DR 6/11-135A and 135 EC 1×N Frequency Diversity Operation and Maintenance Terminal/Regenerator Replacement Procedures

Contents Page

AT&T— PROPRIETARY
This document contains proprietary information of AT&T and is not to be disclosed or used except in accordance with applicable agreements

Copyright © 1996 AT&T
Unpublished and Not for Publication
All Rights Reserved
Printed in U. S. A.

Contents

Page

Tables

1 Introduction

Use the procedures in this section to replace units in a terminal or regenerator bay.

After you have completed the replacement procedure, return to the flowchart or procedure that sent you to this section. In most cases, additional tests will have to be performed on the replaced unit or on the entire terminal or regenerator.

To replace an entire shelf or backplane pin connectors, refer to the Maintenance Support manual.

NOTE:
If a replacement plug-in (card) does not repair the trouble, it is a good idea to reinstall the original.

1.1 Safety Labels

Safety labels are strategically placed symbols and messages that will alert you to potential risks. There are three types of safety labels.

DANGER:
DANGER *indicates the presence of a hazard that* ***will*** *cause death or severe personal injury if the hazard is not avoided.*

WARNING:
WARNING *indicates the presence of a hazard that* ***can*** *cause death or severe personal injury if the hazard is not avoided.*

CAUTION:
CAUTION *indicates the presence of a hazard that* ***will*** *or* ***can*** *cause minor personal injury or property damage if the hazard is not avoided.*

Within the **CAUTION** safety label, the term "property damage" refers also to possible service interruption or impairment.

Please refer to the Safety Labels heading in the **START HERE** tab for additional information about, and examples of, safety labels.

1.2 Service Protection

Service protection is the critical part of plug-in replacement in a terminal or regenerator. The proper method of protecting service depends upon the following:

- Station (terminal or regenerator)
- Channel (regular or protection)
- Shelf (regular, protection, regenerator, growth, or control and service channel)
- Plug-in type.

Procedure 2, Plug-In Replacement, indicates the service protection required for each plug-in on the various shelves.

For additional service protection information, refer to the **SERVICE PROTECTION** tab.

2 Plug-In Replacement

These procedures guide you through service protection and equipment conditioning steps that must be performed before you replace any unit. You will be referred to Procedure 3.1 for plug-in removal and installation instructions.

2.1 Control and Service Channel Shelf

This procedure is used to replace plug-in units in the control and service channel shelf at terminal or regenerator locations.

NOTE:
Reinsertion of the TERM CONTR plug-in requires a special sequence to properly reboot the system.

CAUTION:
Electrostatic Discharge (ESD) may damage plug-in units. Use proper methods to prevent ESD damage.

CAUTION:
Before removing any plug-in unit on the control and service channel shelf, ensure that the system is in a normal, nonswitched state. If the system is in a switched state, attempt to clear the trouble that caused the switch before changing any plug-in unit. Otherwise, a service failure may result since a switch or lockout may be taken down (dropped) upon removal of a plug-in unit.

Step	Procedure
1	Verify that a replacement plug-in of the same type and code is available.
2	Verify (with alarm center, if necessary) that the system does not have any line or span switch operated.
3	What unit are you going to replace? a. Control (green latch label) plug-in. Go to Step 4. b. Service channel (yellow latch label) plug-in. Go to Step 8. c. POWER UNIT. Go to Step 10.

Control (Green Latch Label) Plug-In Replacement

4 Unseat, and partially remove, the TERM CONTR or REGEN CONTR plug-in.

Reference: Removal and/or Installation under Procedure 3.1, Plug-In (this tab).

5 Replace the faulty or suspected plug-in, if other than a CONTR plug-in.

Reference: Removal and/or Installation under Procedure 3.1, Plug-In (this tab).

6 Insert and reset the replacement or old TERM (or REGEN) CONTR plug-in as follows:

Terminal:

a. Before inserting TERM CONTR plug-in, use a small tool to press and hold the recessed CONTR RESET push-button switch in.

b. Insert unit while holding push button in.

c. Release CONTR RESET push button.

d. Wait for indicator lights to clear.
(The exerciser will run for 10-15 seconds.)

e. Reset again by pressing and holding the CONTR RESET push button in until the CONTR FAIL indicator lights.

f. Release the CONTR RESET push button.
(The exerciser will run again.)

Regenerator:

a. Insert REGEN CONTR plug-in.

b. Use a small tool to press and hold the recessed CONTR RESET push-button switch in until the CONTR FAIL indicator lights.

c. Release the CONTR RESET push button.

7 Return to the procedure or flowchart that referred you to this procedure.

Service Channel (Yellow Latch Label) Plug-In Replacement

CAUTION:
If you remove the SC MULDM, all service channel communication will be lost to this station.

NOTE:
If you are replacing an SC MULDUM or SC EXPN plug-in, remove the 210-type module from the defective unit and reinstall on the replacement plug-in. If a 210-type module is defective, replace only that module on the existing plug-in.

Reference: SC MULDUM, Figure 1.
SC EXPN, Figure 2.

8 Replace the faulty or suspected plug-in.

Reference: Removal and/or Installation under Procedure 3.1, Plug-In (this tab).

9 Return to the procedure or flowchart that referred you to this procedure.

POWER UNIT Replacement

10 Unseat and partially remove, **in this order**, the following plug-in units:

Reference: Removal and/or Installation under Procedure 3.1, Plug-In (this tab).

Terminal:

a. TERM CONTR
b. PROT STAT
c. All equipped CHAN STAT plug-in units
d. TRMT STAT.

Regenerator: REGEN CONTR.

11 Replace the POWER UNIT.

12 Measure and verify correct DC voltages on the replaced unit.

13 Insert, ***in this order***, the following plug-in units:

Terminal:

a. TRMT STAT

b. All equipped CHAN STAT plug-in units

c. PROT STAT.

Regenerator: None.

14 Insert the TERM (or REGEN) CONTR plug-in as follows:

Terminal:

a. Before inserting TERM CONTR plug-in, use a small tool to press and hold the recessed CONTR RESET push-button switch in.

b. Insert unit while holding push button in.

c. Release CONTR RESET push button.

d. Wait for indicator lights to clear.

e. Reset again by pressing and holding the CONTR RESET push button in until the CONTR FAIL indicator lights.

f. Release the CONTR RESET push button.

Regenerator:

a. Insert REGEN CONTR plug-in.

b. Use a small tool to press and hold the recessed CONTR RESET push-button switch in until the CONTR FAIL indicator lights.

c. Release the CONTR RESET push button.

15 Return to the procedure or flowchart that referred you to this procedure.

End of Procedure

2.2 Terminal—Growth Shelf

Only terminal stations are equipped with a growth shelf which is located in the initial bay, above the station control and service channel shelf.

CAUTION:
The ESD may damage plug-in units. Use proper methods to prevent ESD damage.

Step	Procedure
1	Verify that a replacement plug-in of the same type and code is available.
2	Protect service. Lock out the protection channel in both directions.
3	Are you replacing a POWER UNIT? No - Go to Step 4. Yes - Go to Step 7.
4	On the plug-in to be replaced: a. Label all cables connected to the faceplate connectors. b. Remove all cables from the faceplate connectors.
5	Replace the faulty or suspected plug-in. Reference: Removal and/or Installation under Procedure 3.1, Plug-In (this tab).
6	On the replaced plug-in: a. Reconnect cables to their proper connectors on the faceplate. b. Go to Step 8.
7	Replace the faulty or suspected POWER UNIT. Reference: Removal and/or Installation under Procedure 3.1, Plug-In (this tab).
8	Return to the procedure or flowchart that referred you to this procedure.

End of Procedure

2.3 Terminal—Regular Channel Shelf

CAUTION:
The ESD may damage plug-in units. Use proper methods to prevent ESD damage.

Step	Procedure
1	Verify that a replacement plug-in of the same type and code is available.
2	Protect service per Table A.

Table A. Service Protection, Terminal—Regular Channel Shelf

Unit	Plug-In	Service Protection
Receiver	64QAM DEMOD through TERM FRMR*	Manual line switch (receive direction)
	LINE SW through VMR & CODER(s)*	Manual span switch (receive direction)
	BLUE GEN	Not required
	CHAN CONTR†	Lockout (receive direction)
Transmitter	B3ZS DCODR through FRAME GEN*	Manual span switch (transmit direction)
	EC CODER (135 EC) or CRC CODER (135A) through 64QAM MOD*	Manual line switch (transmit direction)
	Any POWER UNIT	Manual span switch (both directions)

* Left to right as viewed from front.

† DIAG Code 60 will appear; after replacement, press ALM RST push button to clear it.

3	Replace the faulty or suspected plug-in. Reference: Removal and/or Installation under Procedure 3.1, Plug-In (this tab).
4	Return to the procedure or flowchart that referred you to this procedure.

End of Procedure

2.4 Terminal—Protection Channel Shelf

CAUTION:
The ESD may damage plug-in units. Use proper methods to prevent ESD damage.

Step	Procedure
1	Verify that a replacement plug-in of the same type and code is available.
2	Protect service per Table B.

Table B. Service Protection, Terminal—Protection Channel Shelf

Unit	Plug-In	Service Protection
Receiver	CHAN CONTR*	Protection lockout (receive direction)
	All other units	Protection lockout (receive direction)
Transmitter	POWER UNITS	Protection lockout (both directions)
	All other units	Protection lockout (transmit direction)

* DIAG Code 60 will appear; after replacement, press ALM RST push button to clear it.

3	Replace the faulty or suspected plug-in.
	Reference: Removal and/or Installation under Procedure 3.1, Plug-In (this tab).
4	Return to the procedure or flowchart that referred you to this procedure.

End of Procedure

2.5 Regenerator—Regenerator Shelf

CAUTION:
The ESD may damage plug-in units. Use proper methods to prevent ESD damage.

Step	Procedure
1	Verify that a replacement plug-in of the same type and code is available.
2	Protect service per Table C.

Table C. Service Protection, Regenerator—Regenerator Shelf

Channel	Plug-In	Service Protection
Regular	Any unit	Manual line switch (channel direction)
Protection	Any unit	Protection lockout (channel direction)

3	Replace the faulty or suspected plug-in. Reference: Removal and/or Installation under Procedure 3.1, Plug-In (this tab).
4	Return to the procedure or flowchart that referred you to this procedure.

End of Procedure

3 Removal and Installation

These procedures describe the removal and installation of plug-in units, fans, or fan control boards in the terminal and regenerator bays.

3.1 Plug-In

This is the procedure that physically removes and installs plug-in units.

Prerequisite: The service-protection and equipment conditioning steps in the appropriate procedure (2.1 through 2.5), in this tab, must be completed before you continue in this procedure.

CAUTION:
The ESD may damage plug-in units. Use proper methods to prevent ESD damage.

CAUTION:
Some units may be hot enough to cause burns. Handle them carefully and let them cool before placing them in a protective wrapping.

Step	Procedure
1	Review the Safety Labels and verify that the prerequisite has been met.
	Removal
2	On the plug-in to be removed: a. Simultaneously: — Release the latch catch. — Pull the latch lever forward. Reference: Figure 3. b. Pull the latch lever down until the unit is released from the backplane connector. c. Hold the plug-in at the top and bottom as you: — Slide it out of the shelf. — Place it in an ESD-protective container.

Installation

3 On the replacement plug-in, simultaneously:

a. Release the latch catch.

b. Pull the latch lever forward.

CAUTION:
Backplane connector damage may occur if the plug-in and the shelf guides are not properly aligned.

4 Carefully align the plug-in with the top and bottom shelf guides.

5 Slide the replacement plug-in into the shelf until the bottom of the latch lever clears the front of the shelf.

6 To seat the plug-in;

a. Simultaneously:

— Apply light pressure to the top of the plug-in.

— Push up on the latch lever.

b. Ensure that the catch has engaged the latch lever.

Reference: Figure 3.

7 Return to the procedure or flowchart that referred you to this procedure.

End of Procedure

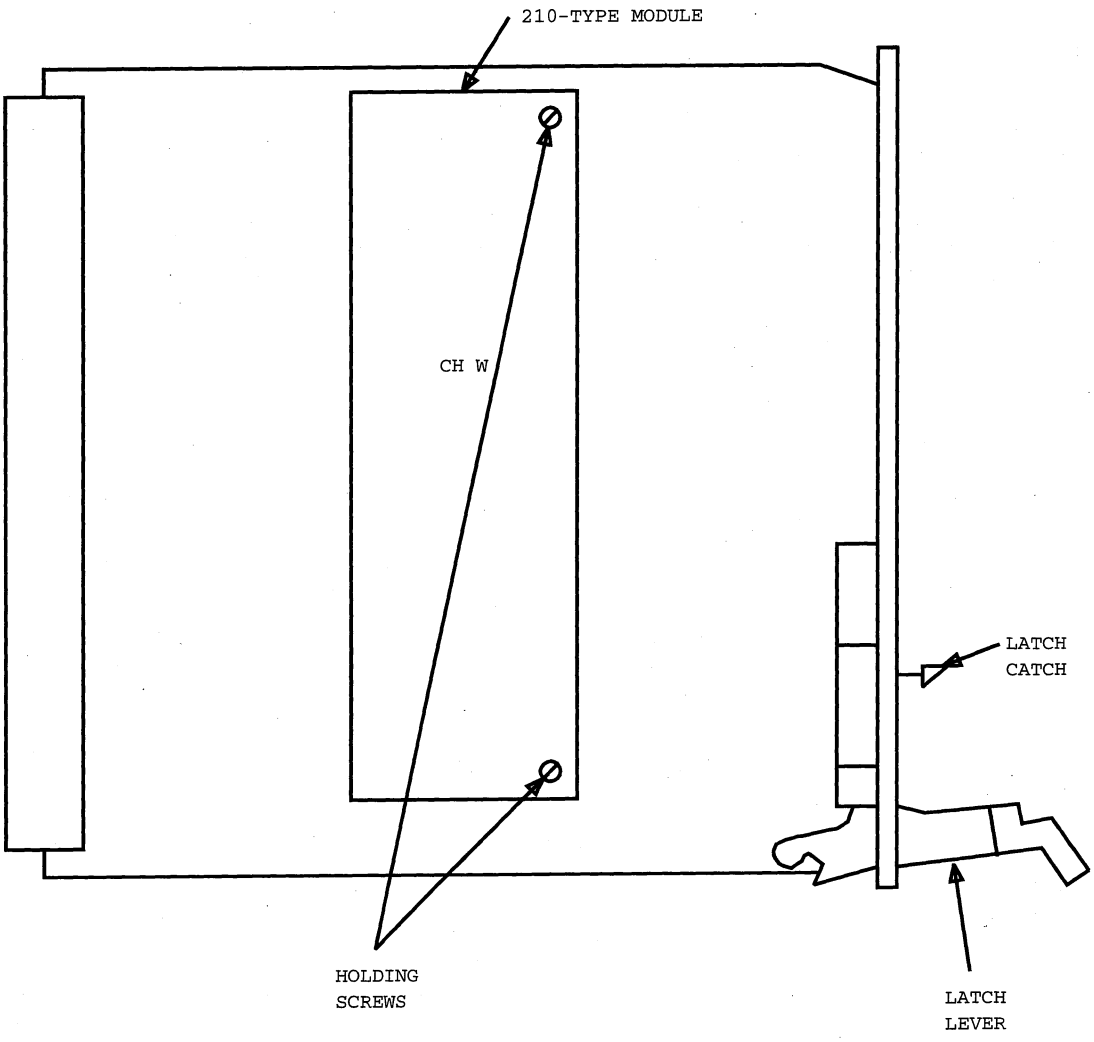

Figure 1. 210-Type Module Location on SC MULDM Unit

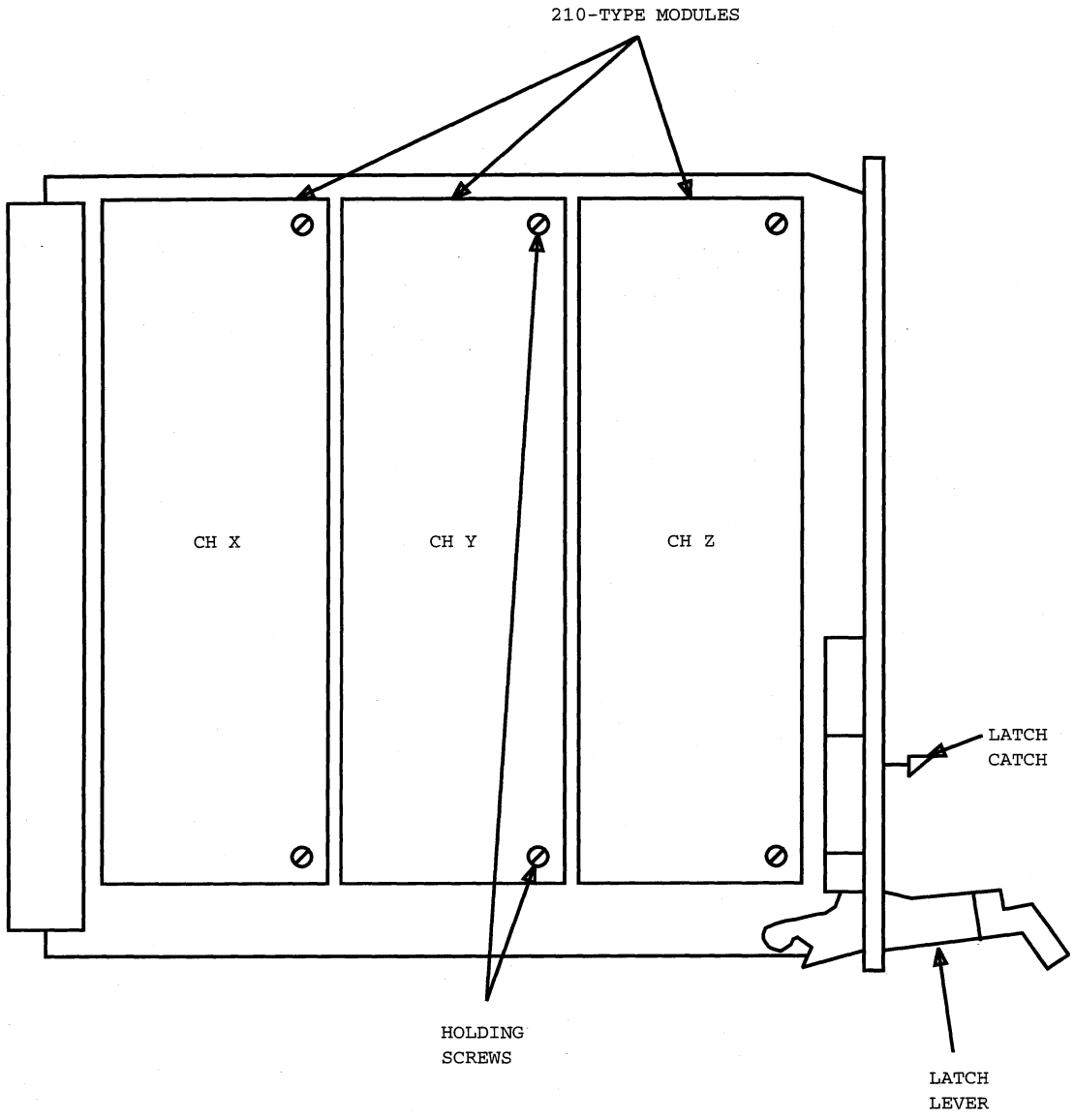

Figure 2. 210-Type Module Locations on SC EXPN Unit

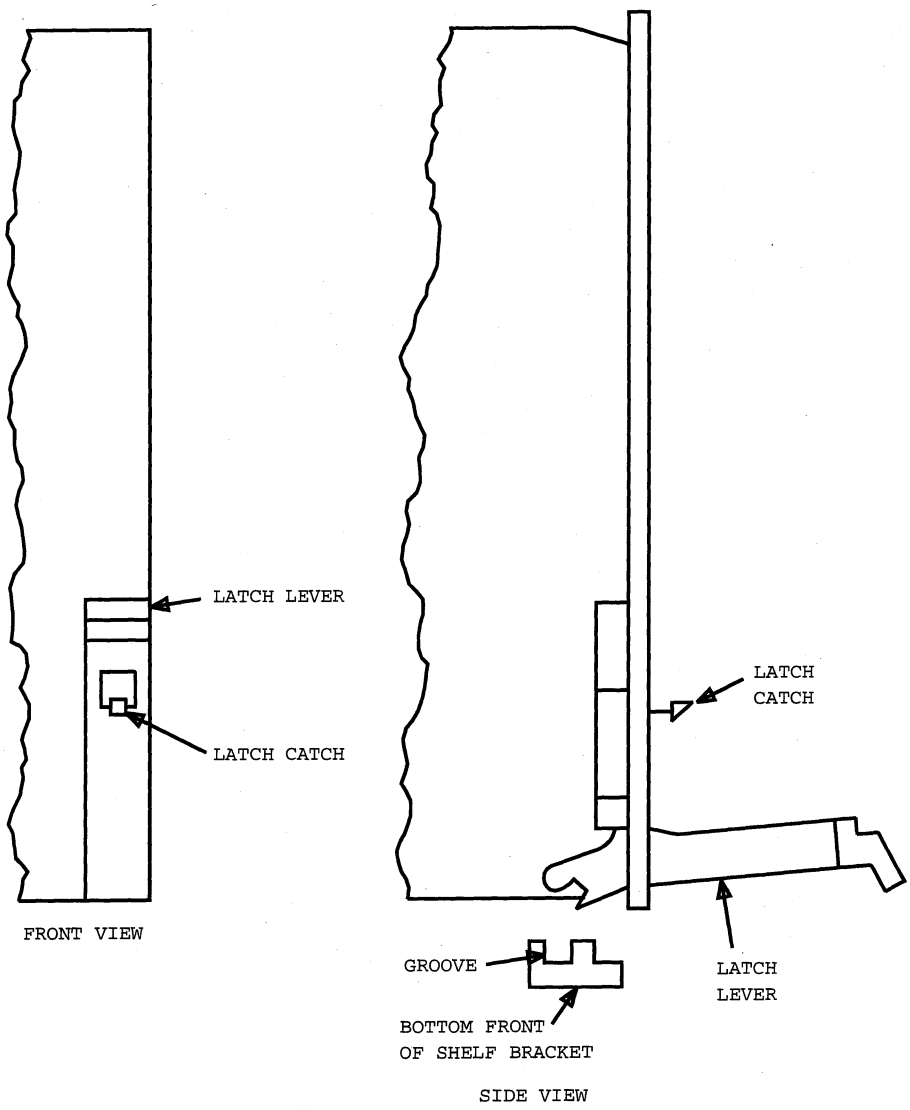

Figure 3. Front and Side View of a Typical Plug-In

3.2 Fan or Fan Control Printed Wiring Board

Use this procedure to replace a fan or a fan control printed wiring board in a terminal or regenerator bay.

CAUTION:
The ESD may damage the printed wiring board. Use proper methods to prevent ESD damage.

CAUTION:
The fan shelf should not be disconnected longer than 30 minutes to prevent overheating in the bay shelves. For longer time intervals, use an external fan to circulate the air.

Required tools: 1 - screwdriver, 2 inch
1 - screwdriver, 10 inch

Step	Procedure
1	On the Terminal or Regenerator bay, remove the bay side covers (if equipped).

Fan Shelf Removal

2 On the fan shelf:

CAUTION:
Protect the pins of the power plug removed in the next step. The pins can be burnt and melted if they are shorted to ground.

a. Disconnect the power plug from the connector on the right side of the fan shelf by simultaneously pushing both plastic latches at the top and the bottom of the connector plug.

b. If equipped, remove the telephone set from the front panel.

c. Remove the four mounting screws from the tabs on each side of the shelf.

d. Slide the shelf forward as you carefully move any cables aside to clear the tabs.

3 Are you replacing a fan or a fan control Printed Wiring Board (PWB)?

Fan - Go to Step 4.

PWB - Go to Step 6.

Fan Removal and Installation

4 On the fan to be removed:

a. Note the polarity stamped on the power plug.

b. Remove the power plug from the fan.

c. Remove the four mounting bolts, lockwashers, and nuts.

d. Remove the fan from the shelf.

5 To install the replacement fan:

a. Place the fan into the shelf with the air-direction arrow pointing up.

b. Fasten the fan to the shelf with the same bolts, lockwashers, and nuts removed in Step 4.

c. Connect the power plug with the same polarity as noted in Step 4.

d. Go to Step 8.

Fan Control PWB Removal and Installation

6 On the fan control PWB:

Reference: Figure 4.

a. Remove the five mounting screws and washers.

b. Move the fan control PWB, simultaneously:

— To the left so the power connector will clear the shelf frame

— Back until the LEDs and fuses clear the front panel of the shelf.

c. One at a time, move the six power leads located at the bottom left of the PWB to corresponding connectors on the replacement PWB.

d. Transfer the telephone wire connector E9, if equipped, to the replacement fan control PWB.

7 To install the replacement fan control PWB:

a. Align the LEDs and fuses with the front-panel openings.

b. Move the PWB to the right so the power connector extends through the hole in the frame shelf.

c. Install the five screws and washers removed in Step 6.

Fan Shelf Installation

8 To install the fan shelf:

a. Carefully slide the fan shelf into the bay as you move any cables aside to clear the mounting tabs.

Comment: You can verify fan operation by reconnecting the power plug and sliding the shelf forward enough to see fan movement.

b. Install the mounting screws removed in Step 2.

c. Reconnect the power plug to the connector on the right side of the shelf and verify that the power plug latches are engaged.

d. If equipped, reinstall the telephone set on the front panel.

NOTE:
The CONTROL fuse may have to be removed and reinserted to reset any FAIL FAN 1, 2, or 3 and associated COM ALARM. At terminal locations, the ALM RST push button on the RCV STAT card will then reset the associated Code 19.

9 Return to the procedure or flowchart that referred you to this procedure.

End of Procedure

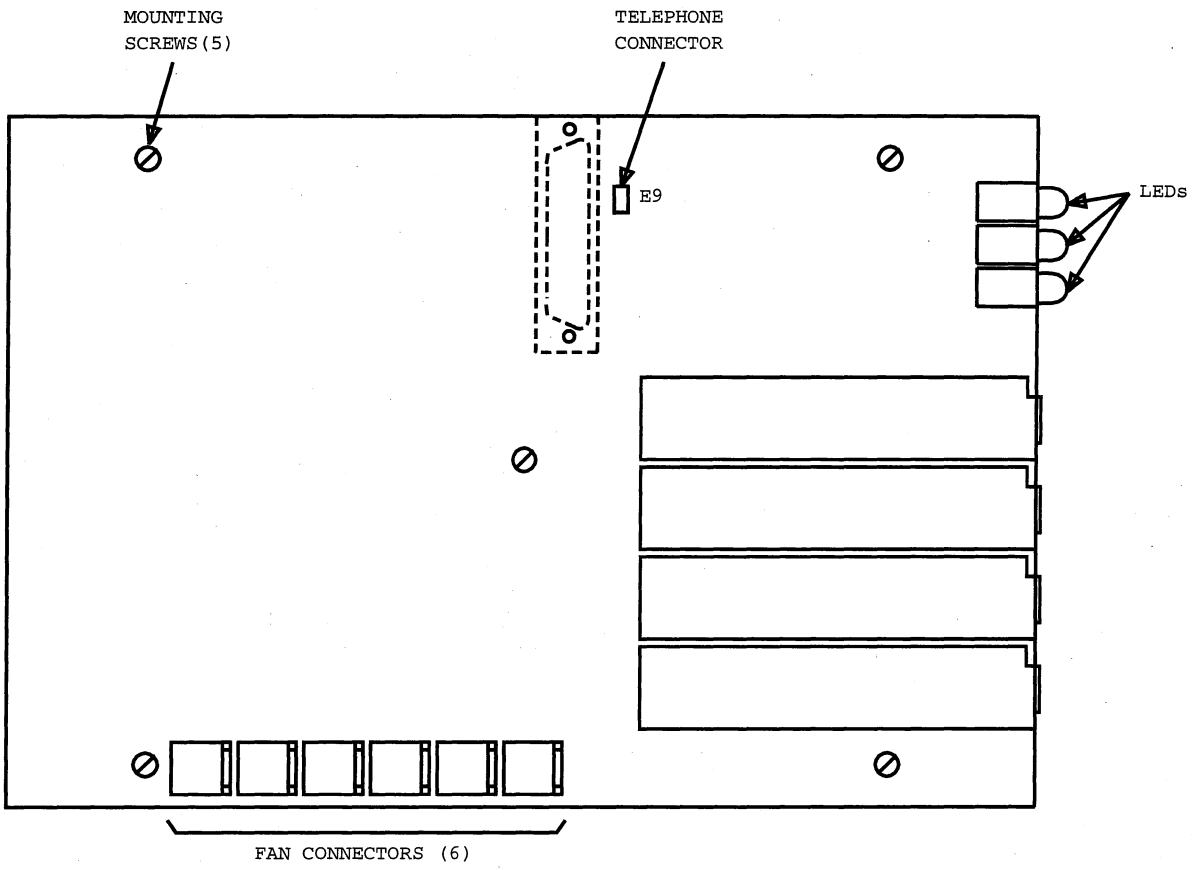

Figure 4. Fan Control PWB—Side View

This page has been intentionally left blank.