-22), and rerun the program. *d*. If subsequent SSVD displays of REF TM 35 occur, repeat step c above until the failed test passes or selection values of C13 are exhausted. *e*. If the selection values of C13 are exhausted and the test continues to fail, return the UUT to the depot
REF TM 36	Remove and install a new A3, and rerun the program. If REF TM 36 is displayed on SSVD again, reinstall the removed A3, and replace A4. If REF TM 36 does not display on SSVD again, the removed A3 is faulty.
REF TM 37	Observe the value displayed on 1A10. Adjust R1 counterclockwise, just past the point where the value on 1A10 stops increasing. Press the PROCEED switch.

Table 9-1. AC Power Supply/Signal Conditioner Programmed Tests - Continued.

Print message ref no.	Action or instructions
REF TM 38	*a*. Loosen screws (29, fig. 9-6) and remove cover (32). *b*. Disconnect one lead of C11 and test tile capacitor for a short with the multimeter. (1) If the meter reading indicates C11 to be good, reconnect the lead of C11, reinstall A3, and replace A4. (2) If tile meter reading indicates C11 to be shorted, reinstall A3 and A4, and replace C11 (par. 9-9)
REF TM 39	*a*. Loosen screws (29, fig. 9-6), and remove bottom plate (32). *b*. Disconnect one lead of C12, and test the capacitor for an open with the multimeter. (1) If the meter reading indicates C12 to be good, reconnect the lead of C12, and proceed to step *c*. (2) If the meter reading indicates C12 to be open, replace C12, and proceed to step *c*. **NOTE** **Refer to paragraph 9-22 for replacement of C13, C14, and C16.** *c*. Repeat step b for C13, C14, C15, and C16, and proceed to step *d*. *d*. Install cover (32), and tighten screws (29).
REF TM 40	*a*. Remove mounting hardware (17, 4 and 3, fig. 9-6) and cover (14). *b*. Remove A4, and measure the resistance between A4-11 and A4-22 with the multimeter. (1) If the meter reading is less than 900 ohms, replace A4 and A3, and proceed to step *c*. (2) If the meter reading is greater than 900 ohms, reinstall A4, and replace A3. Proceed to step *c*. *c*. Install cover (14) with mounting hardware (17, 4 and 3).
REF TM 41	*a*. Remove mounting hardware (17, 4 and 3, fig. 9-6) and cover (14). *b*. Remove A4, and measure the resistance between A4-11 and A4-22 with the multimeter. (1) If the meter reading is less than 900 ohms, replace A4, and proceed to step *c*. (2) If the meter reading is greater than 900 ohms, reinstall A4, and proceed to step *c*. *c*. Remove A3, and measure the resistance between A3-15 and A3-22 with the multimeter. (1) If the meter reading is less than 900 ohms, replace A3 and A1, and proceed to step *e*. (2) If the meter reading is greater than 900 ohms, proceed to step *d*. *d*. Measure the resistance between A3-11 and A3-22 with the multimeter. (1) If the meter reading is less than 900 ohms, replace A3 and A1, and proceed to step *e*. (2) If the meter reading is greater than 900 ohms, reinstall A3, and replace A1. Proceed to step *e*. *e*. Install cover (14) with mounting hardware (17, 4 and 3).
REF TM 42	*a*. Loosen screws (29, fig. 9-6), and remove cover (32). *b*. Disconnect one lead of CR7, and test the diode with the multimeter. (1) If the meter reading indicates CR7 to be good, reconnect the lead of CR7, replace Q3, and proceed to step *c*. (2) If the meter reading indicates CR7 to be faulty, replace CR7 and Q3, and proceed to step *c*. *c*. Install cover (32), and tighten screws (29).
REF TM 43	*a*. Disconnect one lead of C10, and test the capacitor for an open with the multimeter. (1) If the meter reading indicates C10 to be good, reconnect the lead of C10, and proceed to step *b*. (2) If the meter reading indicates C10 to be open, replace C10. *b*. Discontinue the UUT test, and run the confidence and maintenance test program in accordance with TM 9-4935-552-14/2.

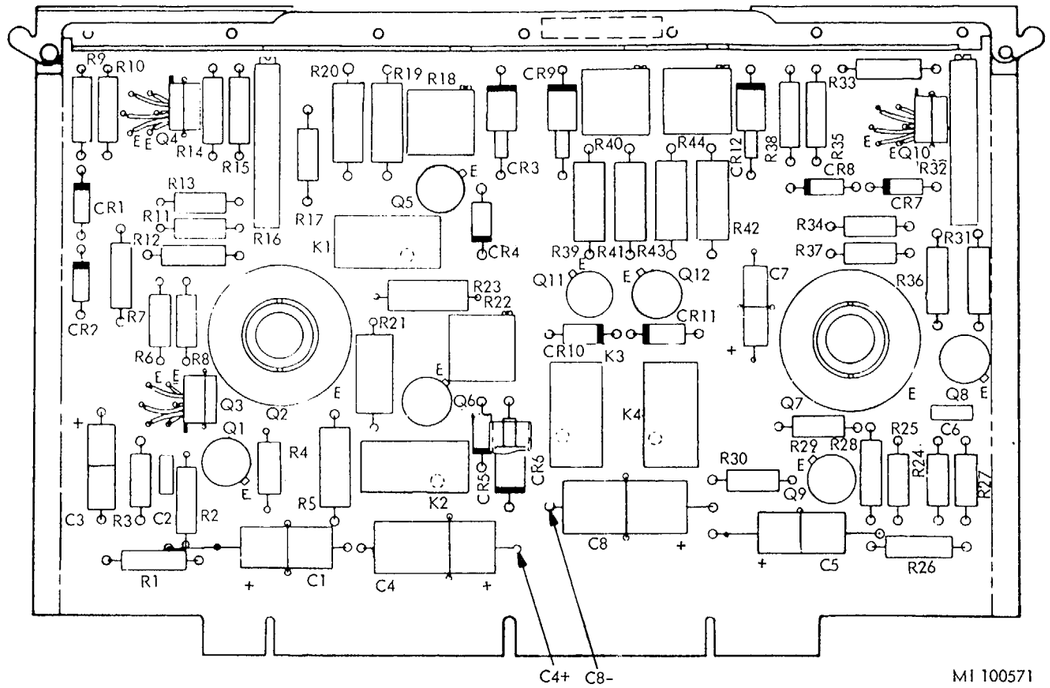
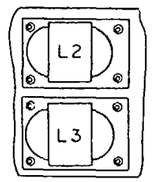
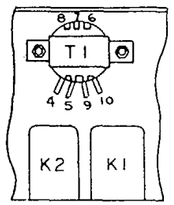


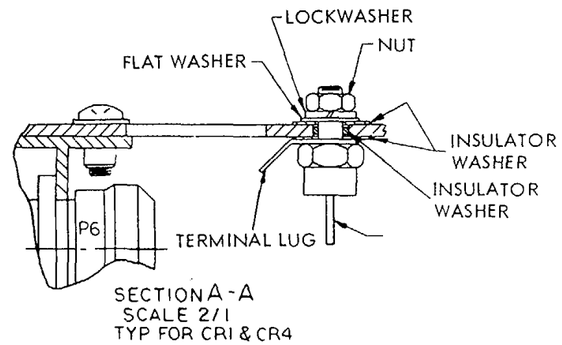
Figure 9-2. ±25 VDC regulator (A1), probing diagram.



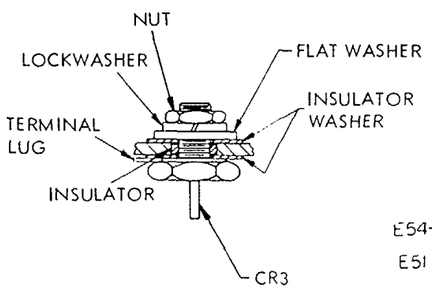
VIEW J-J
SCALE NONE



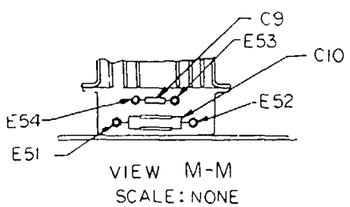
VIEW K-K
SCALE NONE



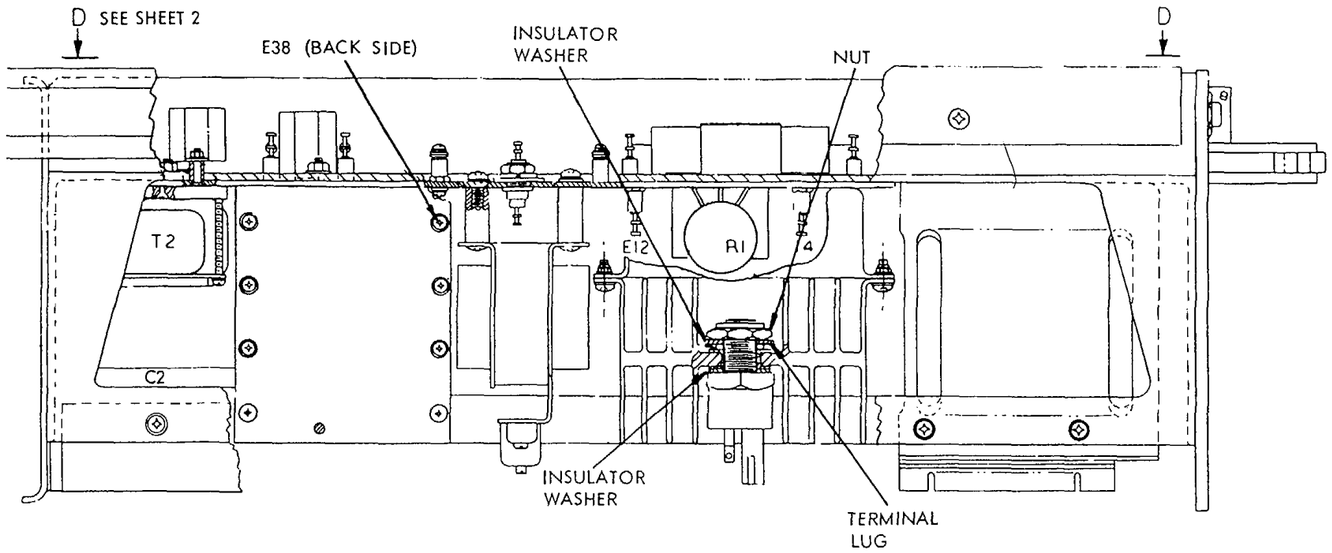
SECTION A-A
SCALE 2/1
TYP FOR CR1 & CR4



SECTION B-B
TYP FOR CR2 & CR3
SCALE 2/1



VIEW M-M
SCALE: NONE



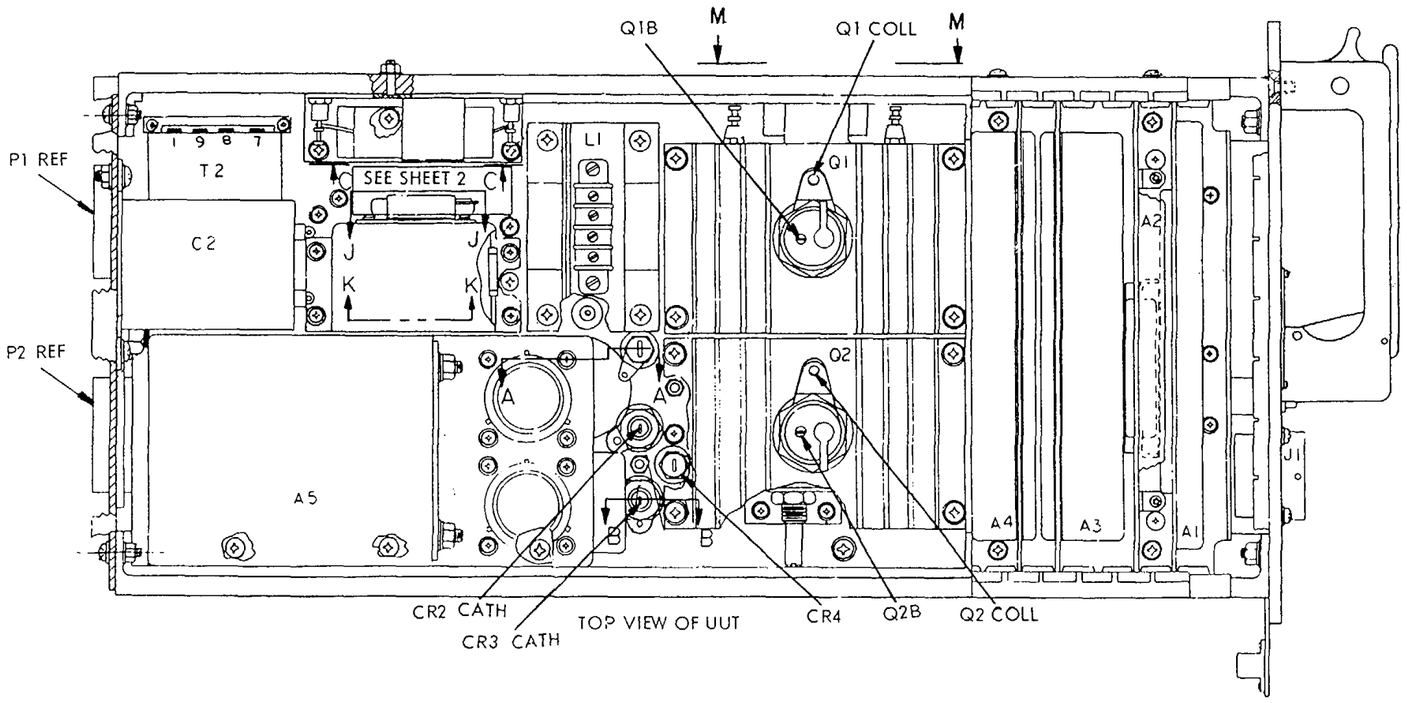


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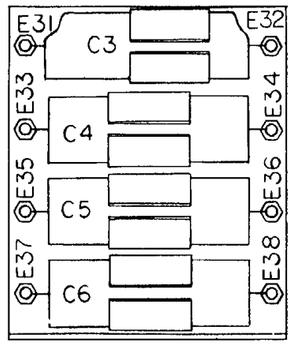
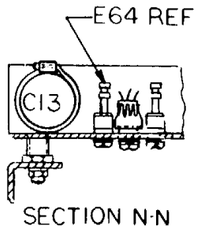
Figure 9-3. TA-222, parts location diagram (sheet 1 of 2).



VIEW C-C
SEE SHEET 1



SECTION N-N
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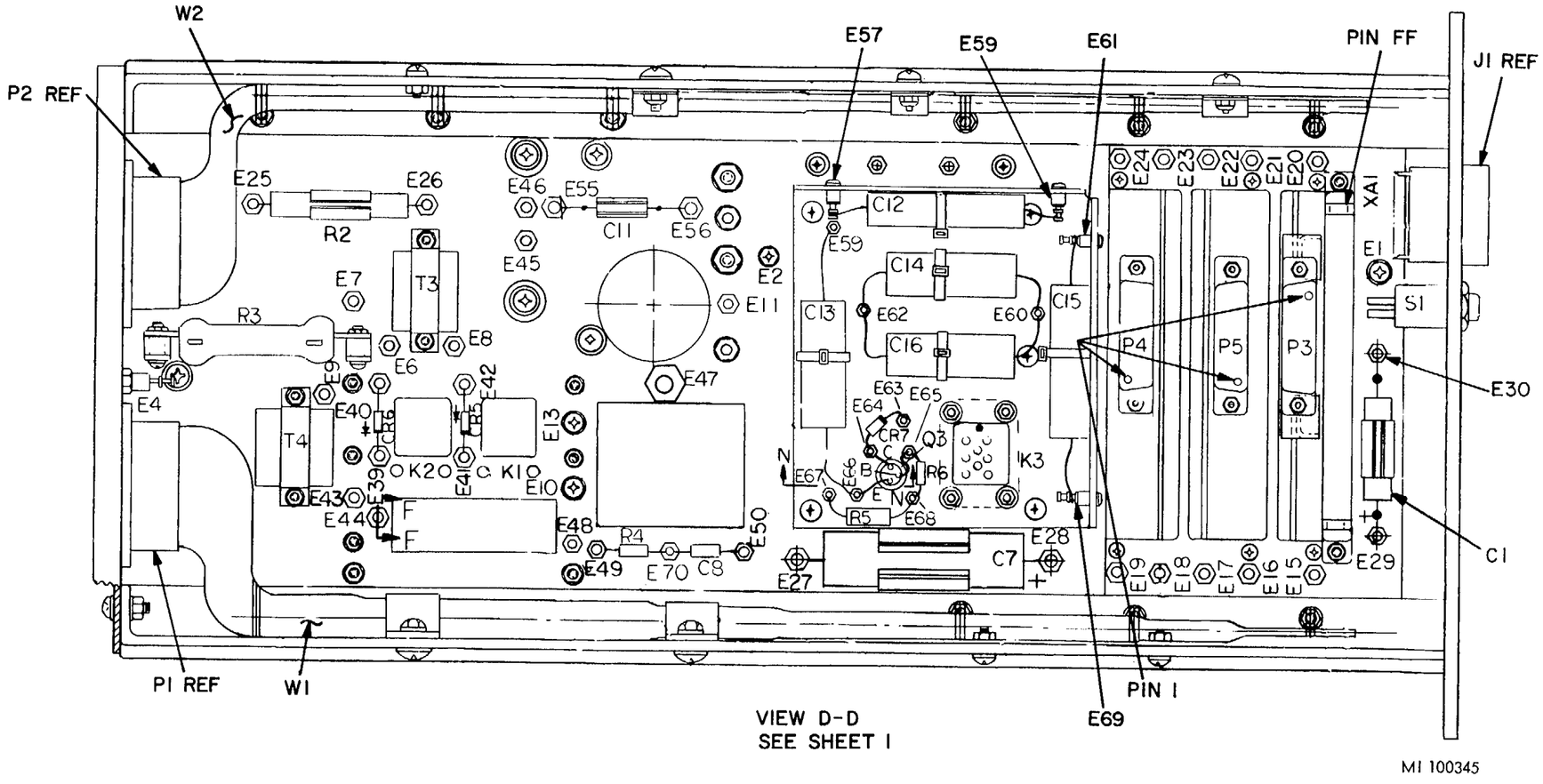

VIEW D-D
SEE SHEET 1

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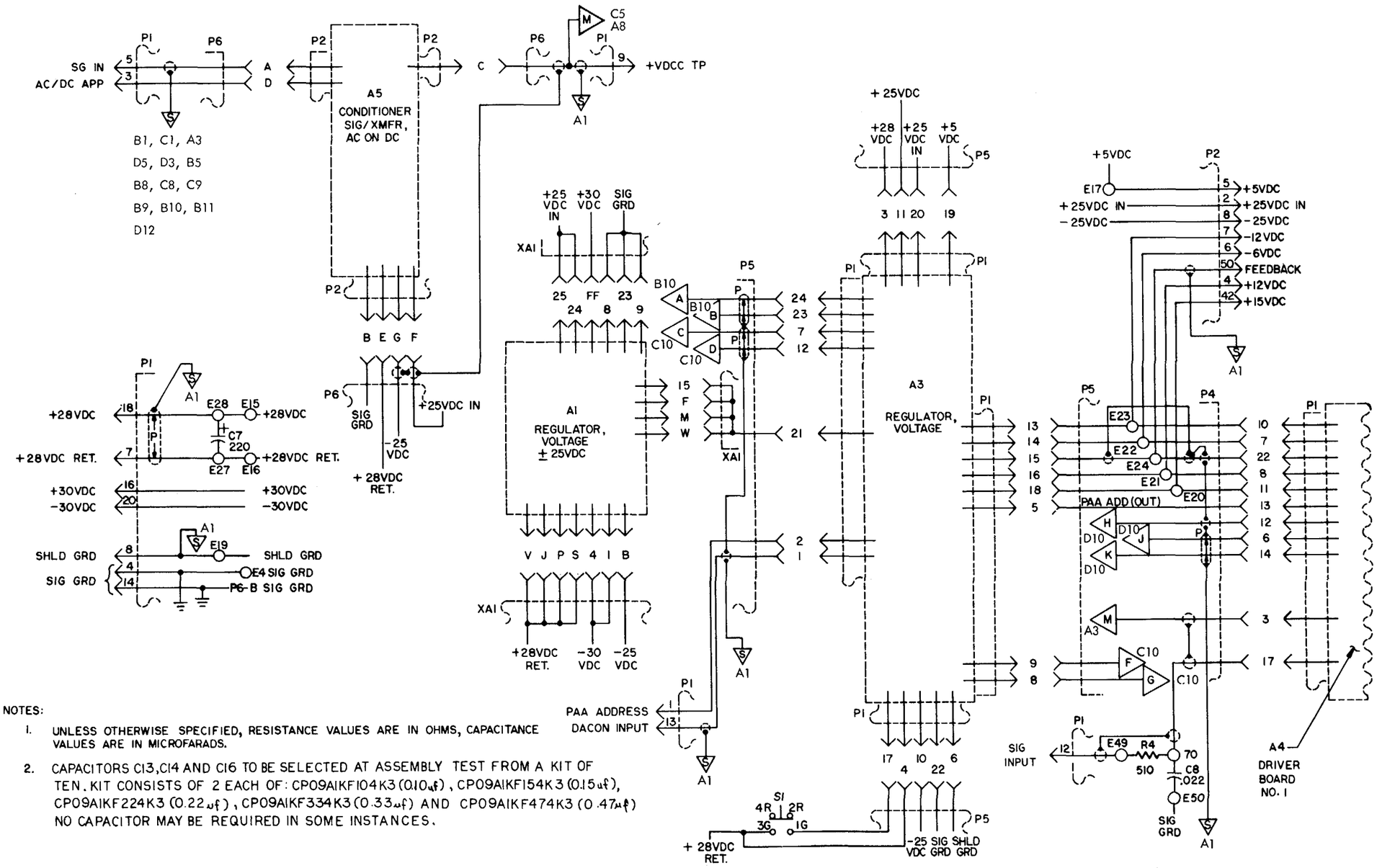
Figure 9-3. (sheet 2 of 2).



NOTES:

1. UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS, CAPACITANCE VALUES ARE IN MICROFARADS.
2. CAPACITORS C13,C14 AND C16 TO BE SELECTED AT ASSEMBLY TEST FROM A KIT OF TEN. KIT CONSISTS OF 2 EACH OF: CP09AIKF104K3 (0.10μf), CP09AIKF154K3 (0.15μf), CP09AIKF224K3 (0.22μf), CP09AIKF334K3 (0.33μf) AND CP09AIKF474K3 (0.47μf) NO CAPACITOR MAY BE REQUIRED IN SOME INSTANCES.

Figure 9-4. TA-222 schematic diagram (sheet 1 of 2).

Figure 9-4. (sheet 2 of 2).

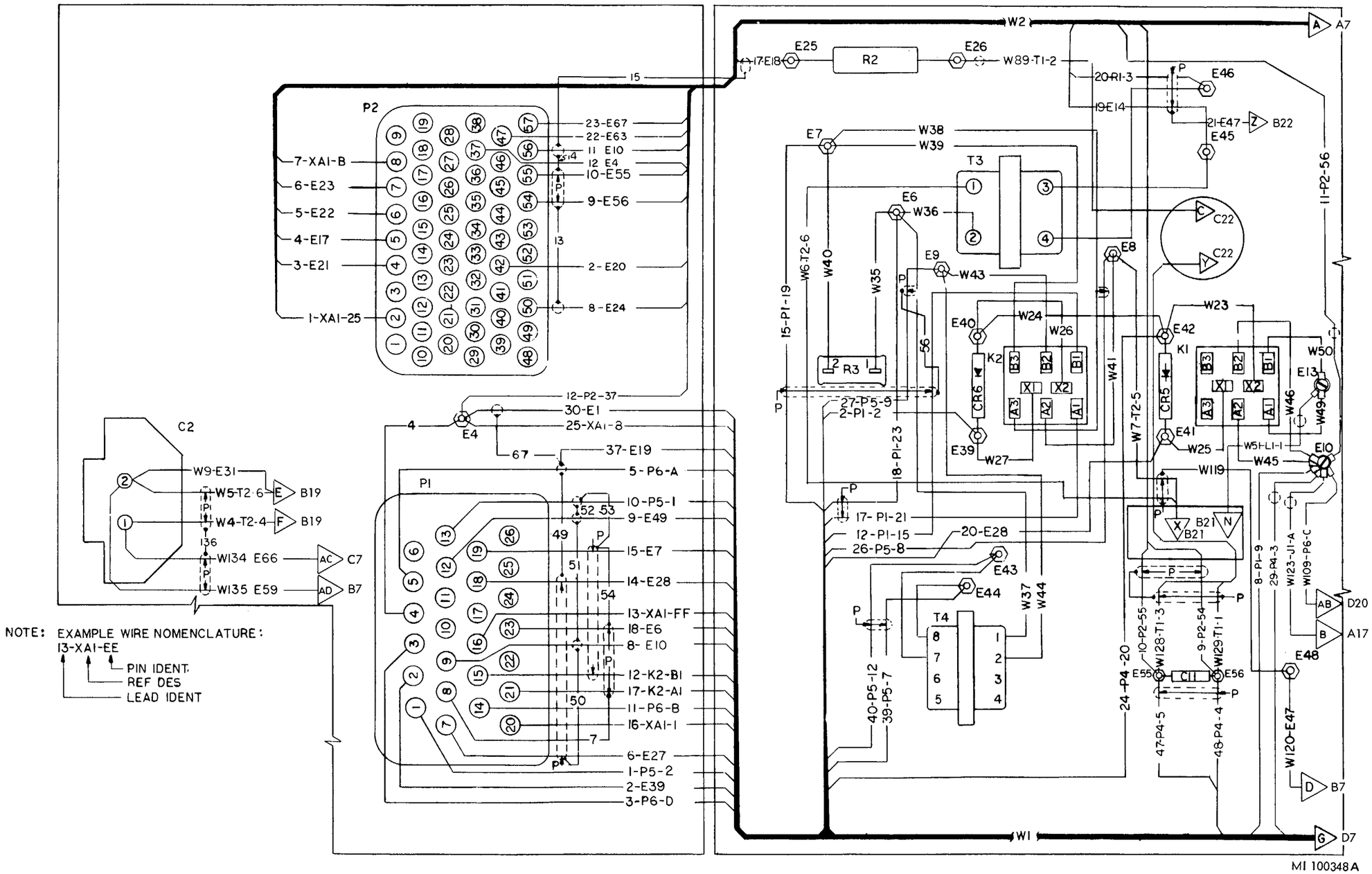


Figure 9-5. TA-222, wiring diagram (sheet 1 of 4).

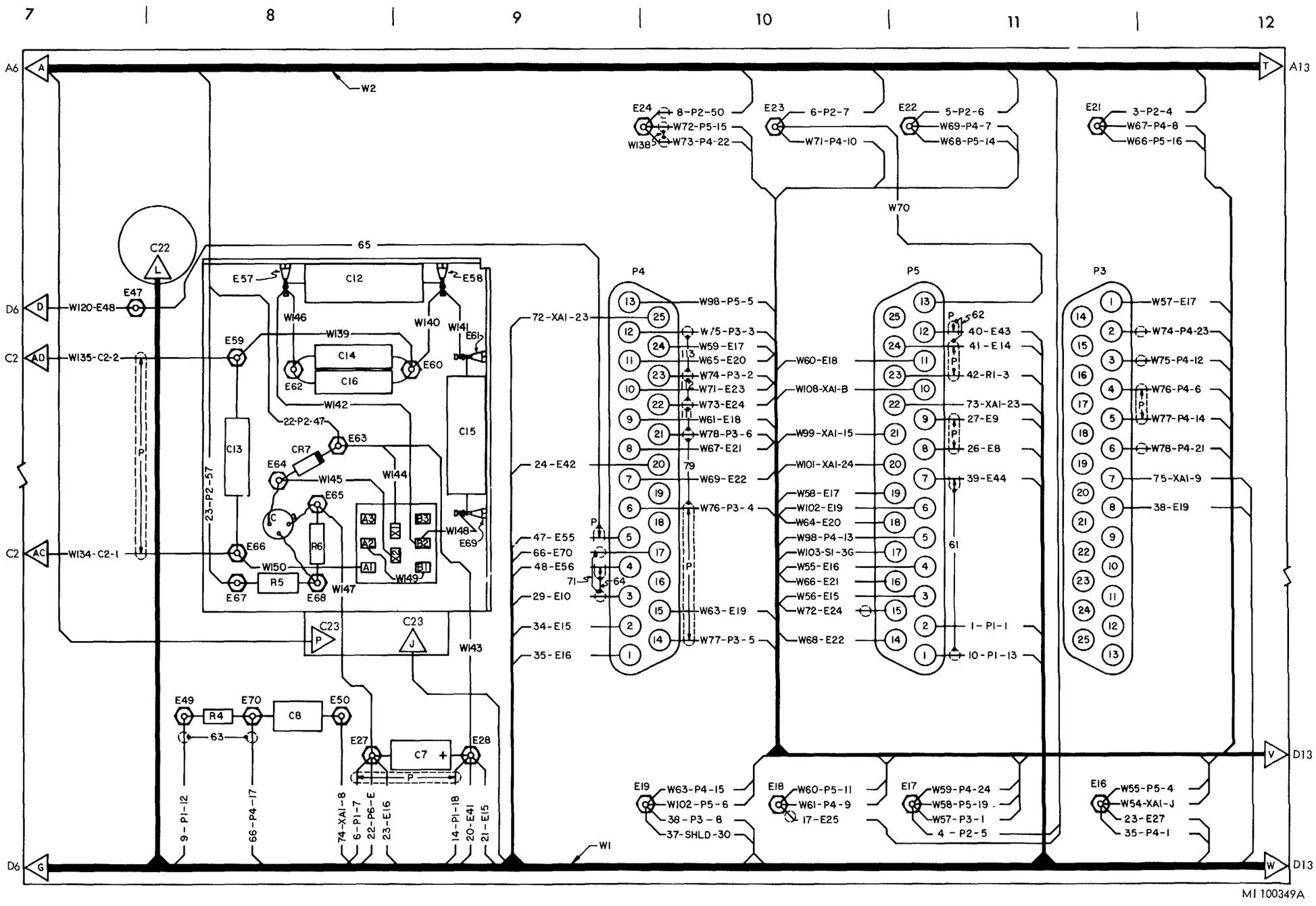


Figure 9-5. (sheet 2 of 4).

13 | 14 | 15 | 16 | 17 | 18

A

B

C

D

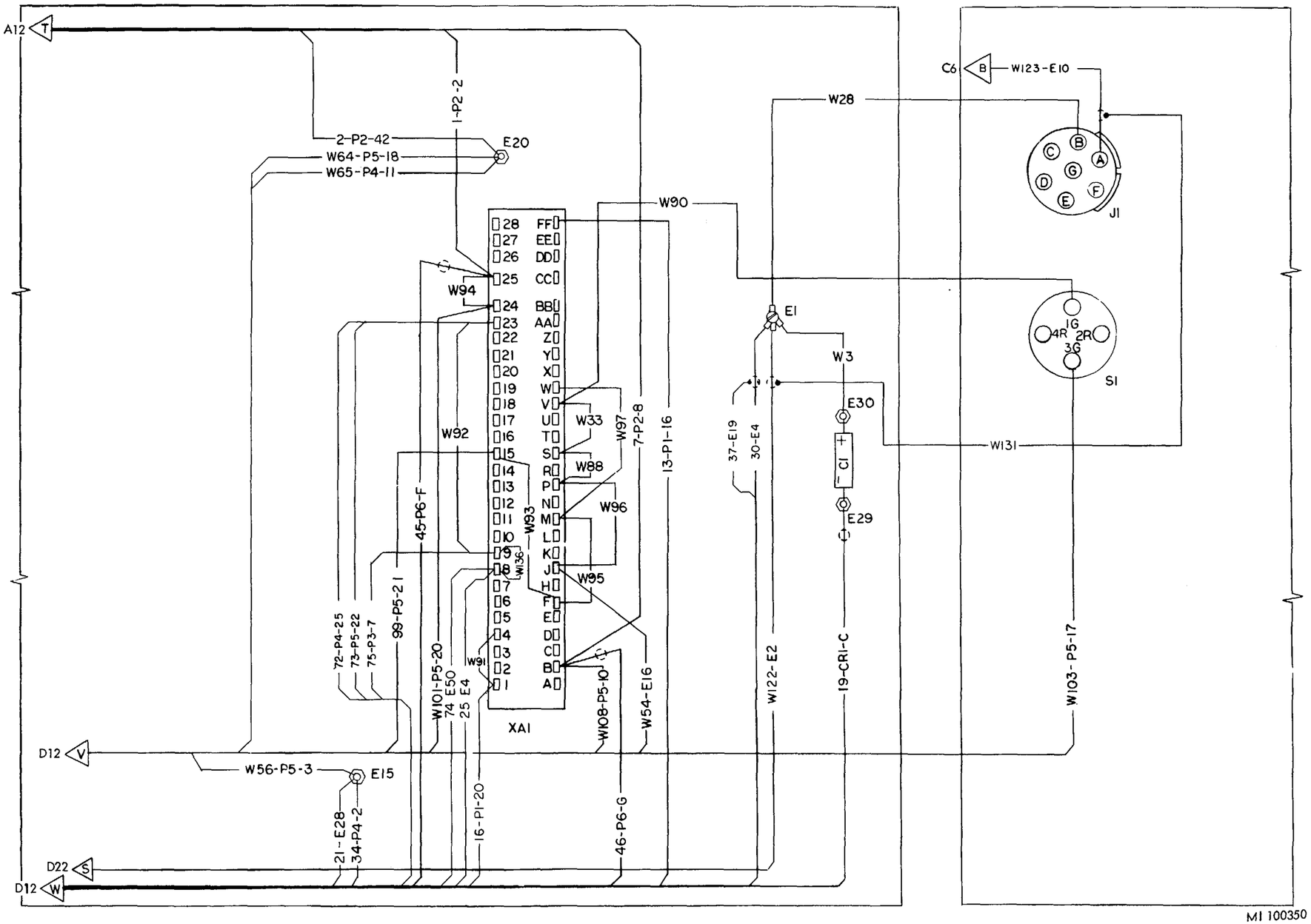


Figure 9-5. (sheet 3 of 4).

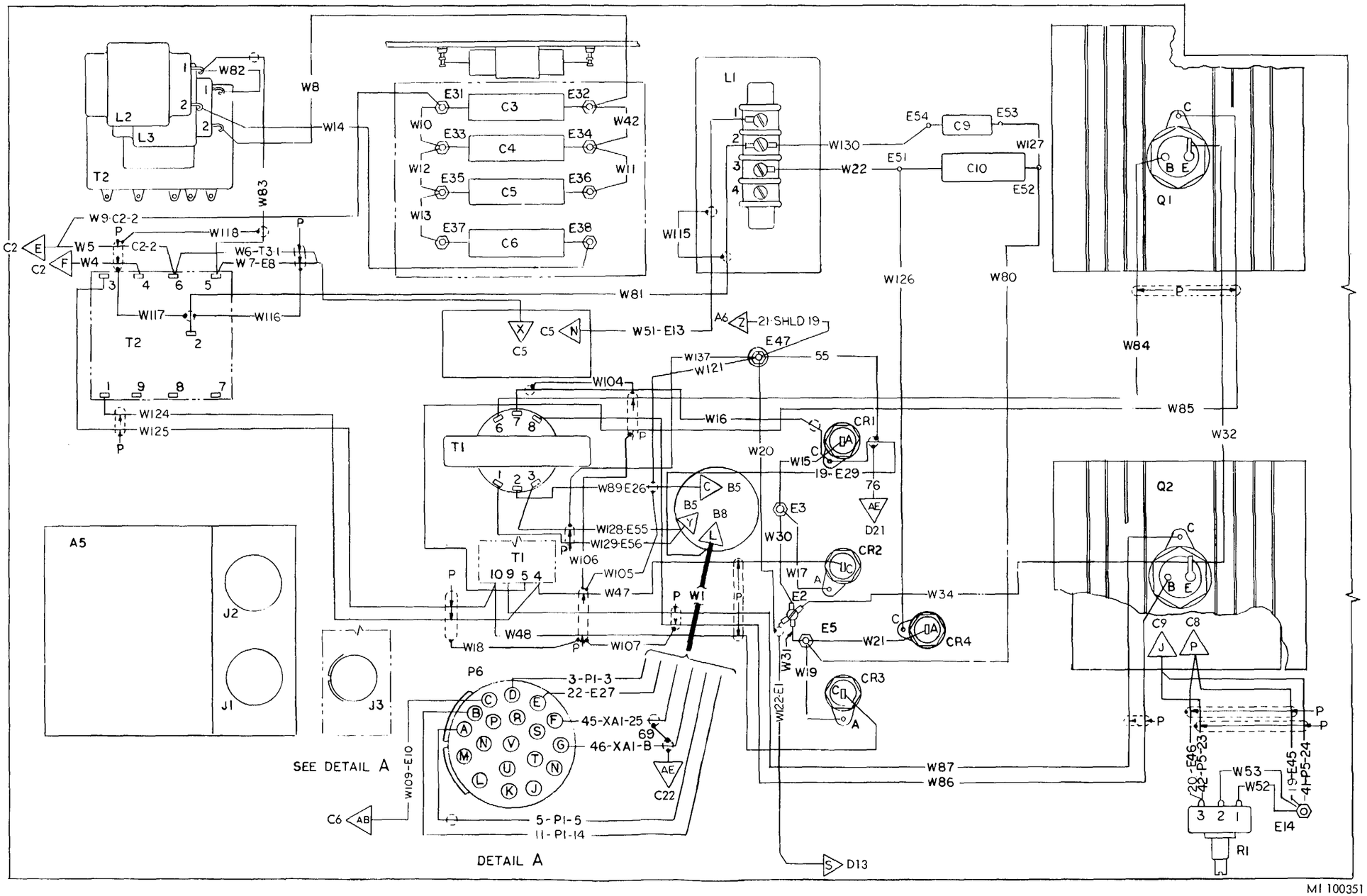


Figure 9-5. (sheet 4 of 4).

Section II. REPAIR PROCEDURES

9-5. General

This section provides repair information for the UUT within the scope of DS and GS maintenance personnel. Figures 9-6 through 9-11 illustrate the disassembly and assembly of the UUT. Paragraphs 9-6 through 9-22 contain only those procedures peculiar to the UUT or not obvious to a trained technician. TM 9-4935-557-34P contains a list of repair parts and special tools authorized for maintenance personnel.

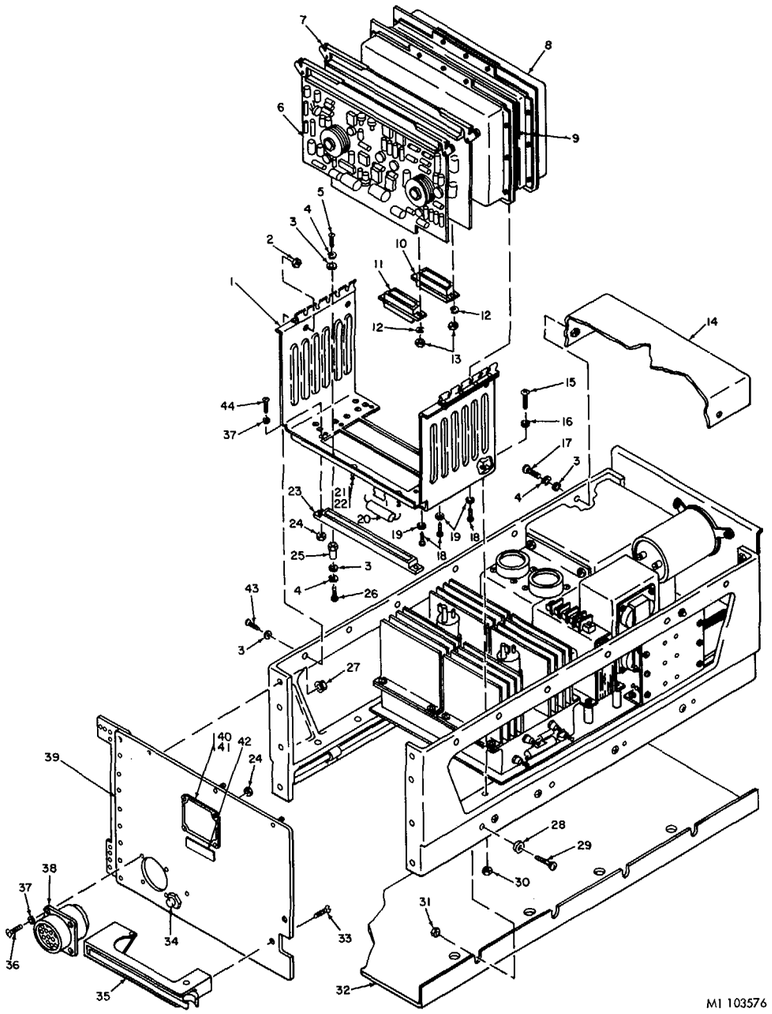
9-6. Module (A5) Removal and Installation Procedure

a. Removal.

(1) Remove mounting hardware (3, 4, and 17, fig. 9-6) and dust cover (14).
(2) Remove mounting hardware (28, 29, and 31) and cover (32).
(3) Remove mounting hardware (14 and 15, fig. 9-8).
(4) Disconnect P6 (34) from A5J3 and remove A5 (13).

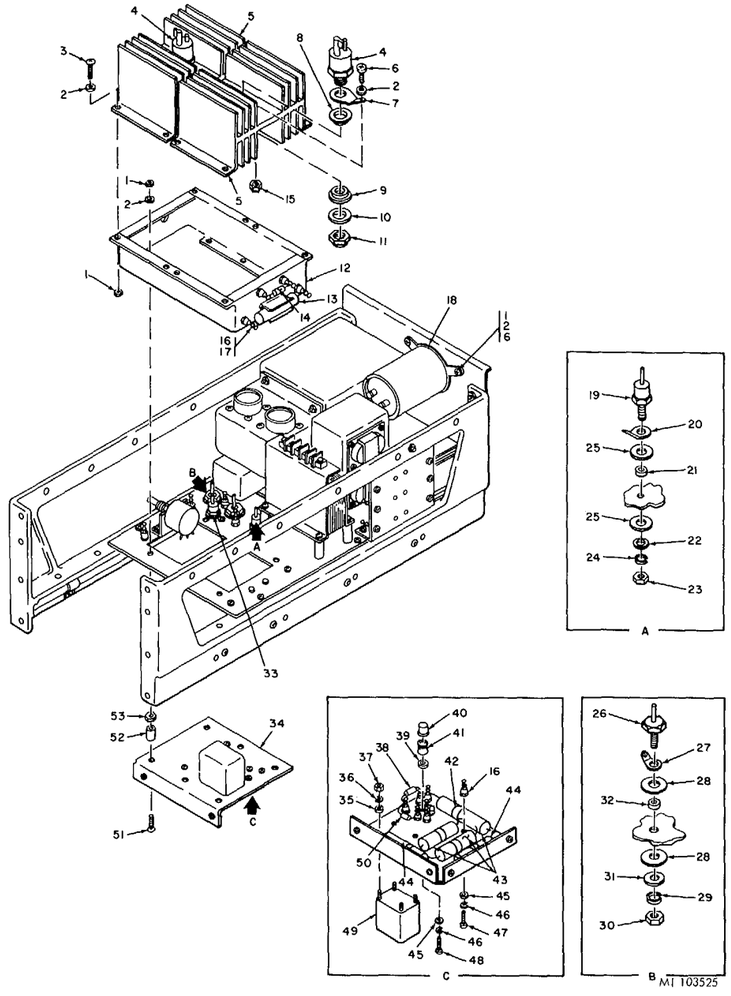
b. Installation.

(1) Install A5 (13, fig. 9-8) and connect P6 (34) to A5J3.
(2) Install mounting hardware (14 and 15).
(3) Install cover (32, fig. 9-6) with mounting hardware (28, 29, and 31).
(4) Install dust cover (14) with mounting hardware (3, 4, and 17).



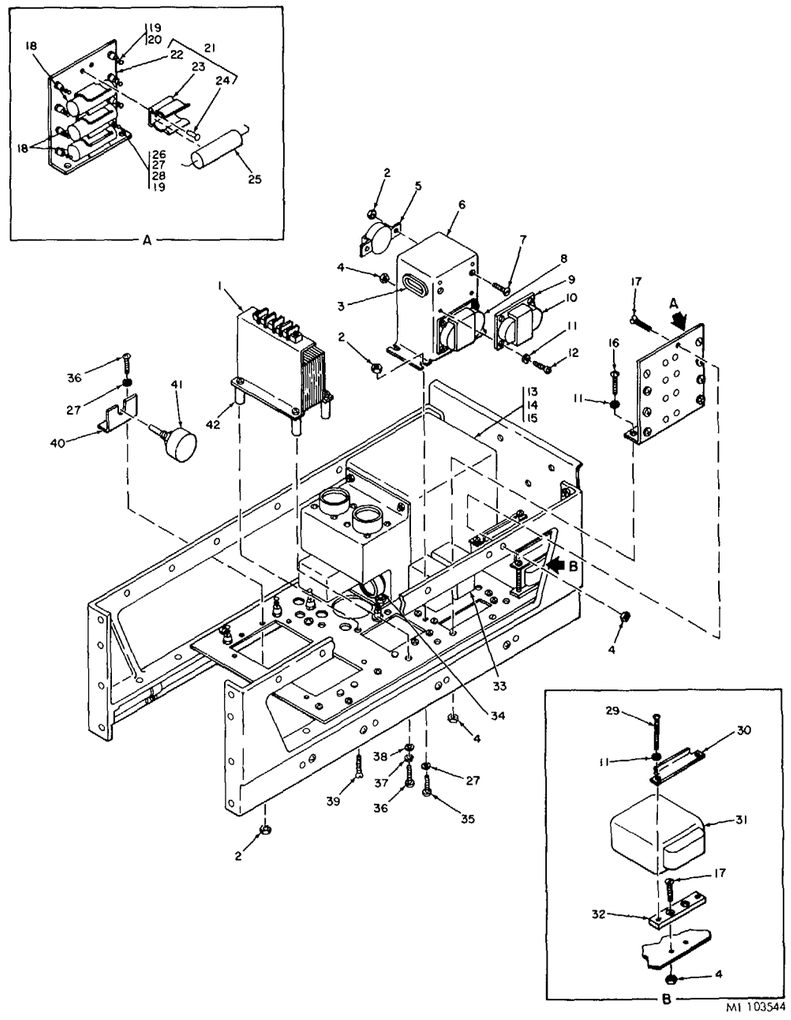
1 – Holder assembly (Depot repair)
2 – Nut
3 – Washer
4 – Lockwasher
5 – Screw
6 – A1 (Depot repair)
7 – A2 (Depot repair)
8 – A4 (Depot repair)
9 – A3 (Depot repair)
10 – P5
11 – P3, P4
12 – Lockwasher
13 – Nut
14 – Dust cover (Depot repair)
15 – Screw
16 – Washer
17 – Screw
18 – Screw
19 – Washer
20 – C1
21 – E15 through E24, E29, E30
22 – Screw
23 – XA1
24 – Nut
25 – Insulator
26 – Screw
27 – Nut (Depot only)
28 – Washer
29 – Screw
30 – Nut
31 – Nut
32 – Cover
33 – Screw
34 – S1
35 – Handle assembly
36 – Screw
37 – Washer
38 – J1
39 – Front panel (Depot only)
40 – Identification plate (Depot repair)
41 – Screw
42 – Decal
43 – Screw
44 – Screw

Figure 9-6. Repair of TA-222 - view 1.



1 – Nut
2 – Washer
3 – Screw
4 – Q1, Q2
5 – Heat sink
6 – Screw
7 – Terminal lug
8 – Washer
9 – Bushing
10 – Washer
11 – Nut
12 – Bracket
13 – C10
14 – C9
15 – Nut
16 – E51 through E54, E57 through E69
17 – Screw
18 – C2
19 – CR1
20 – Terminal lug
21 – Insulator
22 – Washer
23 – Nut
24 – Lockwasher
25 – Insulator
26 – CR2, CR3
27 – Terminal lug
28 – Insulator
29 – Lockwasher
30 – Nut
31 – Washer
32 – Washer
33 – CR4
34 – Bracket (Depot repair)
35 – Washer
36 – Lockwasher
37 – Nut
38 – CR7
39 – Bushing
40 – Q3
41 – Retainer
42 – Strap
43 – C13, C14, C16
44 – C12, C15
45 – Washer
46 – Lockwasher
47 – Screw
48 – Screw
49 – K3
50 – R6
51 – Screw
52 – Spacer
53 – Nut

Figure 9-7. Repair of TA-222 - view 2.



1 – L1
2 – Nut
3 – Grommet
4 – Nut
5 – T1
6 – Bracket
7 – Screw
8 – L3
9 – Plate (Depot repair)
10 – L2
11 – Washer
12 – Screw
13 – A5
14 – Screw
15 – Nut
16 – Screw
17 – Screw
18 – C4, C5, C6
19 – E31 through E38
20 – Screw
21 – Bracket (Depot repair)
22 – Bracket (Depot only)
23 – Clip (Depot only)
24 – Rivet (Depot only)
25 – C3
26 – Lockwasher
27 – Washer
28 – Screw
29 – Screw
30 – Bracket
31 – T2
32 – Bracket
33 – K1, K2
34 – P6
35 – Screw
36 – Screw
37 – Lockwasher
38 – Washer
39 – Screw
40 – Holder
41 – R1
42 – Post

Figure 9-8. Repair of TA-222 - view 3

9-7. Transistor (Q1 or Q2) Removal and Installation Procedure

a. Removal

(1) Remove mounting hardware (3, 4, and 17, fig. 9-6) and dust cover (14).
(2) Disconnect and tag the leads to Q1 or Q2 (4, fig. 9-7).
(3) Remove mounting hardware (1 trough 3) and the transistor and heat sink (5) from bracket (12).
(4) Remove mounting hardware (8 through 11) and Q1 or Q2 from the heat sink.

b. Installation.

(1) Install Q1 or Q2 (4, fig. 9-7) with mounting hardware (8 through 11) on heat sink (5).
(2) Install the heat ink with mounting hardware (1 through 3) on bracket (12).
(3) Connect the leads to Q1 or Q2.
(4) Install dust cover (14, fig. 9-6) with mounting hardware (3, 4, and 17).

9-8. Diode (CR2 or CR3) Removal and Installation Procedure

a. Removal

(1) Remove A5 (par. 9-6a).
(2) Disconnect and tag the leads to CR2 or CR3 (26, fig. 9-7).
(3) Remove mounting hardware (27 through 32) and CR2 or CR3.

b. Installation.

(1) Apply thermal compound, NAS2906-25W, to the mounting surface on both sides of the chassis.
(2) Install CR2 or CR3 (26, fig. 9-7) with mounting hardware (27 through 32).
(3) Connect the leads to CR2 or CR3.
(4) Install A5 (par. 9-6b).

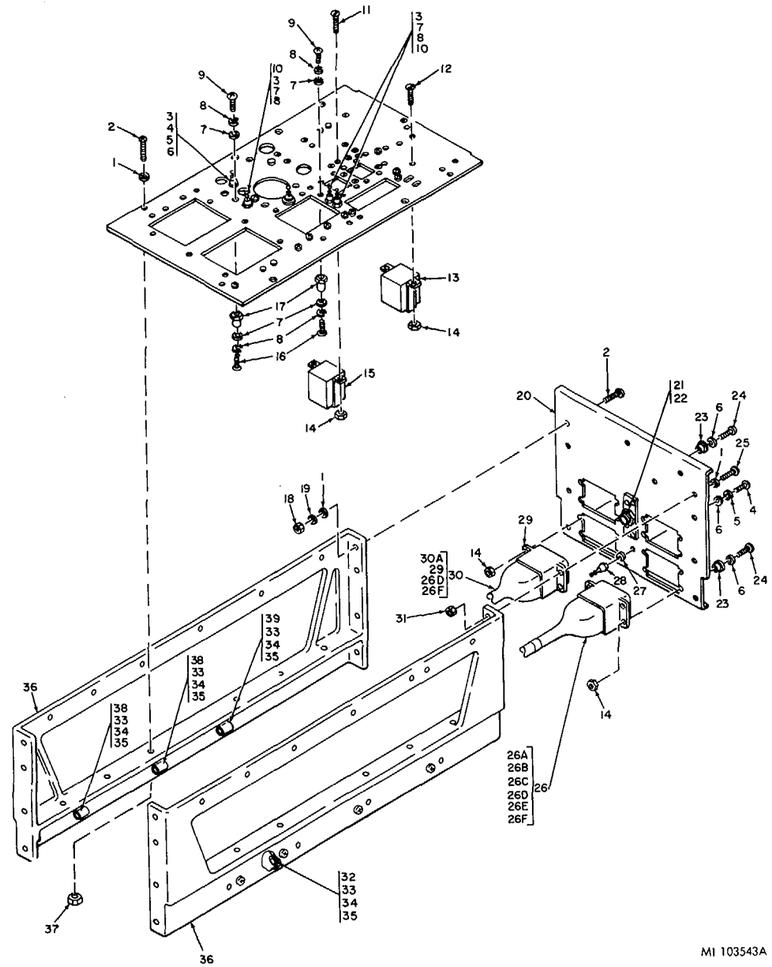
9-9. Capacitor (C8 or C11) Removal and Installation Procedure

a. Removal

(1) Remove mounting hardware (28, 29, and 31, fig. 9-6) and cover (32) from the chassis.
(2) Disconnect and tag the leads to C8 (6, fig. 9-10) or C11 (22) and remove the capacitor.
(3) Clean the mounting area with alcohol, Fed Spec O-E-760, grade 3. Allow the area to dry for at least five minutes.

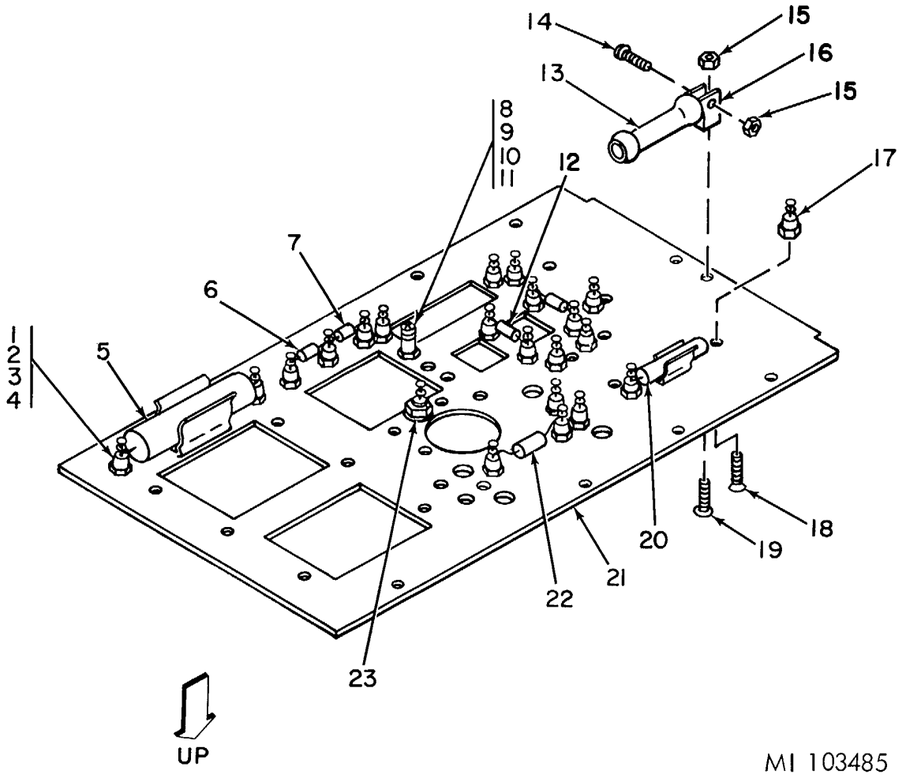
b. Installation.

(1) Install C8 (6, fig. 9-10) or C11 (22) and connect the leads.
(2) Bond the capacitor to plate (21) with silicone adhesive sealant, MIL-A-46106.
(3) Install cover (32, fig. 9-6) with mounting hardware (28, 29, and 31) on the chassis.



1 – Washer
2 – Screw
3 – E1, E2, E10, E13
4 – Screw
5 – Lockwasher
6 – Washer
7 – Washer
8 – Lockwasher
9 – Screw
10 – Screw
11 – Screw
12 – Screw
13 – T4
14 – Nut
15 – T3
16 – Screw
17 – Insulator
18 – Nut (Depot only)
19 – Washer (Depot only)
20 – Panel (Depot only)
21 – Nut
22 – Bushing
23 – Bushing
24 – Screw
25 – Screw (Depot only)
26 – W1
26A – Connector
26B – Ferrule
26C – Terminal
26D – Terminal
26E – Strap
26F – Ferrule
27 – Lockwasher
28 – E4
29 – W2P2
30 – W2
30A – Strap
31 – Nut (Depot only)
32 – Clamp
33 – Screw
34 – Washer
35 – Nut
36 – Frame (Depot only)
37 – Nut
38 – Clamp
39 – Clamp

Figure 9-9. Repair of TA-222 - view 4.



1 – E3, E5 through E9, E14, E27, E28, E39 through E46, E48, E49, E50, E55, E56, E70
2 – Screw
3 – Lockwasher
4 – Washer
5 – C7
6 – C8
7 – R4
8 – Insulator
9 – Screw
10 – Washer
11 – Lockwasher
12 – CR5, CR6
13 – R3
14 – Screw
15 – Nut
16 – Holder
17 – E25, E26
18 – Screw
19 – Screw
20 – R2
21 – Plate (Depot repair)
22 – C11
23 – E47

Figure 9-10. Repair of TA-222 - view 5.

9-10. Relay (K1 or K2) Removal and Installation Procedure

a. Removal.

(1) Remove A5 (par. 9-6).
(2) Remove mounting hardware (2, 27, and 35, fig. 9-8) to gain access to K1 or K2 (33).
(3) Disconnect and tag the leads to K1 or K2.
(4) Remove the mounting hardware and K1 or K2 from plate (21, fig. 9-10).

b. Installation.

(1) Install K1 or K2 (33, fig. 9-8) with the mounting hardware on plate (21, fig. 9-10).
(2) Connect the leads to K1 or K2 (33, fig. 9-8) and remove the tags.
(3) Install bracket (6) with mounting hardware (2, 27, and 35).
(4) Install A5 (par. 9-6b).

9-11. Transformer (T1) Removal and Installation Procedure

a. Removal

(1) Remove A5 (par. 9-6a).
(2) Disconnect and tag the leads to T1 (5, fig. 9-8).
(3) Remove nuts (2) and T1 from bracket (6).

b. Installation.

(1) Install T1 (5, fig. 9-8) with nuts (2) on bracket (6).
(2) Connect the leads to T1.
(3) Install A5 (par. 9-6b).

9-12. Reactor (L2 or L3) Removal and Installation Procedure

a. Removal

(1) Remove A5 (par. 9-6a).
(2) Remove mounting hardware (2, 27, and 35, fig. 9-8) to gain access to L2 (10) or L3 (8).
(3) Remove mounting hardware (4, 11, 16, and 17) and slide bracket (21) away from L2 and L3.
(4) Disconnect and tag the leads to L2 or L3.
(5) Remove L2 or L3 from plate (9) with a knife.
(6) Clean the plate mounting area with alcohol, Fed Spec O-E-760, grade 3. Allow the area to dry for at least five minutes.

b. Installation.

(1) Bond L2 (10, fi. 9-8) or L3 (8) to plate (9) with insulating compound, MIL-I-16923, type B.
(2) Connect the leads to L2 or L3.
(3) Install bracket (21) with mounting hardware (4, 11, 16, and 17).
(4) Install bracket (6) with mounting hardware (2, 27, and 35).
(5) Install A5 (par. 9-6b).

9-13. Relay (K3) Removal and Installation Procedure

a. Removal

(1) Remove mounting hardware (3, 4, and 17, fig. 9-6) and dust cover (14).
(2) Remove mounting hardware (28, 29, and 31) and cover (32).
(3) Disconnect and tag the leads to K3 (49, fig. 9-7)
(4) Remove mounting hardware (1 through 3) securing heat sink (5) to gain access to K3.
(5) Remove mounting hardware (35 through 37) and K3 from bracket (34).

b. Installation.

(1) Install K3 (49, fig. 9-7) with mounting hardware (35 through 37) on bracket (34).
(2) Install heat sink (5) with mounting hardware (1 through 3) on bracket (12).
(3) Connect the leads to K3.
(4) Install cover (32, fig. 9-6) with mounting hardware (28, 29, and 31).
(5) Install dust cover (14) with mounting hardware (3, 4, and 17).

9-14. Transformer (T2) Removal and Installation Procedure

a. Removal

(1) Remove mounting hardware (3, 4, and 17, fig. 9-6) and dust cover (14).
(2) Remove mounting hardware (1, 2, and 6, fig. 9-7) and slide C2 (18) away from T2 (31, fig. 9-8).
(3) Disconnect and tag the leads to T2.
(4) Remove mounting hardware (11 and 29), bracket (30), and T2.

b. Installation.

(1) Install T2 (31, fig. 9-8) with bracket (30) and mounting hardware (11 and 29).
(2) Connect the leads to T2.
(3) Install C2 (18, fig. 9-7) with mounting hardware (1, 2, and 6) on the rear panel.
(4) Install dust cover (14, fig. 9-6) with mounting hardware (3, 4, and 17).

9-15. Reactor (L1) Removal and Installation Procedure

a. Removal

(1) Remove mounting hardware (3, 4, and 17, fig. 9-6) and dust cover (14).
(2) Remove mounting hardware (28, 29, and 31) and cover (32).
(3) Disconnect and tag the leads to L1 (1, fi 9-8).
(4) Remove mounting hardware (36 through 39) and L1.

b. Installation.

(1) Apply sealing compound, MIL-S-22473, grade H, to the threads of crews (39, fig. 9-8).

(2) Install L1 (1) with mounting hardware (36 through 39).
(3) Connect the leads to L1.
(4) Install cover (32, fig. 9-6) with mounting hardware (28, 29, and 31).
(5) Install dust cover (14) with mounting hardware (3, 4, and 17).

9-16. Relay (A5K1) Removal and Installation Procedure

a. Removal

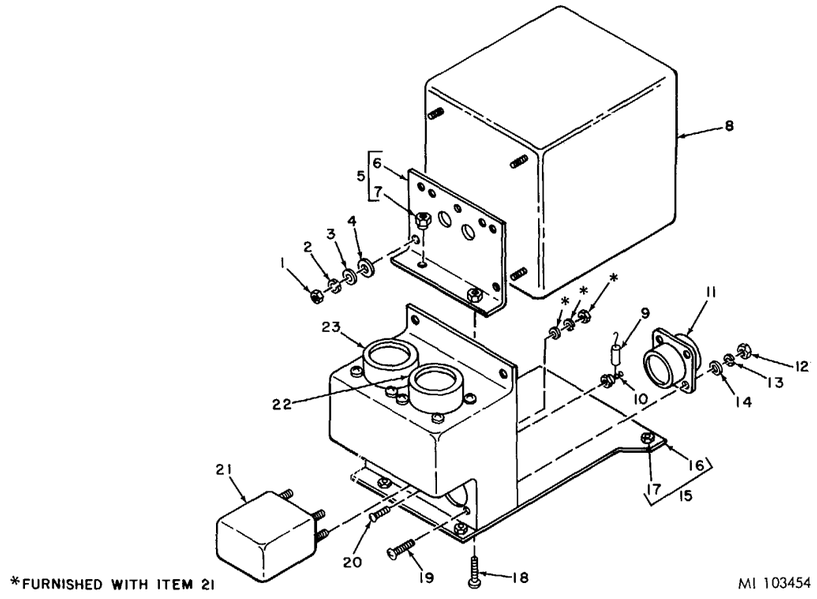
(1) Remove A5 (par. 9-6a).
(2) Remove mounting hardware (1 through 4, fig. 9-11) securing A5T1 (8) to enclosure (15) and screws (18) securing bracket (5) to the enclosure.

CAUTION
Do not remove A5T1 from A5 or damage to the wiring will result.

(3) Position A5T1 and the bracket to gain access to A5K1 (21).
(4) Disconnect and tag the leads to A5K1.
(5) Remove the supplied mounting hardware and A5K1 from the enclosure.

b. Installation.

(1) Install A5K1 (21, fig. 9-11) with the supplied mounting hardware on enclosure (15).
(2) Connect the leads to A5K1.
(3) Install A5T1 (8) and bracket (5) with mounting hardware (1 through 4, and 18) on the enclosure.
(4) Install A5 (par. 9-6b).



1 – Nut
2 – Lockwasher
3 – Washer
4 – Insulator
5 – Bracket (Depot repair)
6 – Bracket (Depot only)
7 – Clinch nut (Depot only)
8 – A5T1
9 – A5CR1
10 – A5E1 through A5E9
11 – A5J3
12 – Nut
13 – Lockwasher
14 – Washer
15 – Enclosure assembly (Depot repair)
16 – Enclosure (Depot only)
17 – Clinch nut (Depot only)
18 – Screw
19 – Screw
20 – Screw
21 – A5K1
22 – A5J1
23 – A5J2

Figure 9-11. Repair of A5.

9-17. Diode (A5CR1) Removal and Installation Procedure

a. Removal.

(1) Remove A5 (par. 9-6a).
(2) Remove mounting hardware (1 through 4, fig. 9-11) securing A5T1 (8) to enclosure (15) and screws (18) securing bracket (5) to the enclosure.

CAUTION
Do not remove A5T1 from A5 or damage to the wiring will result.

(3) Position A5T1 and the bracket to gain access to A5CR1 (9).
(4) Disconnect and tag the leads to A5CR1 and remove the diode.

b. Installation.

(1) Install A5CR1 (9, fig 9-11) and connect the leads.
(2) Install A5T1 (8) and bracket (5) with mounting hardware (1 through 4, and 18) on enclosure (15).
(3) Install A5 (par. 9-66).

9-18. Transformer (A5T1) Removal and Installation Procedure

a. Removal

(1) Remove A5 (par. 9-6a).
(2) Remove mounting hardware (1 through 4, fig. 9-11) securing A5T1 (8) to enclosure (15) and screws (18) securing bracket (5) to the enclosure.

CAUTION
Do not remove A5T1 from A5 or damage to the wiring will result.

(3) Position A5T1 and the bracket to gain access to the leads to A5T1.
(4) Disconnect and tag the leads to A5T1.
(5) Remove mounting hardware (1 through 4) securing A5T1 to the bracket and A5T1.

b. Installation.

(1) Install A5T1 (8, fig. 9-11) with mounting hardware (1 through 4) on bracket (5).
(2) Connect the leads to A5T1.
(3) Install A5T1 and the bracket with mounting hardware (1 through 4, and 18) on enclosure (15).
(4) Install A5 (par. 9-6b).

9-19. Switch (S1) Removal and Installation Procedure (Fig. 9-6)

a. Removal.

(1) Remove mounting hardware (28, 29, and 31) and cover (32).
(2) Disconnect and tag the leads to S1 (34).
(3) Remove the supplied mounting hardware and S1 from front panel (39).

b. Installation.

(1) Install S1 (34) with the supplied mounting hardware on front panel (39).
(2) Connect the leads to S1.
(3) Install cover (32) with mounting hardware (28, 29, and 31).

9-20. Handle Assembly Removal and Installation Procedure (Fig. 9-6)

a. Removal

(1) Remove mounting hardware (28, 29, and 31) and cover (32).
(2) Remove screws (3 and handle assembly (35) from front panel (39).

b. Installation.

(1) Apply securing compound, MIL-S-22473, grade H, to the threads of screws (33).
(2) Install handle assembly (35) with the screws on front panel (39).
(3) Install cover (32) with mounting hardware (28, 29, and 31).

9-21. Decal Removal and Installation Procedure (Fig. 9-6)

WARNING
The solvents used in this repair procedure are toxic and flammable. Be careful. Avoid prolonged or repeated breathing of the vapor. Keep the solvent away from heat and open flames. Use only in well ventilated areas.

a. Removal.

(1) Remove decal (42) with a knife.
(2) Clean the mounting area with MEK, Fed Spec TT-M-261.

b. Installation.

(1) Mark new decal (42) with the same information that appeared on the old decal without bending or distorting the decal.

(2) Apply acetone, Fed Spec O-A-51 to the back of the decal.

(3) When the adhesive side is sticky, install the decal on front panel (39) and press flat.

9-22. Replacement of Capacitors C13, C14, and C16

NOTE

Under certain conditions, two capacitor kits may be exhausted before an "ALL TEST GO" is obtained. This might occur if L1, L2, C2, or T2 were replaced.

a. The capacitors are supplied in capacitor kit (FSN 5910-003-5241).

b. When it is necessary to replace C13, C14 or C16, except as noted in REF TM 35 for C13, replace the removed component with one of the same value selected from the referenced capacitor kit.

c. If the marking of the capacitor value is unreadable, replace it with a capacitor of similar physical dimensions from the kit.

9-23. Painting

CAUTION

Mask all connectors, light assembly panels, lettering and mounting surfaces before painting the adjoining surfaces.

Inspect and paint the exterior of the UUT.

a. Inspect the exterior surface of the UUT for scratched, chipped, or peeled paint.

b. Smooth the damaged area with sandpaper, wet/dry (120400 grit).

c. Spot-paint damaged areas with a brush.

d. Use paint, Fed Spec TT-E-527, color no. 37038, for the handles and paint, MIL-E-15090, type 1081-24578, for the assembly panels.

9-24. Packaging

a. When the AC power supply/signal conditioner is to be shipped to the depot for further testing and repair, package the assembly in accordance with TM 38-230, method II D, insuring that adequate cushioning material and bracing are used to prevent damage to the assembly during shipment.

b. Packages should be marked in accordance with local directives.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS,
General, United States Army,
Chief of Staff.

Official:

VERNE L. BOWERS,
Major General, United States Army,
The Adjutant General.

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