

NLite N
6-38 GHz DIGITAL RADIO SYSTEM

Section IV MAINTENANCE

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1. GENERAL

This section provides instructions for maintenance of the NLite N used for 6-38 GHz microwave radio system.

This section provides instructions on the precautions, test setup and accessories, routine maintenance, corrective maintenance and mounting of optional modules.

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2. PRECAUTIONS

The following precautions must be carefully observed during maintenance.

- (a) The maintenance personnel should report arrival and departure from a station to the relevant station. The following are dangers and warnings to the maintenance personnel.

Warning: 1. *The -48 V DC power is superimposed on the centre conductor of the coaxial cable between the MDP and the TRP/ALL INDOOR TRP. Connecting test equipment directly to this terminal may damage it and touching the coaxial cable core may cause electrical shock.*

2. *Persons performing maintenance must take necessary steps to avoid Electro-static Discharge (ESD) which may damage the modules on the MDP or cause error. Wear a conductive wrist strap connected to the grounded (G) jack on the front of the equipment shelf. This will minimize static build-up during maintenance. (see Fig. 2-1).*

3. *Do not remove/connect the IF cable with the MDP power ON. Turn the MDP power OFF before connecting/disconnecting the IF cable, or equipment may be damaged.*

4. *After turning ON the equipment, wait at least 1 minute before turning it OFF again. Repeatedly turning the power ON and OFF within a short interval may cause the MDP to fail.*

5. *Do not allow open or short circuit of TRP/ALL INDOOR TRP TX output with the TX power on conditions. Perform the TX Mute control in the Maintenance mode or turn the PWR switch off at the MDP before disconnecting cable or feeder from the TRP/ALL INDOOR TRP TX output.*

6. *Contact NEC before program download on the LCT is performed. Equipment may not function correctly with improper operation.*

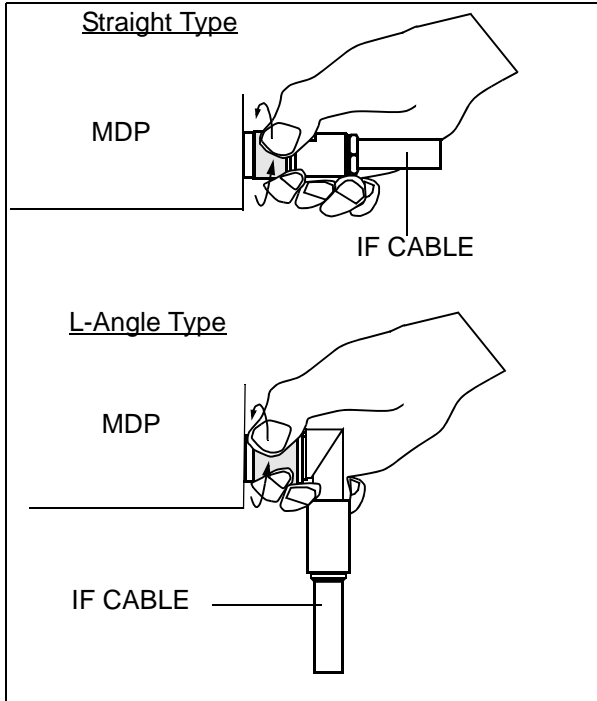
Caution: 1. *The top surface of the MDP above MODEM is hot in operation.*

2. *When replacing the MODEM, 2P LAN INTFC or DC-DC CONV (optional) turn off the PWR switch and disconnect all cables connected to the module which is to be replaced.*

- (b) During maintenance, the MDP should be set to Maintenance “On” condition by the local craft terminal (LCT).
- (c) To avoid traffic interruption, under the maintenance, perform TX/RX SW manual switching in 1+1 system.

Note: When TX/RX SW has been automatically switched during a fault, keep this condition by manual switching operation.

- (d) While the CPU is initialized by the CPU RESET switch, alarm(s) status is reset to normal. After initialization, the alarm information is properly provided through relay contacts.
- (e) Information on the maintenance and the control such as Mute, CW, LB, etc. is released if the power is turned off.
- (f) If each setup item of “Equipment Setup” or “Provisioning” is changed during in operation, traffic will be momentarily interrupted.
- (g) When the TX SW is activated, momentary traffic interruption may occurs.
- (h) Before removing or installing the MDP/TRP, turn off the power switch on the MODEM.
- (i) After completing maintenance, restore all connections, manual control settings to normal and confirm that all alarm LEDs are unlit.
- (j) When replacing the MODEM or 2P LAN INTFC with spare, disconnect every cables connected to the module which is to be replaced, then turn off the power switch on the MODEM, surely.
- (k) After equipment start-up, allow the equipment to warm up at least 30 minutes.

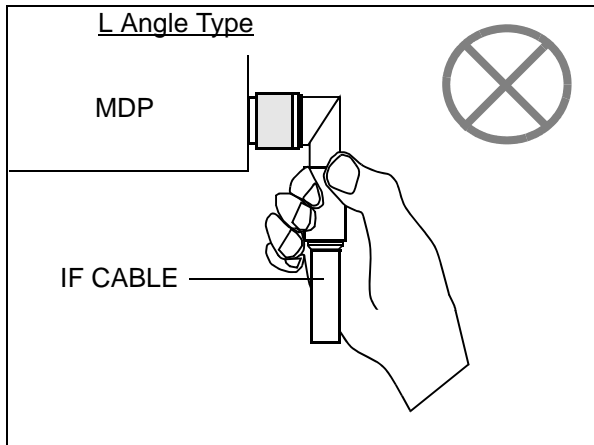


Caution

Tighten the TNC-male connector of IF cable to the MDP with engage connector nut only using fingers and holding the cable with another hand.

Tighten the engage connector nut only for the L-angle connector also.

*(Tightening Torque : 0.3 to 0.5 N•m
(3 to 5kg•cm))*



If rotate other parts of the L-angle connector as illustrated left, it can cause connector damage.

Chart 2-1 Wrist Strap Connection

Step	Procedure
1	Connect the wrist strap to the ESD ground terminal (G).

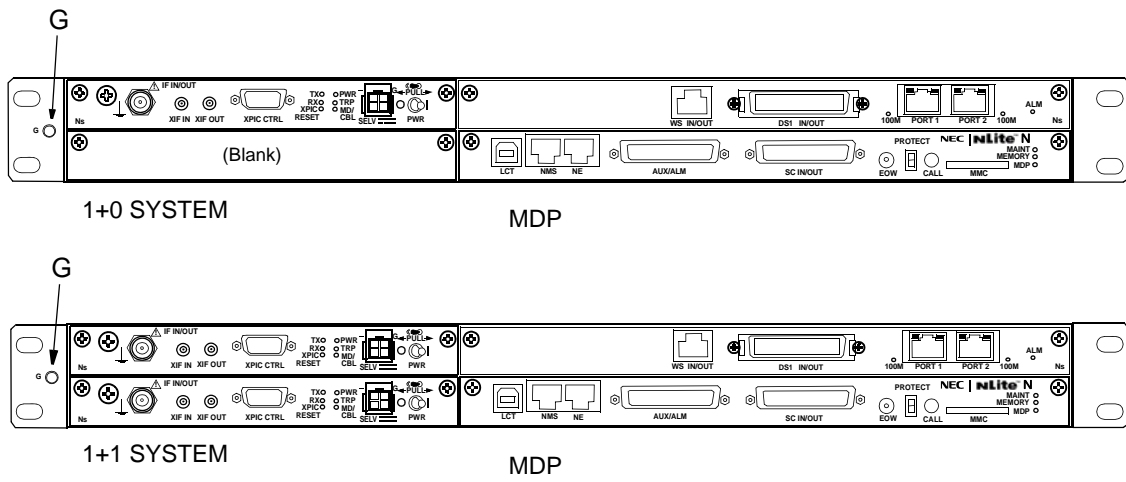
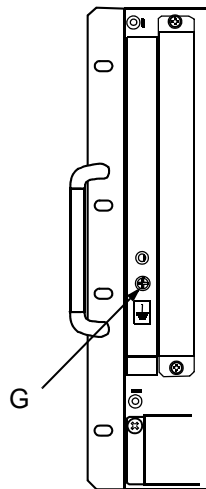


Fig. 2-1 ESD Ground Terminal Location



L6/U6/11 GHz
ALL INDOOR TRP

ALL INDOOR Type TRP

Fig. 2-2 Location of G Terminal (TRP)

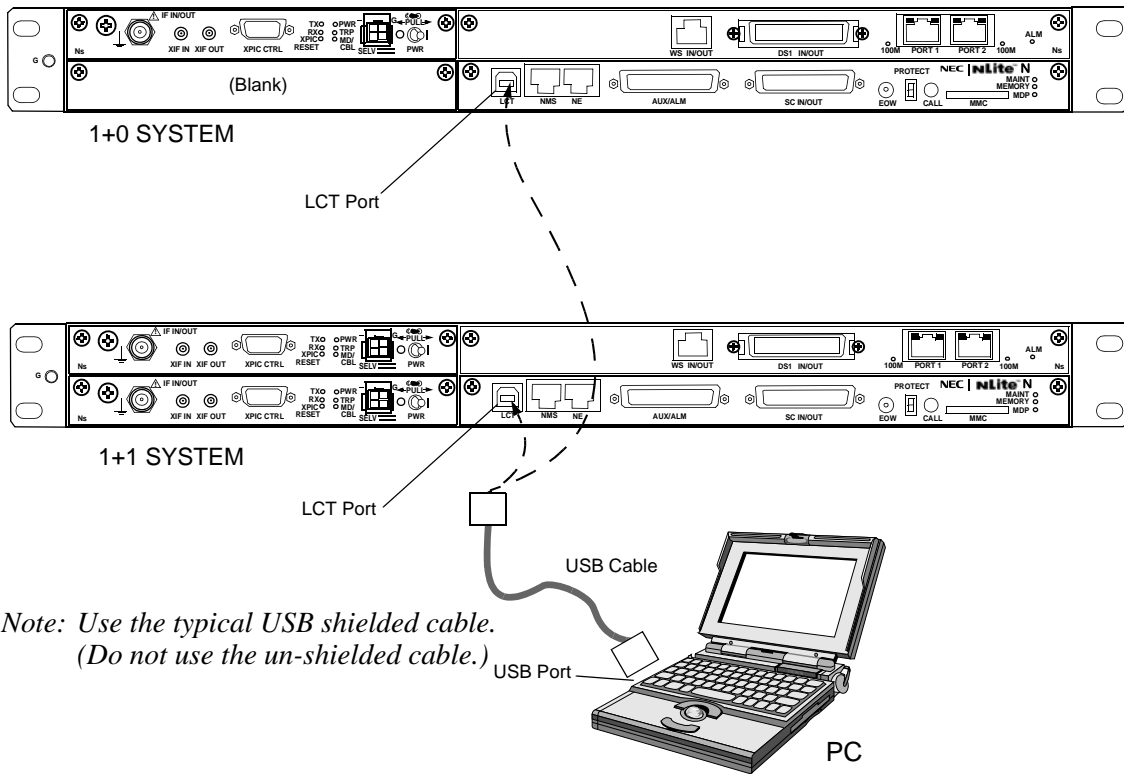
Chart 2-2 Maintenance Mode Setting

Step	Procedure
------	-----------

For the LCT operation, refer to Chapter 6 of LCT Operation in Appendix of this Section IV.

Maintenance Mode Setting

- 1 Connect the USB port and the LCT port of the PC and the LCT using a USB cable. (see Fig. 2-3)



*Note: Use the typical USB shielded cable.
(Do not use the un-shielded cable.)*

Fig. 2-3 LCT Setup

Chart 2-2 Maintenance Mode Setting (Cont'd)

- | Step | Procedure |
|------|-------------------------------------------------------|
| 2 | Enter User name "Admin" and enter the valid Password. |
| 3 | Click on "Login" button. |

LCT Login

User

Password

- | | |
|---|----------------------------------------------|
| 4 | Click on "Maintenance" button in "LCT MENU". |
|---|----------------------------------------------|

LCT MENU

Alarm/Status
Equipment Setup
Inventory
AUX I/O
Maintenance
Maintenance1
Maintenance2
Provisioning
Metering
PMON(History)

- | | |
|---|------------------------------------------------------------------|
| 5 | Click on "Maintenance1" button in "Maintenance" background menu. |
|---|------------------------------------------------------------------|

---Maintenance1---

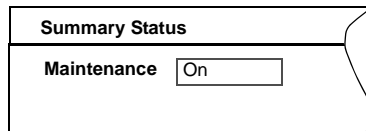
Item	Value	Setting	
Maintenance	Off	<input checked="" type="radio"/> Off <input type="radio"/> On	Set

Chart 2-2 Maintenance Mode Setting (Cont'd)

Step	Procedure
6	Click on “On” Setting button of the Maintenance, click on “Set” button, then Maintenance Value turns to “On” and Maintenance status in “Summary Status area turns to “On”.

---Maintenance1---

Item	Value	Setting	Set
Maintenance	On	<input type="radio"/> Off <input checked="" type="radio"/> On	Set



Notes: 1. To perform setup and control the equipment, it must be set to Maintenance “On” mode using LCT.

2. In Maintenance “On” mode, RL3 to RL6 external alarm outputs are masked and automatic control is inhibited.

Restoring to Normal Mode

- 7 Click on “Maintenance1” button.
- 8 Click on “Off” or “Auto” control button and click “Set” button for each control item which has been manually controlled.
- 9 Click on “Off” setting button of Maintenance.
- 10 Check that there is not coloured yellow items and Maintenance “Off”, is displayed in Progress Status.

Note: To restore the Maintenance mode to normal mode, first reset the control from control “On” to control “Off” (or Auto), then set the mode to Maintenance “Off”.

Chart 2-3 Manual Switchover Operation (only 1+1 Configuration)

Step	Procedure
	For the LCT operation, refer to Chapter 6 of LCT Operation in Appendix of this Section IV.
1	Connect the USB port and the LCT port of the PC and the LCT using a USB cable, (see Fig. 2-3)
2	Login to the LCT with User name “Admin” and Admin “Password”.
3	Click on “Maintenance” button in “LCT MENU” and click on “Maintenance1” button in Maintenance background menu.
	<i>Notes 1. Control items can be performed only when the MAINT mode is “On”.</i>
	<i>2. Control items displayed on the LCT vary depending on system configuration.</i>
4	Click on TX SW and/or RX SW to desired “No.1”, “No.2” or “Auto” button.
5	Click on “Set” button.

---Maintenance1---

Item	Value	Setting	
Maintenance	On	<input type="radio"/> Off <input checked="" type="radio"/> On	Set
TX SW Manual Control	No.1	<input type="radio"/> Auto <input checked="" type="radio"/> No.1 <input type="radio"/> No.2	Set
RX SW Manual Control	Auto	<input checked="" type="radio"/> Auto <input type="radio"/> No.1 <input type="radio"/> No.2	Set

- 6 After test has been completed, set the TX SW and RX SW to “Auto” position.
- 7 Set maintenance mode to “Off” according to Chart 2-2.

3. TEST SETS AND ACCESSORIES

The test sets and special accessories listed in Table 3-1 are required for maintenance. If recommended test sets and accessories are not available, equivalents may be used.

Table 3-1 Test Sets and Accessories

No.	Model Type	Model Number	Manufacture
1	SONET/SDH/PDH Analyzer	XTA Modules CMA5000a /MP1570A*	ANRITSU
2	Optical Variable Attenuator	MN95D	ANRITSU
3	Digital Multimeter	34401A	Agilent
4	Screwdriver	—	—
5	T Type Hexagonal Driver	—	—
6	Torque Wrench	—	—
7	PC for Local Craft Terminal (LCT)**	—	—

Notes: 1. * Discontinued Model.

2. ** Refer LCT Operation in Appendix in this Section IV.

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4. ROUTINE MAINTENANCE

This chapter provides the routine (annually) maintenance procedures to ensure the satisfactory operation of the equipment. During routine maintenance, carefully observe the precautions given in Chapter 2.

4.1 Meter Reading

Chart 4-1 Meter Reading

Step	Procedure
	For the LCT operation, refer to Chapter 6 of LCT Operation in Appendix of this Section IV.
1	Connect the PC to the MDP using USB cable. (Refer to Fig. 2-3 in Chart 2-2)
2	Login to the LCT with User name "User".
3	Click on "Metering" button in "LCT MENU".

LCT MENU

Alarm/Status
Equipment Setup
Inventory
AUX I/O
Maintenance
Provisioning
Metering
PMON (History)

---Metering---

	No.1	No.2
TX Power [dBm]	+0.7	*
RX Level [dBm]	-65.2	-70.0
TRP Power Supply [V]	-45	-45
BER	1.0E-10	Calculating

- Notes:*
1. If an abnormal indication appears, check Alarm/Status, performance monitor and perform loopback test to distinguish sections of normal and alarmed.
 2. RX LEV varies depending on received RF signal level.
 3. Power Supply voltage at TRP/ALL INDOOR TRP varies depending on IF cable length between the MDP and TRP/ALL INDOOR TRP.
 4. During total number of erroneous bits and total number of correctly received bits are calculating, "Calculating" is displayed.
 5. 1.0E-10 is indicted equal to 1×10^{-10} .

4.2 Performance Monitoring

Chart 4-2 Performance Monitoring

Step	Procedure
------	-----------

LCT MENU

Alarm/Status
Equipment Setup
Inventory
AUX I/O
Maintenance
Provisioning
Metering
PMON (History)

For the LCT operation, refer to Chapter 6 of LCT Operation in Appendix of this Section IV.

- 1 Connect the PC to the MDP using USB cable. (Refer to Fig. 2-3 in Chart 2-2)
- 2 Login to the LCT with User name "User".
- 3 Click on "PMON (History)" in "LCT MENU".

PMON (History)
RX Level (24h/15min)
RX Level (7days/day)
Total (24h/15min)
Total (7days/day)
CSU (24h/15min)
CSU (7days/day)
RMON (Line) (24h/15min)
RMON (Line) (7days/day)
RMON (DMR) (24h/15min)
RMON (DMR) (7days/day)

- 4 Click on "RX level (24h/15min)" sub-menu button in "PMON (History)".

---RX Level (15min)--- : Maintenance Mode On : Current Time

Date	Time	Status	MIN(No.1)	MAX(No.1)	MIN(No.2)	MAX(No.2)
2009/01/05	15:30-15:45		-59.7	-58.6	-59.3	-58.1
2009/01/05	15:45-16:00		-59.8	-58.7	-58.7	-58.2
2009/01/05	16:00-16:15		-59.5	-59.0	-58.7	-58.2
2009/01/05	16:15-16:30		-59.5	-59.0	-58.7	-58.2
2009/01/05	16:30-16:45		-59.5	-59.0	-71.2	-58.2
2009/01/05	16:45-17:00		-74.2	-55.8	-58.8	-54.1
2009/01/05	17:00-17:15		-59.5	-57.9	-58.8	-58.1

Detailed 24 hours 15min RX Level performance monitor data are displayed.

Chart 4-2 (Cont'd)

Step	Procedure
------	-----------

- Click on “RX level (7days/day)” sub-menu button in “PMON (History)”.

---RX Level (1day)--- : Maintenance Mode On

Date	Status	MIN(No.1)	MAX(No.1)	MIN(No.2)	MAX(No.2)
2009/01/01		-59.7	-58.6	-59.3	-58.1
2009/01/02		-59.8	-58.7	-58.7	-58.2
2009/01/03		-59.5	-59.0	-58.7	-58.2
2009/01/04		-59.5	-59.0	-58.7	-58.2
2009/01/05		-59.5	-59.0	-71.2	-58.2
2009/01/06		-74.2	-55.8	-58.8	-54.1
2009/01/07		-59.5	-57.9	-58.8	-58.1

Detailed 7days daily RX Level performance monitor data are displayed.

- Click on “Total (24h/15min)” sub-menu button in “PMON (History)”.

---Total (15min)--- : Maintenance Mode On : Current Time

Date	Time	Status	OFS	SEP	BBE	ES	SES	UAS
2009/01/05	15:30-15:45		0	0	0	0	0	0
2009/01/05	15:45-16:00		0	0	0	0	0	0
2009/01/05	16:00-16:15		0	0	0	0	0	0
2009/01/05	16:15-16:30		0	0	0	0	0	0
2009/01/05	16:30-16:45		0	0	0	0	0	0
2009/01/05	16:45-17:00		0	0	0	0	0	0
2009/01/05	17:00-17:15		0	0	0	0	0	0

Detailed 24 hours 15min Total performance data are displayed.

- Click on “Total (7days/day)” sub-menu button in “PMON (History)”.

Chart 4-2 (Cont'd)

Step	Procedure
------	-----------

---Total (1day)--- : Maintenance Mode On

Date	Status	OFS	SEP	BBE	ES	SES	UAS
2009/01/01		0	0	0	0	0	0
2009/01/02		0	0	0	0	0	0
2009/01/03		0	0	0	0	0	0
2009/01/04		0	0	0	0	0	0
2009/01/05		0	0	0	0	0	0
2009/01/06		0	0	0	0	0	0
2009/01/07		0	0	0	0	0	0

Detailed 7days daily total performance monitor data are displayed.

- 8 Click on “RMON (Line) (24h/15min)” sub-menu button in “PMON (History)”.
- 9 Click on “CSU (24h/15min)” sub-menu button in “PMON (History)”.

---CSU (15min)--- : Maintenance Mode On : Current Time

Date	Time	Incoming CV-L		Incoming CV-P		Outgoing CV-P	
		Status	Count	Status	Count	Status	Count
2009/01/05	15:30-15:45		0		0		0
2009/01/05	15:45-16:00		0		0		0
2009/01/05	16:00-16:15		0		0		0
2009/01/05	16:15-16:30		0		0		0
2009/01/05	16:30-16:45		0		0		0
2009/01/05	16:45-17:00		0		0		0
2009/01/05	17:00-17:15		0		0		0

Detailed 24 hours 15 min Total performance data are displayed.

Chart 4-2 (Cont'd)

Step	Procedure
------	-----------

10	Click on “CSU (7days/day)” sub-menu button in “PMON (History)”.
----	-----------------------------------------------------------------

--CSU (1day)---

: Maintenance Mode On : Current Time

Date	Time	Incoming CV-L		Incoming CV-P		Outgoing CV-P	
		Status	Count	Status	Count	Status	Count
2009/01/01			0		0		0
2009/01/02			0		0		0
2009/01/03			0		0		0
2009/01/04			0		0		0
2009/01/05			0		0		0
2009/01/06			0		0		0
2009/01/07			0		0		0

Detailed 7days daily total performance monitor data are displayed.

11	Click on “RMON (Line) (24h/15min)” sub-menu button in “PMON (History)”.
----	-------------------------------------------------------------------------

--RMON (Line) (15min)---

: Maintenance Mode On : Current Time

Port1 ▼

Date	Time	Status	1	2	3	4	5
2009/01/05	00:00-00:15						
2009/01/05	00:15-00:30						
2009/01/05	00:30-00:45						
2009/01/05	00:45-01:00						
2009/01/05	01:00-01:15						
2009/01/05	01:15-01:30						
2009/01/05	01:30-01:45						
2009/01/05	01:45-02:00						
2009/01/05	02:00-02:15						
2009/01/05	02:15-02:30						
2009/01/05	02:30-02:45						
2009/01/05	02:45-03:00						
2009/01/05	03:00-03:15						
2009/01/05	03:15-03:30						
2009/01/05	03:30-03:45						
2009/01/05	03:45-04:00						
2009/01/05	04:00-04:15						
2009/01/05	04:15-04:30						
2009/01/05	04:30-04:45						
2009/01/05	04:45-05:00						
2009/01/05	05:00-05:15						

- 1: RX Unicast PKTS
- 2: RX Broadcast PKTS
- 3: RX Multicast PKTS
- 4: RX Pause PKTS
- 5: RX CRC Errors
- 6: RX Align Errors
- 7: RX Symbol Errors
- 8: RX Undersize PKTS
- 9: RX Fragments
- 10: RX PKTS 64
- 11: RX PKTS 65-127
- 12: RX PKTS 128-255
- 13: RX PKTS 256-511
- 14: RX PKTS 512-1023
- 15: RX PKTS 1024-1536
- 16: RX PKTS 1537-MAX
- 17: RX Jabbers
- 18: TX Unicast PKTS
- 19: TX Broadcast PKTS
- 20: TX Multicast PKTS
- 21: TX Pause PKTS
- 22: TX Total Collisions

Chart 4-2 (Cont'd)

Step

Procedure

- Detailed 24 hours 15min Line (LAN) RMON (Remote Network Monitoring) data are displayed.
- 12 Click on “RMON (Line) (7days/day)” sub-menu button in “PMON (History)”.

---RMON (Line) (1day)--- Maintenance Mode On

Port1 ▼

Date	Time	Status	1	2	3	4	5	6

- 1: RX Unicast PKTS
- 2: RX Broadcast PKTS
- 3: RX Multicast PKTS
- 4: RX Pause PKTS
- 5: RX CRC Errors
- 6: RX Align Errors
- 7: RX Symbol Errors
- 8: RX Undersize PKTS
- 9: RX Fragments
- 10: RX PKTS 64
- 11: RX PKTS 65-127
- 12: RX PKTS 128-255
- 13: RX PKTS 256-511
- 14: RX PKTS 512-1023
- 15: RX PKTS 1024-1536
- 16: RX PKTS 1537-MAX
- 17: RX Jabbers
- 18: TX Unicast PKTS
- 19: TX Broadcast PKTS
- 20: TX Multicast PKTS
- 21: TX Pause PKTS
- 22: TX Total Collisions

Detailed daily Line (LAN) RMON (Remote Network Monitoring) data are displayed.

Chart 4-2 (Cont'd)

Step	Procedure
13	Click on “RMON (DMR) (24h/15min)” sub-menu button in “PMON (History)”.

---RMON(DMR)(15min)--- Maintenance Mode On : Current Time

Port1 ▼

Date	Time	Status	1	2	3	4	5
2006/01/05	00:00-00:15						
2006/01/05	00:15-00:30						
2006/01/05	00:30-00:45						
2006/01/05	00:45-01:00						
2006/01/05	01:00-01:15						
2006/01/05	01:15-01:30						
2006/01/05	01:30-01:45						
2006/01/05	01:45-02:00						
2006/01/05	02:00-02:15						
2006/01/05	02:15-02:30						
2006/01/05	02:30-02:45						
2006/01/05	02:45-03:00						
2006/01/05	03:00-03:15						
2006/01/05	03:15-03:30						
2006/01/05	03:30-03:45						
2006/01/05	03:45-04:00						

- 1: RX Unicast PKTS
- 2: RX Broadcast PKTS
- 3: RX Multicast PKTS
- 4: RX Pause PKTS
- 5: RX CRC Errors
- 6: RX Fragments
- 7: RX PKTS 64
- 8: RX PKTS 65-127
- 9: RX PKTS 128-255
- 10: RX PKTS 256-511
- 11: RX PKTS 512-1023
- 12: RX PKTS 1024-1536
- 13: RX PKTS 1537-MAX
- 14: RX Jabbers
- 15: TX Unicast PKTS
- 16: TX Broadcast PKTS
- 17: TX Multicast PKTS
- 18: TX Pause PKTS

Detailed 15 minutes DMR (LAN) RMON (Remote Network Monitoring) data are displayed.

Chart 4-2 (Cont'd)

Step	Procedure
14	Click on “RMON (DMR) (7days/day)” sub-menu button in “PMON (History)”.

---RMON(DMR)(1day)--- Maintenance Mode On

Port1 ▼

Date	Time	Status	1	2	3	4	5	6	
									1: RX Unicast PKTS
									2: RX Broadcast PKTS
									3: RX Multicast PKTS
									4: RX Pause PKTS
									5: RX CRC Errors
									6: RX Fragments
									7: RX PKTS 64
									8: RX PKTS 65-127
									9: RX PKTS 128-255
									10: RX PKTS 256-511
									11: RX PKTS 512-1023
									12: RX PKTS 1024-1536
									13: RX PKTS 1537-MAX
									14: RX Jabbers
									15: TX Unicast PKTS
									16: TX Broadcast PKTS
									17: TX Multicast PKTS
									18: TX Pause PKTS

Detailed daily DMR (LAN) RMON (Remote Network Monitoring) data are displayed.

5. CORRECTIVE MAINTENANCE

Corrective maintenance done in the field is described in this chapter. Corrective maintenance in the field covers fault isolation, module/unit replacement and alignment. The fault location procedures describes how to isolate module-level/unit-level faults.

Faults can be classified into those that cause deterioration of the transmission quality and those that interrupt the traffic due to a malfunction of the equipment. This chapter explains the troubleshooting procedures for equipment faults and the corresponding remedial methods. The purpose of troubleshooting malfunctioning equipment is to restart the service by locating the faulty part and replacing it with a spare.

The faults that cause deterioration in the transmission quality are primarily originated by changes occurred in the state of propagation. Therefore, if a decline in the transmission quality or similar fault takes place frequently, the link design will have to be reviewed.

During the corrective maintenance, carefully observe the precautions given in Chapter 2, until the alignment is completed.

5.1 Alarm/Status

When an alarm event has occurred, At first, check alarm indication on the front of the MDP. Continuously, connect the PC to the LCT jack on the MDP and check alarm/status indication, Meter Reading on the LCT.

(a) Check of the ALM LED Indications and LCT Indication

A faulty part can be located by checking the ALM LED indicators and LCT Alarm indications. For the explanation of the ALM LED indication, refer to Chapter 2 OPERATING EQUIPMENT in Section II. Also refer to Chapter 2 Alarm/Status in this Section IV APPENDIX LCT OPERATION.

(b) Meter Readings

Based on the meter readings during periodical inspection with LCT described in Chapter 4, a faulty part can be located by checking if the reading values exceed the permissible ranges.

(c) Loopback

In the case of an abnormal BER measurement result among the meter reading items, try to distinguish the faulty part by Chart 5.1.3 Loopback.

5.1.1 Alarm and Status

The alarm and status of each module and TRP/ALL INDOOR TRP are displayed. Each items is explained below.

TRP/ALL INDOOR TRP

TX Power: Indicates the status of the transmitter in the TRP/ALL INDOOR TRP. When the transmission level is decreased 3 dB or more from preset ATPC minimum level, "Alarm" is issued.

TX Input: Indicates the status of the TRP/ALL INDOOR TRP input signal from MDP. When the input signal from the MDP is lost, "Alarm" is issued.

RX Level: Indicates the status of the received RF signal level of the TRP/ALL INDOOR TRP. When the level decreased below the RX threshold level, "Alarm" is issued.

APC: Indicates the status of the synthesizer in the TRP/ALL INDOOR TRP. When any abnormality occurs in the synthesizer, "Alarm" is issued.

TRP CPU/Cable Open:
Indicates the status of the CPU in the TRP/ALL INDOOR TRP or IF cable, When any abnormality occurs the CPU operation or IF cable is open, "Alarm" issued.

Mute Status: Indicates the control status of the TRP/ALL INDOOR TRP TX power output. When the TX power is set to Mute, "On" is issued.

TX SW Lock in Status:
Indicates the status of "TX SW Lock in Status".

TX SW Reverse REQ:
Indicates the detection of transmitting Reverse Function.

TX SW Status (for 1+1 configuration):
Indicates the TX SW status for the No. 1 or No. 2 CH selection.

RX SW Status (for 1+1 configuration):
Indicates the RX SW status for the No. 1 or No. 2 CH selection.

MODEM

Unequipped: Indicates the status of the MODEM existence. When the MODEM is loose contact or it is not mounted according to the "Equipment Setup", "Alarm" is issued.

Type Mismatch:

Indicates installed MODEM type status. When the MODEM that is not used for NLite N is installed in the NLite N MDP, "Alarm" is issued.

Module: Indicates the status of the modulator-demodulator. When a failure occurred in the modulator-demodulator and as a result of a LSI failure, "Alarm" is issued.

LOF: Indicates the frame synchronization status. When the synchronization from DMR is lost, "Alarm" is issued.

Frame ID: Indicates the status of ID number against MODEM of opposite station or the other channel in Twinpath configuration. When ID number assignment is improper, "Alarm" is issued.

High BER: Indicates the quality severe deterioration status between radio sections. When the signal deteriorates below the threshold preset value, "Alarm" is issued. The settable threshold values are: 1E-3, 1E-4 and 1E-5.

Low BER: Indicates the quality unsevere deterioration status between radio sections. When the signal deteriorates below the preset threshold value, "Alarm" is issued. The settable threshold values are: 1E-6, 1E-7, 1E-8 and 1E-9.

Early Warning:

Indicates quality deterioration status. When the signal deteriorates below the preset threshold level, "Alarm" is issued. (When the Early Warning is used for protection switchover in 1+1 configuration, RX Hitless Switch is operated.) The preset threshold level is less than 1E-9.

MOD: Indicates the operating status of the MOD. When any failure occurs in the modulator section, "Alarm" is issued.

DEM: Indicates the operating status of the DEM. When any failure occurs in the demodulator section, "Alarm" is issued.

Input Voltage: Indicates the power supply input voltage status. When power supply is exceeding the limited, "Alarm" is issued.

Power Supply: Indicates the operating status of the power supply. When power supply is abnormal, "Alarm" is issued.

IF Cable Short: Indicates the status of IF cable between MDP and TRP/ALL INDOOR TRP. When a short circuit is caused between TRP/ALL INDOOR TRP and the MDP, "Alarm" is issued.

Cable EQL: Indicates the status of IF cable equalizer. When equalizer characteristics control is lost, "Alarm" is issued.

Linearizer Function: Indicates the status of linearizer function.
OPR: When the linearizer function is used.
NO OPR: When the linearizer function is not used. In this case, TX output power decreases approx. 4 dBm from a standard value.
N/A: When the TRP/ALL INDOOR TRP is used without linearizer function.

Linearizer: Indicates the linearizer operating status. When linearizer operation is improper in OPR condition, "Alarm" is issued.

ATPC Power Mode: Indicates the status of ATPC operation mode. When the ATPC function is improper, stop the control and maintain the TX output level at HOLD/MAX/MIN selectable.

INTFC

Unequipped: Indicates the existence status of the () INTFC. When the () INTFC is not equipped, "Alarm" is issued.

Type Mismatch:

Indicates the mounted status of the () INTFC. When the INTFC type is not coincided with the inventory list, "Alarm" is issued.

Module: Indicates the operating status of the () INTFC. When any failure occurs in the INTFC Module, "Alarm" is issued.

Input LOS CH:

Indicates the input status of the input DS1 signal from MUX. When the input is disconnected, "Alarm" is issued.

AIS Received CH:

Indicates the DS1 signal transmitting status. When AIS is received from MUX, "Alarm" is issued.

AIS Generated CH:

Indicates the DS1 signal receiving status. When AIS is generated in the 2P LAN INTFC, the status is issued.

Usage Error CH:

Indicates the status for the DS1 WS signal input. When the input signal DS1 WS is applied to the input interface which is adjusted to "Not Used", this alarm is issued. this indicates only when CH Usage Error Report has been selected.

In-band NELB CH:

Indicates the In-band NELB (Near End Loopback) status.

In-band FELB CH:

Indicates the DS1 In-band FELB (Far End Loopback) status.

WS Input LOS:

Indicates the operating status of the 2P LAN. When DS1 WS input signal is lost, "Alarm" is issued.

WS AIS Received:

Indicates the DS1 WS signal transmitting status. When WS AIS is received in the 2P LAN INTFC, "Alarm" is issued. (The indication is available only when "Reported" is selected)

WS AIS Generated:

Indicates the DS1 WS signal receiving status. When WS AIS is generated in the 2P LAN INTFC, status is issued. (The indication is available only when "Reported" is selected)

WS Usage Error:

Indicates the status for the DS1 WS signal input. When the input signal DS1 WS is applied to the input interface which is adjusted to "Not Used", this alarm is issued. this indicates only when CH Usage Error Report has been selected.

LAN Link:

Indicates the status of Link between related equipment and Port (). Indicates "Link" when the Port is linked with related equipment and indicates "Alarm" in other case.

LAN Collision:

Indicates the status of Collision in Half Duplex mode. In Full Duplex mode, "Normal" is always displayed. Indicates status when Port () is in collision condition.

Link Loss Forwarding:

Indicates the operating status during the fault in opposite station or when the link of local Port () LAN is disconnected by the fault of radio section. When any failure occurs in the MAIN INTFC, "Alarm" is also issued.

Speed & Duplex:

Indicates the operating mode of Port ().

Inphase:

Indicates the received signal DADE status between No. 1 and No. 2 at 2P LAN INTFC. When the received signal delay time is out of permissible range, Outphase alarm is issued.

UAE

UAE: Indicates the UAS status.

CTRL

CTRL Module:

Indicates the operating status of the CTRL. When any failure occurs in the CTRL Module, "Alarm" is issued.

MMC: Indicates the MMC status. When the mounted MMC is detected, "On" is displayed.

TCN-RX LEV

TCN-RX LEV-15min:

Indicates the RX Level threshold crossing (15min).

TCN-RX LEV-1day:

Indicates the RX Level threshold crossing (1day).

TCN-15 min 1 day

Total-15min: Indicates the total threshold crossing (15min).

Total-1day: Indicates the total threshold crossing (1day).

CSU-15min: Indicates the DS1 CSU PMON threshold crossing (15min).

CSU-1day: Indicates the DS1 CSU PMON threshold crossing (1day).

5.1.2 Control Item

Control items can be selected only under maintenance mode. As this “Control” is likely to cause disconnection of signal, take care during operation.

Details of “Control” item is described as follows:

TXSW Manual Control:

Controls manual switchover of the TX SW at the transmitting side in the Hot standby (HS) configuration.

RXSW Manual Control:

Controls manual switchover of the RX SW in the 1+1 configuration. The switchover is carried out without traffic interruption when the DADE is In-phase. Adjustment of the delay time of No.1 and No.2 is automatically set.

Caution: When the RX SW mode is set to “Forced” in provisioning, RX SW manual control can select either No. 1 or No. 2 RX route though one is alarmed. Then, take care switching to avoid traffic interruption.

ATPC Manual Control (No.1/2):

Used when it is required ATPC operation ON/OFF or the change of the transmitting power range in ATPC operation.

TX Mute Control (No.1/2):

Turns off the transmitter output.

CW Control (No.1/2):

Used for transmitting a unmodulated carrier wave (CW). Used to confirm the TX frequency stability.

IF Loopback (No.1/2):

Used for distinguish equipment failure to TRP or MDP. The input traffic signal from MUX is looped back at IF stage. When no abnormality is found in the signal after IF loopback, it is assumed that the TRP has a problem.

Since the control is not interlocked with the RX SW, the RX SW control is needed to select CH which it is IF looped back in 1+1 configuration.

Main CH Loopback (Near End):

Used for distinguish equipment failure to MUX equipment or radio equipment. The input signal from MUX is looped back to the MUX. When no abnormality is found in the signal with NEAR END loopback, it is assumed that the radio equipment (MDP or TRP) has a problem.

Main CH Loopback (Far End):

Used for distinguish equipment failure to MUX equipment or radio equipment. Signal is looped back at the MDP of the opposite station. When no abnormality is found in the signal through FAR END loopback, it is assumed that the local radio equipment (MDP or TRP) has no problem.

LAN Device Reset (for LAN transmission only):

Used for reset control to LAN interface Port 1 or Port 2.

DADE Adjust:

Sets the DADE for Hot Standby SD/Twinpath configuration. Selects to make INTFC status In-phase.

Notes: 1. The DADE control applies in 1+1 configuration to adjust delay time for RX hitless switching when the INTFC status is indicated Outphase.

2. The DADE adjustment is needed in initial lineup or when the IF CABLE is replaced. It is not needed readjustment when the INTFC status is indicated In-phase.

RF Sub Band Select (No.1/2):

Used for changing the TRP sub band for radio link depending on the RF frequency assignment.

RF Shift Frequency Setting (No.1/2):

Set the RF Shift Frequency (number).

Antenna Alignment Mode (No.1/2):

The Antenna Alignment Mode is used for extending the dynamic range of the Digital Multimeter. In order to measure in high range of AGC V, it is mandatory required to set Antenna Alignment Mode to ON. If not it set to ON, the indicated AGC voltage is not guaranteed value. For the antenna orientation, set the TX power to the required level by MTPC mode at the opposite site.

5.1.3 Loopback

When loopback condition is necessary, set the system to loopback condition. (see Chart 5-1)

When there is an interruption of signals, use the PDH analyzers and isolate the faulty section by checking the traffic signal by loopback. Setup the test equipment according to the following diagrams.

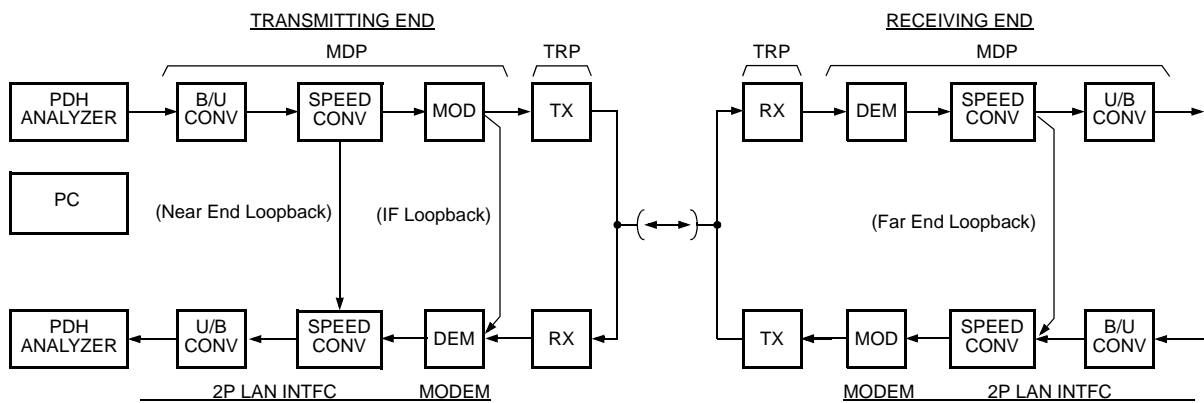


Fig. 5-1 Loopback Diagram for Fault Isolation for DS1

Note: The IF LOOPBACK and the RX SW is not operated interlock. In 1+1 configuration, The RX SW switching is needed to select the same CH that is testing in IF LOOPBACK. When the RX SW manual control is disable, set it to Forced mode in Provisioning.

Chart 5-1 Loopback Control

Step	Procedure
------	-----------

For the LCT operation, refer to Chapter 6 of LCT Operation in Appendix of this Section IV.

This chart contains:

- A. Preparation
- B. IF Loopback Control
- C. Main CH Loopback (Near End) Control
- D. Main CH Loopback (Far End) Control

If loopback operation is performed, timing loop may occur (timing loop is described in ITU-T Recommendation G.781).

Step	Procedure
------	-----------

Caution: *The Loopback control affects the radio link connection.*

1. *Loopback control operation is not performed at the same time, or perform the Loopback reset control and perform either Loopback mode.*
 - *IF Loopback*
 - *Near End Loopback*
 - *Far End Loopback*
2. *Loopback operation is not performed with an opposite station simultaneously.*
3. *Far End Loopback control will be canceled when radio link failure occurs under the control has been executed.*

A. PREPARATION

- 1 Set up the BER measurement. (refer to Fig. 5-4)
- 2 Connect the LCT port and the USB port with a USB cable. (see Fig. 2-3 in Chart 2-2)
- 3 Login LCT with User name "Admin" and Admin password.

Chart 5-1 (Cont'd)

Step	Procedure
4	Click on the “Maintenance” button in “LCT MENU”.

LCT MENU

Alarm/Status
Equipment Setup
Inventory
AUX I/O
Maintenance
Provisioning
Metering
PMON(History)

Maintenance1
Maintenance2

- 5 Click on the “Maintenance1” menu.
- 6 Click on the control button “On” and click “Set” button, to set to Maintenance On mode.
- 7 For 1+1 configuration, switchover the TX SW and RX SW for the channel is to be set loopback. (Refer to Chart 2-3 Manual Switchover Operation (only 1+1 Configuration))
- 8 Click on the “IF Loopback ()” button in “Maintenance1” menu and click on the setting button “On”.

Note: The control affects Radio link connection.

---Maintenance1---

Item	Value	Setting	
Maintenance	On	<input type="radio"/> Off <input checked="" type="radio"/> On	Set
IF Loopback (No.1)	On	<input type="radio"/> Off <input checked="" type="radio"/> On	Set
IF Loopback (No.2)	Off	<input checked="" type="radio"/> Off <input type="radio"/> On	Set

Note: The control applies to IF loopback in local MODEM.

- 9 Click on the “Set” button.
- 10 Click on the Alarm/Status on LCT MENU to check the status.
- 11 Refer to Fig. 5-5 to Fig. 5-9 Troubleshooting Flowchart to diagnose the problem.
- 12 Click on the setting button “Off” of the IF Loopback () and click on the “Set” button.

Chart 5-1 (Cont'd)

Step	Procedure
------	-----------

For 2P LAN

- 13 Click on the “Select” button and click on the setting button “On” of the required CH#(s) to be loop back and click on the “SET” button,

For all DS1 channel loop back, click on the “Select” button “On” in All Setting menu and click on the “SET” button,

---Maintenance1---

Item	Value	Setting	
Maintenance	On	<input type="radio"/> Off <input checked="" type="radio"/> On	Set
Main CH Loopback (Near End)	Off		Select
Main CH Loopback (Far End)	Off		Select

Note: The control applies to loopback in each DS1 signal.

---Main CH Loopback (Near End)---

CH1-16

CH1	On	<input type="radio"/> Off <input checked="" type="radio"/> On
CH2	Off	<input checked="" type="radio"/> Off <input type="radio"/> On
CH3	Disable	<input checked="" type="radio"/> Off <input type="radio"/> On
CH4	Off	<input checked="" type="radio"/> Off <input type="radio"/> On
CH5	Off	<input checked="" type="radio"/> Off <input type="radio"/> On
CH15	Off	<input checked="" type="radio"/> Off <input type="radio"/> On
CH16	Off	<input checked="" type="radio"/> Off <input type="radio"/> On

All Setting

Off On

Note: The Control is available for DS1 channels set to used.

Chart 5-1 (Cont'd)

Step	Procedure
------	-----------

---Main CH Loopback (Far End)---

CH1-16

CH1	On	<input type="radio"/> Off <input checked="" type="radio"/> On
CH2	Off	<input checked="" type="radio"/> Off <input type="radio"/> On
CH3	Disable	<input checked="" type="radio"/> Off <input type="radio"/> On
CH4	Off	<input checked="" type="radio"/> Off <input type="radio"/> On
CH5	Off	<input checked="" type="radio"/> Off <input type="radio"/> On
CH15	Off	<input checked="" type="radio"/> Off <input type="radio"/> On
CH16	Off	<input checked="" type="radio"/> Off <input type="radio"/> On

All Setting

<input checked="" type="radio"/> Off <input type="radio"/> On	Select
---------------------------------------------------------------	--------

SET

Close

Note: The Control is available for DSI channels set to used.

5.1.4 In-band Loopback

To perform In-band loopback set In-band loopback to the equipment. (see Chart 5-1)

When set “code/message” is sent per DS1 channel basis, In-band loopback is executed. Settable In-band loopback functions for each kind of DS1 Frame Format are shown in Table 5-1.

Table 5-1 Settable In-band Loopback functions

Code/ Messages	In-band Near End Loopback			In-band Far End Loopback		
	DS1 Frame Format					
	Unframed	SF	ESF	Unframed	SF	ESF
Code	○	○	○	-	-	-
Messages	-	-	○	-	-	○

○: Available

Fig. 5-2 indicates the location where the in-band near end loop back and in-band far end loopback is applied.

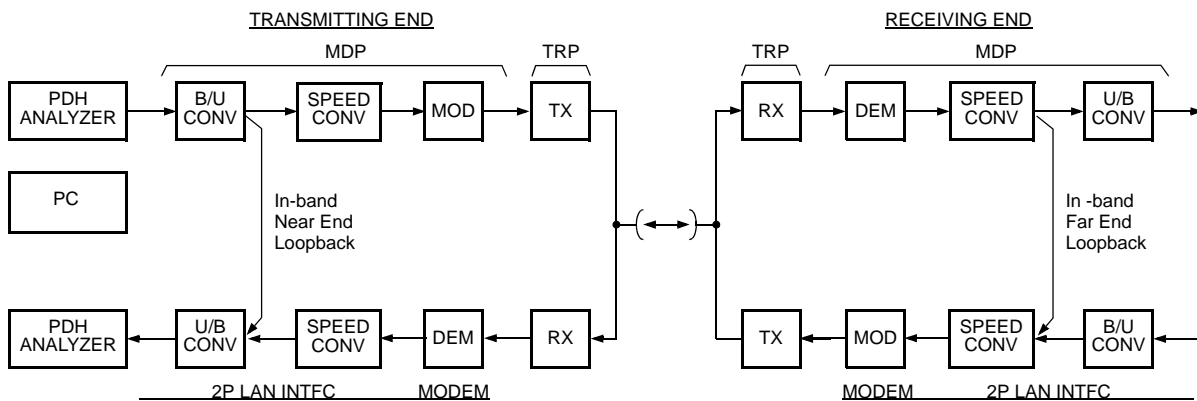


Fig. 5-2 Loopback Diagram for Fault Isolation

By using in-band loopback code/message function, traffic failure section can be identified.

Fig. 5-3 shows a three hop N lite N linear network. In-band NE loopback is applied at MDP in station (equipment) #1 and in-band far end loop back is applied at MDP in station (equipment) #6.

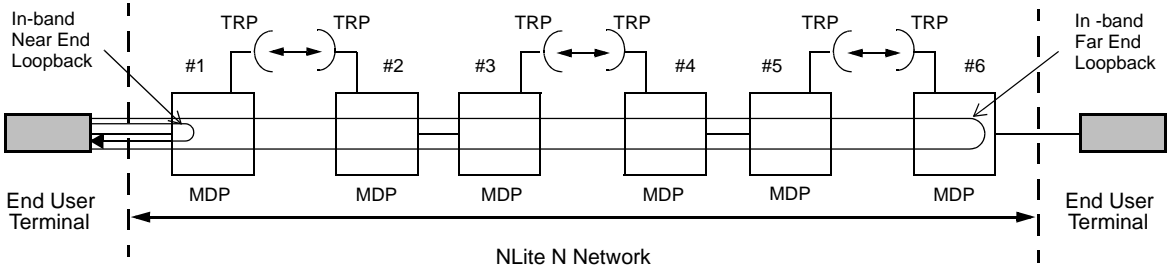


Fig. 5-3 Loopback Diagram for Fault Isolation

Chart 5-2 In-band Loopback Control

Step	Procedure
------	-----------

For the LCT operation, refer to Chapter 7 of LCT Operation in Appendix of this Section IV.

This chart contains:

- A. Preparation
- B. Near End In-band Loopback Code Setting
- C. Near End In-band Loopback Messages Setting
- D. Far End In-band Loopback Messages Setting

Step	Procedure
------	-----------

A. PREPERATION

- 1 Set up the BER measurement. (refer to Fig. 5-4)
- 2 Connect the LCT port and the USB port with a USB cable. (see Fig. 2-3 in Chart 2-2)
- 3 Login LCT with User name “Admin” and Admin password.
- 4 Click on the “Provisioning” button in “LCT MENU”.

LCT MENU

Alarm/Status
Equipment Setup
Inventory
AUX I/O
Maintenance
Provisioning
Metering
PMON(History)

DS1 Setting
WS Setting
BER Threshold Setting
SC Assignment
LAN Port Setting
TX Power Control
Condition for TX/RX SW
Relay Setting
TCN Threshold (15min)
TCN Threshold (1day)
PMON Select
In-band Loopback Setting
Others

Chart 5-2 (Cont'd)

Step	Procedure
------	-----------

- | | |
|---|-----------------------------------------------|
| 5 | Click on the “In-band Loopback Setting” menu. |
|---|-----------------------------------------------|

---In-band Loopback setting---

CH**

---Near End---

Item	Value	Setting
Mode	Disable	Disable <input type="button" value="▼"/>
Activation Code		<input type="button" value="▼"/>
Deactivation Code		<input type="button" value="▼"/>
Activation Messages		11111111 0??????0
Deactivation Messages		11111111 0??????0

<< Direction of Transmission

---Far End---

Item	Value	Setting
Mode	Disable	Disable <input type="button" value="▼"/>
Activation Messages		11111111 0??????0
Deactivation Messages		11111111 0??????0

<< Direction of Transmission

B. Near End In-band Loopback Code Setting

- 6 Select the near end loop-back mode to “Enable (code)” from the drop down list.
- 7 To Set the activation code, select the number of bits in the code and enter its value. (Example: 5bit, 00001)
- 8 To set the deactivation code, select the number of bits in the code and enter its value. (Example 3bit, 001)
- 9 Click on the “set” button.

Note: Can not set duplicated values for activation code and deactivation code.

Example Activation code is “6 bit, 001001” and deactivation code is “3 bit, 001”.

Note: Activation code value cannot be set to all “0” or all “1”. Deactivation code value cannot be set to all “0”.

Chart 5-2 (Cont'd)

Step	Procedure
------	-----------

---In-band Loopback setting---

CH**

---Near End---

Item	Value	Setting
Mode	Disable	Enable (Code) ▼
Activation Code	00001	5 bit ▼ 00001
Deactivation Code	001	3 bit ▼ 001
Activation Messages		11111111 0??????0
Deactivation Messages		11111111 0??????0

<< Direction of Transmission

C. Near End In-band Loop back Message Setting

- 10 Select the near end loop back “mode” to “Enable (Messages)” from the drop down list.
- 11 To set the Activation Message, enter the 6 bit value to be inserted in the place of “?” in the 16 bit Activation Message.
Example: “111000”
- 12 To set the Deactivation Message, enter the 6 bit value to be inserted in the place of “?” in the 16 bit Activation Message.
Example: “001110”
- 13 Click the “Set” button

Note: Cannot enter the same value for Activation Message and Deactivation Message.

Note: Value of Activation Message and Deactivation Message cannot be all “0” or all “1”.

Chart 5-2 (Cont'd)

Step	Procedure
------	-----------

---In-band Loopback setting---

CH**

---Near End---

Item	Value	Setting
Mode	Disable	Enable (Code) <input type="text"/> ▼
Activation Code		<input type="text"/> ▼
Deactivation Code		<input type="text"/> ▼
Activation Messages	11111111 01110000	11111111 0??????0 111000
Deactivation Messages	11111111 00011100	11111111 0??????0 001110

<< Direction of Transmission

D: Far End In-band Loop back Message Setting

- 14 Select the Far end loop back “mode” to “Enable (Messages)” from the drop down list.
- 15 To set the Activation Message, enter the 6 bit value to be inserted in the place of “?” in the 16bit Activation Message.
Example: “000010”
- 16 To set the Deactivation Message, enter the 6 bit value to be inserted in the place of “?” in the 16 bit Activation Message.
Example: “011100”
- 17 Click the “Set” button

Note: Cannot enter the same value for Activation Message and Deactivation Message.

Note: Value of Activation Message and Deactivation Message cannot be all “0” or all “1”.

Chart 5-2 (Cont'd)

Step	Procedure
------	-----------

---In-band Loopback setting---

CH**

---Far End---

Item	Value	Setting	
Mode	Disable	Enable (Code)	▼
Activation Messages	11111111 00000100	11111111 0??????0	000010
Deactivation Messages	11111111 00111000	11111111 0??????0	011100

<< Direction of Transmission

- 18 By sending the DS1 signal with the “Code/Messages”, loopback is applied/released at the specified in-band loopback locations.
- 19 To cancel the entered code/message, select the Near End/Far End in-band loopback to “Disable”.

5.1.5 BER Measurement

Chart 5-3 BER Measurement

Apparatus:

Digital Multimeter with test leads

Screwdriver

Headset

Step	Procedure
------	-----------

A. 2P LAN INTERFACE

Note: Pin connector facilities are necessary to connect the PDH analyzer signal cable to MDR connector.

Note: The BER measurement can not be performed for the channel which is set to Not Used or the channels shared with LAN.

- 1 At the transmitting end, disconnect DS1 IN/OUT on the 2P LAN INTFC. (see Fig. 5-4)
- 2 At the receiving end, disconnect DS1 IN/OUT on the 2P LAN INTFC. (see Fig. 5-4)

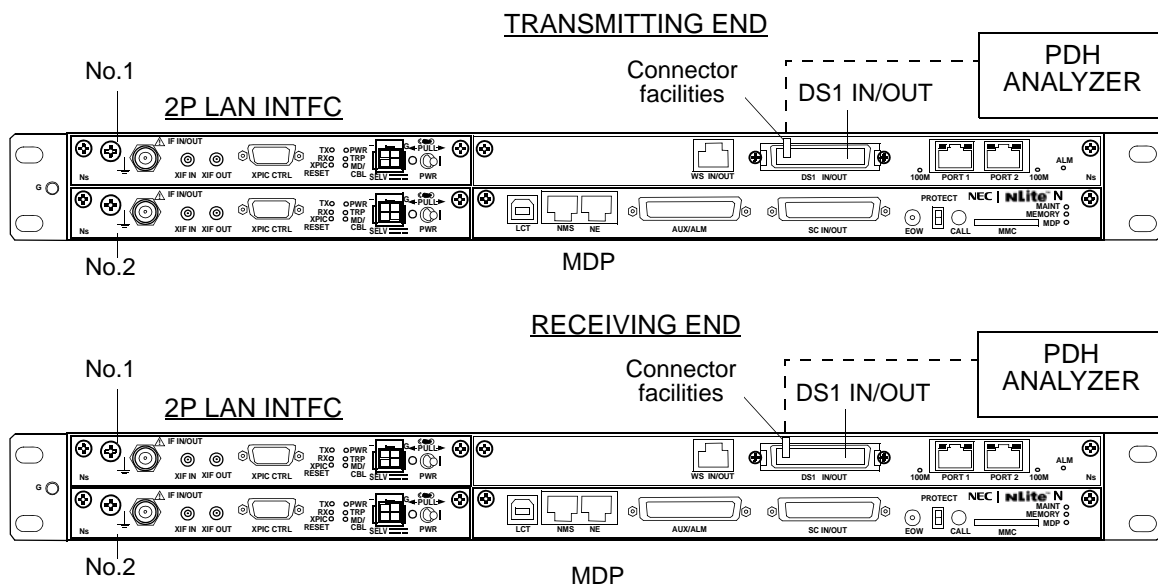


Fig. 5-4 BER Measurement (DS1)

5.1.6 Trouble Shooting Flow

When alarm condition occurs, red alarm LEDs on the MDP are lit except when there is a power supply failure. Faults can be distinguished using the LED indicators on the front panel of the MDP. Connect the LCT to the equipment and check the equipment conditions in according with the flow chart are shown in Fig. 5-5 to Fig. 5-9.

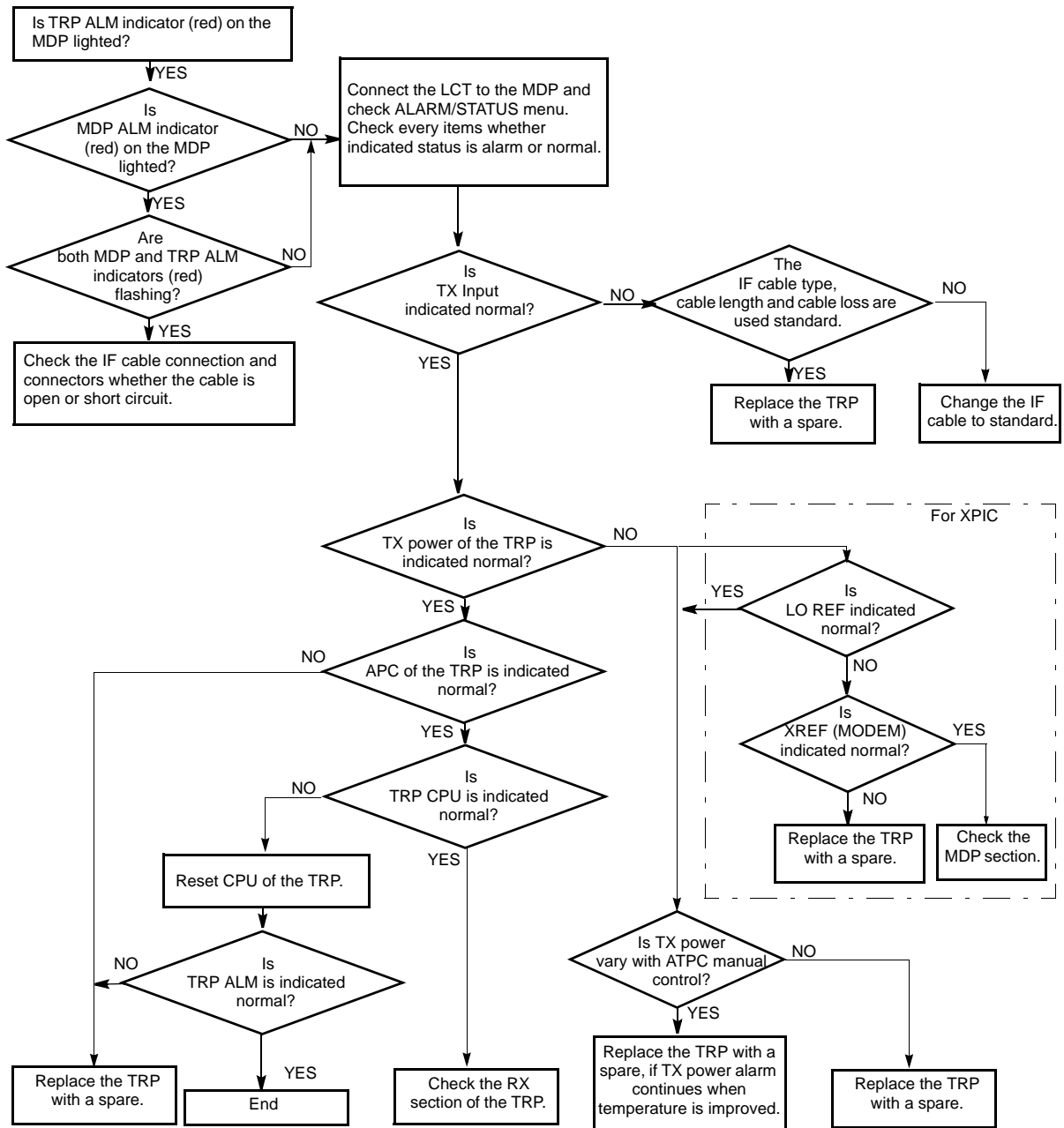


Fig. 5-5 TRP TX Section Troubleshooting Flowchart

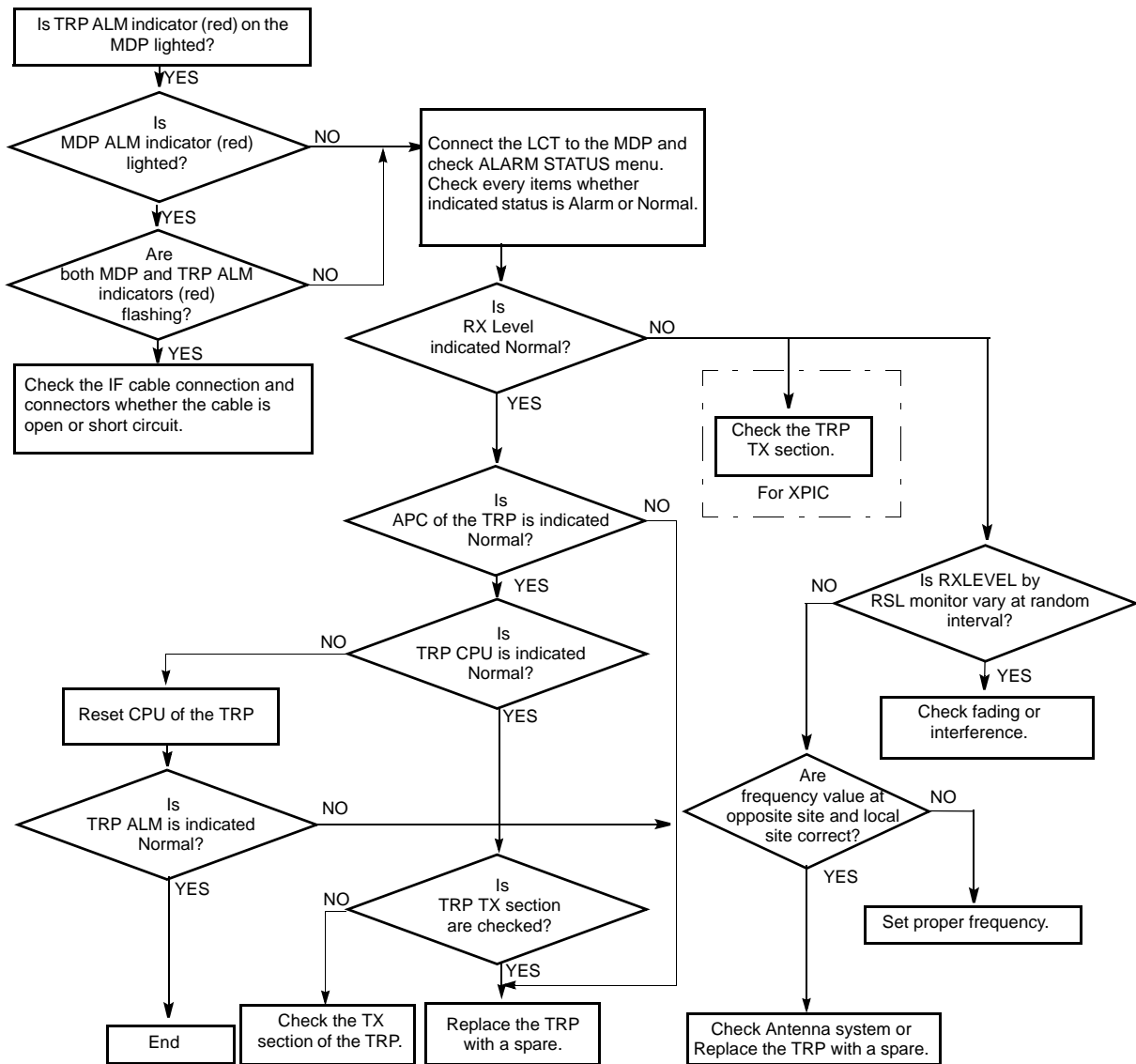


Fig. 5-6 TRP RX Section Troubleshooting Flowchart

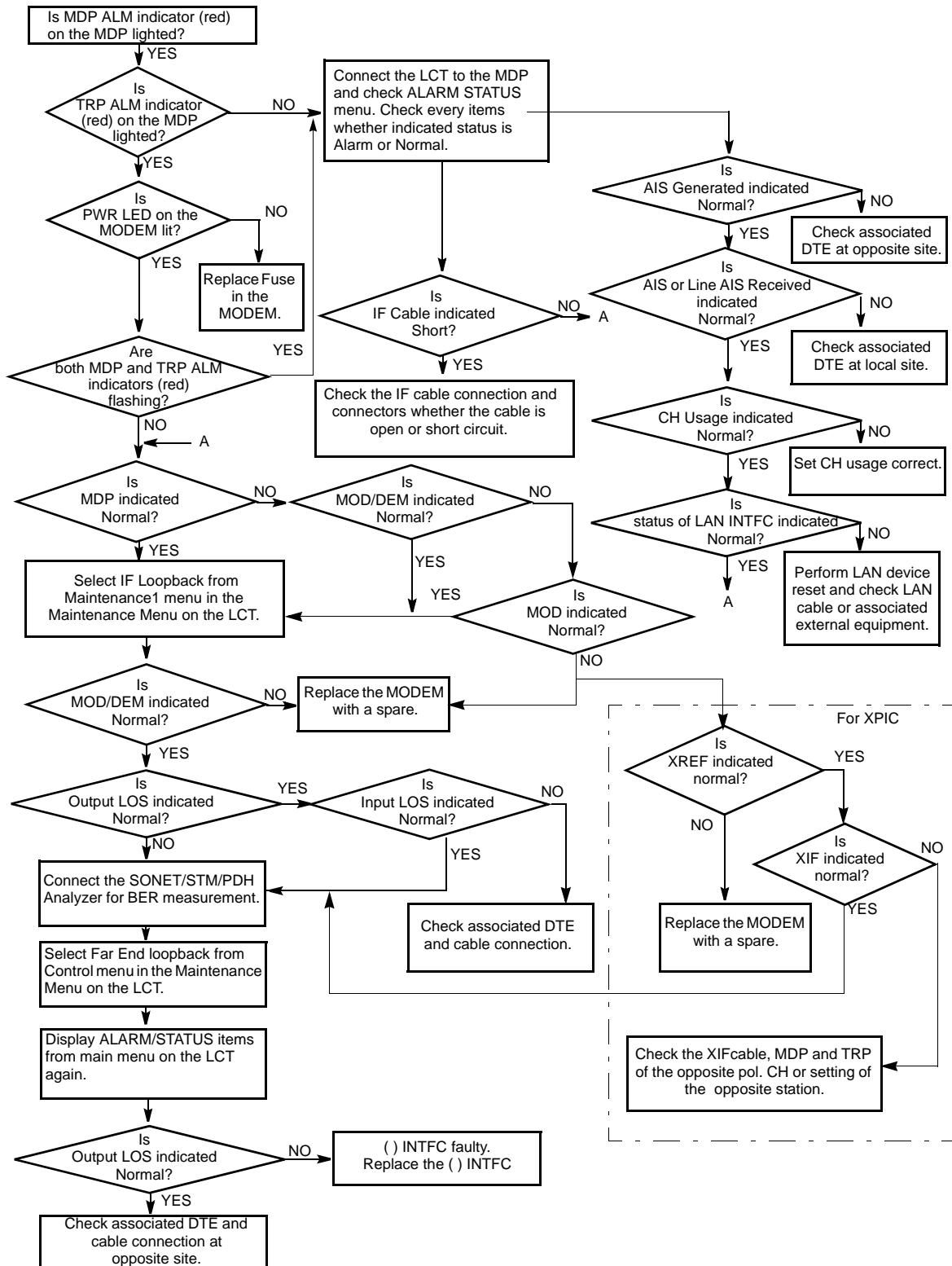


Fig. 5-7 MDP Section Troubleshooting Flowchart

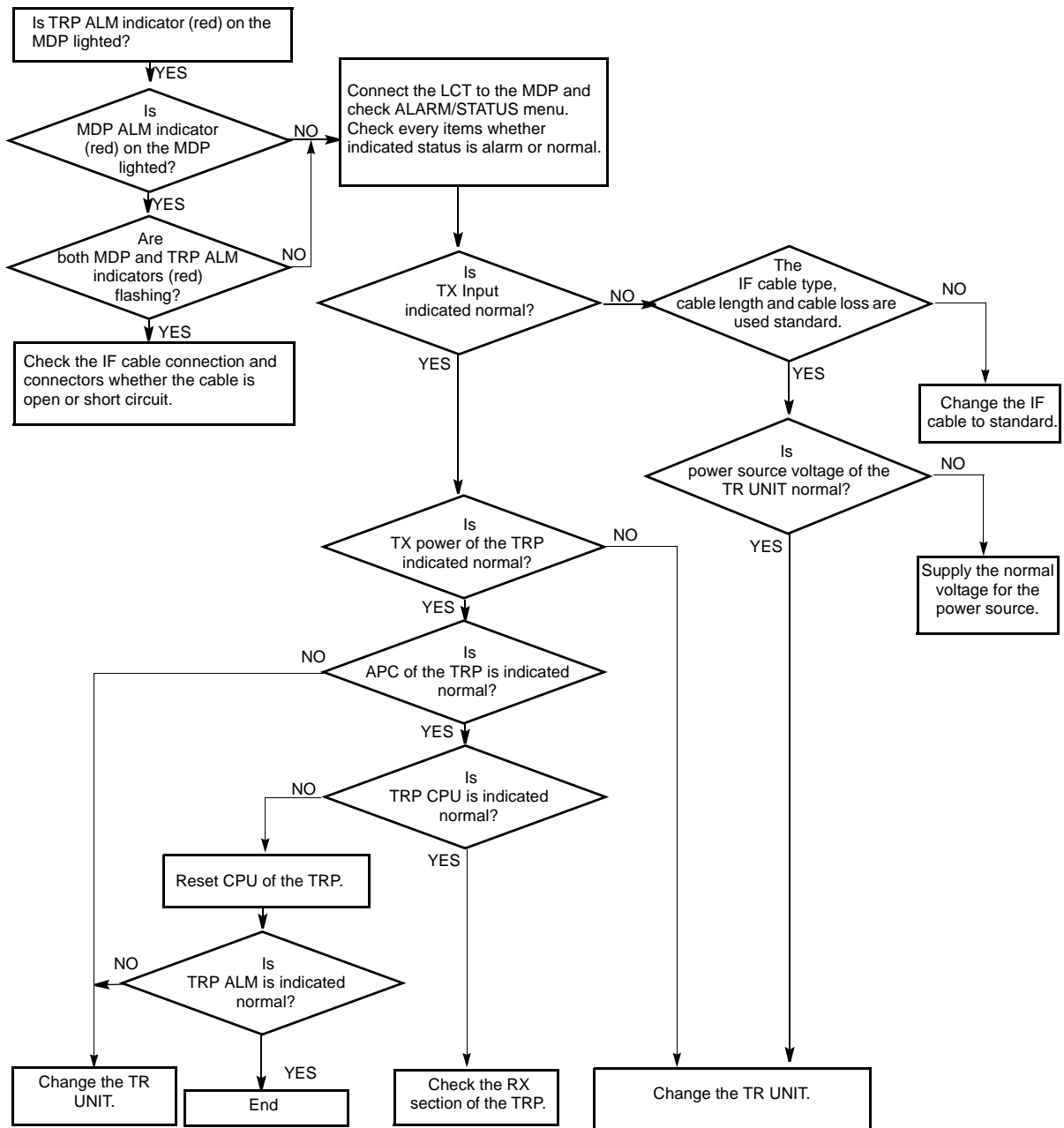


Fig. 5-8 ALL INDOOR TRP TX Section Troubleshooting Flowchart

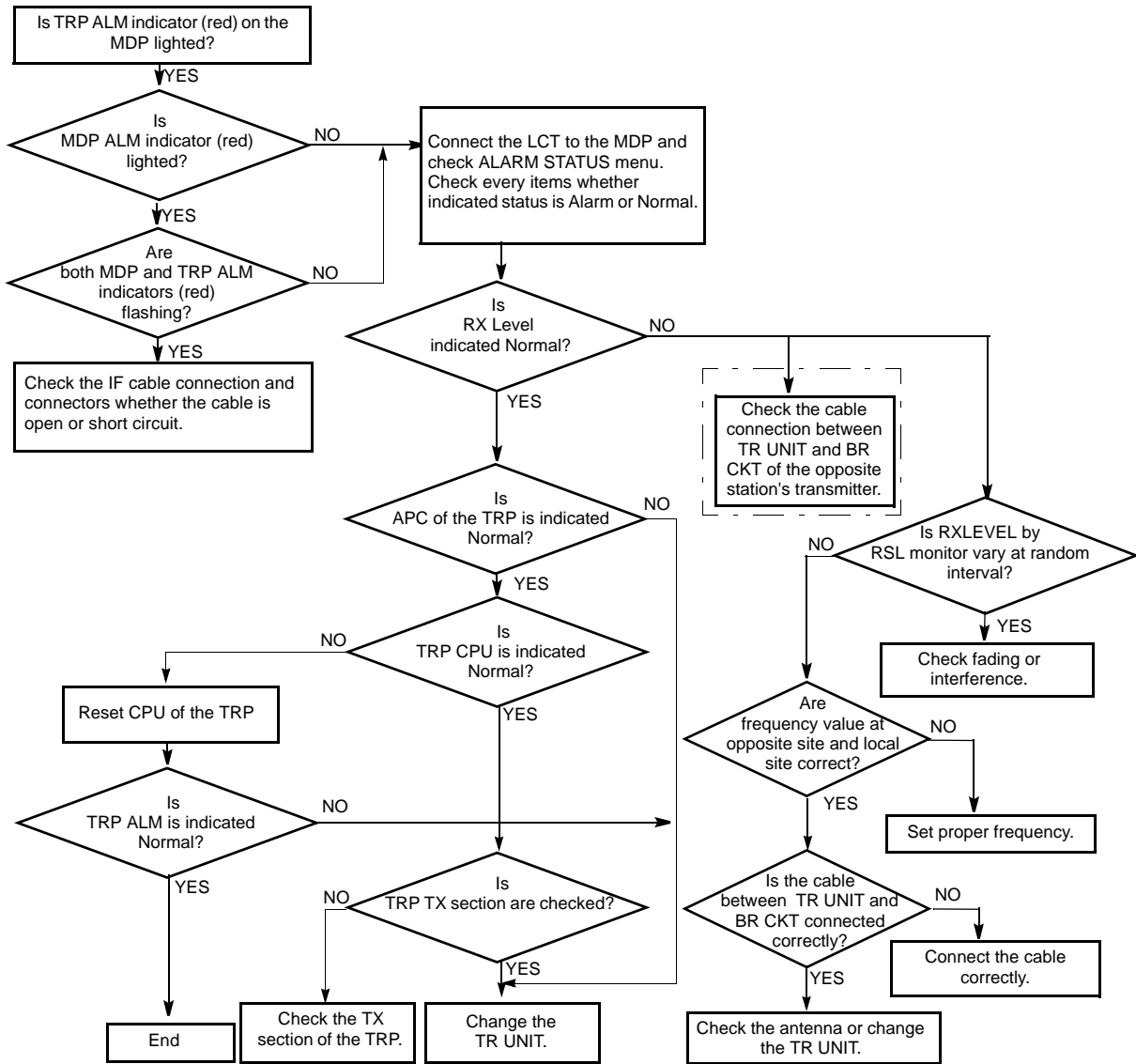


Fig. 5-9 ALL INDOOR TRP RX Section Troubleshooting Flowchart

5.2 Replacement

The replacement procedures of the MDP and TRP is described below.

5.2.1 TRP Replacement

The procedures for replacing the TRP with a spare are given in the Chart 5-4. The label attached to the side of TRP indicates the TRP type (see Fig. 5-10). To replace the TRP, prepare another TRP of the same type as indicated on the label of the failed one.

Check the name plate of the spare TRP. When the indicated items are coincided, the TRP can be replaced.

Caution: Do not remove/connect the IF cable with the MDP power ON. Turn the MDP power OFF before connecting/disconnecting the IF cable, or equipment may be damaged.

Caution: To avoid microfonic properties, occurrence of bit errors, when installing the TRP on the HYB or OMT, protect the TRP from mechanical knocks which is not be replaced.

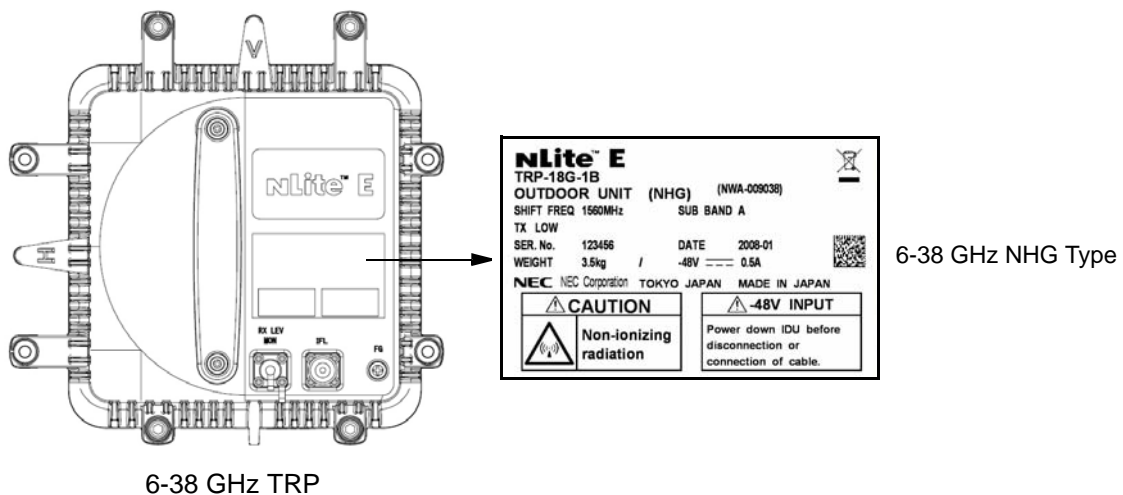


Fig. 5-10 TRP Type and Frequency Indication Label

Note: Before replacing the TRP in XPIC, perform the control of XPIC Local and XPIC Remote Reset by the LCT for Main Master or Sub Master channel that is to be used online.

The mounting and demounting the TRP from/to antenna, refer to the Installation and Initial Line up in Section III.

Chart 5-4 TRP Replacement

Apparatus:

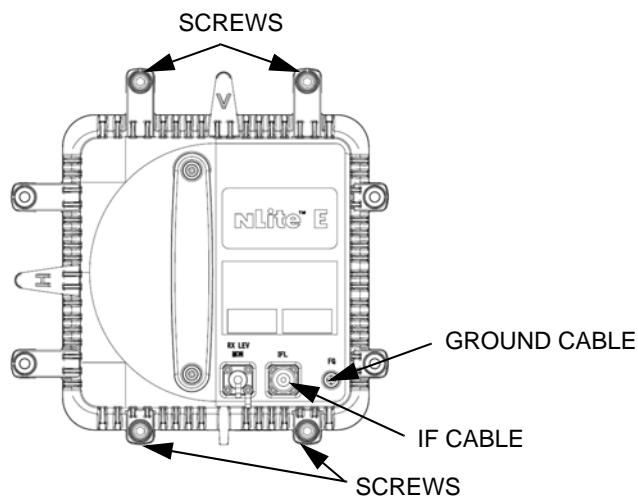
T type hexagonal driver

Step	Procedure
------	-----------

REMOVING

- 1 For 1+1 configuration, switchover the TX SW and RX SW for the standby channel is to be replaced.
- 2 Turn off the power switch on the MODEM which is connected to the TRP is to be replaced.
- 3 Remove the self-bonding tape from the IF IN/OUT connector.
- 4 Disconnect the IF cable from the IF IN/OUT connector on the TRP.
- 5 Disconnect ground cable from the FG terminal on the TRP.
- 6 Loosen four bolts fixed the TRP with a T type hexagonal driver.

Note: Being careful, loosen alternately and gradually four screws.



TRP

- 7 Remove the TRP from the bracket.

Chart 5-4 TRP Replacement (Cont'd)

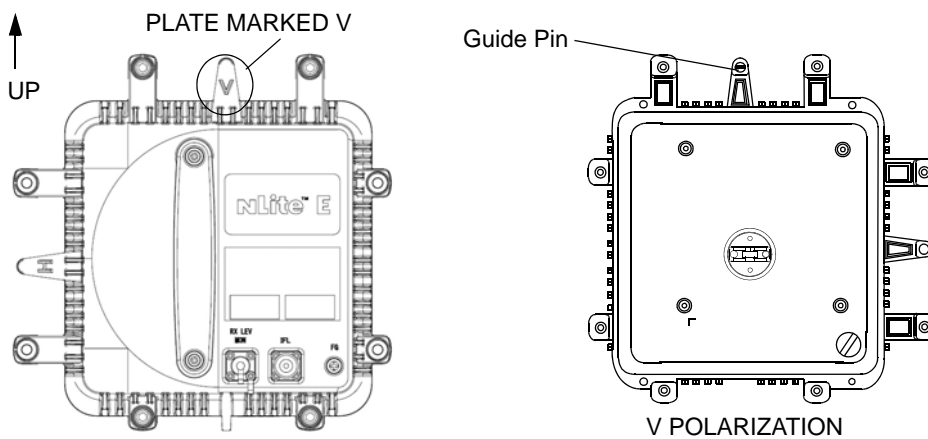
Step	Procedure
------	-----------

MOUNTING

- 8 When the TRP is used for vertical polarization, rotate the TRP so that the plate marked V is on top.

Note: Remove the protection metallic plate covering the waveguide hole on TRP.

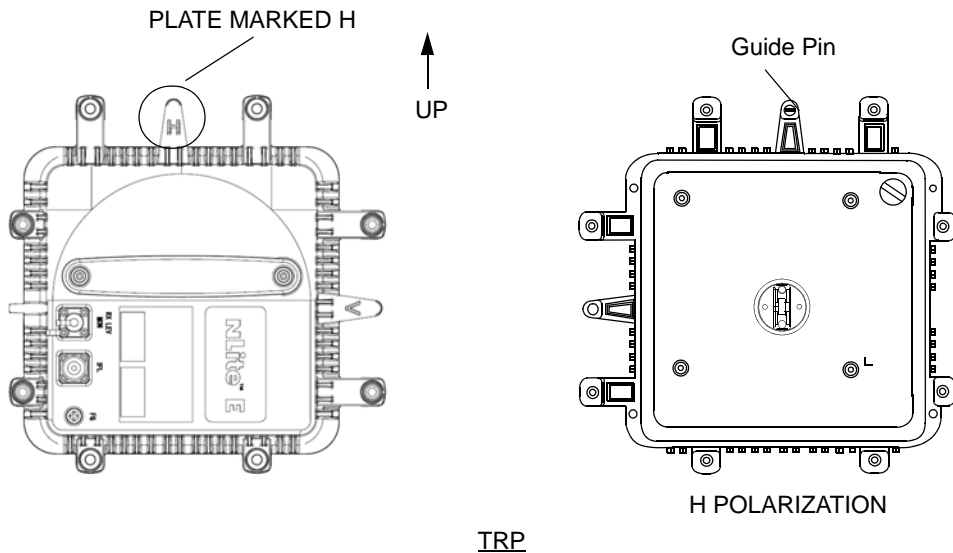
- 9 When the TRP is used for horizontal polarization, remove the guide pin fixed on the plate marked V.

TRP

- 10 Insert the guide pin removed in step 8 behind of the plate marked H.
- 11 Rotate the TRP so that the plate marked H is on top.

Chart 5-4 TRP Replacement (Cont'd)

Step	Procedure
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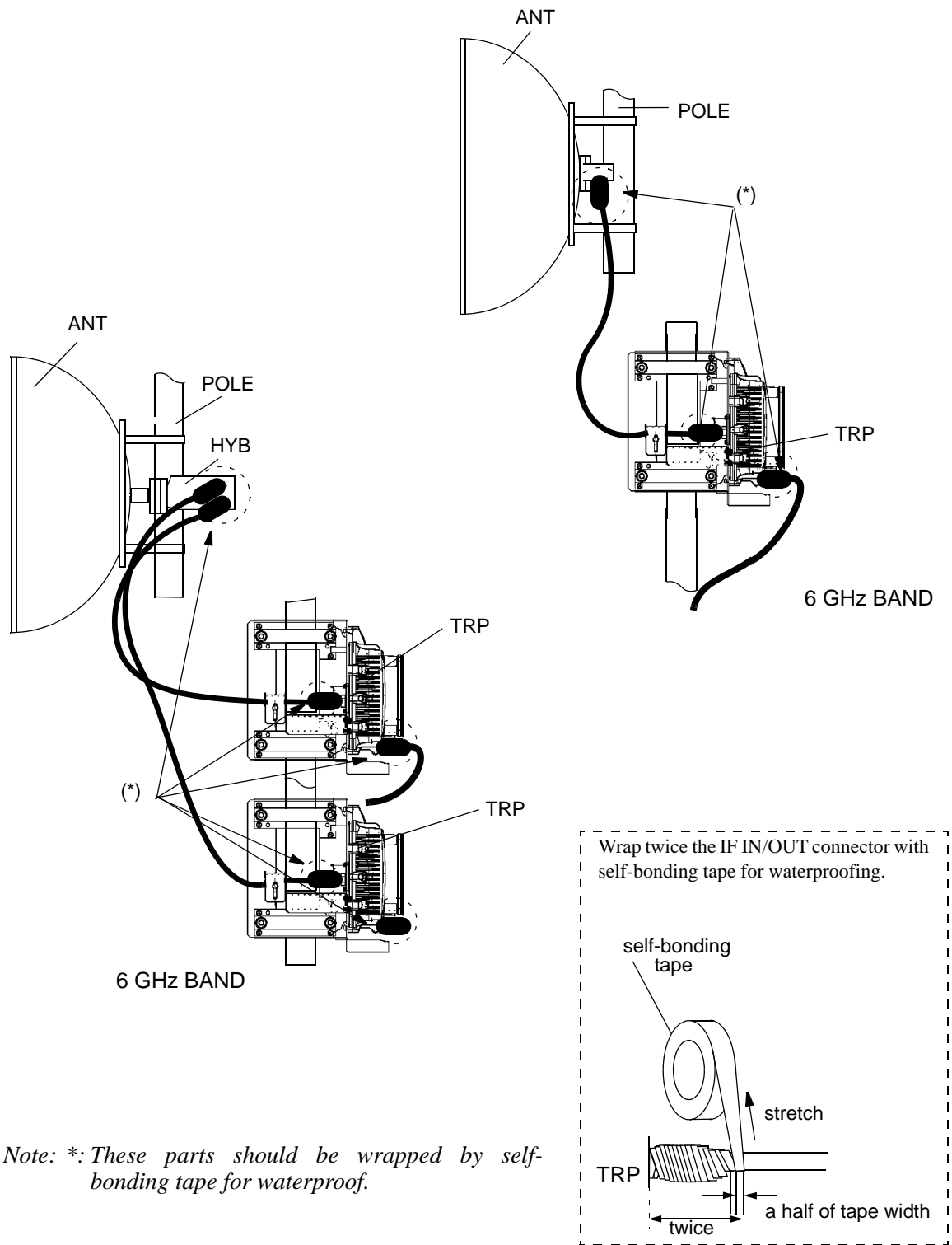
TRP

- 12 Fit the spare TRP onto the bracket.

Notes: 1. Be careful not to damage the flange and O-ring.

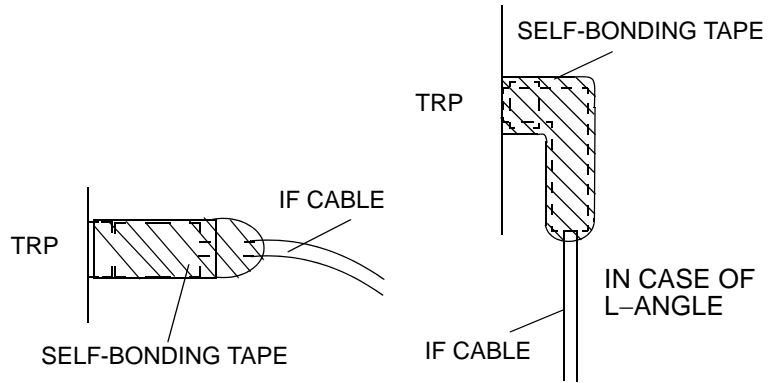
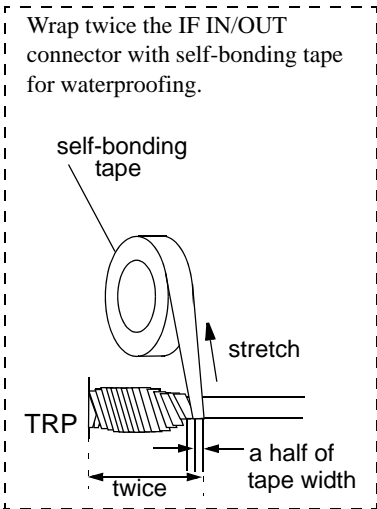
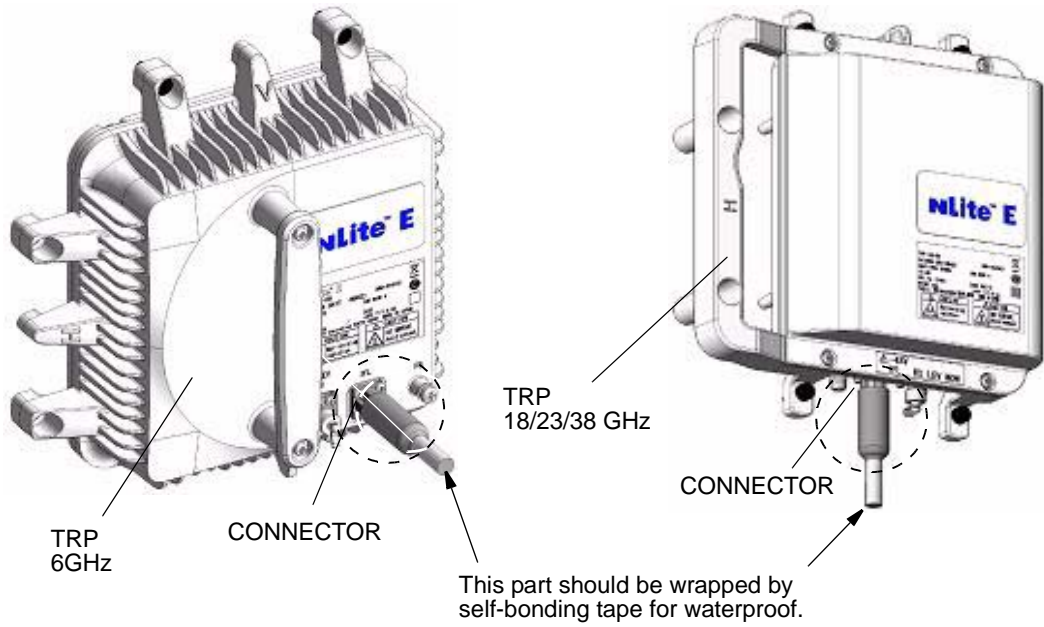
2. Being careful, tighten alternately and gradually four screws.

- 13 Mount the spare TRP onto the bracket and tighten the four screws on the TRP.
- 14 Reconnect the IF cable to the IF IN/OUT connector on the TRP.
- 15 Wrap twice the IF IN/OUT connector with self-bonding tape for waterproofing. (see Fig. 5-11 (1/2) and (2/2))
- 16 Reconnect ground cable removed in step 4 to FG terminal.
- 17 Turn on the power switch on the MDP.



Note: *: These parts should be wrapped by self-bonding tape for waterproof.

Fig. 5-11 Location of Connector for Waterproof (1/2)



Note: The self-bonding tape should be prepared by customer.

Fig. 5-11 Location of Connector for Waterproof (2/2)

5.2.2 MDP and Module Replacement

The procedures for replacing MDP/module with a spare are given in the Chart 5-5.

Chart 5-5 MDP and Module Replacement

Caution: *Persons performing maintenance must take necessary steps to avoid electro-static discharge which may damage the modules or cause error. Wear a conductive wrist strap connected to the grounded (G) jack on the front of the equipment shelf. This will minimize static build-up during maintenance. (see Fig. 2-1 in Chapter 2).*

Caution: *Do not remove/connect the IF cable with the MDP power ON. Turn the MDP power OFF before connecting/disconnecting the IF cable, or equipment may be damaged.*

This chart contains:

- A. Module replacement
- B. MDP replacement

Apparatus:

Suitable Screwdriver

Step	Procedure
-------------	------------------

A. MODULE REPLACEMENT

Notes: 1. Be careful do not touch the electric parts and printed circuit on the module.

2. The top surface of the MDP above MODEM is hot in operation.

3. The maintenance personnel should report starting replacement from a station to the relevant station.

- | | |
|---|---------------------------------------------------------------------------------------------------------------------------------|
| 1 | Referring to Chart 2-2, set the MDP to maintenance ON condition by LCT. |
| 2 | For 1+1 configuration, switchover the TX SW and RX SW for the standby channel from the working channel which is to be replaced. |

Chart 5-5 MDP and Module Replacement (Cont'd)

Step	Procedure
Removing MODEM	
3	When the MODEM will be replaced, turn off the power switch on the corresponding MODEM which is to be replaced.
4	Disconnect cables as following order. (1) Disconnect power supply cable from SELV connector. (2) Disconnect IF cable from IF IN/OUT connector. The adapter is reused. (3) Disconnect ground cable from the ground terminal.
5	Loosen two screws on the MODEM module. (See Fig. 5-12)
6	Remove the MODEM module from the MDP shelf.
Mounting MODEM	
1	When the MODEM is replaced, check that the power switch is set to Off position.
2	Align the MODEM to the shelf, then push it in until the multipin connector firmly fits.
3	Tighten the two screws on the module.
4	Connect cables as following order. (1) Connect ground cable to the ground terminal. (2) Connect IF cable with adapter to IF IN/OUT connector. (3) Connect power supply cable to SELV connector.
5	Turn on the power switch on the MODEM.
6	Check that the MODEM is normal on the Alarm/Status display.
7	Check that the installed MODEM module exists in the INVENTORY list.
8	Check the operation of the replaced MODEM module.
9	Referring to Chart 2-2, set the MDP to maintenance OFF condition by LCT.

Chart 5-5 MDP and Module Replacement (Cont'd)

Step	Procedure
------	-----------

Removing 2P LAN INTFC, CTRL

- 1 Referring to Chart 2-2, set the MDP to maintenance ON condition by LCT.

Notes: 1. When the CTRL is a failure, replace it with a spare as explained below.

2. When the CTRL is replaced without power OFF, refer to the "Replacing the CTRL Used MMC or LCT".

---Maintenance1---

Item	Value	Setting	
Maintenance	On	<input type="radio"/> Off <input checked="" type="radio"/> On	Set

- 2 Turn off the power switch on the MODEM (both MODEM for 1+1 configuration).
- 3 Disconnect all the cables connected to the module.
- 4 Loosen two screws on the module. (See Fig. 5-12)
- 5 Extract the module.

Note: Be careful not catch the module on the cable when extracting the module. If the module caught on the live cables, it may be caused radio link error.

- 6 This work finishes.
-

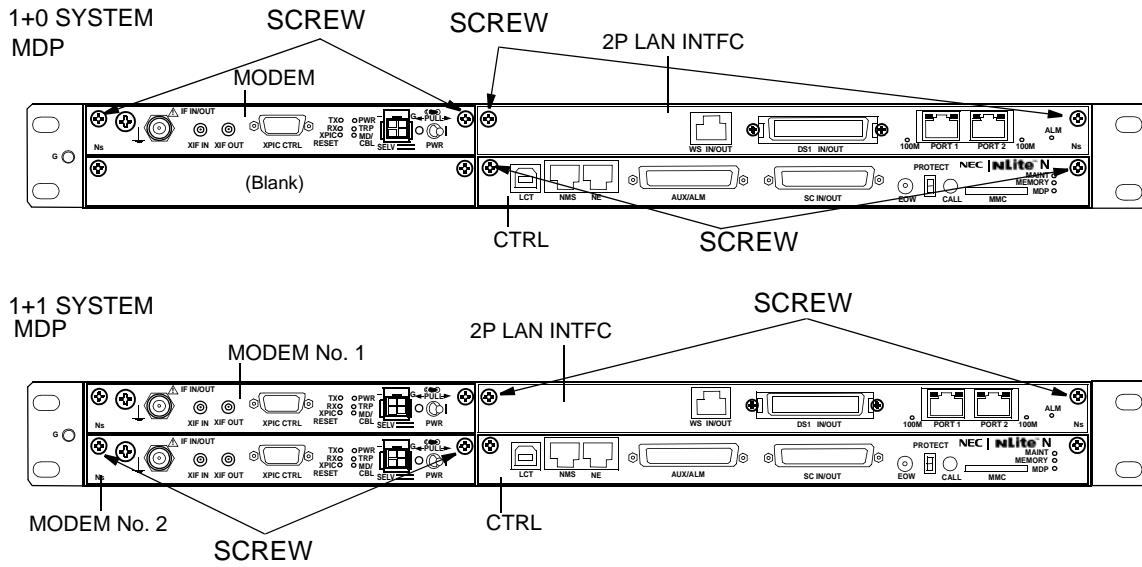


Fig. 5-12 Demounting and Remounting Module

Chart 5-5 MDP and Module Replacement (Cont'd)

Step	Procedure
------	-----------

2P LAN INTFC, CTRL

- 1 Referring to Chart 2-2, set the MDP to maintenance ON condition by LCT.

---Maintenance1---

Item	Value	Setting	
Maintenance	On	<input type="radio"/> Off <input checked="" type="radio"/> On	Set

- 2 Turn OFF the power switch on the MODEM.
- 3 Check that the switch on the MODEM (both MODEM for 1+1 configuration) is off position.
- 4 Align the module to the MDP shelf, then push it in until the multipin connector firmly fits.
- 5 Tighten two screws on the module.
- 6 Connect all cables to the module.
- 7 Turn on the power switch on the MODEM.
- 8 Check that the 2P LAN INTFC, CTRL is normal on the Alarm/Status display.
- 9 Check that the installed 2P LAN INTFC, CTRL module exists in the INVENTORY list.
- 10 Check the operation of the replaced 2P LAN INTFC, CTRL module.
- 11 Click on the “Off” button of Maintenance and click on the “Set” button.

---Maintenance1---

Item	Value	Setting	
Maintenance	Off	<input checked="" type="radio"/> Off <input type="radio"/> On	Set

- 12 This work finishes.
-

Chart 5-5 MDP and Module Replacement (Cont'd)

Step	Procedure
------	-----------

Replacing the CTRL Used the MMC or LCT.

This procedure is explains how to replace the CTRL module (Card) using the MMC or LCT. This procedure is applies when the CTRL is not failure or when the equipment configuration data are saved into the MMC or LCT/PNMx.

Note: The Firmware versions before ver. 3.4.5 do not copy the Network/MIB configuration to the MMC card, only the equipment configuration. Therefore resetup of the Network/MIB configuration by PNMTj or downloading the Network/MIB configuration files by PNMTj/LCT is required.

The Use of the MMC for the CTRL Replacement

When the MMC is used, the replacement of the CTRL can be carried out without the LCT or PNMTj.

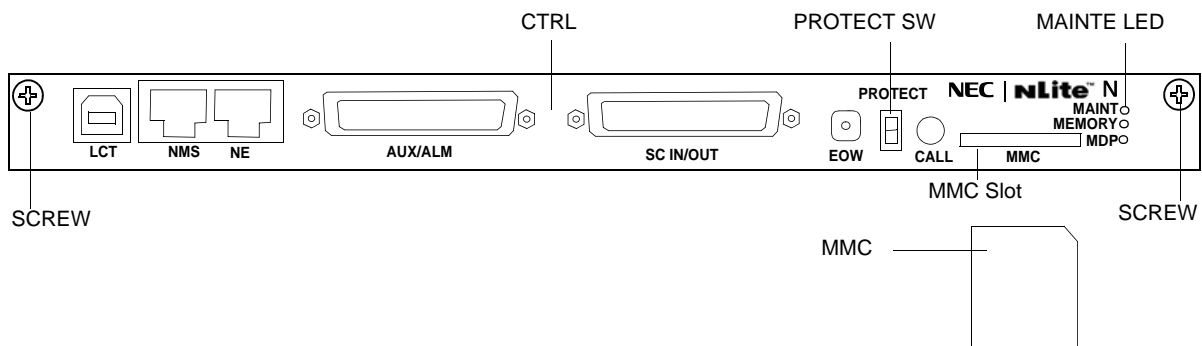
- 1 Insert the MMC into the MMC slot on the CTRL front, (The data size to save is approximately 10 kbyte.)
- 2 Set the PROTECT SW on the CTRL front to ON position (for upper side). Then, the MAINT LED (amber) on the MDP is lit and Equipment/Network/MIB configuration data gather up and saving of data to the MMC start.
- 3 When Equipment/Network/MIB configuration data gather up and data saving to the MMC has been completed, the MAINT LED on the MDP blinks slowly. (Check that the MAINT LED blinks slowly before removing the CTRL.)
- 4 Remove the cables connected to the CTRL, loosen two fixed screws and remove the CTRL.

Note: Be careful not catch the module on the cables when extracting the module. If the module get caught on the live cables, it may cause radio link error.

Chart 5-5 MDP and Module Replacement (Cont'd)

Step	Procedure
------	-----------

- | | |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | <p>Prepare the spare CTRL.</p> <p>Set the PROTECT SW on the spare CTRL to ON position (for upper side), (The PROTECT SW setting distinguish the normal start up or protected start up.) Inset the MMC containing Equipment/Network/MIB configuration files of the removed CTRL, into the MMC slot in the front.</p> |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



- | | |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 | <p>Mount the CTRL into the MDP. Check that the MAINT LED on the MDP blinks. Tighten two screws and connect cables removed in step 4.</p> |
| 7 | <p>The download of the Equipment/Network/MIB configuration data start, the deployment is performed. When the CTRL has been made provision, MAINT LED on the MDP turns to light. Check that the MAINT LED lights and set the PROTECT SW to OFF position (for lower side.) Then, the Equipment/Network/MIB configuration data deploys and data is restored.</p> |
| 8 | <p>In the Equipment Setup menu and the Provisioning menu, confirm that the equipment configuration and setting conditions are the same as before replacement. Check that neither alarm is indicated in the Alarm Status.</p> |
| 9 | <p>For Firmware version before 3.4.5, Network/MIB configuration will not be saved in the MMC. Perform resetup of Network/MIB configuration using the PNMTj.</p> |

Chart 5-5 MDP and Module Replacement (Cont'd)

Step	Procedure
------	-----------

The Use of the LCT for the CTRL Replacement

When the LCT is used, the replacement can be performed without the MMC.

- 1 Referring to Chart 2-2, set the MDP to Maintenance ON condition by LCT (Check that the MAINT LED lights).
- 2 Set the PROTECT SW on the CTRL front to ON position (for upper side).

--- Maintenance2 ---

---Control---

CPU Reset

---Download---

Configuration File

Program File

Equipment Config. File

---Upload---

Configuration File

Equipment Config. File

---Date/Time---

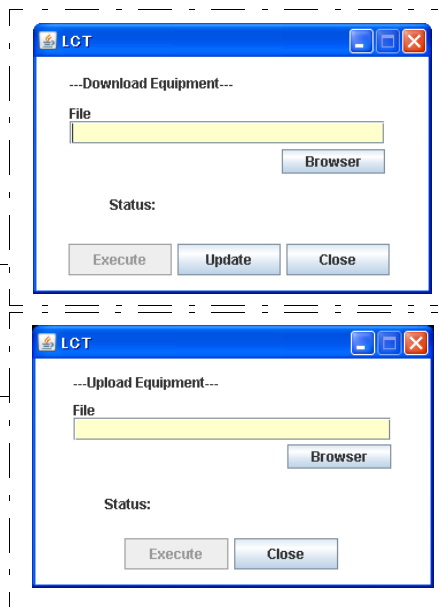
Date/Time Setting

---Password---

Password Setting

---PMON Clear---

PMON Clear



- 3 Select the Maintenance 2 from the Maintenance menu. In the upload section select the Configuration File and click on the Network Config radio button, enter the file name and the directory where the file is to be saved. Click the Execute button to upload the file to the PC (same for MIB Config.) In the upload section select the Equipment Config. File of uploaded, enter the file name and the directory where the file is to be saved. Click the Execute button to upload the file to the PC.
- 4 When the upload to the LCT has completed, MAINT LED blinks slowly (Check that the MAINT LED blinks slowly when remove the CTRL.).

Chart 5-5 MDP and Module Replacement (Cont'd)

Step	Procedure
5	Remove the cables connected to the CTRL, loosen two fixed screws and remove the CTRL.
	<i>Note: Be careful not catch the module on the cable when extracting the module. If the module caught on the live cables, it may be caused radio link error.</i>
6	Prepare the spare CTRL. Set the PROTECT SW on the spare CTRL to ON position (for upper side), (The PROTECT SW setting distinguish the normal start up or protected start up). Mount the CTRL into the MDP. Check that the MAINT LED on the MDP blinks. Tighten two screws and connect cables removed.
7	To download the Equipment configuration data from the LCT, select Maintenance 2 from the Maintenance menu. In the Down Load section select Equipment Configuration File and Browse to the location where the file is saved. Click the Execute button. When "Complete" status appear on the progress status, click the Update button to update the equipment configuration data of the CTRL.
8	When the CTRL has been made provision, MAINT LED on the MDP turns to light. Check that the MAINT LED lights, set the PROTECT SW to OFF position (for lower side). Then, the equipment configuration data deploys and data is restored.
9	In the Equipment Setup menu and the Provisioning menu, confirm that the equipment configuration and setting conditions are the same as before replacement. Check that neither alarm is indicated in the Alarm Status.
10	To download the Network/MIB configuration data, Select Configuration File in the download section. Select Network Config radio button and browse to the location where the file is saved and click the Execute button, do the same for MIB Config file. When "Complete" appear on the progress status, click the update button to update the data.

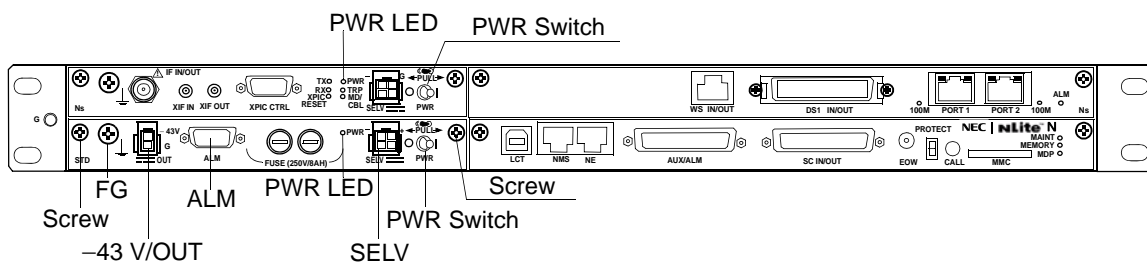
Chart 5-5 MDP and Module Replacement (Cont'd)

Step	Procedure
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Replacing the DC-DC CONV (Optional).

When the power is supplied to the SELV of the DC-DC CONV (optional) but the PWR LED of the DC-DC CONV is not lit though the power switch is on, before replacing the DC-DC CONV, check the conduction of the fuse in the DC-DC CONV.

- 1 Referring to Chart 2-2, set the MDP to maintenance ON condition by LCT.
- 2 Set the power switch on the MODEM to Off position.
- 3 Set the power switch on the DC-DC CONV to Off position.



- 4 Disconnect cables connected to the DC-DC CONV as following order.
 - (1) Disconnect power supply cable from SELV connector.
 - (2) Disconnect power supply cable from -43 V/OUT connector.
 - (3) Disconnect ground cable from ground terminal.
 - (4) Disconnect ALM cable from ALM terminal.
- 5 Loosen two screws fixed the DC-DC CONV.
- 6 Extract the DC-DC CONV from the MDP shelf.
- 7 Check that the power switch on the spare DC-DC CONV is Off position.
- 8 Mount the spare DC-DC CONV to the MDP shelf.
- 9 Tighten two screws to fix the DC-DC CONV.
- 10 Connect cables to the DC-DC CONV as reversed order in step 4.

Chart 5-5 MDP and Module Replacement (Cont'd)

Step	Procedure
11	Turn on the power switch on the DC-DC CONV.
12	Check that PWR LED on the DC-DC CONV is on.
13	Turn on the power switch on the MODEM.
14	Check that PWR LED on the MODEM is on.
15	Check that ALM LED on the MDP is unlit.
16	Set the MDP to maintenance OFF condition by LCT.

Chart 5-5 MDP and Module Replacement (Cont'd)

Step	Procedure
------	-----------

B. MDP REPLACEMENT**REMOVING**

- 1 Turn off the power switch on the MODEM (both MODEM in 1+1 configuration).
- 2 Disconnect the IF cable, signal cables and the power cable, etc. as following order.
 - (1) Disconnect XPIC CTRL cables from opposite MDP. (XPIC configuration only.)
 - (2) Disconnect XIF coaxial cables from opposite MDP. (XPIC configuration only.)
 - (3) Disconnect, DS1, LAN, Aux. signal cables from connector.
 - (4) Disconnect power supply cable from SELV connector.
 - (5) Disconnect IF cable from IF IN/OUT connector.
 - (6) Disconnect ground cable from the ground terminal

Note: The adapter for IF cable connector is reused.

- 3 As shown in Fig. 5-13, loosen four screws and remove the MDP.

MOUNTING

- 4 Fix the two brackets to desired position on the MDP, if necessary (see Fig. 5-14).
- 5 Mount the MDP into the original position of the mounting rack and tighten the four screws.
- 6 Reconnect the IF cables, signal cables and the power cable to the original position as following order.
 - (1) Connect ground cable to the ground terminal
 - (2) Connect IF cable (with adapter) to IF IN/OUT connector.
 - (3) Connect power supply cable to SELV connector.
 - (4) Connect DS1, LAN, Aux. signal cables to proper connector.
 - (5) Connect XIF coaxial cables to opposite MDP. (XPIC configuration only.)
 - (6) Connect XPIC CTRL cables to opposite MDP. (XPIC configuration only.)

Chart 5-5 MDP and Module Replacement (Cont'd)

Step	Procedure
7	<p>Form the wiring, and fix the cables using cable binder to the mounting rack.</p> <p><i>Notes:</i> 1. Do not cross the cables on front of indicators and power switch used for maintenance.</p> <p>2. Take suitable radius to wiring the IF cable. (5DFB: 45 mm or more, 8DFB, 10DFB: 70 mm or more)</p>
8	<p>Turn on the power switch on the MDP.</p>

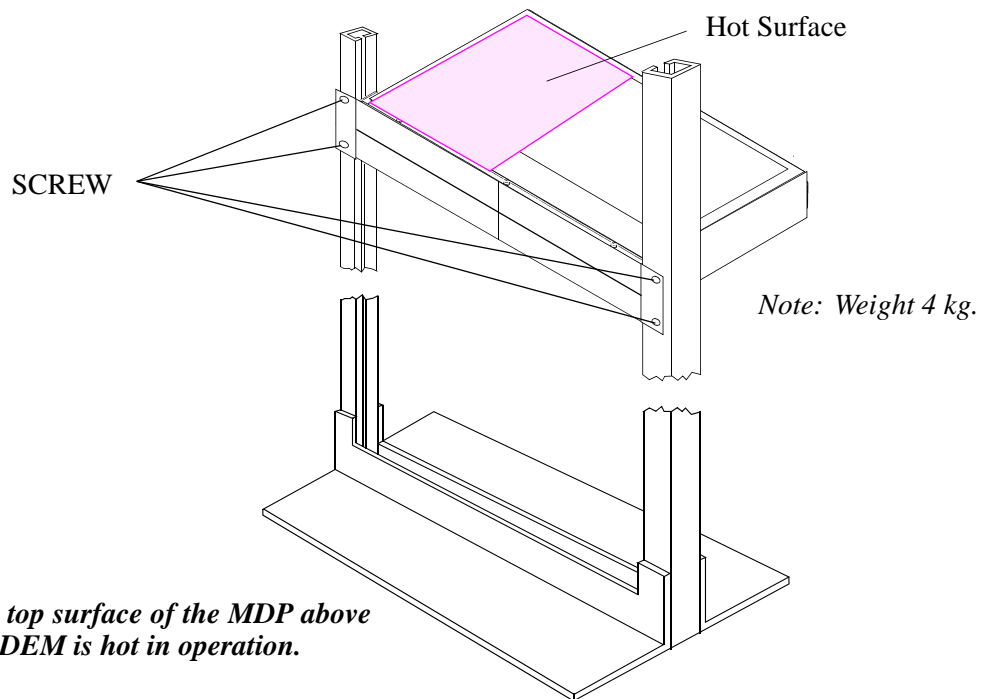


Fig. 5-13 Demounting and Remounting

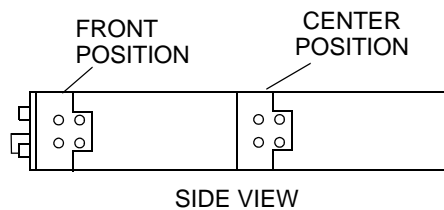


Fig. 5-14 Bracket Mounting Position

5.2.3 ALL INDOOR TRP Replacement

The procedures for replacing ALL INDOOR TRP with a spare are given in the Chart 5-6.

Chart 5-6 ALL INDOOR TRP Replacement

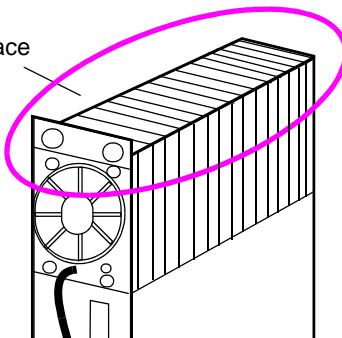
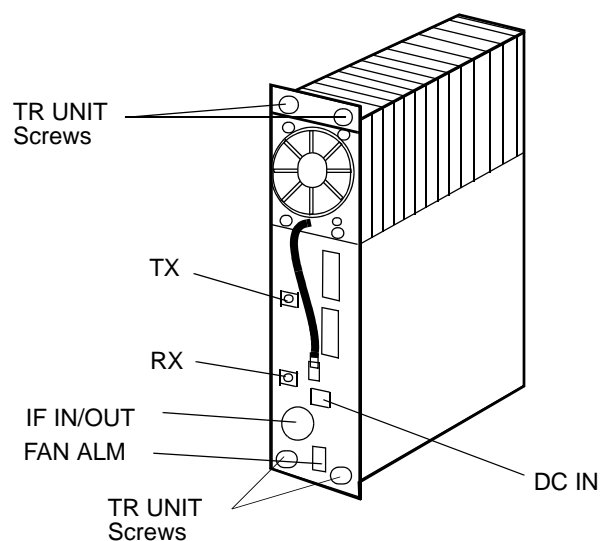
Step	Procedure
<u>REMOVING (ALL INDOOR)</u>	
1	Referring to Chart 2-2, set maintenance mode to Maint "ON" by the LCT.
2	Lockout the automatic switching with the LCT for the TX SW and RX SW in 1+1 system, (Set the TX SW and RX SW to No. 1 when the unit in No. 2 is replaced or when the unit in No. 1 is replaced, set those SWs to No. 2.).
3	Turn off the power switch on the associated MDP.
<p>Warning: <i>Because the TR UNIT becomes hot during operation, do not touch the upper side of the TR UNIT.</i></p>	
<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">Hot Surface</div>  </div>	
4	Disconnect the IFL cable from the IFL connector on the TR UNIT which is to be replaced.
<p>Warning: <i>Do not remove the IFL cable before turning OFF the power switch on the MDP.</i></p>	
5	Disconnect the power supply cable from the DC IN (SEL V) connector on the TR UNIT which is to be replaced.
6	Disconnect SJ cables from the TX terminal and RX terminal on the TR which is to be replaced.
<p><i>Note:</i> <i>Being careful, loosen alternately and gradually the two connectors of the SJ cable.</i></p>	
7	Disconnect FAN ALM cable from the FAN ALM terminal on the TR UNIT which is to be replaced.

Chart 5-6 ALL INDOOR TRP Replacement (Cont'd)

Step	Procedure
8	Loosen four screws holding the TR UNIT which is to be replaced.
9	Hold the two screws of upper and lower part of the TR UNIT and pull out the TR UNIT from the shelf.



REMountING (ALL INDOOR)

- 10 Check that the power switch on the associated MDP is set to OFF.
- 11 Insert the TR UNIT into the shelf.
- 12 Using a screw driver, tighten four screws to hold the TR UNIT in the shelf.
- 13 Connect the IFL cable to the IFL connector on the TR UNIT front panel.

Warning: Do not connect the IFL cable before turn OFF the power switch on the MDP.

- 14 Connect the power supply cable to the DC IN (SEL V) connector on the TR UNIT front panel.

Chart 5-6 ALL INDOOR TRP Replacement (Cont'd)

Step	Procedure
15	Connect the SJ cables to the TX terminal and the RX terminal on the TR UNIT. <i>Note: Being careful, fasten alternately and gradually the two connectors of the SJ cable.</i> <i>Tightening torque: 0.6 N·m</i>
16	Connect the FAN ALM cable to the FAN ALM terminal on the TR UNIT.
17	Turn on the power switch on the associated MDP.
18	Confirm that alarm LEDs on the TR UNIT and MDP are unlit.
19	Reset the protection switching to Auto mode in the 1+1 system referring to Chart 2-2.
20	Reset the Maintenance mode to off with the LCT.
21	Check that the MAINT LED on the MDP goes off.

5.2.4 Fuse Replacement

When the power is supplied to the SELV but the MDP can not be powered on with the power switch, check the conduction of fuse in the MODEM.

Chart 5-7 Fuse Replacement

Step	Procedure
1	Set the power switch on the MODEM which is not powered to Off position.
2	Disconnect cables connected to the MODEM as following order. (1) Disconnect power supply cable from SELV connector. (2) Disconnect IF cable from IF IN/OUT connector. The adapter is reused. (3) Disconnect ground cable from the ground terminal.
3	Loosen two screws on the MODEM.
4	Extract the MODEM from the MDP shelf.
5	Remove protection cap over the fuse (see Fig. 5-15).
6	Remove the fuse from the fuse holder.
7	Check conduction of the broken fuse using tester.
8	Check conduction of the reserved fuse using tester.
9	Replace the broken fuse with reserved one.
10	Set the replaced fuse to the fuse holder.
11	Cap over the replaced fuse.
12	Mount the MODEM to the MDP shelf.
13	Tighten two screws on the MODEM.
14	Connect cables to the MODEM as reversed order in step 2.
15	Turn on the power switch on the MODEM.
16	Check that power is on.

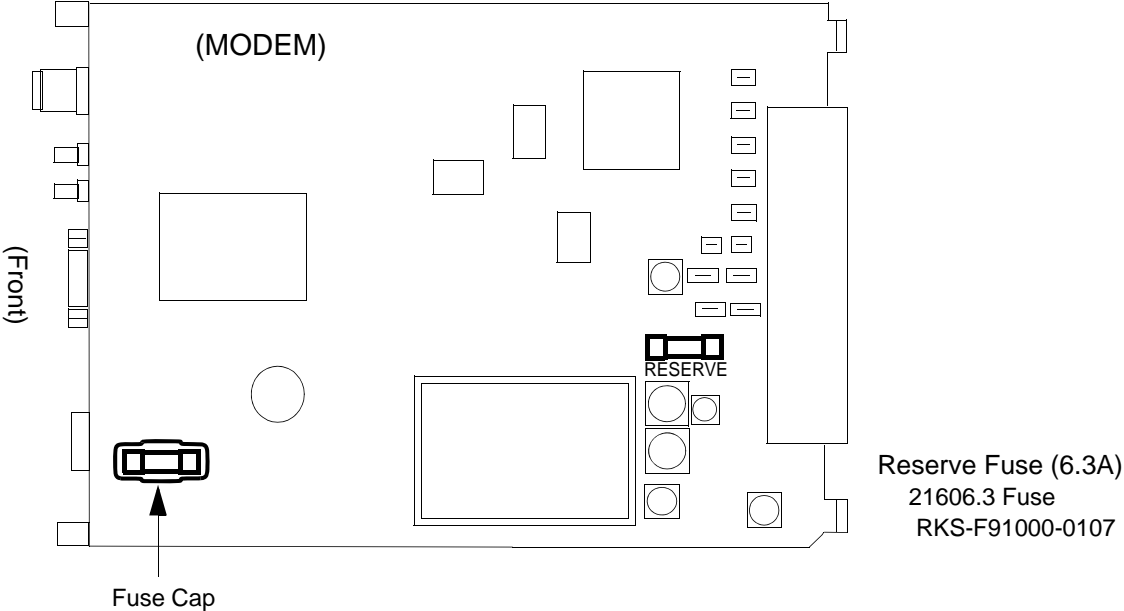


Fig. 5-15 Fuse in the MODEM

When the power is supplied to the SELV of the DC-DC CONV (optional) but the PWR LED of the DC-DC CONV is not lit though the power switch is on, check the conduction of the fuse in the DC-DC CONV.

Chart 5-8 DC-DC CONV Fuse Replacement

Step	Procedure
1	Set the power switch on the DC-DC CONV which is not powered to Off position
2	Disconnect cables connected to the DC-DC CONV as following order. (1) Disconnect power supply cable from SELV connector. (2) Disconnect power supply cable from –43 V/OUT connector. (3) Disconnect ground cable from ground terminal. (4) Disconnect ALM cable from ALM terminal.
3	Loosen two screws on the DC-DC CONV.
4	Extract the DC-DC CONV from the unit.
5	Put the screwdriver to the groove of the fuse holder and turns the fuse holder counter clockwise.
6	Remove the fuse from the fuse holder.
7	Check conduction of the broken fuse using tester.
8	Remove the reserved fuse as described in step 5.
9	Check conduction of the reserved fuse using tester.
10	Replace the broken fuse with reserved one.
11	Set the replaced fuse to the fuse holder.
12	Put the screwdriver to the groove of the fuse holder and push it into the DC-DC CONV.
13	Turn the screwdriver clockwise until the fuse holder is locked up. (When the fuse holder is locked up, the groove of the fuse holder is set to horizontal as shown in Fig. 5-16.)
14	Check and replace another fuse in the same way as from Step 5 to Step 13.
15	Mount the DC-DC CONV to the unit.

Chart 5-8 DC-DC CONV Fuse Replacement

Step	Procedure
16	Tighten two screws on the DC-DC CONV.
17	Connect cables to the DC-DC CONV as reversed order in step 2.
18	Turn on the power switch on the DC-DC CONV.
19	Check that power is on.
20	Turn on the power switch on the MDP/DC-DC CONV UNIT.
21	Check that power is on.

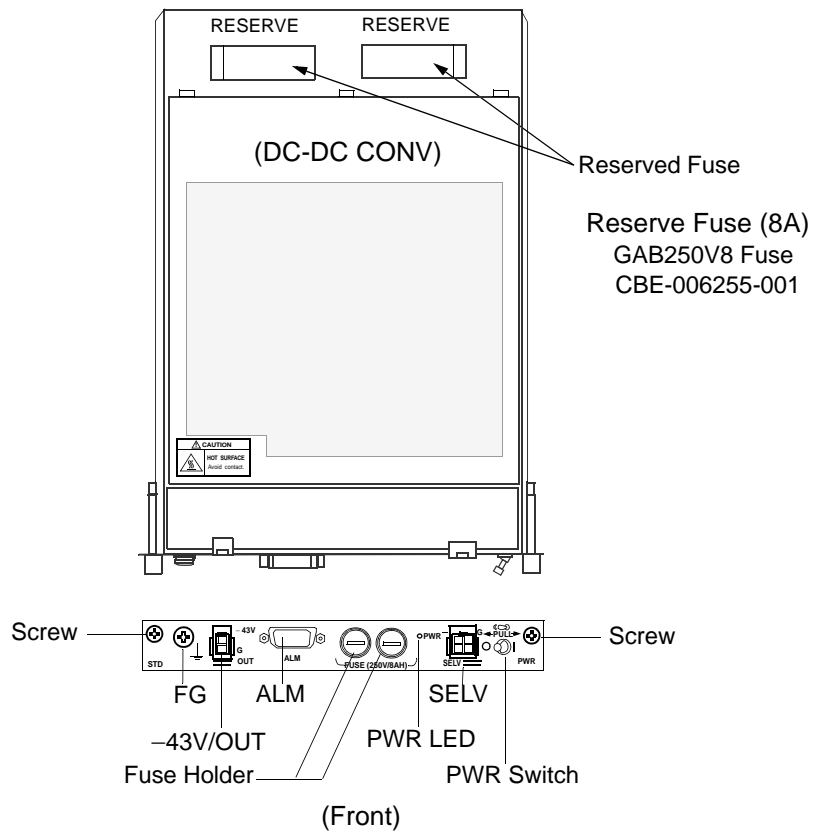


Fig. 5-16 Fuse in the DC-DC CONV

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