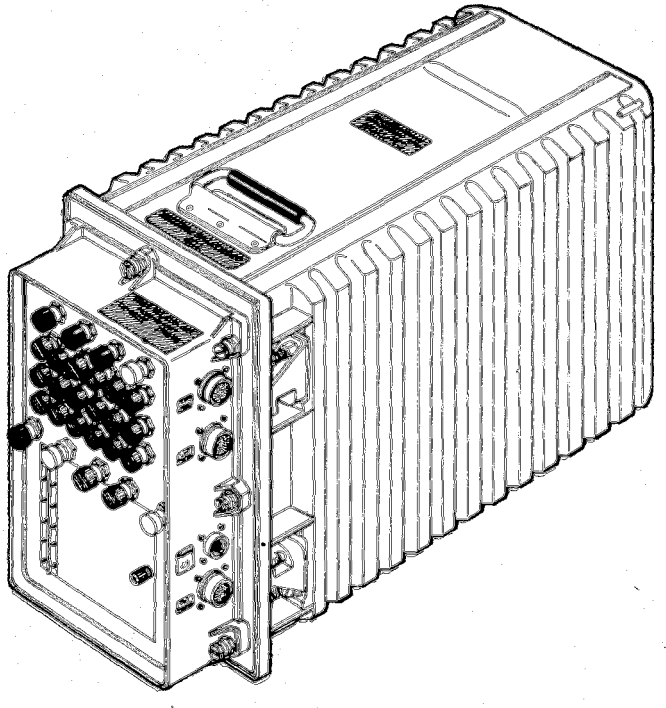
ARMY TM 11-7010-201-12

NAVY ET821-AA-OMI-010/E154 MTS

AIR FORCE TO 31S5-2TSQ73-1

TECHNICAL MANUAL

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL



TEST SET, ELECTRONIC CIRCUIT PLUG-IN UNIT TS-3317( )/TSQ-73 (NSN 1430-01-033-1078)

DEPARTMENTS OF THE ARMY, NAVY, AND AIR FORCE

14 MAY 1984

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

3. IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL

4. SEND FOR HELP AS SOON AS POSSIBLE

5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

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.

Be careful not to contact high-voltage connections when installing or operating this equipment.

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.

Do not be misled by the term “low voltage.” Potentials as low as 50 volts may cause death under adverse conditions.

WARNING

Ensure prime power is off to prevent shock hazard to personnel.

WARNING

When extending the MTS, always provide support for both the MTS and the case. Extension of the MTS causes an unbalanced condition and the assembly may tip forward causing personnel injury and equipment damage.

WARNING

HIGH TEMPERATURE is common for the dc/dc converters. Severe burns may result if personnel fail to observe safety precautions. Allow dc/dc converter to cool before removing, or use gloves to protect hands.

WARNING

USE OF CLEANING SOLVENT

Fumes of TRICHLOROTRIFLUOROETHANE are poisonous. Provide adequate ventilation whenever you use TRICHLOROTRIFLUOROETHANE. Do not use solvent near heat or open flame. TRICHLOROTRIFLUOROETHANE will not burn, but heat changes the gas into poisonous, irritating fumes. DO NOT breathe the fumes or vapors. TRICHLOROTRIFLUOROETHANE dissolves natural skin oils. DO NOT get the solvent on your skin. Use gloves, sleeves and an apron which the solvent cannot penetrate. If the solvent is taken internally, see a doctor immediately.

For First Aid refer to FM21-11.

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

Dates of issue for original and changed pages are: 14 May 1984.

Original . . 0 . .

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 202 CONSISTING OF THE FOLLOWING:

Zero in this column indicates an original page.

HOW TO USE THIS MANUAL

ŽLocate the information you need.

Table of contents. To help you locate the information you need, this manual has a table of contents. The table of contents lists information by chapter and section.

To find a chapter or section use the table of contents.

This manual also uses several types of indexes. They are as follows:

Front cover index. Major items, such as operating instructions, preventive maintenance, trouble-shooting, etc., are listed on the right side of the front cover. Each item listed lines up with a page edge marked in black.

To use the front cover index, find the item and turn to the black edged page it lines up with.

Chapter index. A chapter index is located at the beginning of each chapter. Each chapter index tells you what information is in the chapter. The information is listed by paragraph number.

To use the chapter index, find the paragraph you need and turn to it.

Alphabetical index. An alphabetical index is located in the back of the manual. Information is listed alphabetically by subject.

To use the alphabetical index, look up the subject and turn to the listed paragraph number.

Ž**Follow the procedure steps.**

In most cases, the procedures in this manual should be done from left to right. Do the steps in order. Look at drawing number (1). Do what it says. Then look at the next drawing and do what it says. Continue until the procedure is finished.

If a step has a bullet (•) before it, it is a summary step. Other steps are located below the drawings. Light bullets (•) only highlight information.

TECHNICAL MANUAL
NO. 11-7010-201-12
ET821-AA-OMI-010/E154 MTS
TECHNICAL ORDER
TO 31S5-2TSQ73-1

TM 11-7010-201-12
ET821-AA-OMI-010/E154 MTS
TO 31S5-2TSQ73-1

DEPARTMENTS OF THE ARMY
THE NAVY, AND
THE AIR FORCE
Washington, DC, 14 May 1984

Operator's and Organizational Maintenance Manual
for
TEST SET, ELECTRONIC CIRCUIT PLUG-IN UNIT
TS-3317( )/TSQ-73
(NSN 1430-01 -033-1 078)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications - Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703.

For Air Force, submit AFTO Form 22 (Technical Order System Publication Improvement Report and Reply) in accordance with paragraph 6-5, Section VI, T.O. 00-5-1. Forward direct to prime ALC/MST.

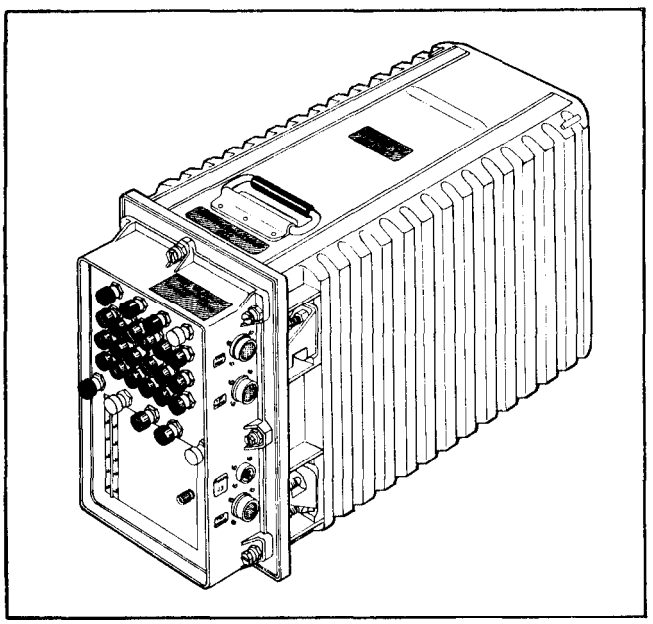
For Navy, mail comments to the Commander, Naval Electronics Systems Command, ATTN: ELEX 8122, Washington, DC 20360.

In either case, a reply will be furnished direct to you.

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE.



This manual Is an operator's and organizational maintenance manual (type-12).

It describes the Test Set, Electronic Circuit Plug-in Unit, TS-3317( )/TSQ-73, which we will refer to as the MTS (Module Test Set), and it gives instructions for MTS operation and maintenance.

The purpose of the MTS is to test ADP circuit cards used in the AN/TTC-39 and the AN/TYC-39 systems.

1-2. MAINTENANCE FORMS, RECORDS AND REPORTS.

Use the proper forms and procedures for equipment maintenance.

a. To report maintenance and defective equipment:

Army: See DA Pam 738-750 as contained in Maintenance Management Update.

Air Force: To report maintenance, use AFR 66-1, and to report defective equipment (UR submissions), use TO 00-35D-54;

Navy: To report maintenance, use the Maintenance Data Collection Subsystem (MDCS) IAW OPNAVINST 4790.2, Vol. 3, and to report defective equipment (UR submissions), use IAW OPNAVINST 4790.2, Vol. 2, Chapter 17.

b. To report defects in packaging and handling: use SF 364 (Report of Discrepancy (ROD)) as prescribed in:

AR 735-11-2;

NAVMATINST 4355.73A;

AFR 400-54;

MCO 4430.3F; and

DLAR 4140.55.

1-2. MAINTENANCE FORMS, RECORDS AND REPORTS. (Cont.)

c. To report an error in shipment: use Discrepancy in Shipment Report (DISREP) (SF 361) prescribed in:

AR 55-38;

NAVSUPINST 4610.33C;

AFR 75-18;

MCO P4610.19D; and

DLAR 4500.15.

1-3. HAND RECEIPT (-HR) MANUALS.

This manual has a companion document with a TM number followed by "-HR" (which stands for Hand Receipt). The TM 11-7010-201-12-HR consists of preprinted hand receipts (DA Form 2062) that list end item related equipment (for example, COEI, Bll, and AAL) that you must account for. In accordance with the procdures in Chapter 3, AR 310-2, and DA Pam 310-10-2, you may request additional -HR manuals from:

The US Army Adjutant General Publications Center
Baltimore, MD.

1-4. INDEX OF TECHNICAL PUBLICATIONS.

Army: Refer to latest issue of DA Pam 310-1 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

Air Force: Use TO 0-1-31 Series Numerical Index and Requirements Table (NIRT).

1-5. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

a. Authority for Destruction. Destroy equipment ONLY on order of the commander.

b. Methods of Destruction. Use destruction methods outlined in TM 750-244-2.

1-6. PREPARATION FOR STORAGE OR SHIPMENT.

a. Administrative Storage. Administrative storage of equipment issued to and used by Army activities will have maintenance performed in accordance with Chapter 3 before storing. When removing the equipment from administrative storage, the routine checks (para 3-2) should be performed to assure operational readiness. Packing the equipment for limited storage is the same as preparation for MTS movement, paragraph 2-8.

b. Shipment. Preparation for shipment is the same as preparation for MTS movement, paragraph 2-8.

1-7. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

If your MTS needs improvement, let us know.

Send us an EIR.

Let us know what you don't like about the design.

Army: Put your remarks on an SF 368 (Quality Deficiency Report).

Mail it to: Commander
U. S. Army Communications - Electronics Command
and Fort Monmouth
ATTN: DRSEL-ME-MP
Fort Monmouth, New Jersey 07703

Air Force: Submit AF Form 1000 in accordance with AFM 900-4.

Navy: Submit EIR's through local Beneficial Suggestion Program.

We'll send you a reply.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

CHARACTERISTICS

- The MTS is case-mounted. It comes with a power supply in a transit case, a test probe assembly, and a special purpose cable assembly.
- The MTS tests ADP circuit cards in the AN/TTC-39 and AN/TYC-39 systems.

Ž All card testing is automatic.

Ž All controls and indicators are on the front panel.

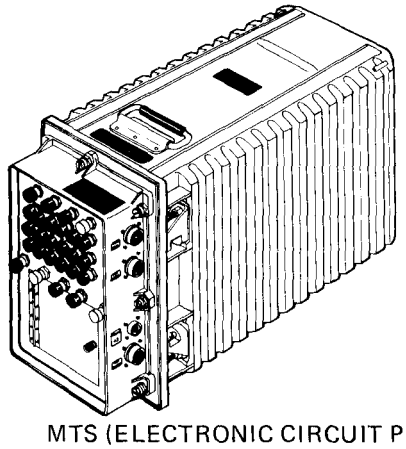
CAPABILITIES AND FEATURES

- The MTS has a built-in self-test.

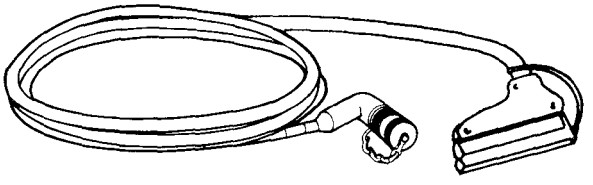
Ž The MTS can test circuit cards both in the system units and at the MTS itself.

Ž The Test Set Probe Assembly interfaces with the MTS and the Card Under Test (CUT).

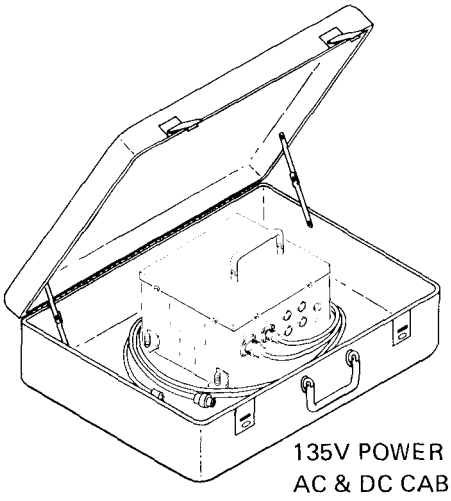
Ž The Special Purpose Cable Assembly enables the MTS to interface with the Unit Under Test (UUT) during in-system card tests.



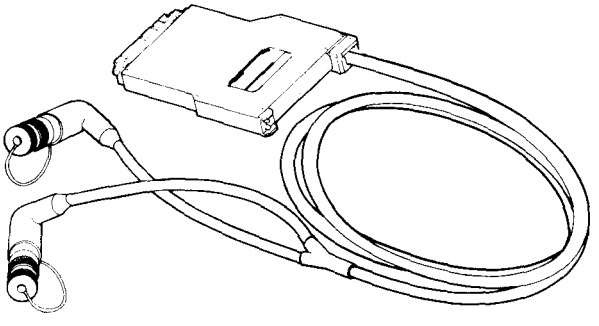
MTS (ELECTRONIC CIRCUIT PLUG-IN UNIT TEST SET, TS-3317( )/TSQ-73)



SPECIAL PURPOSE CABLE ASSEMBLY W210 (UMBILICAL)



135V POWER SUPPLY, AC & DC CABLES

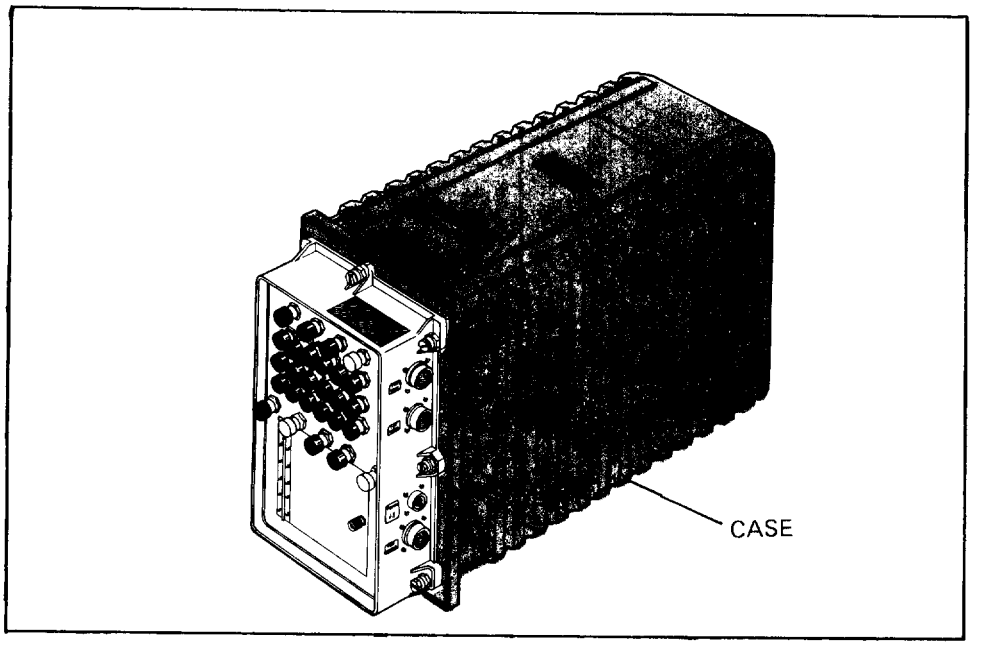


TEST SET PROBE ASSEMBLY W209

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

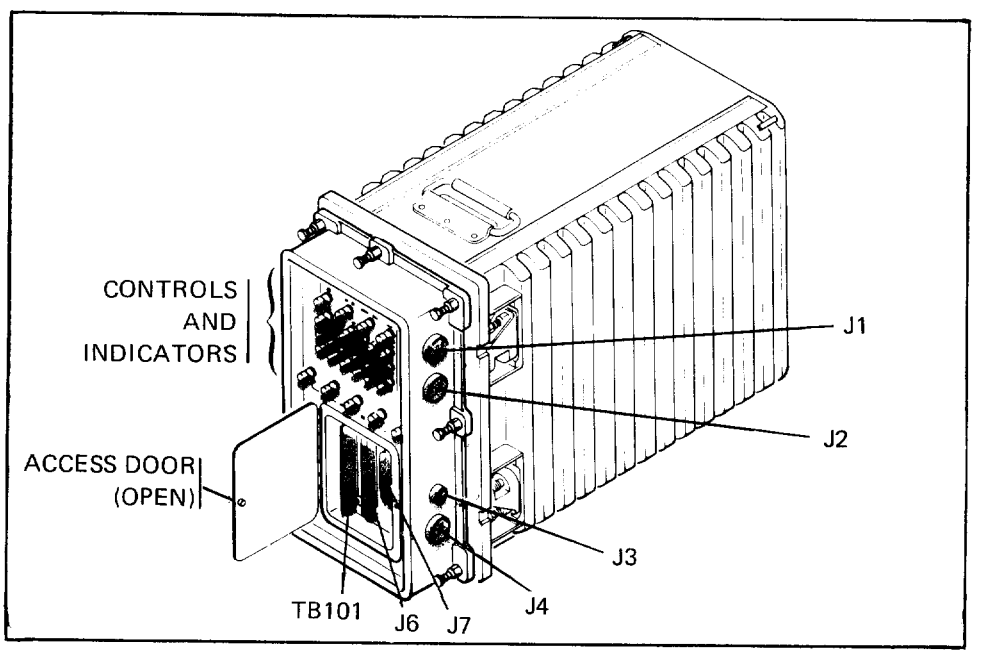
a. Case Assembly.

The case is made of welded aluminum alloy. It has cooling fins on both sides and carrying handles on top and bottom. Vent openings at rear and bottom allow cooling air to circulate through the interior.



b. Front Panel Assembly.

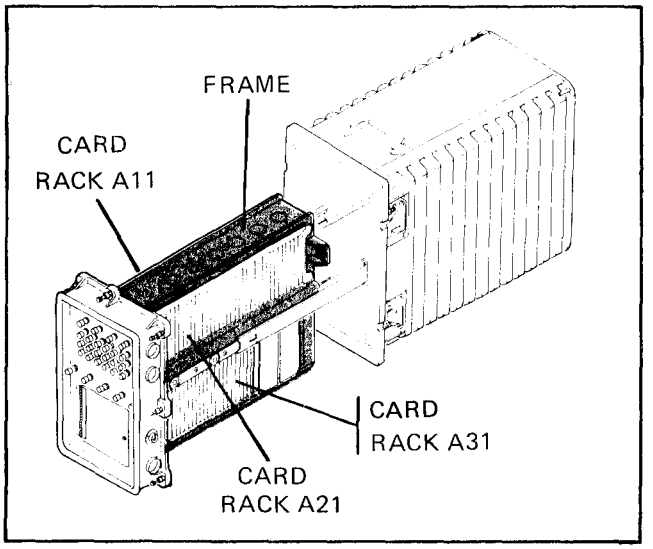
The front panel assembly has all controls and indicators for operating the MTS. There are four connectors (J1, J2, J3 and J4) on the right side. Behind the access door there are two connectors (J6 and J7) and a self-test terminal board (TB101).



1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. (Cont.)

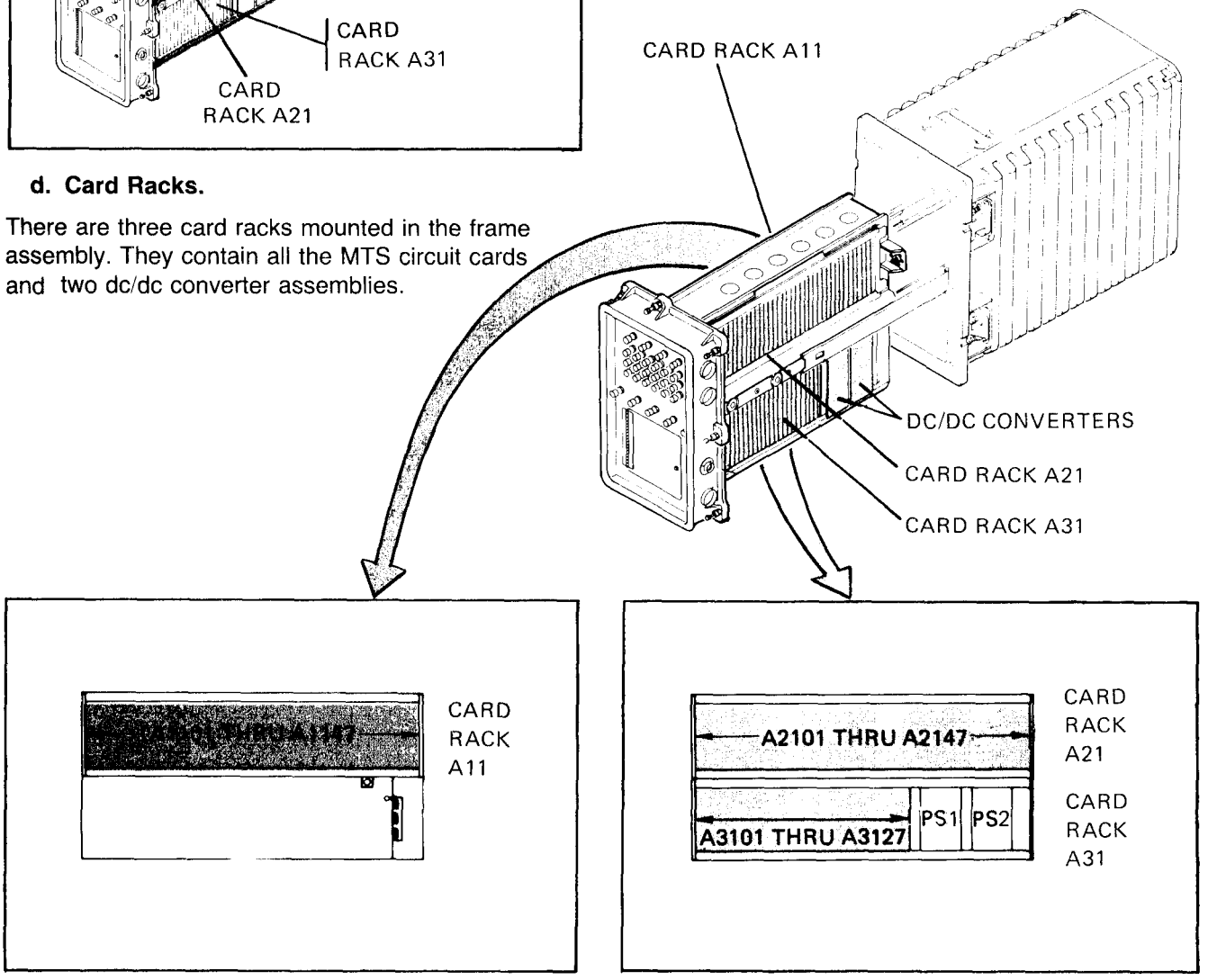
c. Frame Assembly.

The frame assembly holds three card racks (A11, A21, A31).



d. Card Racks.

There are three card racks mounted in the frame assembly. They contain all the MTS circuit cards and two dc/dc converter assemblies.



1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. (Cont.)

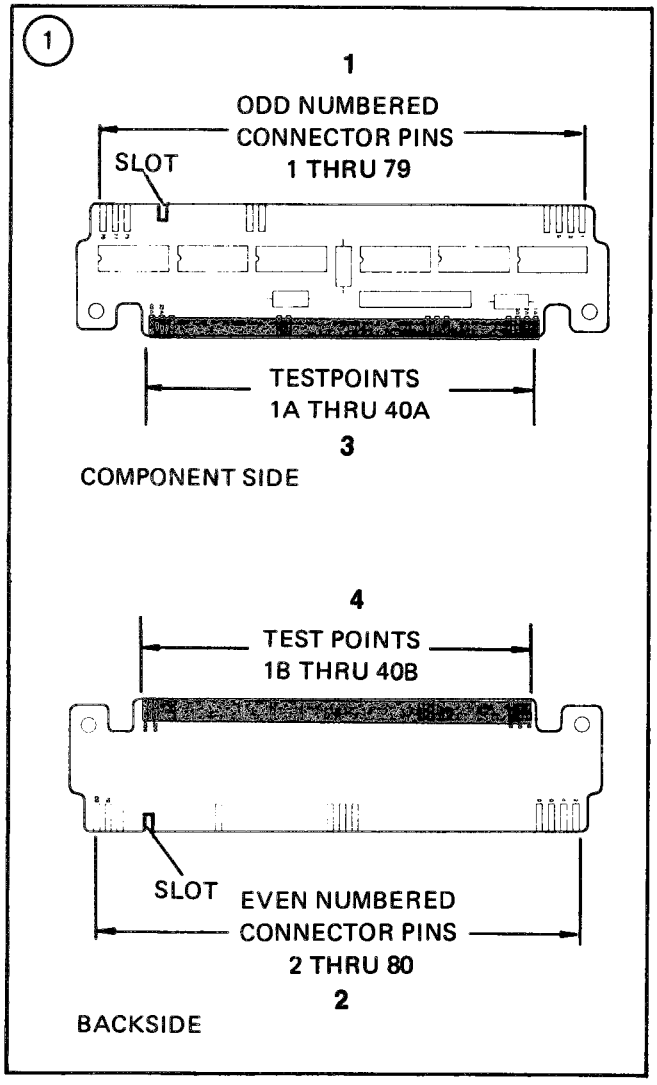
(1) Circuit Cards.

The MTS Circuit Card Location Table lists all the circuit cards in the MTS. MTS circuit cards are color-coded by part number. (See Circuit Card Color-Coding, para 5-22b.)

The three sizes of circuit cards found in the MTS are shown and described below.

- Each circuit card has 80-pin etched connectors, 40 on each side of the card (1), (2).

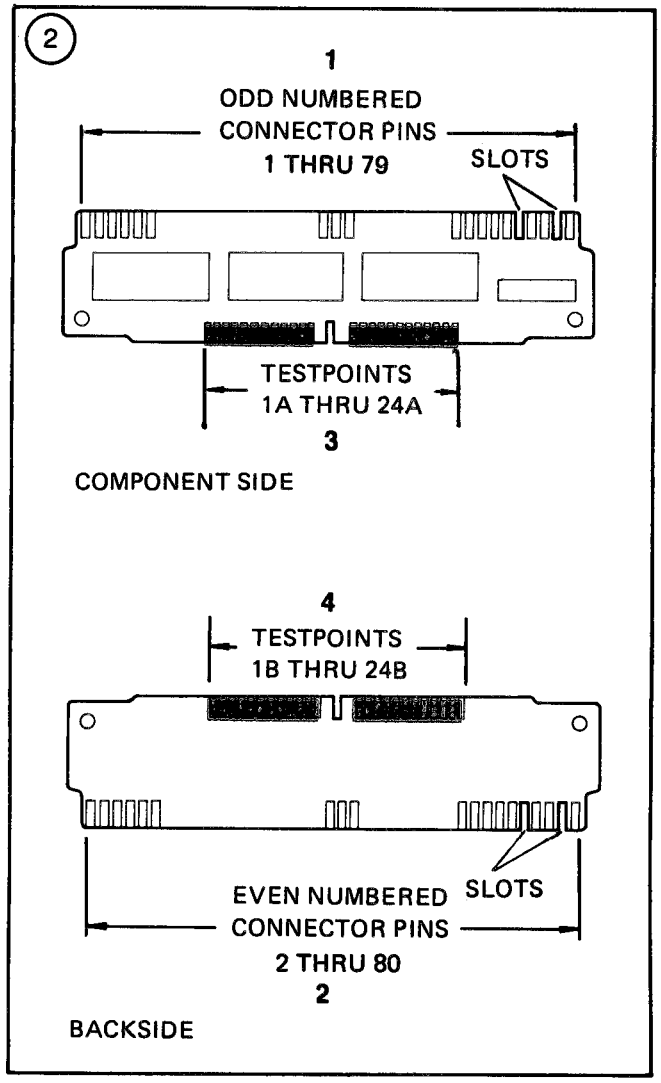
This card found in Racks A11 and A21.



This card has 80 test points etched on the edge opposite the connectors (3), (4).

- Each circuit card is coded by slots cut in the connector. (Corresponding keys in the card cage circuit card connectors prevent insertion of an improperly coded card.)

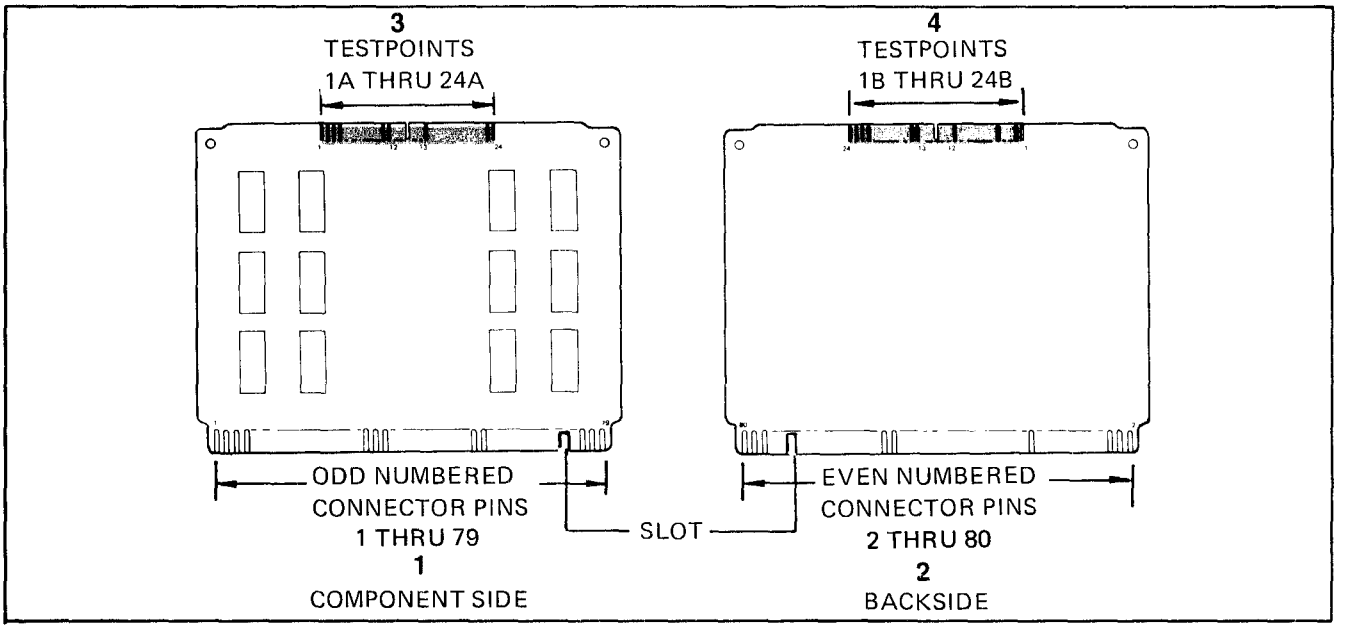
This card found in Racks A11 and A21.



This card has 48 test points etched on the edge opposite the connectors (3), (4).

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. (Cont.)

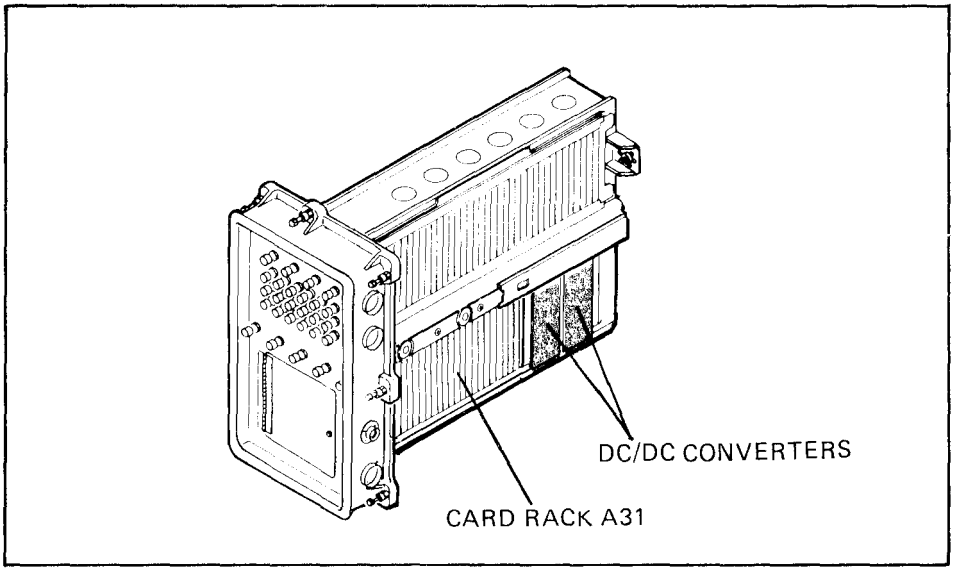
This card found only in Rack A31.



This card has 48 test points etched on the edge opposite the connectors (3), (4).

(2) DC/DC Converters.

The two dc/dc converters are located in card rack A31.



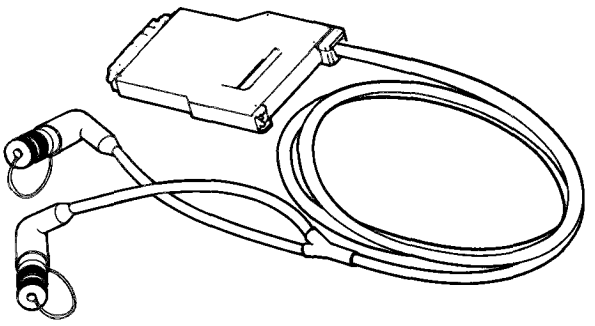
1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. (Cont.)

e. Accessories.

There are three accessories used with the MTS: (1) Test Set Probe Assembly; (2) Special Purpose Cable Assembly; and (3) Power Supply.

(1) Test Set Probe Assembly W209.

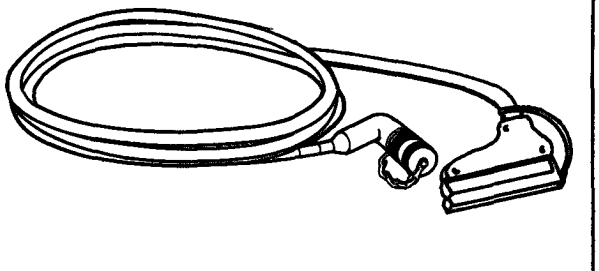
This assembly interfaces between the MTS and the Card Under Test (CUT).



TEST SET PROBE ASSEMBLY
W209

(2) Special Purpose Cable Assembly W210 (Umbillcal).

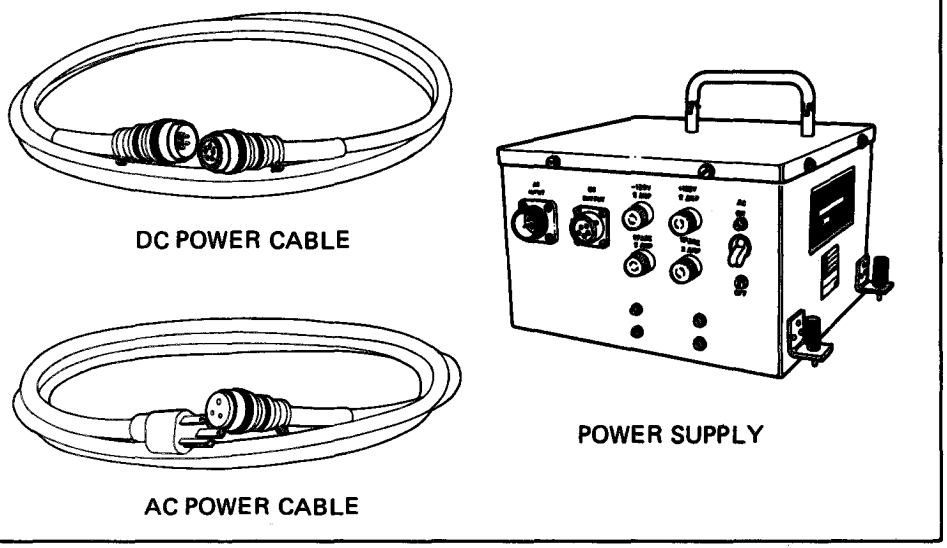
This umbilical cable attaches the MTS to the MTS INTERFACE CARD connector in the Unit Under Test (UUT) (in either the AN/TTC-39 or the AN/TYC-39) during in-system testing.



SPECIAL PURPOSE CABLE ASSEMBLY
W210 (UMBILICAL)

(3) 135V Power Supply.

The power supply provides dc power for operating the MTS. An ac power cable assembly connects input power to the power supply. A dc power cable assembly connects the power supply to the MTS.



DC POWER CABLE

POWER SUPPLY

AC POWER CABLE

1-10. EQUIPMENT DATA.

The circuit cards tested by the MTS are listed in the table below.

TABLE OF AN/TYC-39 AND AN/TTC-39 CIRCUIT CARDS TESTED BY THE MTS

Part number	Card type	Color code[1] Zone 1	Zone 2	Zone 3	Zone 4
149512-100	Counter/decoder	White	Green	Brown	Red
149513-100	Multiplexer	White	Green	Brown	Orange
149516-100	Shift register	White	Green	Brown	Blue
149576-100	Parity checker/generator	White	Green	Violet	Blue
149580-100	Quad exclusive OR gate	White	Green	Gray	Black
587102-102	Quad 2-input NAND gate	Violet	Brown	Black	Red
587103-102	Triple 3-input NAND gate	Violet	Brown	Black	Orange
587104-102	Dual 4-input NAND gate	Violet	Brown	Black	Yellow
587105-102	Dual D flip-flop	Violet	Brown	Black	Green
587106-102	Quad 2-input lamp driver	Violet	Brown	Black	Blue
587108-102	Single 8-input NAND gate	Violet	Brown	Black	Gray
587109-102	Quad 16-bit memory	Violet	Brown	Black	White
587110-102	Adder	Violet	Brown	Brown	Black
587117-102	Hex inverter	Violet	Brown	Brown	Violet
10281602	Counter/decoder	Brown	Blue	Black	Red
10281606	Shift register	Brown	Blue	Black	Blue
10281780	Quad exclusive OR gate	Brown	Violet	Gray	Black

[1]Color codes are painted on the card slots in system card racks.

1-11. SAFETY, CARE, AND HANDLING.

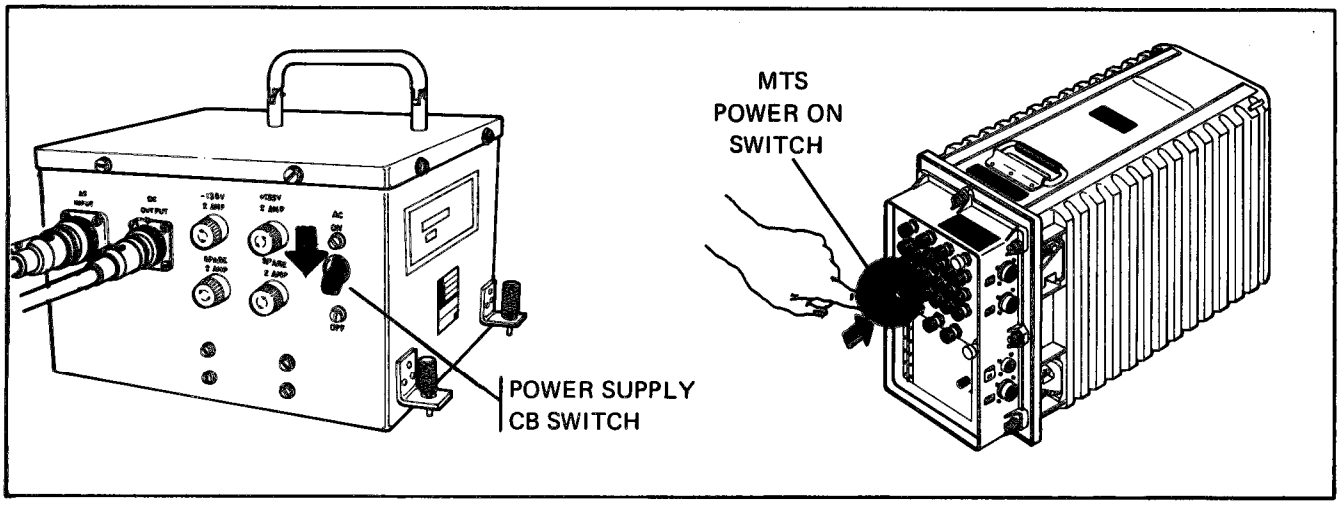
WARNING

High voltage is used in the operation of the MTS. Death on contact may result if you fall to observe safety precautions.

WARNING

The MTS weighs 150 pounds. It requires two persons to lift it. Lift the MTS by the two handles.

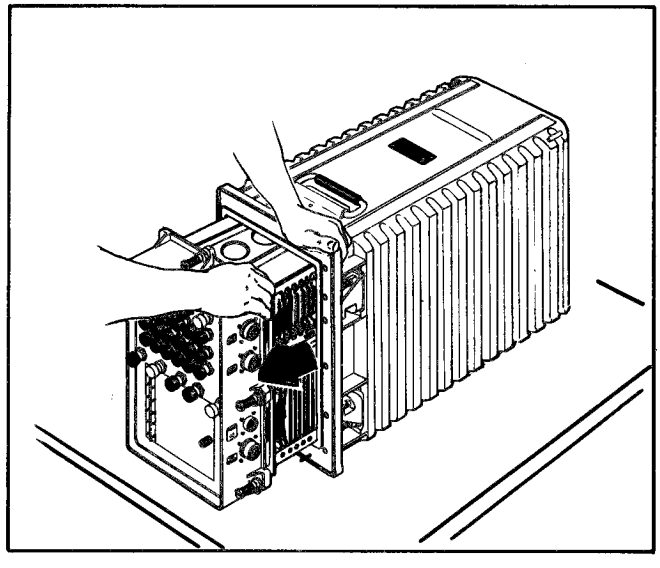
a. Before working on the MTS, shut off power Supply.



b. When extending the MTS, always provide support for the MTS and the case.

WARNING

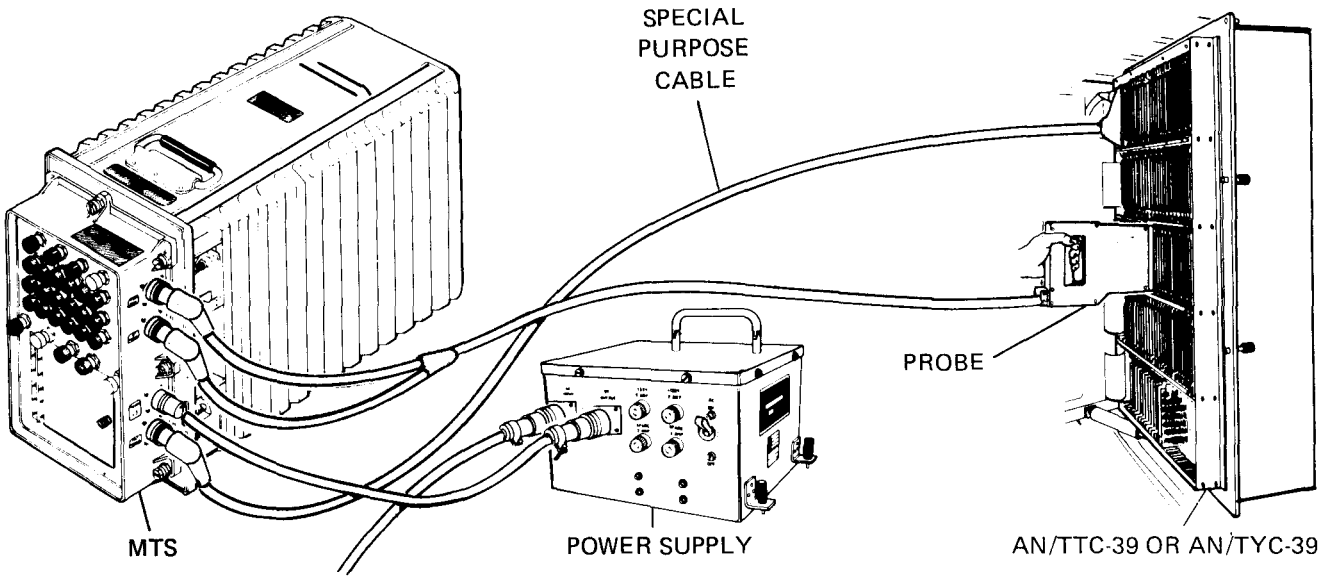
Extension of the MTS causes a shift in weight and the assembly may tip forward and cause injury to personnel and/or damage to equipment.



Section III. PRINCIPLES OF OPERATION

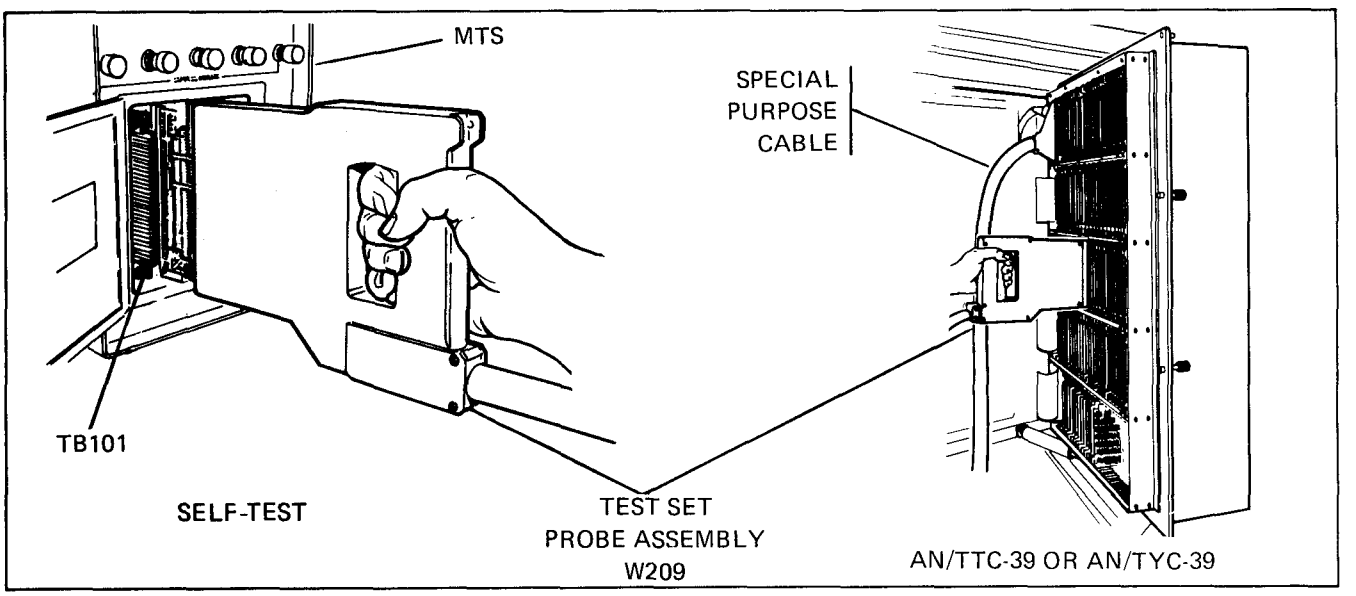
1-12. FUNCTIONAL DESCRIPTION OF EQUIPMENT OPERATION.

The basic function of the MTS is to test ADP circuit cards in the AN/TTC-39 and AN/TYC-39 systems.



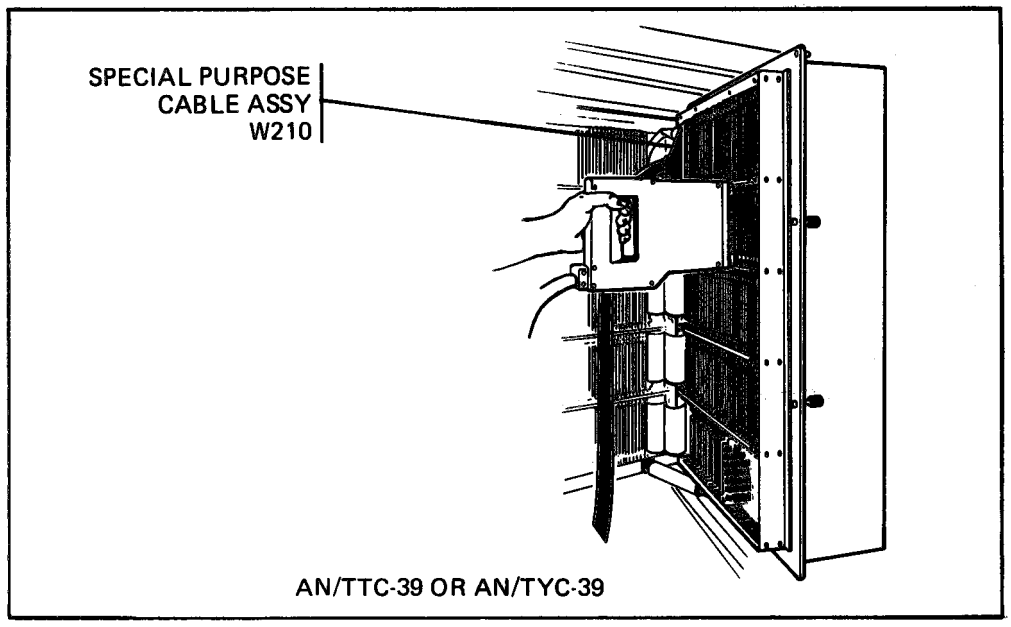
The MTS carries out its function by means of three accessories:

Ž The Test Set Probe Assembly W209 enables the MTS to carry out a self-test and (in conjunction with the Special Purpose Cable Assembly) to test ADP circuit cards in the circuit and message switches.

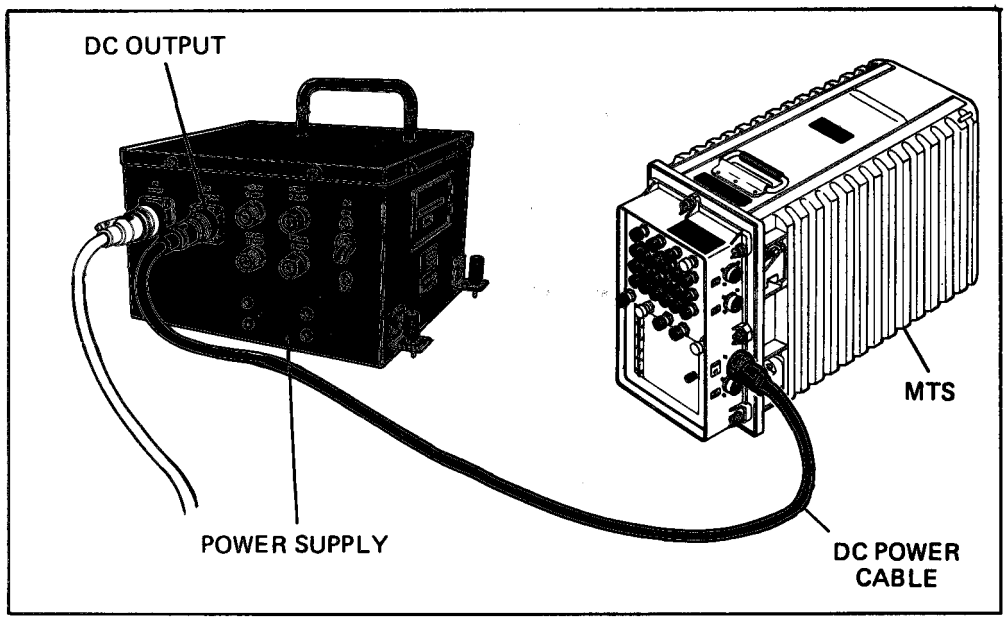


1-12. FUNCTIONAL DESCRIPTION OF EQUIPMENT OPERATION. (Cont.)

- The Special Purpose Cable Assembly W210 enables the MTS to interface with the circuit and message switches and thereby carry out testing of ADP circuit cards.



- The power supply provides power for the MTS.



CHAPTER 2
OPERATING INSTRUCTIONS

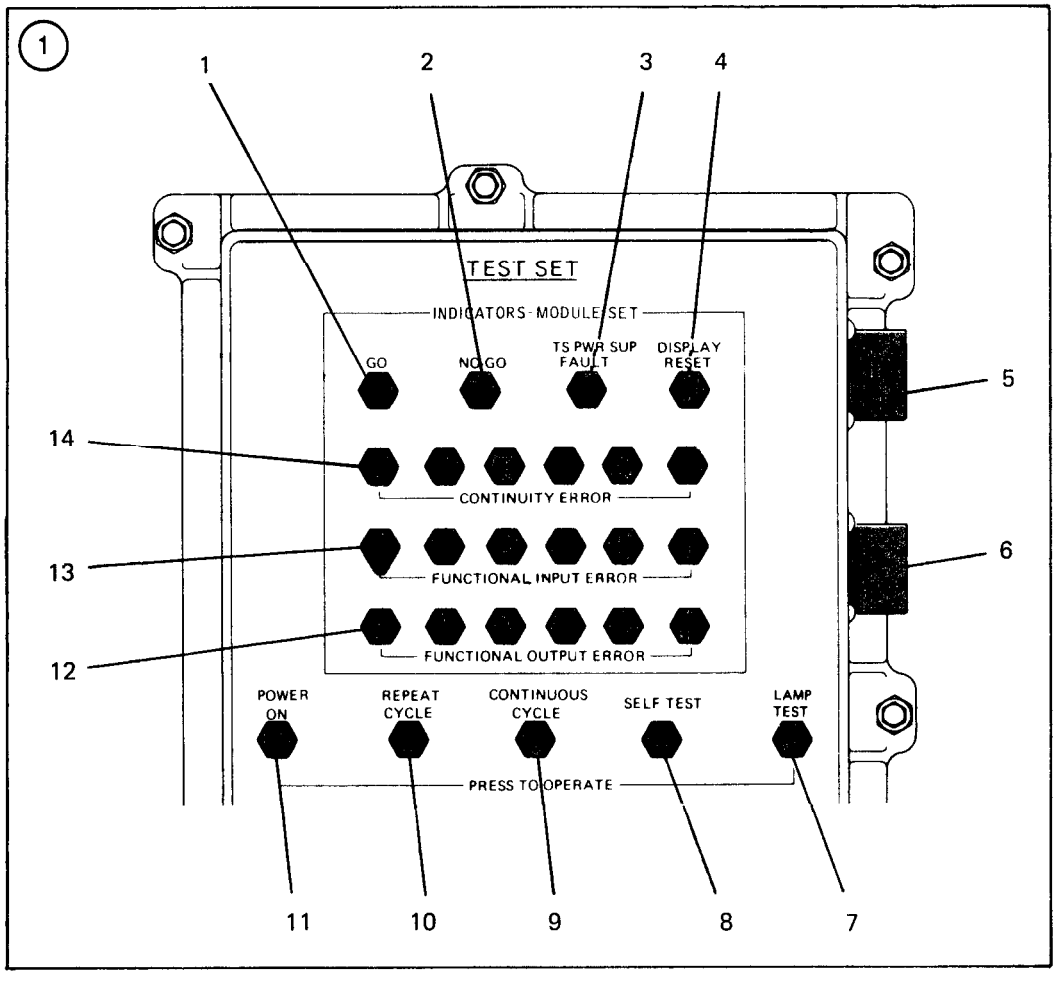
Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. DAMAGE FROM IMPROPER SETTINGS.

There are no settings that can damage the equipment.

2-2. OPERATOR'S CONTROLS AND INDICATORS.

a. MTS Controls, Indicators, and Connectors are shown and described below.

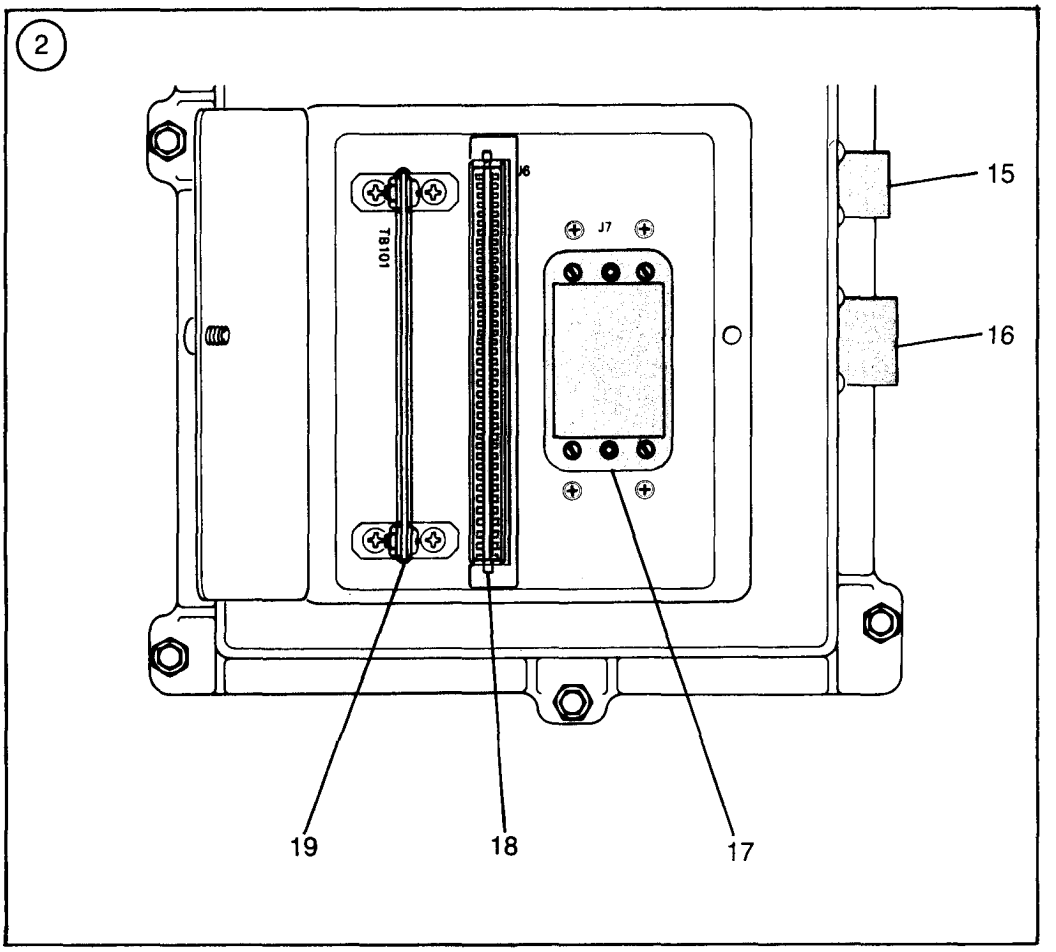


2-2. OPERATOR'S CONTROLS AND INDICATORS. (Cont.)

MTS CONTROLS, INDICATORS, AND CONNECTORS

Key	Control, indicator, or connector	Function
1	GO indicator (green)	Lights during card test and MTS self-test. Remains lighted to indicate a passed test.
2	NO-GO indicator (red)	Lights during card test and MTS self-test. Remains lighted to indicate a failed test.
3	TS PWR SUP FAULT indicator (red)	Lights when MTS dc/dc converter fails or during a current overload condition.
4	DISPLAY RESET momentary pushbutton (white)	Resets all error display indicators to clear accumulated errors in error display register. Indicator lights while accumulated errors are being cleared from error display register.
5	TEST PROBE J1 connector	Connects with test set probe assembly cable W209 connector P1.
6	TEST PROBE J2 connector	Connects with test set probe assembly cable W209 connector P2.
7	LAMP TEST momentary pushbutton (white)	Lights all MTS indicators.
8	SELF TEST momentary pushbutton (yellow)	Provides for completion of self-test after error is detected. Lights when self-test operation is completed.
9	CONTINUOUS CYCLE momentary pushbutton (yellow)	Initiates continuous cycle testing mode. Indicator lights while MTS is in continuous mode. When indicator is off, MTS is in single-cycle mode.
10	REPEAT CYCLE momentary pushbutton (white)	Initiates one test cycle. Indicator lights when cycle is completed. Switch function is used for MTS troubleshooting only.
11	POWER ON alternate-action pushbutton (green)	Applies power to MTS circuits. Indicator lights when switch is activated and power is on.
12	FUNCTIONAL OUTPUT ERROR indicators (yellow)	Light when card-under-test (CUT) output signal line fails functional test. Indicators (left to right) correspond to failed ICs (top to bottom) of card under test.
13	FUNCTIONAL INPUT ERROR indicators (yellow)	Light when card-under-test (CUT) input signal line fails functional test. Indicators (left to right) correspond to failed ICs (top to bottom) of card under test.
14	CONTINUITY ERROR indicators (yellow)	Light when card-under-test (CUT) signal line fails continuity test. Indicators (left to right) correspond to failed Integrated Circuits (ICs) (top to bottom) of card under test.

2-2. OPERATOR'S CONTROLS AND INDICATORS. (Cont.)

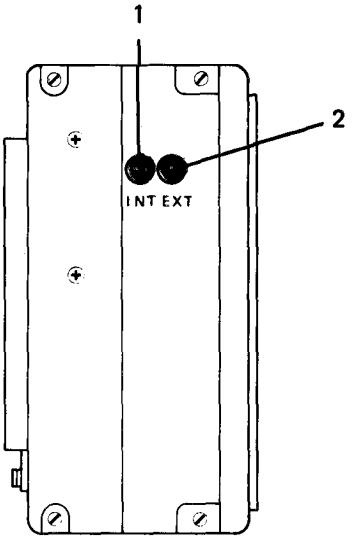


MTS CONTROLS, INDICATORS, AND CONNECTORS (Cont.)

Key	Control, indicator, or connector	Function
15	POWER J3 connector	Connects with 135V power supply dc power cable.
16	TEST CABLE J4 connector	Connects with special purpose cable assembly W210 connector P2.
17	J7 connector	Provides test points for maintenance purposes.
18	J6 connector	Connects individual card under test (CUT).
19	TB101 terminal board connector	Connects with test set probe assembly for self-test.

2-2. OPERATOR'S CONTROLS AND INDICATORS. (Cont.)

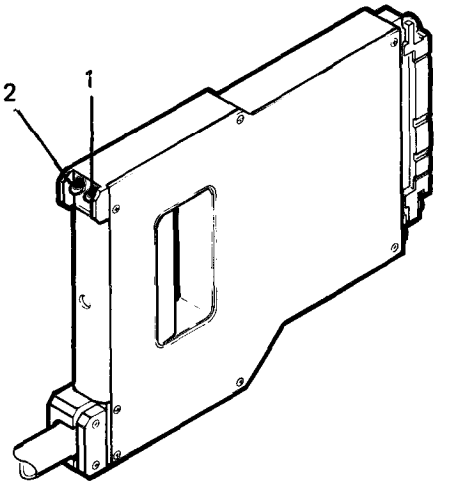
b. DC/DC Converter Indicators are shown and described below.



DC/DC CONVERTER INDICATORS

Key	Indicator	Function
1	INT (white)	Lights to indicate internal fault.
2	EXT (white)	Lights to indicate external fault.

c. Test Set Probe Assembly W209 Indicators are shown and described below.

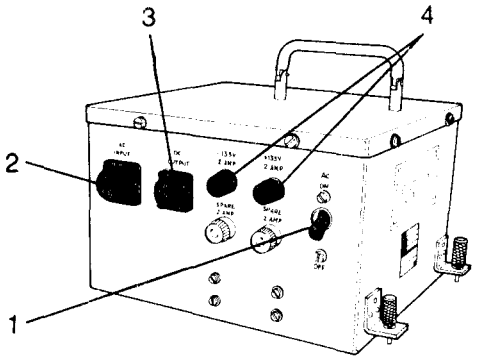


TEST SET PROBE ASSEMBLY INDICATORS

Key	Indicator	Function
1	GRN (go) (green)	Lights when card under test has passed test.
2	RED (no-go) (red)	Lights when card under test has failed test.

2-2. OPERATOR'S CONTROLS AND INDICATORS. (Cont.)

d. 135V Power Supply Controls and Connectors are shown and described below.



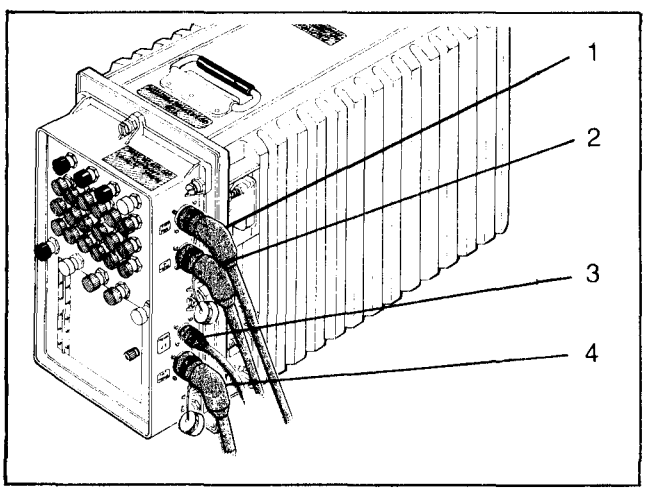
135V POWER SUPPLY CONTROLS AND CONNECTORS

Key	Control or connector	Function
1	AC circuit breaker	When set to ON, applies ac power from external source to power supply. Circuit breaker provides input overcurrent protection.
2	AC INPUT connector	Allows connection of input ac power cable assembly.
3	DC OUTPUT connector	Allows connection of output dc power cable assembly.
4	Fuses	Fuse +/−135V output from power supply.

Section II. OPERATION UNDER USUAL CONDITIONS

2-3. PREPARATION OF MTS FOR OPERATION.

a. Check that cables to MTS are connected (para 5-8).



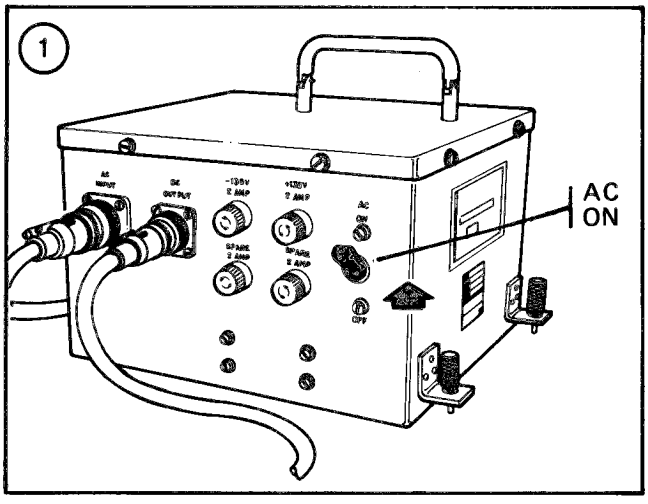
Connect test set probe assembly W209 (1), (2).

Connect power supply (3). Check that power supply is plugged into external power source.

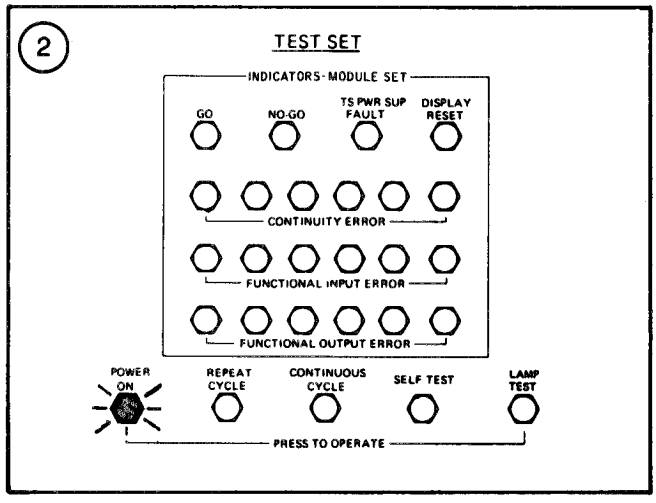
Connect special purpose cable assembly W210 (4).

2-3. PREPARATION OF MTS FOR OPERATION. (Cont.)

b. Check that power is on.

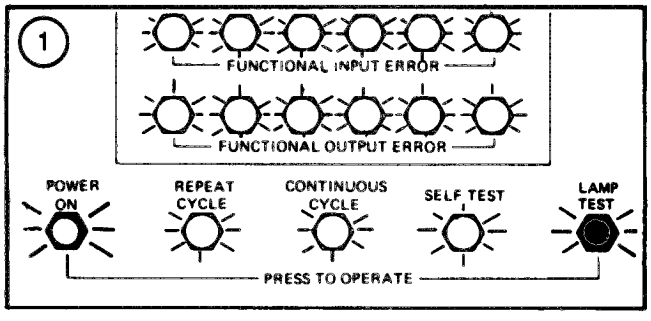


On power supply, check that AC circuit breaker is ON.

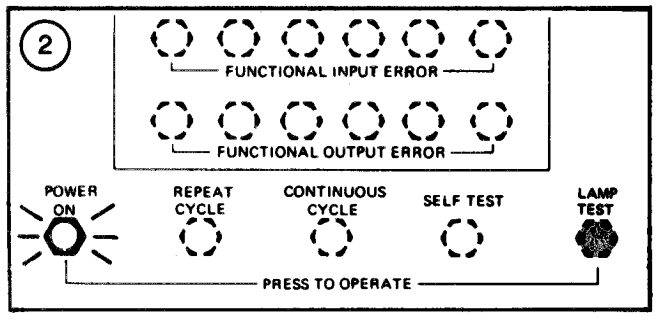


On MTS, check that POWER ON pushbutton is lit.

c. Perform lamp test.



Press and release LAMP TEST pushbutton on MTS.



Press and release LAMP TEST pushbutton on MTS. Check that all indicators go off.

NOTE

Test is passed if all indicators light.

d. Perform MTS self-test (para 5-10).

2-4. OPERATING PROCEDURES.

The MTS performs two card testing procedures:

(1) In-system card tests (described in para 2-5); and

(2) Individual card tests (described in para 2-6).

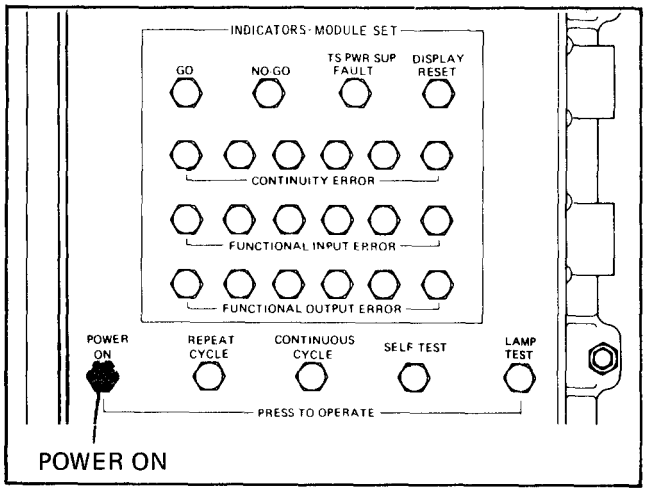
2-5. IN-SYSTEM CARD TEST.

NOTE

The MTS must be prepared for operation (para 2-3) before you do in-system card tests.

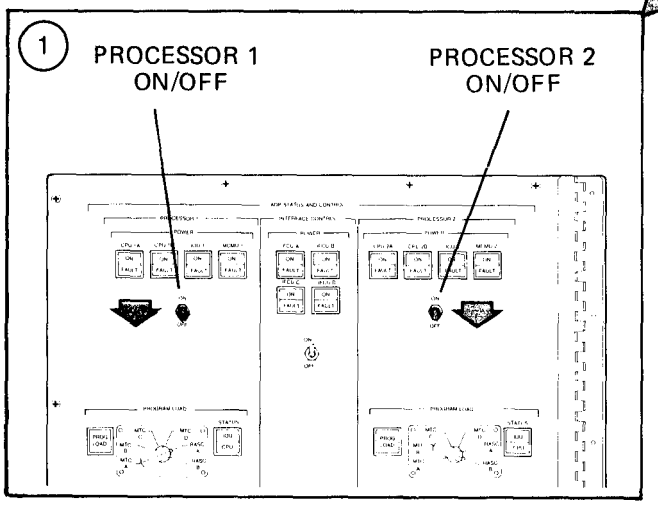
a. Perform preliminary in-system card test procedures.

- ***Turn off power on MTS.***



Press and release POWER ON pushbutton. Check that indicator goes off.

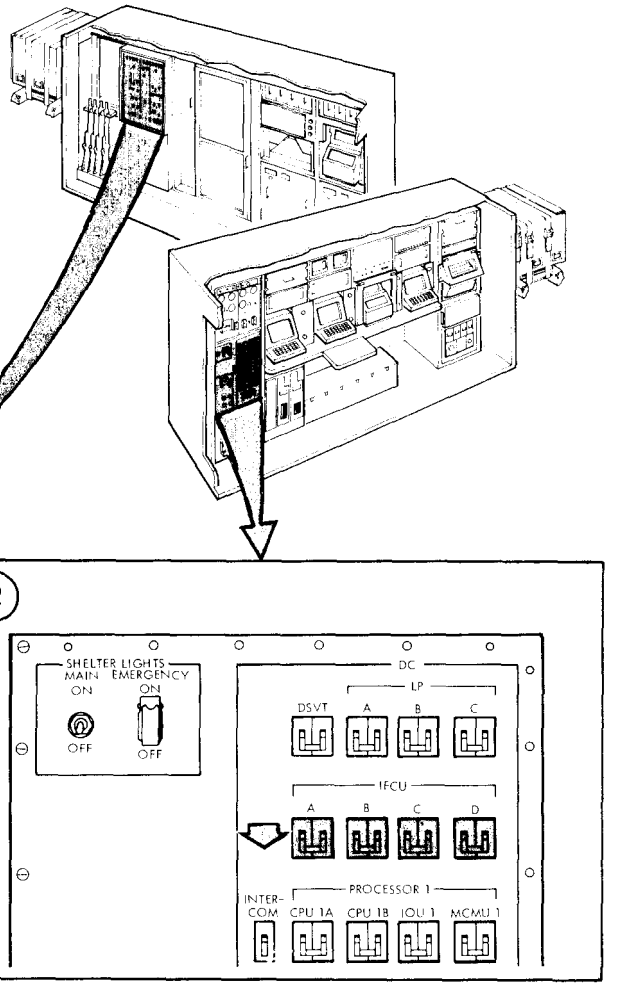
- ***Turn off power on unit under test (UUT).***



For PROCESSOR 1 or 2, set ON/OFF switch on ADP STATUS AND CONTROL panel to OFF.

NOTE

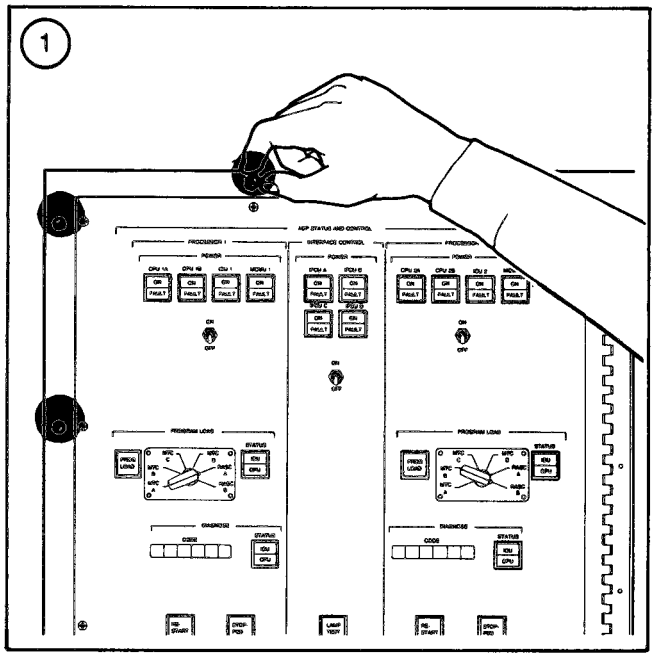
Illustrations of the ADP STATUS AND CONTROL panel and of the circuit breaker panel in this manual are of the AN/TYC-39. For more specific systems information, refer to TM 11-5805-683-12 (AN/TYC-39) and to TM 11-5805-681-12 (AN/TTC-39).



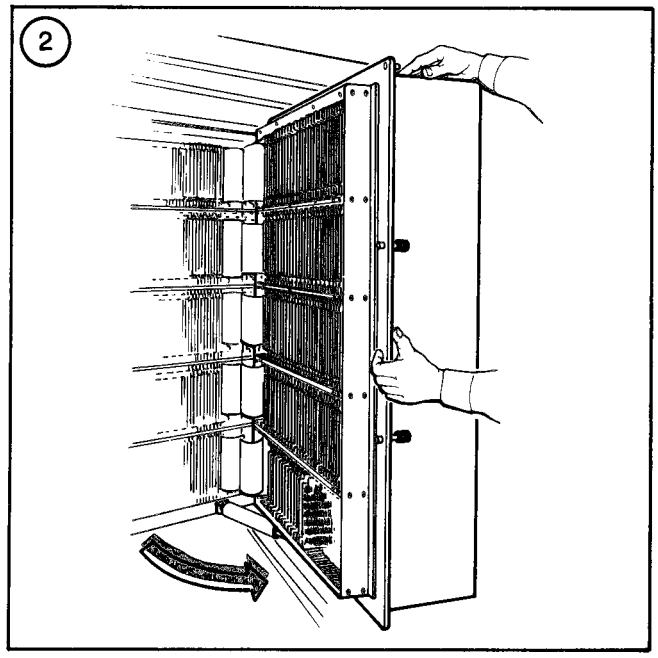
For INTERFACE CONTROL, switch off IFCU circuit breaker for faulty IFCU on circuit breaker panel.

2-5. IN-SYSTEM CARD TEST. (Cont.)

- ***Open door for UUT.***

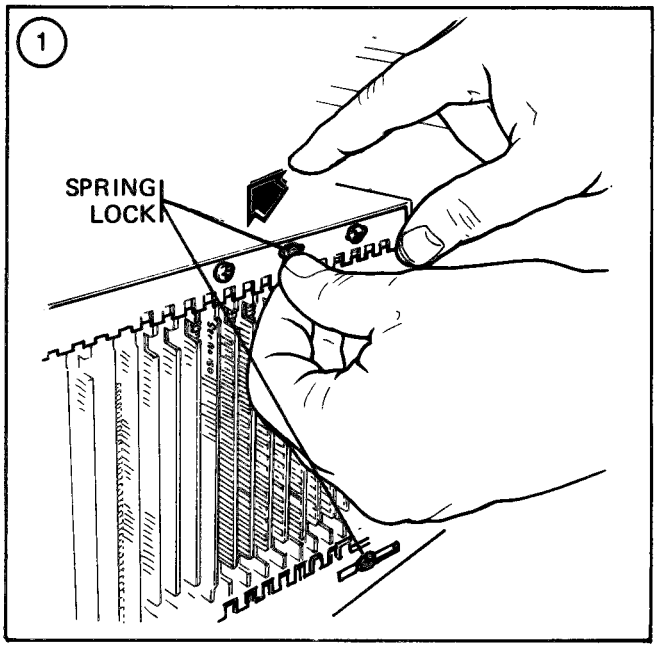


Release screws that secure door that contains UUT.

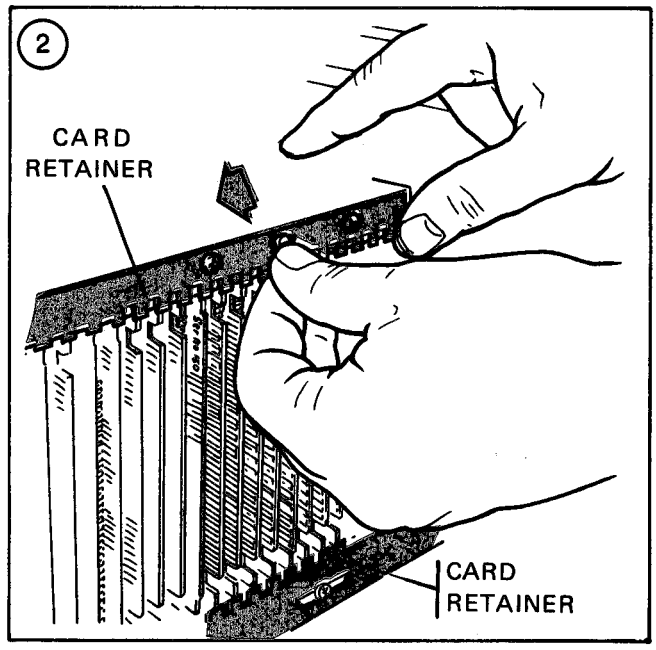


Open door.

- ***Unlock two card retainers.***



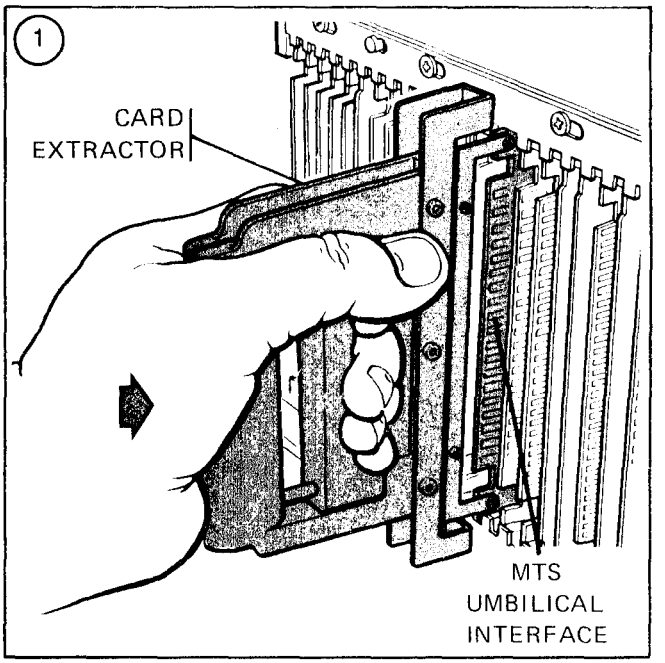
Press down on spring lock.



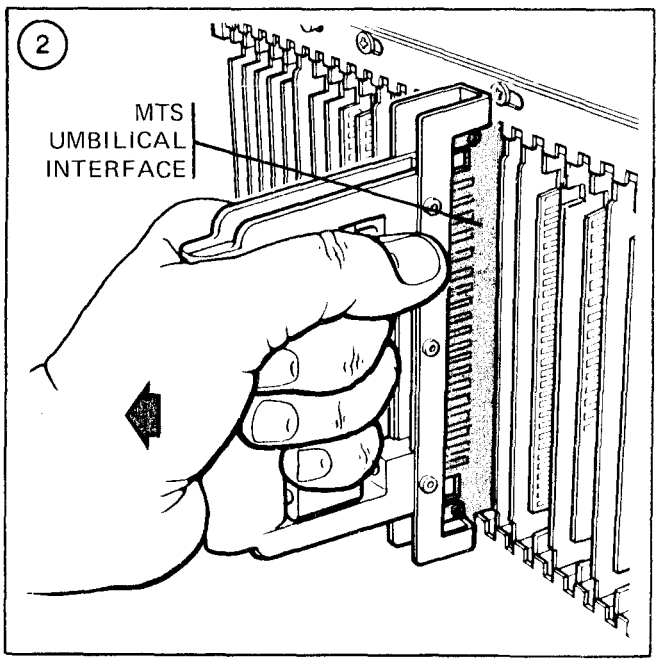
Slide retainers to left.

2-5. IN-SYSTEM CARD TEST. (Cont.)

- ***Remove MTS interface card (UMBILICAL INTERFACE) from UUT.***



Attach card extractor to MTS UMBILICAL INTERFACE (MTS UMBILICAL INTERFACE clearly marked).



Withdraw MTS UMBILICAL INTERFACE.

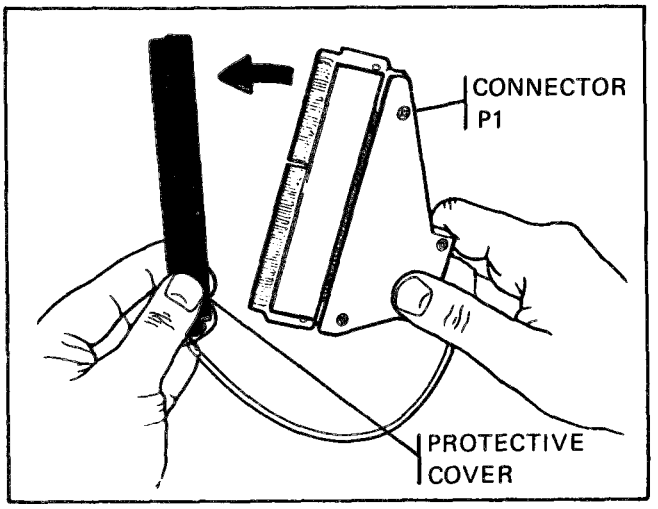
2-5. IN-SYSTEM CARD TEST. (Cont.)

• Remove shorting circuit card (when applicable).

NOTE

There are shorting circuit cards for all Input Output Units (IOUs) and for all Interface Control Units (IFCUs). (See system maintenance manuals. For AN/TYC-39, see TM 11-5805-683-12 and for AN/TTC-39, see TM 11-5805-681-12.)

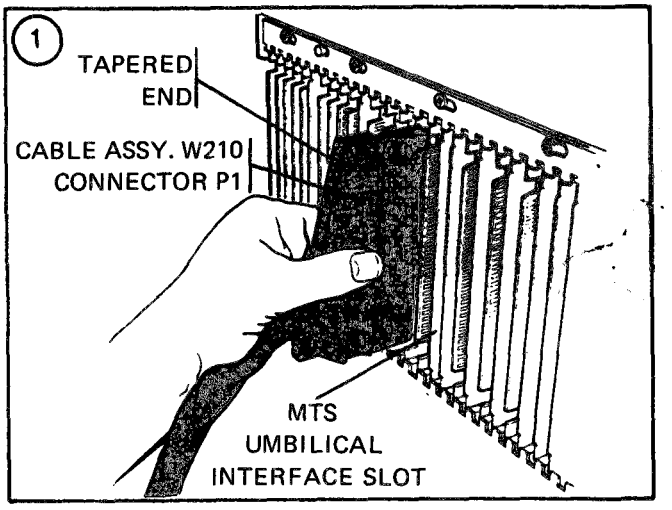
• Remove protective cover from connector P1 on special purpose cable assembly W210.



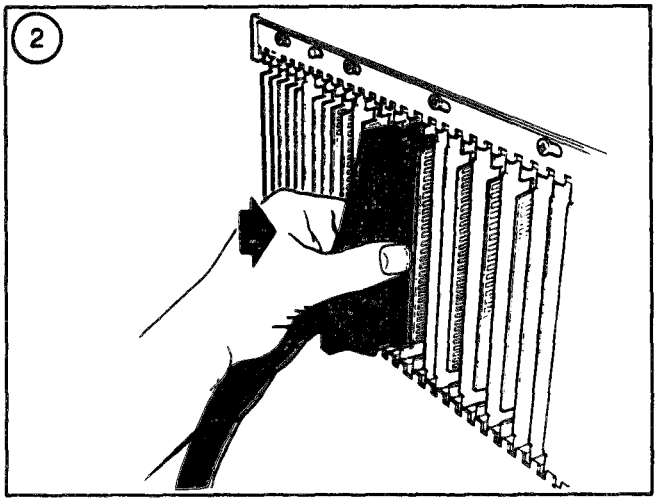
CAUTION

Do not insert or remove cable assembly W210 with power on at either MTS or UUT.

• Connect cable assembly W210 connector P1 to MTS UMBILICAL INTERFACE slot of UUT.



Be sure tapered end of cable assembly W210 connector P1 is up.



Insert cable assembly W210 connector P1 into MTS UMBILICAL INTERFACE slot of UUT.

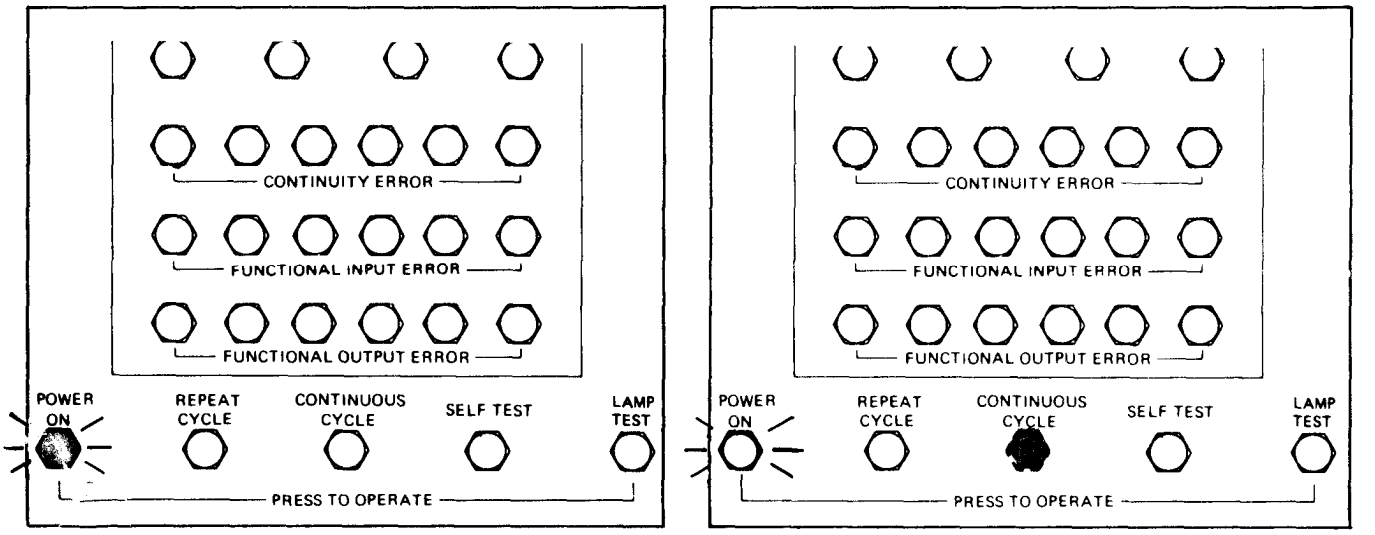
2-5. IN-SYSTEM CARD TEST. (Cont.)

NOTE

MTS must be in single-cycle mode for this test.

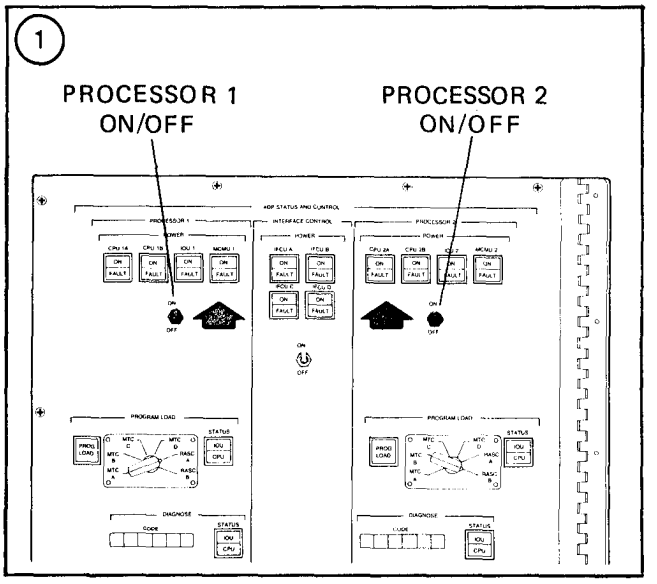
- ***Press and release POWER ON pushbutton on MTS.***

- ***If CONTINUOUS CYCLE pushbutton is on, press and release pushbutton so indicator goes off.***

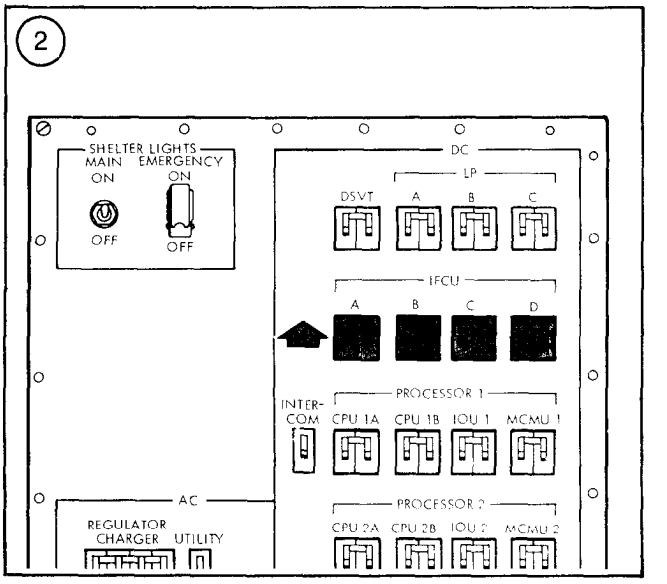


Check that POWER ON indicator lights to indicate power is on.

- ***Turn on power to UUT.***



For PROCESSOR 1 or 2, set ON/OFF switch on ADP STATUS AND CONTROL panel to ON.



For INTERFACE CONTROL, switch on IFCU circuit breaker on circuit breaker panel for UUT.

2-5. IN-SYSTEM CARD TEST. (Cont.)

b. Initiate in-system card test.

CAUTION

Do not connect test set probe assembly to card under test (CUT) if a card is in MTS connector J6. To avoid damage to the CUT or to the test set probe assembly:

(1) Press probe straight on to card and hold in place;

(2) Do not use a rocking motion or move probe from side to side; and

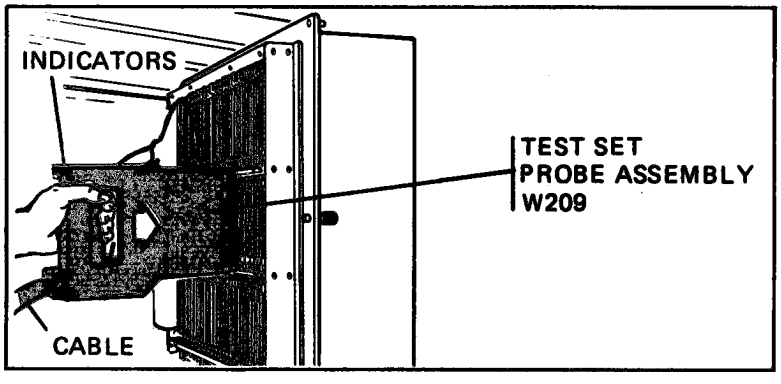
(3) Use the card release trigger on probe handle to separate probe from CUT.

When test is finished, be sure CUT is pressed firmly into card cage assembly connector before proceeding to the next circuit card.

NOTE

When test set probe assembly is attached to CUT, RED and GRN indicators on probe must be up and cable down.

- ***Connect test set probe assembly W209 to CUT.***



Press probe straight on to card and hold steadily in place.

NOTE

To show test in progress:

(1) GO and NO-GO indicators on MTS light; and

(2) RED and GRN indicators on test set probe assembly light.

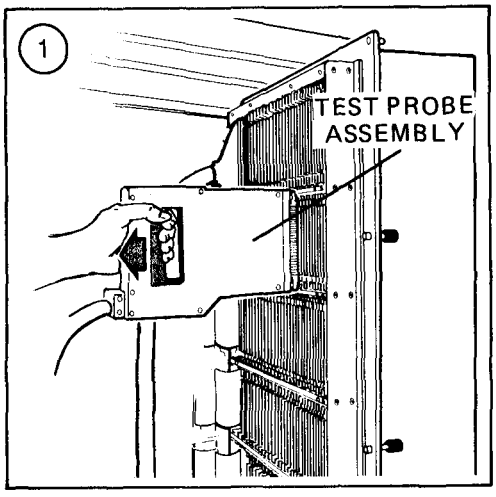
2-5. IN-SYSTEM CARD TEST. (Cont.)

c. Observe MTS for test results.

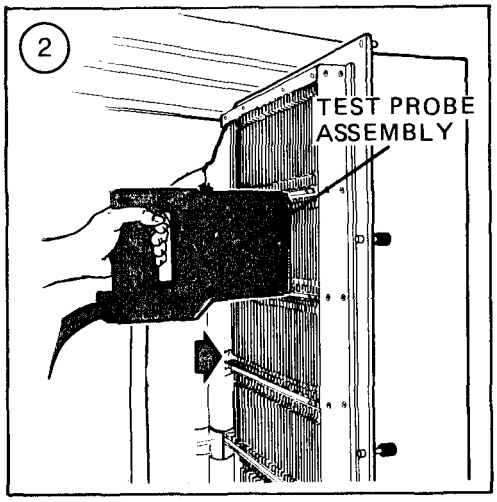
- ***If CUT passes test, test next card.***

NOTE

When CUT passes test, GO (on MTS) and GRN (on probe) indicators remain lighted.



Squeeze handle on test set probe assembly W209 to release probe from CUT.



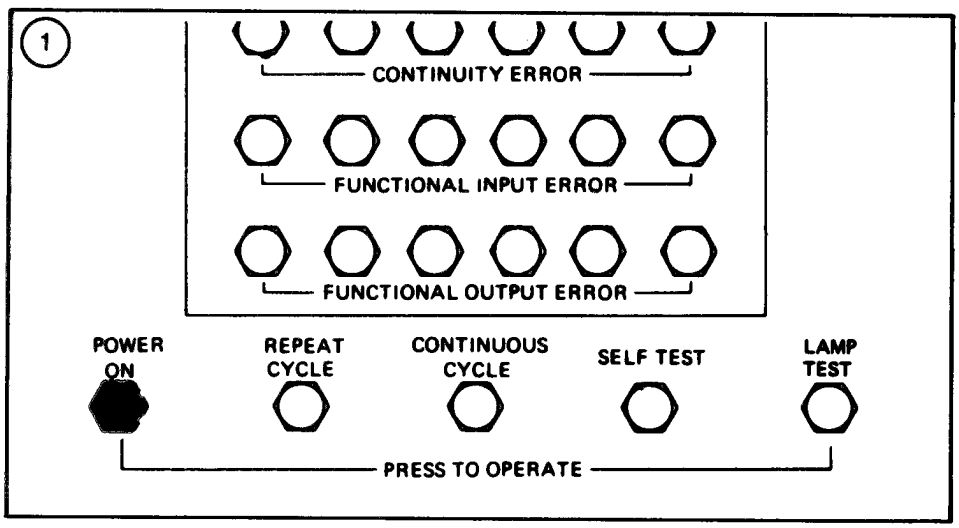
Attach test set probe assembly to next CUT.

2-5. IN-SYSTEM CARD TEST. (Cont.)

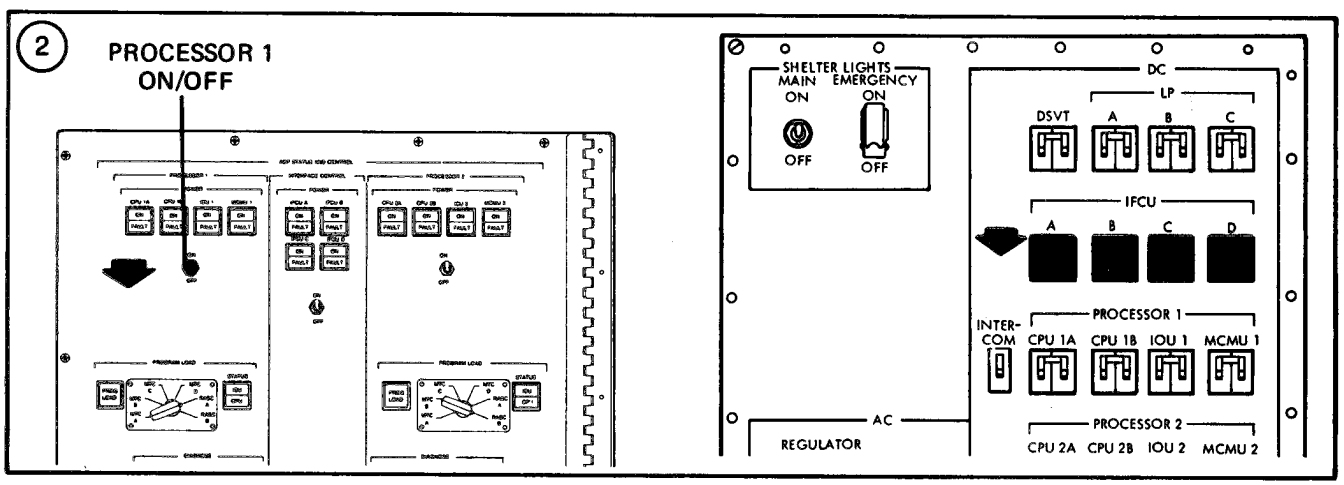
- ***If CUT fails test, do individual card test.***

NOTE

When CUT fails test, on the MTS, NO-GO indicator remains lighted and at least one ERROR indicator lights; on probe, RED indicator remains lighted.



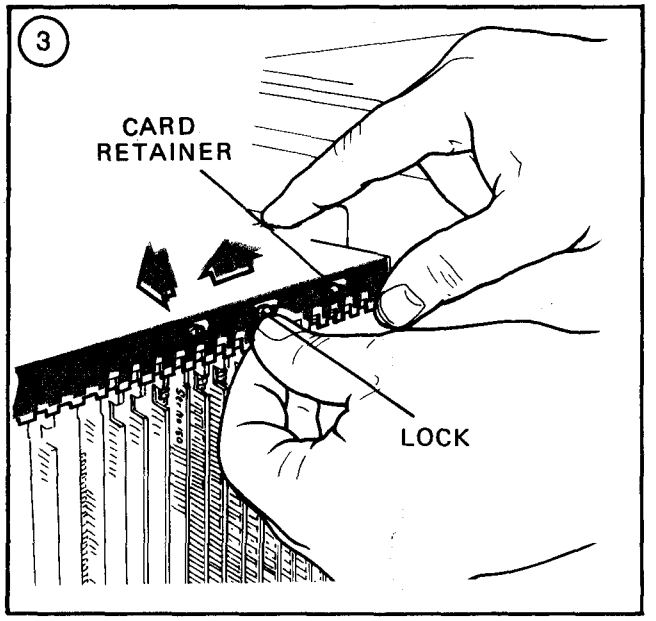
Turn off power to MTS.



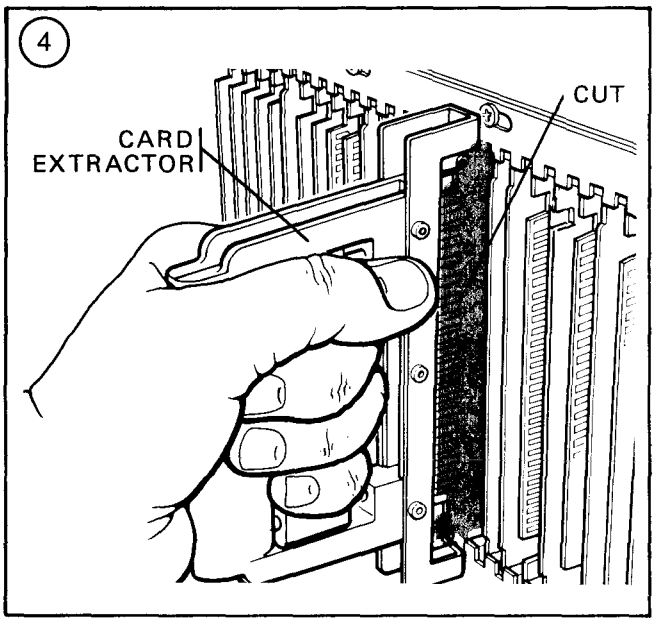
For PROCESSOR 1, set ON/OFF switch on ADP STATUS AND CONTROL panel to OFF.

For INTERFACE CONTROL, switch off IFCU circuit breaker for faulty IFCU on circuit breaker panel.

2-5. IN-SYSTEM CARD TEST. (Cont.)



Unlock card retainers.



Remove CUT.

Do individual card test (para 2-6).

- ***When in-system card testing is completed:***

(1) Remove special purpose assembly W210 from MTS UMBILICAL INTERFACE;

(2) Replace MTS UMBILICAL INTERFACE;

(3) Replace shorting circuit card(s); and

(4) Lock card retainers.

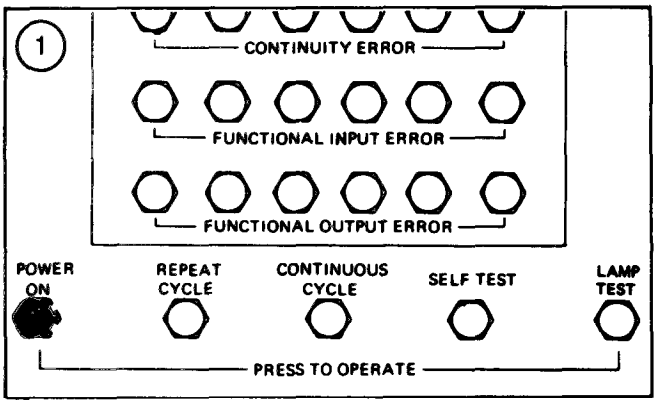
2-6. INDIVIDUAL CARD TEST.

NOTE

The individual card test procedure tests a card that failed an in-system card test. The card is tested at the MTS. Before you do individual card test(s), you must prepare the MTS for operation (para 2-3).

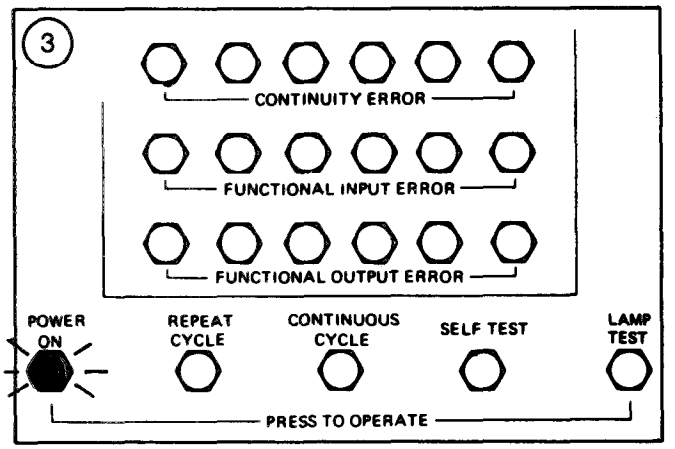
a. Perform preliminary individual card test procedures.

- ***Check that power on MTS is off.***



Press and release POWER ON pushbutton, if lighted.

- ***Press and release POWER ON pushbutton to turn power on.***

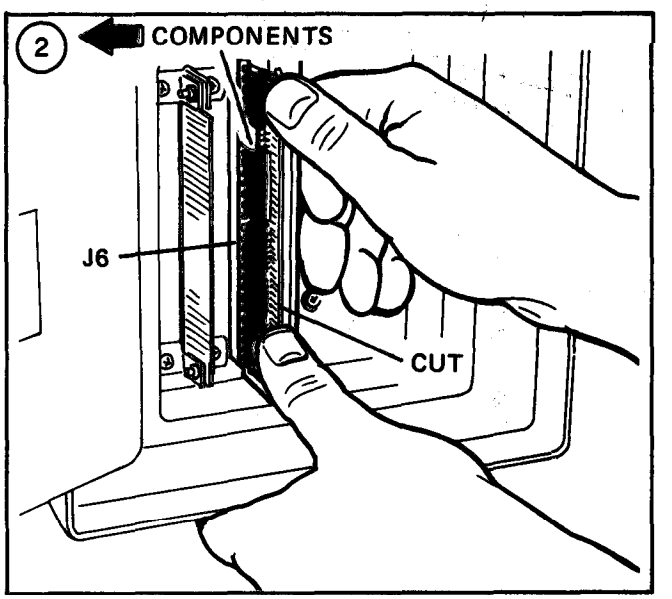


Check that POWER ON indicator lights.

CAUTION

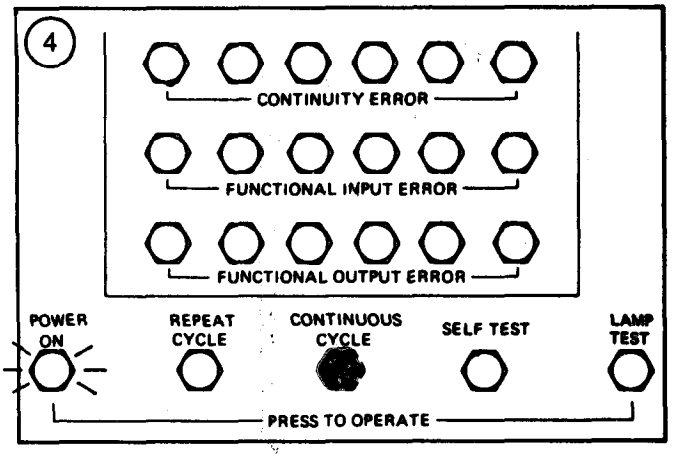
To prevent electrical damage to the CUT, install card with components facing left.

- ***Install CUT in MTS connector J6.***



Be sure components face left.

- ***Check that MTS is in single cycle mode.***



Check that CONTINUOUS CYCLE indicator is off to indicate MTS is in single-cycle mode.

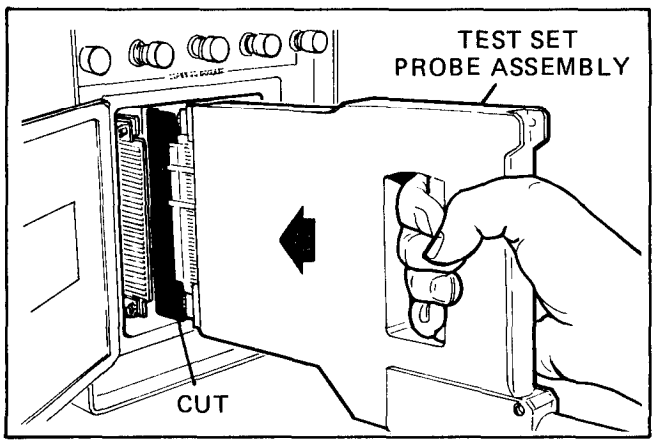
2-6. INDIVIDUAL CARD TEST. (Cont.)

b. Initiate individual card test.

NOTE

When test set probe assembly W209 is attached to CUT, RED and GRN indicators on probe should be up and cable down.

- ***Connect test set probe assembly W209 to CUT.***



Hold probe steadily in place.

NOTE

Card test starts automatically: on MTS, GO and NO-GO indicators light; and on probe, RED and GRN indicators light.

c. Observe MTS for test results.

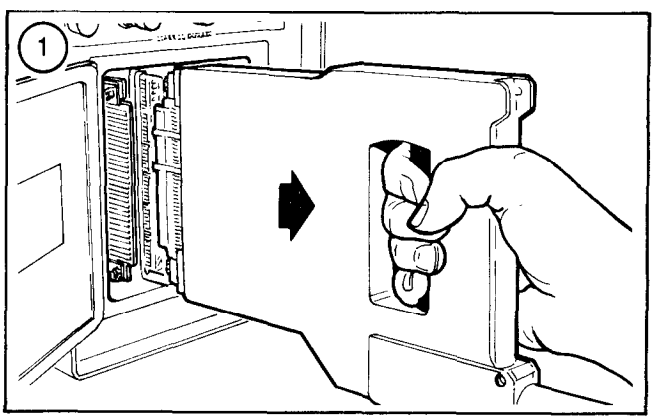
- ***Check results of individual card test.***

(1) CUT passes test if GO (on MTS) and GRN (on probe) remain lighted.

(2) CUT fails test if NO-GO (on MTS) and RED (on probe) remain lighted and at least one ERROR indicator on the MTS lights.

d. Conclude individual card test.

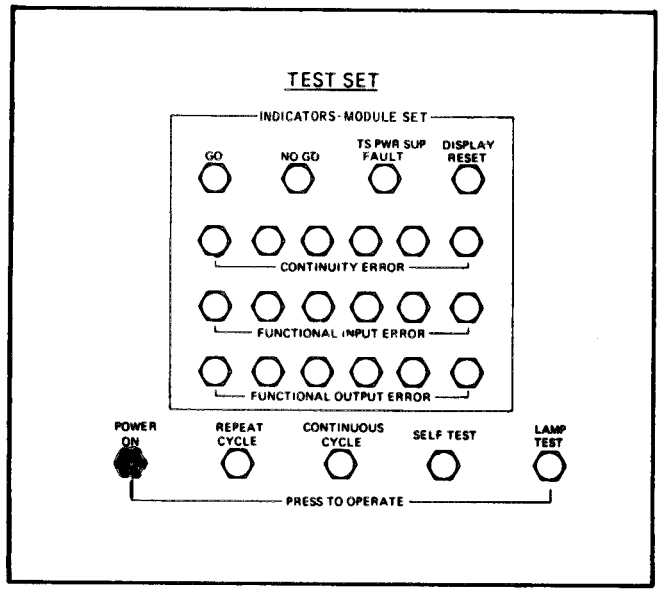
- ***Remove probe from CUT.***



Release probe by squeezing handle.

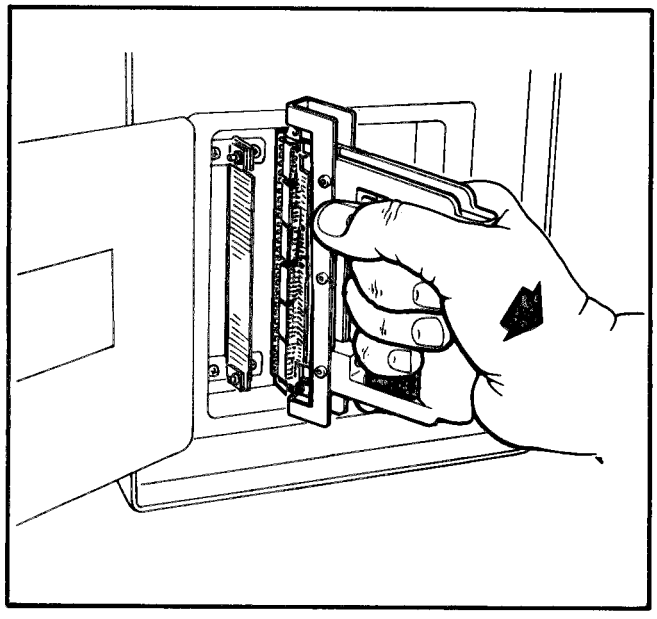
2-6. INDIVIDUAL CARD TEST. (Cont.)

- ***Turn off power on MTS.***



Press and release POWER ON pushbutton.

- ***Remove CUT from MTS connector J6.***



Attach card extractor to CUT in connector J6.

Remove CUT by squeezing handle on card extractor.

2-6. INDIVIDUAL CARD TEST. (Cont.)

• *If CUT passed test,* perform *defective reed relay card test (para 2-7).*

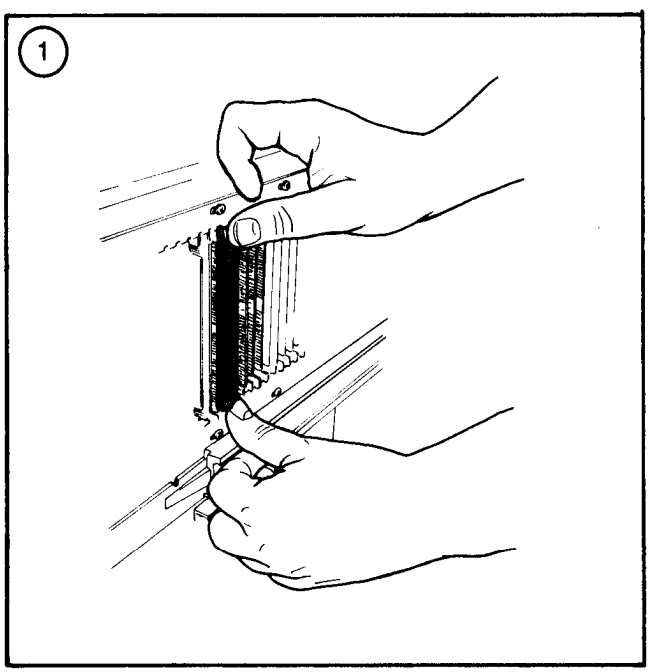
NOTE

The defective reed relay card test is performed only after the CUT (that failed an in-system card test) passes an individual card test and either of the following two conditions are met:

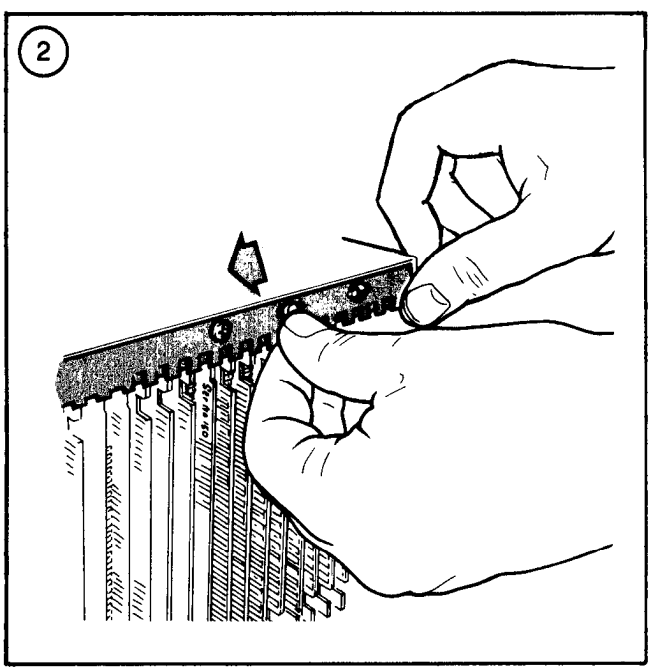
(1) In-system card test displayed both GO and NO-GO indicators at the same time; or

(2) In-system card test displayed all (5 or 6, determined by card type) CONTINUITY ERROR indicators at the same time.

• ***If CUT failed test, replace card.***



Replace original card in system with known good card.



If no other cards are to be tested in UUT:

(1) Remove special purpose assembly W210 from MTS UMBILICAL INTERFACE;

(2) Replace MTS UMBILICAL INTERFACE;

(3) Replace shorting circuit card(s); and

(4) Lock card retainers.

2-7. DEFECTIVE REED RELAY CARD TEST.

NOTE

This test is done only when in-system card test displays both GO and NO-GO indicators at same time or all (5 or 6 as determined by card type) CONTINUITY ERROR indicators are lighted and card passes individual card test.

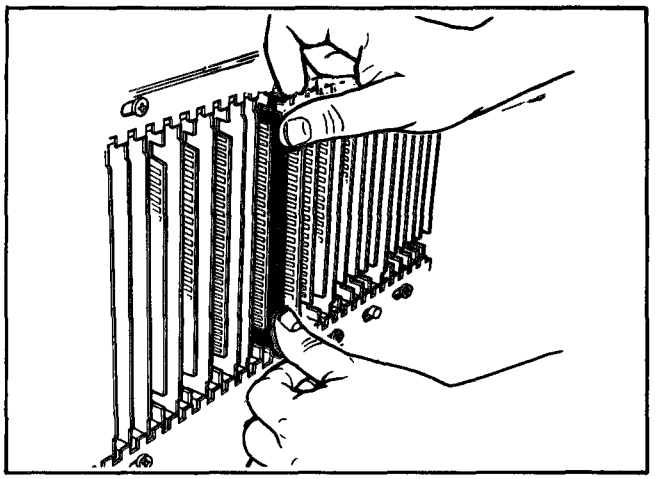
To identify 6-chip and 5-chip circuit cards for CONTINUITY ERRORs, see table below.

TABLE OF CIRCUIT CARD TYPES

6-chip cards		5-chip cards
587102	587117	149512
thru	149516	149513
587106	149576	10281602
587108	149580	
thru	10281606	
587110	10281780	

a. Perform in-system card test (para 2-5).

• Use known good card in same slot as original CUT.



b. Observe test results on MTS.

• If known good card passes in-system card test, replace original CUT. (Original card is bad.)

• If known good card fails in-system card test, refer problem to higher maintenance. (Wiring or associated circuit failure is indicated.) Reinstall original CUT.

2-8. PREPARATION OF MTS FOR MOVEMENT.

To prepare the MTS for movement:

(1) Turn off power to power supply and to MTS;

(2) Disconnect cables and replace their protective covers;

(3) Secure access door on front panel assembly;

(4) Install power supply in its transit case together with its two cables; and

(5) Pack MTS probe assembly cable and special purpose cable assembly.

Section III. OPERATION UNDER UNUSUAL CONDITIONS

This section is not applicable.

CHAPTER 3
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Paragraph

3-1. INTRODUCTION.

WARNING

Be sure prime power is off before checking/servicing MTS.

Preventive Maintenance Checks and Services (PMCS) consist of routine housekeeping functions, such as inspecting and cleaning external surfaces, and inspecting cables, connectors, switches, and card cages, which should be done on a regular basis.

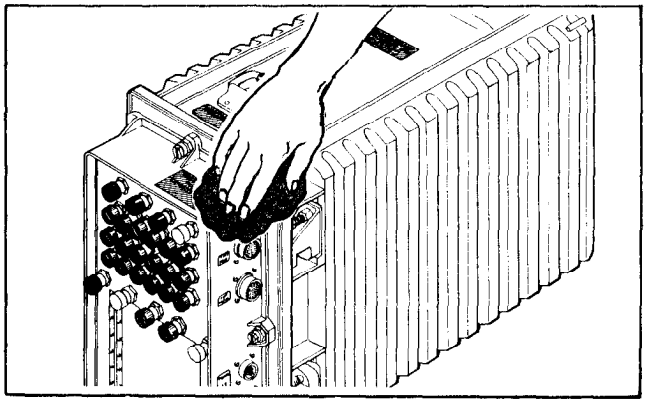
To report any defects, use proper forms:

- Army use TM 38-750
- Air Force use DA Pam 738-750

If the MTS fails to operate, troubleshoot.

3-2. ROUTINE CHECKS AND SERVICES.

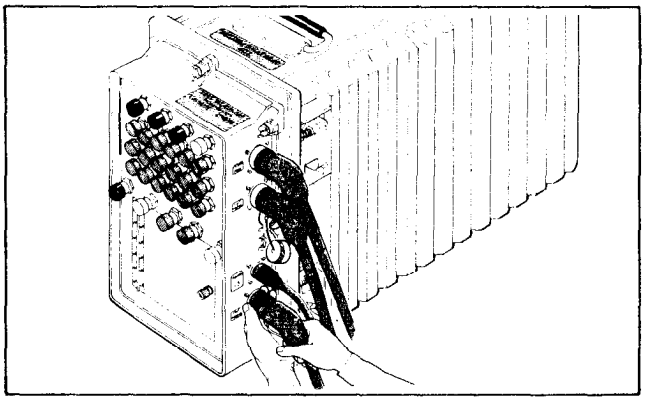
a. Check external surfaces.



Remove any dirt, grease, moisture, or fungus with clean, dry, soft cloth.

Clean with mild detergent and water, if needed, and then rinse thoroughly and dry immediately.

b. Check cables and connectors.



Check for corrosion, moisture, or damaged connector pins.

Check connections of cables to connectors for tightness.

Replace cable(s) if necessary.

3-2. ROUTINE CHECKS AND SERVICES. (Cont.)

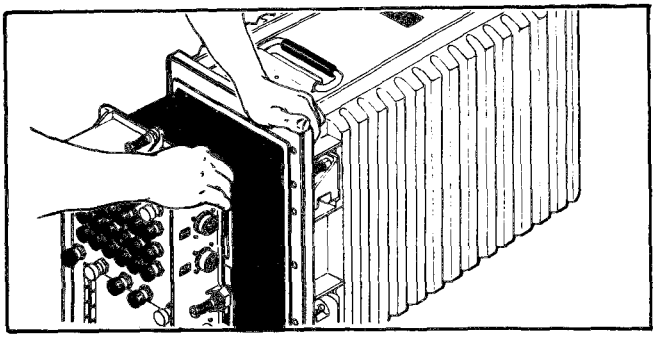
c. Check MTS interior.

WARNING

Be sure AC ON/OFF switch on power supply and POWER ON pushbutton on MTS are off before extending MTS.

WARNING

Extension of the MTS causes a shift in weight and the assembly may tip forward and cause injury to personnel and/or damage to equipment. Always provide support for the MTS and the case.



Extend MTS.

Check all assemblies for damage.

Remove dust and dirt with soft bristle brush and vacuum cleaner.

WARNING

USE OF CLEANING SOLVENT

Fumes of TRICHLOROTRIFLUOROETHANE are poisonous. Provide adequate ventilation whenever you use TRICHLOROTRIFLUOROETHANE. Do not use solvent near heat or open flame. TRICHLOROTRIFLUOROETHANE will not burn, but heat changes the gas into poisonous, irritating fumes. DO NOT breathe the fumes or vapors. TRICHLOROTRIFLUOROETHANE dissolves natural skin oils. DO NOT get the solvent on your skin. Use gloves, sleeves, and an apron which the solvent cannot penetrate. If the solvent is taken internally, see a doctor immediately.

Clean unpainted metallic surfaces with cloth slightly dampened with trichlorotrifluoroethane (NSN 6850-00-105-3084) if needed.

CHAPTER 4
OPERATOR MAINTENANCE

This chapter is not applicable. There is no operator maintenance for the Module Test Set (MTS). Refer to Chapter 5 for organizational maintenance.

CHAPTER 5
ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. COMMON TOOLS AND TEST EQUIPMENT; SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); SUPPORT EQUIPMENT; AND REPAIR PARTS

5-1. COMMON TOOLS AND TEST EQUIPMENT.

The Tools and Test Equipment Table lists the common tools and test equipment used with the MTS for organizational maintenance. (Additional information is in the Maintenance Allocation Chart (MAC), in Appendix B.)

TOOLS AND TEST EQUIPMENT TABLE

Nomenclature	NSN
Extractor, Printed Circuit Card (Litton)	5999-00-407-5062
Tool Kit, Electronic Equipment TK-101/G	5180-00-064-5178
Supplementary Tool Kit, OL	
Digital Voltmeter, AN/USM-451	6625-00-060-6804

5-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

No special tools, TMDE, or support equipment are needed in addition to the common tools and test equipment.

5-3. REPAIR PARTS.

Refer to Repair Parts and Special Tools List (RPSTL) (TM 11-7010-201-20P).

Section II SERVICE UPON RECEIPT

5-4. UNPACKING MTS.

There are no special unpacking procedures required for the MTS, or for the test set probe assembly W209 and the special purpose cable assembly W210. The 135V power supply comes in its own transit case with its two cables.

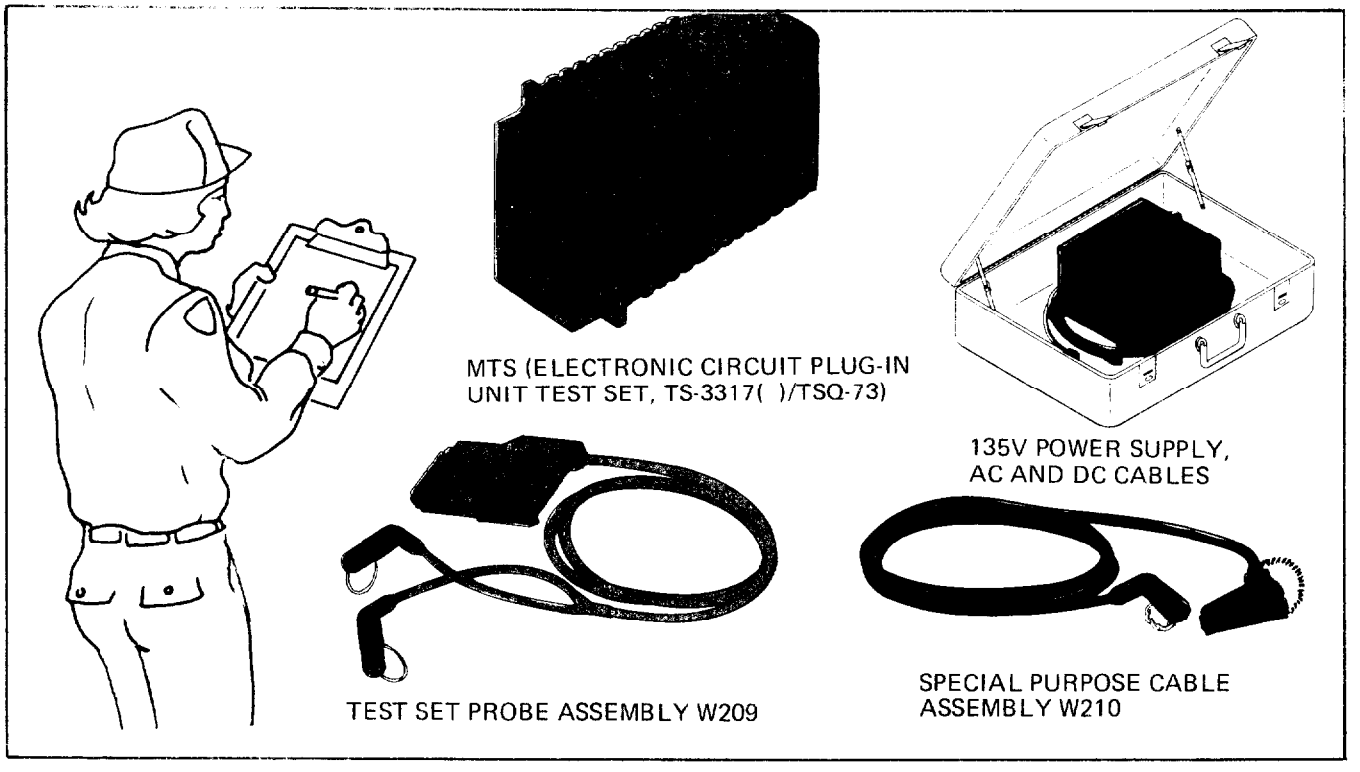
5-5. CHECKING UNPACKED EQUIPMENT.

a. Inventory equipment.

Check to see if inventory is complete.

Check inventory list against packing slip.

Report any discrepancies in a Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/ MCO P4610.19D and DLAR 4500.15.

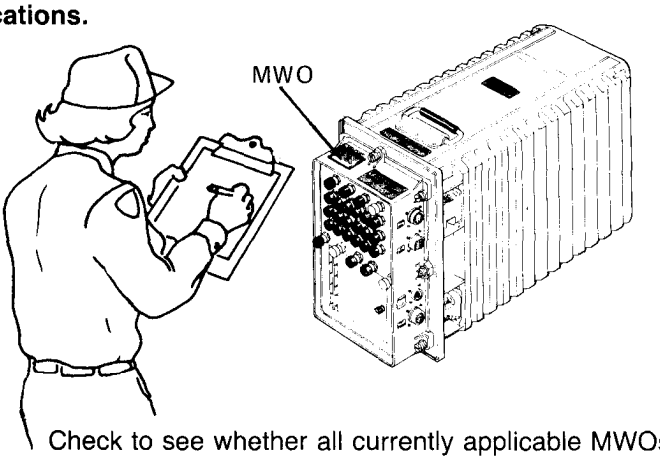


b. Inspect for damage.

Ž If equipment is damaged, report damage on SF 364 (Report of Discrepancy(ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.

5-5. CHECKING UNPACKED EQUIPMENT. (Cont.)

c. Check for modifications.



Check to see whether all currently applicable MWOs (Modification Work Orders) have been applied (DA PAM 310-1).

5-6. SIGNING FOR EQUIPMENT.

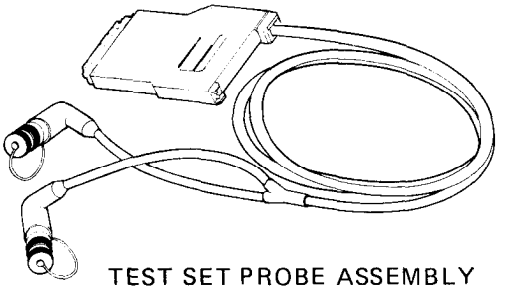
For equipment received, sign hand receipt form in TM 11-7010-201-12-HR.

5-7. INSTALLATION INSTRUCTIONS.

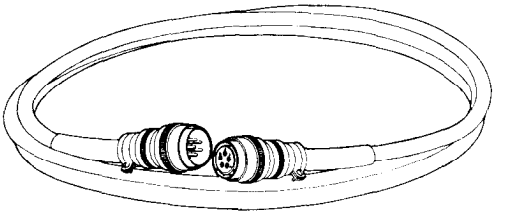
The following paragraphs contain procedures for connecting cables, for preliminary checks of the MTS, and for MTS self-test.

5-8. ELECTRICAL CABLE CONNECTIONS.

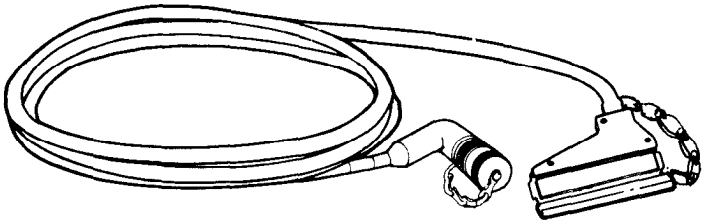
CABLES USED WITH THE MTS



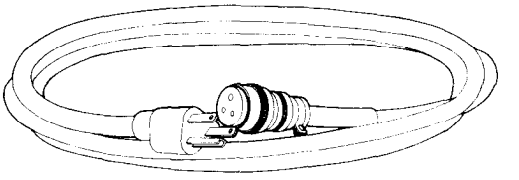
TEST SET PROBE ASSEMBLY



POWER SUPPLY DC POWER CABLE



SPECIAL PURPOSE CABLE ASSEMBLY

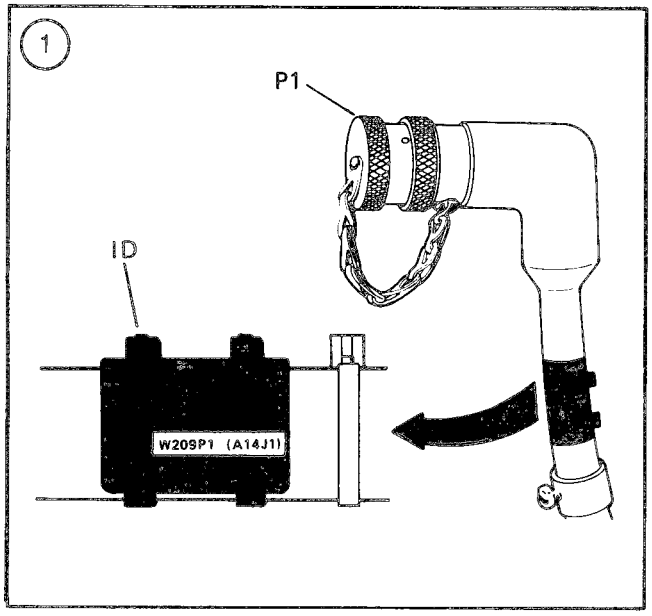


POWER SUPPLY AC POWER CABLE

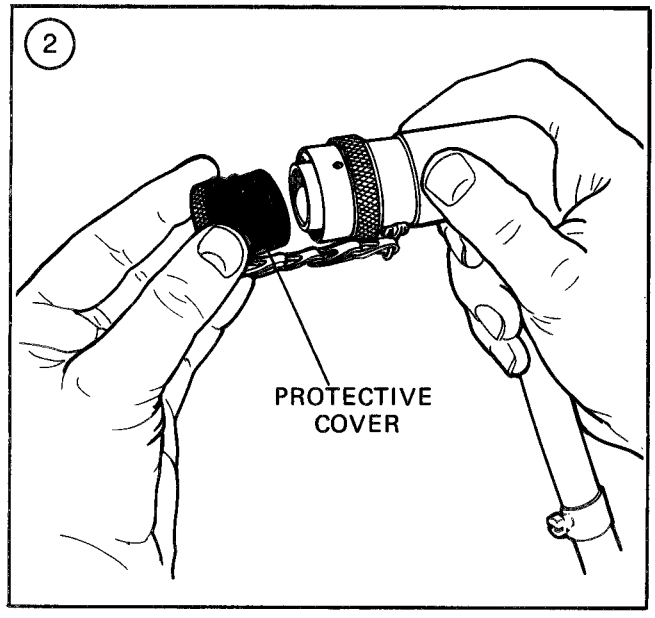
5-8. ELECTRICAL CABLE CONNECTIONS. (Cont.)

a. Connect test set probe assembly (W209) to MTS.

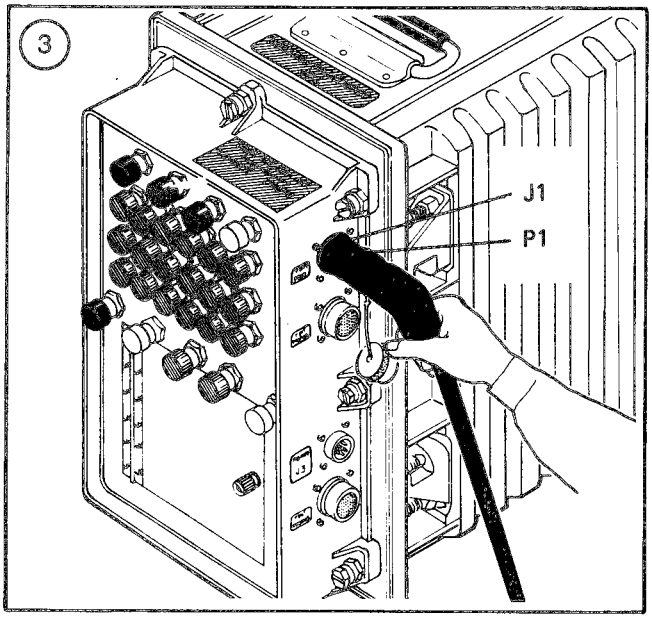
- ***Connect P1 of cable W209 to J1 of MTS.***



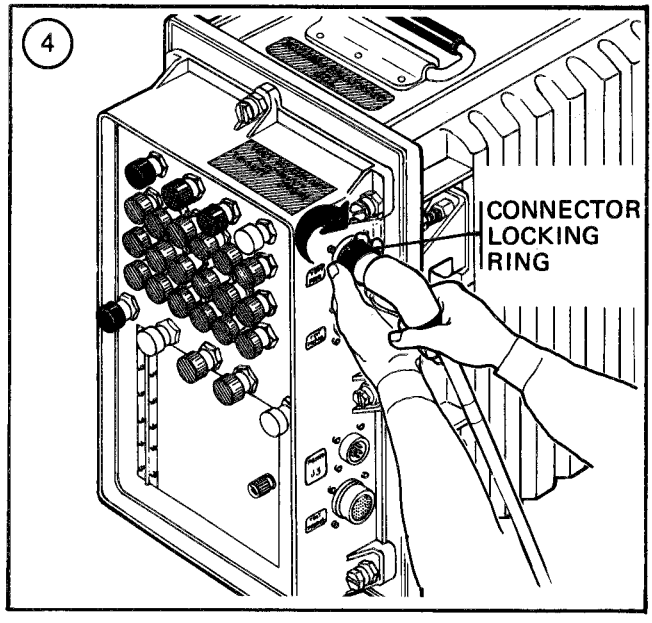
Find ID on cable W209.



Remove protective cover.



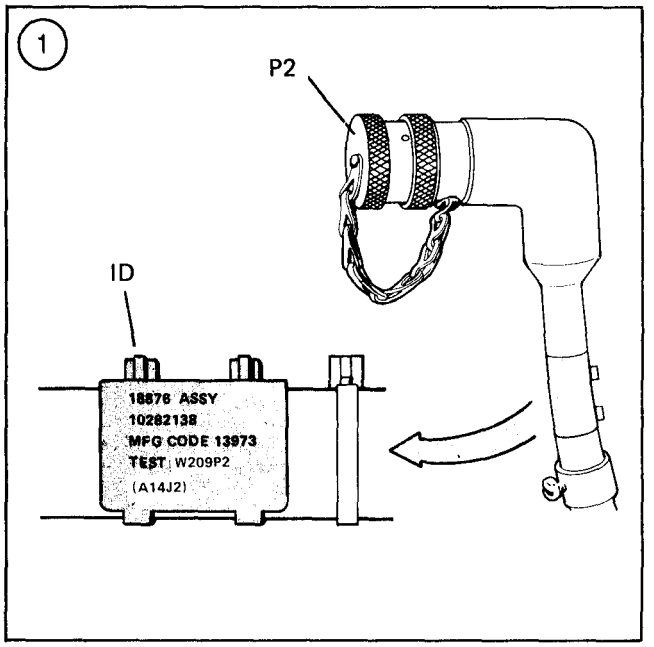
Line up keys on P1 with slots on J1.



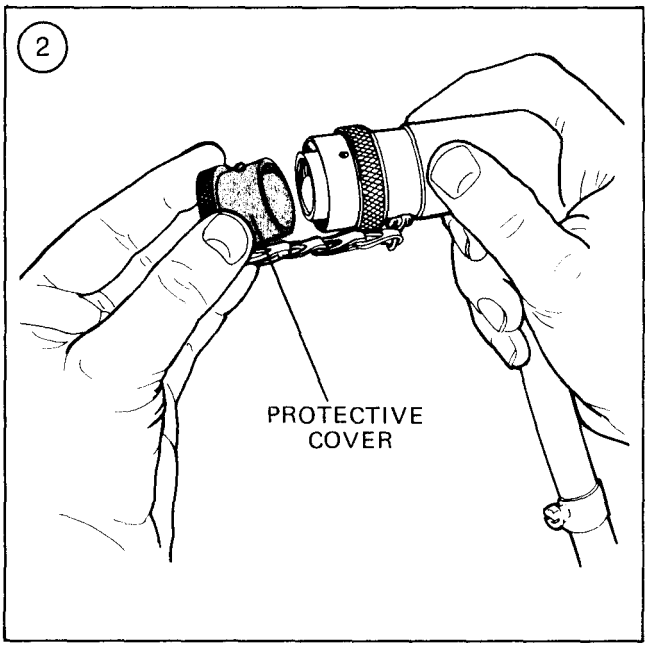
Insert P1 into J1 and turn connector locking ring to right until locked.

5-8. ELECTRICAL CABLE CONNECTIONS. (Cont.)

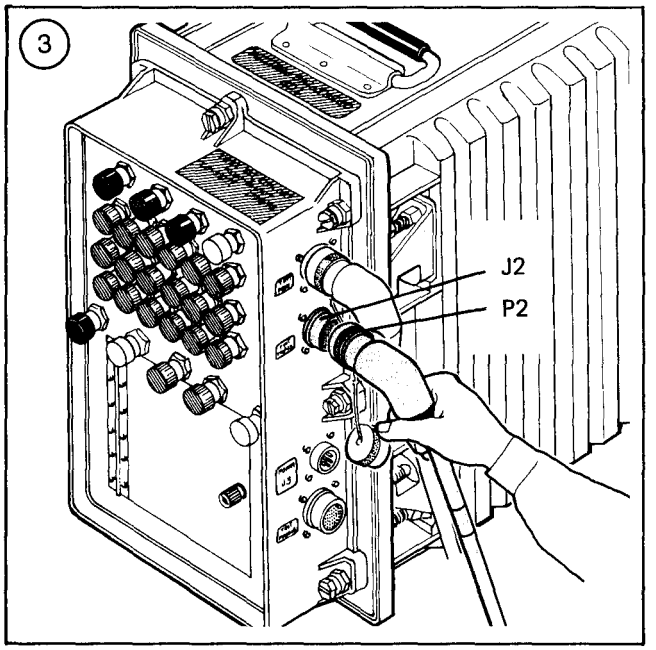
- ***Connect P2 of cable W209 to J2 of MTS.***



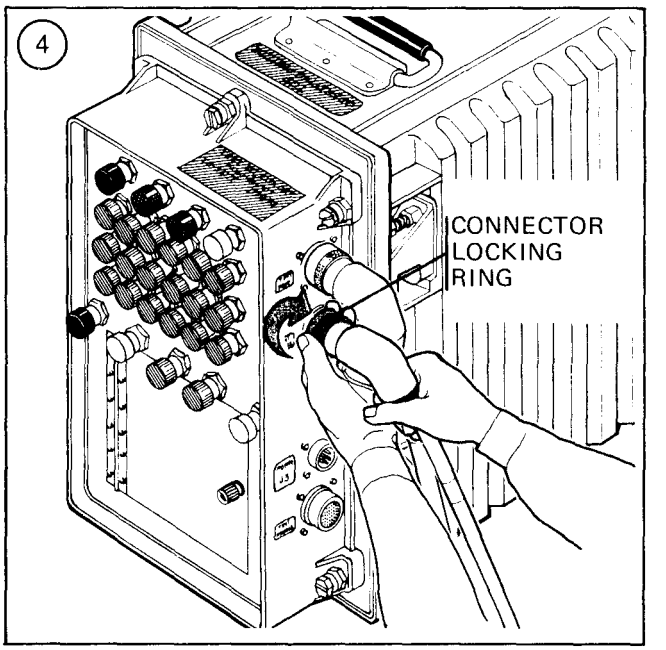
Find ID on cable W209.



Remove protective cover.



Line up keys on P2 with slots on J2.

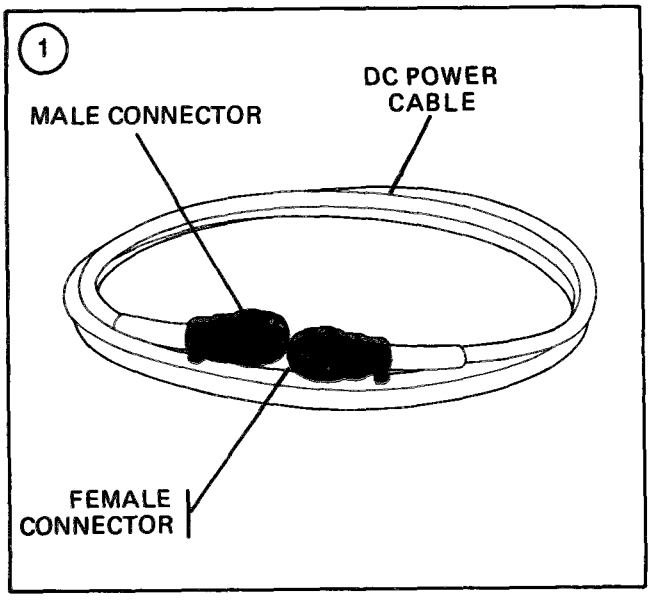


Insert P2 into J2 and turn connector locking ring to right until locked.

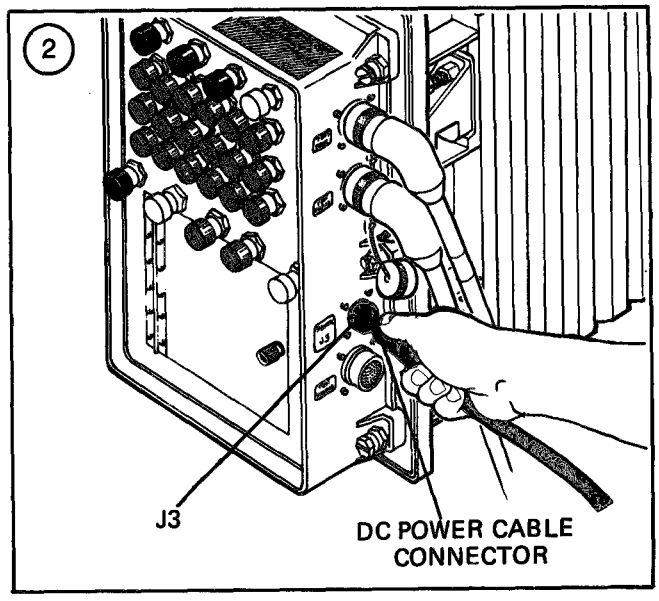
5-8. ELECTRICAL CABLE CONNECTIONS. (Cont.)

b. Connect power supply to MTS.

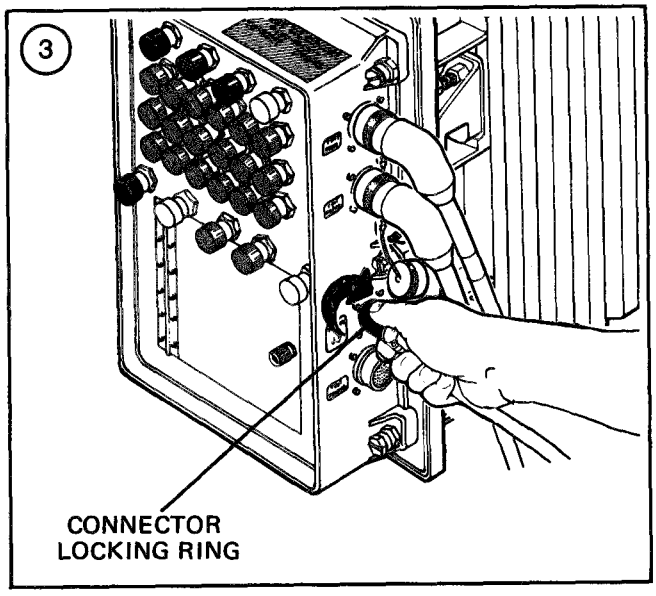
- ***Connect power supply dc power cable to connector J3 on MTS.***



Identify connector.



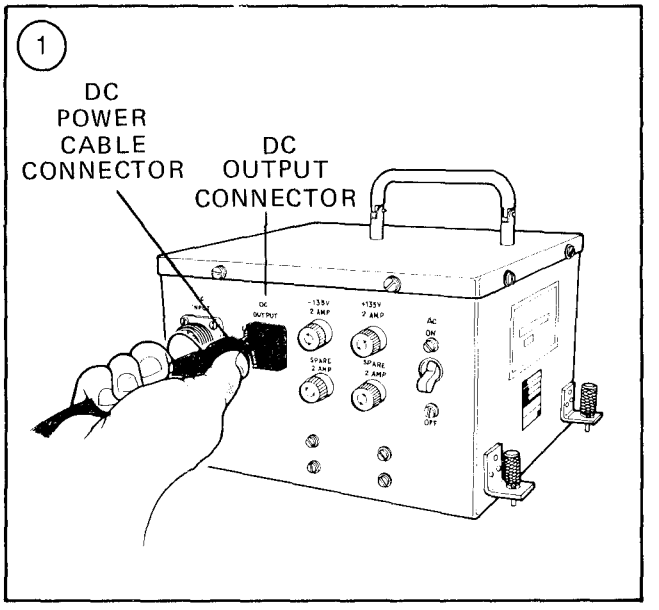
Line up keys on dc power cable female connector with slots on J3.



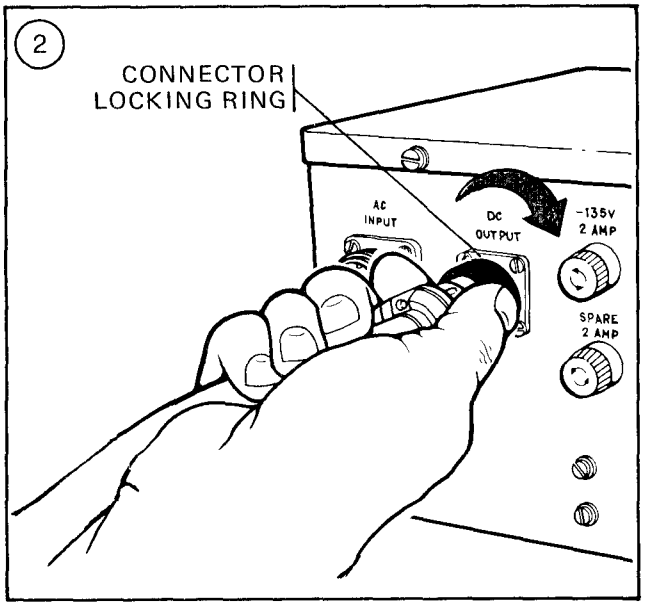
Insert keys on dc power cable connector into slots on J3 and turn connector locking ring to right until locked.

5-8. ELECTRICAL CABLE CONNECTIONS. (Cont.)

- ***Connect power supply dc power cable to DC OUTPUT connector on power supply.***



Line up keys on dc power cable male connector with slots on DC OUTPUT connector.

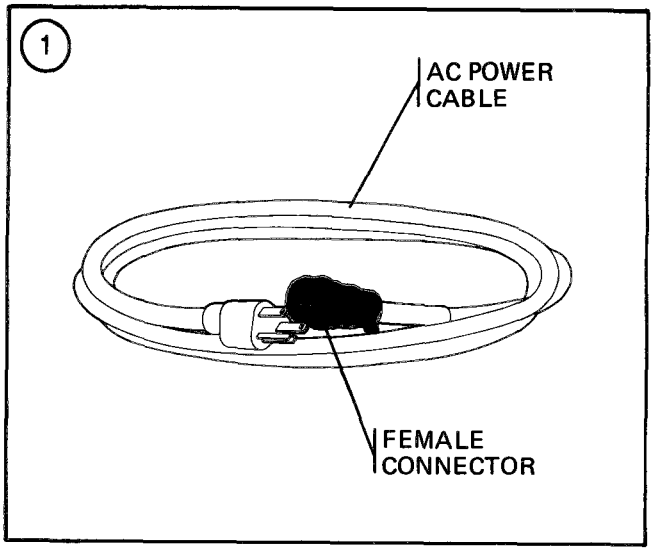


Insert keys on dc power cable connector into slots on DC OUTPUT connector and turn connector locking ring to right until locked.

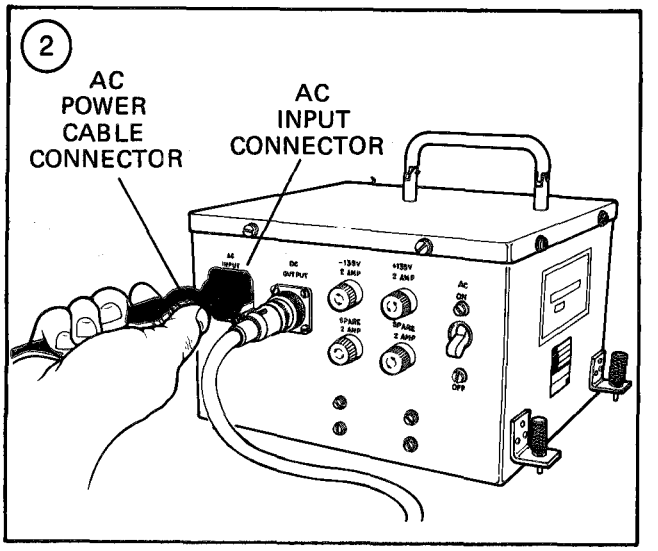
5-8. ELECTRICAL CABLE CONNECTIONS. (Cont.)

c. Connect power supply to external power source.

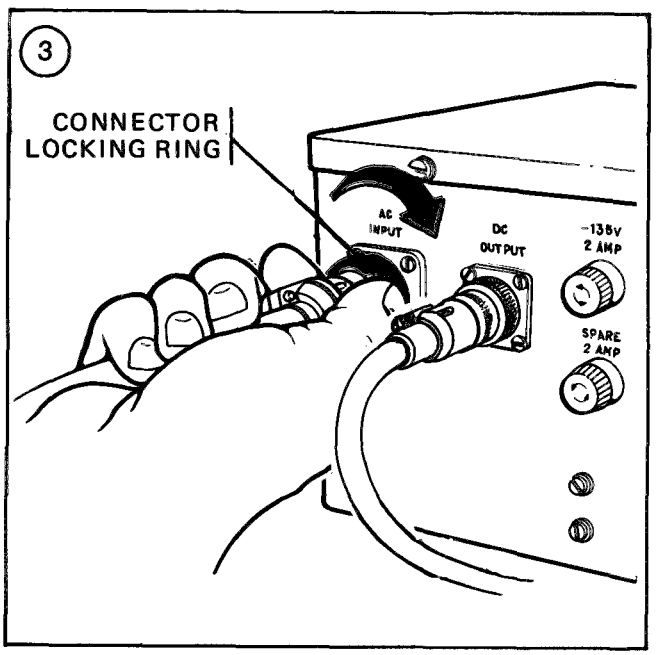
- ***Connect ac power cable to AC INPUT connector on power supply.***



Identify proper connector: female connector.

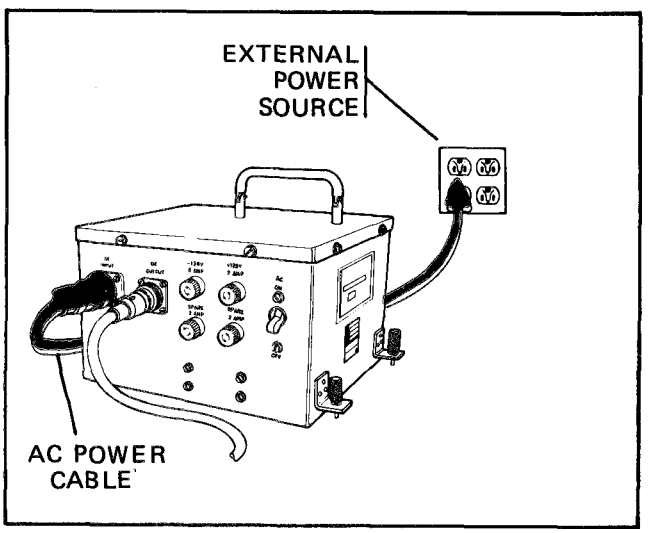


Line up key on ac power cable connector with slot on AC INPUT connector.



Insert key on ac power cable connector into slot on AC INPUT connector and turn connector locking ring to right until tight.

- ***Plug ac power cable into external power source (115V, 50, 60, or 400 Hz power source).***

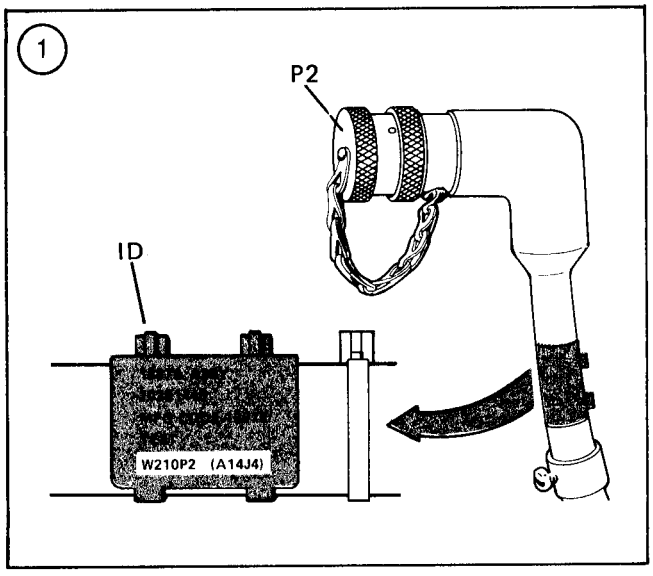


Plug 3-pronged ac power cable connector into 3-holed electrical outlet.

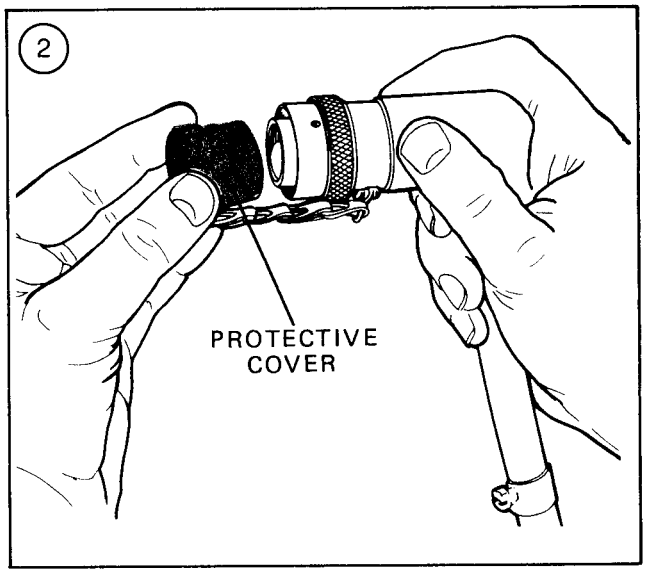
5-8. ELECTRICAL CABLE CONNECTIONS. (Cont.)

d. For in-system card tests, connect special purpose cable assembly (W210) to MTS.

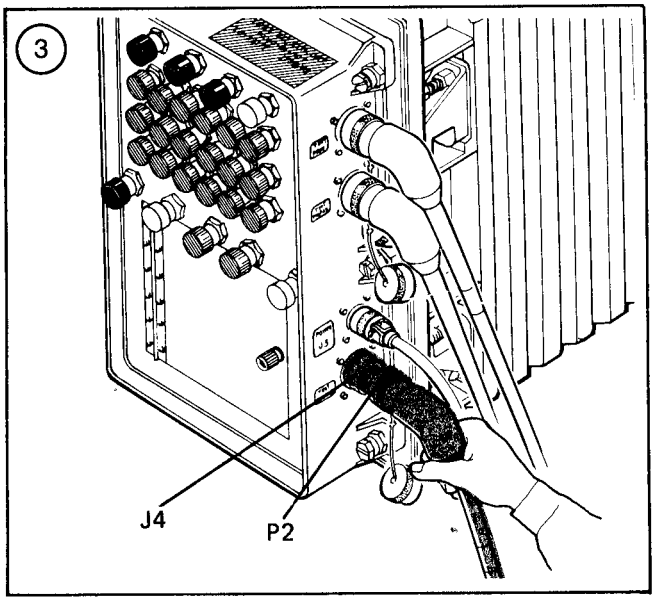
- ***Connect P2 on special purpose cable assembly W210 (umbilical) to J4 connector on MTS.***



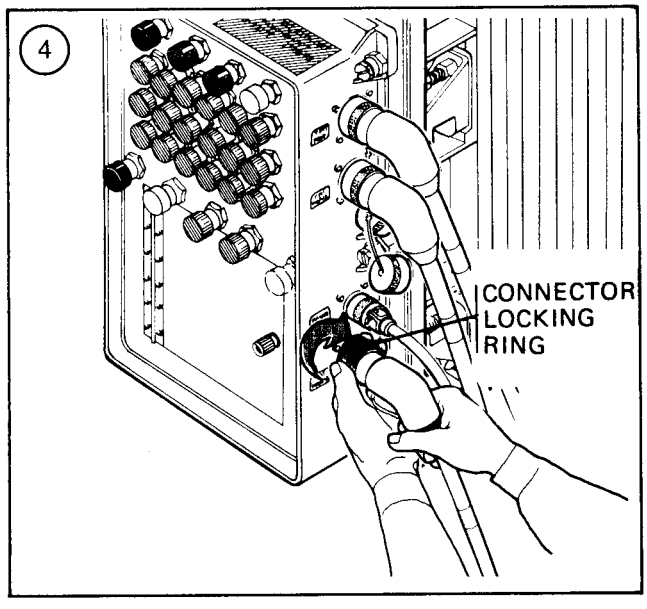
Find ID on cable W210.



Remove protective cover.



Line up keys on P2 with slots on J4.

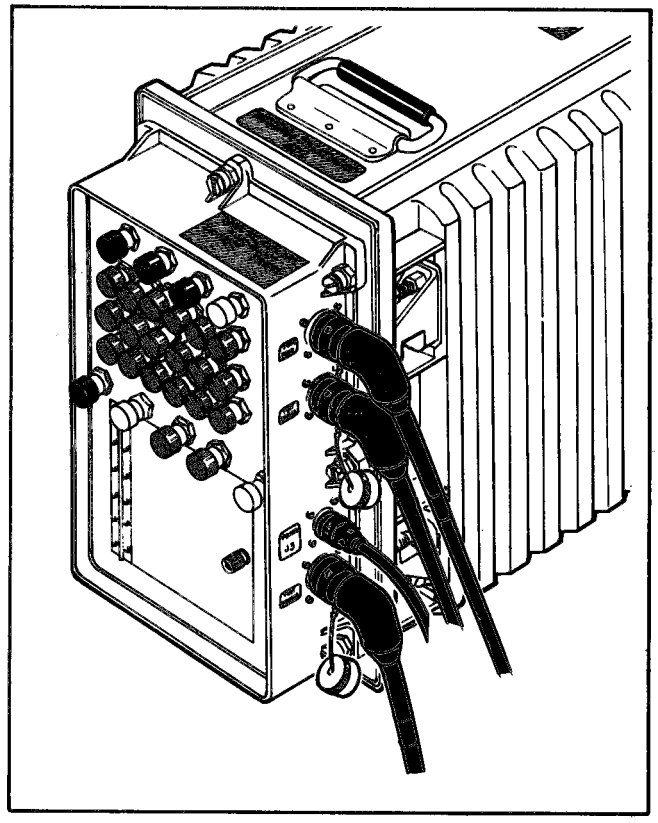


Insert P2 into J4 and turn connector locking ring to right until locked.

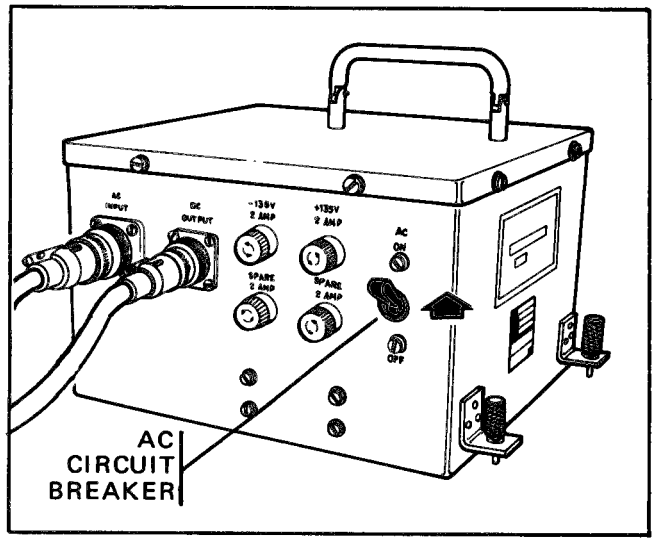
5-9. PRELIMINARY CHECKS.

a. Perform lamp test.

- ***Connect cables (para 5-8).***



- ***Switch power supply on.***

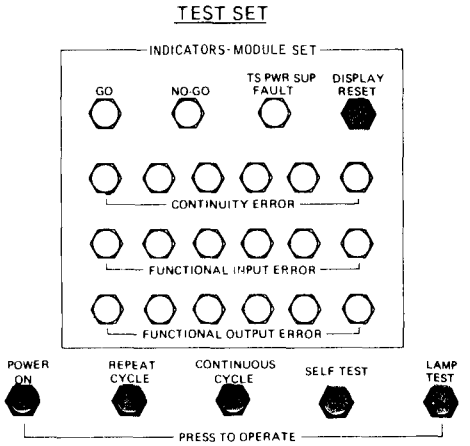


Set AC circuit breaker ON.

5-9. PRELIMINARY CHECKS. (Cont.)

NOTE

All six switches on MTS have built-in indicator lamps.



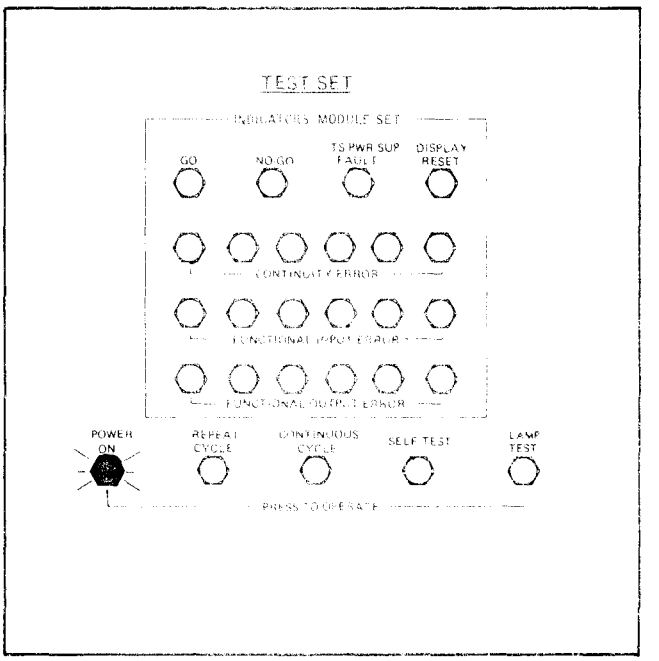
In the following procedures:

= indicator lit

= indicator not lit

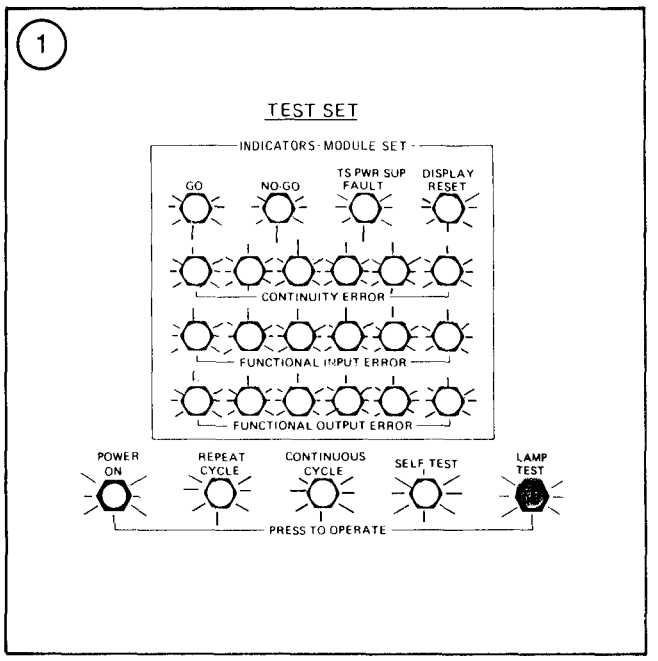
= indicator goes dark

- ***Switch MTS on.***

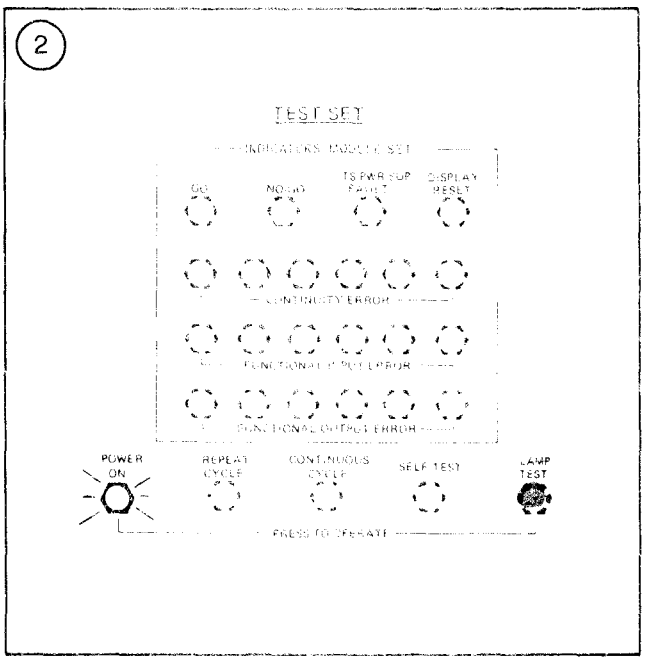


Press and release POWER ON pushbutton on MTS. (POWER ON indicator lights.)

- ***Do lamp test.***



Press and hold LAMP TEST pushbutton on MTS. All indicator lamps should light.

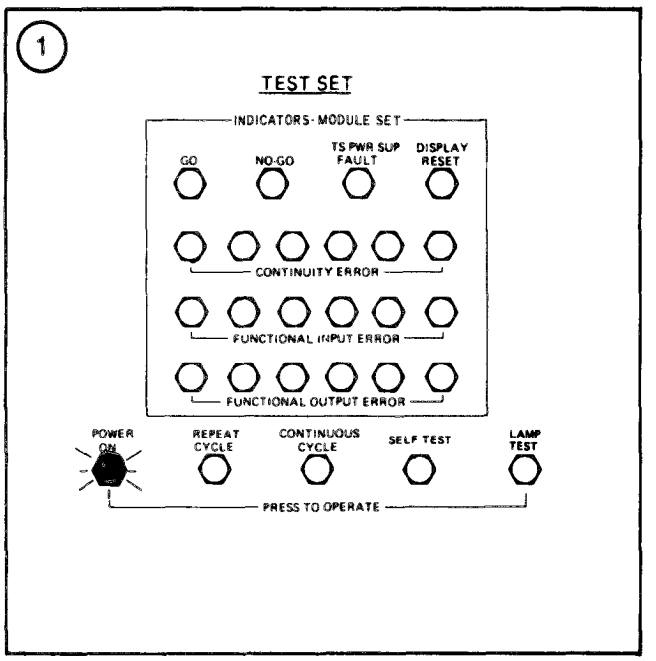


Release LAMP TEST pushbutton. (LAMP TEST indicator goes dark.)

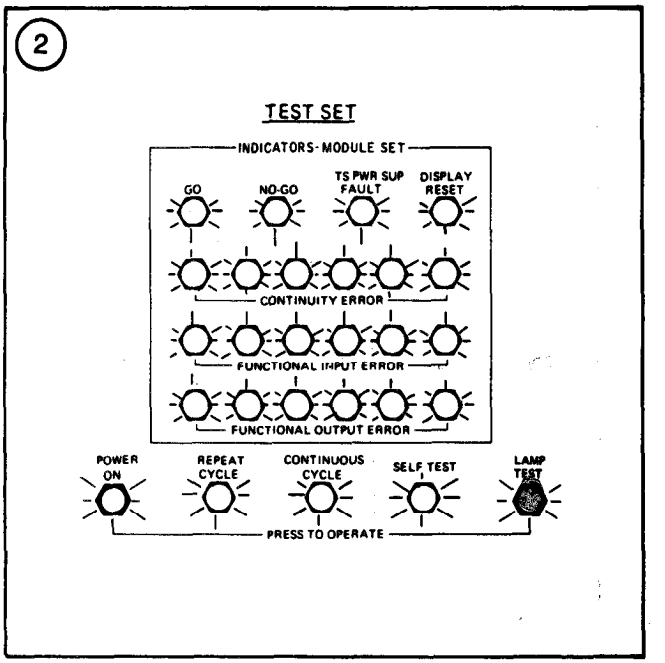
5-9. PRELIMINARY CHECKS. (Cont.)

b. If all MTS indicators do not light, replace faulty lamp(s) (para 5-20).

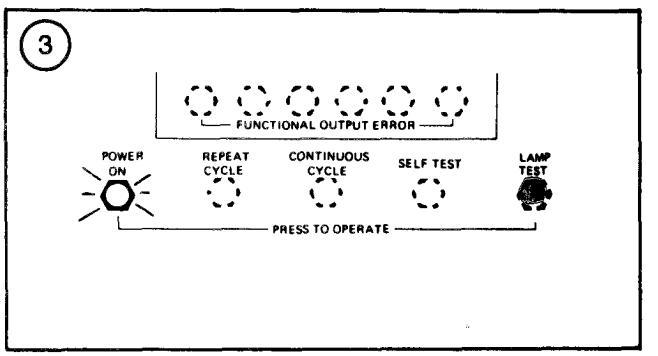
- ***Do lamp test.***



Press and release POWER ON pushbutton on MTS.



Press and hold LAMP TEST pushbutton on MTS. If all MTS indicators light, MTS passes lamp test.



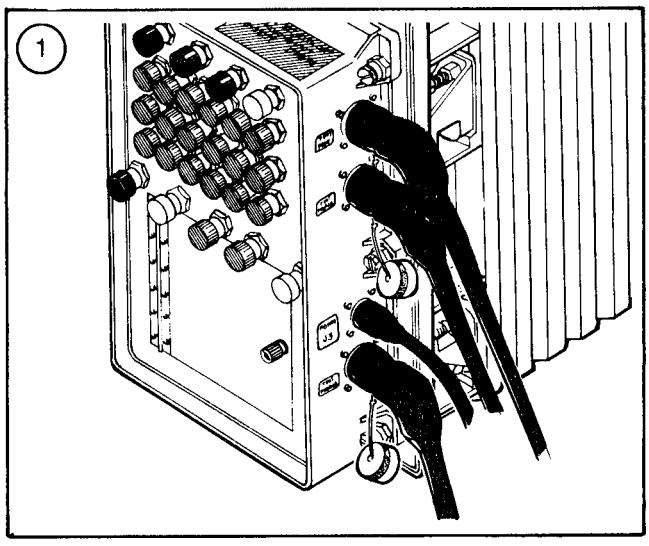
Release LAMP TEST pushbutton.

- ***If all MTS indicators do not light, refer to higher maintenance.***

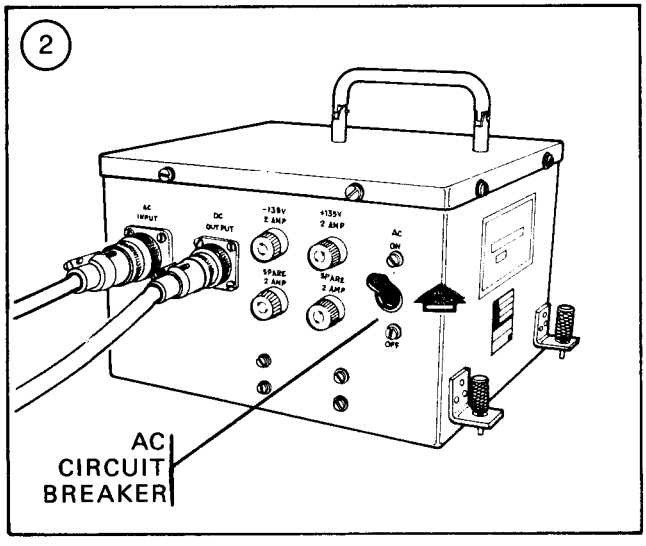
5-10. MTS SELF-TEST PROCEDURE.

a. Perform preliminary self-test procedures.

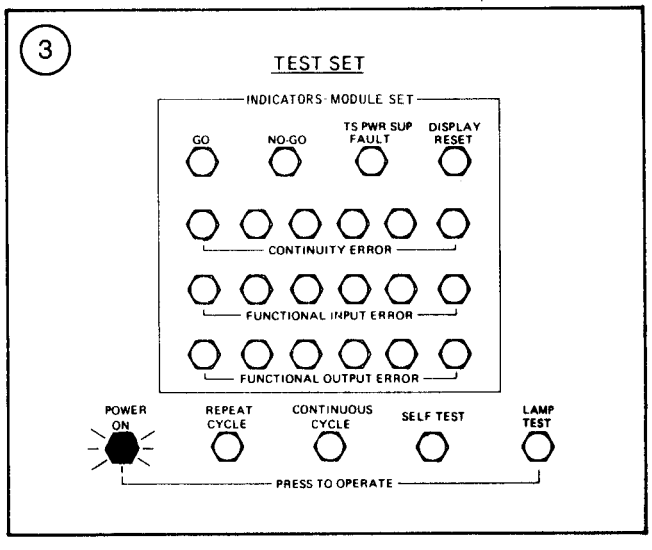
- ***Check that the following conditions exist:***



Be sure all electrical cables are connected (para 5-8).



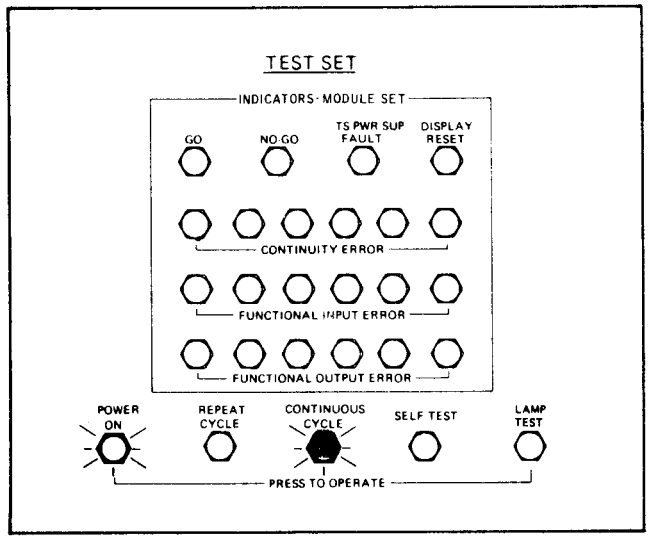
Be sure AC circuit breaker on power supply is ON.



Be sure POWER ON pushbutton on MTS is on. (POWER ON indicator is lighted.)

Be sure all lamps work (para 5-9).

- ***Set MTS in continuous cycle.***



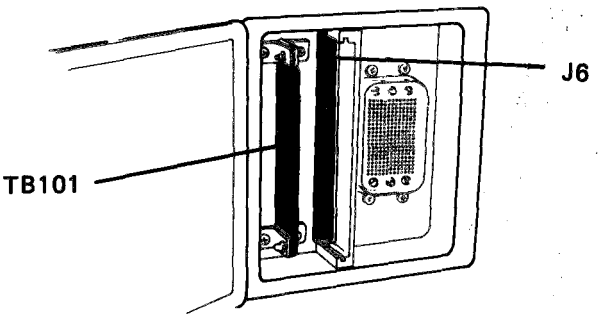
Press and release CONTINUOUS CYCLE pushbutton. (CONTINUOUS CYCLE indicator lights.)

5-10. MTS SELF-TEST PROCEDURE. (Cont.)

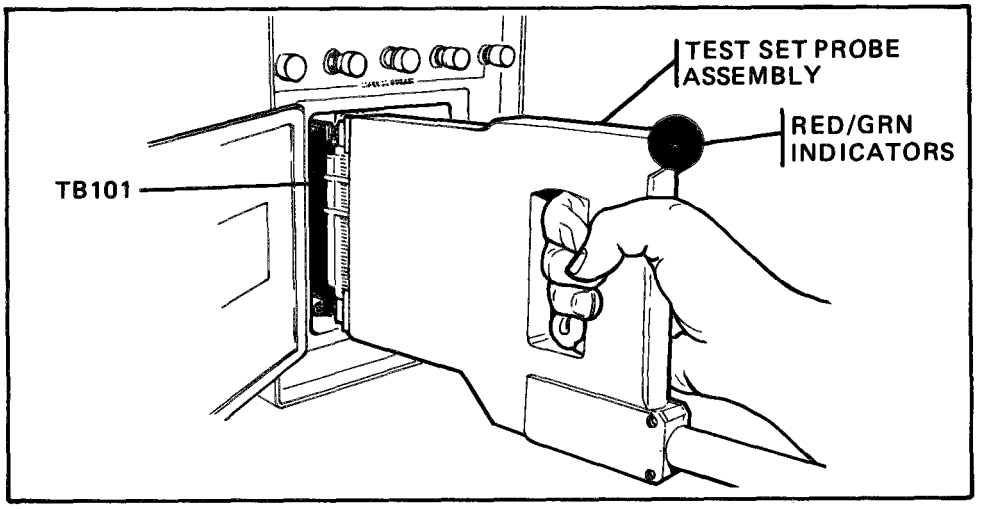
b. Initiate self-test.

CAUTION

Do not connect test set probe assembly to TB101 if a card is in connector J6 of MTS.



- ***Connect test set probe assembly (W209) to self-test terminal board TB101 on MTS. (Be sure RED and GRN indicators on test set probe assembly are in the up position.)***



Hold probe in place.

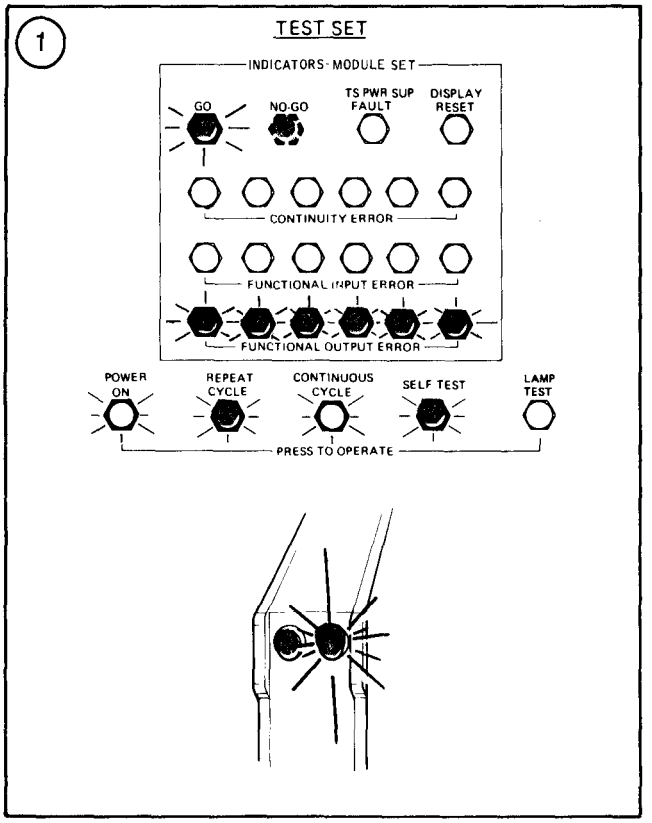
NOTE

On MTS, both GO and NO-GO indicators light to show that test is in progress. On test set probe assembly, both RED and GRN indicators also light to show test in progress.

5-10. MTS SELF-TEST PROCEDURE. (Cont.)

c. Observe MTS for test results.

ŽMTS passes test.



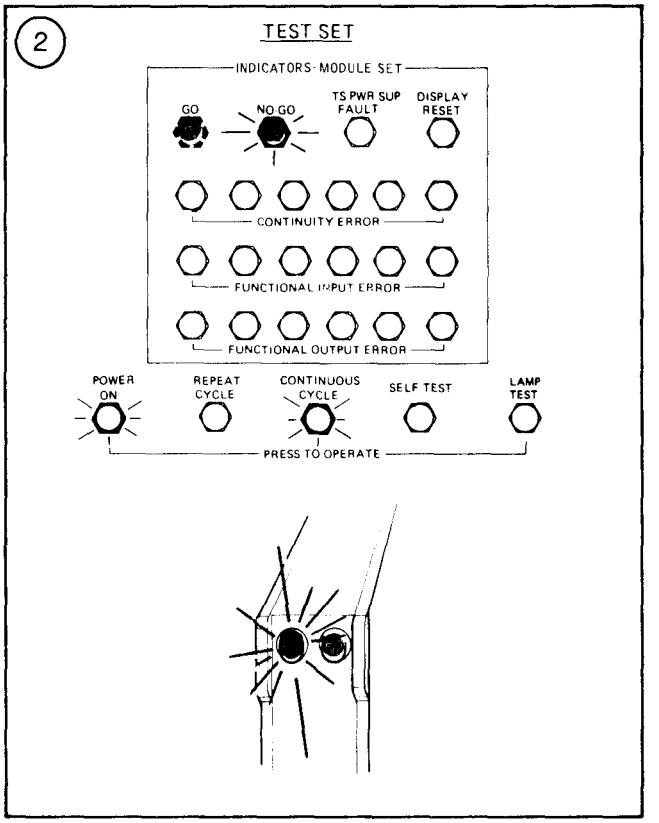
All the following must happen:

- GO (on MTS) and GRN (on test set probe assembly) indicators remain lit.
- All FUNCTIONAL OUTPUT ERROR indicators remain lit.

ŽNO-GO (on MTS) and RED (on test set probe assembly) indicators go dark.

- SELF TEST indicator lights.
- REPEAT CYCLE indicator flashes at approximately 8-second intervals.

ŽMTS fails test.



All the following must happen:

ŽGO (on MTS) and GRN (on test set probe assembly) indicators go dark.

ŽNO-GO (on MTS) and RED (on test set probe assembly) indicators remain lit.

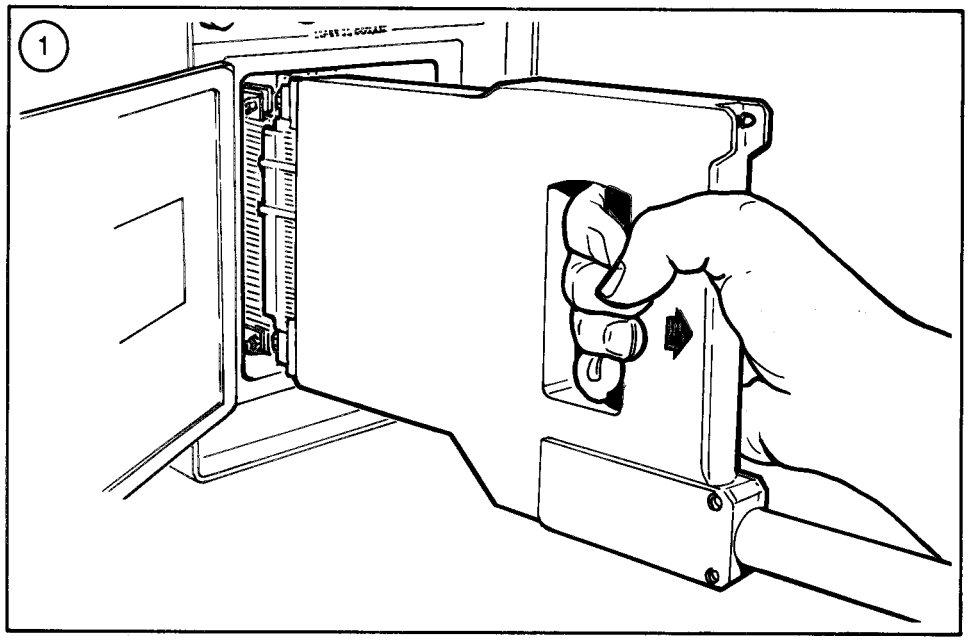
- ERROR indicator(s) remain(s) lit.

• If MTS fails test, troubleshoot.

5-10. MTS SELF-TEST PROCEDURE. (Cont.)

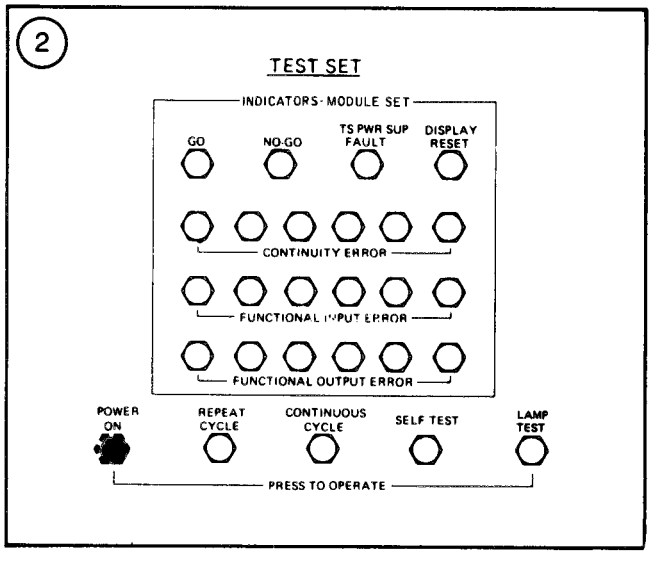
d. Conclude self-test.

- ***Release test set probe assembly from MTS.***



Squeeze handle on probe.

- ***Press and release POWER ON pushbutton to turn power off. (POWER ON indicator goes dark.)***



Section III. TROUBLESHOOTING

5-11. INTRODUCTION.

Troubleshooting the MTS is based on fault isolation to a replaceable circuit card, module, or indicator lamp.

The MTS Fault Isolation (Fl) Flow Chart helps you to isolate the common malfunctions which you may find during the operation or maintenance of the MTS or its components. You should perform the tests/ inspections and corrective actions in the order shown.

This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If you are unable to isolate or to correct a malfunction by taking corrective action(s), notify higher maintenance.

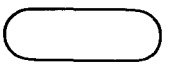
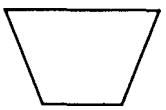
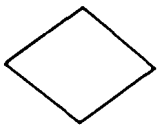
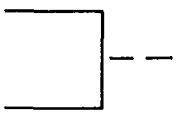
5-12. FAULT ISOLATION PROCEDURE.

a. Flow Chart Symbols and Abbreviations.

To isolate faults in the MTS, use the MTS Fault Isolation (Fl) Flow Chart. The meanings of the flow chart symbols are given in the Flow Chart Symbols Table.

The meanings of the abbreviations in the MTS Fl Flow Chart are found in the Dictionary of Abbreviations.

FLOW CHART SYMBOLS TABLE

Symbol	Symbol name	Meaning
	Terminal	Represents the start or stop point of the flow chart.
	Connector	Represents a connection. If a number and letter are inside, find the matching number and letter and continue. If no number or letter, follow the flow line.
	Operation	Represents a procedure you must do.
	Decision	Represents a decision. Your answer (yes or no) determines which path on the flow chart you will follow.
	Note	Represents additional information. Used for comments.

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

DICTIONARY OF ABBREVIATIONS

Abbreviation	Meaning
BRKR	Breaker
CB	Circuit Breaker
CMPNT	Component
CONDTN	Condition
CONN	Connector(s), Connect
CONV	Converter
GND	Ground
ID	Identification
IND	Indicator(s)
INDV	Individual
LT	Lit
ORIG	Original
PWR	Power
RECONN	Reconnect
REF	Refer
SEC	Second(s)
SPLY	supply
SW	Switch
TP	Test Point(s)

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

b. How to use the MTS FI Flow Chart.

(1) Begin at (START) and proceed through the flow chart. When your action solves the problem (STOP). (If you are not able to correct the fault, refer it to higher maintenance.)

(2) Proceed from top to bottom (|) and from left to right (—),

EXCEPT:

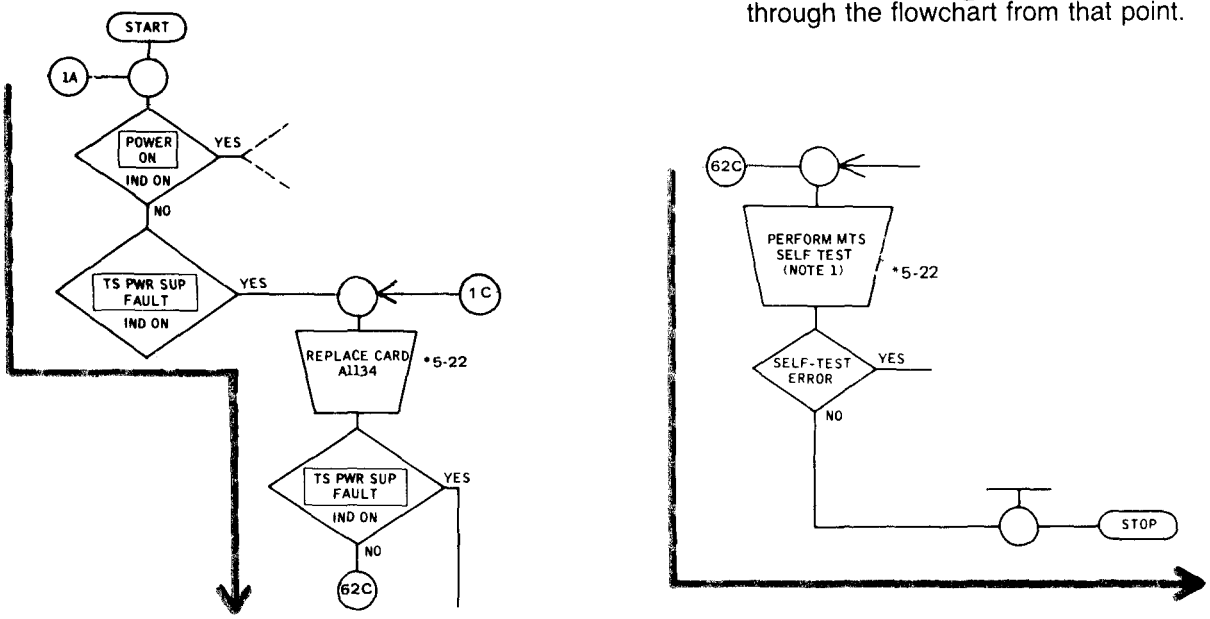
- when an arrow (↑ /←) indicates a change in direction; or
- when a connector (○) sends you to another junction in the flowchart.

(3) Example:

Begin at (START) and move from top to bottom and left to right by following the dashed line.

NOTE

Connector (62C) sends you from Sheet 1 to Sheet 62. On Sheet 62, find connector (62C) and continue through the flowchart from that point.



c. Isolating Malfunctions.

Isolate the malfunction to a defective LRU (Least Replaceable Unit).

ŽUse the MTS FI Flow Chart.

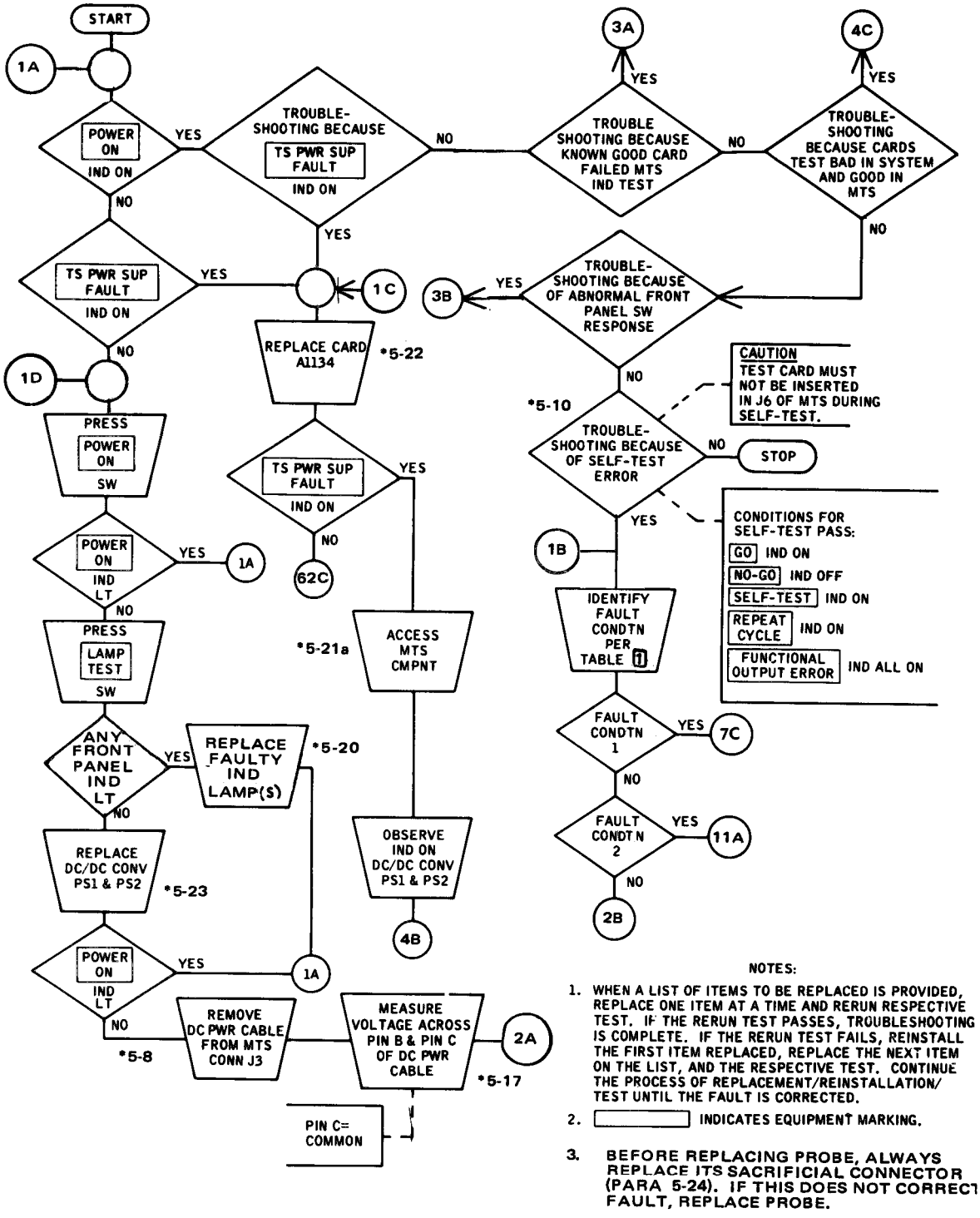
NOTE

All procedures referred to by the FI Flow Chart are indicated by an * followed by their paragraph number in this manual.

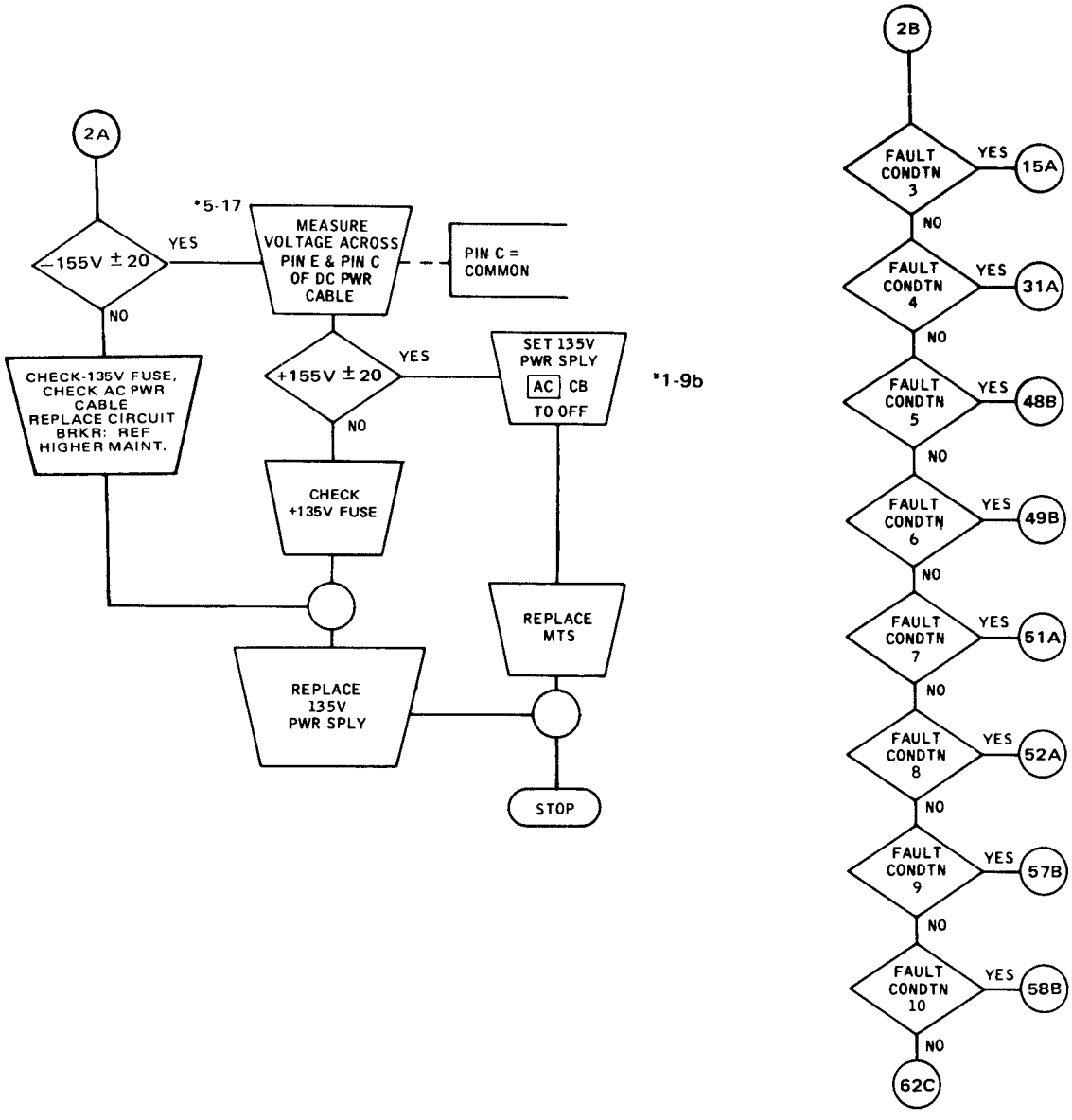
The five tables used with the FI Flow Chart are referred to by boxed numbers: for example, Table 1

These tables are found at the end of the FI Flow Chart.

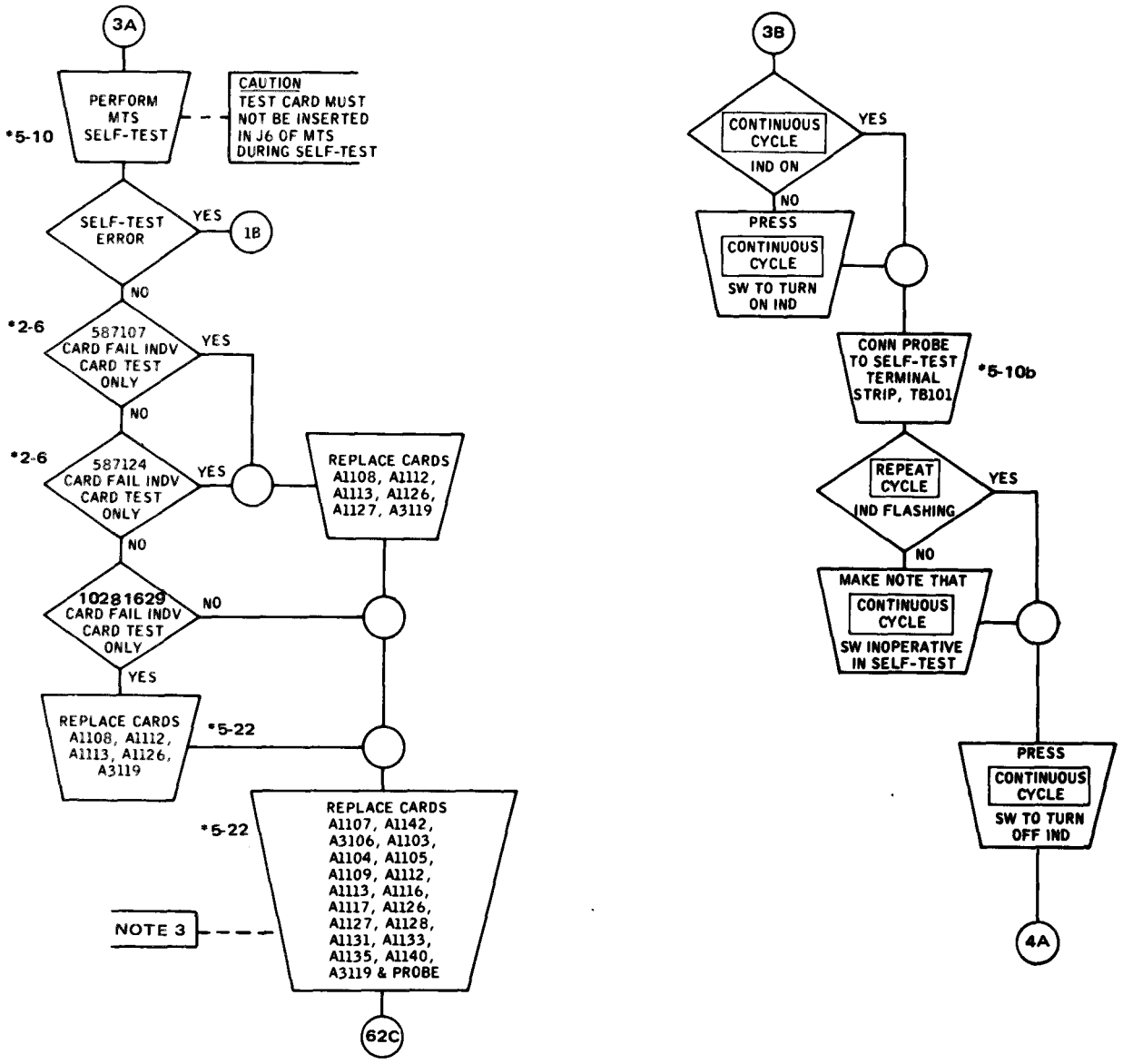
The MTS FI Flow Chart includes troubleshooting data for card types used in other systems because the MTS is internally programmed to test these cards. The programmed data for all MTS-testable cards is checked during self-test.



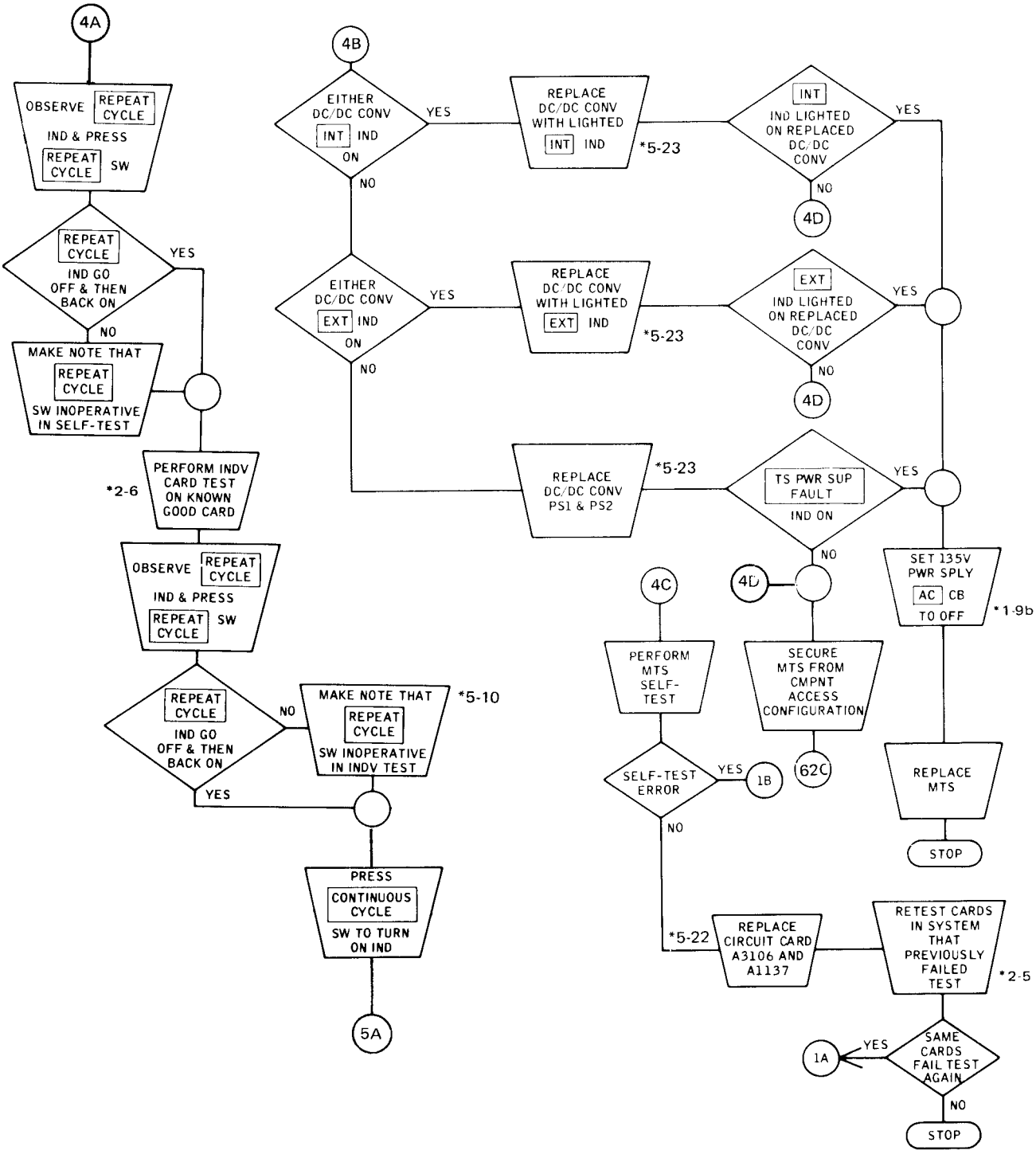
FAULT ISOLATION FLOW CHART (Sheet 1 of 62)



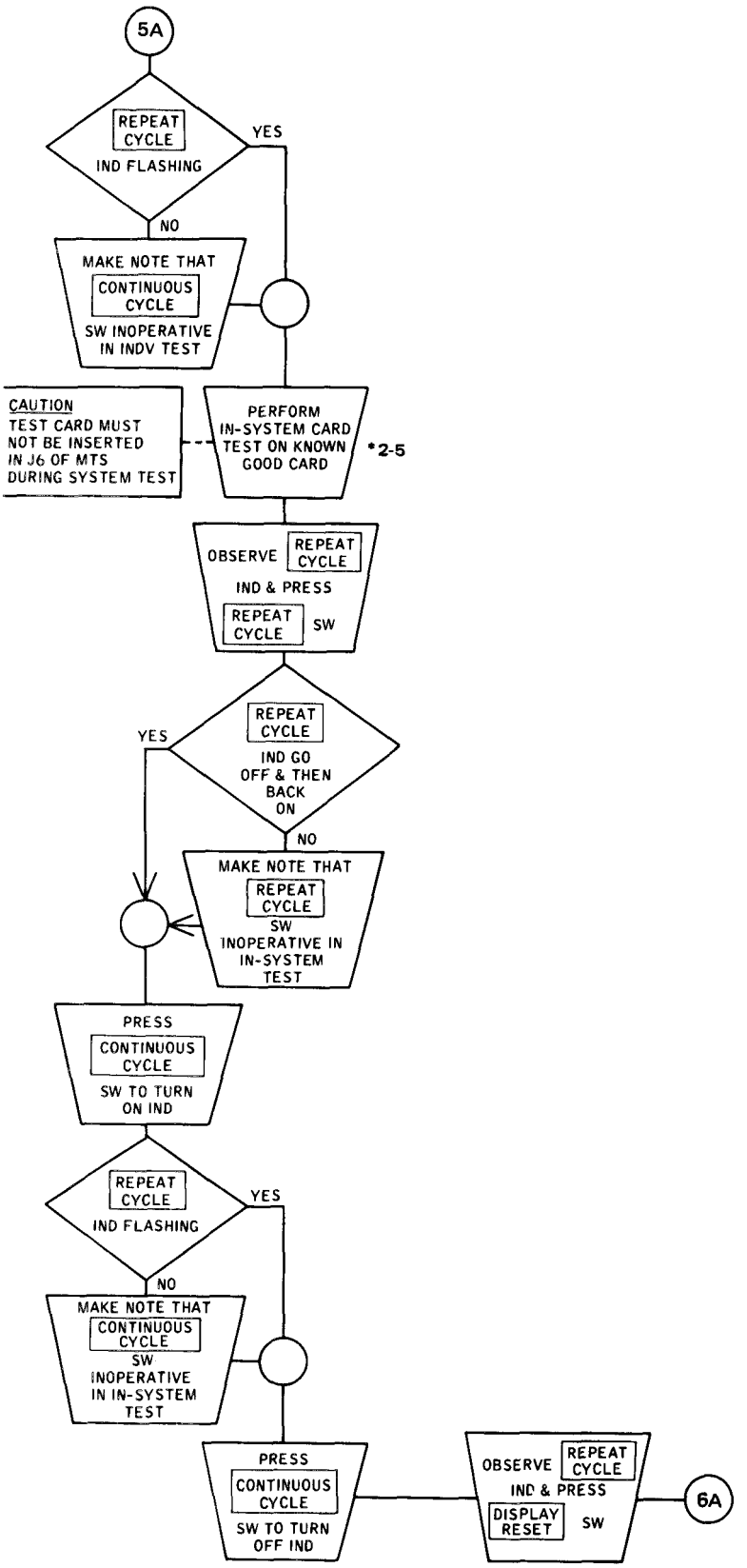
FAULT ISOLATION FLOW CHART (Sheet 2 of 62)



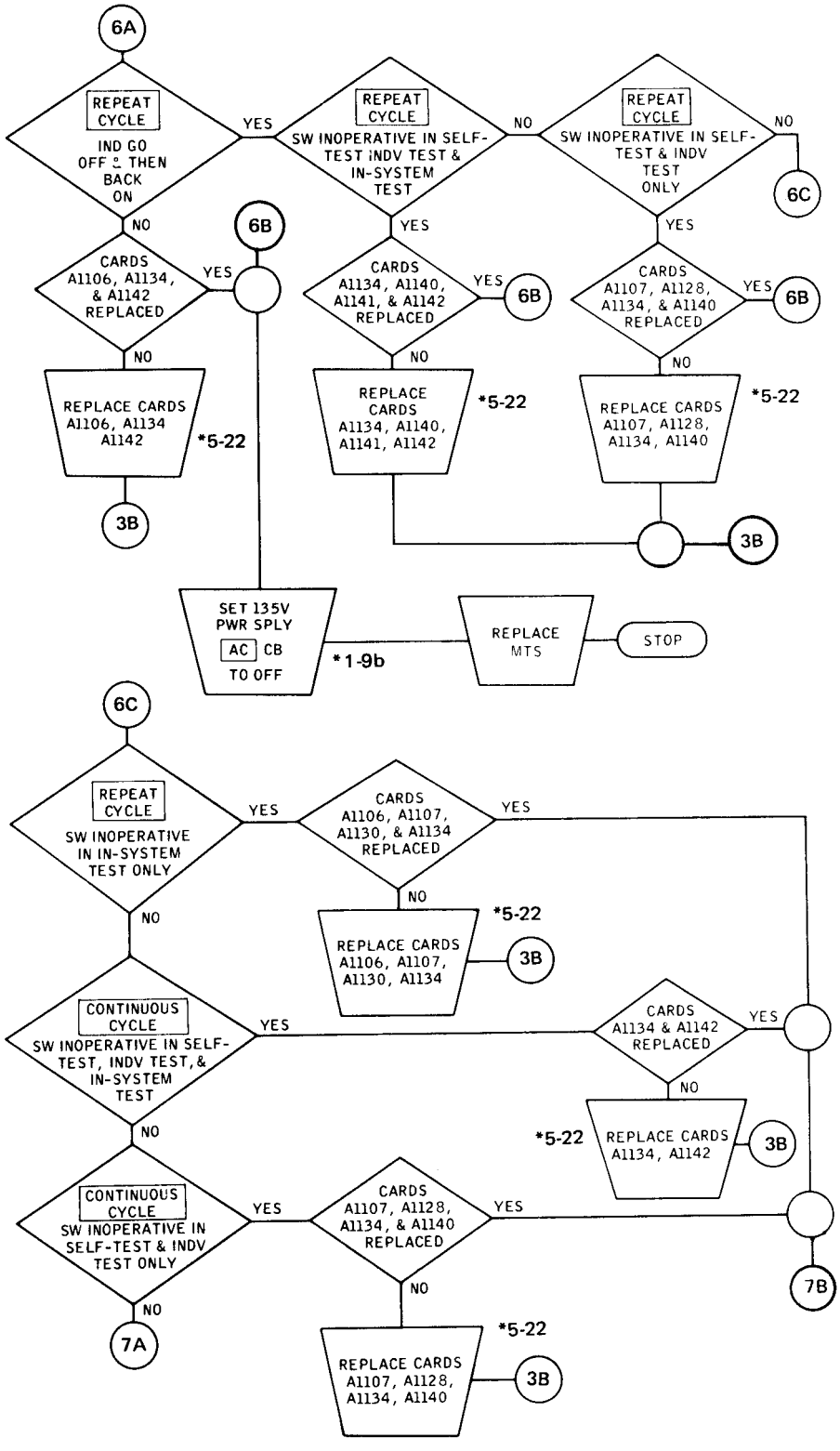
FAULT ISOLATION FLOW CHART (Sheet 3 of 62)



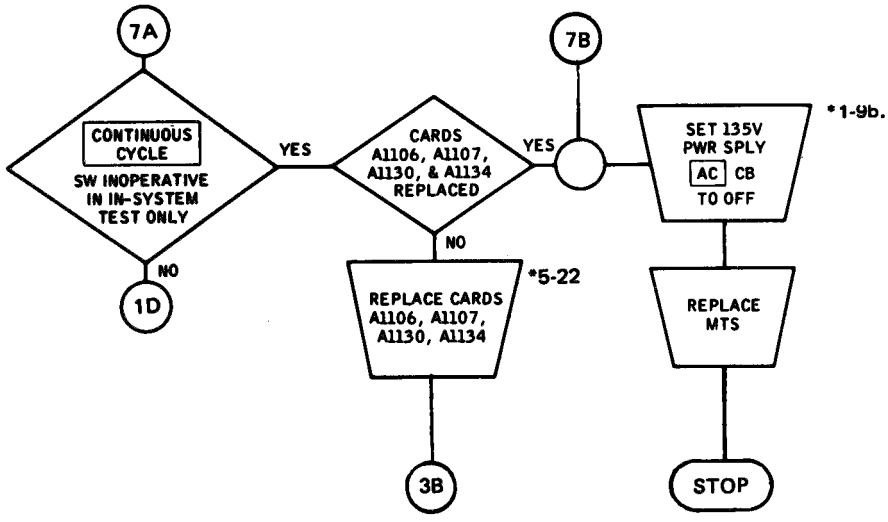
FAULT ISOLATION FLOW CHART (Sheet 4 of 62)

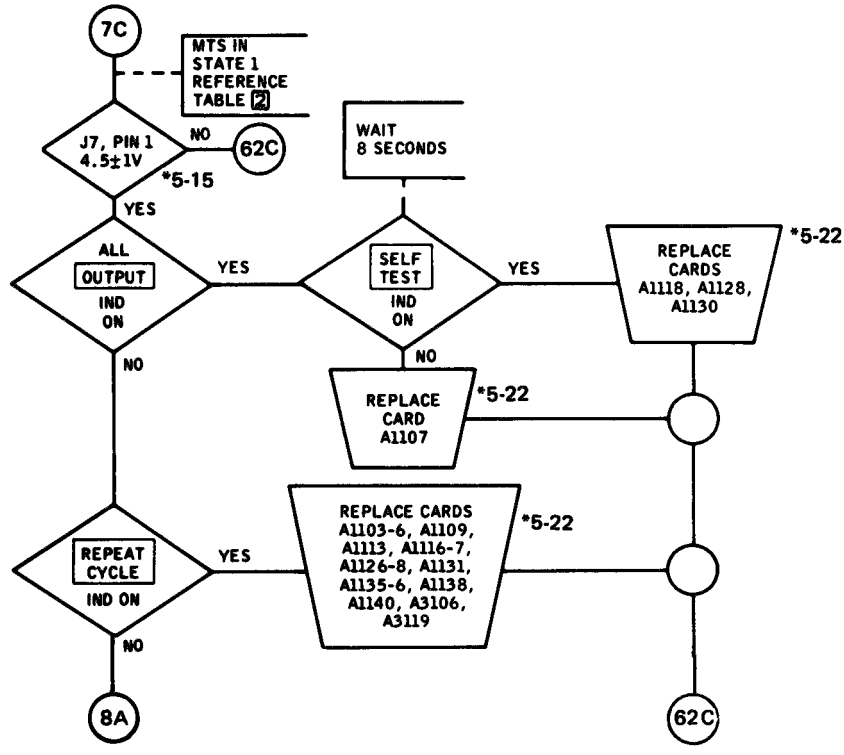


FAULT ISOLATION FLOW CHART (Sheet 5 of 62)

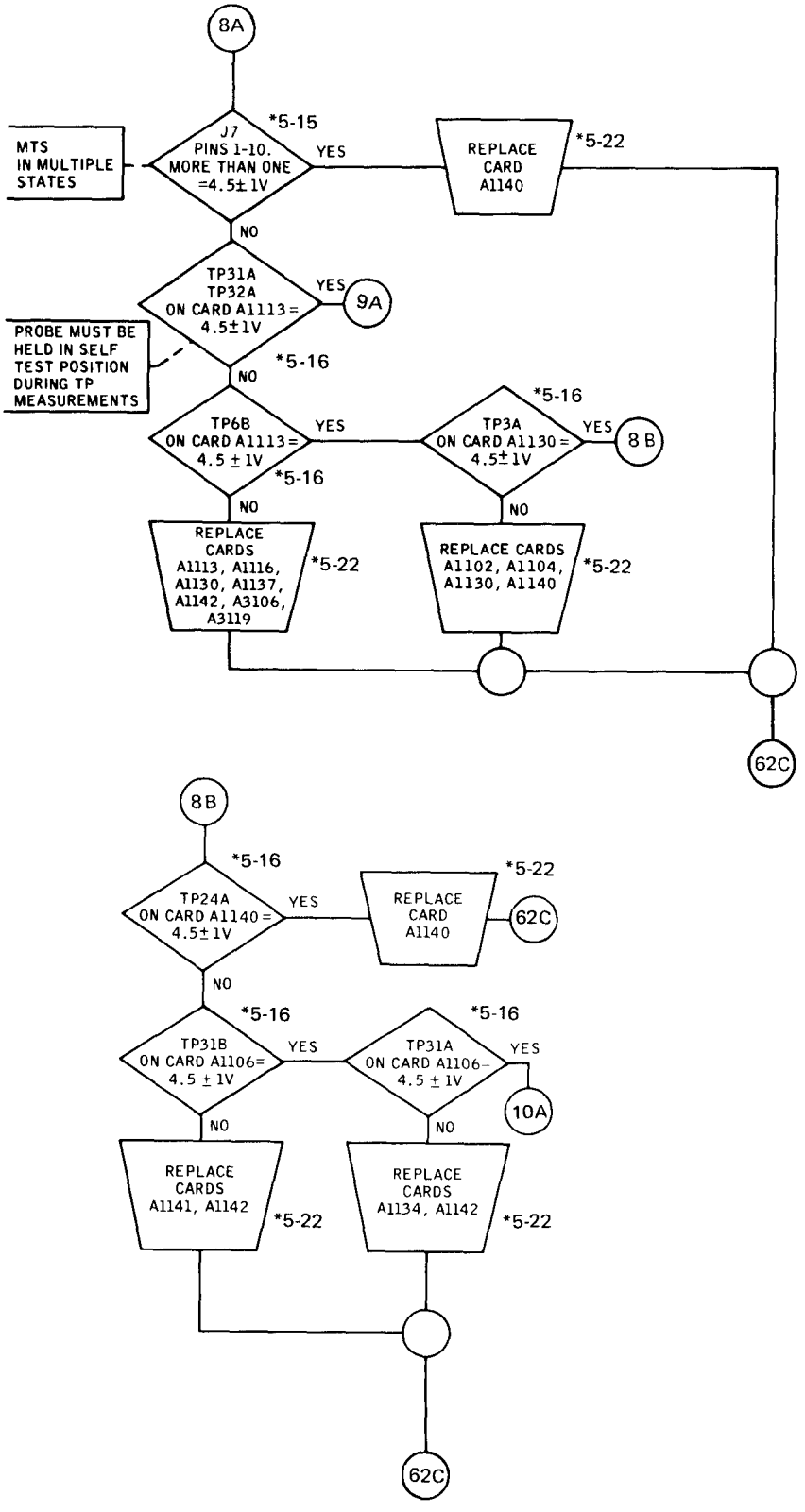


FAULT ISOLATION FLOW CHART (Sheet 6 of 62)

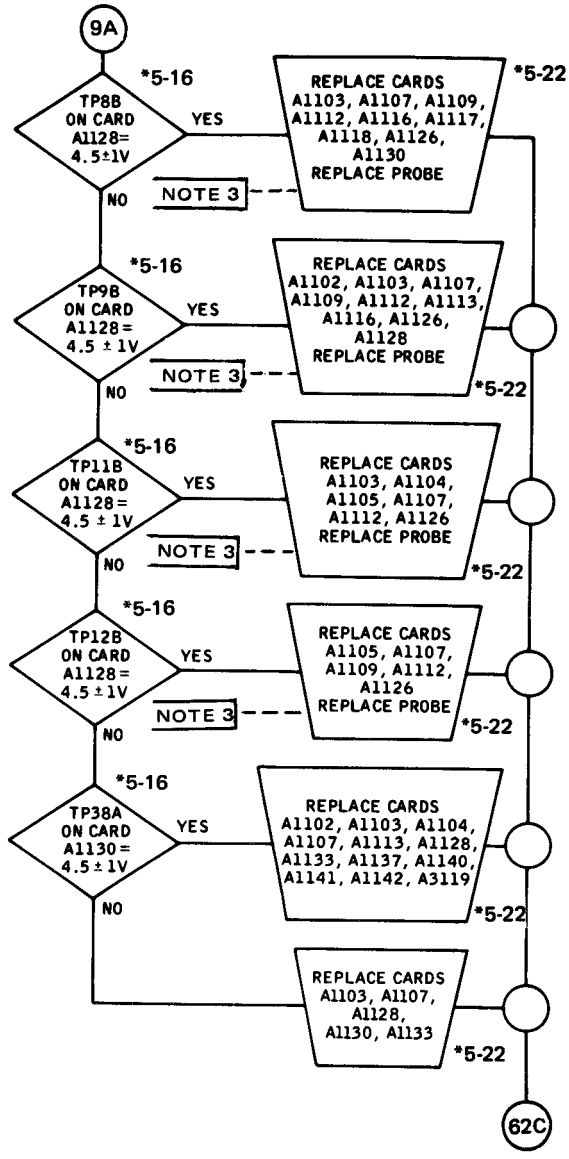




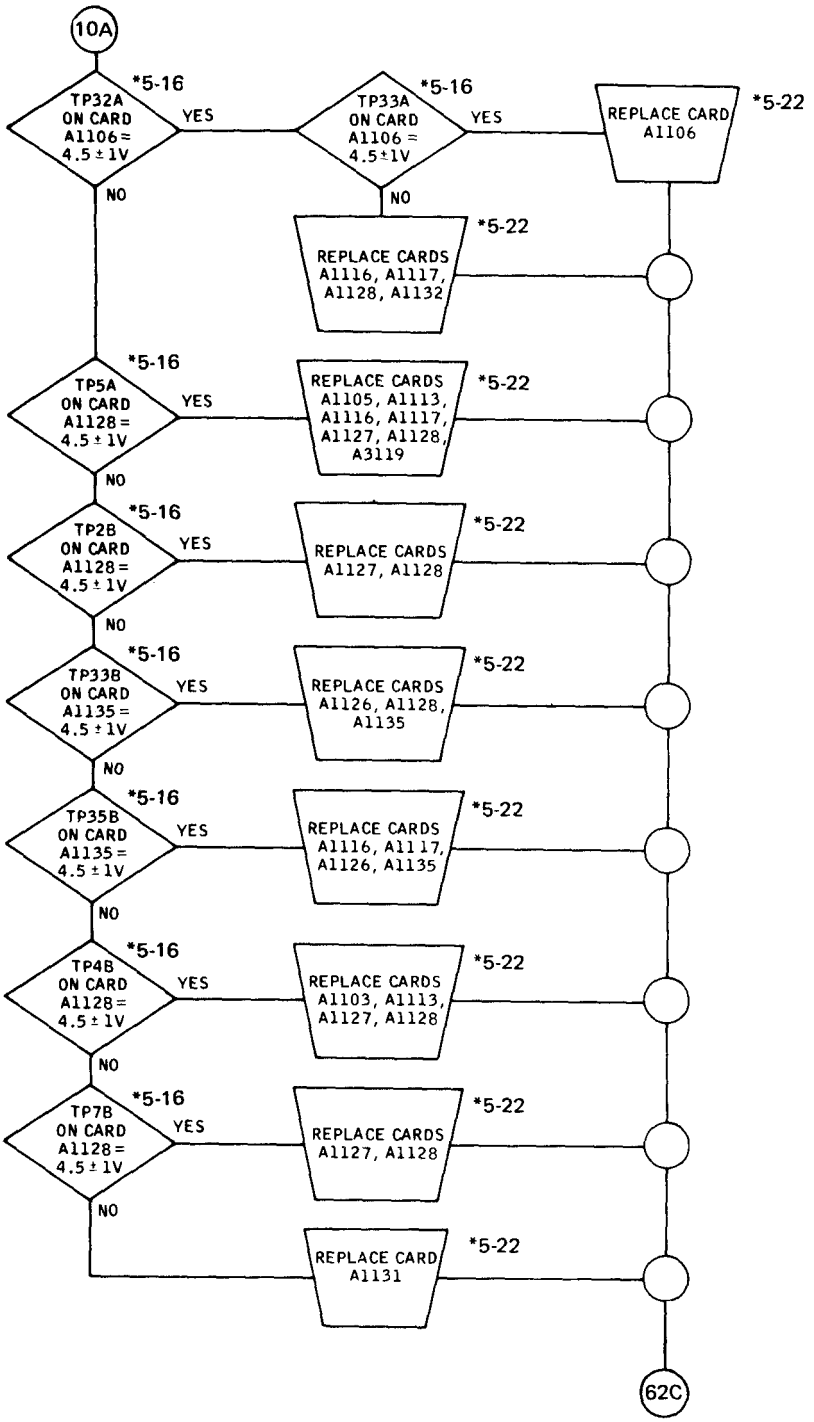
FAULT ISOLATION FLOW CHART (Sheet 7 Of 62)



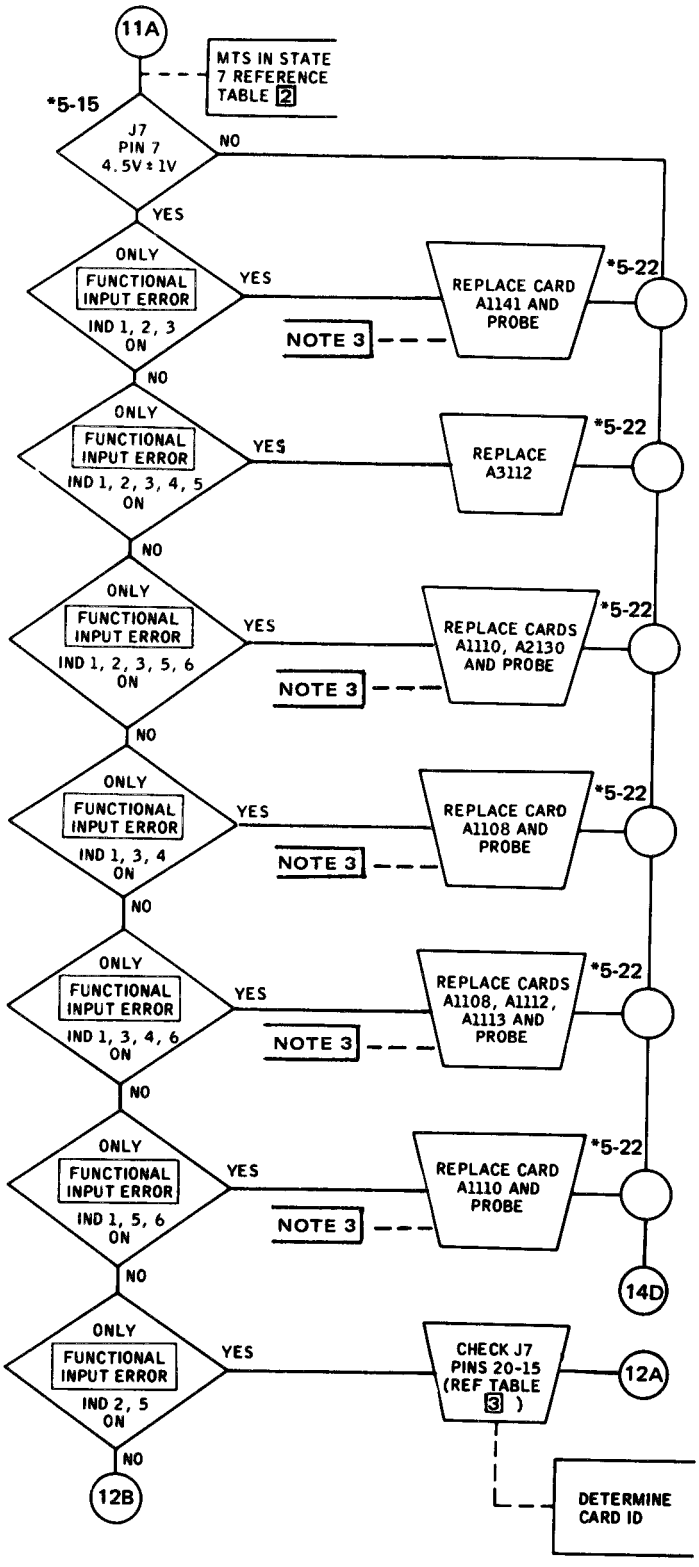
FAULT ISOLATION FLOW CHART (Sheet 8 of 62)



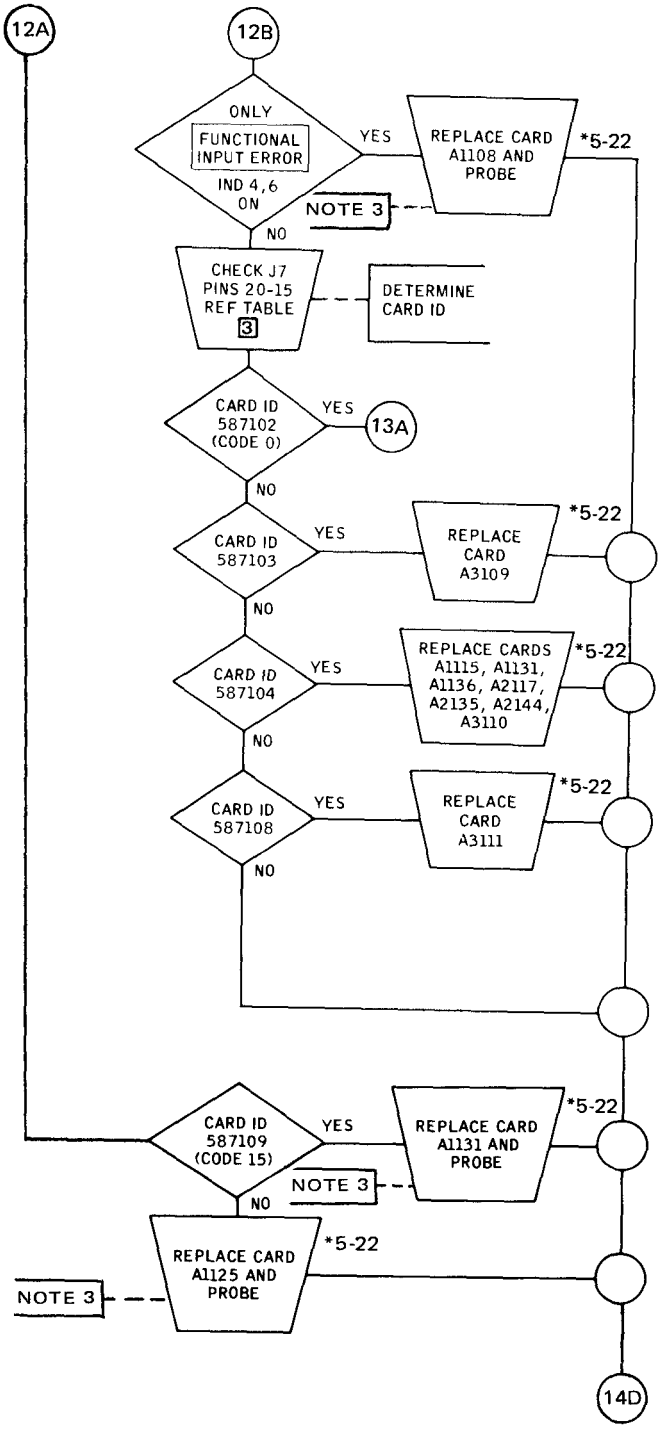
FAULT ISOLATION FLOW CHART (Sheet 9 of 62)



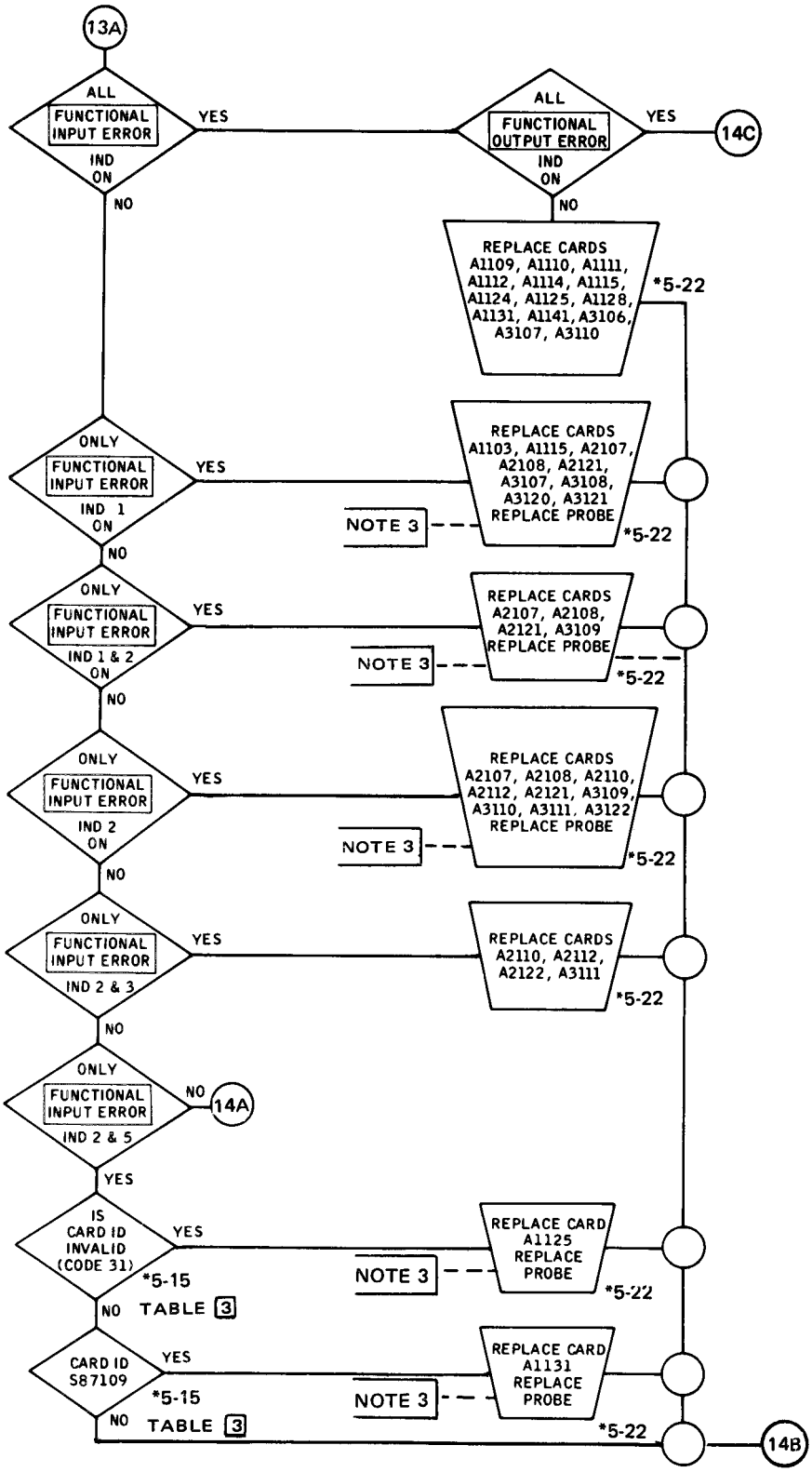
FAULT ISOLATION FLOW CHART (Sheet 10 of 62)



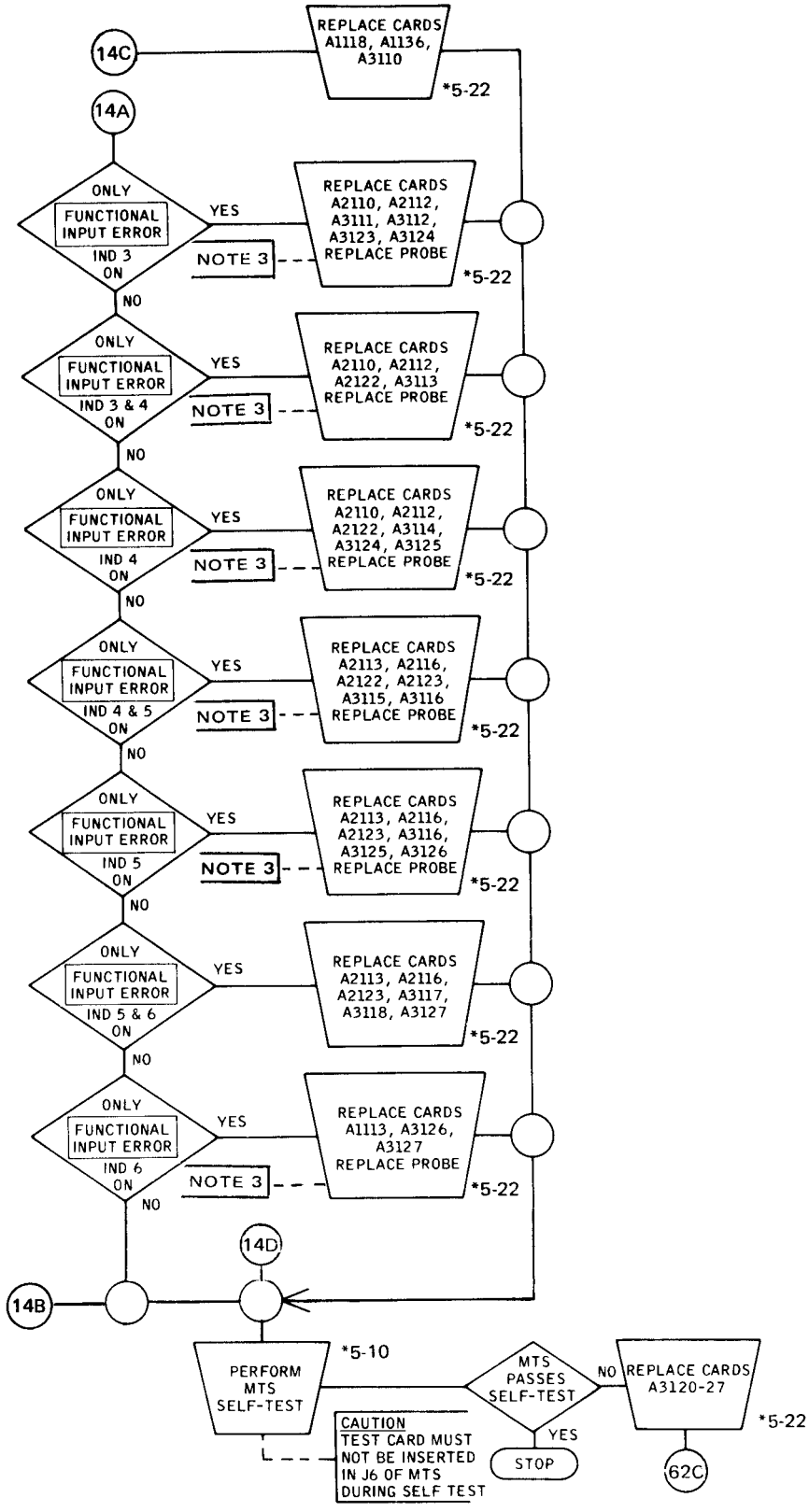
FAULT ISOLATION FLOW CHART (Sheet 11 of 62)



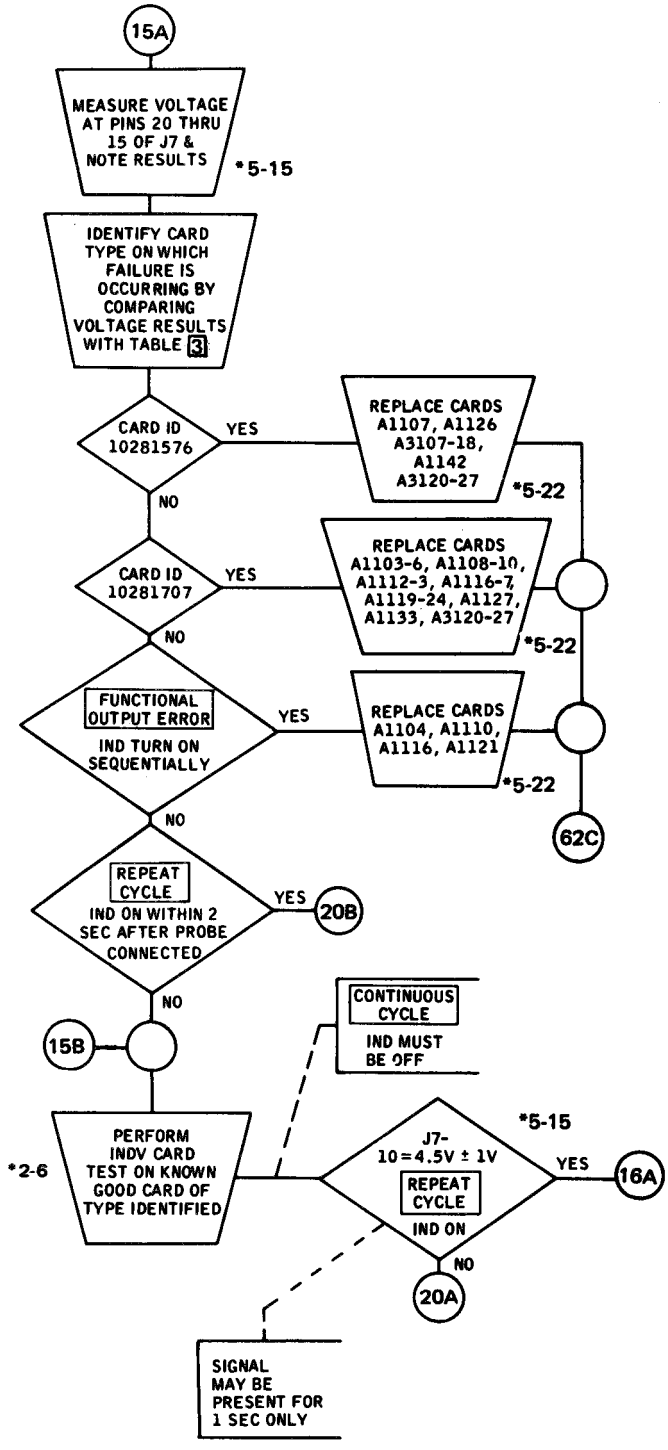
FAULT ISOLATION FLOW CHART (Sheet 12 of 62)



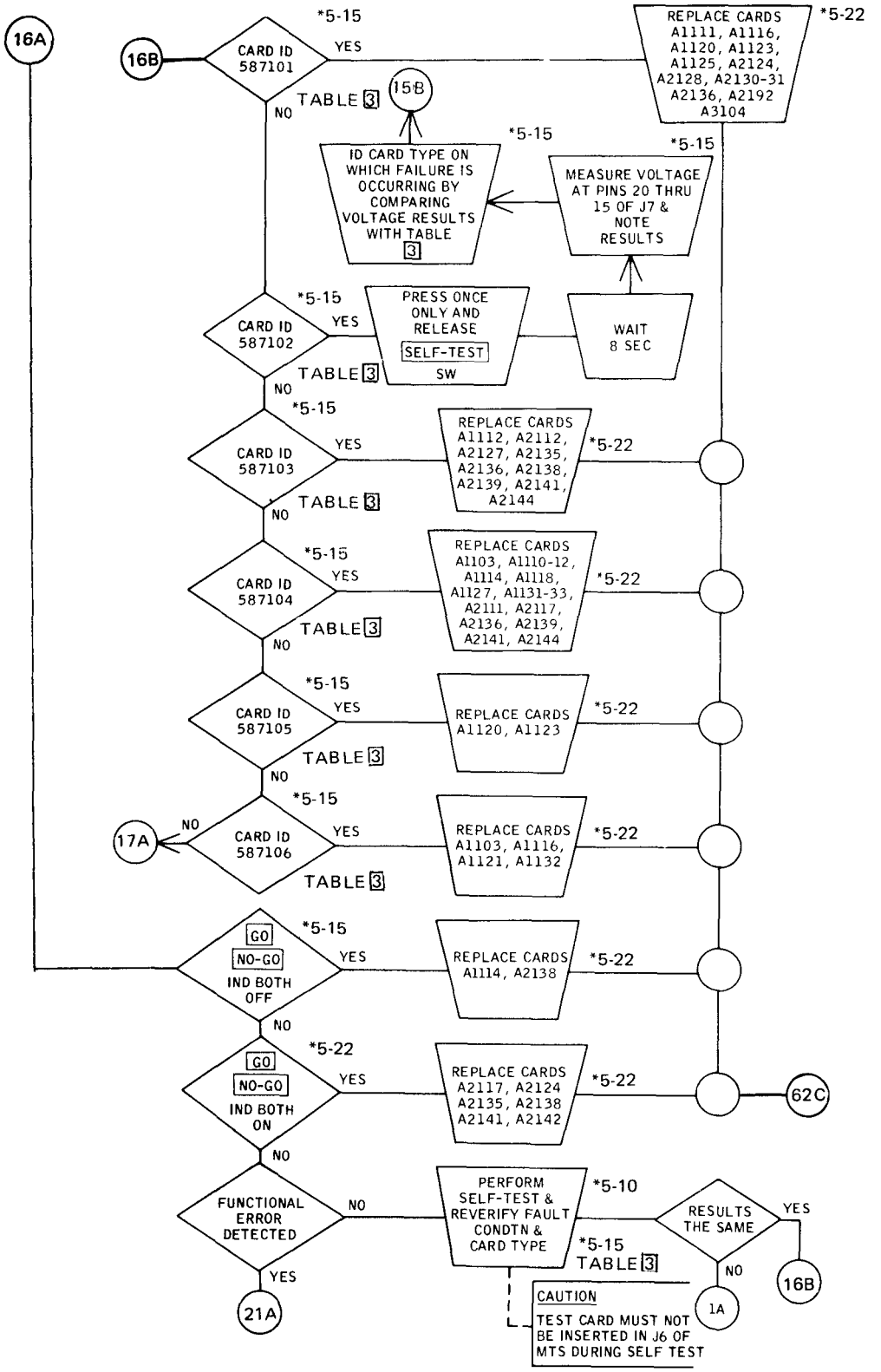
FAULT ISOLATION FLOW CHART (Sheet 13 of 62)



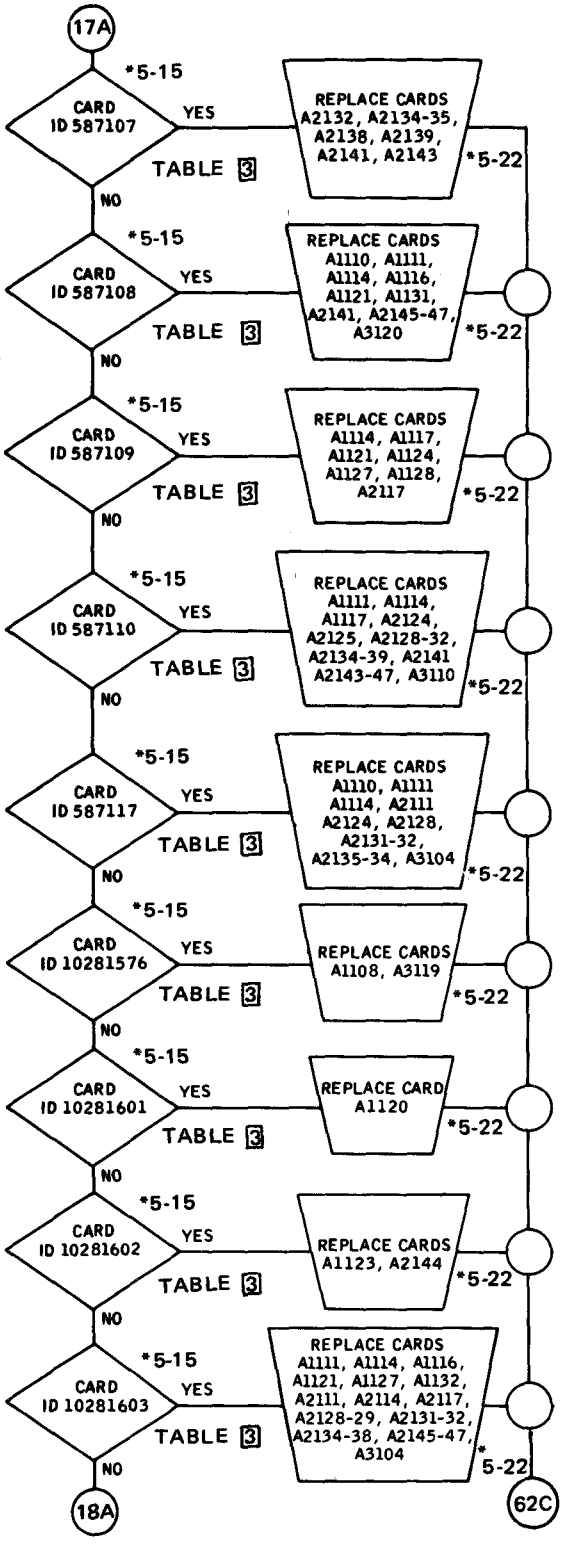
FAULT ISOLATION FLOW CHART (Sheet 14 of 62)



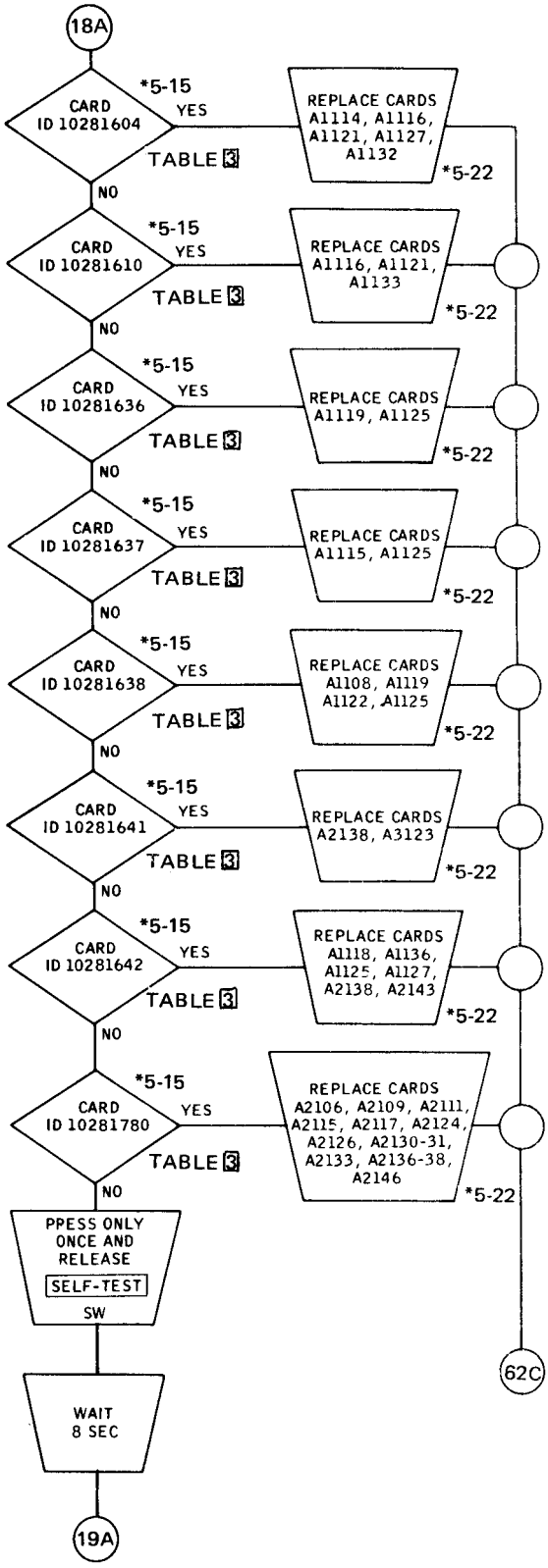
FAULT ISOLATION FLOW CHART (Sheet 15 of 62)



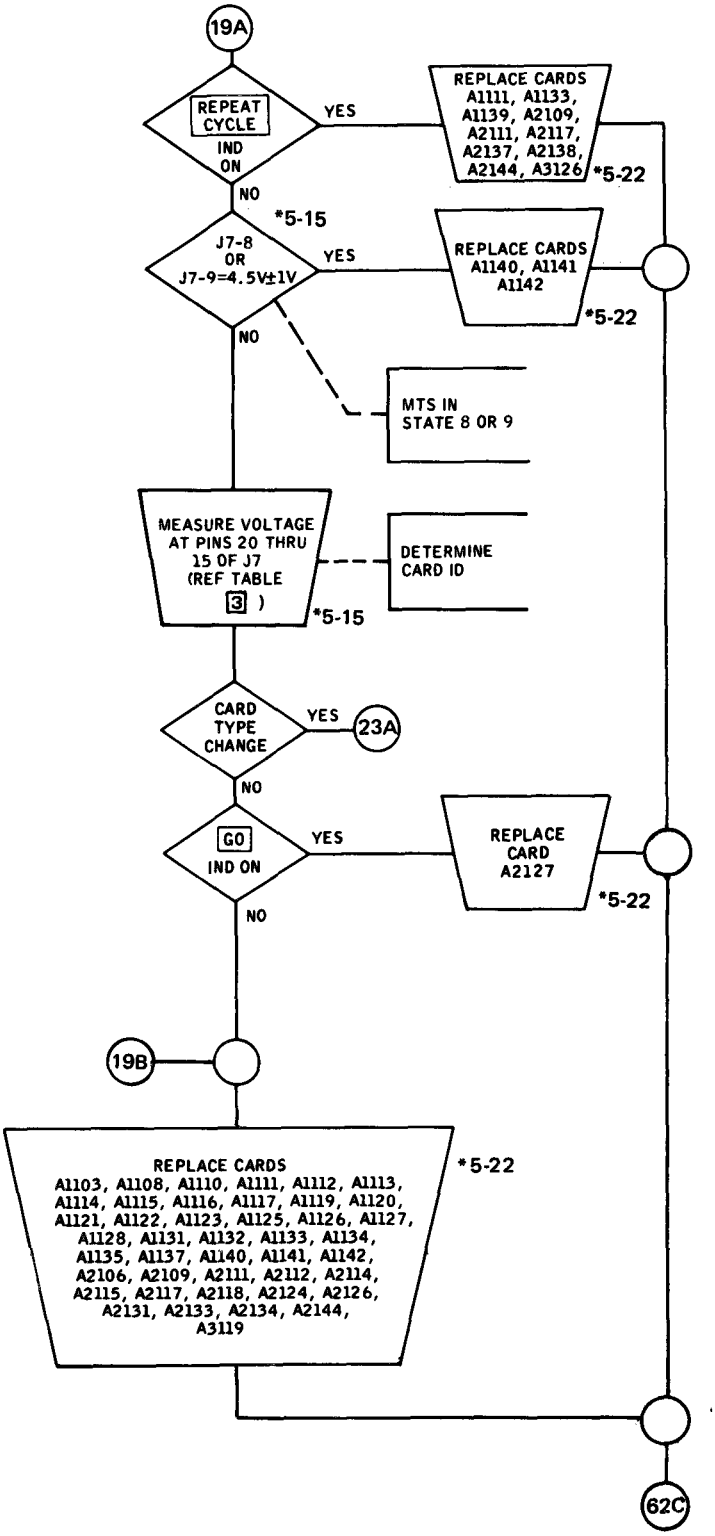
FAULT ISOLATION FLOW CHART (Sheet 16 of 62)



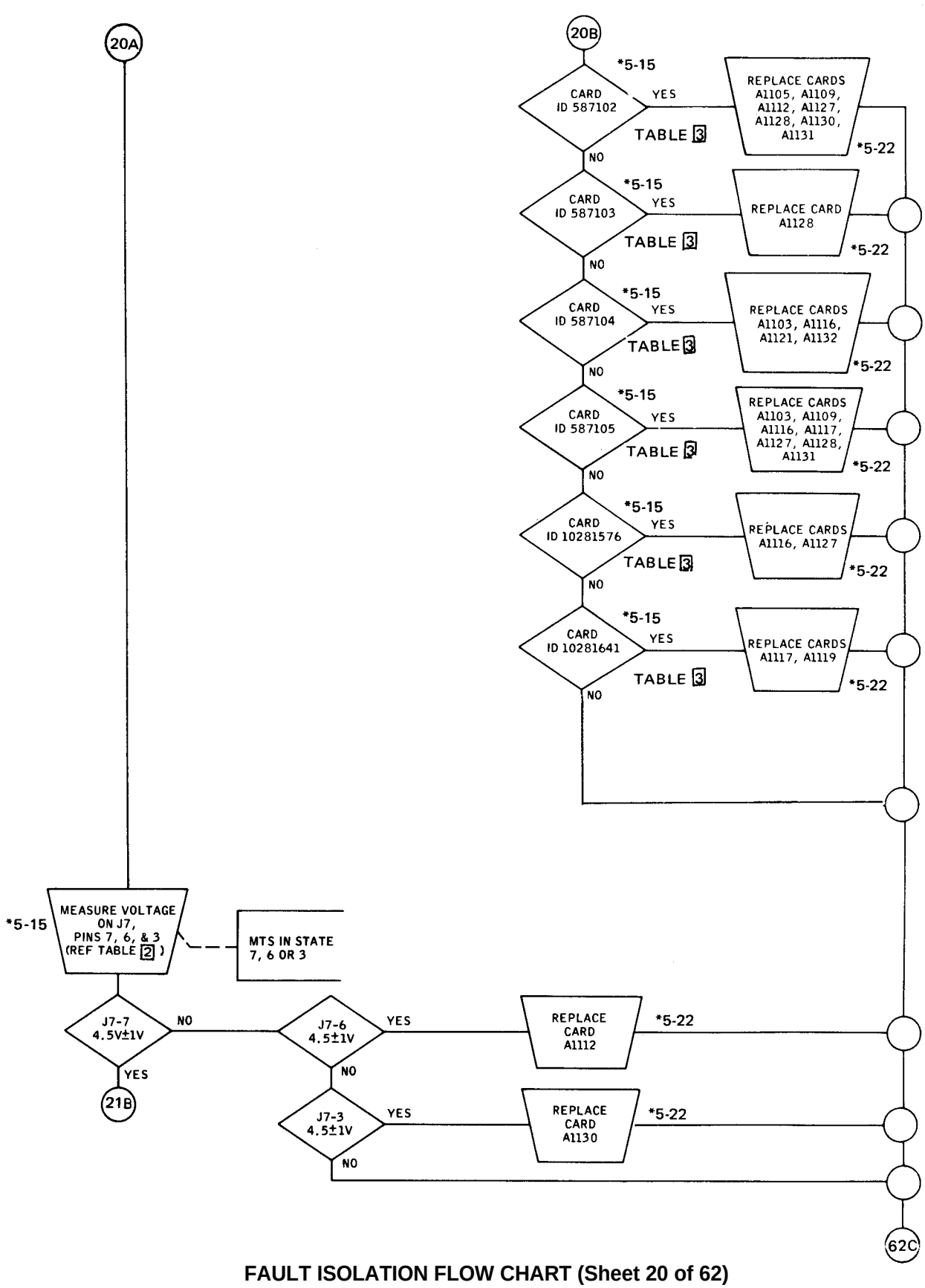
FAULT ISOLATION FLOW CHART (Sheet 17 of 62)



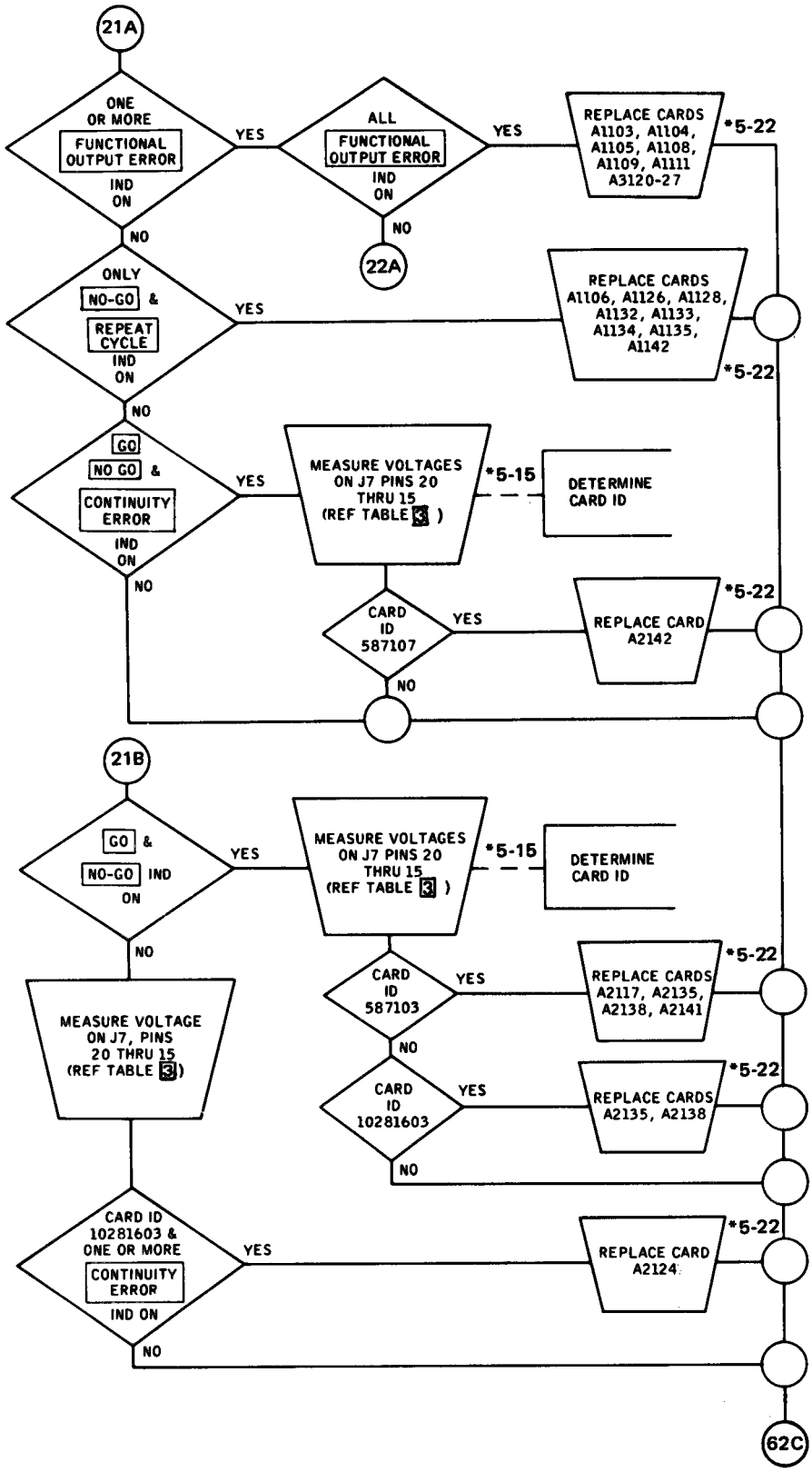
FAULT ISOLATION FLOW CHART (Sheet 18 of 62)



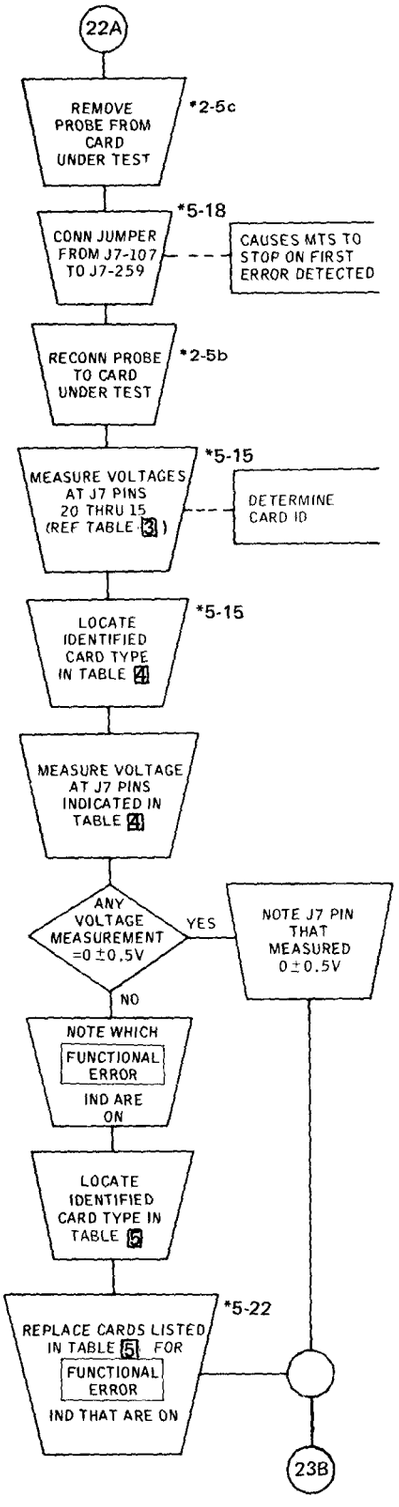
FAULT ISOLATION FLOW CHART (Sheet 19 of 62)



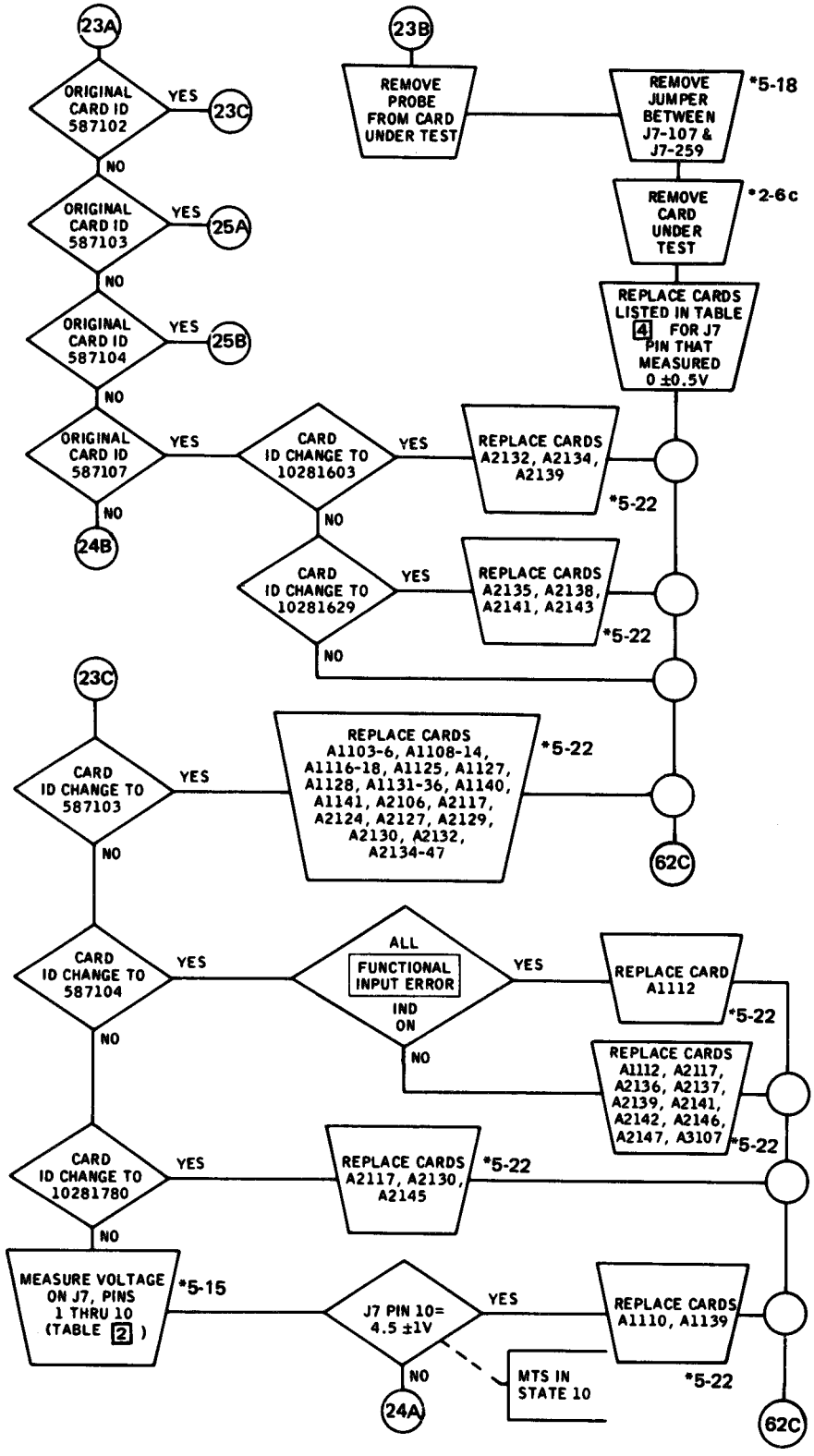
FAULT ISOLATION FLOW CHART (Sheet 20 of 62)



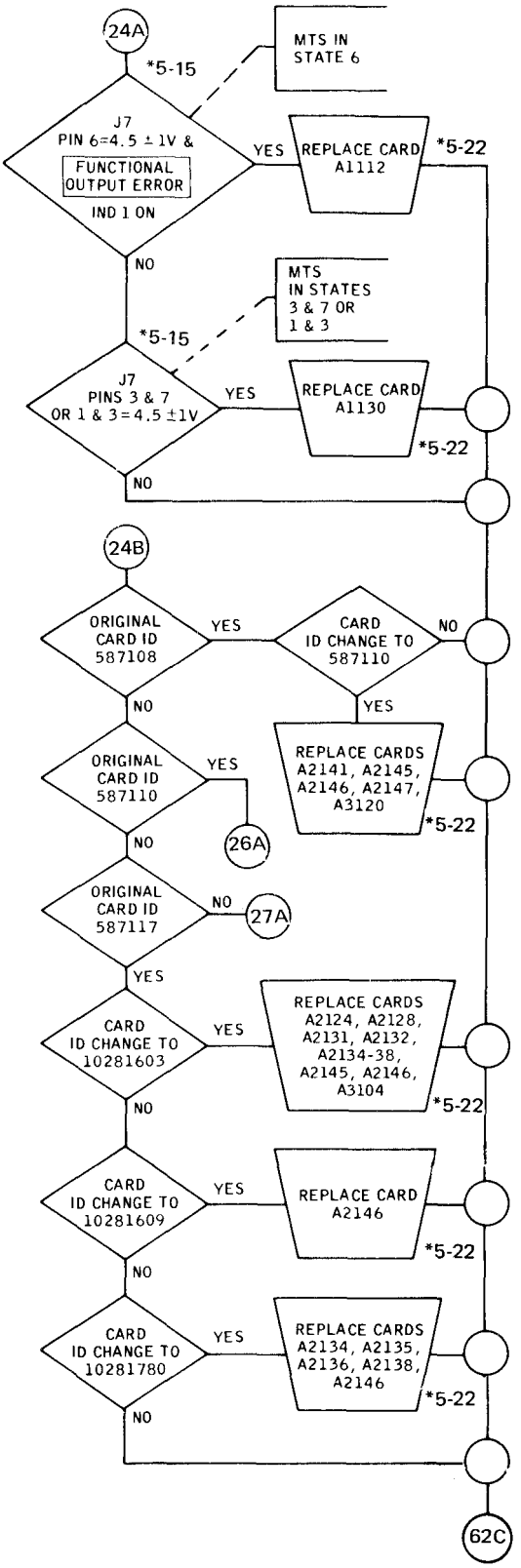
FAULT ISOLATION FLOW CHART (Sheet 21 of 62)



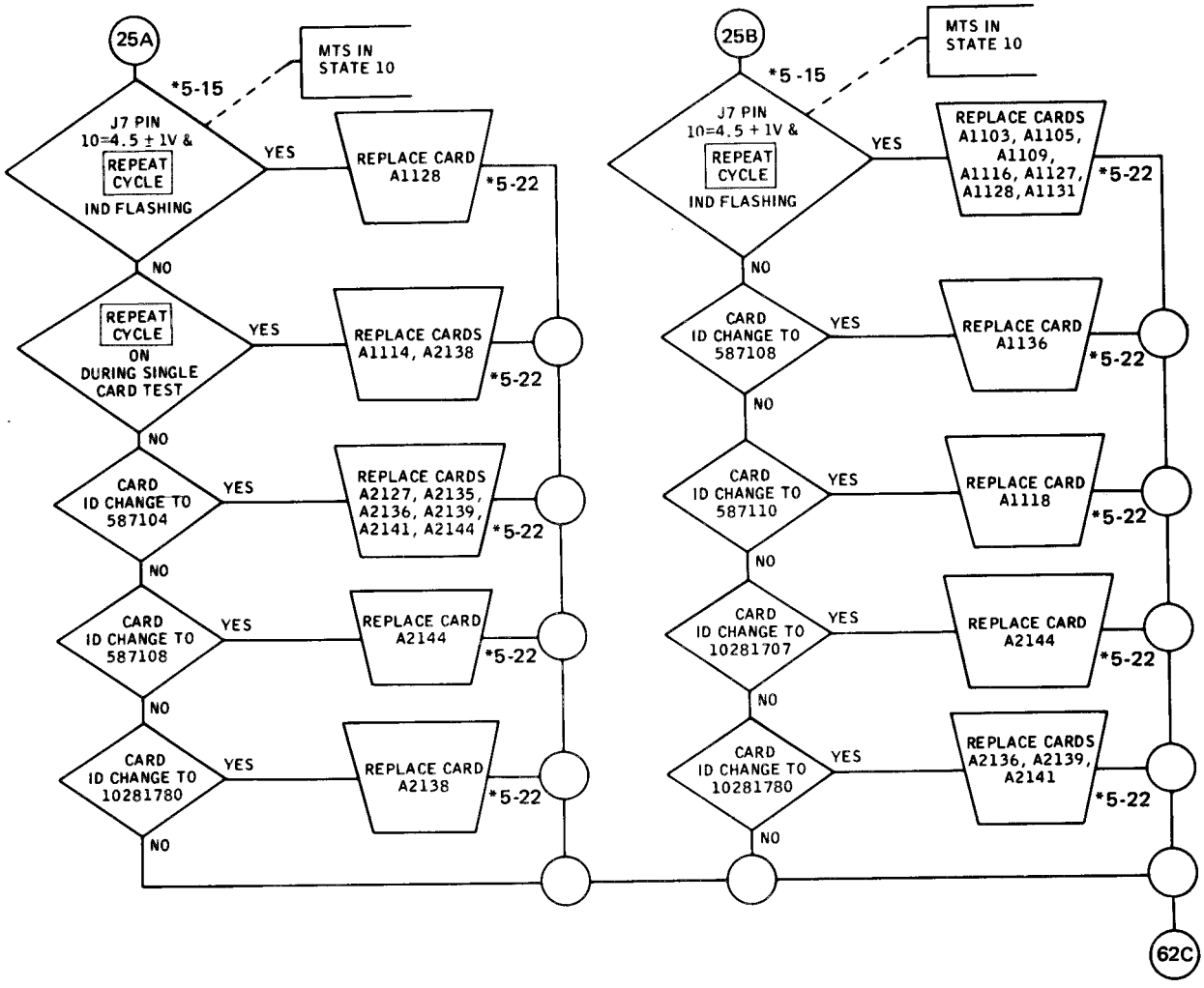
FAULT ISOLATION FLOW CHART (Sheet 22 of 62)



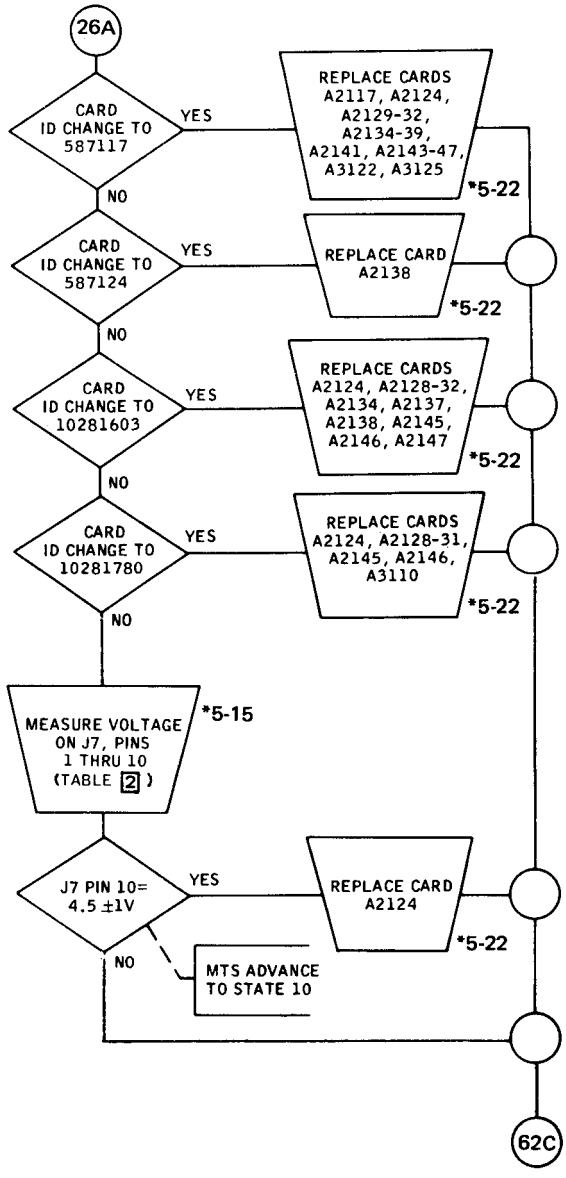
FAULT ISOLATION FLOW CHART (Sheet 23 of 62)



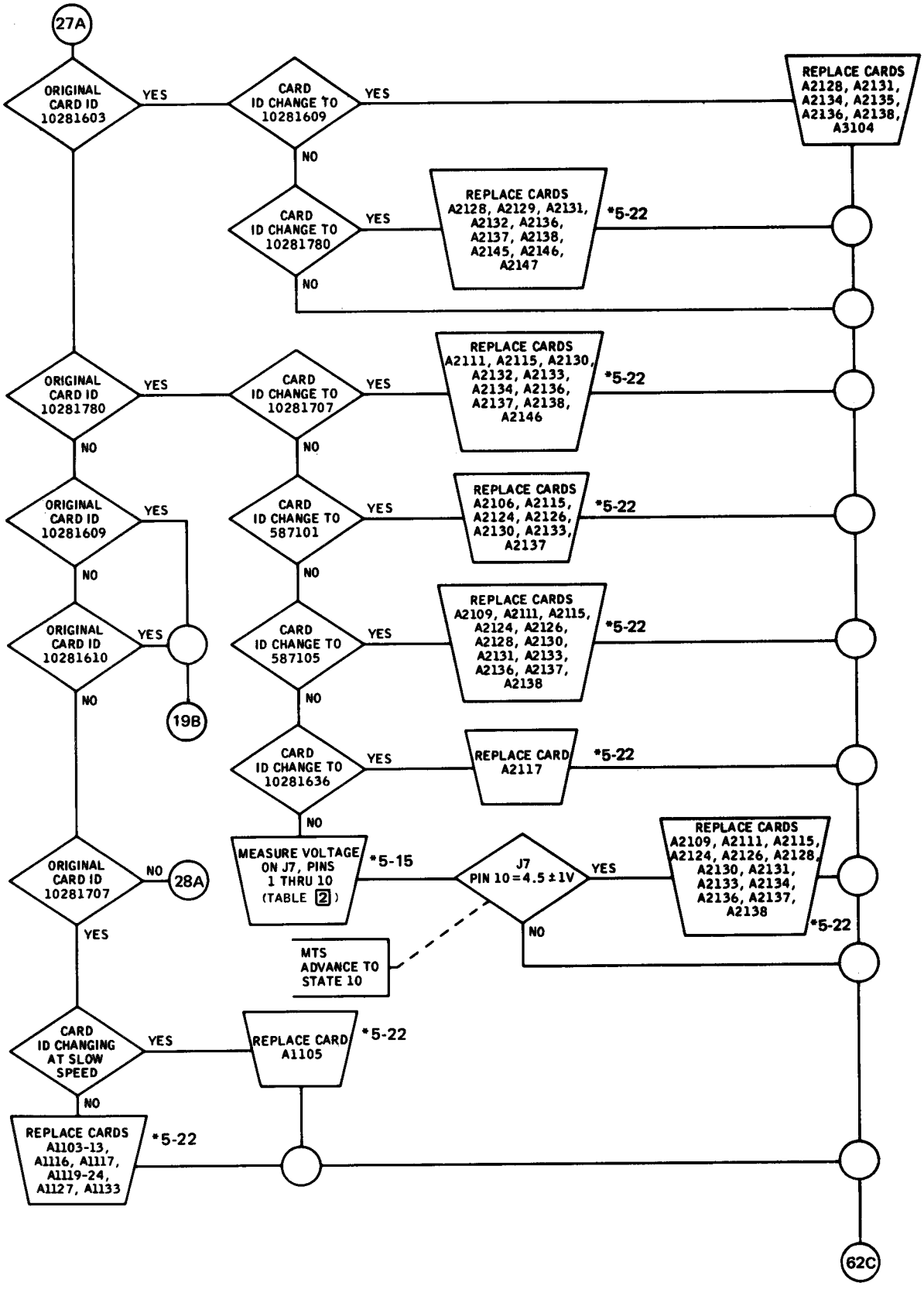
FAULT ISOLATION FLOW CHART (Sheet 24 of 62)



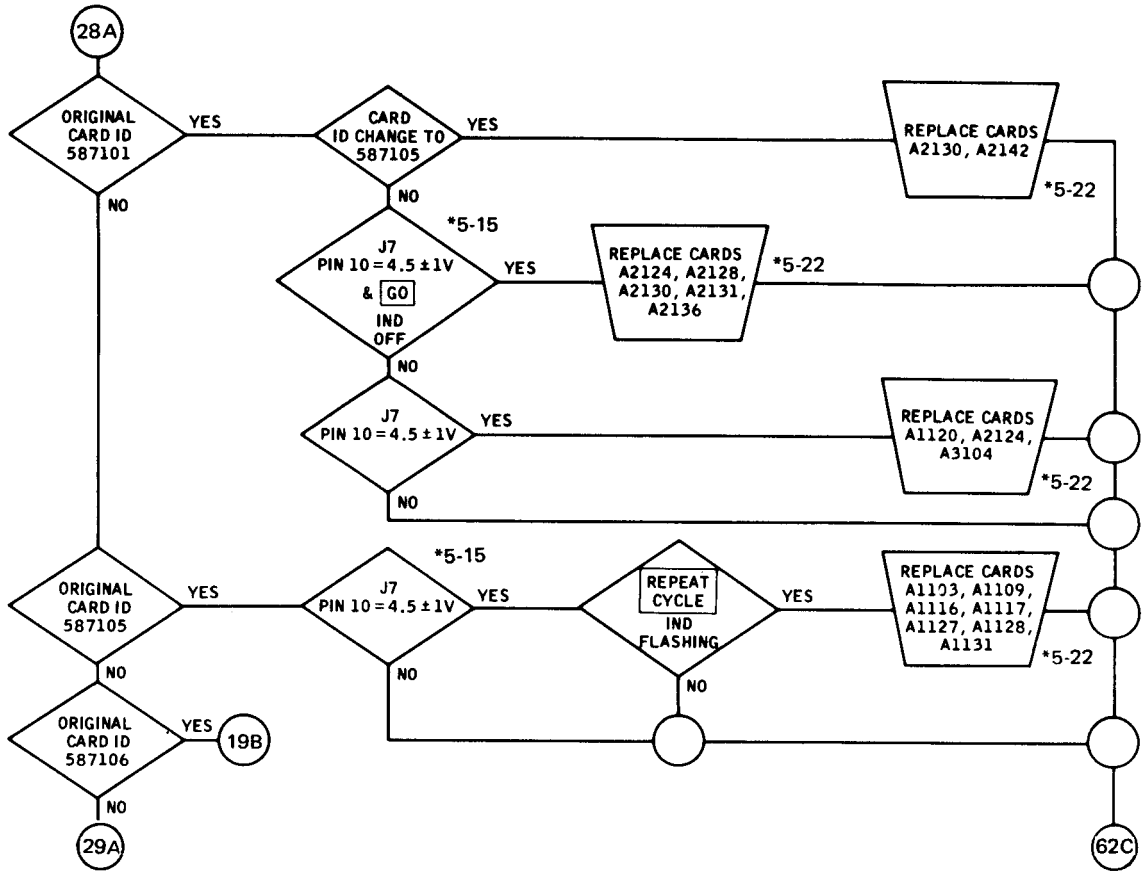
FAULT ISOLATION FLOW CHART (Sheet 25 of 62)



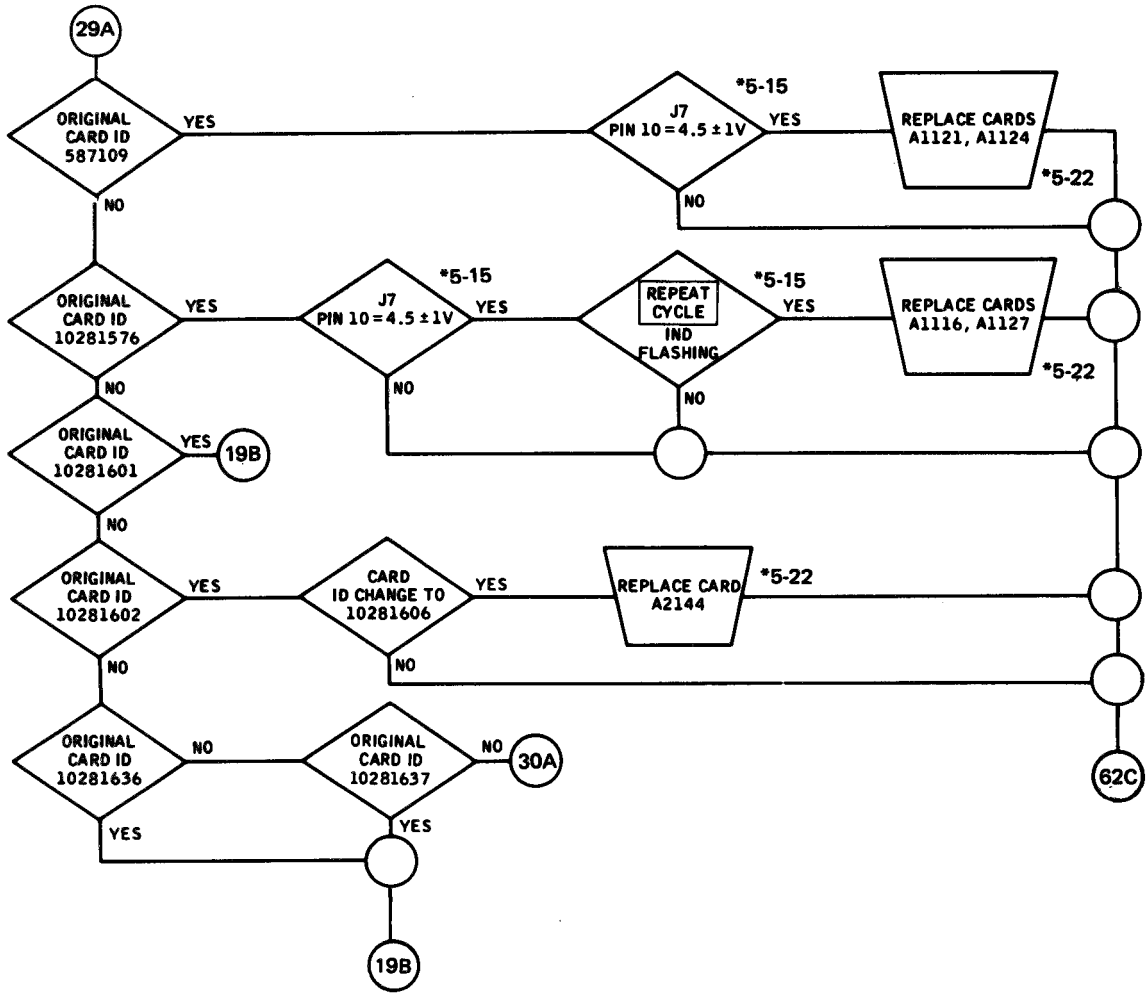
FAULT ISOLATION FLOW CHART (Sheet 26 of 62)



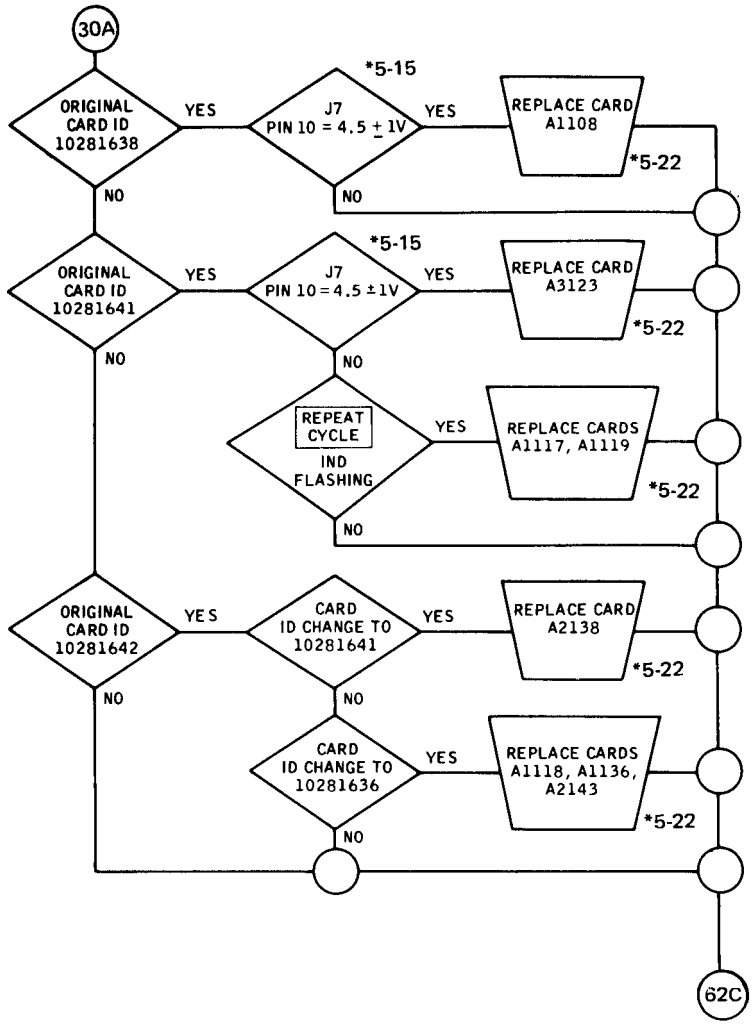
FAULT ISOLATION FLOW CHART (Sheet 27 of 62)



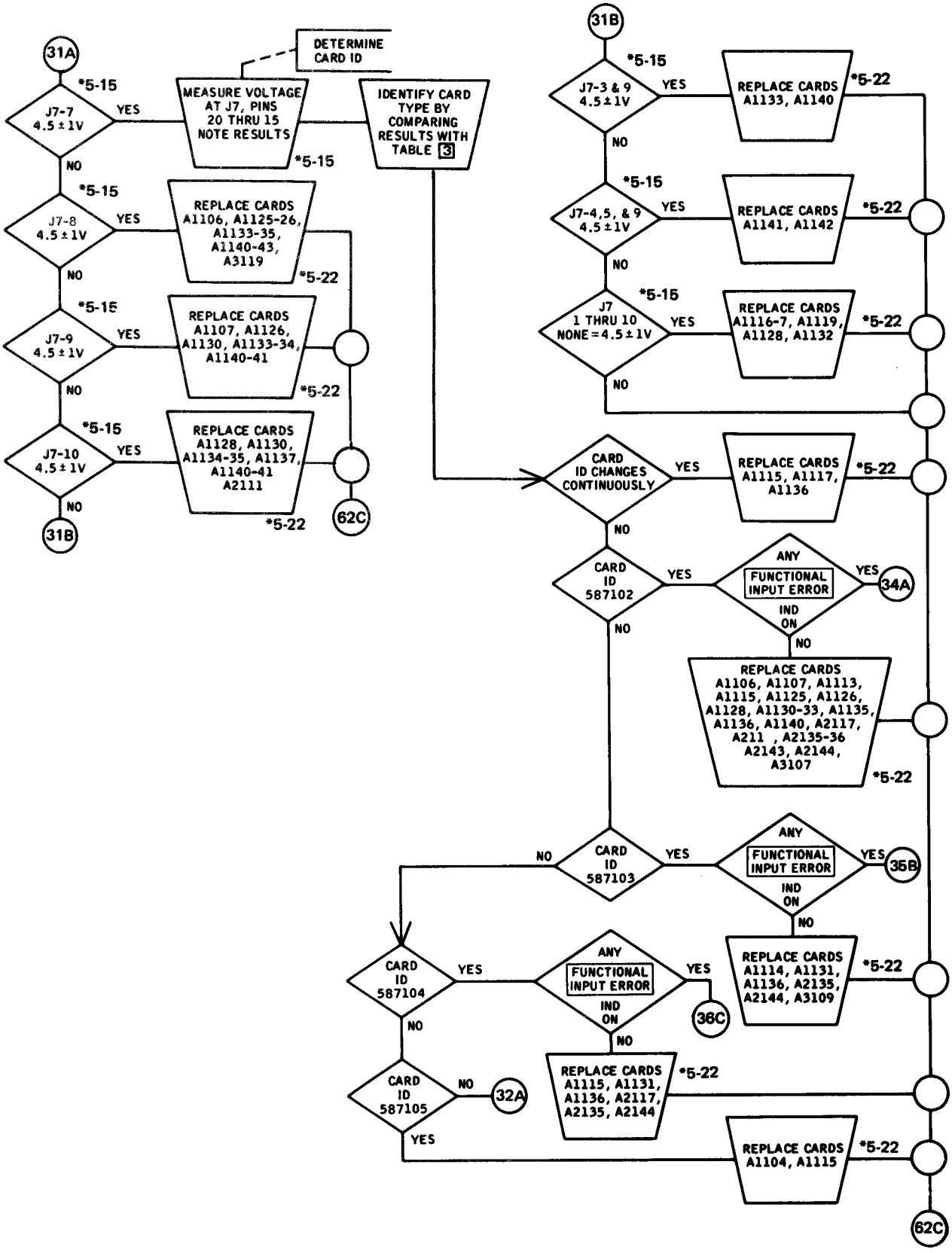
FAULT ISOLATION FLOW CHART (Sheet 28 of 62)



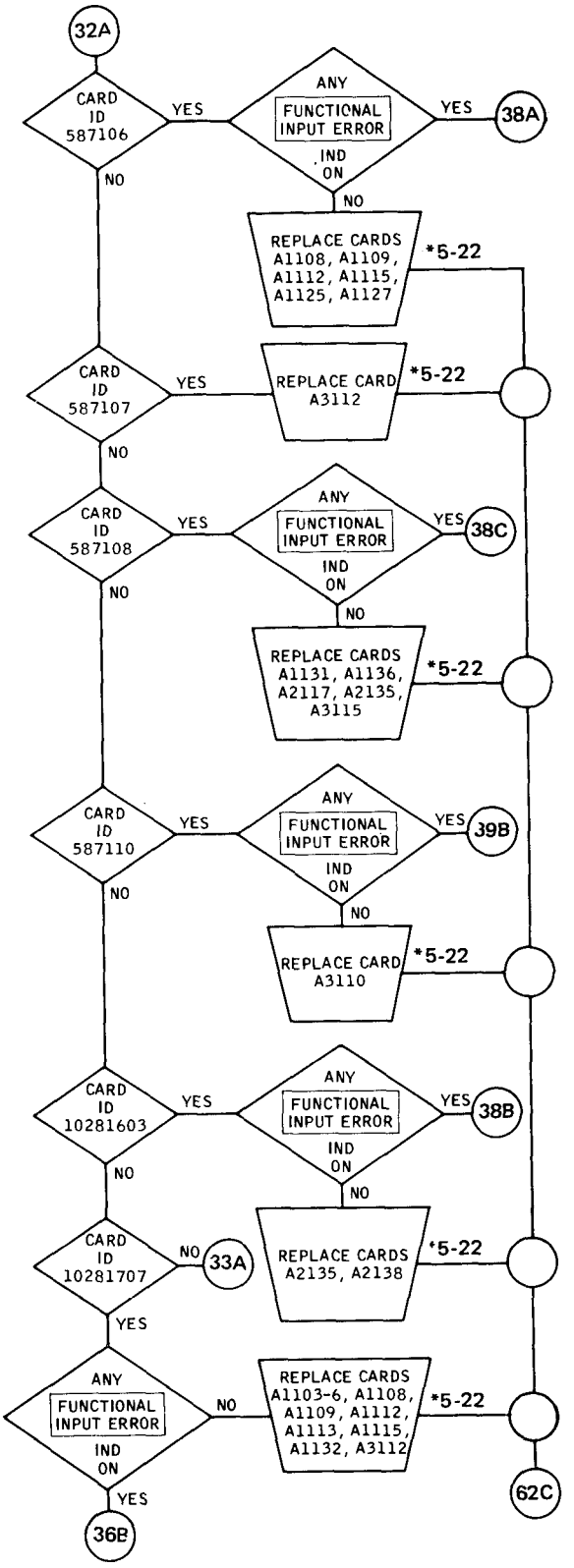
FAULT ISOLATION FLOW CHART (Sheet 29 of 62)



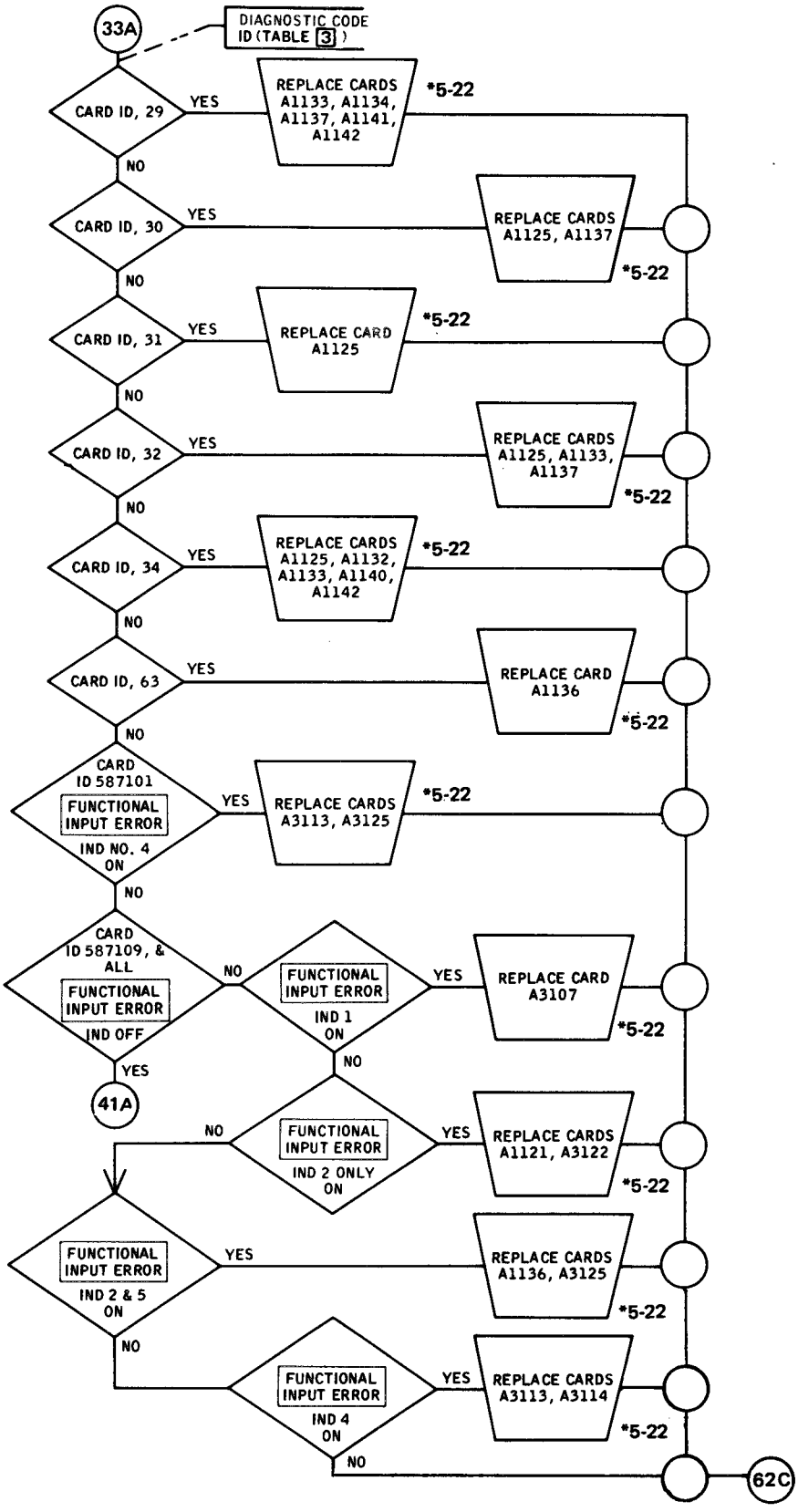
FAULT ISOLATION FLOW CHART (Sheet 30 of 62)



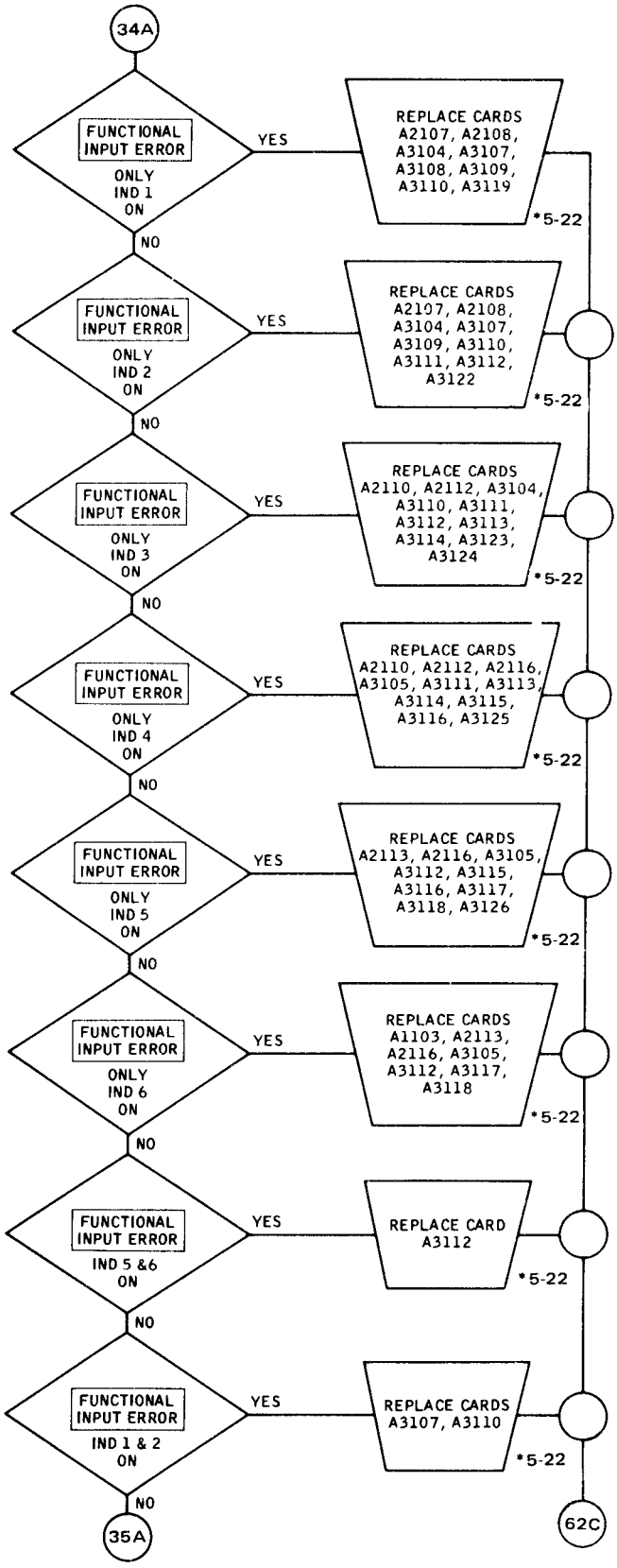
FAULT ISOLATION FLOW CHART (Sheet 31 of 62)



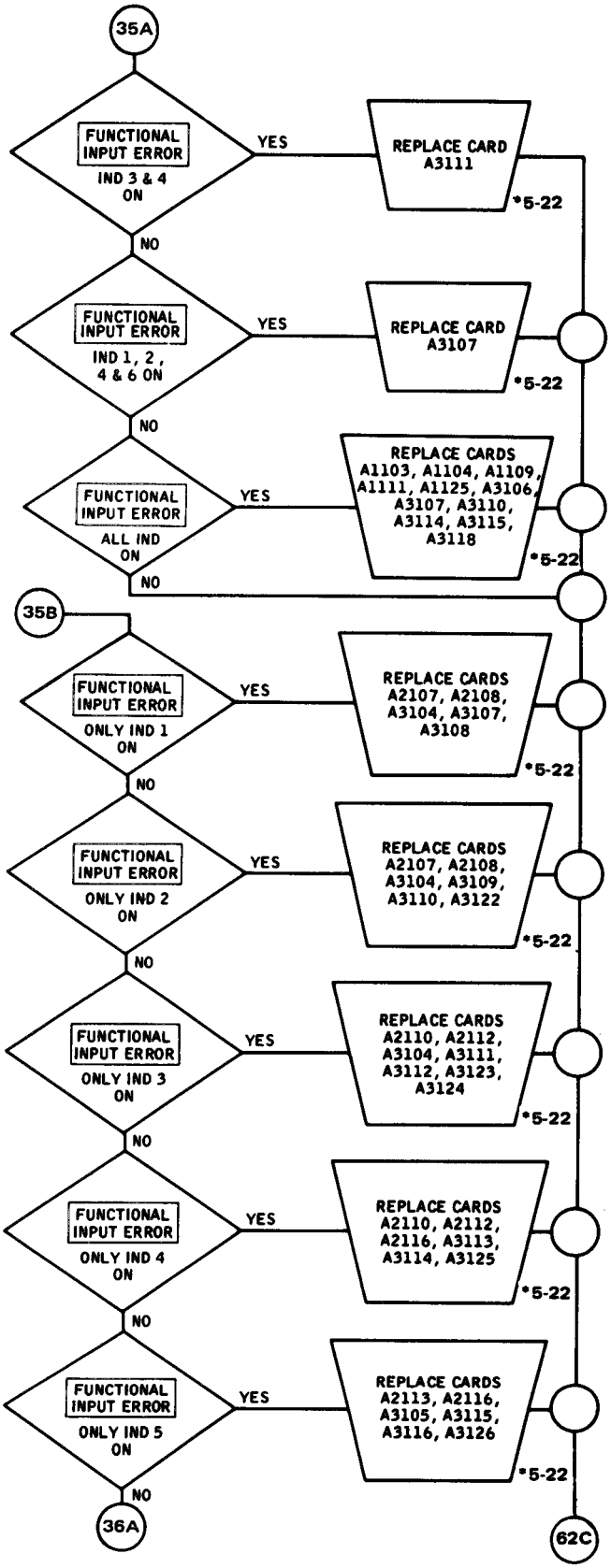
FAULT ISOLATION FLOW CHART (Sheet 32 of 62)



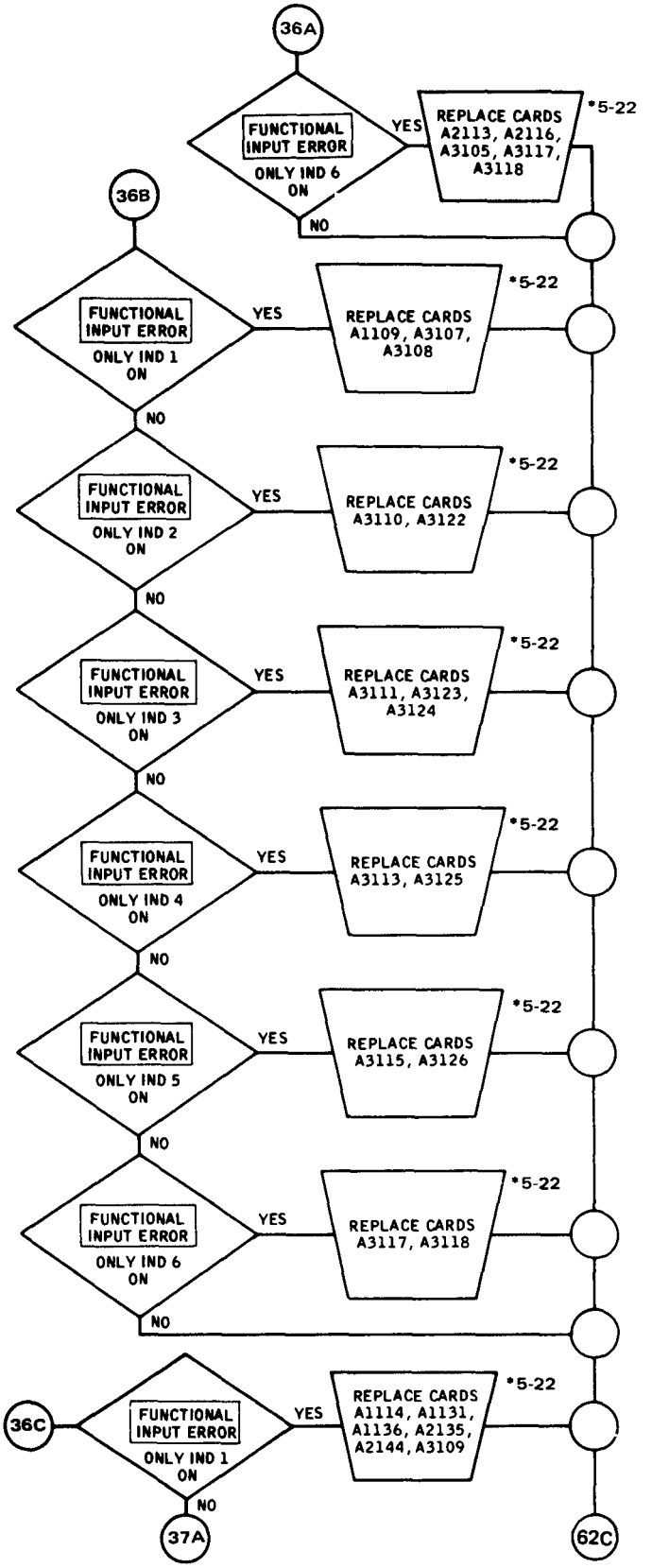
FAULT ISOLATION FLOW CHART (Sheet 33 of 62)



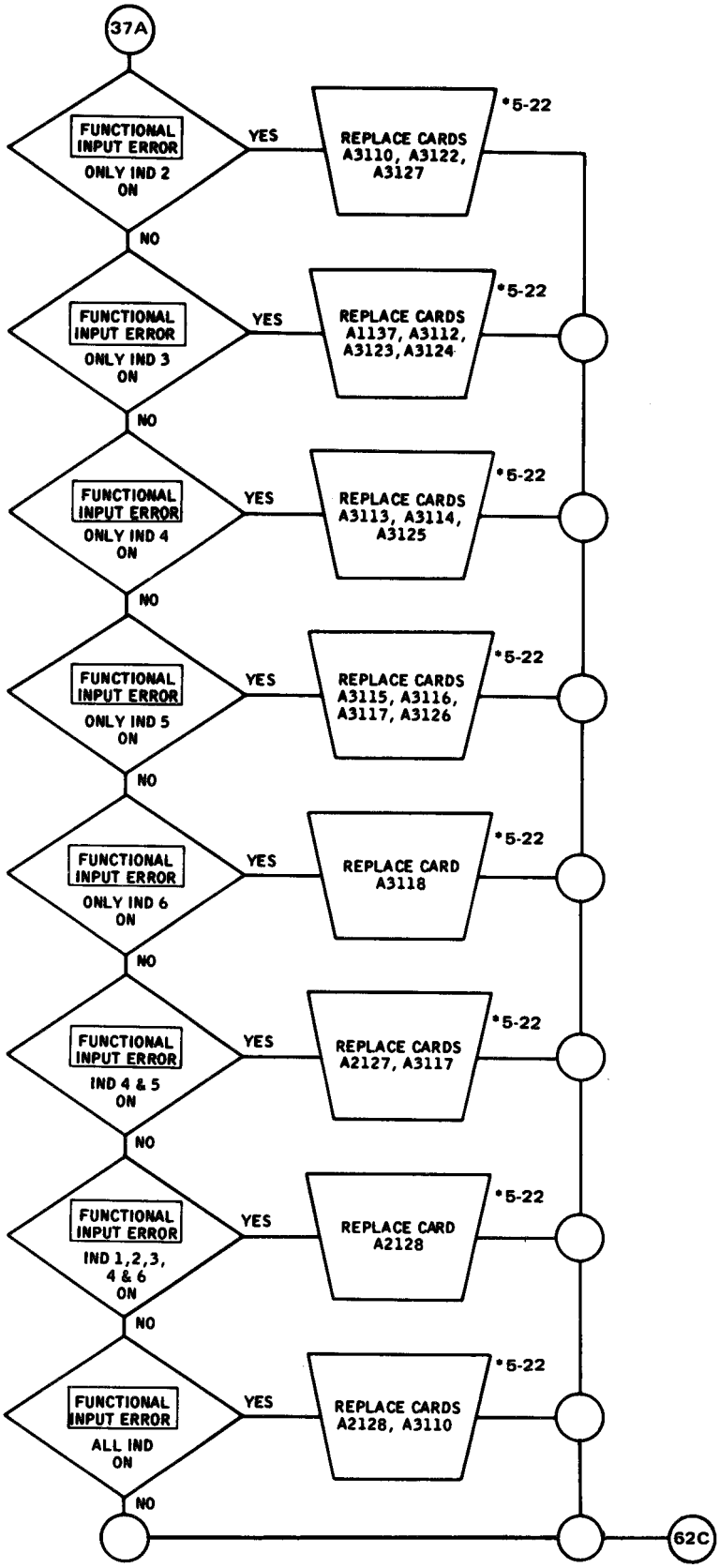
FAULT ISOLATION FLOW CHART (Sheet 34 of 62)



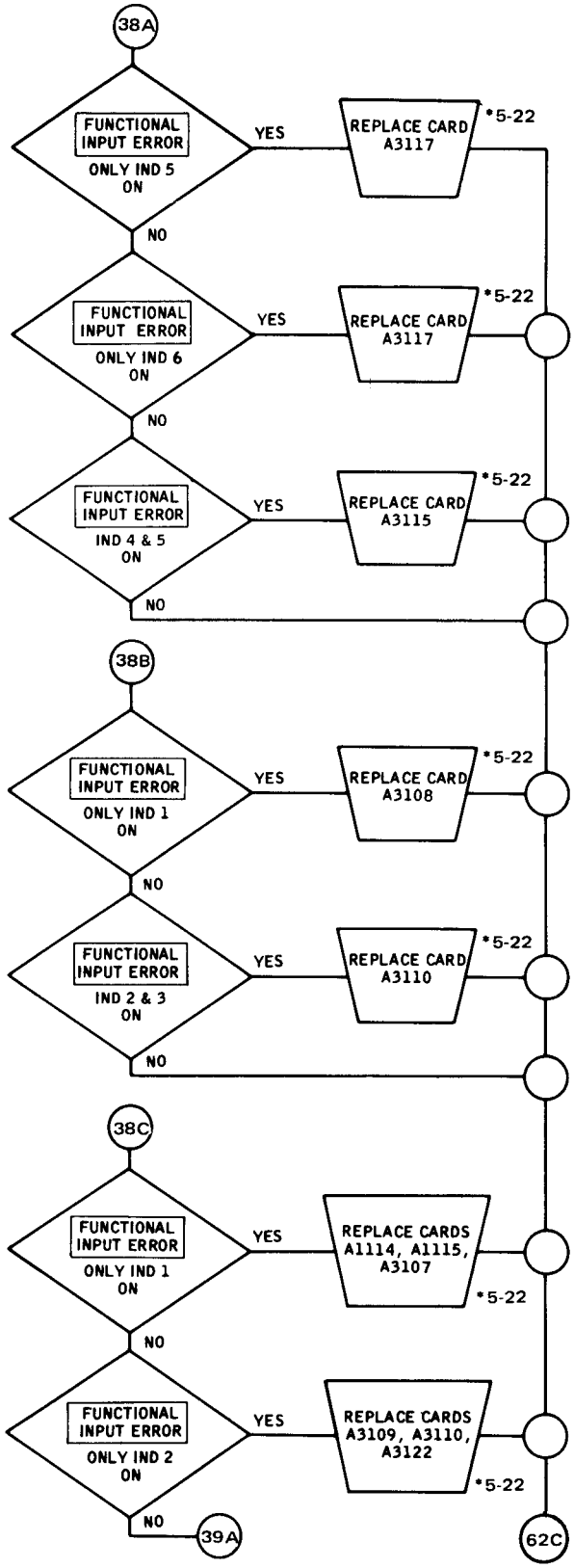
FAULT ISOLATION FLOW CHART (Sheet 35 of 62)



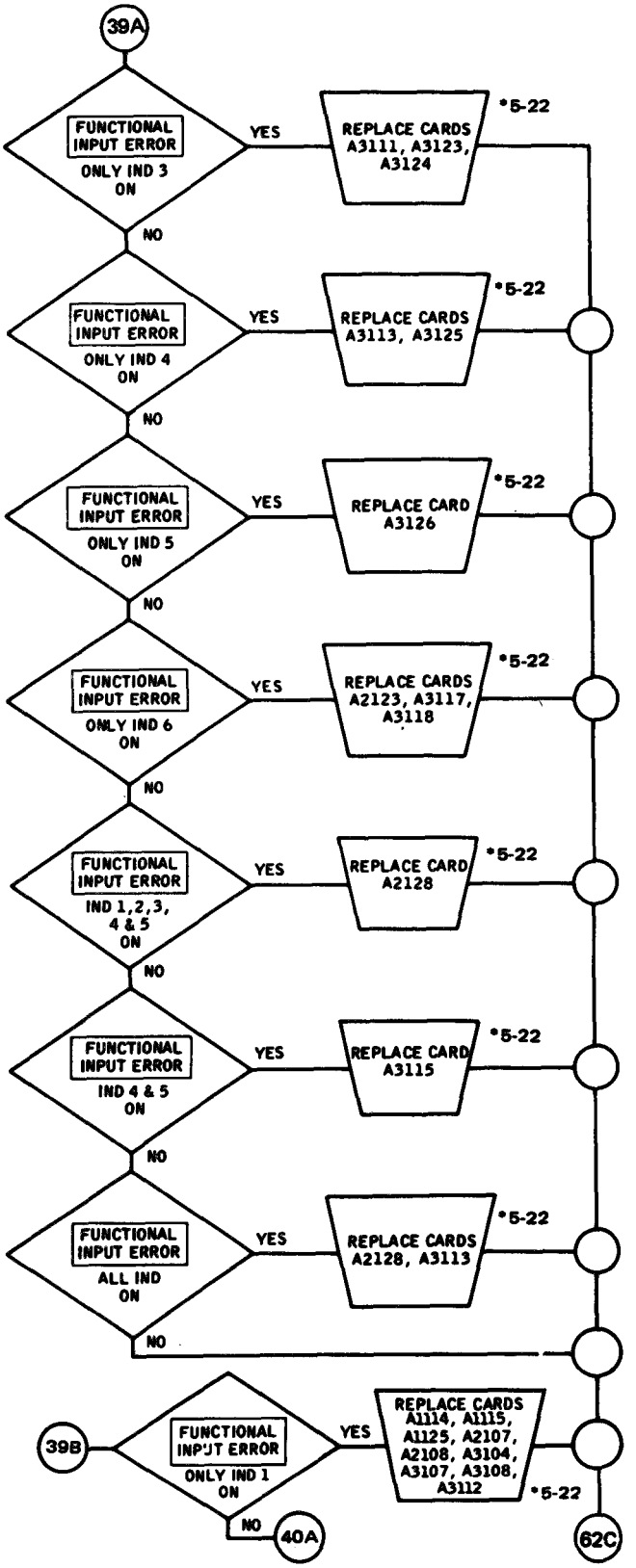
FAULT ISOLATION FLOW CHART (Sheet 36 of 62)



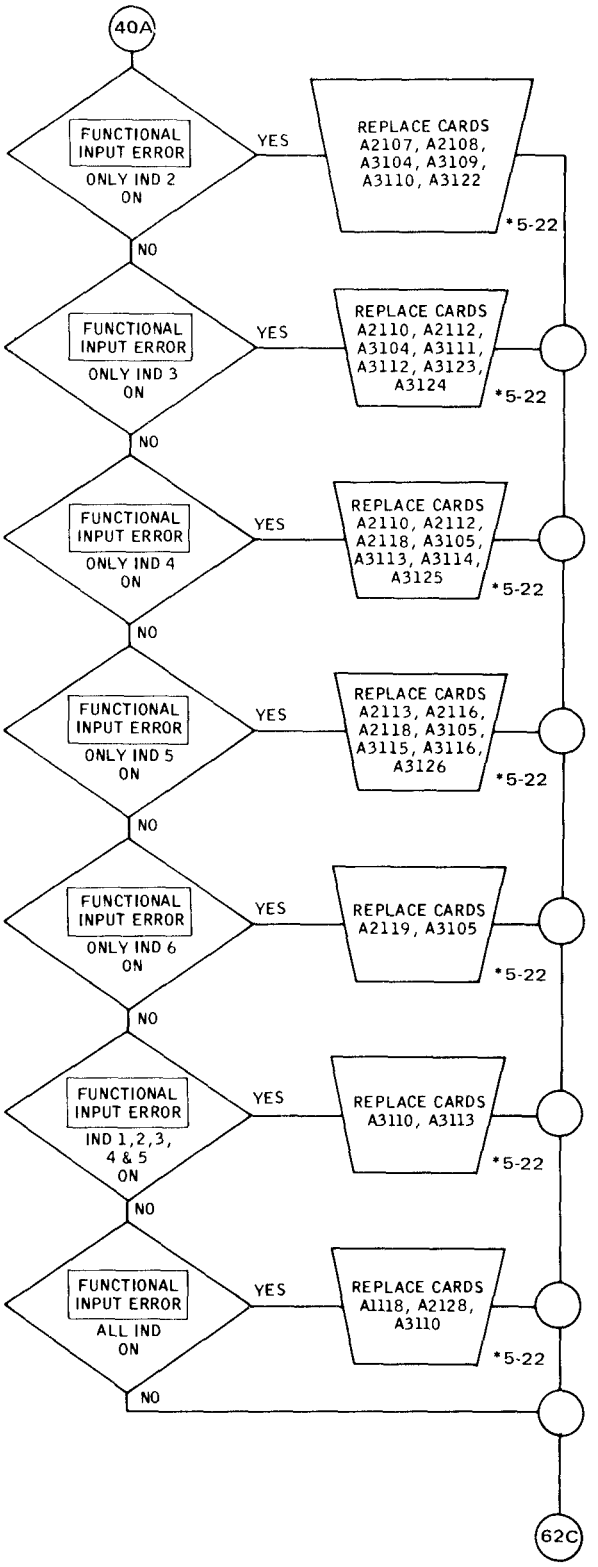
FAULT ISOLATION FLOW CHART (Sheet 37 of 62)



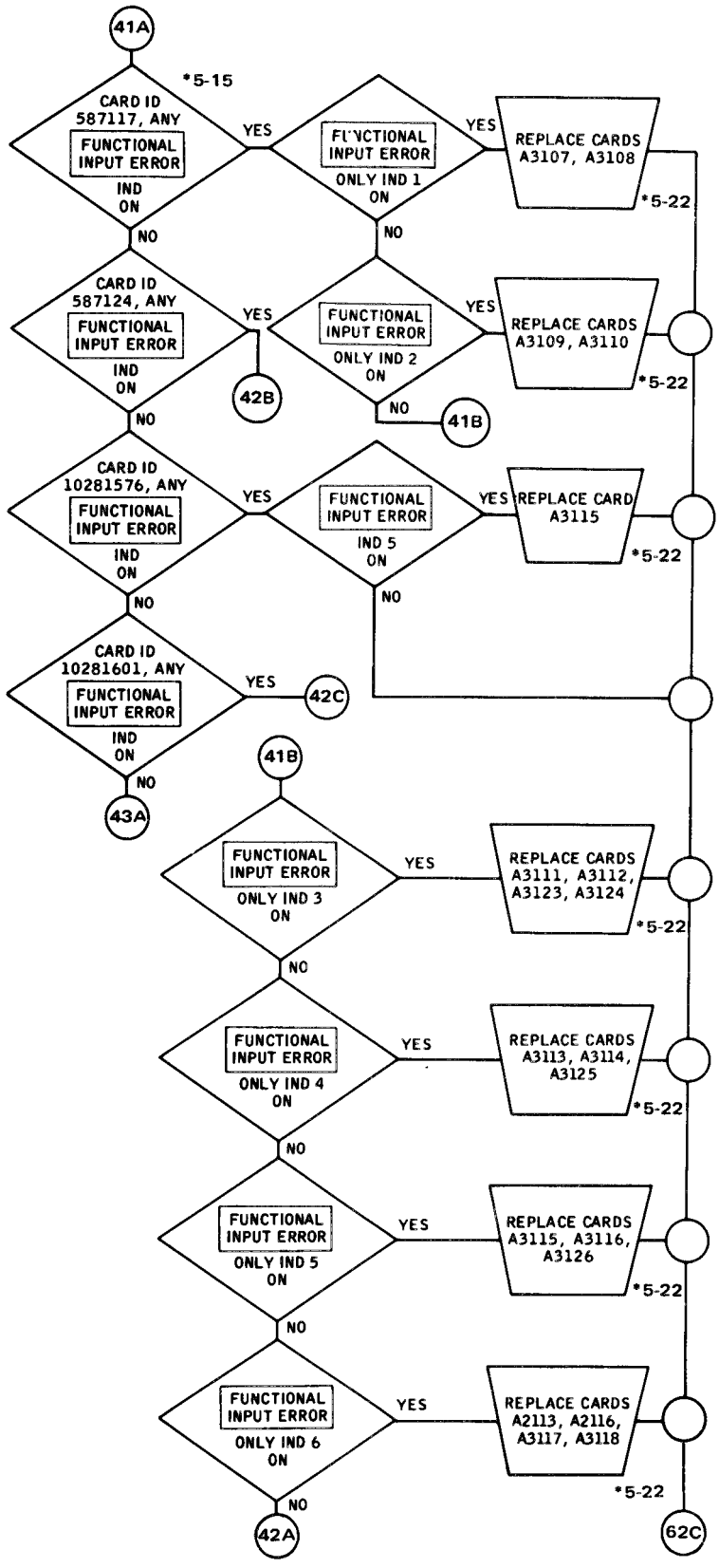
FAULT ISOLATION FLOW CHART (Sheet 38 of 62)



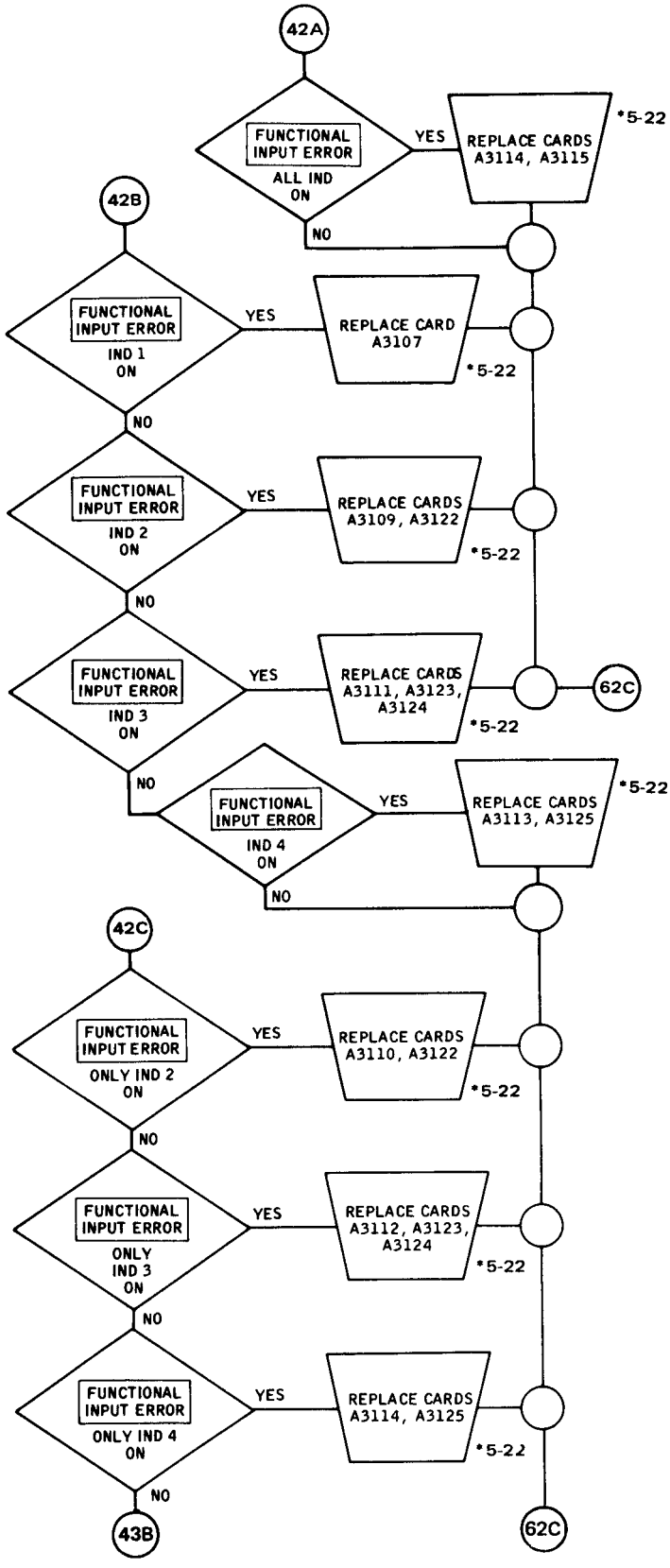
FAULT ISOLATION FLOW CHART (Sheet 39 of 62)



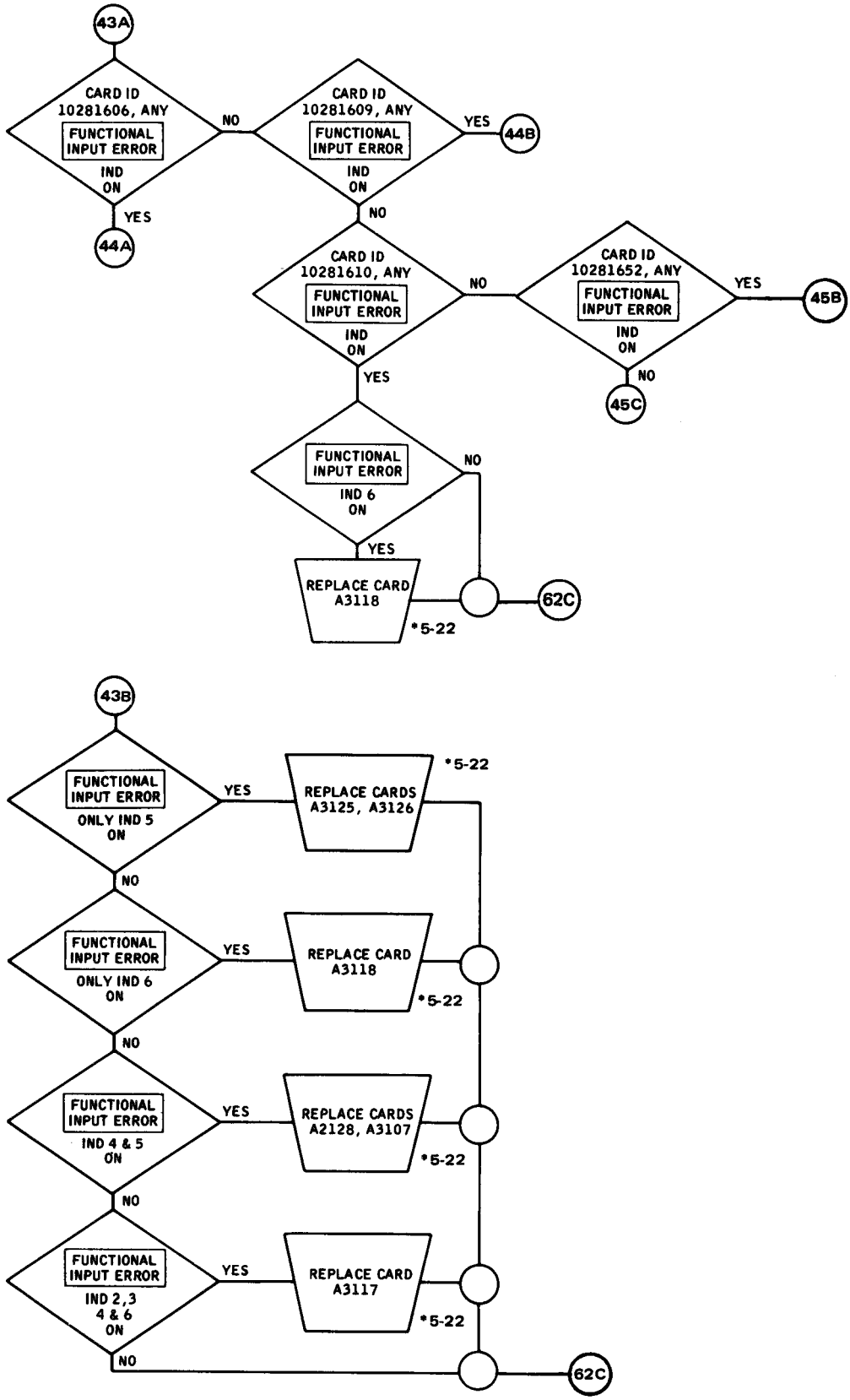
FAULT ISOLATION FLOW CHART (Sheet 40 of 62)



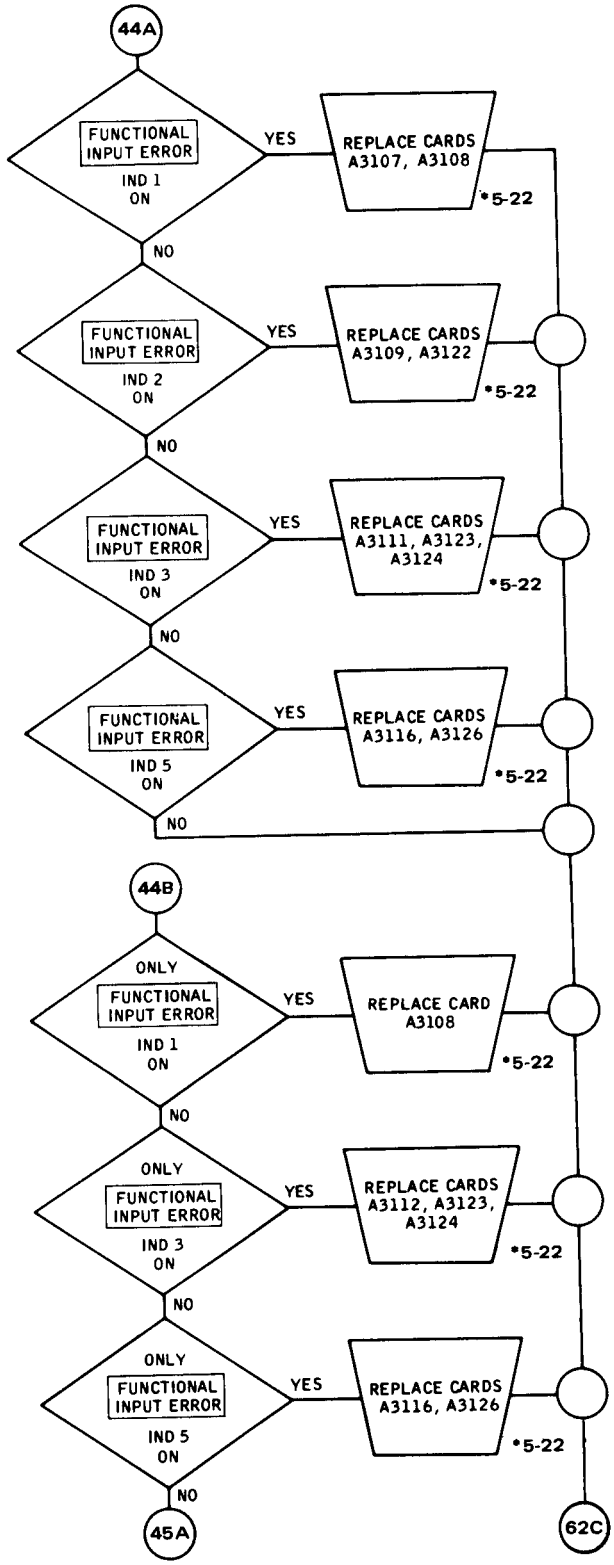
FAULT ISOLATION FLOW CHART (Sheet 41 of 62)



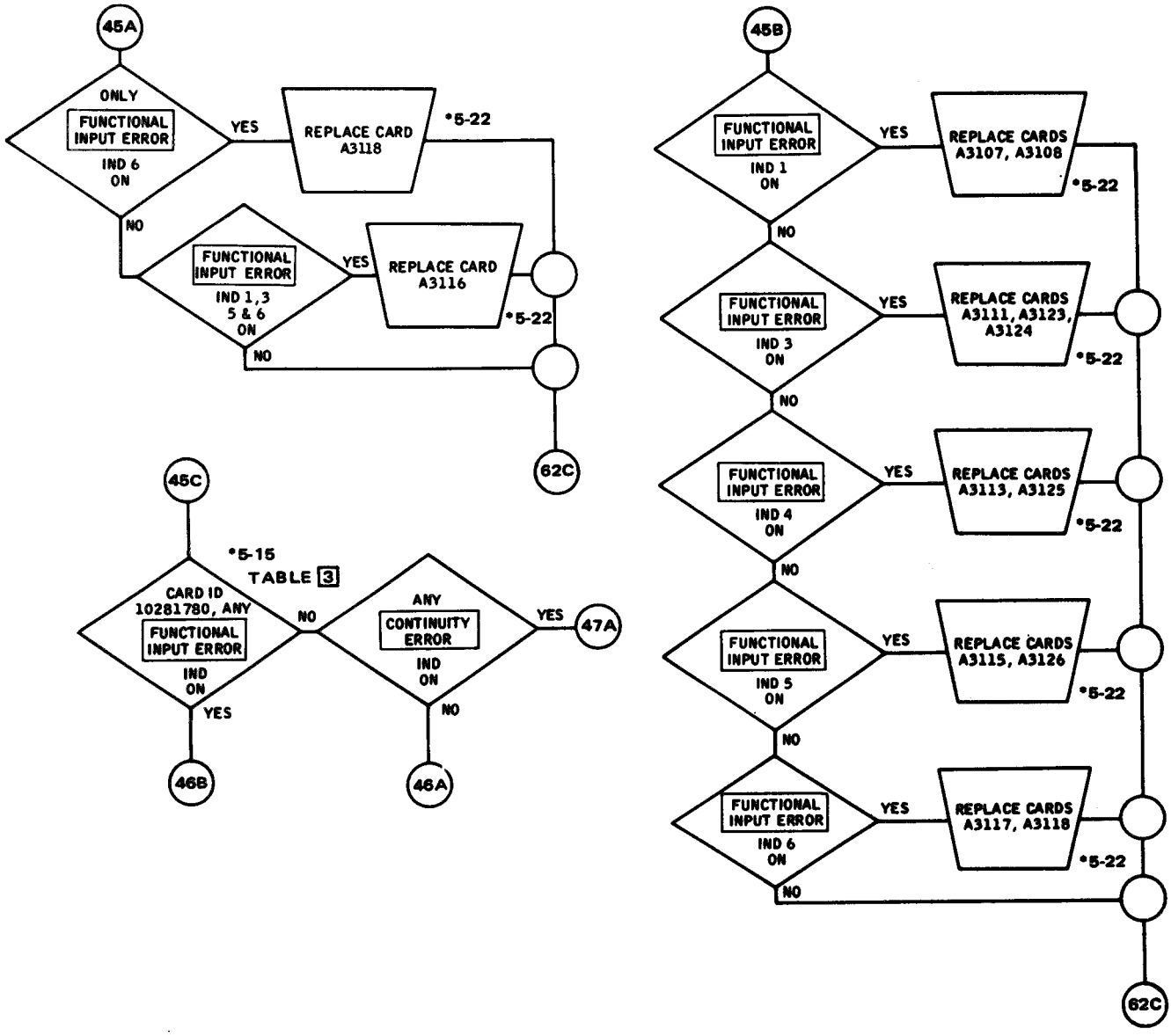
FAULT ISOLATION FLOW CHART (Sheet 42 of 62)



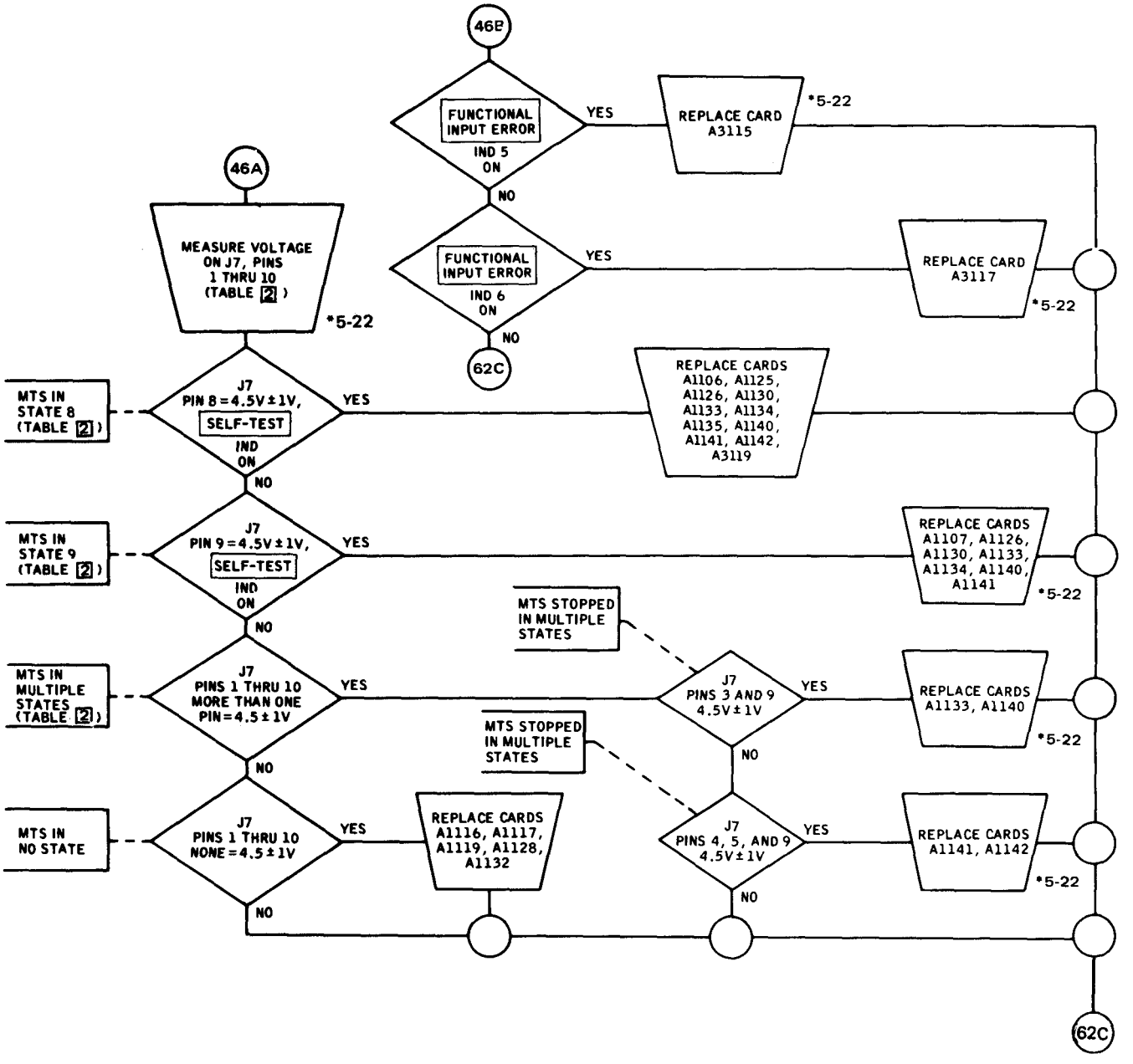
FAULT ISOLATION FLOW CHART (Sheet 43 of 62)



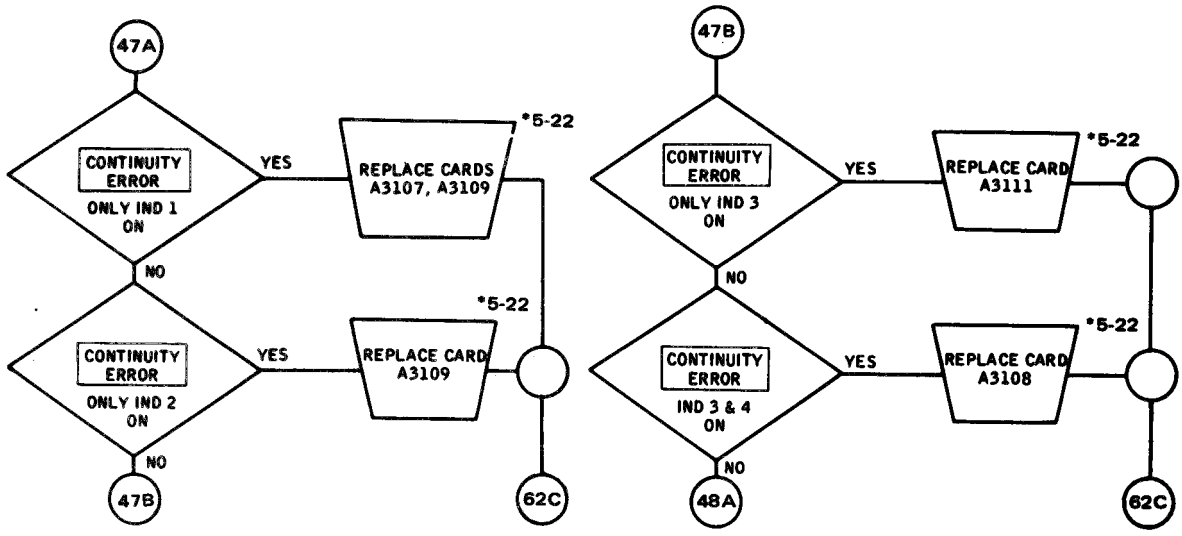
FAULT ISOLATION FLOW CHART (Sheet 44 of 62)



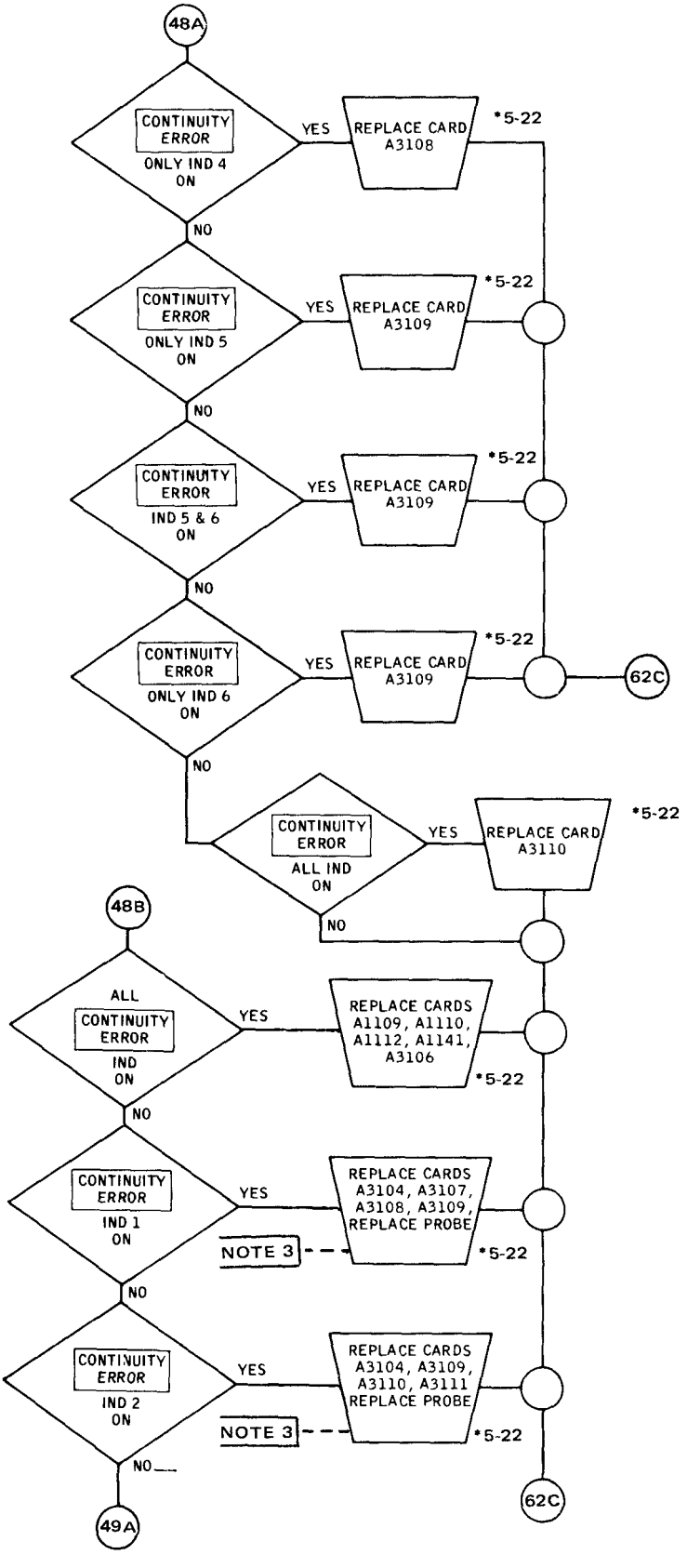
FAULT ISOLATION FLOW CHART (Sheet 45 of 62)



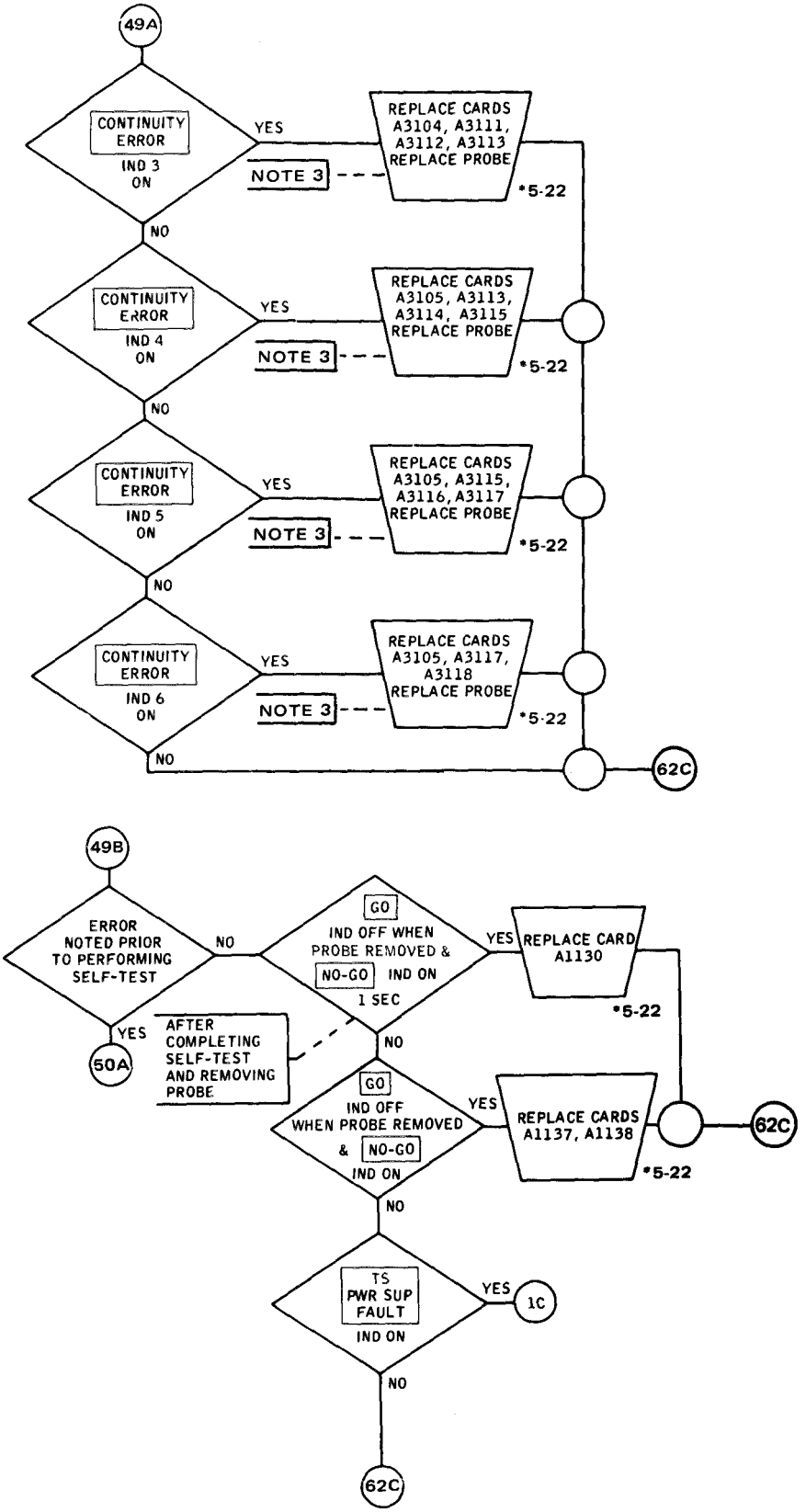
FAULT ISOLATION FLOW CHART (Sheet 46 of 62)



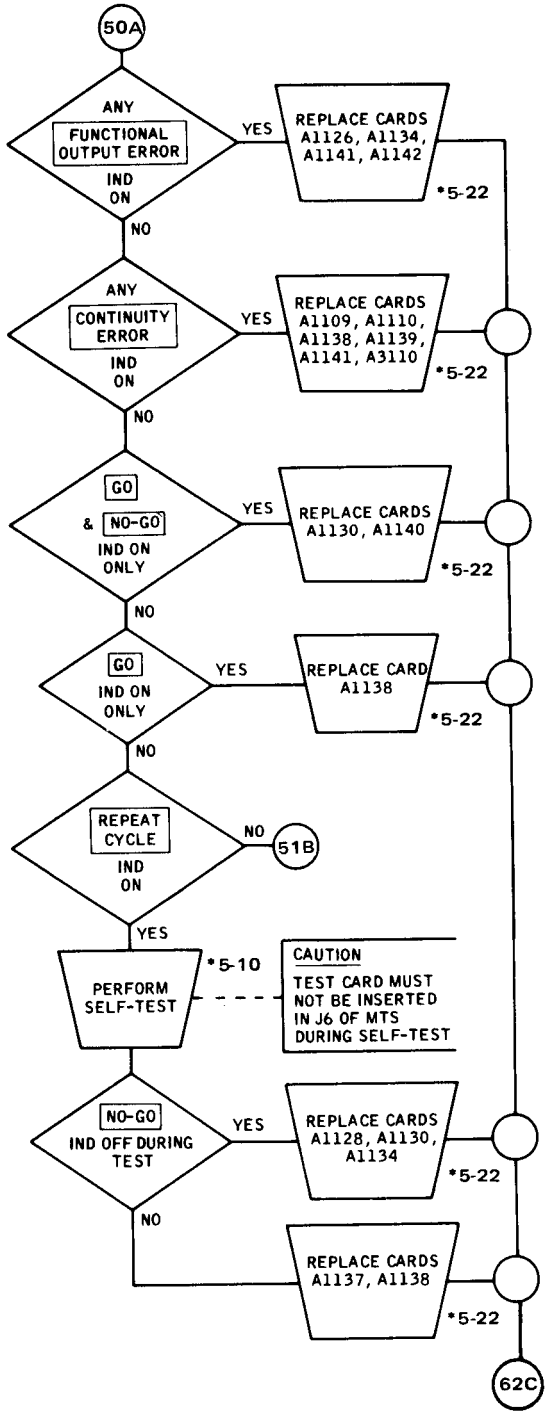
FAULT ISOLATION FLOW CHART (Sheet 47 of 62)



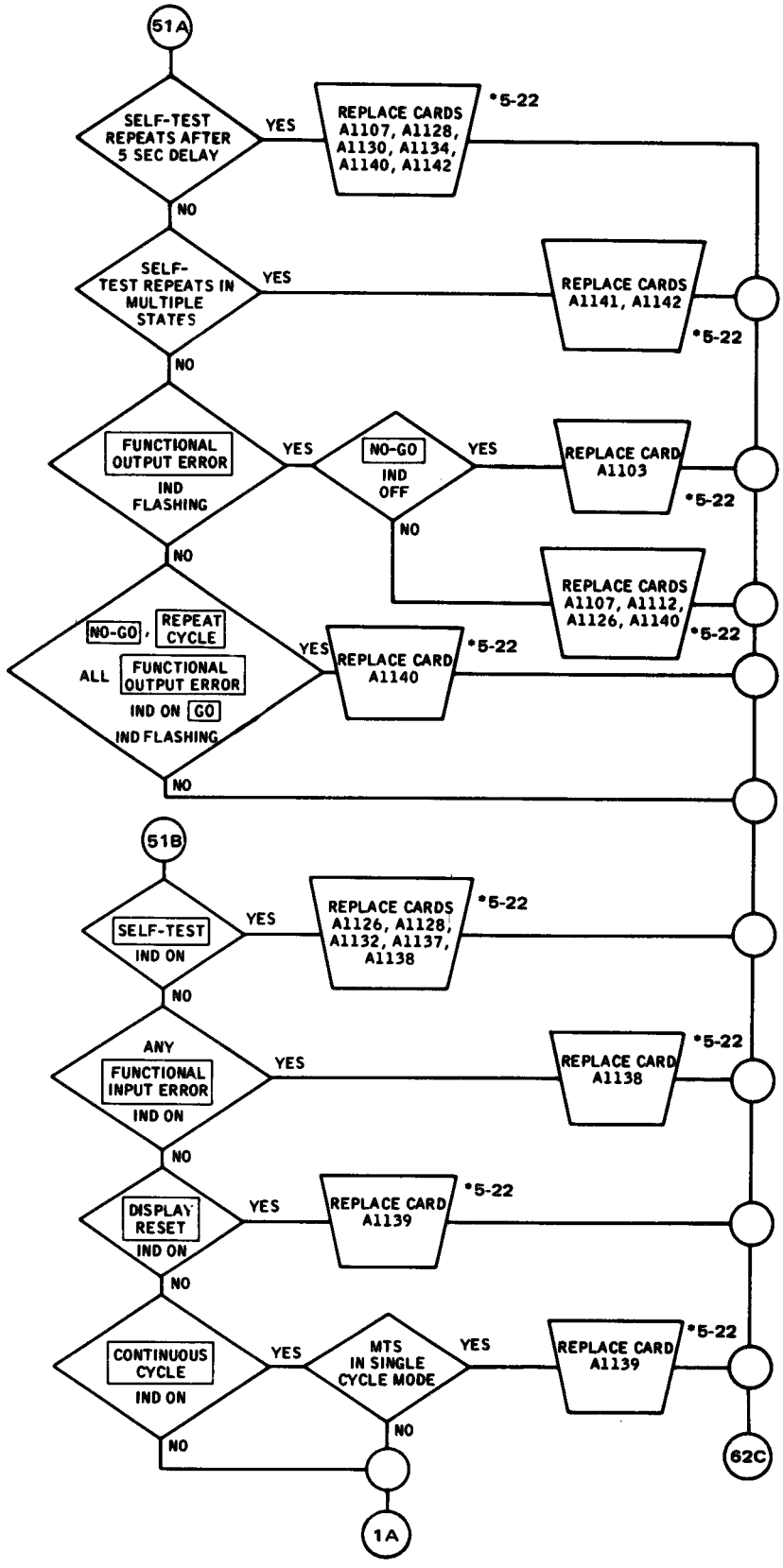
FAULT ISOLATION FLOW CHART (Sheet 48 of 62)



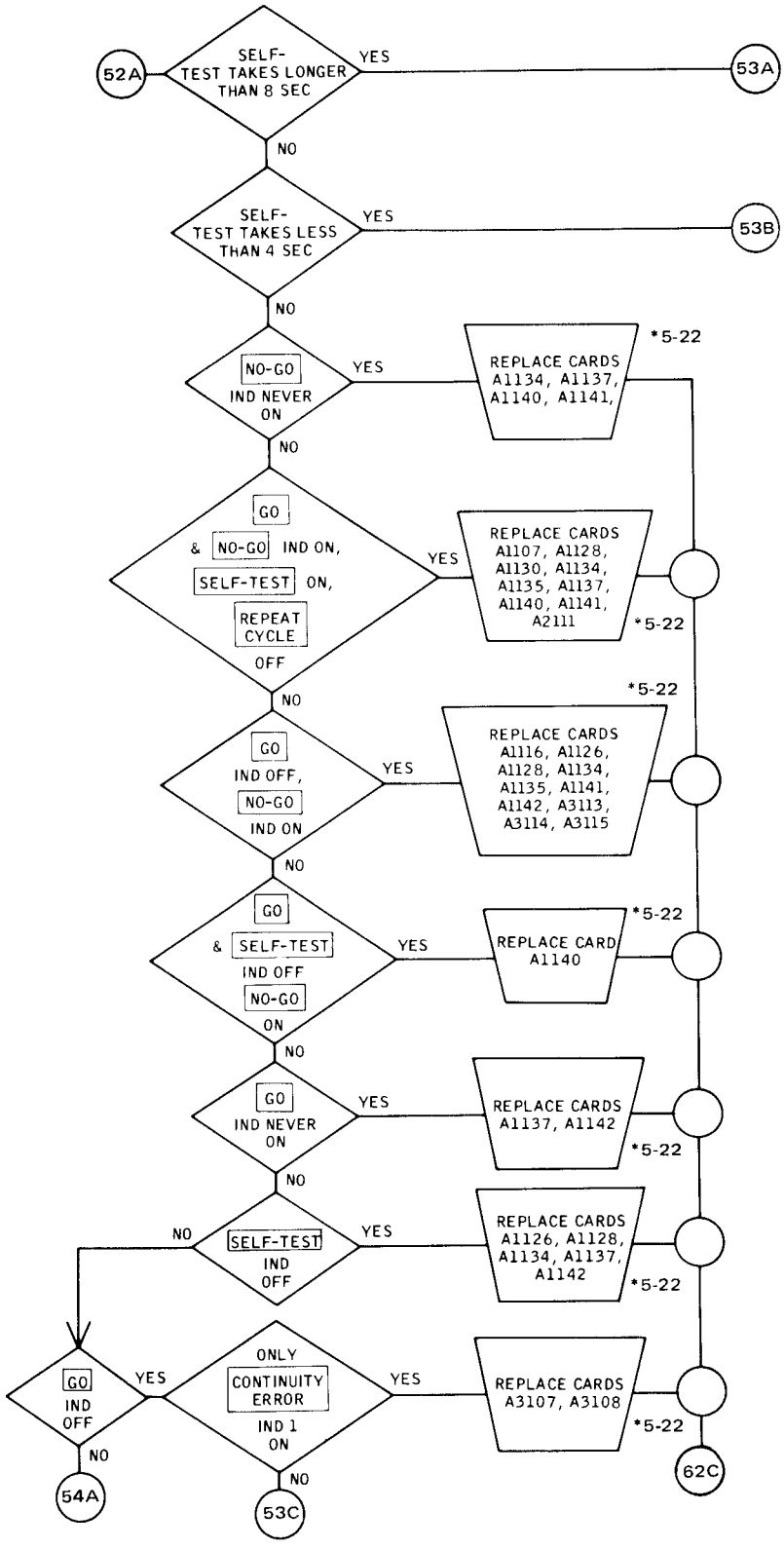
FAULT ISOLATION FLOW CHART (Sheet 49 of 62)



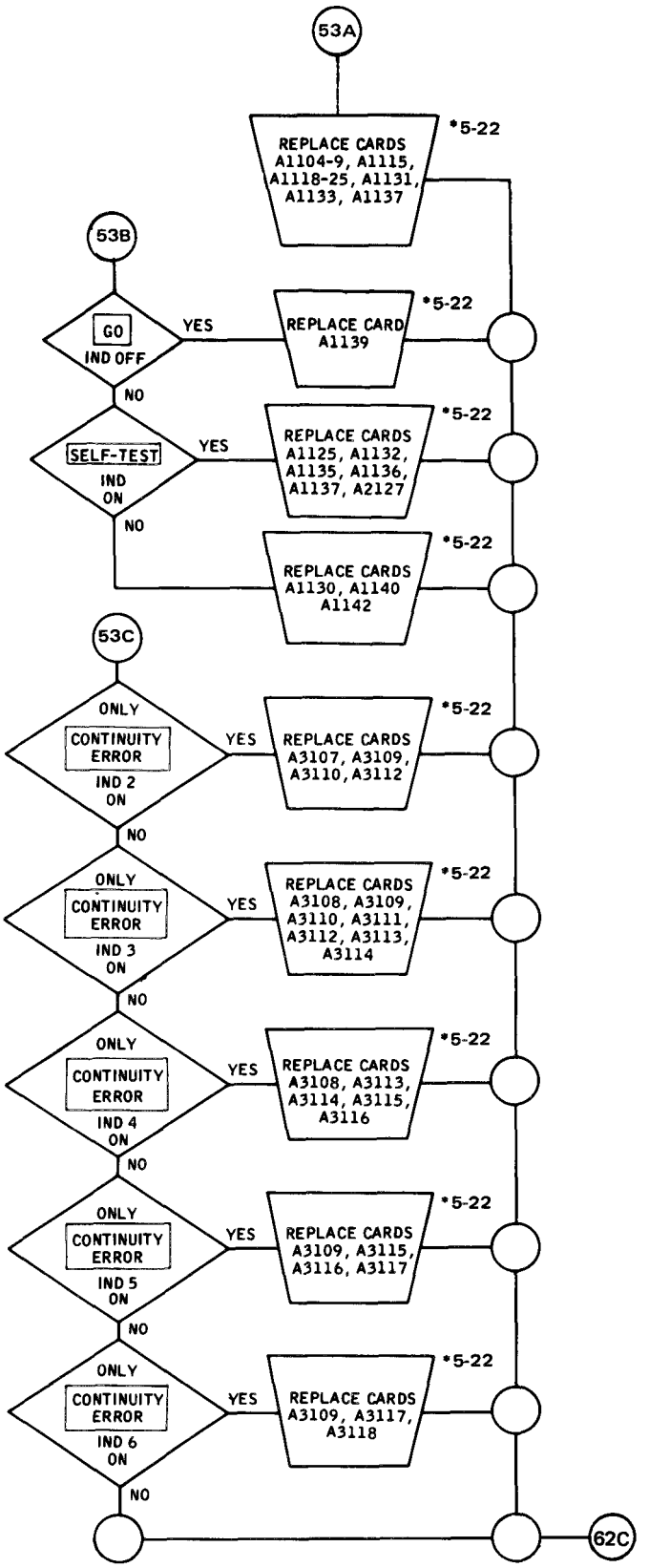
FAULT ISOLATION FLOW CHART (Sheet 50 of 62)



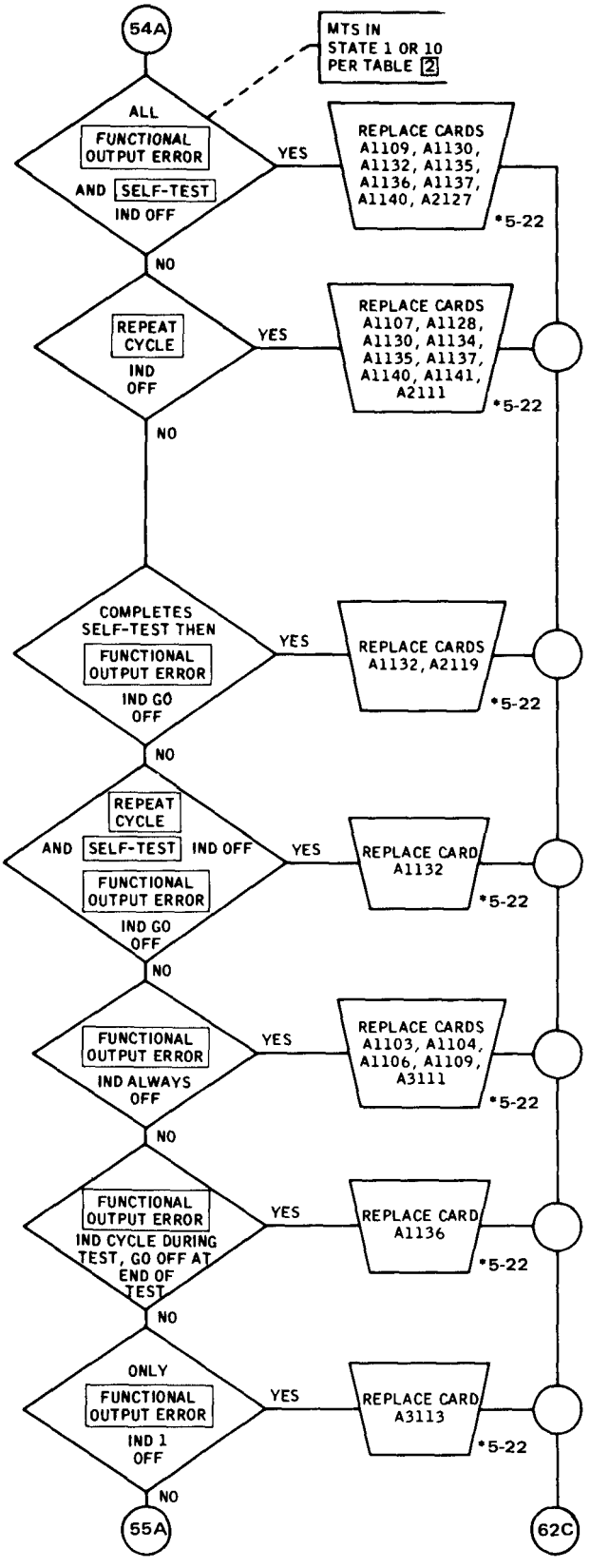
FAULT ISOLATION FLOW CHART (Sheet 51 of 62)



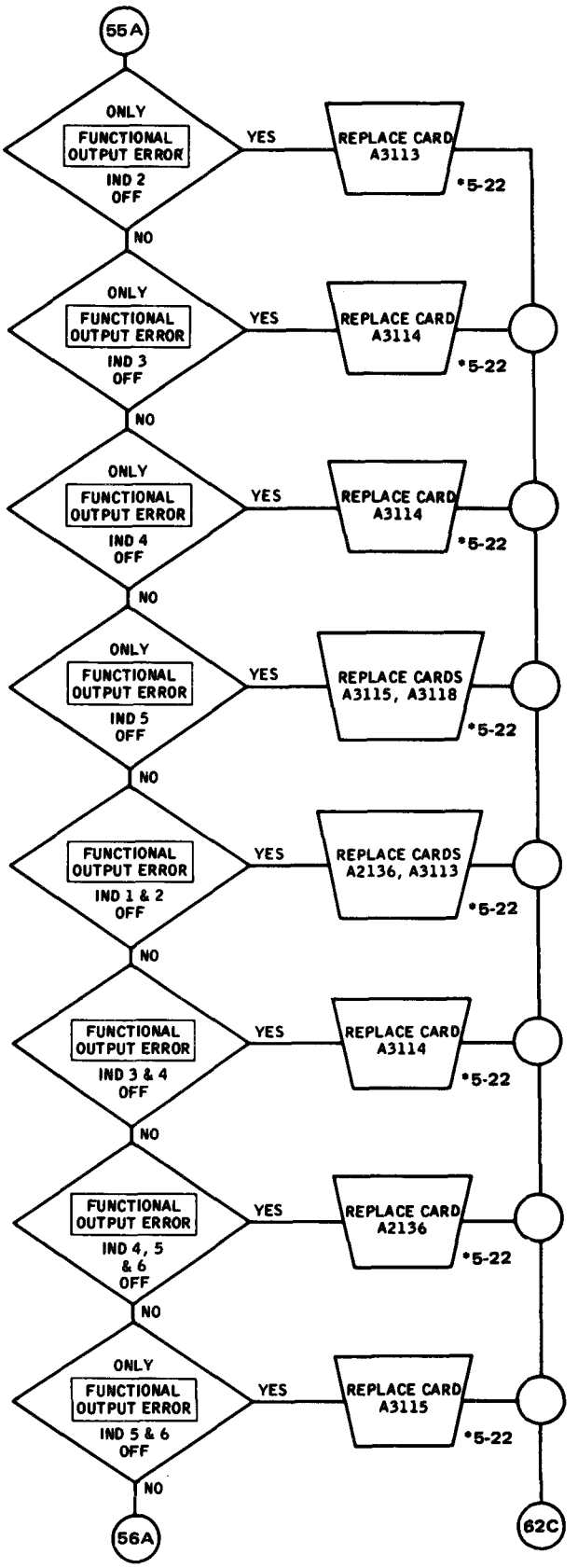
FAULT ISOLATION FLOW CHART (Sheet 52 of 62)



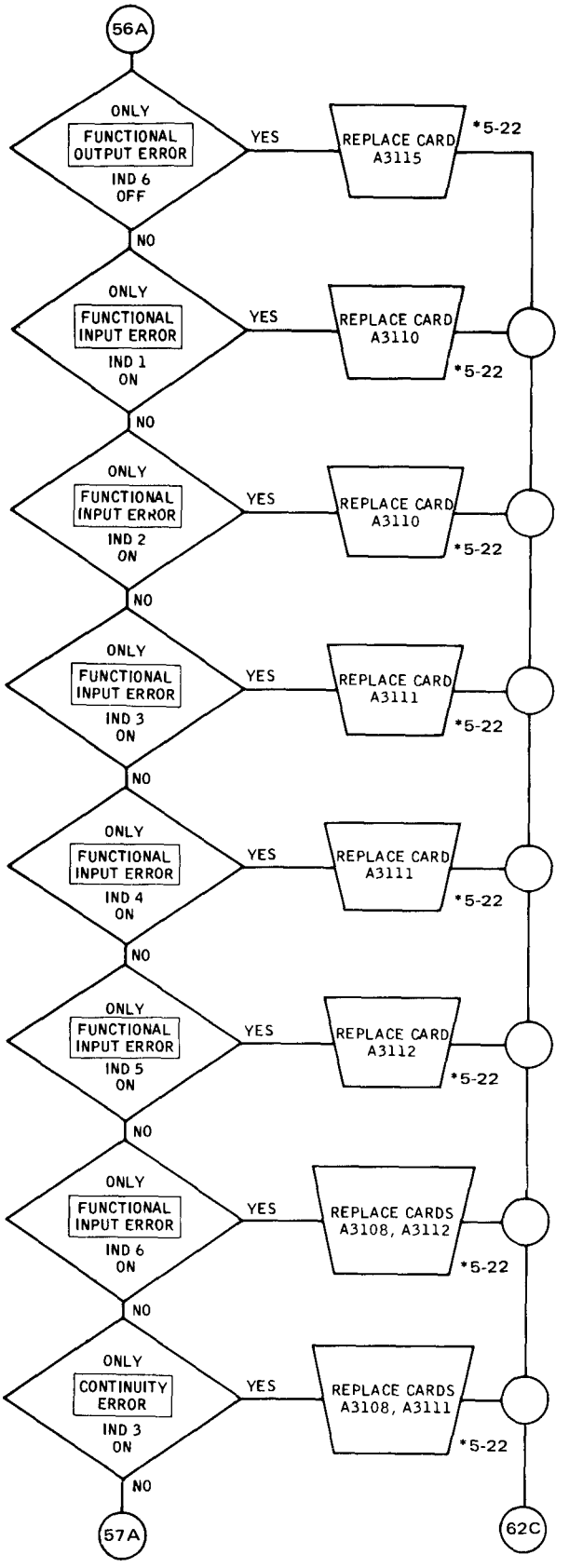
FAULT ISOLATION FLOW CHART (Sheet 53 of 62)



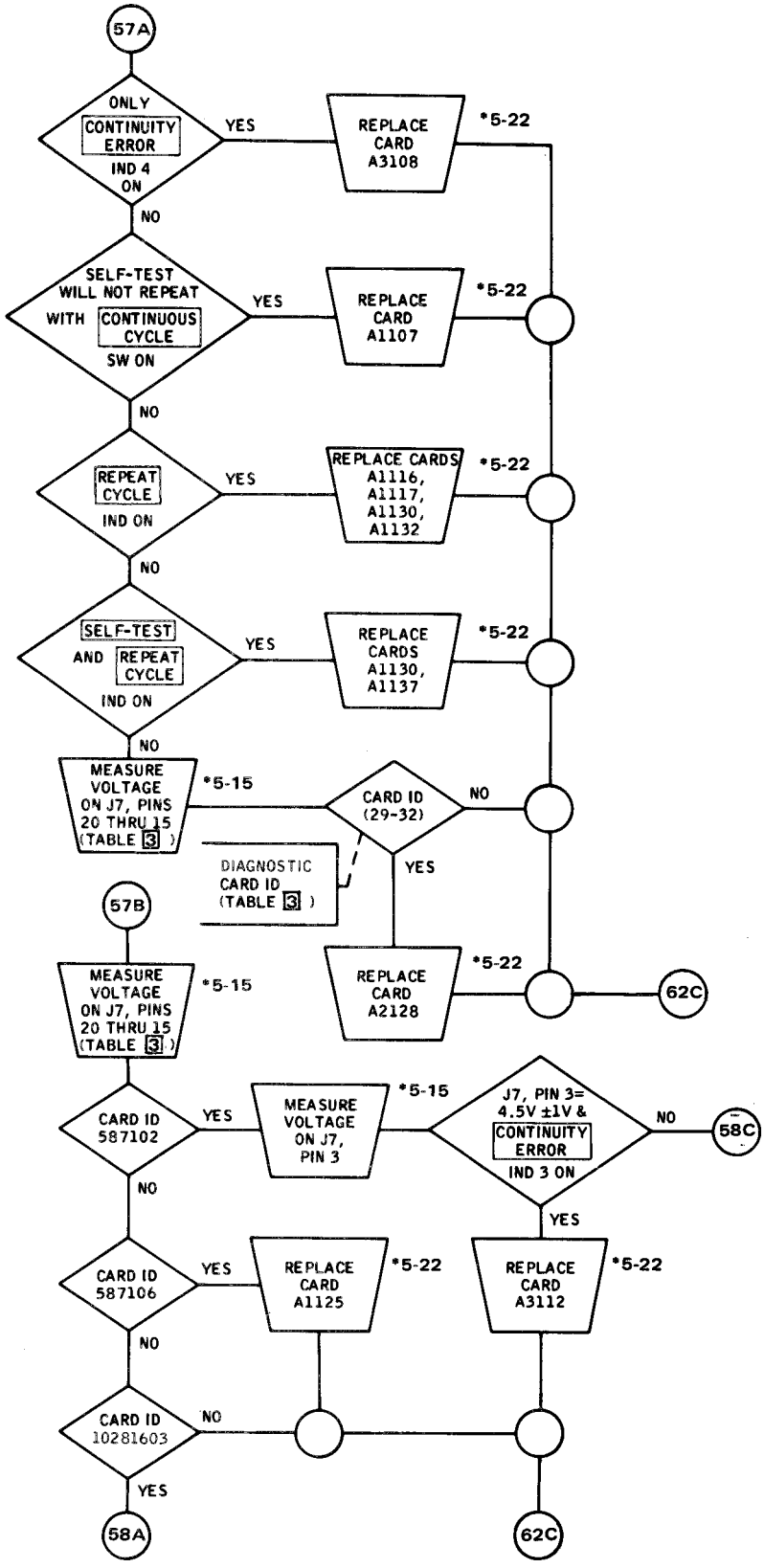
FAULT ISOLATION FLOW CHART (Sheet 54 of 62)



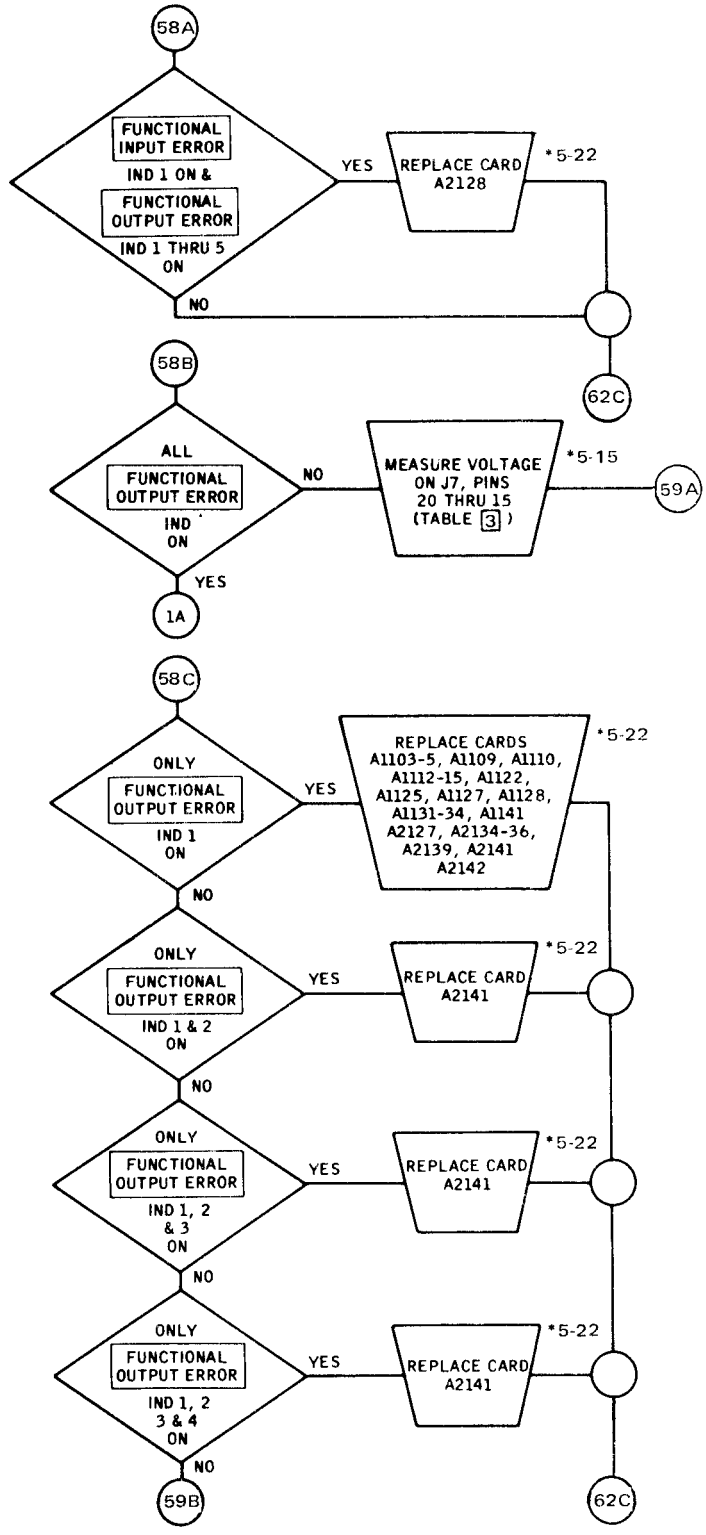
FAULT ISOLATION FLOW CHART (Sheet 55 of 62)



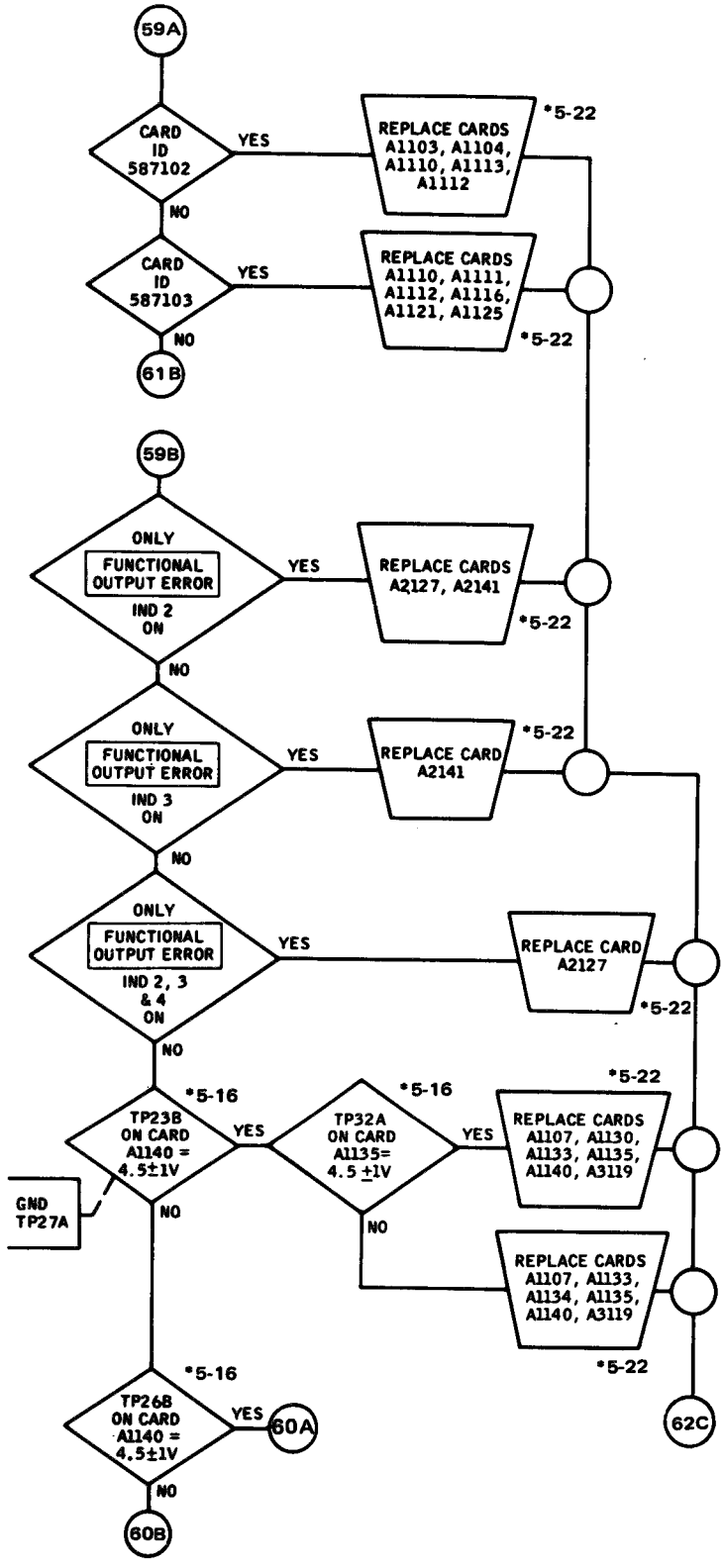
FAULT ISOLATION FLOW CHART (Sheet 56 of 62)



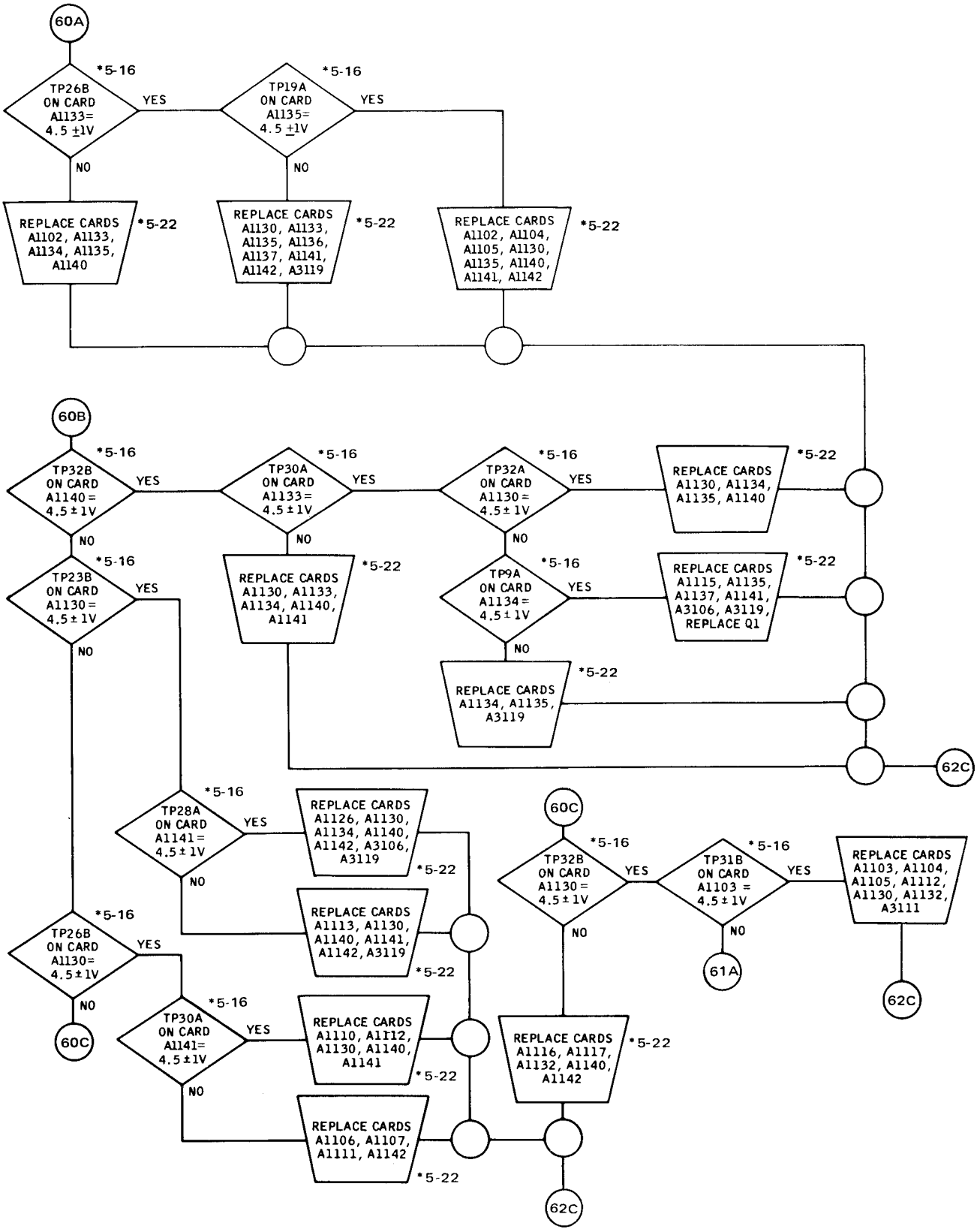
FAULT ISOLATION FLOW CHART (Sheet 57 of 62)



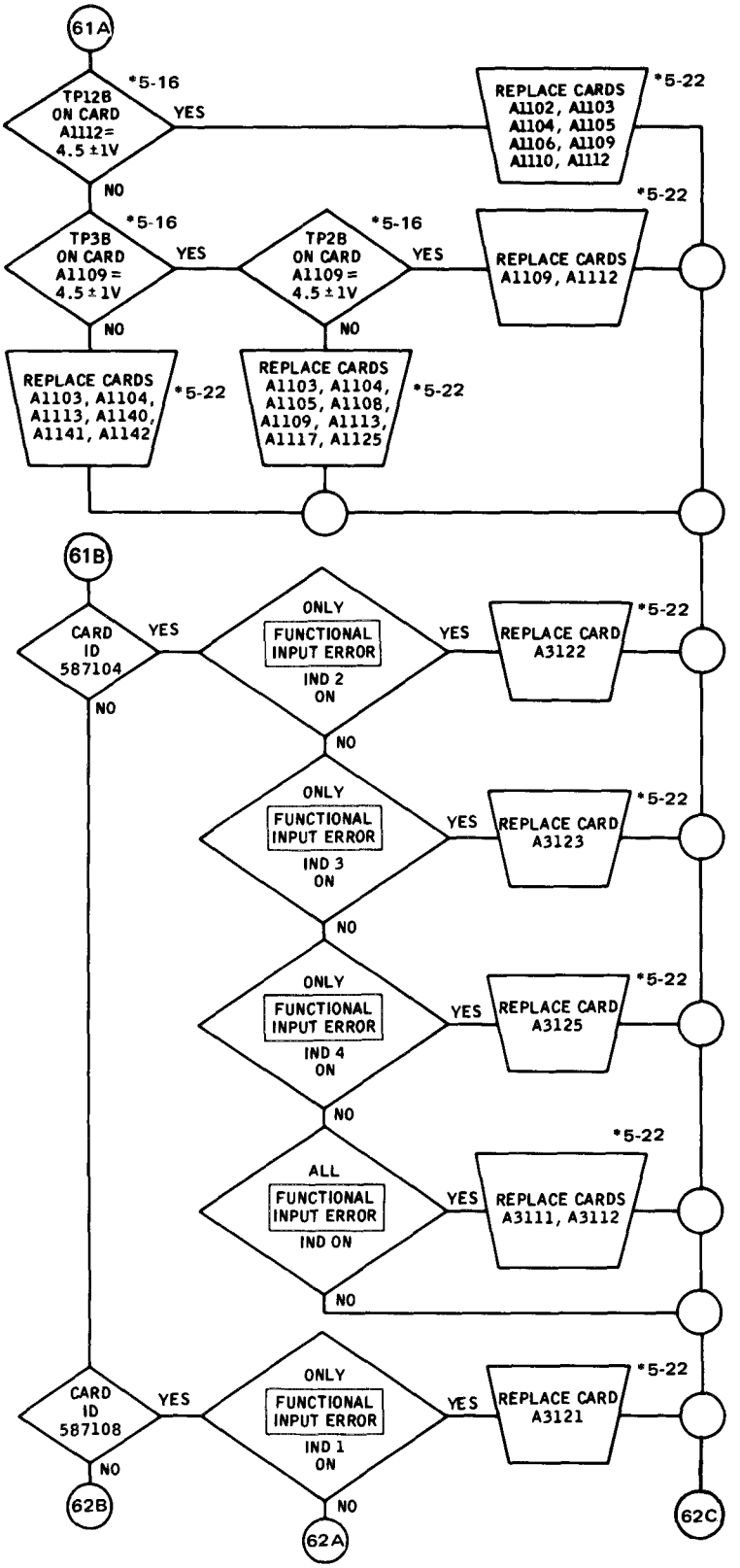
FAULT ISOLATION FLOW CHART (Sheet 58 of 62)



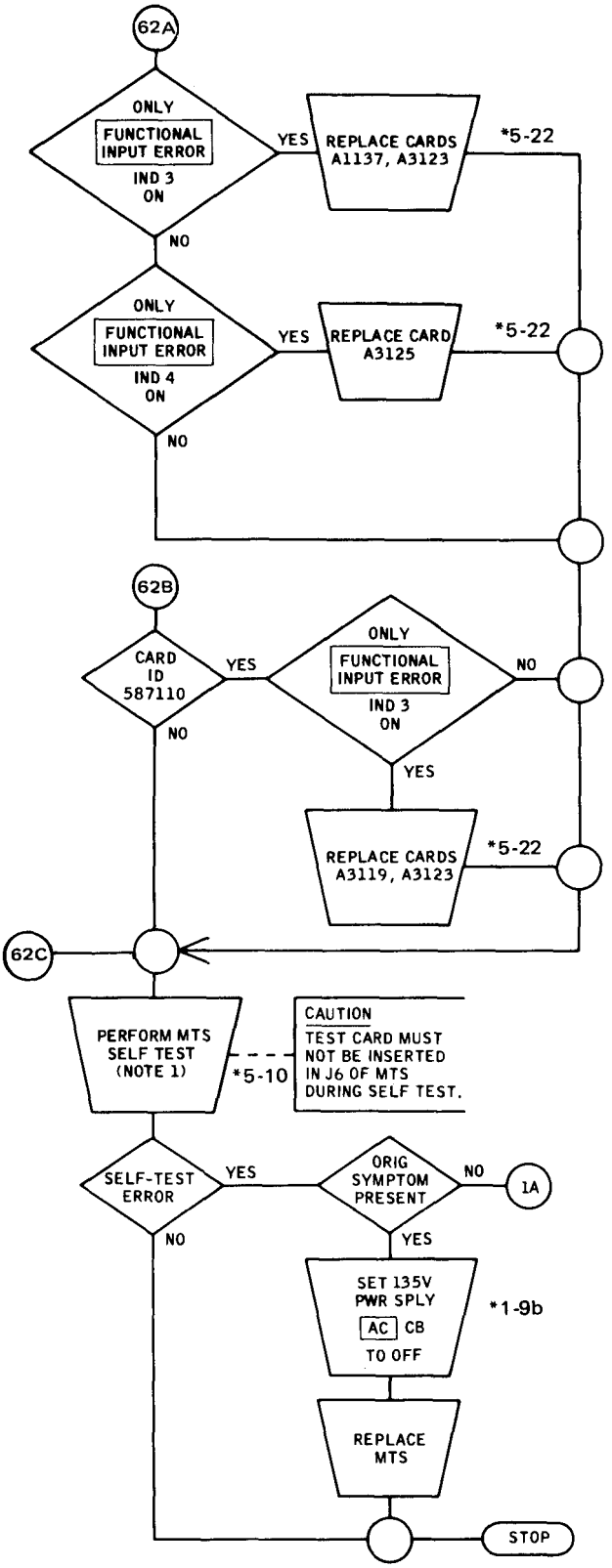
FAULT ISOLATION FLOW CHART (Sheet 59 of 62)



FAULT ISOLATION FLOW CHART (Sheet 60 of 62)



FAULT ISOLATION FLOW CHART (Sheet 61 of 62)



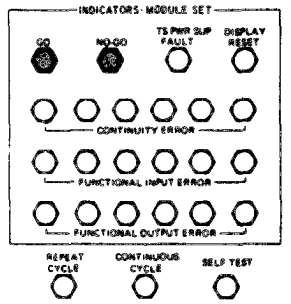
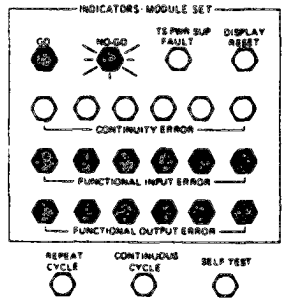
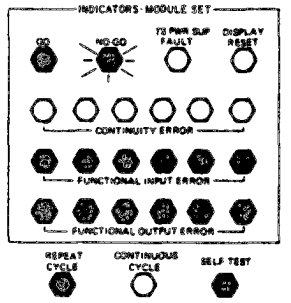
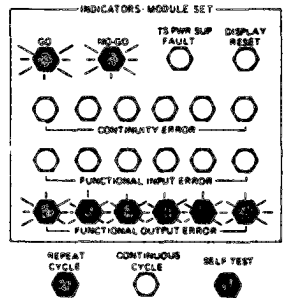
FAULT ISOLATION FLOW CHART (Sheet 62 of 62)

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION IDENTIFICATION TABLE [1]

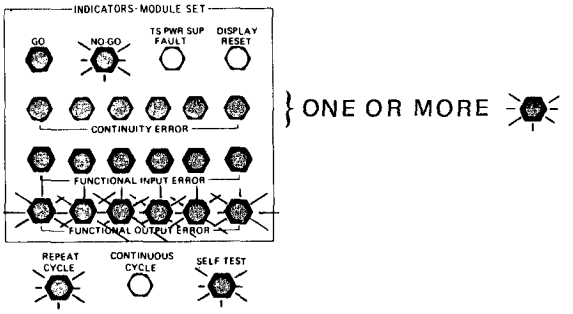
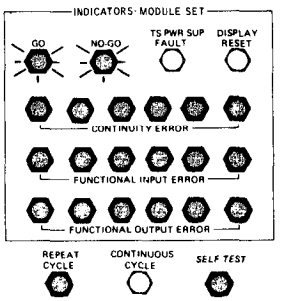
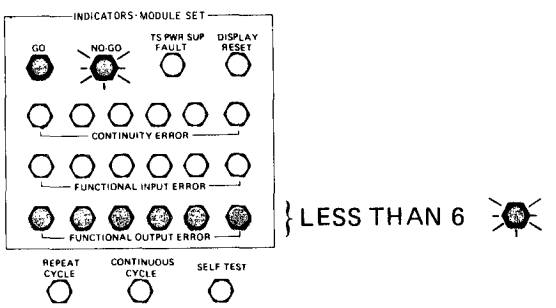
This table identifies ten conditions of failure in the MTS.

To use this table, find the fault condition that corresponds with the reading on the front panel of the MTS.

Fault condition displays	Symptom (Disregard all unspecified indicators)	
1  LEGEND: LAMP MUST BE ON; LAMP MUST BE OFF; LAMP MAY BE ON OR OFF	GO	Off
	NO-GO	Off
2  } ONE OR MORE; } ONE OR MORE	GO	Off
	NO-GO	On
	FUNCTIONAL INPUT ERROR (1 or more)	On
	FUNCTIONAL OUTPUT ERROR (1 or more)	On
3  } ONE OR MORE	GO	Off
	NO-GO	On
	FUNCTIONAL INPUT ERROR (all)	Off
	FUNCTIONAL OUTPUT ERROR (1 or more)	On
	REPEAT CYCLE	Off
	SELF-TEST	Off
4 	GO	On
	NO-GO	On
	FUNCTIONAL OUTPUT ERROR (all)	On
	REPEAT CYCLE	Off
	SELF-TEST	Off

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION IDENTIFICATION TABLE [1] (Cont.)

Fault condition displays	Symptom (Disregard all unspecified indicators)	
5 	GO NO-GO CONTINUITY ERROR (1 or more) FUNCTIONAL INPUT ERROR (all) FUNCTIONAL OUTPUT ERROR (all) REPEAT CYCLE SELF-TEST	Off On On Off On On On
6	Incorrect lamp display either prior to self-test or after probe is removed at end of self-test	
7	Repeats self-test, with or without errors, with CONTINUOUS CYCLE switch OFF	
8	Appears to complete self-test but the length of the test or the lamp configuration at end is incorrect	
9 	GO NO-GO CONTINUITY ERROR (all) FUNCTIONAL INPUT ERROR (all) FUNCTIONAL OUTPUT ERROR (all) REPEAT CYCLE SELF-TEST	On On Off Off Off Off Off
10 	GO NO-GO FUNCTIONAL OUTPUT ERROR (less than six)	Off On On

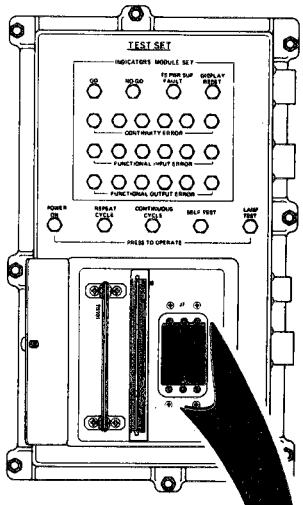
5-12. FAULT ISOLATION PROCEDURE. (Cont.)

TEST CONNECTOR J7 PIN ASSIGNMENTS TABLE 2

This table identifies the functions of certain pins on connector J7.

To find the state of the MTS, measure the voltage of pins 1 through 10.

Pin	Assignment	Remarks
1 thru 10	MTS state (1 thru 10)[1]	See figure below.
15 thru 20	Card ID (being tested)	
[2]107	Check point (CP)	
112 thru 183	MTS lines (functional test)	
184 thru 255	MTS lines (continuity test)	
257,259	Ground	
260	Spare	

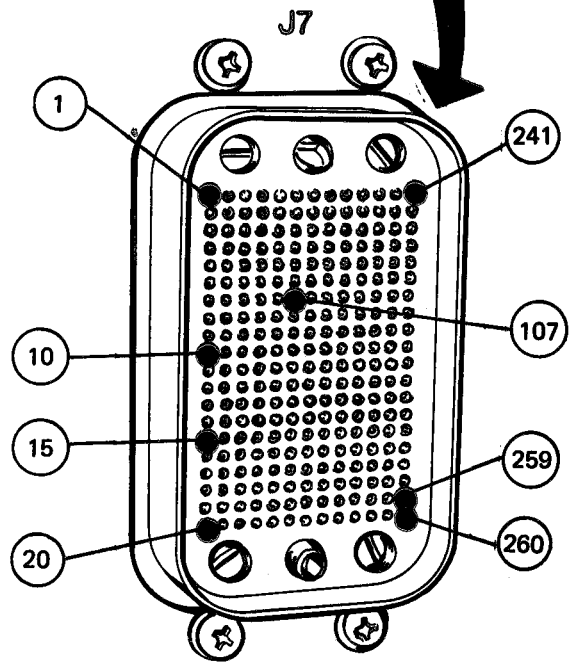


[1] A one (4.5V ± 1V) on pin indicates MTS state.

[2] Pin 107 logic 0 causes MTS to stop on functional error. Pin 108 logic 0 will cause either of the following:

a. If 107 is also 0, MTS will advance out of a functional error stop and stop on next detected error.

b. If 107 is 0 and no error, MTS will single-step functional test pattern in state 7. Pin 109 logic 0 causes MTS to stop in state 7 (functional test state).



5-12. FAULT ISOLATION PROCEDURE. (Cont.)

CARD TYPE IDENTIFICATION TABLE [3]

This table identifies card types.

To identify the card types, measure the voltage on connector J7 pins 20 through 15.

Voltage at J7 pin [1]							
20	19	18	17	16	152	Decimal equivalent of binary number vs	Card type[3]
0	0	0	0	0	0	0	587102
0	0	0	0	0	1	1	587103
0	0	0	0	1	0	2	587104
0	0	0	0	1	1	3	587107
0	0	0	1	0	0	4	587108
0	0	0	1	0	1	5	587110
0	0	0	1	1	0	6	587117
0	0	0	1	1	1	7	587124
0	0	1	0	0	0	8	10281603, 149513
0	0	1	0	0	1	9	10281780, 149580
0	0	1	0	1	0	10	10281609
0	0	1	0	1	1	11	10280610
0	0	1	1	0	0	12	10281629
0	0	1	1	0	1	13	10281707
0	0	1	I	1	0	14	587106
0	0	1	1	1	1	15	587109
0	1	0	0	0	0	16	587101
0	1	0	0	0	1	17	587105
0	1	0	0	1	0	18	10281601
0	1	0	0	1	1	19	10281602, 149512
0	1	0	1	0	0	20	10281606, 149516
0	1	0	1	0	1	21	0281652
0	1	0	1	1	0	22	10281576, 49576
0	1	0	1	1	1	23	10281643
0	1	1	0	0	0	24	10281642
0	1	1	0	0	1	25	10281636

Cross Reference	
Card type[3]	Decimal equivalent of binary number vs
587101	16
587102	0
587103	1
587104	2
587105	17
587106	14
587107	3
587108	4
587109	15
587110	5
587117	6
587124	7
10281576, 149576	22
10281601	18
10281602, 149512	19
10281603, 149513	8
10281606, 149516	20
10280609	10
10281610	11
10281629	12
10281636	25
10281637	27
10281638	28
10281641	26
10281642	24
10281643	23
10281652	21

See footnotes at end of table.

5-12. FAULT ISOLATION PROCEDURE. (cont.)

CARD TYPE IDENTIFICATION TABLE 3 (Cont.)

Voltage at J7 pin [1]							
20	19	18	17	16	15[2]	Decimal equivalent of binary number vs	Card type[3]
0	1	1	0	1	0	26	10281641
0	1	1	0	1	1	27	10281637
0	1	1	1	0	0	28	10281638
0	1	1	1	0	1	29	
0	1	1	1	1	0	30	
0	1	1	1	1	1	31	
1	0	0	0	0	0	32	
1	0	0	0	1	0	34	
1	1	1	1	1	1	63	

Diagnostic codes. Used in fault isolation procedures only.

Cross Reference		
Card type[3]	vs	Decimal equivalent of binary number
10281707		13
10281780, 149580		9

[1]Logical "0" = 0V ± 0.5 Vdc, Logical "1" = 4.5V ± 1.0 Vdc. Ground is Pin 257 or 259.

[2]Pin 15 of J7 is the lsb and Pin 20 of J7 is the msb of the binary number, as shown.

[3]Refer to Table of AN/TYC-39 and AN/TYC-39 Circuit Cards Tested by the MTS (para 1-10) for cards used in AN/TYC-39 and AN/TTC-39 systems. The following card types are interchangeable:

149512 and 10281602

149513 and 10281603

149516 and 10281606

149576 and 10281576

149580 and 10281780

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4]

NOTE

This table deals only with Fault Condition 3 as described in the FAULT CONDITION IDENTIFICATION TABLE and Fault Condition 3 deals with a fault in Functional Output.

After having identified the card type by means of Table [3] , locate the card type in this table and measure the voltage at the pins indicated and replace circuit cards as indicated.

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
587101	119		3A	A1108, A1112, A1113, A2130, A3120, A3121
	120		4B	Same as 119
	121		5B	A1103, A1105, A1106, A1108, A1109, A1110, A1112, A1113, A1115, A1116, A1117, A1120, A1123, A1125, A1127, A1131, A1133, A2117, A2130, A2132, A2136, A2139, A2141, A2142, A3120, A3121
	122		6B	Same as 121
	131		9B	A2130, A3121, A3122
	132		10B	Same as 131
	133		11B	A2130, A2135, A3121, A3122
	134		12B	Same as 133
	143		15B	A2133, A3123, A3124
	144		16B	Same as 143
	145		17B	A2117, A2133, A3123, A3124
	146		18B	Same as 145
	155		23B	A2133, A3124, A3125
	156		24B	Same as 155
	157		25B	A2117, A2133, A3124, A3125
	158		26B	Same as 157
	167		31B	A2137, A3126, A3127
	168		30B	Same as 167
	169		31B	A2117, A2137, A3126, A3127
	170		32B	Same as 169
	197		35B	A2137, A3125, A3127
	180		35A	Same as 179
	181		37A	A2117, A2137, A3125, A3127
	182		38A	Same as 181

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
587102	114		5A	A1112, A1113, A1114, A1115, A1117, A1125, A1127, A1130, A1131, A1133, A2106, A2108, A2109, A2117, A2120, A2124, A2126, A2127, A2129, A2130, A2142, A2144, A3109, A3110, A3111, A3112, A3120, A3126
	117		2B	A1133, A2106, A2108, A2109, A2120, A2124, A2126, A2127, A2130, A2135, A2136, A2139, A2141, A2142, A2144, A3107, A3120, A3126
	120		4B	A1117, A1128, A1142, A2107, A2108, A2109, A2117, A2120, A2124, A2126, A2127, A2130, A3120, A3121, A3126
	123		7B	A1110, A1112, A1114, A1116, A1117, A1121, A1125, A1128, A1131, A2106, A2108, A2109, A2117, A2120, A2124, A2126, A2130, A2136, A2139, A2141, A2142, A3107, A3108, A3121, A3127
	126		12A	A1110, A1113, A1116, A1117, A1121, A1125, A1133, A2106, A2109, A2120, A2124, A2126, A2130, A2135, A3121, A3127
	129		9A	A1113, A1116, A1117, A1125, A1127, A2106, A2108, A2109, A2117, A2120, A2124, A2126, A2130, A3121, A3122, A3127.
	132		10B	A2106, A2108, A2109, A2120, A2124, A2126, A2127, A2130, A2135, A2136, A2139, A2141, A3122, A3127
	135		13B	A2106, A2108, A2109, A2120, A2124, A2126, A2130, A3122, A2127
	138		18A	A2111, A2112, A2114, A2117, A2119, A2124, A2128, A2131, A2133, A3123
	139		17A	A2106
	141		15A	A1130, A2106, A2111, A2112, A2114, A2119, A2128, A2131, A2133, A3123
	144		16B	A1117, A1127, A1134, A2106, A2111, A2114, A2119, A2128, A2131, A2133, A2134, A3123, A3124
	147		19B	A2111, A2114, A2119, A2128, A2133, A2134, A3124
	150		24A	A2108, A2111, A2112, A2114, A2117, A2118, A2124, A2128, A2131, A2133, A3124
	153		21A	A2106, A2111, A2112, A2114, A2118, A2131, A2133, A3124, A3125
	156		24B	A2108, A2111, A2112, A2114, A2117, A2118, A2128, A2131, A2133, A3125
	159		27B	A2109, A2111, A2114, A2118, A2127, A2128, A2131, A2133, A3125
	162		31A	A1102, A1117, A2114, A2115, A2117, A2118, A2127, A2128, A2136, A2137, A2138, A2141, A3126
	165		28A	A2106, A2114, A2115, A2116, A2118, A2136, A2137, A2138, A3126

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc
587102 (Cont.)	168		30B	A2114, A2115, A2116, A2118, A2136, A2137, A2138, A3126, A3127
	171		33B	A2109, A2114, A2115, A2116, A2118, A2136, A2137, A2138, A3127
	174		37B	A1113, A1117, A1127, A2114, A2115, A2117, A2119, A2124, A2136, A2137, A2138, A2141, A3127
	177		34A	A2114, A2115, A2116, A2119, A2136, A2137, A2138, A3124, A3125, A3126, A3127
	180		35A	A2106, A2114, A2115, A2119, A2134, A2136, A2137, A3124. A3125, A3126, A3127
	183		39A	A2109, A2115, A2116, A2119, A2134, A2136, A2137, A2138. A2141, A3124, A3125, A3126, A3127
587103	115		4A	A1112, A1114, A1118, A1125, A1131, A1136, A2117, A2124, A2130, A2132, A2134, A2135, A2136, A2139, A2141, A2142, A2143, A3109, A3120
	119		3A	A1112, A1113, A2130, A3108, A3120
	123		7B	A1131, A2117, A2129, A2130, A2136, A2139, A2141, A2142, A3121
	127		11A	A2130, A3121
	131		9B	A2130, A2139, A2142, A3122
	135		13B	A2130, A3122
	139		17A	A2119, A2133, A3123
	143		15B	A2133, A3123
	147		19B	A2133, A3124
	151		23A	A2133, A2136, A2139, A3124
	155		23B	A2133, A3125
	159		27B	Same as 155
	163		30A	A2115, A2137, A3126
	167		29B	A2137, A3126
	171		33B	A2137, A3127
	175		36B	Same as 171
	179		35B	Same as 171
	183		39A	Same as 171
587104	120		4B	A1131, A2117, A2124, A2126, A2130, A2132, A2139, A2142, A3104, A3120, A3121
	121		5B	A2124, A2126, A2130, A3104, A3120, A3121
	132		10B	A2124, A2126, A2130, A2134, A2142, A3106, A3121, A3122

5-12. FAULT ISOLATION PROCEDURE. (cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
587104 (Cont.)	133		11B	A2124, A2126, A2130, A3121, A3122
	144		16B	A2128, A2133, A3106, A3123, A3124
	145		17B	A2128, A2133, A2134, A3123, A3124
	156		24B	A2128, A2131, A2133, A3105, A3124, A3125
	157		25B	A2124, A2128, A2131, A2133, A3124, A3125
	168		30B	A2136, A2137, A2138, A3105, A3126, A3127
	169		31B	A2136, A2137, A2138, A3126, A3127
	180		35A	A2134, A2136, A2137, A3120, A3127
	181		37A	A2134, A2136, A2137, A3105, A3127
587105	119		3A	A2106, A2130, A2133, A3120, A3121
	120		4B	Same as 119
	121		5B	A1108, A1112, A1113, A1117, A1120, A1123, A1127, A2108, A2109, A2130, A3120, A3121
	122		6B	Same as 121
	131		9B	A2117, A2130, A3121, A3122
	132		10B	Same as 131
	133		11B	A1120, A2109, A2130, A3121, A3122
	134		12B	Same as 133
	143		15B	A2117, A2133, A3123, A3124
	144		16B	Same as 143
	145		17B	A2114, A2133, A3123, A3124
	146		18B	Same as 145
	155		23B	A2114, A2133, A3124, A3125
	156		24B	Same as 155
	157		25B	Same as 155
	158		26B	Same as 155
	167		29B	A2114, A2137, A3126, A3127
	168		30B	Same as 167
	169		31B	Same as 167
	170		32B	Same as 167
	179		35B	A2114, A2137, A3125, A3127
	180		36A	Same as 179
	181		37A	Same as 179
	182		38A	Same as 179

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
587106	114		5A	A3120
	117		2B	A3120
	120		4B	A3120, A3121
	123		7B	A3121
	126		12A	A3121
	129		9A	A3121, A3122
	132		10B	A3122
	135		13B	A3122
	138		18A	A3123
	141		15A	A3123
	144		16B	A3123, A3124
	147		19B	A3124
	150		24A	A3124
	153		21A	A3124, A3125
	156		24B	A3125
	159		27B	A3125
	162		31A	A3126
	165		28A	A3126
	168		30B	A3126, A3127
	171		33B	A3127
	174		37B	A3127
	177		34A	A3126, A3127
	180		35A	A3126
	183		39A	A3126
587107	–			No voltage measurement required. Replace cards as specified in the Fault Isolation Flow Chart.
587108	118		2A	A3120
	121		5B	A1113, A2130, A3120, A3121
	133		11B	A2130, A3121, A3122
	145		17B	A2133, A3123, A3124
	157		25B	A2133, A3124, A3125
	169		31B	A2137, A3126, A3127
	181		37A	A2137, A3120, A3127

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
587109	120		4B	A1108, A1112, A1113, A1117, A1121, A1124, A1127, A1128, A1133, A2117, A3120, A3121
	121		5B	Same as 120
	144		16B	A1117, A2114, A3122, A3123, A3124
	145		17B	Same as 144
	156		24B	A1117, A2114, A3123, A3124
	157		25B	Same as 156
	180		35A	A1117, A2109, A2114, A3124, A3127
	181		37A	Same as 180
587110	115		4A	A2106, A2108, A2109, A2117, A2120, A2124, A2126, A2129, A2130, A2142, A2143, A3120, A3121
	116		3B	Same as 115
	117		2B	Same as 115
	127		11A	A2106, A2108, A2109, A2117, A2120, A2124, A2126, A2129, A2130, A2131, A2134, A2135, A2138, A2139, A2141, A3121, A3122
	128		10A	Same as 127
	129		9A	Same as 127
	139		17A	A2106, A2111, A2112, A2114, A2117, A2119, A2128, A2131, A2132, A2133, A2134, A2138, A2141, A3123, A3124
	140		16A	Same as 139
	141		15A	Same as 139
	151		23A	A2106, A2111, A2112, A2114, A2117, A2118, A2124, A2128, A2129, A2131, A2133, A2134, A2141, A3124, A3125
	152		22A	Same as 151
	153		21A	Same as 151
	163		30A	A2106, A2114, A2115, A2116, A2118, A2132, A2135, A2136, A2137, A2138, A2141, A2143, A3126, A3127
	164		29A	Same as 163
	165		28A	Same as 163
	180		35A	A2137, A3120, A3127
	181		37A	Same as 180
587117	113		6A	A2108, A2130, A3120
	115		4A	A1114, A1115, A1118, A1131, A2109, A2130, A3120
	117		2B	A3120, A3120
	119		3A	A2130, A3120

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
587117 (Cont.)	120		4B	A2130, A3121
	122		6B	A2130, A3121
	125		13A	A2130, A3121
	127		11A	A2130, A3121
	129		9A	A2130, A3122
	130		8B	A2130, A3122
	132		10B	A2130, A3122
	134		12B	A2130, A3122
	137		19A	A2133, A3123
	139		17A	A2133, A3123
	141		15A	A2133, A3123
	142		14B	A2133, A3123
	144		16B	A2133, A3124
	146		18B	A2133, A3124
	149		25A	A2133, A3124
	151		23A	A2133, A3124
	153		21A	A2133, A3125
	154		22B	A2133, A3125
	156		24B	A2133, A3125
	158		26B	A2133, A3125
	161		32A	A2137, A3126
	163		30A	A2137, A3126
	165		28A	A2137, A3126
	166		28B	A2137, A3126
	168		30B	A2137, A3127
	170		32B	A2137, A3127
	173		38B	A2119, A2134, A2137, A3127
	175		36B	A2115, A2116, A2119, A2132, A2137, A3127
	176		36A	A2115, A2116, A2119, A2134, A2136, A2137, A3127
	177		34A	A2106, A2114, A2115, A2119, A2134, A2136, A2137, A3127
	178		34B	A2114, A2115, A2119, A2132, A2134, A2136, A2137, A3127
	182		38A	A2134, A2137, A3127

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
587124	112		7A	A2130, A3120
	117		2B	A2130, A3120
	124		14A	A2130, A3121, A3122
	129		9A	A2130, A3121, A3122
	136		20A	A2133, A3123
	141		15A	A2133, A3123
	148		21A	A2133, A3124, A3125
	153		26A	A2133, A3124, A3125
10281576, 149576	112		7A	A1107, A1126, A1142, A3120, A3121
	124		14A	A3121, A3122
	136		20A	A3123, A3124
	148		26A	A3124, A3125
	160		33A	A3126, A3127
	183		39A	A3125, A3127
10281601	118		2A	A3120, A3121, A3122
	119		3A	A3120, A3121, A3122
	123		7B	A3120, A3121, A3122
	127		11A	A3121, A3122, A3123
	128		10A	A3121, A3122, A3123
	129		9A	A3120, A3121, A3122
	130		8B	A3120, A3121, A3122
	138		18A	A3123, A3124, A3125
	139		17A	A3123, A3124, A3125
	140		16A	A3121, A3122, A3123
	142		14B	A3121, A3122, A3123
	143		15B	A3121, A3122, A3123
	150		24A	A3123, A3124, A3125
	151		23A	A3123, A3124, A3125
	155		23B	A3123, A3124, A3125
	162		31A	A3124, A3125, A3126, A3127
	169		31B	A3124, A3125, A3126, A3127
	182		38A	A3125, A3126, A3127

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc
10281602, 149512	112		7A	A3120, A3121, A3122
	113		6A	A3120, A3121, A3122
	114		5A	A3120, A3121, A3122
	115		4A	A3120, A3121, A3122
	120		4B	A3120, A3121, A3122
	121		5B	A3120, A3121, A3122
	122		6B	A3120, A3121, A3122
	123		7B	A3120, A3121, A3122
	124		14A	A3121, A3122, A3123
	125		13A	A3121, A3122, A3123
	126		12A	A3121, A3122, A3123
	129		9A	A3120, A3121, A3122
	130		8B	A3120, A3121, A3122
	133		11B	A3121, A3122, A3123
	134		12B	A3121, A3122, A3123
	135		13B	A3121, A3122, A3123
	136		20A	A1108, A1112, A1113, A1117, A1118, A1120, A1122, A1123, A1124, A1127, A2114, A3123, A3124, A3125
	137		19A	Same as 136
	138		18A	Same as 136
	140		16A	A3121, A3122, A3123
	141		15A	A3121, A3122, A3123
	142		14B	A3121, A3122, A3123
	143		15B	A3121, A3122, A3123
	148		26A	A2114, A3124, A3125, A3126, A3127
	153		21A	A1108, A1112, A1113, A1117, A1118, A1120, A1122, A1123, A1124, A1127, A2114, A3123, A3124, A3125
	164		29A	A2114, A3124, A3125, A3126, A3127
	165		28A	Same as 164
	166		28B	Same as 164
	176		36A	A2114, A3125, A3126, A3127
	177		34A	Same as 176
	180		35A	Same as 176
	181		37A	Same as 176

5-12. FAULT ISOLATION PROCEDURE. (cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
10281603, 149513	118		2A	A1131, A2106, A2108, A2109, A2117, A2120, A2124, A2126, A2129, A2130, A2131, A2136, A2139, A2143, A3107, A3120, A3121, A3122
	119		3A	Same as 118
	127		11A	A2106, A2109, A2117, A2120, A2124, A2128, A2129, A2130, A2133, A2134, A2135, A3121, A3122, A3123
	128		10A	Same as 127
	138		18A	A2111, A2112, A2114, A2117, A2118, A2119, A2128, A2131, A2132, A2133, A2134, A2142, A3104, A3123, A3124, A3125
	139		17A	Same as 138
	147		19B	A3124
	159		27B	A2109, A2111, A2112, A2114, A2115, A2117, A2118, A2127, A2128, A2129, A2131, A2133, A2135, A2138, A3105, A3124, A3125, A3126, A3127
	162		31A	Same as 159
	165		28A	Same as 159
	169		31B	Same as 159
	173		38B	A2109, A2114, A2115, A2117, A2118, A2119, A2128, A2132, A2134, A2135, A2136, A2137, A2138, A3121, A3124, A3126, A3127
	174		37B	Same as 173
	176		36A	Same as 173
	178		34B	Same as 173
10281606, 149516	112		7A	A1108, A1112, A1113, A1117, A1120, A1123, A1128, A2117, A3120, A3121
	114		5A	Same as 112
	121		5B	Same as 112
	123		7B	Same as 112
	124		14A	A1117, A1127, A2109, A3121, A3122
	126		12A	Same as 124
	133		11B	Same as 124
	135		13B	Same as 124
	136		20A	A2114, A3123, A3124
	138		18A	A2114, A3123, A3124
	145		17B	A2114, A3123, A3124
	147		19B	A2114, A3123, A3124
	148		26A	A2114, A3124, A3125
	150		24A	A2114, A3124, A3125

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
10281606, 149516 (Cont.)	157		25B	A2114, A3124, A3125
	159		27B	A2114, A3124, A3125
	160		33A	A2114, A3126, A3127
	162		31A	A2114, A3126, A3127
	169		31B	A2114, A3126, A3127
	171		33B	A2114, A3126, A3127
	172		39B	A2114, A3125, A3127
	174		37B	A2114, A3125, A3127
	181		37A	A2114, A3125, A3127
	183		39A	A2114, A3125, A3127
10281609	113		6A	A3120
	116		3B	A1121, A1125, A1133, A2131, A2138, A2139, A3120, A3121, A3122
	119		3A	Same as 116
	122		6B	Same as 116
	126		12A	Same as 116
	127			A3121, A3122, A3123, A3124
	130			A1121, A1125, A1133, A2131, A2138, A2139, A3120, A3121, A3122
	132		10B	A3121, A3122, A3123, A3124
	135		13B	A3121, A3122, A3123, A3124
	137		19A	A3121, A3122, A3123, A3124
	138		18A	A2134, A3123, A3124, A3125, A3126
	140		16A	A3121, A3122, A3123, A3124
	145		17B	A2134, A3123, A3124, A3125, A3126
	149		25A	A3124, A3125, A3126, A3127
	150		24A	A2134, A3123, A3124, A3125, A3126
	154		22B	A2134, A3123, A3124, A3125, A3126
	158		26B	A3124, A3125, A3126, A3127
	160		33A	A3126, A3127
	162		31A	A3124, A3125, A3126, A3127
	167		29B	A3124, A3125, A3126, A3127
	171		33B	A3126, A3127
	175		36B	A3126, A3127
	177		34A	A2134, A3123, A3124, A3125, A3126
	182		38A	A3126, A3127

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc
10281610	113		6A	A3120, A3121
	123		7B	A3120, A3121
	125		13A	A3121, A3122
	135		13B	A3121, A3122
	137		19A	A3123, A3124
	147		19B	A3123, A3124
	149		25A	A2118, A3124, A3125
	159		27B	A2118, A3124, A3125
	161		32A	A3126, A3127
	171		33B	A3126, A3127
	172		39B	A3126, A3127
	182		38A	A3126, A3127
10281629	120		4B	A3120, A3121, A3122, A3123, A3124
	121		5B	Same as 120
	122		6B	Same as 120
	130		8B	Same as 120
	134		12B	Same as 120
	136		20A	Same as 120
	138		18A	Same as 120
	139		17A	Same as 120
	141		15A	Same as 120
	142		14B	Same as 120
	144		16B	Same as 120
	147		19B	Same as 120
	158		26B	A3124, A3125, A3126, A3127
	160		33A	Same as 158
	161		32A	Same as 158
	162		31A	Same as 158
	169		31B	Same as 158
	170		32B	Same as 158
	171		33B	Same as 158
	173		38B	Same as 158
	175		36B	Same as 158
	177		34A	Same as 158

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
10281629 (Cont.)	179		35B	Same as 158
	183		39A	Same as 158
10281636	113		6A	A1104, A1105, A1110, A1116, A1117, A1118, A1119, A1120, A1121, A1122, A1125, A1133, A2109, A2117, A2135, A2144, A3120, A3121, A3122
	121		5B	Same as 113
	123		7B	Same as 113
	124		14A	Same as 113
	125		13A	Same as 113
	127		11A	Same as 113
	128		10A	Same as 113
	132		10B	Same as 113
10281637	114		5A	A1116, A1117, A1119, A1122, A1125, A1140, A2109, A2117, A3120, A3121, A3122, A3123
	121		5B	Same as 114
	129		9A	Same as 114
	131		9B	Same as 114
10281638	112		7A	A1116, A1119, A1122, A1125, A1131, A1133, A1136, A3126, A3127
	113		6A	Same as 112
	114		5A	Same as 112
	115		7A	Same as 112
	120		4B	Same as 112
	121		5B	Same as 112
	123		7B	Same as 112
10281641	112		7A	A1119, A1120, A1121, A1122, A1125, A1127, A1134, A1140, A3120, A3121, A3122, A3123
	113		6A	Same as 112
	114		5A	Same as 112
	115		4A	Same as 112
	116		3B	Same as 112
	117		2B	Same as 112
	118		2A	Same as 112
	119		3A	Same as 112
	120		4B	Same as 112
	121		5B	Same as 112

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
10281641 (Cont.)	122		6B	Same as 112
	123		7B	Same as 112
	125		13A	Same as 112
	128		10A	Same as 112
	129		9A	Same as 112
	130		8B	Same as 112
	132		10B	Same as 112
	141		15A	Same as 112
10281642	112		7A	A1117, A1120, A1121, A1123, A1124, A1125, A1127, A1131, A1133, A2131, A2134, A2136, A3120, A3121, A3122, A3123, A3124, A3125
	115		4A	Same as 112
	116		3B	Same as 112
	118		2A	Same as 112
	121		5B	Same as 112
	122		6B	Same as 112
	129		9A	Same as 112
	130		8B	Same as 112
	131		9B	Same as 112
	134		12B	Same as 112
	135		13B	Same as 112
	136		20A	Same as 112
	137		19A	Same as 112
	138		18A	Same as 112
	139		17A	Same as 112
	140		16A	Same as 112
	141		15A	Same as 112
	142		14B	Same as 112
	144		16B	Same as 112
	145		17B	Same as 112
	146		18B	Same as 112
	147		19B	Same as 112
	148		26A	Same as 112
	150		24A	Same as 112

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
10281642 (Cont.)	152		22A	Same as 112
	154		22B	Same as 112
	155		23B	Same as 112
10281643	114		5A	A1120, A1123, A3120, A3121, A3122, A3123, A3124, A3125, A3126
	120		4B	Same as 114
	135		13B	Same as 114
	136		20A	Same as 114
	137		19A	Same as 114
	138		18A	Same as 114
	139		17A	Same as 114
	140		16A	Same as 114
	144		16B	Same as 114
	145		17B	Same as 114
	146		18B	Same as 114
	147		19B	Same as 114
	149		25A	Same as 114
	151		23A	Same as 114
	152		22A	Same as 114
	154		22B	Same as 114
	160		33A	Same as 114
	161		32A	Same as 114
10281652	112		7A	A1112, A1113, A1120, A1123, A1128, A2117, A3120, A3121
	123		7B	Same as 112
	124		14A	A1117, A1127, A2106, A3121, A3122
	135		13B	Same as 124
	136		20A	A2106, A3123, A3124
	147		19B	A2106, A3123, A3124
	148		26A	A2106, A3124, A3125
	159		27B	A2106, A3124, A3125
	160		33A	A2106, A3126, A3127
	171		33B	A2106, A3126, A3127
	172		39B	A2106, A3125, A3127
	183		39A	A2106, A3125, A3127

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 FAULT ISOLATION TABLE [4] (Cont.)

Card type	Measure voltage at J7 pin	or	Card test point	Cards to replace if measurement is not 4.5V ± 1.0 Vdc.
10281780, 149580	112		7A	A2117, A2124, A2130, A3120
	115		4A	A2124, A2126, A2130, A2132, A2133, A2139, A2142, A3120
	120		4B	A2130, A3120, A3121
	123		7B	A2130, A3121
	124		14A	A2130, A2136, A2139, A2141, A3121
	127		11A	A2142, A2126, A2130, A3122
	132		10B	A2130, A2138, A3122
	135		13B	A2130, A3122
	136		20A	A2133, A3123
	139		17A	A2131, A2133, A3123
	144		16B	A2133, A3123, A3124
	147		19B	A2117, A2133, A3124
	148		26A	A2133, A3124
	151		23A	A2128, A2131, A2133, A3124
	156		24B	A2131, A2133, A3125
	159		27B	A2133, A3125
	160		33A	A2137, A3126, A3127
	163		30A	A2128, A2137, A2138, A3126
	168		30B	A2137, A3126, A3127
	171		33B	A2137, A3127
	172		39B	A2114, A2115, A2119, A2137, A3127
	175		36B	A2136, A2137, A2138, A3127
	176		36A	A2134, A2136, A2137, A3127
	183		39A	A2109, A2115, A2119, A2132, A2134, A2136, A2137, A3127

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 NO TEST ERROR FAULT ISOLATION TABLE [5]

If the voltage measurements of Table [4] do not identify the faulty card, use this table to replace cards according to the indications on the front panel of MTS.

Card type	Cards to replace for FUNCTIONAL INPUT ERROR and/or FUNCTIONAL OUTPUT ERROR indicators that are on					
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
587101	A3107	A3109	A3111	A3113	A3115	A3117
	A3108	A3110	A3112	A3114	A3116	A3118
587102	A3104	A3104	A3104	A3105	A3105	A3105
	A3106	A3109	A3111	A3113	A3115	A3117
	A3107	A3110	A3112	A3114	A3116	A3118
	A3108					
587103	A3107	A3109	A3111	A3113	A3115	A3117
	A3108	A3110	A3112	A3114	A3116	A3118
587104	Same as 587103					
587105	Same as 587103					
587106	Same as 587103					
587107	A1110	A1110	N/A	N/A	N/A	N/A
	A1116	A1116				
	A1121	A1121				
	A1125	A1125				
		A1126				
	A1126	A1134				
	A1135	A1135				
	A1141	A1141				
	A1142	A1142				
	A2117	A2106				
		A2132				
	A2134	A2134				
	A2142	A2135				
		A2139				
	A3108	A2142				
	A3120	A3109				
	A3121	A3120				
		A3122				
587108	A3107	A3109	A3111	A3113	A3115	A3117
	A3108	A3110	A3112	A3114	A3116	A3118

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 NO TEST ERROR FAULT ISOLATION TABLE 5 (Cont.)

Card type	Cards to replace for FUNCTIONAL INPUT ERROR and/or FUNCTIONAL OUTPUT ERROR indicators that are on					
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
587109	A3107	N/A	A3111	A3113	N/A	A3117
	A3108		A3112	A3114		A3118
587110	A3107	A3109	A3111	A3113	A3115	A3117
	A3108	A3110	A3112	A3114	A3116	A3118
587117	Same as 587110					
587124	A3107	A3109	A3111	A3113	N/A	N/A
	A3108	A3110	A3112	A3114		
10281576, 149576	A3107	A3109	A3111	A3113	A3115	A3117
	A3108	A3110	A3112	A3114	A3116	A3118
10281601	A3107	A3109	A3111	A3113	A3115	N/A
	A3108	A3110	A3112	A3114	A3116	
	A3109	A3111	A3113	A3115	A3117	
			A3114	A3116	A3118	
10281602, 149512	Same as 10281601					
10281603, 149513	Same as 10281601					
10281606, 149516	A3107	A3109	A3111	A3113	A3115	A3117
	A3108	A3110	A3112	A3114	A3116	A3118
10281609	A3107	A3109	A3111	A3113	A3115	N/A
	A3108	A3110	A3112	A3114	A3116	
	A3109	A3111	A3113	A3115	A3117	
		A3112	A3114	A3116	A3118	
10281610	A3107	A3109	A3111	A3113	A3115	A3117
	A3108	A3110	A3112	A3114	A3116	A3118
		A3111	A3113			
10281629	A3107	A3109	A3111	A3113	A3115	A3117
	A3108	A3110	A3112	A3114	A3116	A3118
	A3109	A3111	A3113	A3115	A3117	
10281636	A3107	A3109	A3111	N/A	N/A	N/A
	A3108	A3110				
	A3109	A3111				
10281637	A3107	A3109	A3111	N/A	N/A	N/A
	A3108	A3110	A3112			
10281638	A3107	A3109	A3111	N/A	N/A	N/A
	A3108	A3110				

5-12. FAULT ISOLATION PROCEDURE. (Cont.)

FAULT CONDITION 3 NO TEST ERROR FAULT ISOLATION TABLE [5] (Cont.)

Card type	Cards to replace for FUNCTIONAL INPUT ERROR and/or FUNCTIONAL OUTPUT ERROR indicators that are on					
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
10281641	A3107	A3109	A3111	N/A	N/A	N/A
	A3108	A3110	A3112			
10281642	A3107	A3109	A3111	A3113	N/A	N/A
	A3108	A3110	A3112	A3114		
10281643	A3107	A3109	A3111	A3113	A3115	N/A
	A3108	A3110	A3112	A3114	A3116	
10281652	A3107	A3109	A3111	A3113	A3115	A3117
	A3108	A3110	A3112	A3114	A3116	A3118
10281780, 149580	Same as 10281652					

5-13. REMOVAL/REPLACEMENT OF LRU.

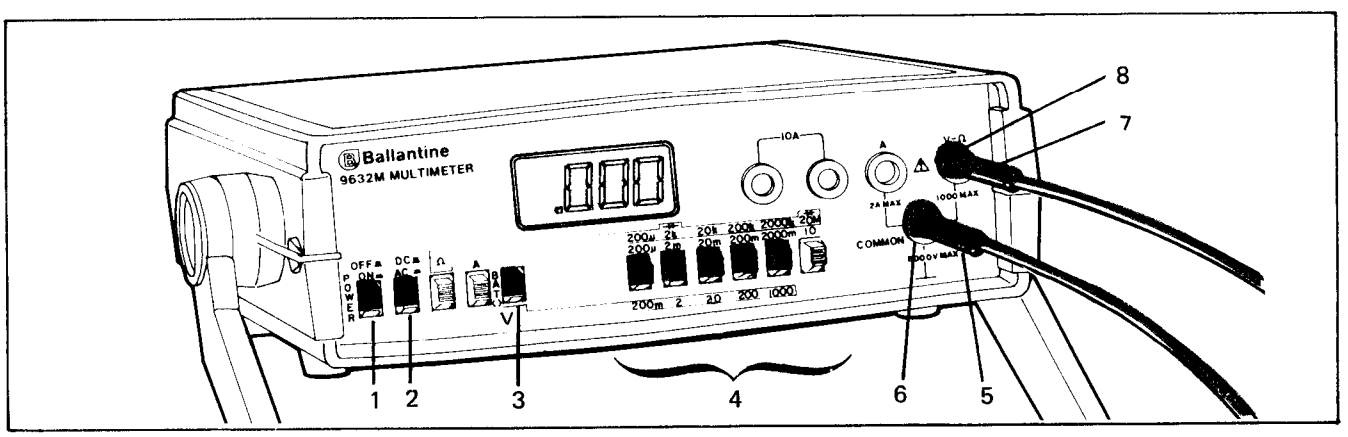
Refer to paragraphs 5-20 through 5-25 for removal or replacement of LRUs (Least Replaceable Units).

5-14. VERIFICATION THAT MALFUNCTION HAS BEEN REMOVED.

Rerun the test. If the rerun test passes, the fault has been corrected.

5-15. MEASUREMENT OF VOLTAGE AT PINS OF J7 CONNECTOR.

a. Set up multimeter (AN/USM-451).



Press POWER ON pushbutton (1) in.

Check that DC pushbutton (2) is out.

Press V pushbutton (3) in.

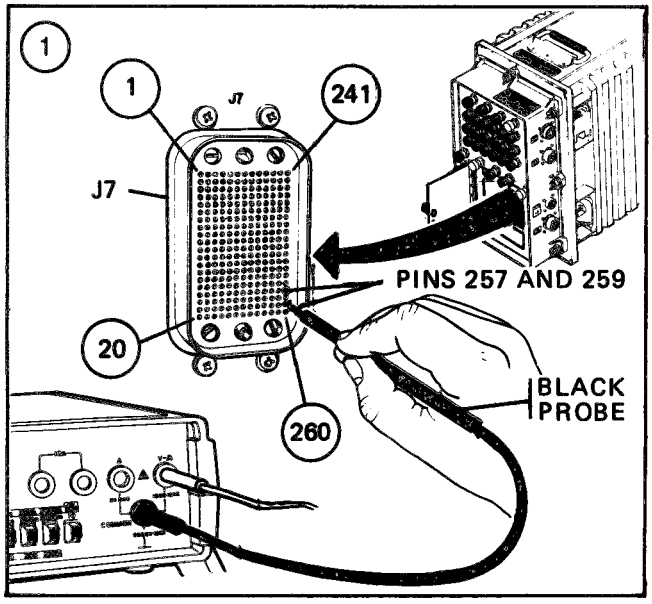
Press in appropriate range pushbutton (4).

Insert black plug (5) into COMMON jack (6) on multimeter.

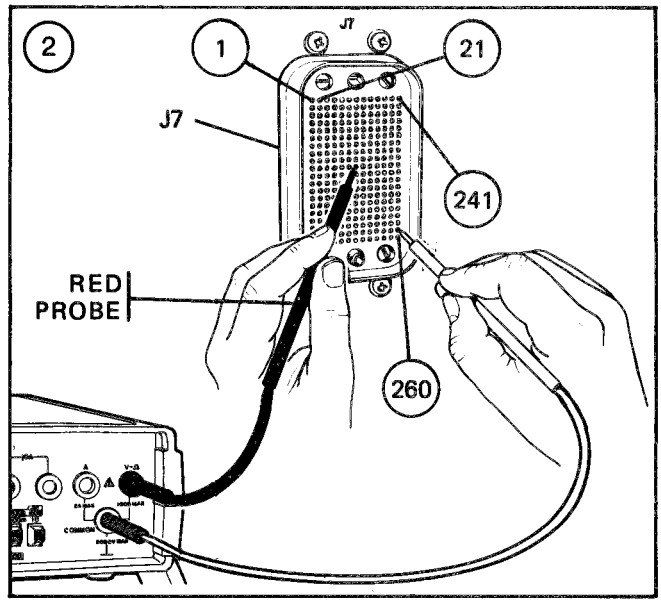
Insert red plug (7) into V jack (8) on multimeter.

5-15. MEASUREMENT OF VOLTAGE AT PINS OF J7 CONNECTOR. (Cont.)

b. Attach meter probes to pins on J7 connector.

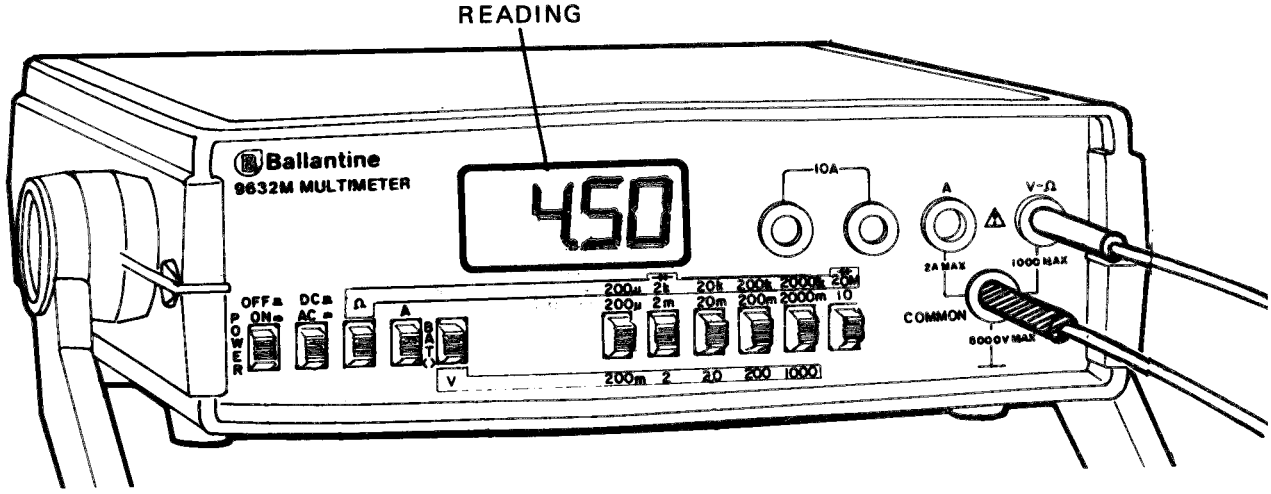


Ground multimeter by attaching black probe to pin 257 or pin 259 on J7 connector.



Measure voltage by attaching red probe to designated pin on J7 connector.

c. Observe reading on multimeter.



d. Remove probes from J7 pins.

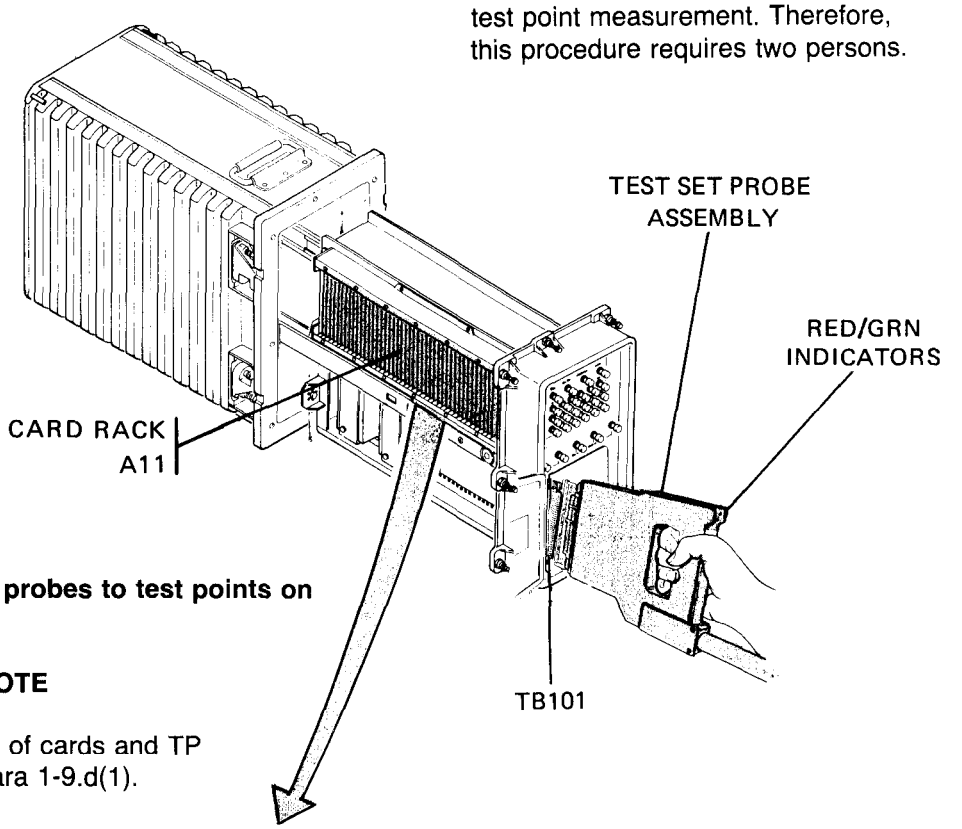
5-16. MEASUREMENT OF VOLTAGE AT TEST POINTS ON CIRCUIT CARDS.

a. Set up multimeter (AN/USM-451) as in paragraph 5-15.a.

b. Extend MTS (para 5-21).

NOTE

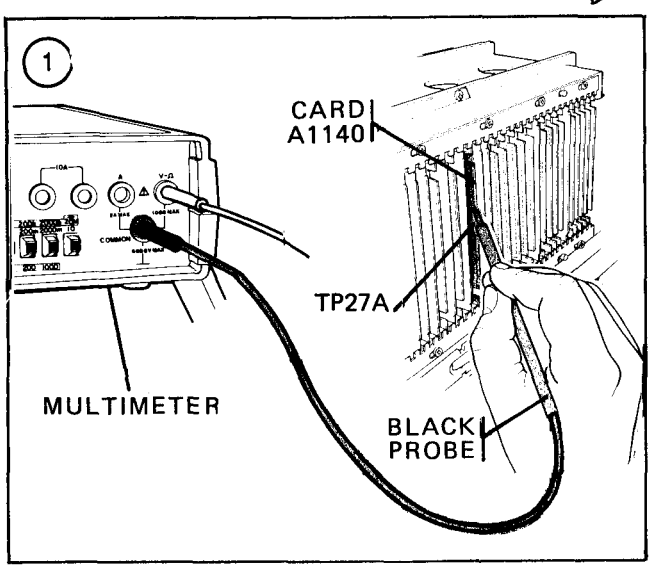
Test set probe assembly W209 must be held in self-test position during test point measurement. Therefore, this procedure requires two persons.



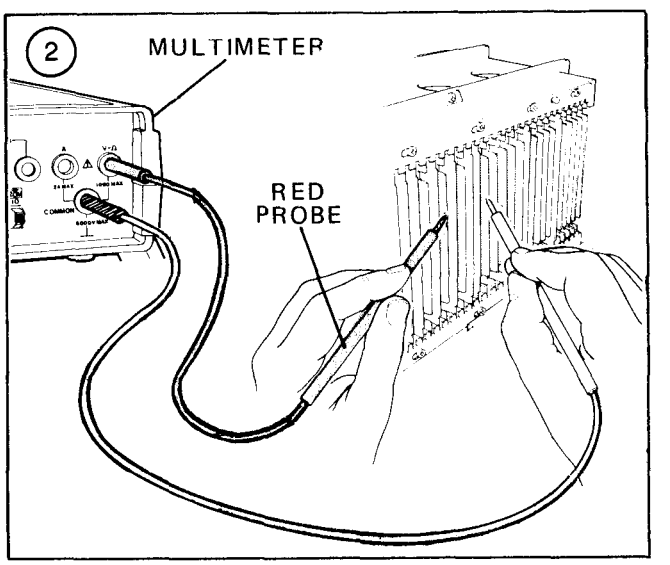
c. Attach multimeter probes to test points on circuit card.

NOTE

For description of cards and TP location see para 1-9.d(1).



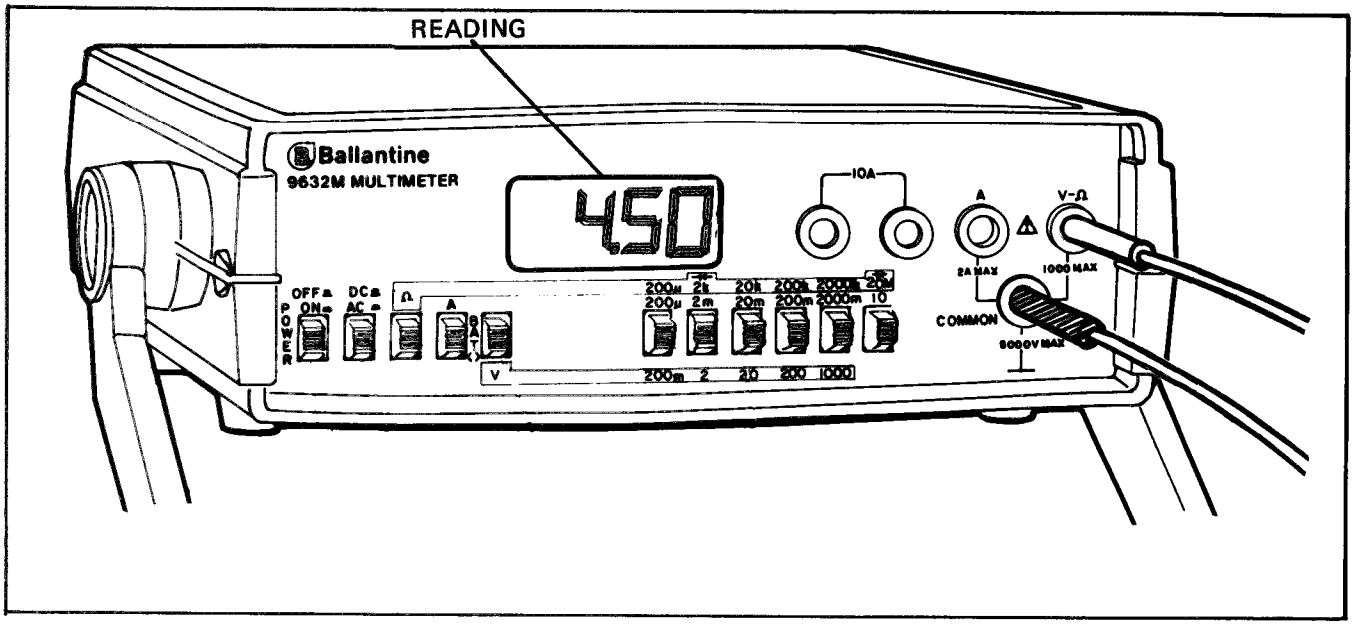
Ground multimeter by attaching black probe to test point 27A on card A1140.



Measure voltage by attaching red probe on multimeter to designated test point(s).

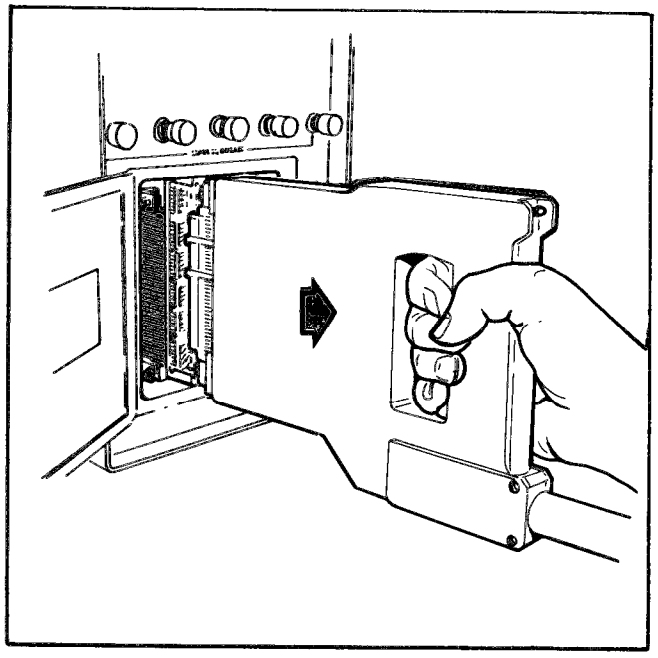
5-16. MEASUREMENT OF VOLTAGE AT TEST POINTS ON CIRCUIT CARDS. (Cont.)

d. Observe reading on multimeter.



e. Remove probes from test points.

f. Remove probe assembly (W209) from TB101.



g. Retract MTS (para 5-21).

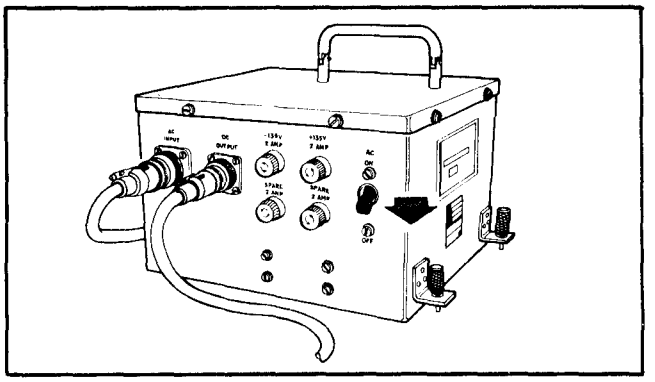
5-17. MEASUREMENT OF VOLTAGE ACROSS PINS OF DC POWER CABLE.

a. Set up multimeter (AN/USM-451) as in paragraph 5-15.a.

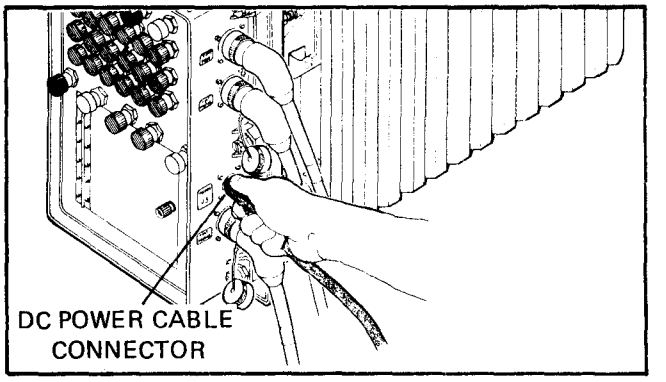
WARNING

Be sure power is off. The voltage between pins on dc power cable can cause personal injury.

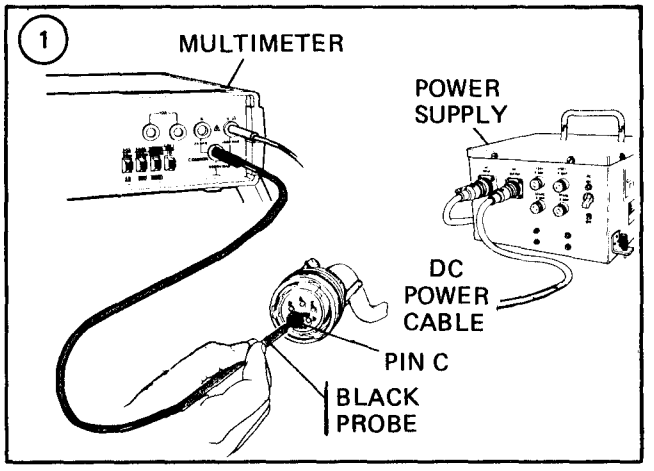
b. Turn off power supply.



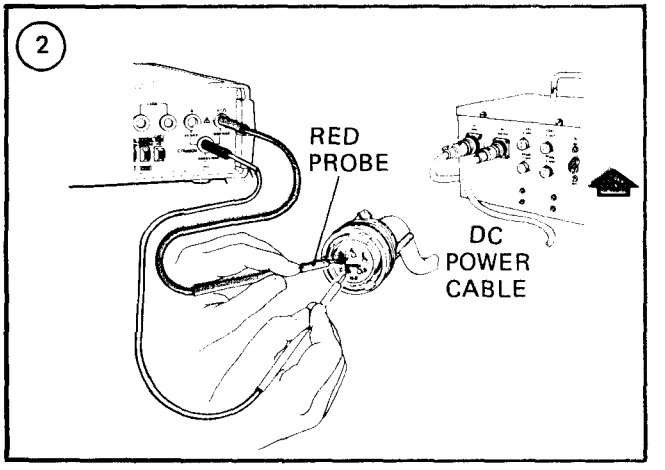
c. Disconnect dc power cable from MTS.



d. Attach multimeter probes to pins of dc power cable.



Ground multimeter by attaching black probe to pin C (common) of dc power cable.

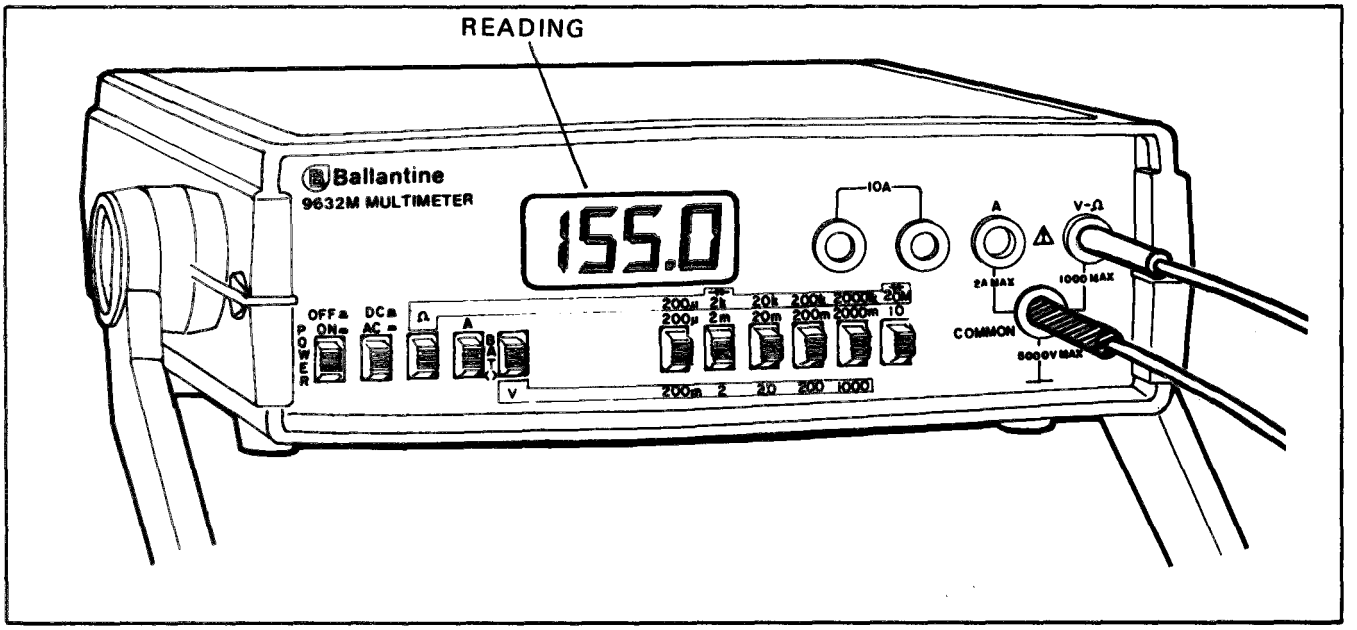


Turn on power.

Measure voltage by attaching red probe to designated pin on dc power cable.

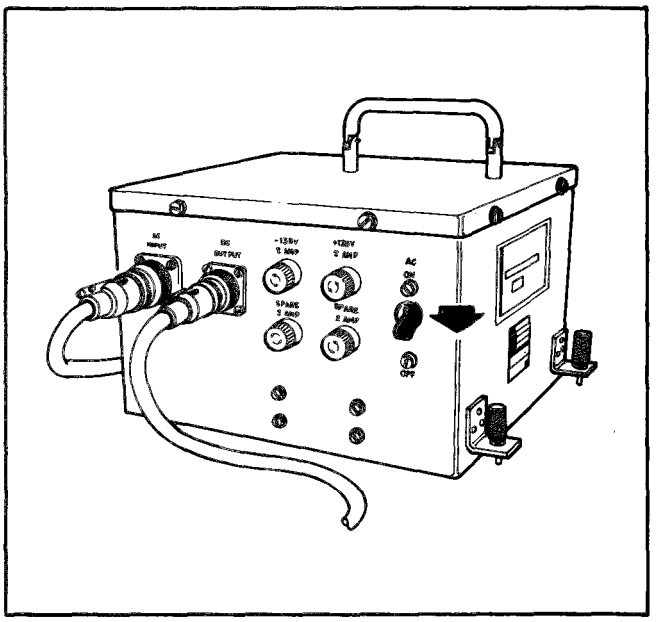
5-17. MEASUREMENT OF VOLTAGE ACROSS PINS OF DC POWER CABLE. (Cont.)

e. Observe reading on multimeter.

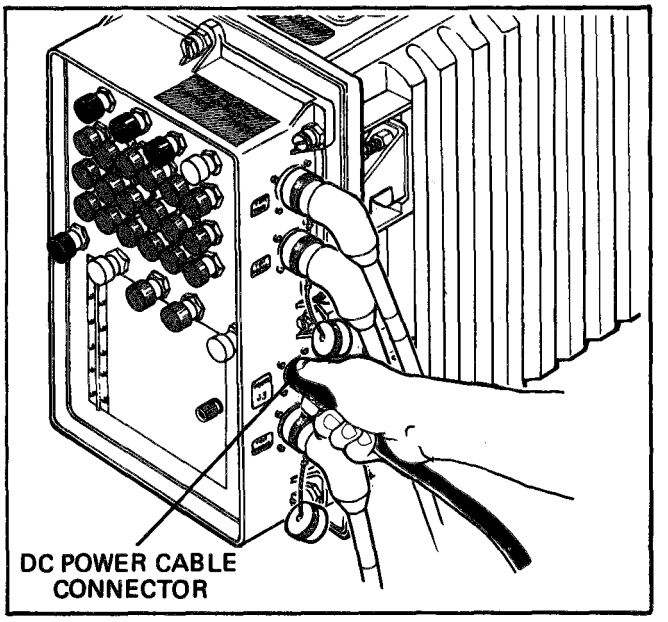


f. Remove probes from dc power cable pins.

g. Turn off power to power supply.



h. Reconnect dc power cable to MTS.

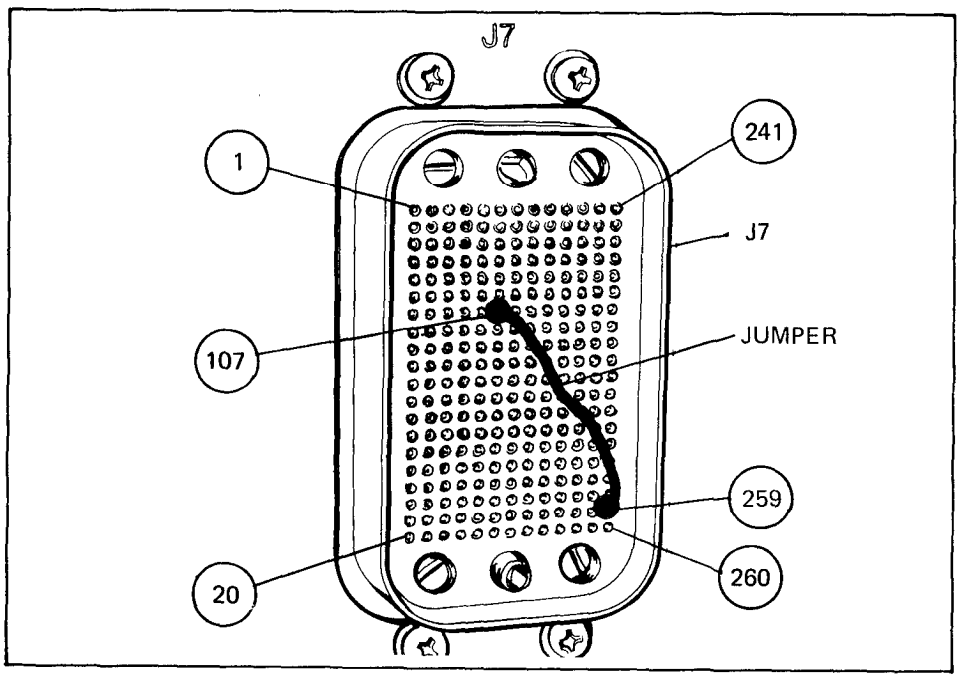


5-18. CONNECTION OF JUMPER BETWEEN PINS ON J7 CONNECTOR.

NOTE

This procedure causes the MTS to stop on the first error detected.

a. Connect jumper to J7 pins.



Attach jumper to pins 107 and 259 on J7 connector.

b. Remove jumper from J7 pins.

Section IV. MAINTENANCE PROCEDURES

5-19. INTRODUCTION.

This section contains the removal and replacement procedures done by organizational maintenance. (Refer to Maintenance Allocation Chart (MAC) in Appendix B.)

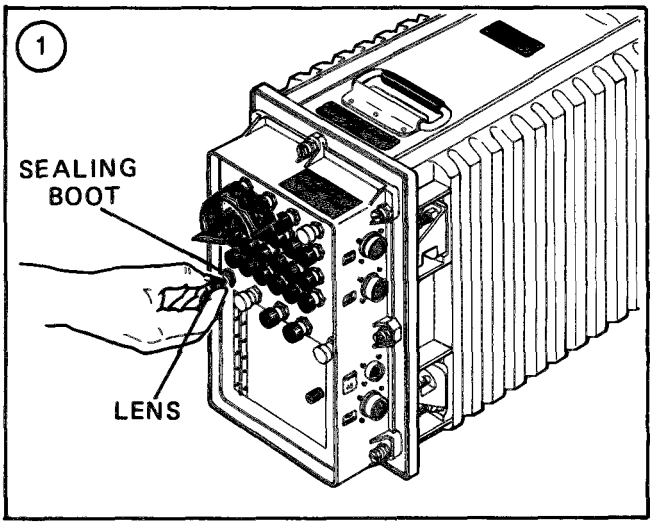
WARNING

High voltage is used in the MTS. Death on contact may result if personnel fail to observe safety precautions.

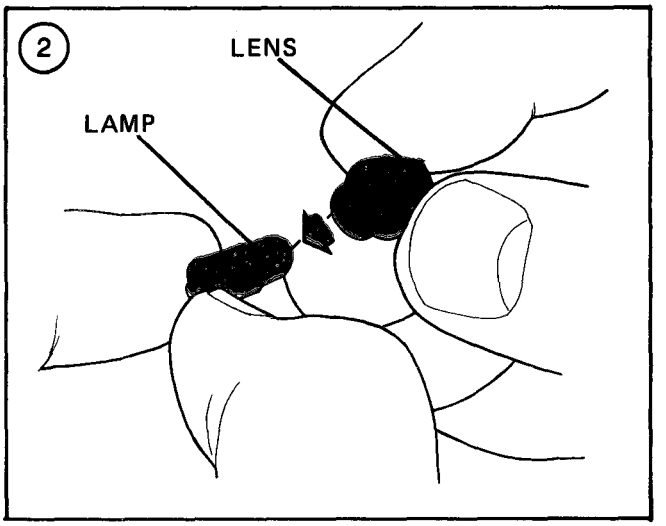
Before working on the MTS, turn off power and ground points of high potential before touching them.

5-20. INDICATOR LAMP REMOVAL AND REPLACEMENT.

a. Remove indicator lamp.

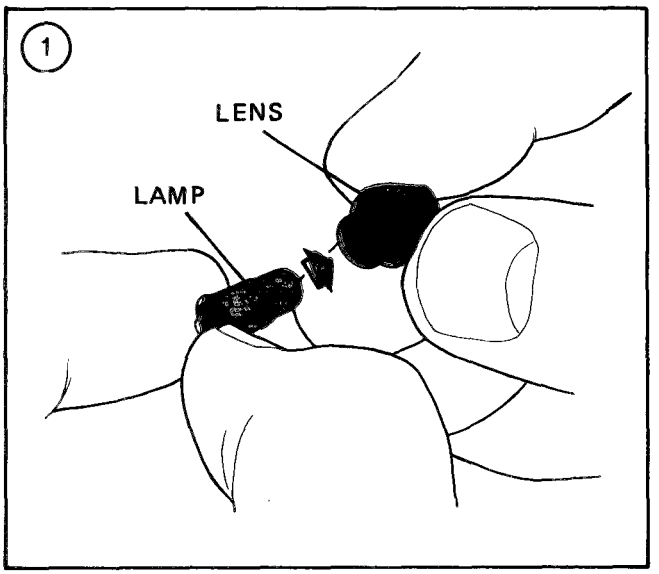


Unscrew lens from sealing boot.

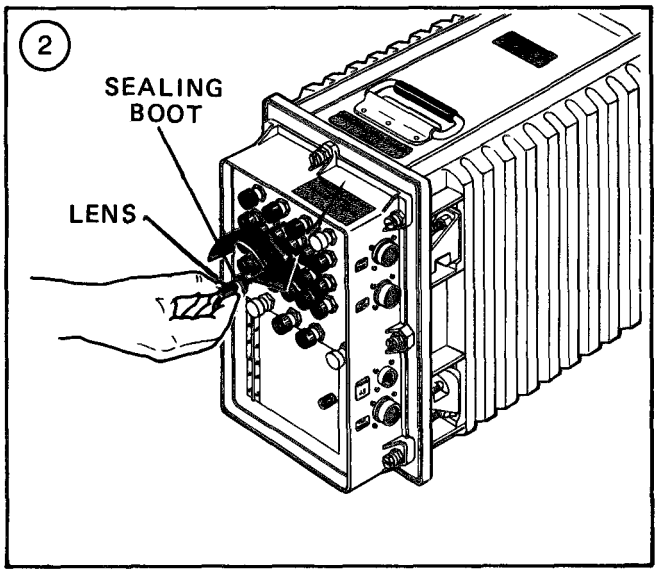


Withdraw indicator lamp from rear of lens.

b. Replace indicator lamp.



Insert new lamp into rear of lens.



Screw lens into sealing boot.

5-21. MTS COMPONENT ACCESS.

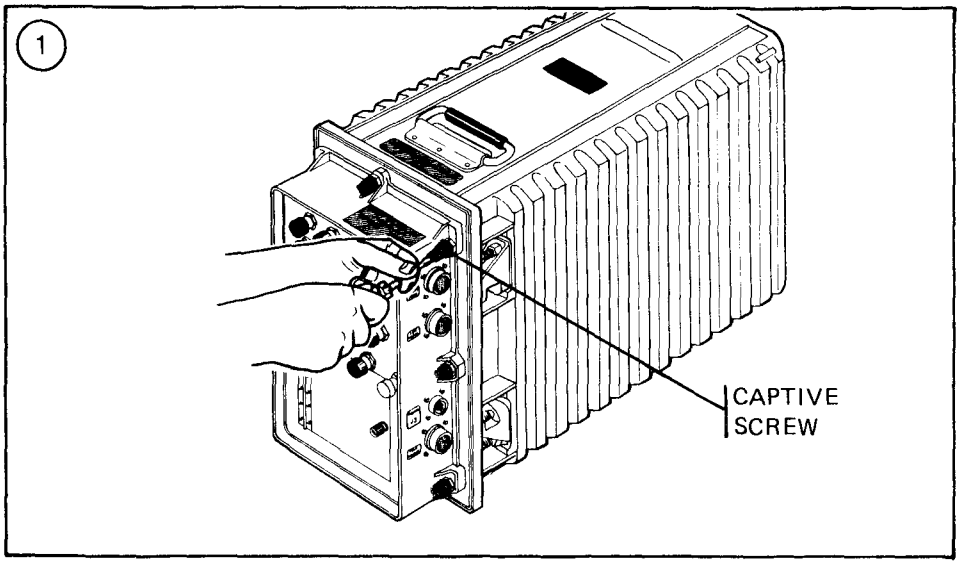
WARNING

Be sure power is off.

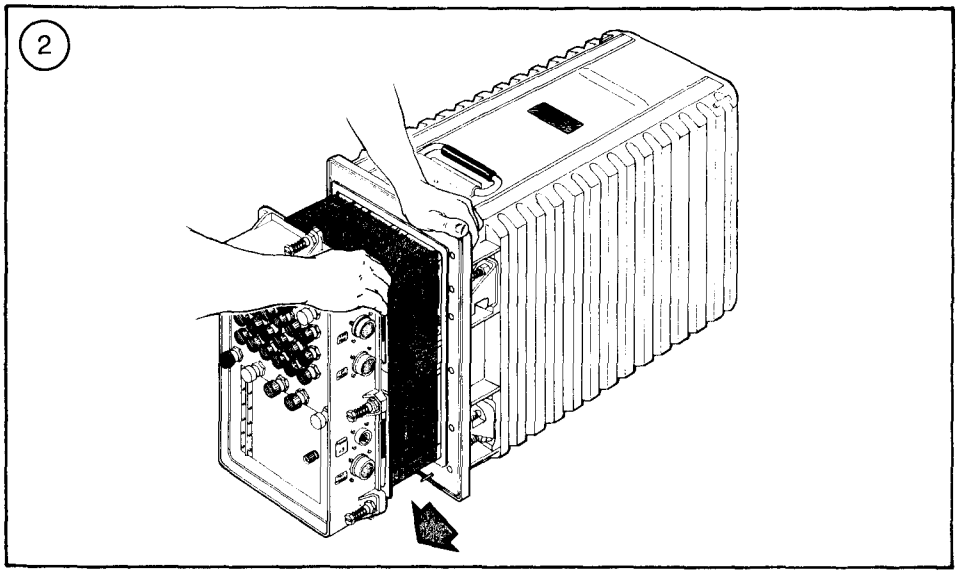
WARNING

Always provide support for both the MTS and its case when extending the MTS. (Extending the MTS causes an unbalanced condition and the assembly may tip forward.)

a. Extend MTS.



Release 8 captive screws on front panel.



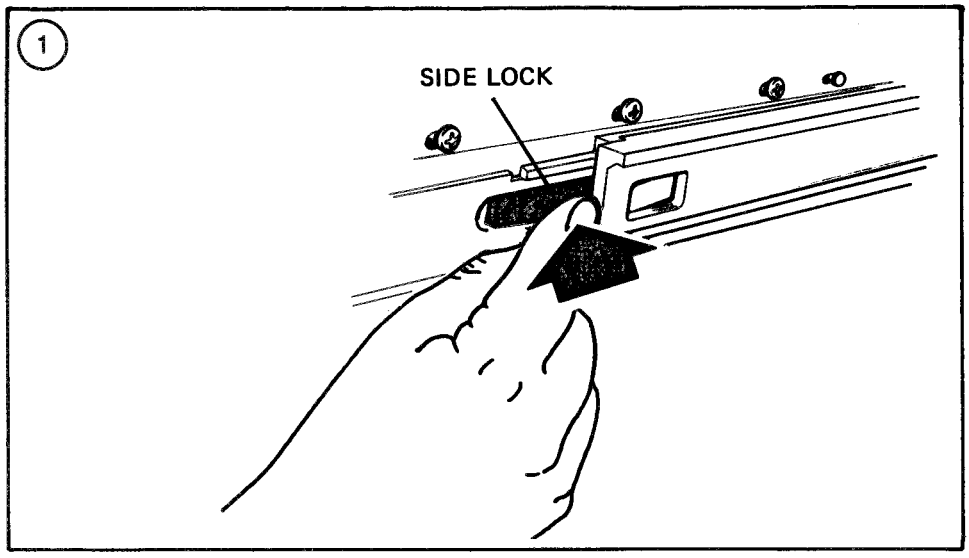
Slowly slide frame out of case until side locks engage.

5-21. MTS COMPONENT ACCESS. (Cont.)

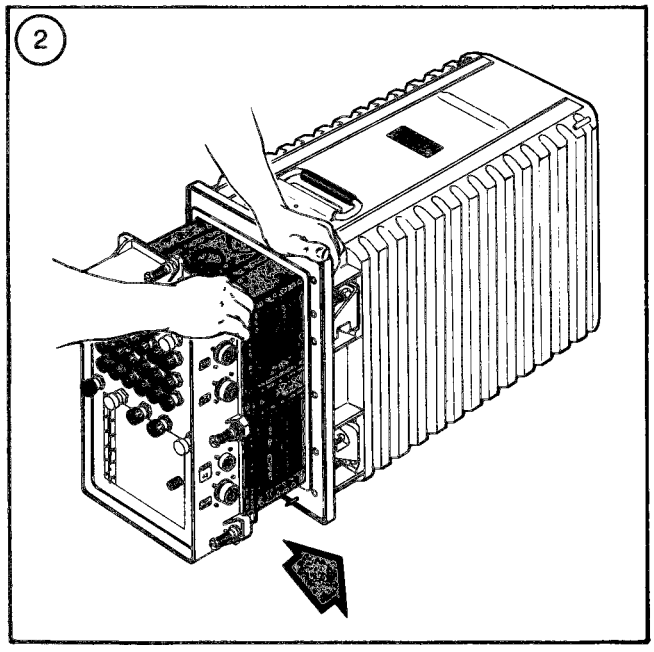
b. Retract MTS.

WARNING

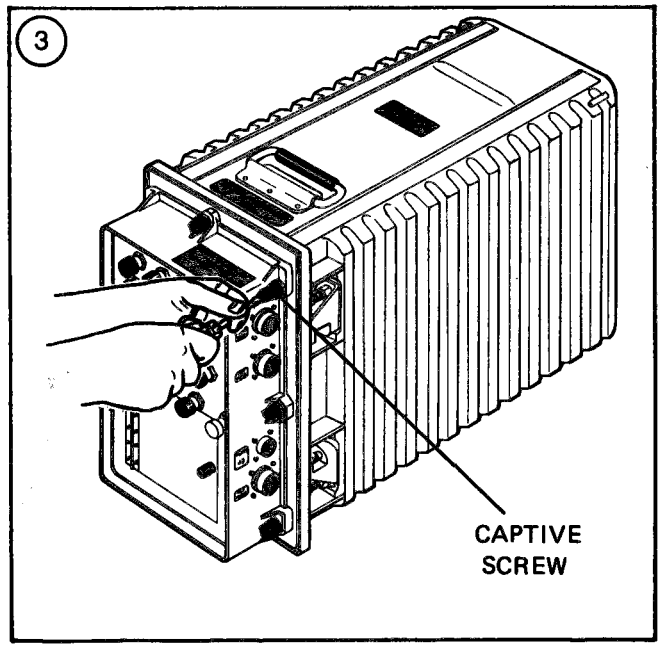
Be sure to press down side locks as shown. Failure to do so may cause personal injury.



Press down on side locks on both sides of MTS to release them.



Slide frame back into case.



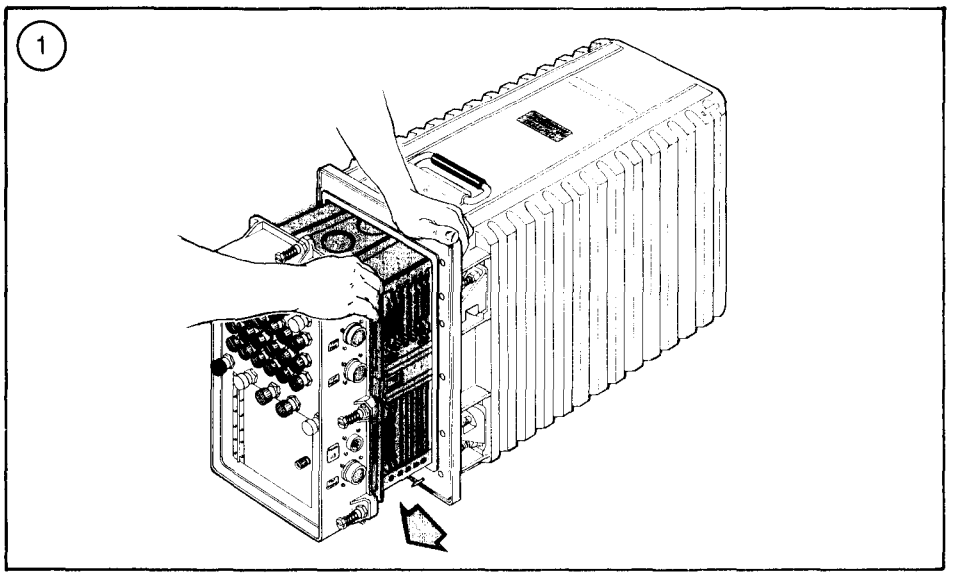
Tighten 8 captive screws on front panel.

5-22. CIRCUIT CARD ASSEMBLY REMOVAL AND REPLACEMENT.

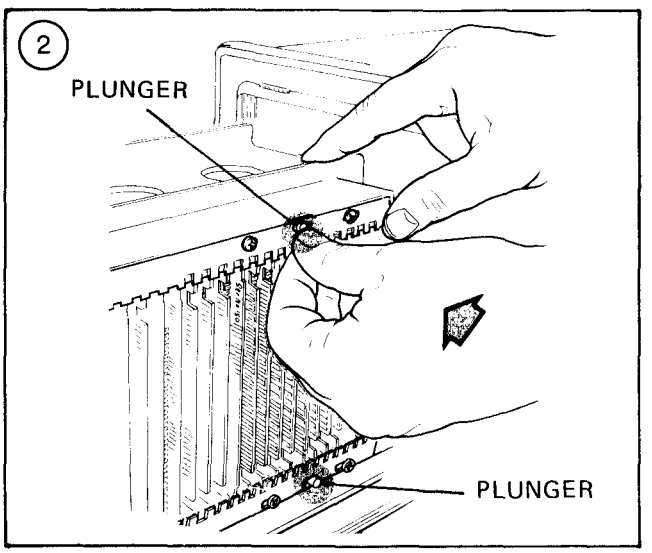
WARNING

Be sure power is off.

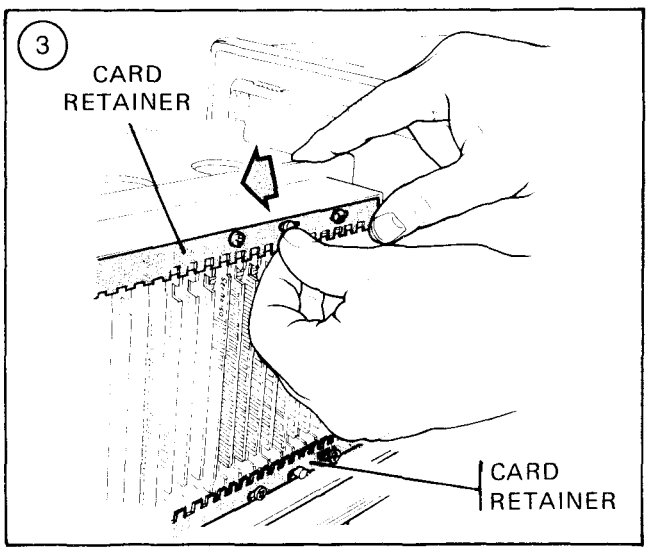
a. Remove circuit card assembly.



Extend MTS (para 5-21a.).



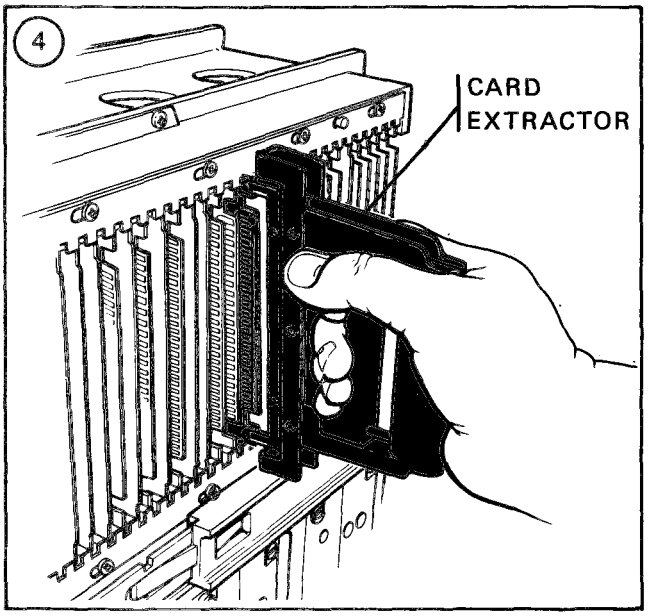
Press spring-loaded plungers on both card retainers.



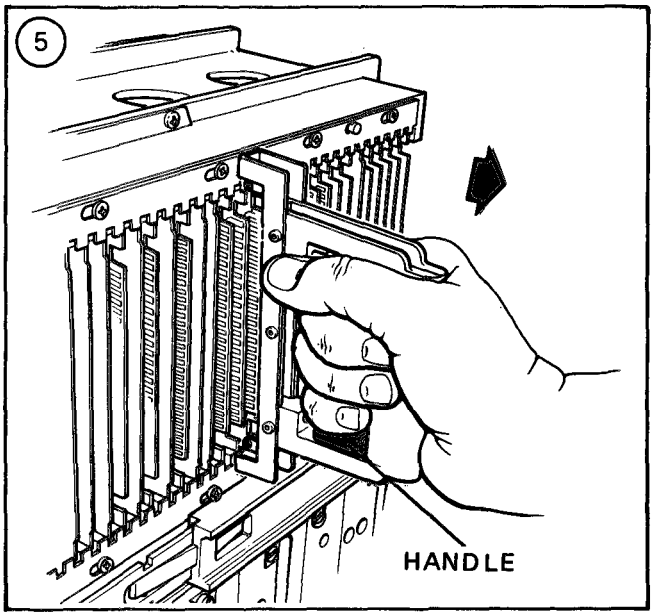
Slide card retainers to left.

(Be sure circuit cards are in line with card retainer notches.)

5-22. CIRCUIT CARD ASSEMBLY REMOVAL AND REPLACEMENT. (Cont.)

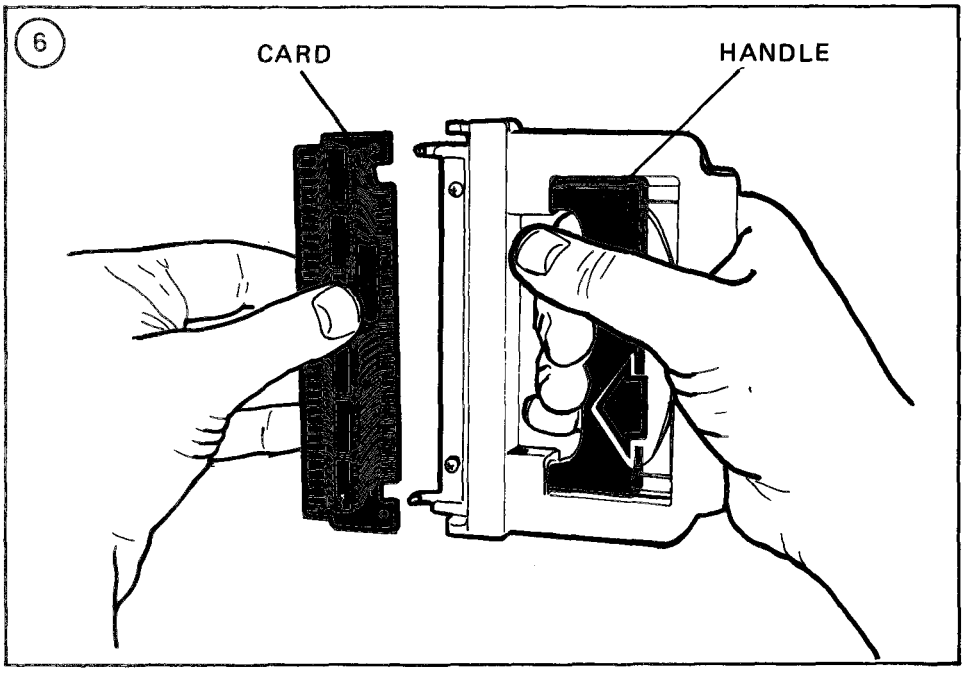


Insert card extractor pins in holes of circuit card to be removed.



Squeeze card extractor handle.

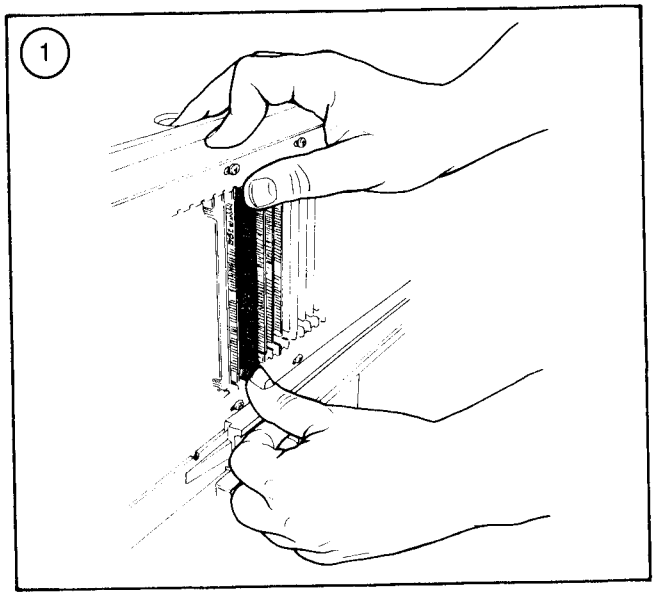
Slowly remove card from card rack.



Hold removed card with free hand, being careful not to grasp exposed connector surfaces, and release pressure on card extractor handle.

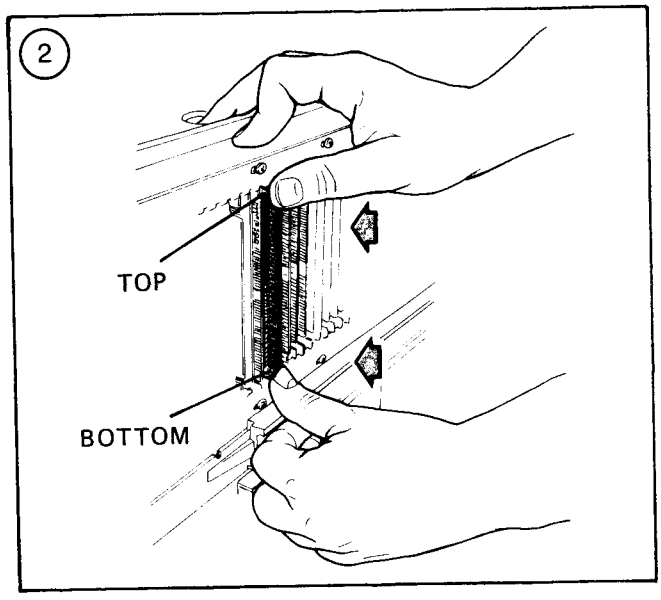
5-22. CIRCUIT CARD ASSEMBLY REMOVAL AND REPLACEMENT. (Cont.)

b. Replace circuit card assembly.



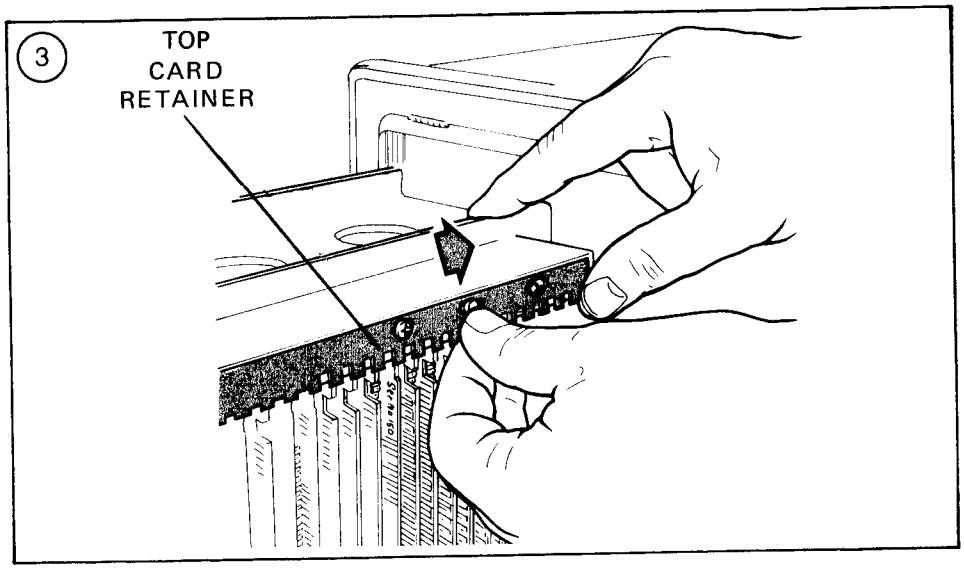
Select correct card type (according to color code and MTS Circuit Card Location Table).

Insert card in card slot from which original card was removed.



Slide circuit card in card guide until it stops.

Push in on top and bottom of circuit card at same time to seat circuit card in card connector.



Slide both card retainers to right to lock cards in place.

Retract MTS according to paragraph 5-21b.

5-22. CIRCUIT CARD ASSEMBLY REMOVAL AND REPLACEMENT. (Cont.)

CIRCUIT CARD COLOR CODING

MTS circuit cards are color-coded by part number.

For the 1028XXXX series, the last four digits of the part number are represented by colors in zones 1 through 4 on the circuit card edge.

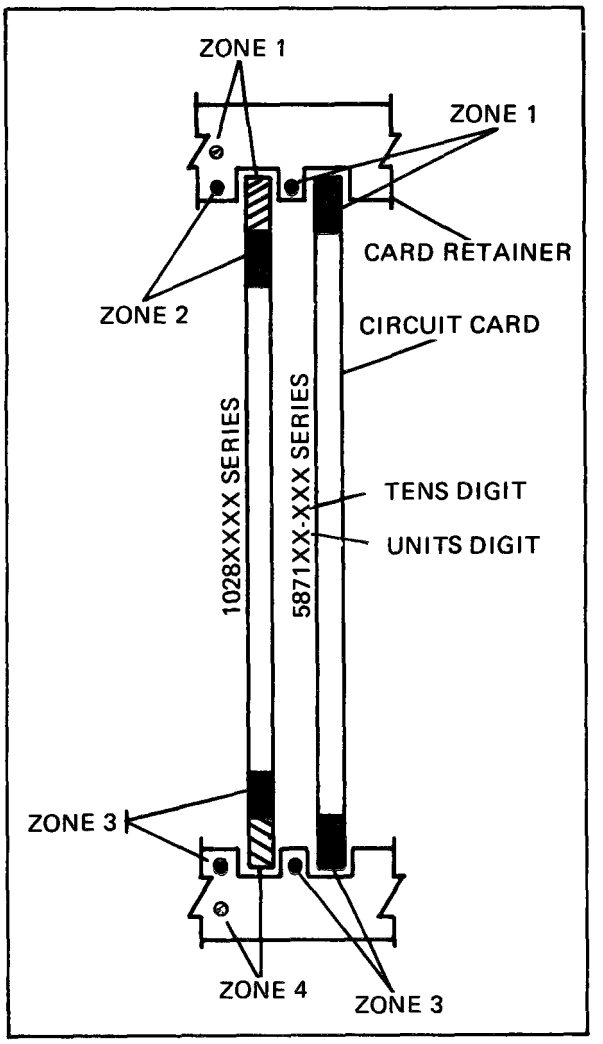
For the 5871XX-XXX series, some cards are not color-coded. Others are color-coded with only one or two colors. When color is used, color in zone 1 represents the tens digit of the basic part number and color in zone 3 represents the units digit.

NOTE

Color codes are used on circuit cards and card cage card slots. Circuit cards are marked on edge tabs and card slots are marked with color dots on card guides.

COLOR CODE

Color	Value
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Gray	8
White	9



CIRCUIT CARD AND CARD SLOT COLOR CODES

5-22. CIRCUIT CARD ASSEMBLY REMOVAL AND REPLACEMENT. (Cont.)

MTS CIRCUIT CARD LOCATION TABLE

Card slot	Part number	Card type	Color code (zone) 1	2	3	4
A1101	–		–	–	–	–
A1102	587100-102	4/8-MHz oscillator	–	–	–	–
A1103	587102-102	Quad 2-input NAND gate	–	–	Red	–
A1104	587117-102	Hex inverter	Brown	–	Violet	–
A1105	587105-102	Dual D flip-flop	–	–	Green	–
A1106	587104-102	Dual 4-input NAND gate	–	–	Yellow	–
A1107	587103-102	Triple 3-input NAND gate	–	–	Orange	–
A1108	10281602	Counter/decoder	Brown	Blue	Black	Red
A1109	587103-102	Triple 3-input NAND gate	–	–	Orange	–
A1110	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue
A1111	10282779	Test set control memory no. 1	Red	Violet	Violet	White
A1112	587117-102	Hex inverter	Brown	–	Violet	–
A1113	587102-102	Quad 2-input NAND gate	–	–	Red	–
A1114	10281780	Quad exclusive OR gate	Brown	Violet	Grey	Black
A1115	10281602	Counter/decoder	Brown	Blue	Black	Red
A1116	587117-102	Hex inverter	Brown	–	Violet	–
A1117	587102-102	Quad 2-input NAND gate	–	–	Red	–
A1118	587118-100	1-kohm resistor	–	–	–	–
A1119	10282780	Test set control memory no. 2	Red	Violet	Gray	Black
A1120	10282781	Test set control memory no. 3	Red	Violet	Gray	Brown
A1121	10282782	Test set control memory no. 4	Red	Violet	Gray	Red
A1122	10282783	Test set control memory no. 5	Red	Violet	Gray	Orange
A1123	10282784	Test set control memory no. 6	Red	Violet	Gray	Yellow
A1124	10282785	Test set control memory no. 7	Red	Violet	Gray	Green
A1125	10281602	Counter/decoder	Brown	Blue	Black	Red
A1126	587103-102	Triple 3-input NAND gate	–	–	Orange	–
A1127	587117-102	Hex inverter	Brown	–	Violet	–
A1128	587102-102	Quad 2-input NAND gate	–	–	Red	–
A1129	587105-100	240-ohm resistor	–	–	–	–
A1130	587105-102	Dual D flip-flop	–	–	Green	–

5-22. CIRCUIT CARD ASSEMBLY REMOVAL AND REPLACEMENT. (Cont.)

MTS CIRCUIT CARD LOCATION TABLE (Cont.)

Card slot	Part number	Card type	Color code (zone) 1	2	3	4
A1131	10282786	Test set control memory no. 8	Red	Violet	Gray	Blue
A1132	587108-102	Single 8-input NAND gate	–	–	Gray	–
A1133	587117-102	Hex inverter	Brown	–	Violet	–
A1134	587102-102	Quad 2-input NAND gate	–	–	Red	–
A1135	587103-102	Triple 3-input NAND gate	–	–	Orange	–
A1136	587118-100	1-kohm resistor	–	–	–	–
A1137	587106-102	Quad 2-input lamp driver	–	–	Blue	–
A1138	587128-100	Diode/resistor	–	–	–	–
A1139	587128-100	Diode/resistor	–	–	–	–
A1140	587105-102	Dual D flip-flop	–	–	Green	–
A1141	587117-102	Hex inverter	Brown	–	Violet	–
A1142	587102-102	Quad 2-input NAND gate	–	–	Red	–
A1143	–	–	–	–	–	–
A1144	10283505	Test set interface	Orange	Green	Black	Green
A1145	–	–	–	–	–	–
A1146	–	–	–	–	–	–
A1147	W556	Connector	–	–	–	–
A2101	W556	Connector	–	–	–	–
A2102	–	–	–	–	–	–
A2103	W552	Connector	–	–	–	–
A2104	W553	Connector	–	–	–	–
A2105	W554	Connector	–	–	–	–
A2106	587102-102	Quad 2-input NAND gate	–	–	Red	–
A2107	587106-102	Quad 2-input lamp driver	–	–	Blue	–
A2108	587117-102	Hex inverter	Brown	–	Violet	–
A2109	587102-102	Quad 2-input NAND gate	–	–	Red	–
A2110	587106-102	Quad 2-input lamp driver	–	–	Blue	–
A2111	587102-102	Quad 2-input NAND gate	–	–	Red	–
A2112	587117-102	Hex inverter	Brown	–	Violet	–
A2113	587106-102	Quad 2-input lamp driver	–	–	Blue	–
A2114	587102-102	Quad 2-input NAND gate	–	–	Red	–
A2115	587102-102	Quad 2-input NAND gate	–	–	Red	–
A2116	587117-102	Hex inverter	Brown	–	Violet	–
A2117	587103-102	Triple 3-input NAND gate	–	–	Orange	–

5-22. CIRCUIT CARD ASSEMBLY REMOVAL AND REPLACEMENT. (Cont.)

MTS CIRCUIT CARD LOCATION TABLE (Cont.)

Card slot	Part number	Card type	Color code (zone) 1	2	3	4
A2118	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue
A2119	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue
A2120	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue
A2121	10282787	Test set control memory no. 9	Red	Violet	Gray	Violet
A2122	10282788	Test set control memory no. 10	Red	Violet	Gray	Gray
A2123	10282789	Test set control memory no. 11	Red	Violet	Gray	White
A2124	587117-102	Hex inverter	Brown	–	Violet	–
A2125	587118-100	1-kohm resistor	–	–	–	–
A2126	587102-102	Quad 2-input NAND gate	–	–	Red	–
A2127	587118-100	1-kohm resistor	–	–	–	–
A2128	587117-102	Hex inverter	Brown	–	Violet	–
A2129	587118-100	1-kohm resistor	–	–	–	–
A2130	10282790	Test set control memory no. 12	Red	Violet	White	Black
A2131	587102-102	Quad 2-input NAND gate	–	–	Red	–
A2132	587118-100	1-kohm resistor	–	–	–	–
A2133	10282791	Test set control memory no. 13	Red	Violet	White	Brown
A2134	587102-102	Quad 2-input NAND gate	–	–	Red	–
A2135	587104-102	Dual 4-input NAND gate	–	–	Yellow	–
A2136	587117-102	Hex inverter	Brown	–	Violet	–
A2137	10282792	Test set control memory no. 14	Red	Violet	White	Red
A2138	587102-102	Quad 2-input NAND gate	–	–	Red	–
A2139	10281602	Counter/decoder	Brown	Blue	Black	Red
A2140	587103-102	Triple 3-input NAND gate	–	–	Orange	–
A2141	587117-102	Hex inverter	Brown	–	Violet	–
A2142	10282793	Test set control memory no. 15	Red	Violet	White	Orange
A2143	587102-102	Quad 2-input NAND gate	–	–	Red	–
A2144	587105-102	Dual D flip-flop	–	–	Green	–
A2145	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue
A2146	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue
A2147	10281606	Hex 4-bit shift register	Brown	Blue	Black	Blue

5-22. CIRCUIT CARD ASSEMBLY REMOVAL AND REPLACEMENT. (Cont.)

MTS CIRCUIT CARD LOCATION TABLE (Cont.)

Card slot	Part number	Card type	Color code (zone) 1	2	3	4
A3101	W554	Connector	–	–	–	–
A3102	W552	Connector	–	–	–	–
A3103	W553	Connector	–	–	–	–
A3104	10282752	Line terminator	Red	Violet	Green	Red
A3105	10282752	Line terminator	Red	Violet	Green	Red
A3106	10281785	Reference voltage regulator	Brown	Violet	Gray	Green
A3107	10282794	Test set data comparator no. 1	Red	Violet	White	Yellow
A3108	10282795	Test set data comparator no. 2	Red	Violet	White	Green
A3109	10282796	Test set data comparator no. 3	Red	Violet	White	Blue
A3110	10282797	Test set data comparator no. 4	Red	Violet	White	Violet
A3111	10282798	Test set data comparator no. 5	Red	Violet	White	Gray
A3112	10282799	Test set data comparator no. 6	Red	Violet	White	White
A3113	10282800	Test set data comparator no. 7	Red	Gray	Black	Black
A3114	10282801	Test set data comparator no. 8	Red	Gray	Black	Brown
A3115	10282802	Test set data comparator no. 9	Red	Gray	Black	Red
A3116	10282803	Test set data comparator no. 10	Red	Gray	Black	Orange
A3117	10282804	Test set data comparator no. 11	Red	Gray	Black	Yellow
A3118	10282805	Test set data comparator no. 12	Red	Gray	Black	Green
A3119	10281784	Identification decode	Brown	Violet	Gray	Yellow
A3120	10282771	Test set data memory no. 1	Red	Violet	Violet	Brown
A3121	10282772	Test set data memory no. 2	Red	Violet	Violet	Red
A3122	10282773	Test set data memory no. 3	Red	Violet	Violet	Orange
A3123	10282774	Test set data memory no. 4	Red	Violet	Violet	Yellow
A3124	10282775	Test set data memory no. 5	Red	Violet	Violet	Green
A3125	10282776	Test set data memory no. 6	Red	Violet	Violet	Blue
A3126	10282777	Test set data memory no. 7	Red	Violet	Violet	Violet
A3127	10282778	Test set data memory no. 8	Red	Violet	Violet	Gray

5-23. DC/DC CONVERTER REMOVAL AND REPLACEMENT.

a. Remove dc/dc converter.

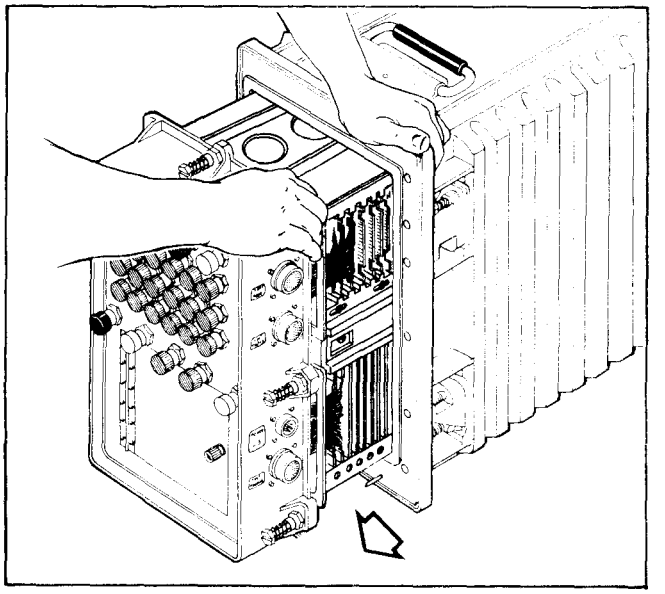
WARNING

Be sure power is off.

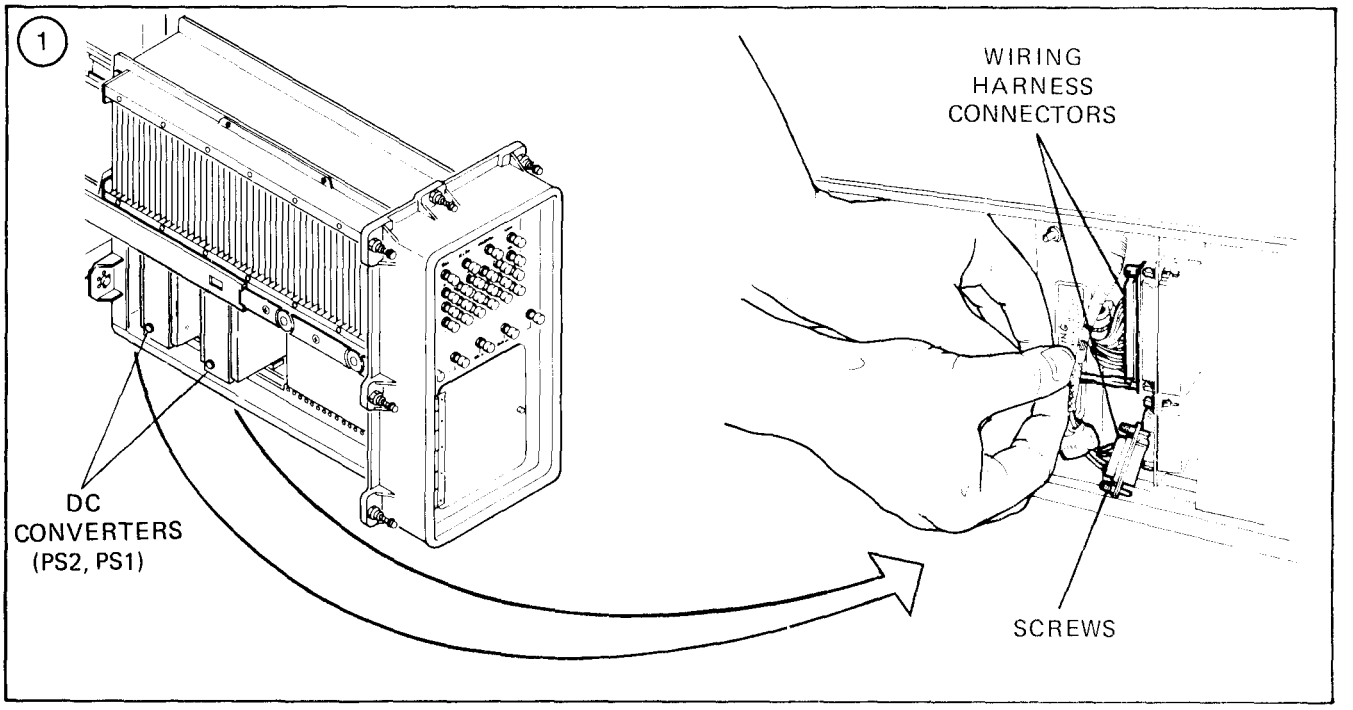
WARNING

High temperature is common for the dc/dc converter. Severe burns may result if personnel fail to observe safety precautions. Allow dc/dc converter to cool before removing it, or wear gloves to protect hands.

- ***Extend MTS from case according to paragraph 5-21a.***



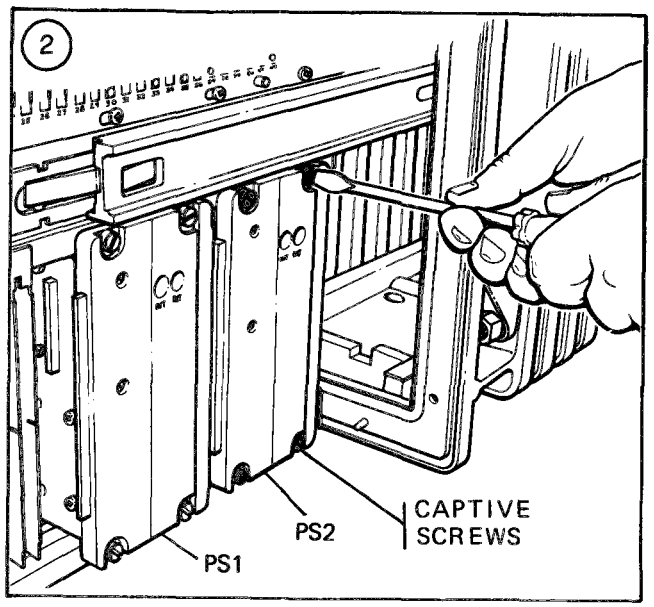
- ***Remove wiring harness connectors from dc/dc converter.***



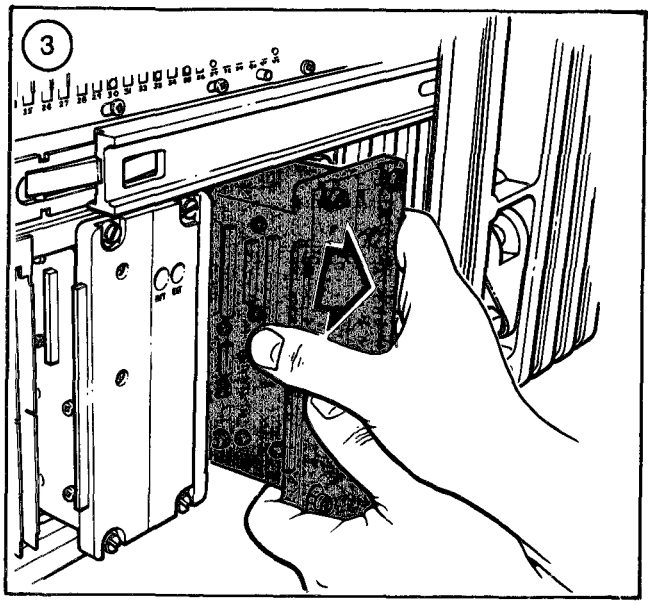
Locate wiring harness connectors on back of dc/dc converter.

Unscrew two screws that attach each connector to dc/dc converter.

5-23. DC/DC CONVERTER REMOVAL AND REPLACEMENT. (Cont.)

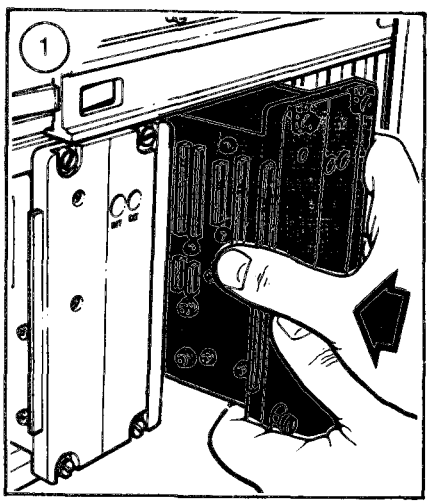


On front of dc/dc converter, release four captive screws which secure dc/dc converter to card rack A31.



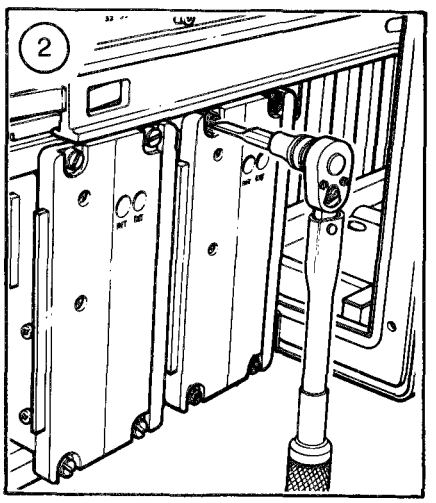
Remove dc/dc converter from MTS.

b. Replace dc/dc converter.



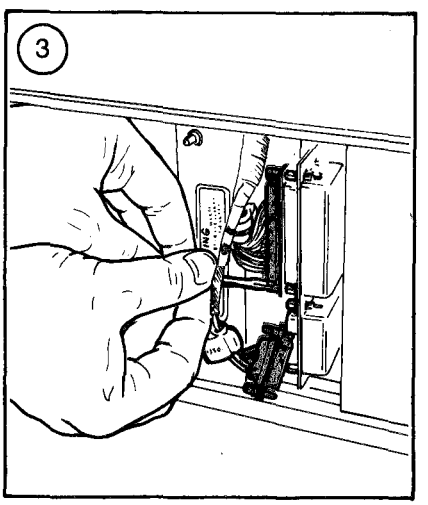
Insert proper dc/dc converter (PS1 or PS2) into card rack A31.

Align dc/dc converter with pins on plate bracket.



Secure dc/dc converter to card rack by tightening four captive screws.

Torque screws from 13 to 16 inch-pounds.

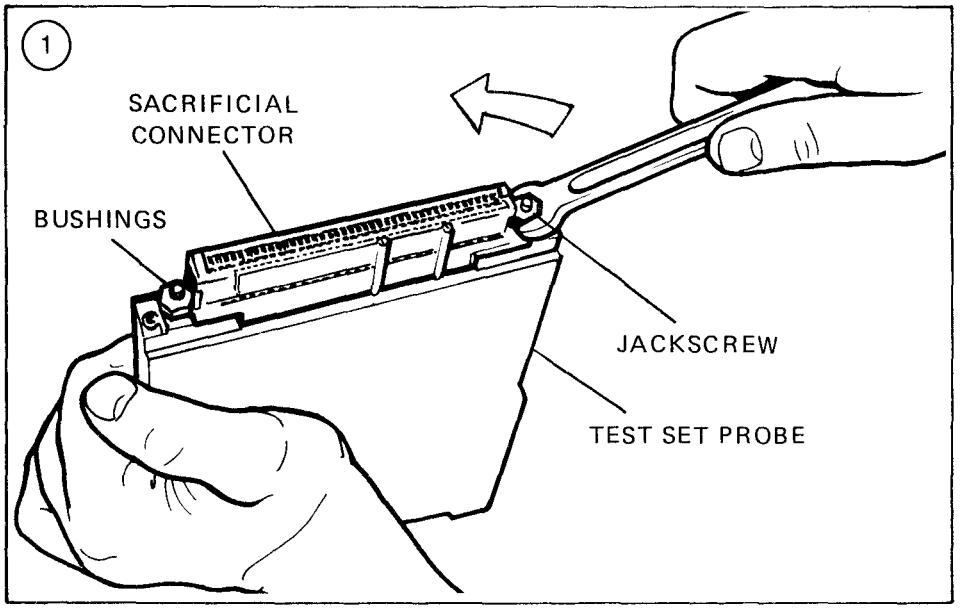


Connect wiring harness connectors P1 and P2 (PS2) or P3 and P4 (PS1), with right-angle connector adapter attached, to connectors J1 and J2 on dc/dc converters.

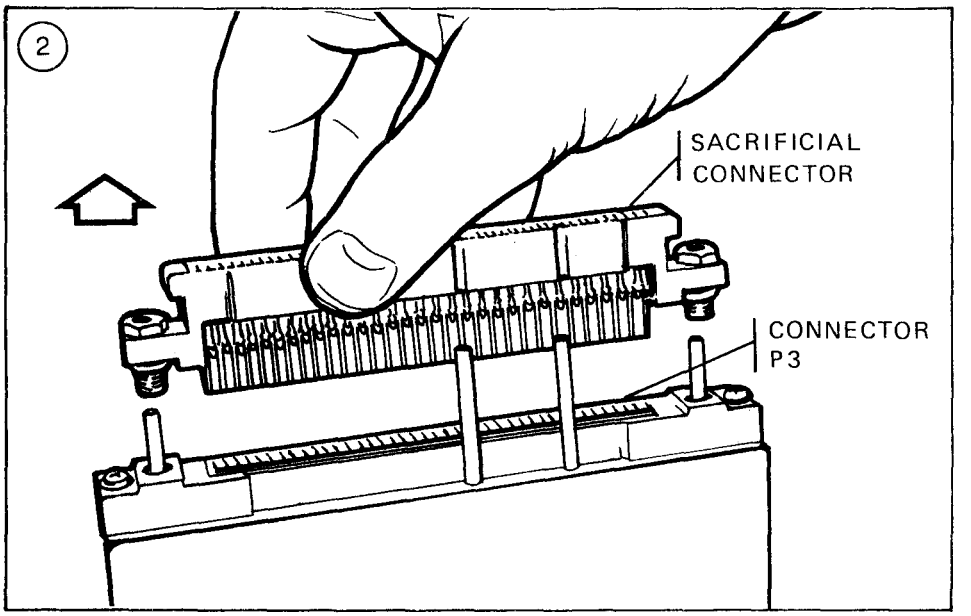
Retract MTS into case according to paragraph 5-21b.

5-24. TEST SET PROBE ASSEMBLY SACRIFICIAL CONNECTOR REMOVAL AND REPLACEMENT.

a. Remove sacrificial connector from test set probe assembly.



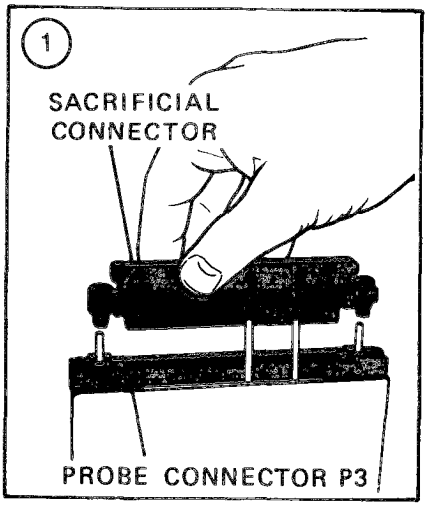
Alternately loosen and unscrew two jackscrews that secure sacrificial connector to bushings on probe assembly.



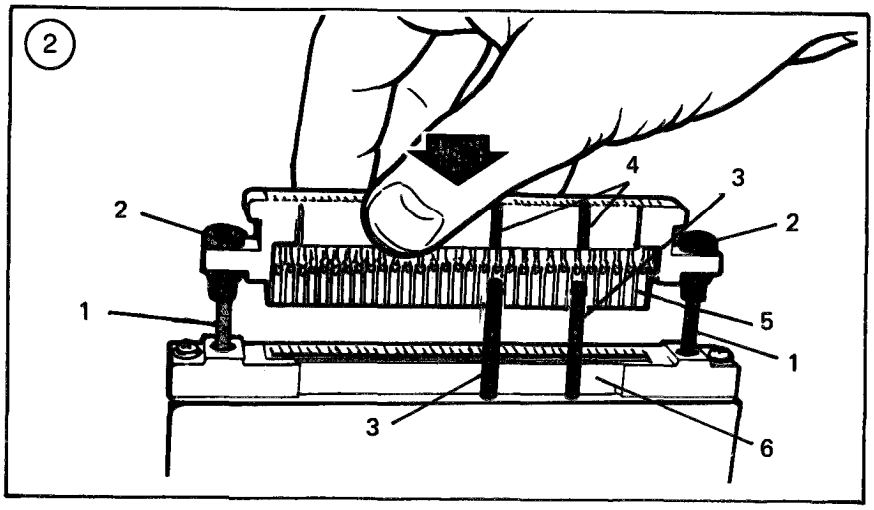
Pull sacrificial connector straight out from connector P3.

5-24. TEST SET PROBE ASSEMBLY SACRIFICIAL CONNECTOR REMOVAL AND REPLACEMENT. (Cont.)

b. Replace sacrificial connector on test set probe assembly.

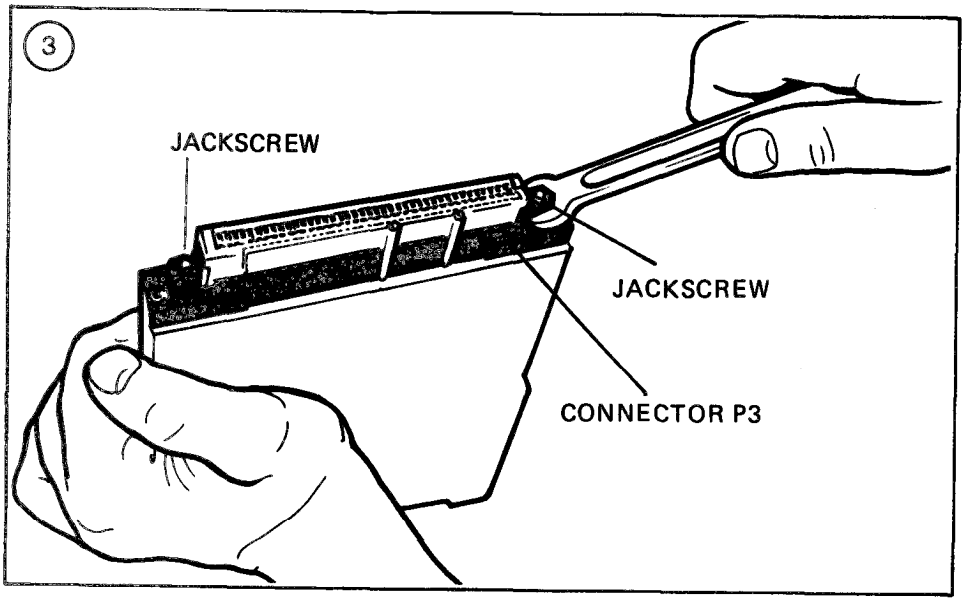


Align sacrificial connector with probe assembly connector P3.



Insert two push rods (1) into holes in sacrificial connector's two jackscrews (2). (Be sure probe assembly's magnetic poles (3) are aligned with mating grooves (4) in sacrificial connector.)

Mount sacrificial connector's printed wiring board (5) on probe's connector P3 (6).



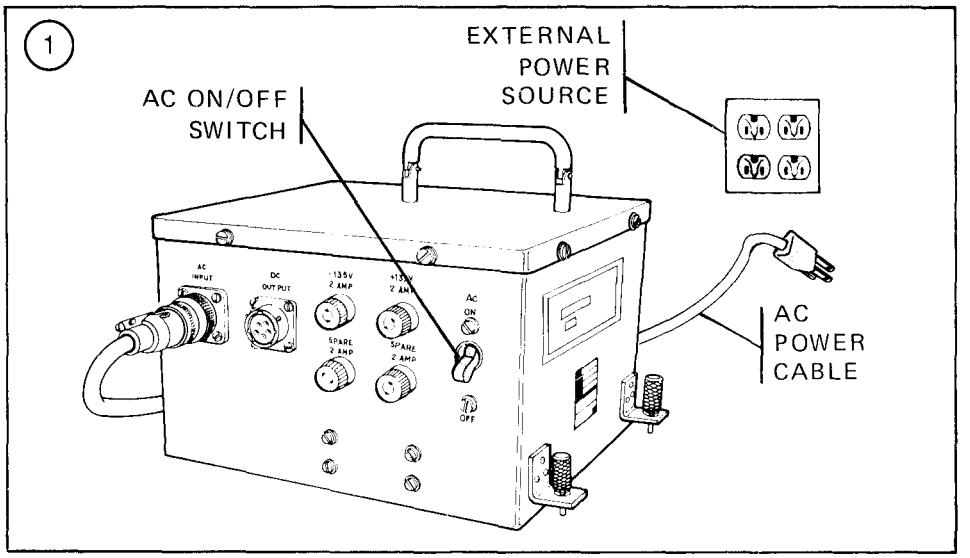
Alternately tighten each jackscrew a few turns at a time until printed wiring board is fully seated in connector P3.

5-25. POWER SUPPLY FUSE REMOVAL AND REPLACEMENT.

a. Remove power supply fuse.

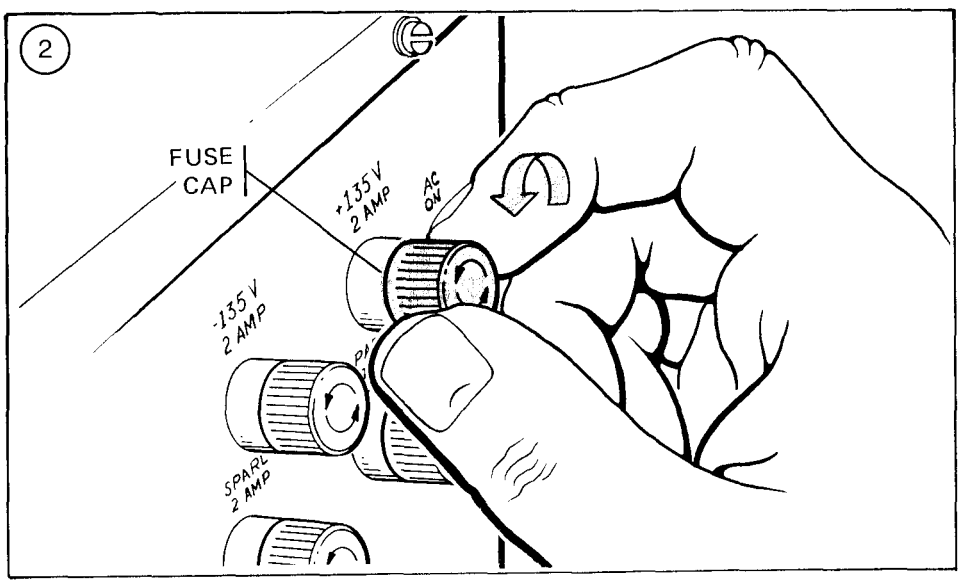
WARNING

Be sure power is off.



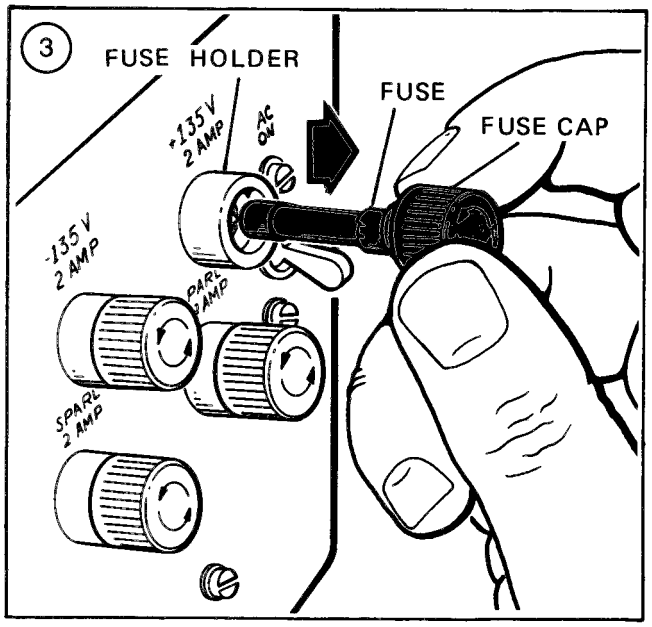
Turn off AC ON/OFF switch.

Unplug AC power cable from external power source.

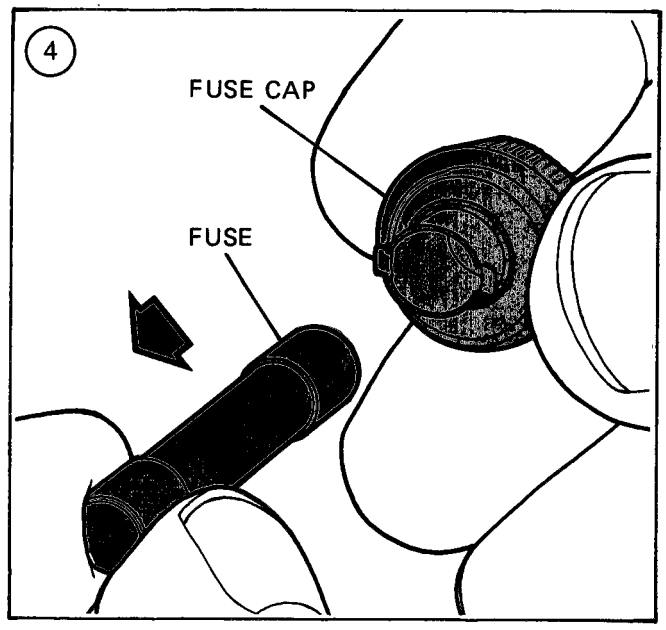


Turn fuse cap to left. (It will pop out.)

5-25. POWER SUPPLY FUSE REMOVAL AND REPLACEMENT. (Cont.)

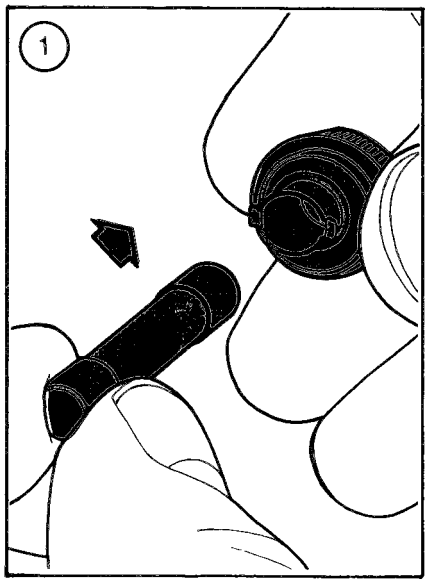


Withdraw fuse cap and fuse from fuse holder.

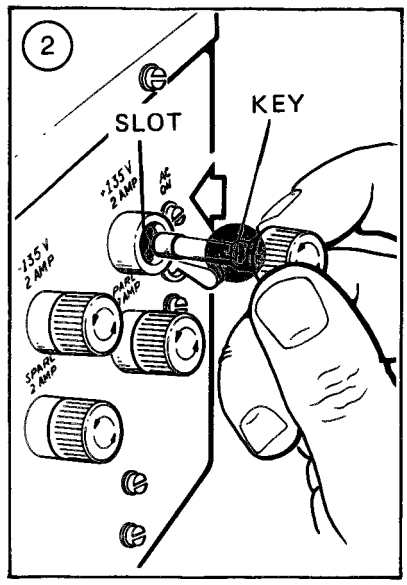


Withdraw fuse from fuse cap.

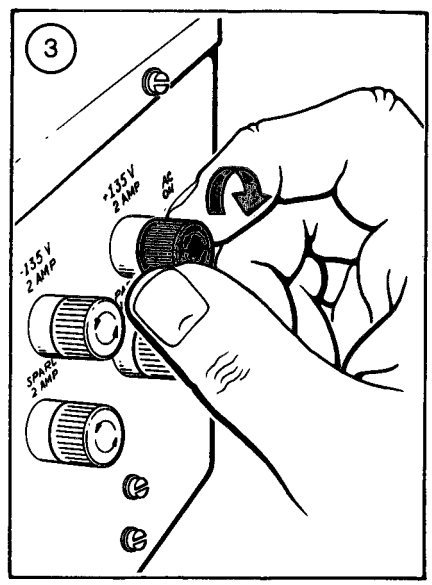
b. Replace power supply fuse.



Insert fuse into fuse cap.



Line up fuse keys with slots in fuse holder.



Press fuse cap with fuse into fuse holder.

Screw fuse cap to right.

5-26. REPAINTING AND REFINISHING.

Inspect the MTS exterior periodically to determine any need for repainting and refinishing.

Inspect the external painted surfaces of the case and front panel assemblies for any damage.

If you can correct any damage with minor touchup, do so according to paragraphs 5-27 and 5-28.

If any damage is extensive, refer MTS to depot maintenance.

Before you refinish the MTS, prepare the surfaces: clean off dirt, grease, fungus, moisture, etc.

Refer to TB 43-0118 for detailed instructions for field touchup of painted surfaces.

5-27. SURFACE PREPARATION.

Before applying any finish, clean surface thoroughly.

a. Masking.

NOTE

If you use masking tape, use electrical grade.

Cover (mask) the following items:

- electrical contact areas;
- heat transfer areas; and
- plastic, rubber, and working parts.

b. Preparatory Cleaning.

(1) Remove grease, oil, etc., with detergent and clean water.

(2) Remove minor pitting or scratches with fine-grit sandpaper and then rinse with clear water.

c. Touchup Surface Treatment.

If surface to be treated has been damaged, do the following:

(1) Treat surface with class 1 A chemical conversion coating according to MIL-C-5541B and MIL-C-81706 (Amendment 4).

(2) Do this treatment within 8 hours (but not more than 72 hours) before applying finish. (Shortest possible interval is preferred.)

(3) After treating, rinse surface with clear water and test treated area with clean, white cloth which you have wet with distilled water.

(4) If cloth shows stains, continue wiping surface with clean white cloths, wet with distilled water, until surface is completely clean.

5-28. SURFACE COATING.

After surface preparation, coat surface according to the following paragraphs.

CAUTION

Do not paint:

- functional, working, or wearing surfaces;
- threads of screws;
- nonmetallic areas; or
- contact areas of metal components.

a. Prime Coat.

(1) Prime surface with one coat of zinc chromate primer, according to TT-P-1757

(2) Air dry for 1-1/2 to 24 hours.

b. Top Coats.

(1) Apply first finish coat of enamel less than 24 hours after zinc chromate primer has dried.

(2) Apply two coats of enamel alkyd, semi-gloss green (color number 24410) paint, according to TT-E-529.

(3) Air dry (class A) or bake dry (class B).

- Air dry for 24 hours between coats.
- Bake dry for 1/2 hour at 300°F between coats.

APPENDIX A

REFERENCES

DA PAM 310-1	Consolidated Index of Army Publications and Blank Forms
DA PAM 738-750	Maintenance Management Update
DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Form 2407	Maintenance Request
SF 364	Report of Discrepancy (ROD)
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters
TM 11-5805-681-12 EE119-BA-OMI-010/E154 TTC39 T031W2-2TTC39-1-1	Operator's and Organizational Maintenance Manual, Central Office Telephone, Automatic AN/TTC-39(V)(*) (NSN's 5805-01-122-3414, 5805-01-121-4395, 5805-01-121-9560)
TM 11-5805-681-20P EE119-BA-PLO-010/E154 TTC39	Operator's and Organizational Maintenance Manual, Repair Parts and Special Tools List; Central Office Telephone, Automatic AN/TTC-39(V)(*) (NSN's 5805-01-122-3414, 5805-01-121-4395, 5805-01-121-9560) (To be published)
TM 11-5805-683-12 EE119-AA-OMI-010/E154 TYC39 TO 31W2-2TYC39-11-1	Operator's and Organizational Maintenance Manual, Central, Message Switching, Automatic AN/TYC-39(V)1 (NSN 5805-01-123-1851)
TM 11-5805-6683-20P EE119-AA-PLO-010/E154 TYC39	Operator's and Organizational Maintenance Manual, Repair Parts and Special Tools List; Central, Message Switching, Automatic AN/TYC-39(V)1 (NSN 5805-01-123-1851) (To be published)
TM 11-7010-201-20P ET821-AA-PLO-010/E154 MTS	Repair Parts and Special Tools List for Test Set, Electronic Circuit Plug-In Unit TS-3317( )/TSQ-73 (RPSTL) (NSN 1430-01-033-1078) (To be published)
TM 740-90-1	Administrative Storage of Equipment
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX B

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

B-1. General. This appendix provides a summary of the maintenance operations for the lest Set, Electronic Circuit Plug-In Unit TS-3317( )/TSQ-73. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function.

B-2. Maintenance Concept. Three levels of maintenance shall be utilized for the equipment as follows:

Organizational Level

General Support Level

Depot Level.

a. Organization Maintenance. That maintenance which is the responsibility of and performed by using organization on its assigned equipment. Its phases normally consist of inspecting, servicing, lubricating, and adjusting, and the replacement of parts, minor assemblies and subassemblies. This level is designated by an "O" in the Maintenance category columns in Section II.

b. General Support Maintenance. That maintenance which is the responsibility of and performed by designated maintenance activities to support lower level activities. In addition, a Specialized Repair Activity (SRA) is designated to provide PC card repair, using the AN/USM-410. General Support Maintenance is normally accomplished in fixed shops. This level is designated by an "H" in the Maintenance Category columns in Section II. The SRA is designated by an (L) in the "H" Maintenance Category columns in Section II.

c. Depot Maintenance. That maintenance which is the responsibility of and performed by designated maintenance activities, to augment stocks of serviceable material, and to support lower level activities by the use of more extensive shop facilities, equipment and personnel of higher technical skills than are available at the lower level of maintenance. Its phases normally consist of inspection, test, repair, modification, alteration, modernization, conversion, overhaul reclamation, or rebuild of parts, assemblies, subassemblies, components, equipment end items, and weapon systems; and the manufacture of critical non-available parts. Depot Maintenance is normally accomplished in fixed shops. This level is designated by a "D" in the Maintenance Category columns in Section II.

B-3. Maintenance Function. Maintenance functions for the Test Set, Electronic Circuit Plug-in Unit TS-3317( )/TSQ-73 are defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition. i.e., to clean (decontaminate). to preserve. to drain. to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating. or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance service (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of' returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

B-4. Column Entries.

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in Column 2. When items are listed without maintenance functions, it is solely for the purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "worktime" figures will be shown for each category. The number of task-hours specified by the "worktime" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of Column 4 are as follows:

C Operator/Crew
O Organizational
F Direct Support
H General Support (L Specialized Repair Activity)
D Depot.

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools), and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in Section IV, Remarks, which is pertinent to the item opposite the particular code.

B-5. Tool and Test Equipment Requirements (Section III).

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

B-6. Remarks (Section IV).

a. Reference Code. This code refers to the appropriate item in Section II, Column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in Section II.

SECTION II. MAINTENANCE ALLOCATION CHART FOR TEST SET, ELECTRONIC CIRCUIT PLUG-IN UNIT TS-3317( )/TSQ-73

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Category C	O	F	H	D	(5) Tools and Equip.	(6) Remarks
00	TEST SET, ELECTRONIC CIRCUIT PLUG-IN UNIT TS-3317( )/TSQ-73	INSPECT		0.1					G
		SERVICE		0.5				7	N
01	MODULE TEST SET	OVERHAUL					30.0	1,2,3,6,8, 10,11	
		REBUILD					30.0	1,2,3,6,8, 10,11	
		TEST		0.2				1,7	A,E
		REPLACE		0.2				7	
		REPAIR		0.3				1,7	
		TEST				0.1		1,3,6,9	F
								1,3,6,8,9	
		REPAIR				1.2			
0101	PRINTED CIRCUIT CARDS	TEST		0.2				1,7	B
		REPLACE		0.1				1,4,7	
		REPAIR				1.5 L)		2,5	
0102	DC/DC CONVERTER ASSEMBLY PS1,PS2	TEST		0.1				1,7	
		REPLACE		0.2				1,7,11	C,D
		REPAIR					2.0	1,3,5, 6,8,9	
0103	TEST ASSEMBLY PLUG-IN UNIT, WIRED	TEST		0.1				1,6	O
		REPAIR		0.3				1,6	O
		TEST				0.1		1,3,6	A
		REPLACE				0.5		1,3,6,9	
		REPAIR					2.0	1,3,6,8,9	
010301	SWITCH-INDICATOR ASSEMBLY	REPLACE				0.5		1,6,9	
		REPAIR				0.3		1,6,9	

SECTION II. MAINTENANCE ALLOCATION CHART FOR TEST SET, ELECTRONIC CIRCUIT PLUG-IN UNIT TS-3317( )/TSQ-73

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Category C	O	F	H	D	(5) Tools and Equip.	(6) Remarks
010302	CARD RACK ASSEMBLY RH, LH, ANALOG	REPAIR					1.0	1,6,8,9	H
010303	WIRE HARNESS CABLE ASSEMBLY W552, W553, W554, W556	TEST				0.1		1,6,9	
		REPLACE				0.3		1,6,9	
		REPAIR				0.1		1,6,8,9	
010304	CONNECTOR ASSEMBLY J1, J2, J3, J4, J6, J7	REPAIR					1.0	1,6,8,9	K
02	POWER SUPPLY 135V	INSPECT		0.1					G
		TEST		0.1				1,7	
		REPLACE		0.3				1,7	
		REPAIR		0.2				1,7	M
		REPAIR				0.5 (L)		1,2,3, 5,6,8,9	
0201	POWER CABLE, AC AND DC	INSPECT		0.1					G
		REPLACE		0.3				7	
		REPAIR				0.5		1,6,8,9	K
03	PROBE ASSEMBLY, TEST SET W209	INSPECT		0.1					G
		TEST		0.1				1,7	
		REPLACE		0.1				1,7	I
		REPAIR		0.2				1,7	J
		REPAIR					1.0	1,6,8,9	
04	CABLE ASSEMBLY, SPECIAL PURPOSE W210	INSPECT		0.1					G,O
		TEST		0.1				1,7	P,O
		REPLACE		0.1				1	L,O
		REPAIR					1.0	1,6,8,9	
05	MTS TEST AID ASSEMBLY, TE113980	INSPECT		0.1					G,O
		TEST		1.0				1,3,10	O
		REPLACE		0.1				1,6	O
		REPAIR				1.5		1,3,5, 6,8,9	
0501	CIRCUIT BOARD ASSEMBLY	REPAIR				1.5 (L)		1,3,5, 6,8	
0502	FRONT PANEL ASSEMBLY	REPAIR				1.0		1,6,8,9	
0503	CABLE ASSEMBLY	REPLACE		0.1				6	O
		REPAIR				1.5		1,6,8,9	K

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR TEST SET, ELECTRONIC CIRCUIT PLUG-IN UNIT TS-3317( )/TSQ-73

ool or Test Equipment Ref. Code	Maintenance Category	Nomenclature	National/NATO Stock Number	Tool Number
1	O,H,D	DIGITAL VOLTMETER AN/USM-451	6625-00-060-6804	
2	L	TEST STATION, ELECTRONIC EQUIPMENT, AN/USM-410	6625-00-614-9535	
3	O,H,D	OSCILLOSCOPE, OS-261/U	6625-00-127-0079	
4	O	EXTRACTOR, PRINTED CIRCUIT CARD (LITTON)	5999-00-407-5062	
5	L	PRINTED CIRCUIT CARD REPAIR TOOL KIT PRC-350C	3439-00-389-0329	
6	O,H,D	TOOL KIT, ELECTRONIC EQUIPMENT, TK-105/G	5180-00-610-8177	
7	O	TOOL KIT, ELECTRONIC EQUIPMENT, TK-101/G	5180-00-064-5178	
8	H,D	TOOL KIT, WIRE WRAP/ CONNECTOR REPAIR		SMB814880
9	H,D	SUPPLEMENTARY TOOL KIT, IL		SMB814891
10	O	POWER SUPPLY (0-40VDC/0-30A) PP-7833/U (HP6268B)	6130-00-249-2748	
11	O	SUPPLEMENTARY TOOL KIT, OL		SMB814890

SECTION IV. REMARKS
FOR
TEST SET, ELECTRONIC CIRCUIT PLUG-IN UNIT TS-3317( )/TSQ-73

Reference Code	Remarks
A	PERFORM SELF-TEST FUNCTIONS AND OBSERVE FRONT PANEL INDICATORS FOR FAULT DIAGNOSIS.
B	FAULT ISOLATE TO THIS ITEM USING MTS SELF-TEST FUNCTION AND FAULT ISOLATION CHART IN ADDITION TO LISTED TEST EQUIPMENT.
C	USE GLOVES FOR REMOVAL TO PREVENT SKIN BURNS.
D	TORQUE HOLDING SCREWS FROM 13 TO 16 INCH-POUNDS AT REPLACEMENT.
E	LAMPS ARE TESTED BY LAMP TEST FUNCTION.
F	REPAIR CONSISTS OF LAMP REPLACEMENT AT ORGANIZATION LEVEL.
G	EXTERNAL VISUAL.
H	LIMITED WIREWRAP REPAIRS CAN BE ACCOMPLISHED AT GENERAL SUPPORT.
I	THIS UNIT IS REPLACED WHEN A FAILURE PREVENTS IT FROM PERFORMING THE FUNCTION OF INTERFACING THE MTS WITH A CARD UNDER TEST.
J	ORGANIZATIONAL REPAIR IS LIMITED TO REPLACEMENT OF SACRIFICIAL CONNECTOR.
K	LIMITED CONNECTOR REPAIR (PIN REMOVAL) CAN BE ACCOMPLISHED AT GENERAL SUPPORT.
L	THIS UNIT IS REPLACED WHEN A FAILURE PREVENTS IT FROM PERFORMING THE FUNCTION OF INTERFACING THE MTS WITH THE UNIT UNDER TEST.
M	ORGANIZATIONAL REPAIR LIMITED TO REPLACEMENT OF FUSES.
N	PERFORM SCHEDULED PREVENTIVE MAINTENANCE.
O	REFER TO TM 11-7010-201-40 FOR MAINTENANCE OF THIS ITEM BY THE DS/GS MAINTENANCE LEVEL THAT FUNCTIONS AS A USING ORGANIZATION.
P	CONTINUITY TEST

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

C-1. SCOPE.

This appendix lists integral components of and basic issue items for the TS-3317( )/TSQ-73 to help you inventory items required for safe and efficient operation.

C-2. GENERAL.

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

a. Section II. Integral Components of the End Item. These items, when assembled, comprise the TS-3317( )/TSQ-73 and must accompany it whenever it is transferred or turned in. The illustrations will help you identify these items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the TS-3317( )/TSQ-73 in operation, to operate it, and to perform emergency repair. Although shipped separately packed, they must accompany the TS-3317( )/TSQ-73 during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. EXPLANATION OF COLUMNS.

a. Illustration. This column is divided as follows:

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

(2) Item Number. The number used to identify item called out in the illustration.

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

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

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

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

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

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

Section II.
INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)	(8) QUANTITY			
(a) FIGURE NO.	(b) ITEM NO.	NATIONAL STOCK NUMBER	PART NO.	DESCRIPTION	LOCATION	USABLE ON CODE	QTY REQD	RCV'D	DATE	DATE	DATE
C-1	1	1430-01-033-1078		Test Set, Electronic Circuit Plug-In Unit (TS-3317( )/TSQ-73 (80058)			1				
	2	1430-01-033-1072 (10285061 (18876))		Probe Assembly, Test			1				
	3	1430-01-033-3972 (10281448)		Cable Assy, Special			1				
	4	6625-01-136-9917 (02-510843)		135V Power Supply			1				
				TECHNICAL MANUAL, TM 11-7010-201-12							

Section III.
BASIC ISSUE ITEMS

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)	(8) QUANTITY			
(a) FIGURE NO.	(b) ITEM NO.	NATIONAL STOCK NUMBER	PART NO.	DESCRIPTION	LOCATION	USABLE ON CODE	QTY REQD	RCV'D	DATE	DATE	DATE
				NO BASIC ISSUE	ITEMS						

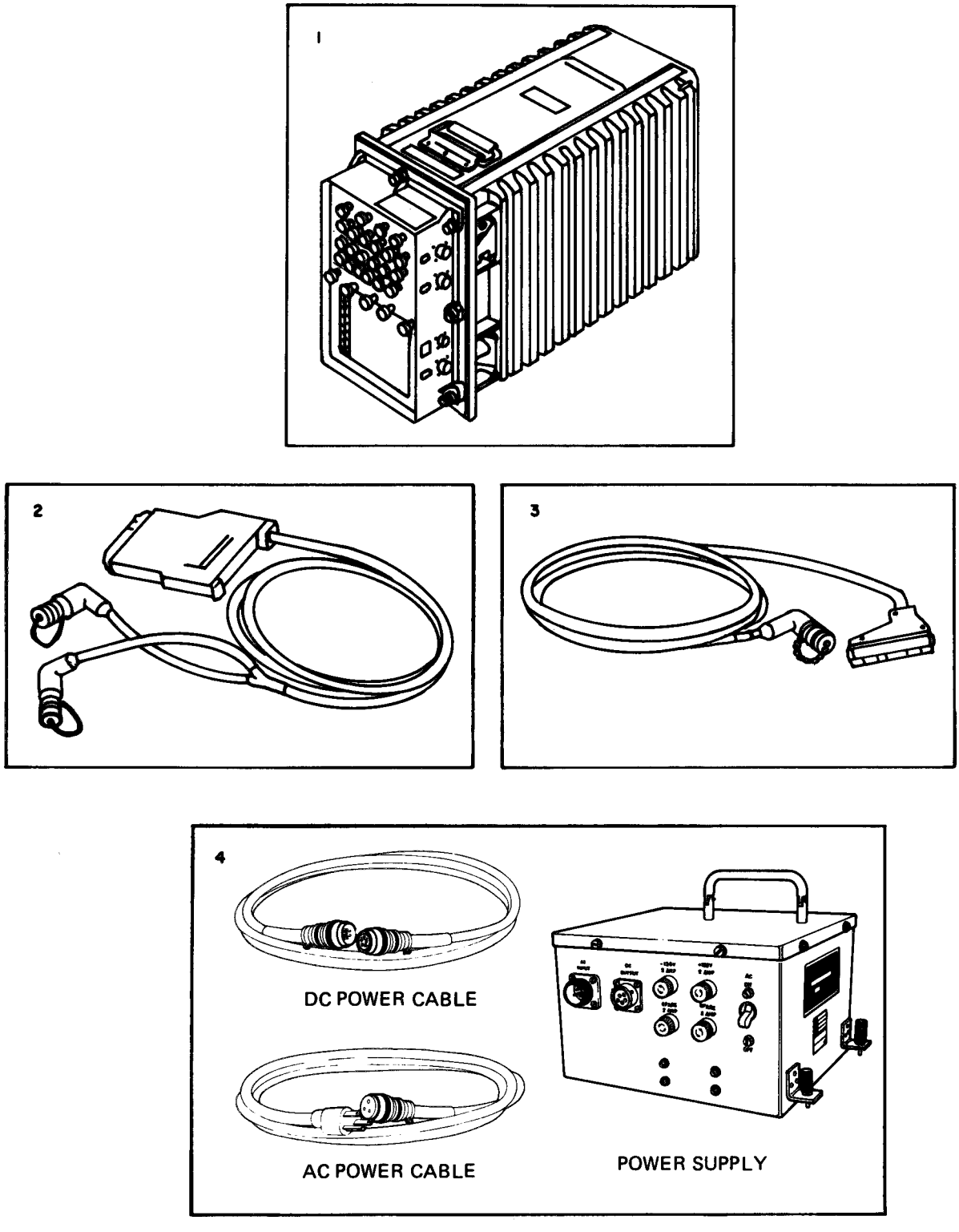


Figure C-1. Module Test Set TS-3317( )/TSQ-73

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

D-1 . SCOPE.

This appendix lists additional items you are authorized for the support of the TS-3317( )/TSQ-73.

D-2. GENERAL.

This list identifies items that do not have to accompany the TS-3317( )/TSQ-73 and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

D-3. EXPLANATION OF LISTING.

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

Section II.
ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION PART NUMBER & FSCM USABLE ON CODE	(3) U/M	(4) QTY AUTH
	MTS Aid Assembly TE113980 (18876)		

APPENDIX E

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain the TS-3317( )/TSQ-73. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

E-2. EXPLANATION OF COLUMNS.

a. Column 1 - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., “Use cleaning compound, item 5, App. D”).

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

C - Operator/Crew
O - Organizational Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

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

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

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

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	0	8010-00-087-0103	Enamel, semigloss, green TT-E-529 (81348)	QT
2	0	8010-00-835-2114	Primer, coative	PT
3	0	5350-00-186-8854	Paper, abrasive	PG
4	0	6810-00-292-9625	Trichlorotrifluoroethane OT620 (81349)	OZ

GLOSSARY

AC . . . . . Alternating current
AD . . . . . Automatic Data processor
ASSY . . . . . Assembly

CUT . . . . . Card under test

DC . . . . . Direct current
DISREP . . . . . Discrepancy in shipment report

EIR . . . . . Equipment improvement recommendation
EXT . . . . . External

F . . . . . Fahrenheit
FI . . . . . Fault isolation

GRN . . . . . Green

HZ . . . . . Hertz

IC . . . . . Integrated Circuit
IFCU . . . . . Interface Control Unit
INT . . . . . Internal
IOU . . . . . Input Output Unit

LRU . . . . . Least replaceable unit
LT . . . . . Light, lit

MAC . . . . . Maintenance allocation chart
MDCS . . . . . Maintenance data collection subsystem
MFG . . . . . Manufacturing
MTS . . . . . Module test set
MWO . . . . . Modification work order

NSN . . . . . National stock number

ORIG . . . . . Original

PARA . . . . . Paragraph
PMCS . . . . . Preventive maintenance checks and services

RECONN . . . . . Reconnect
REF . . . . . Refer. reference
ROD . . . . . Report of discrepancy
RPSTL . . . . . Repair parts and special tools list

SF . . . . . Standard form

TAMES . . . . . The Army maintenance management system
TB . . . . . Terminal board
TM . . . . . Technical manual
TMDE . . . . . Test, measurement, and diagnostic equipment
TS . . . . . Test set

UUT . . . . . Unit under test

V . . . . . Volt
VDC . . . . . Volt, direct current

ALPHABETICAL INDEX

Subject , Para

Subject, Para

ALPHABETICAL INDEX (Cont.)

ALPHABETICAL INDEX (Cont.)

subject, Para

M (Cont.)

Subject, Para

R

ALPHABETICAL INDEX (Cont.)

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
Commander
Stateside Army Depot
ATTN: AMSTA-US
Stateside, N.J. 07703

DATE SENT: 4 April 1978

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5840-340-14&P	23 Jan 74	Radar Set AN/PRC-76

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
E-5				For item 2, change the NSN to read: 5835-00-134-9186. REASON: Accuracy.
E-8		E-3		Identify the cover on the junction box (item no. 5). REASON: It is a separate item and is not called out on figure 19.
E-9				Add the cover of the junction box as an item in the listing for figure 19. REASON: Same as above.

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER: SSG I. M. DeSpiritof 999-1776

SIGN HERE: SSG I.M. DeSpiritof

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