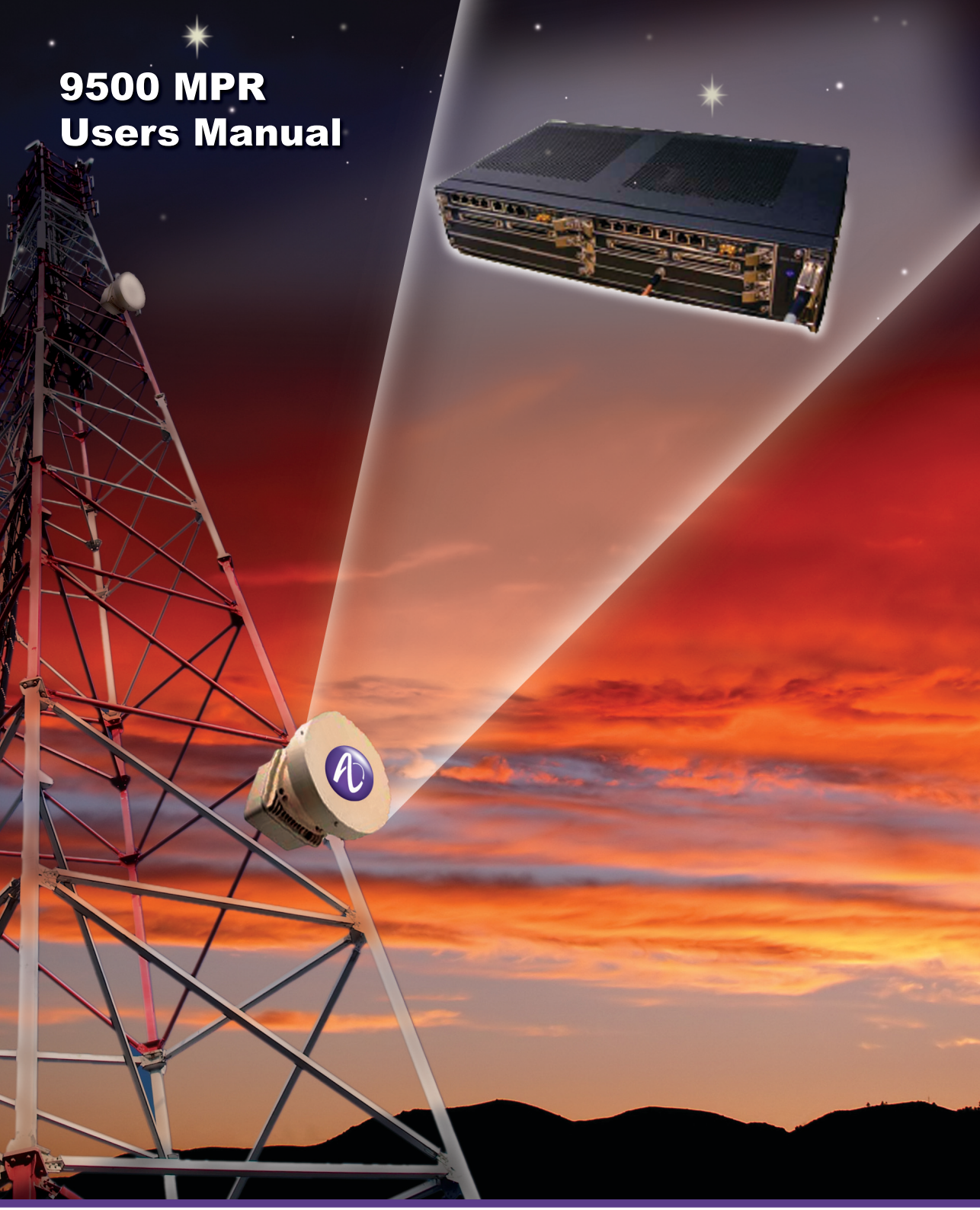
9500 MPR Users Manual



Alcatel·Lucent

This CD (PN 3EM22841ABAA) contains the complete 9500 MPR Radio Operation and Maintenance Manual. Refer to this CD for specific equipment details not covered in the Users Manual.

9500 MPR Radio
Operation and Maintenance Manual

9500 MPR-A

Microwave Packet Radio
Users Manual

Alcatel-Lucent Part Number 3EM22842AB
Issue 2, February, 2009

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- Telephone number
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- Equipment type
- A brief description of the problem affecting their equipment
- **Customer Priority:** *High, Medium,* or *Low.*
- TL-9000 Severity as described below.

TL-9000 Severities Defined

Critical	Problems severely affecting service, traffic, capacity, or network management. They require **immediate corrective action**. (Ex. Loss of network management capability, loss of traffic imminent or existing).
Major	Conditions **seriously affecting** system operation. They require **immediate attention**. (Ex. processor outage, loss of standby equipment, loss of remote access, or network managers).
Minor	Problems not classified as critical or major.

Table of Contents

SAFETY PRECAUTIONS

While the manufacturer has attempted to detail in this manual all areas of possible danger to personnel in connection with the use of this equipment, personnel should use caution when installing, checking out, operating, and servicing this equipment. As with all electronic equipment, care should be taken to avoid electrical shock in all circuits where substantial currents or voltages may be present, either through design or short circuit.

Definitions of Danger, Warnings, Cautions, and Notes used throughout this manual are described below:

DANGER
Possibility of Injury to Personnel

An operating procedure, practice, etc., which, if not correctly followed could result in personal injury or loss of life.

WARNING
Possibility of Damage to Equipment

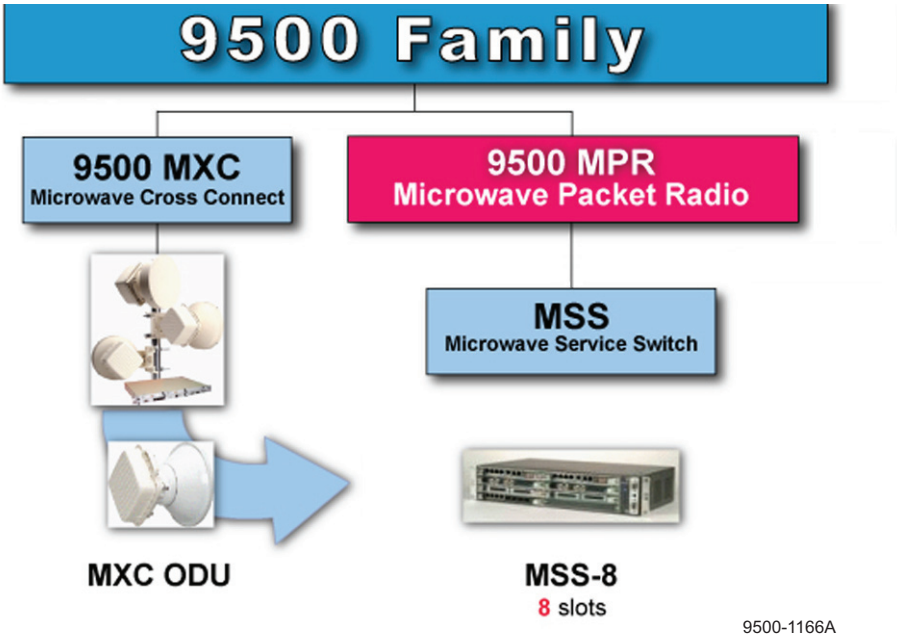
An operating procedure, practice, etc., which, if not strictly observed, could result in damage to or destruction of equipment.

CAUTION
Possibility of Service Interruption

An operating procedure, practice, etc., which, if not correctly followed, could result in an interruption of service.

Note

An operating procedure, condition, etc., which is essential to highlight.



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1 GENERAL

1.1 INTRODUCTION

The information in this Users Manual is a summary of the overall Operation and Maintenance Manual that is located on the attached CD. The summary information is provided to support initial turnup, day-to-day operation, and maintenance of the 9500 MPR equipment.

1.2 9500 MPR OVERVIEW

Outdoor Radio Unit (ODU)

- Optimal for urban links
- Supports 6, 11, 15, 18 GHz
- Integrated antenna mount
- Coaxial connection to MSS

9500-1141A
10/27/08

Microwave Service Switch (MSS)

- Common shelf for nodal architecture
- Consolidates RF spurs into one element
- Both ODU and MPT
- Layer 2 aggregation
- May be deployed standalone

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10/27/08

1.3 9500 MPR FEATURES LIST

Refer to the following list of standard features.

- DS1, DS3 and 10/100/1000 Ethernet interfaces
- CESoETH MEF8
- 300 Mbps full-duplex Ethernet transport capacity
- Flexible aggregate capacity sharing DS1/DS3 and Ethernet
- 10Gb Packet Based Node
- Microwave uplink (ODU V2)
- Ethernet uplink with VLAN
- Point-to-point VLAN
- IEEE 802.1p and Diffserv QoS
- Queue Management & Flow control ability
- DS1/DS3 Protection

- 1+1 EPS on All Cards
- MXC ODU Support:
- 6, 11, 15, 18 GHz
- Supported modulations:
- 32, 128, 256 QAM
- Channel Spacing:
- 10, 30, 40, 50 MHz
- Unprotected, 1+1 HSB & SD/FD Radio Protection
- Node, up to 6 radio directions supported
- SW License control
- SNMP v2
- TSM8000 Support
- 1340 INC Support

1.4 TYPICAL SYSTEM CONFIGURATIONS

The 9500 MPR is configured as a split mount, with the MSS-8 shelf mounted indoors and the ODU mounted on the tower. The MSS-8 shelf is connected to the ODU with coax cable. The ODU can be direct-mounted to the antenna or mounted on the tower and connected to the antenna with flex waveguide. The radio can function as follows:

- MSS-8 Stand Alone Shelf
- 1+0 Terminal
- 1+0 Drop and Insert Repeater
- 1+1 Drop and Insert Repeater
- 1+0 4-Way Junction

1.5 PHYSICAL, ELECTRICAL, AND ENVIRONMENTAL CHARACTERISTICS

1.5.1 Physical Characteristics

Refer to Table 1-1 for dimensions and weight for the MSS-8 shelf and ODU.

Table 1-1 Physical Characteristics

Dimensions (Width x Depth x Height)	
MSS-8	444 x 250 x 88 mm (17.48 x 9.54 x 3.46 in.)
ODU	287 x 119 x 287 mm (11.299 x 4.68 x 11.29 in.)
Weight	
MSS-8 Fully Equipped	6 kg (13.2 lb.)
ODU	6 kg (13.2 lb.)

1.5.2 Environmental Characteristics

Refer to Table 1-2 for temperature and humidity requirements for the MSS-8 shelf, and ODU.

Table 1-2 Environmental Characteristics

Temperature	
MSS-8	-5 to +55°C (+23 to +131°F)
ODU	-33 to +55°C (-17.4 to +131°F)
Humidity	
MSS-8	0 to 95%, non-condensing
ODU	0 to 100%

1.5.3 Basic Electrical Characteristics

Refer to Table 1-3 for the basic electrical characteristics.

Table 1-3 Basic Electrical Characteristics

Function	Characteristic
Power	-48 to +60 Vdc ± 20%
RF Frequency Band	5.8U, L6, U6, 11, 15, 18 GHz
Static Modulation	32, 138, 256 QAM
Adaptive Modulation	4, 16, 64 QAM

1.5.4 Power Budget

Refer to Table 1-4 for the power of the individual modules in the MSS-8 shelf, and ODU. To determine the total power of the MSS-8 shelf, multiply the power of each individual module by the number of that module installed in the shelf and add the resulting products. The sum is the total power.

Table 1-4 Power Budget

Component	Maximum Power Consumption (W)	Current (A)
CSM (Core)	16	0.33
MD300 (Radio)	23	0.48
P32E1DS1 (DS1)	16	0.33
P2E3DS3 (D3	16	0.33
FAN	8	0.17
ODU	30	0.63

Notes:

1. Power shown is for normal operation (not startup).
2. Current is based on a -48 Vdc battery input.

1.5.5 Fault and Configuration Management

Refer to Table 1-5 for fault and configuration management options.

Table 1-5 Fault and Configuration Management

Function	Characteristic
Protocol	SNMP
Interface, Electrical	Ethernet 10/100/1000Base-T
Interface, Physical	RJ-45
Local/Remote configuration and Support Tool	Craft Terminal
Routing protocols Supported	Static and Dynamic Routing, OSPF
Network Management	Alcatel-Lucent 1350 OMS and 5620 SAM

1.5.6 Antenna Interface

Refer to Table 1-6 for helpful waveguide equipment information by frequency.

Table 1-6 Antenna Interface

Freq Band	Radio Flange	Waveguide Mating Flange	Waveguide Type	Spring Washers Req'd.	Bolts Req'd.	Bolt Type	Thread Spec	Hole Depth mm	Bolt Length Required
6 GHz	UDR70	PDR70	WR137	8 x M5	8	M5x0.8	6H	10	Flange thickness + Hole depth - 2mm
7/8 GHz	UDR84	PDR84	WR112	8 x M4	8	M4x0.7	6H	8	Flange thickness + Hole depth - 2mm
10/11 GHz	UDR100	PDR100	WR90	8 x M4	8	M4x0.7	6H	8	Flange thickness + Hole depth - 2mm
13 GHz	UBR120	PBR120	WR75	4 x M4	4	M4x0.7	6H	8	Flange thickness + Hole depth - 2mm
15 GHz	UBR140	PBR140	WR62	4 x M4	4	M4x0.7	6H	8	Flange thickness + Hole depth - 2mm
18/23/26 GHz	UBR220	PBR220	WR42	4 x M3	4	M3x0.5	6H	6	Flange thickness + Hole depth - 2mm
28/32/38 GHz	UBR320	PBR320	WR28	4 x M3	4	M3x0.5	6H	6	Flange thickness + Hole depth - 2mm

1.5.7 Modem Profile – Split Mount - Static Modulation

Refer to Table 1-7 for useful transport signal details for a split mount radio provisioned for static modulation (presetting mode).

Table 1-7 Modem Profile – Static Modulation

RF Band	Channel BW(MHz)	Mod	Radio Capacity (Mbps)	Maximum Equivalent DS1 Capacity	Maximum Equivalent DS3 Capacity	Minimum License Required	Rx Threshold NS (dBM)	Rx Threshold HS (dBm)	Tx PWR (dBm)	System Gain NS	System Gain HS
5.8 GHz	10	128 QAM	52.640	31	1	80	-72.5	-71.0	24.5	97.0	95.5
L6 GHz	10	128 QAM	52.640	31	1	80	-72.5	-71.0	26.0	98.5	97.0
	30	128 QAM	160.170	95	3	120	-68.0	-66.0	24.5	92.5	90.5
	30	256 QAM	183.302	116	4	320	-64.0	-62.5	22.5	86.5	85.5
U6 GHz	10	128 QAM	52.640	31	1	80	-72.5	-71.0	24.5	97.0	95.5
11 GHz	10	128 QAM	52.640	31	1	80	-72.0	-70.5	20.0	92.0	90.5
	30	32 QAM	114.22	67	2	120	-73.5	-72.0	21.5	95.0	93.5
	30	128 QAM	160.170	95	3	160	-67.5	-65.5	20.0	87.5	85.5
	30	256 QAM	183.302	116	4	320	-63.5	-62.0	18.0	81.5	80.0
	40	32 QAM	152.293	90	3	160	-72.5	-71.0	18.0	90.5	89.0
	40	128 QAM	213.935	126	4	320	-66.0	-64.5	18.0	84.0	82.5
15 GHz	10	32 QAM	37.323	22	22	NA	40	-77.5	-76.0	19.5	95.5
	10	128 QAM	52.640	31	31	1	80	-71.0	-69.5	18.0	87.5
	40	32 QAM	152.293	90	90	3	160	-71.5	-70.0	19.5	89.5
	40	128 QAM	213.935	126	126	4	320	-65.0	-63.5	83.0	81.5
18 GHz	10	128 QAM	52.640	31	1	80	-70.5	-69.0	15.5	86.0	84.5
	30	32 QAM	114.22	67	2	120	-72.0	-70.5	17.0	89.0	87.5
	30	128 QAM	160.170	95	3	120	-66.0	-64.0	15.5	81.5	79.5
	40	32 QAM	152.293	90	3	160	-71.0	-69.5	17.0	88.0	86.5
	40	128 QAM	213.935	126	4	320	-64.5	-63.0	15.5	80.0	78.5
	50	32 QAM	190.804	113	3	320	-70.0	-68.5	17.0	87.0	85.5
	50	128 QAM	267.700	159	5	320	-63.5	-62.0	15.5	79.0	77.5

1.5.8 Modem Profile – Split Mount - Adaptive Modulation

Refer to Table 1-8 for useful transport signal details for a split mount radio provisioned for adaptive modulation.

Table 1-8 Modem Profile – Adaptive Modulation

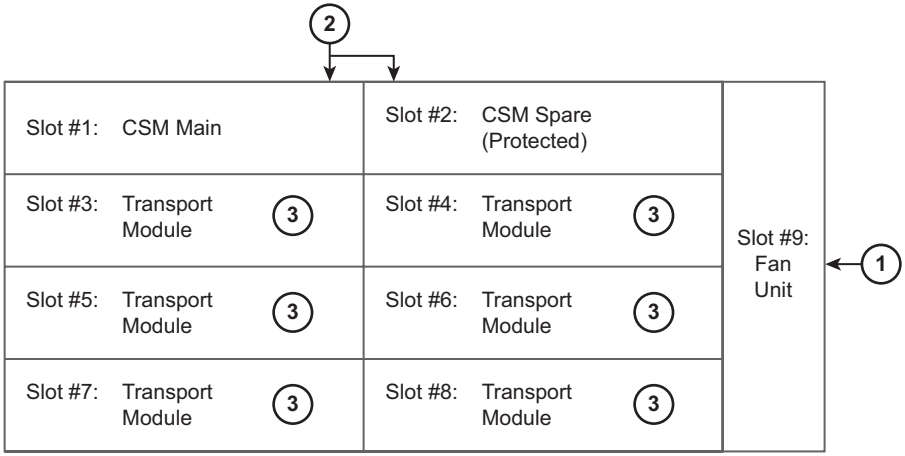
RF Band	Channel BW(MHz)	Mod	Radio Capacity (Mbps)	Maximum Equivalent DS1 Capacity	Maximum Equivalent DS3 Capacity	Minimum License Required	Rx Threshold NS (dBM)	Rx Threshold HS (dBm)	Tx PWR (dBm) *	System Gain NS	System Gain HS
L6 GHz	10	4 QAM	14.191	8	N/A	80	-88.0	-89.5	25.5	113.5	115.0
	10	16 QAM	29.508	18	N/A	80	-82.0	-83.5	25.5	107.5	109.0
	10	64 QAM	44.825	27	N/A	80	-76.0	-77.5	25.5	101.5	103.0
	30	4 QAM	42.950	25	N/A	160	-83.5	-85.0	25.5	109.0	110.5
	30	16 QAM	87.024	52	N/A	160	-77.5	-79.0	25.5	103.0	104.5
	30	64 QAM	131.099	78	N/A	160	-71.5	-73.0	25.5	97.0	98.5
U6 GHz	10	4 QAM	14.191	8	N/A	80	-87.5	-89.0	25.5	113.0	114.5
	10	16 QAM	29.508	18	N/A	80	-81.5	-83.0	25.5	107.0	108.5
	10	64 QAM	44.825	27	N/A	80	-75.5	-77.0	25.5	101.0	102.5
	30	4 QAM	42.950	25	N/A	160	-83.0	-84.5	25.5	108.5	110.0
	30	16 QAM	87.024	52	N/A	160	-77.0	-78.5	25.5	102.5	104.4
	30	64 QAM	131.099	78	N/A	160	-71.5	-73.0	25.5	97.0	98.5
11 GHz	10	4 QAM	14.191	8	N/A	80	-87.5	-89.0	21.0	108.5	110.0
	10	16 QAM	29.508	18	N/A	80	-81.5	-83.0	21.0	102.5	104.0
	10	64 QAM	44.825	27	N/A	80	-75.5	-77.0	21.0	96.5	98.0
	30	4 QAM	42.950	25	N/A	160	-83.0	-84.5	21.0	104.0	105.5
	30	16 QAM	87.024	52	N/A	160	-77.0	-78.5	21.0	98.0	99.5
	30	64 QAM	131.099	78	N/A	160	-71.0	-72.5	21.0	92.0	93.5
15 GHz	10	4 QAM	14.191	8	N/A	80	-86.0	-87.5	19.0	105.0	106.5
	10	16 QAM	29.508	18	N/A	80	-80.0	-81.5	19.0	99.0	100.5
	10	64 QAM	44.825	27	N/A	80	-74.0	-75.5	19.0	93.0	94.5
	30	4 QAM	42.950	25	N/A	160	-81.5	-83.0	19.0	100.5	102.0
	30	16 QAM	87.024	52	N/A	160	-75.5	-77.0	19.0	94.5	96.0
	30	64 QAM	131.099	78	N/A	160	-69.5	-71.0	19.0	88.5	90.0

Table 1-8 Modem Profile – Adaptive Modulation (Cont.)

RF Band	Channel BW(MHz)	Mod	Radio Capacity (Mbps)	Maximum Equivalent DS1 Capacity	Maximum Equivalent DS3 Capacity	Minimum License Required	Rx Threshold NS (dBM)	Rx Threshold HS (dBm)	Tx PWR (dBm) *	System Gain NS	System Gain HS
18 GHz	10	4 QAM	14.191	8	N/A	80	-86.0	-87.5	16.5	102.5	104.0
	10	16 QAM	29.508	18	N/A	80	-80.0	-81.5	16.5	96.5	98.0
	10	64 QAM	44.825	27	N/A	80	-74.0	-75.5	16.5	90.5	92.0
	30	4 QAM	42.950	25	N/A	160	-81.5	-83.0	16.5	98.0	99.5
	30	16 QAM	87.024	52	N/A	160	-75.5	-77.0	16.5	92.0	93.5
	30	64 QAM	131.099	78	N/A	160	-69.5	-71.0	16.5	86.0	87.5

* Based on 64 QAM

1.6 MSS SHELF CONFIGURATION



1. The Fan must be installed in slot #9. The WebEML screen will display this module as MSS/FANS.

2. The Control and Switching Module (CSM - Core) Main must be installed in Slot #1. The WebEML screen will display this module as MSS/CORE-MAIN for slot #1. A CSM protected module can be added to slot #2 if core protection is needed. The WebEML screen will display this protected module as MSS/CORE-SPARE in slot #2.

Transport Module Name	Not Protected Radio WebEML Screen Name	Protected Radio WebEML Screen Name**
P32E1DS1 (DS1)	MSS/DS1	MSS/DS1-MAIN MSS/DS1-SPARE
P2E3DS3 (DS3)	MSS/DS3	MSS/DS3-MAIN MSS/DS3-SPARE
MD300 (RADIO)	MSS/RADIO Dir#3-Ch#1&0*	MSS/RADIO Dir#3-Ch#1* MSS/RADIO Dir#3-Ch#0*

*This example depicts the MD300 radio module in slot #3.

3. There are three types of transport modules used for slot #3 through slot #8. Transport modules can be P32E1DS1 (DS1), P2E3DS3 (DS3) and/or MD300 (RADIO) modules.

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1.7 PARTS LIST

Common equipment supplied with the radio and optional equipment for the 9500 PR is listed below.

Table 1-9 Parts List

Item Description	Part Number	Remarks
RACKS		
Standard Rack, 7' tall, 19" wide	694-9000-006	
Standard Rack, 7' tall, 23" wide	695-0905-003	
Seismic Rack, 7.0'	019-0429-010	
Adapters for 23", 2 RU (PDU two required)	694-8873-005	
Rack Extension Kit - 19" rack	690-1125-003	
Rack Extension Kit (23" rack) added	690-1125-005	
Power Distribution Panel	3EM13317AA	
Kit AC Outlet	690-4373-001	
SUBRACK		
9500 MPR MSS Shelf Shipping Kit	3EM22715AA	
MSS Slot Cover - Blank Plate 1/2H	3DB18163AB	
SUBRACK – Spares		
9500 MPR R1.0 2RU 8 Slot Shelf	3DB18485AA	
MSS Fan Unit	3DB18134BA	
Power Supply Cable (2 per Shelf)	3DB18271AA	
MSS Modules		
Control and Switching Module (CSM - Core)	3DB18209AB	
Modem Module (MD300)	3DB18136AC	
DS1 PDH Module (P32E1DS1)	3DB18126AD	
DS3 PDH Module (P2E3DS3)	3DB18194AA	
MSS Fan Unit	3DB18134AB	
SFP Copper Cable, 1M		
ODU L6 GHz, 252.04 MHz spacing (V2)		
5930-6020MHZ, HP, TX LOW	3DB23215AA	
6182-6272MHZ, HP, TX HIGH	3DB23215AD	
5989-6079MHZ, HP, TX LOW	3DB23215AB	
6241-6331MHZ, HP, TX HIGH	3DB23215AE	
6078-6168MHZ, HP, TX LOW	3DB23215AC	
6330-6420MHZ, HP, TX HIGH	3DB23215AF	

Table 1-9 Parts List (Cont.)

Item Description	Part Number	Remarks
ODU U6 GHz, 160 MHz spacing (V2)		
6540-6610MHZ, HP, TX LOW	3DB23214AA	
6710-6780MHZ, HP, TX HIGH	3DB23214AB	
6590-6660MHZ, HP, TX LOW	3DB23214AC	
6760-6830MHZ, HP, TX HIGH	3DB23214AD	
6640-6710MHZ, HP, TX LOW	3DB23214AE	
6800-6870MHZ, HP, TX HIGH	3DB23214AF	
ODU 11 GHz, 590-490 MHz spacing		
10675-10835MHZ, TX LOW	3DB23035AA	
11200-11345MHZ, TX HIGH	3DB23035AE	
10795-10955MHZ, TX LOW	3DB23035AB	
11310-11465MHZ, TX HIGH	3DB23035AF	
10915-11075MHZ, TX LOW	3DB23035AC	
11430-11585MHZ, TX HIGH	3DB23035AG	
11035-11200MHZ, TX LOW	3DB23035AD	
11550-11705MHZ, TX HIGH	3DB23035AH	
ODU 15 GHz, 475/590 MHz spacing		
14500-14660MHZ, TX LOW	3DB23039ACAA01	
14975-15135MHZ, TX HIGH	3DB23039ADAA01	
ODU 18 GHz, 340 MHz spacing		
18580-18660MHZ, TX LOW	3DB23041AAAA01	
18660-18740MHZ, TX LOW	3DB23041ABAA01	
18740-18820MHZ, TX LOW	3DB23041ACAA01	
18920-1900MHZ, TX HIGH	3DB23041ADAA01	
1900-19080MHZ, TX HIGH	3DB23041AEAA01	
19080-19160MHZ, TX HIGH	3DB23041AFAA01	
ODU 18 GHz, 1560 MHz spacing		
17700-18060MHZ, TX LO	3DB23062AC	
19260-19620MHZ, TX HI	3DB23062AD	
ODU Antenna		
D.M. ANTENNA 5.92-6.425GHz-1.2 M-HPLP-R	3CC56003AA	
D.M. ANTENNA 5.92-6.425GHz-1.8 M-HPLP-R	3CC56004AA	
D.M. ANTENNA 6.425-7.125GHz-1.2 M-HPLP-R	3CC56005AA	
D.M. ANTENNA 6.425-7.125GHz-1.8 M-HPLP-R	3CC56006AA	

Table 1-9 Parts List (Cont.)

Item Description	Part Number	Remarks
D.M. ANTENNA 10.5-11.7GHz-0.6 M-HPLP-R	3CC56012AA	
D.M. ANTENNA 10.5-11.7GHz-0.9 M-HPLP-R	TBA	
D.M. ANTENNA 10.5-11.7GHz-1.2 M-HPLP-R	3CC56014AA	
D.M. ANTENNA 10.5-11.7GHz-1.8 M-HPLP-R	3CC56015AA	
D.M. ANTENNA 15.35GHz-0.3 M-HPLP-R	3CC56021AA	
D.M. ANTENNA 15.35GHz-0.6 M-HPLP-R	3CC56024AA	
D.M. ANTENNA 15.35GHz-0.9 M-HPLP-R	3CC56031AA	
D.M. ANTENNA 15.35GHz-1.2 M-HPLP-R	3CC56034AA	
D.M. ANTENNA 15.35GHz-1.8 M-HPLP-R	3CC56037AA	
D.M. ANTENNA 17.7-19.7GHz-0.3 M-HPLP-R	3CC56039AA	
D.M. ANTENNA 17.7-19.7GHz-0.6 M-HPLP-R	3CC56047AA	
D.M. ANTENNA 17.7-19.7GHz-0.9 M-HPLP-R	3CC56052AA	
D.M. ANTENNA 17.7-19.7GHz-1.2 M-HPLP-R	3CC56058AA	
D.M. ANTENNA 17.7-19.7GHz-1.8 M-HPLP-R	3CC56063AA	
Coupler 6GHz UNEQL 6dB 2 X ODU Slip-Fit	3CC58020AA	
Coupler 11GHz UNEQL 6dB 2 X ODU Slip-Fit	3CC58017AA	
Coupler 15 GHz UNEQL 6dB 2 X ODU Slip-Fit		
Coupler 18GHz UNEQL 6dB 2 X ODU Slip-Fit	3CC58027AA	

Table 1-9 Parts List (Cont.)

Item Description	Part Number	Remarks
Pole mount for ODU or coupler, non integrated antenna configuration	3CC58001AA	
ODU Rack Mount Bracket (verify distance limitation in this configuration with Alcatel-Lucent)	3EM21370AA	
Software		
9500 MRP R1.0 SW License/CD	3EM23052AAAA	
9500 MPR R1.0 CT License (Per PC Installed)	3EM23065AAAA	
9500 MPR R1.0 Flash Card (1 per CORE)	3EM23055AAAA	
9500 MRP R2.0 SW License/CD	3EM23085AAAA	
9500 MPR R2.0 CT License (Per PC Installed)	3EM23067AAAA	
9500 MPR R2.0 Flash Card (1 per CORE)	3EM23086AAAA	
RTU's (License) – per ODU or MPT-HL		
RTU 40Mbps TRX Capacity	3EM23577AAAA	
RTU 80Mbps TRX Capacity	3EM23577ABAA	
RTU 120Mbps TRX Capacity	3EM23577ACAA	
RTU 160Mbps TRX Capacity	3EM23577ADAA	
RTU 320Mbps TRX Capacity	3EM23577AEAA	
RTU Adaptive Modulation Upgrade	3EM23577AFAA	
RTU 5.8 GHz Unlicensed Upgrade	3EM23577AGAA	
Software License Upgrade CD	3EM23578AAAA	
Documentation (1 Per NE)		
9500 MPR O&M Manual CD-ROM	3EM22841ABAA	
9500 MPR User Manual (Paper)	3EM22842AB	
TDM Supplies		
32 E1/T1 Protection Panel - RJ45	1AF15245AB	
E1/T1 SCSI Interface Cable (16 T1/E1 per Cable)	3CC52118AA	
DS3 Protection Cable	3EM22900AA	
MSS Power Supply Cable		
Power Supply Cable (2 per Shelf)	3DB18271AAAA	

Table 1-9 Parts List (Cont.)

Item Description	Part Number	Remarks
Coax Supplies		
KIT SUPPORT FOR 3 CORDS N/QMA IDU	3CC50074AA	
N jack bulkhead to QMA plug QMA (M)-N (F) RF Cable, 108 in.	3EM23311AA	
Coaxial Cable LMR-400 FR - price per foot	1AC014320002	
Connector Straight	1AB095530024	
Connector Right Angle	1AB095530025	
LMR grounding kit	1AB350440001	
LIGHTNING ARREST 9913 INU/IDU&ODU ARREST	3CC50015AA	
Fiber Optic Jumpers		
Optical Cable, LC to LC, 3 meter, multi mode	3EM07641AC	
Optical Cable, LC to LC, 5 meter, multi mode	3EM07641AD	
Optical Cable, LC to LC, 10 meter, multi mode	3EM07641AE	
Optical Cable, LC to SC, 3 meter, multi mode	3EM07646AC	
Optical Cable, LC to SC, 5 meter, multi mode	3EM07646AD	
Optical Cable, LC to SC, 10 meter, multi mode	3EM07646AE	
Optical Cable, LC to FC, 3 meter, multi mode	3EM07651AC	
Optical Cable, LC to FC, 5 meter, multi mode	3EM07651AD	
Optical Cable, LC to FC, 10 meter, multi mode	3EM07651AE	
Optical Cable, LC to LC, 3 meter, single mode	3EM07641AH	
Optical Cable, LC to LC, 5 meter, single mode	3EM07641AJ	
Optical Cable, LC to LC, 10 meter, single mode	3EM07641AK	
Optical Cable, LC to SC, 3 meter, single mode	3EM07646AH	
Optical Cable, LC to SC, 5 meter, single mode	3EM07646AJ	
Optical Cable, LC to SC, 10 meter, single mode	3EM07646AK	

Table 1-9 Parts List (Cont.)

Item Description	Part Number	Remarks
Optical Cable, LC to FC, 3 meter, single mode	3EM07651AH	
Optical Cable, LC to FC, 5 meter, multi mode	3EM07651AJ	
Optical Cable, LC to FC, 10 meter, multi mode	3EM07651AK	
Waveguide Options		
Standard		
Provides transition from the filter SMA output to CMR-137 or WR-75. These kits provide a 15 inch SMA (M) to SMA (M) flex cable and a SMA (F) to waveguide transition (CMR or WR) for each antenna port required. The waveguide transitions mount directly onto the rear of the MPT.		
Single Port WG Kit, CMR-137, 6 GHz (5850-7125 MHz)	3DH04122GA	
Dual Port WG Kit, CMR-137, 6 GHz (5850-7125 MHz)	3DH04122GB	
Option 1		
These kits provide transition from the filter to the antenna waveguide connector using flexible cable. The kits include (1) 4 foot SMA (M) to Type N (M) 1/4" low loss cable and (1) Type N (F) to CPR waveguide adapter.		
WG Kit, 6 GHz	695-7834-007	
Option 2		
Provides a SMA to Waveguide transition for a MPT terminal, equipped with diplexer filters, installed in either position A2, A5, or A8 to the top of the rack using rigid waveguide. The kits include a SMA cable, SMA/ waveguide adapter, straight waveguide, brackets and waveguide clamps. Refer to Network Engineers for specific part numbers.		
6/8/11 GHz, HS, A2 Position	Refer to Network Engineers	
6/8/11 GHz, HSSD, A2 Position	Refer to Network Engineers	
6/8/11 GHz, HS, A5 Position	Refer to Network Engineers	
6/8/11 GHz, HSSD, A5 Position	Refer to Network Engineers	
6/8/11 GHz, HS, A8 Position	Refer to Network Engineers	
6/8/11 GHz, HSSD, A8 Position	Refer to Network Engineers	

Table 1-9 Parts List (Cont.)

Item Description	Part Number	Remarks
High Capacity Kits		
For stacking of up to three high capacity MPT radios onto a single antenna system. Radio growth is in the order of Shelf one in position A2 (Top Shelf), Shelf two in position A5 (Middle Shelf), and Shelf three in position A8 (Bottom Shelf). The Sell prices provided are added to the appropriate terminal Sell price. Refer to Network Engineers for specific part numbers.		
6/8/11 GHz, HS, A2 and A5 Position, Separate Antenna	Refer to Network Engineers	
6/8/11 GHz, HS, A2 and A5 Position, Externally Combining	Refer to Network Engineers	
6/8/11 GHz, HSSD, A2 and A5 Position, Separate Antenna	Refer to Network Engineers	
6/8/11 GHz, HSSD, A2 and A5 Position, Externally Combining	Refer to Network Engineers	
6/8/11 GHz, HS, A8 Position	Refer to Network Engineers	
6/8/11 GHz, HSSD, A8 Position	Refer to Network Engineers	
Waveguide Flange Adapters		
Provides waveguide flange transitions for the MPT.		
Single Port WG Kit, CMR-137 to CPR-137, 6 GHz	3DH04122HA	
Dual Port WG Kit, CMR-137 to CPR-137, 6 GHz	3DH04122HB	
Single Port WG Kit, UG-51 to CPR-112, 8 GHz	3DH04122HK	
Dual Port WG Kit, UG-51 to CPR-112, 8 GHz	3DH04122HL	
Single Port WG Kit, WR-75 to CPR-90, 10 GHz	3DH04122HN	
Dual Port WG Kit, WR-75 to CPR-90, 10 GHz	3DH04122HP	

2 OPERATION

2.1 GENERAL

This section contains turn-on, normal operation, turn-off, and emergency operating procedures plus a description of module indicators and connectors for the 9500 MPR Series Microwave Packet Radios.

Note

Before performing any procedures, operating personnel should become familiar with the locations of power distribution units and circuit breakers. If an equipment performance problem occurs during the following procedures, refer to the Maintenance Section.

2.2 TURN-ON

Radio power is controlled externally via rack and site circuit breakers. The radio is designed to operate continuously without operator intervention. After initial installation and power turn-on, operating procedures are limited to periodic visual checks and alarm checks. Turn-on procedures are needed only if the system has been turned off due to a malfunction or during maintenance.

Note

Until all radios in the transmission link are interconnected, turned on, and operating properly, alarm conditions may exist.

Perform the following procedure to turn on the 9500 MPR series radios:

1. Set rack power to on.
2. Verify that no alarm indicator is lighted. If alarm indicator is lighted troubleshoot as described in the Maintenance Section.

2.3 CRAFT TERMINAL (CT) PROVISIONING FUNCTION/OPERATION

The Craft Terminal software is used for maintenance and support of the radio including fault and status reporting. Refer to the Initial Turn-Up Section for instructions on loading and running the software. Refer to the User's Guide Section for descriptions and functions of the menus.

Note

Refer to the Software Release Notes before performing any operating, provisioning, or maintenance function on this equipment. The Software Release Notes may contain information affecting these functions that is not contained in this instruction manual.

2.4 OPERATING PROCEDURES

Note

The Craft Terminal computer is the main control for the radio. If instructions for setting up the Craft Terminal computer are needed, refer to the Initial Turn-Up Section.

After installation and turn-on, operating procedures are limited to periodic alarm checks. Automatic and manual switching are provided for equipment protection. Manual switching may be accomplished using the Craft Terminal screens on the computer. The following paragraphs provide operating procedures for manual switchover of protected radio systems.

2.4.1 Rx Radio Protection Switching

See Figure 2-1 and follow the steps to switch receive traffic between the main and standby (spare) Radio Modem Modules, manually, using the Craft Terminal.

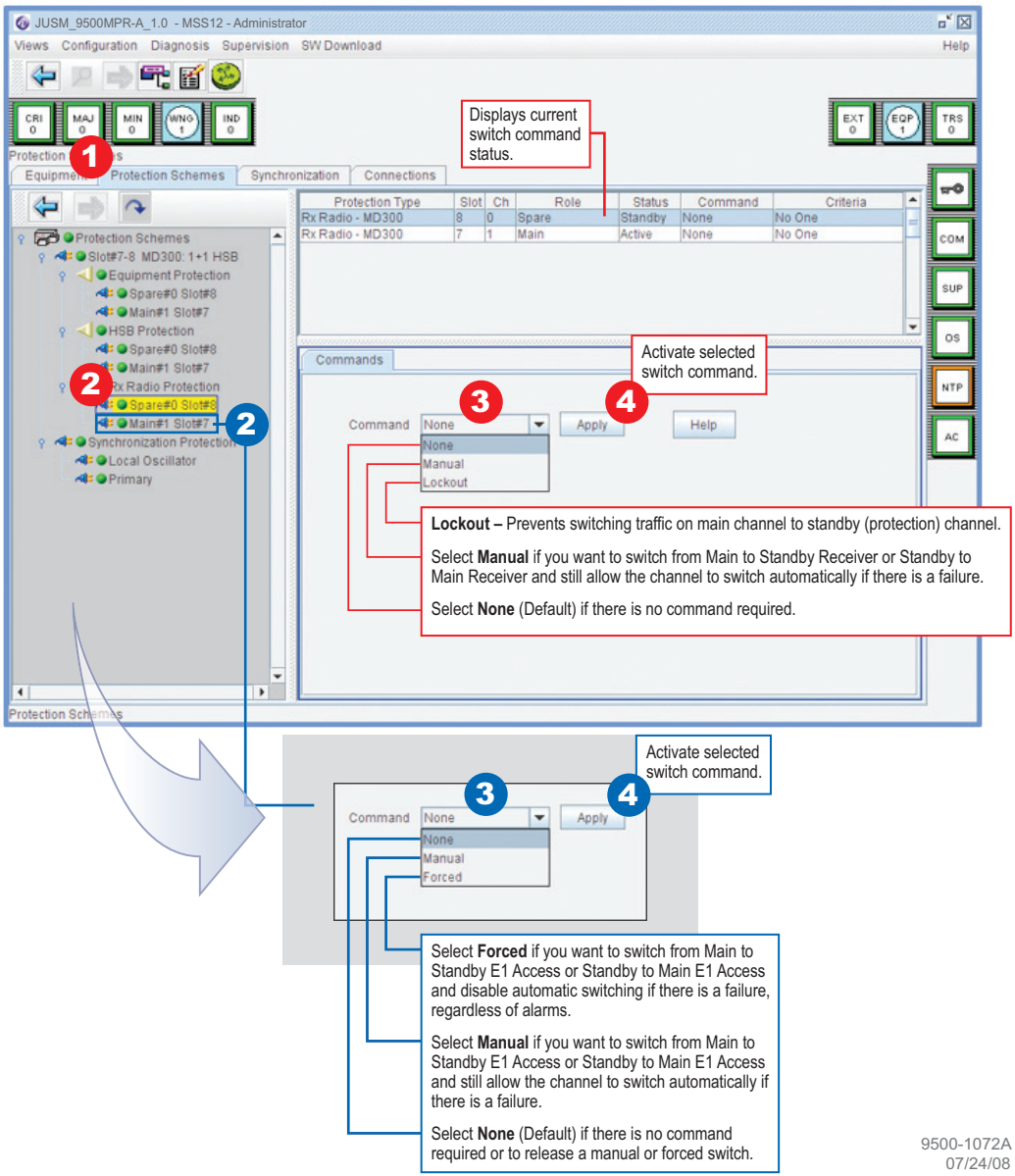

Figure 2-1 Rx Radio Protection Switch

2.4.2 Tx (HSB) Radio Protection Switching

See Figure 2-2 and follow the steps to switch transmit traffic between the main and standby (spare) Radio Modem Modules, manually, using the Craft Terminal.

CAUTION

Possibility of Service Interruption

Switching the radio transmitter may momentarily interrupt traffic. Before switching the transmitter, obtain permission from the proper authority.

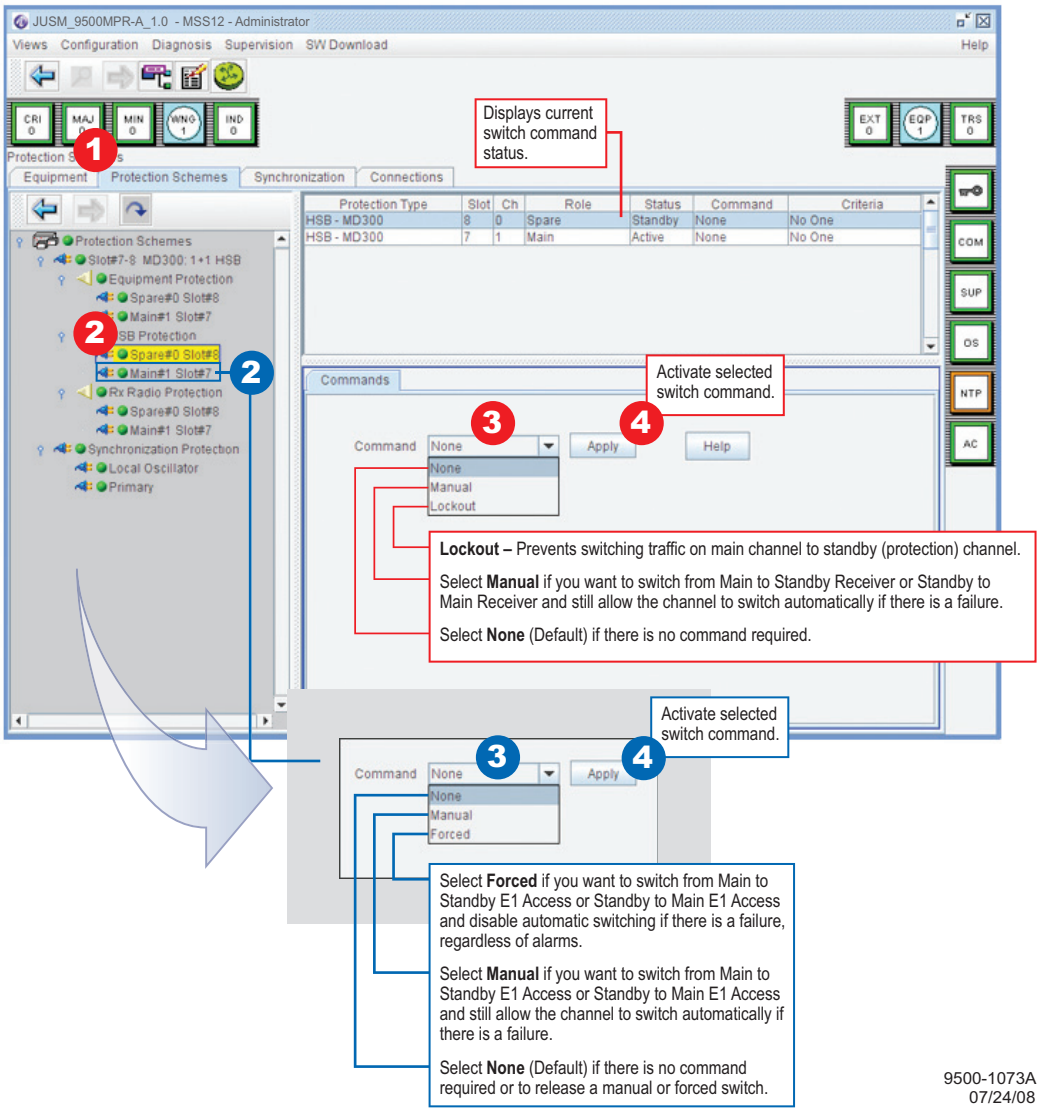

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Figure 2-2 HSB Protection Switch

2.4.3 Equipment Protection Switching

CAUTION

Possibility of Service Interruption

Switching P32E1DS1/P2E3DS3 Modules may momentarily interrupt traffic. Before switching P32E1DS1/P2E3DS3 Modules, obtain permission from the proper authority.

See Figure 2-3 and follow the steps to switch transmit and receive traffic (two directions with one command) between the main and standby (spare) DS1/DS3 Access Modules, manually, using the Craft Terminal.

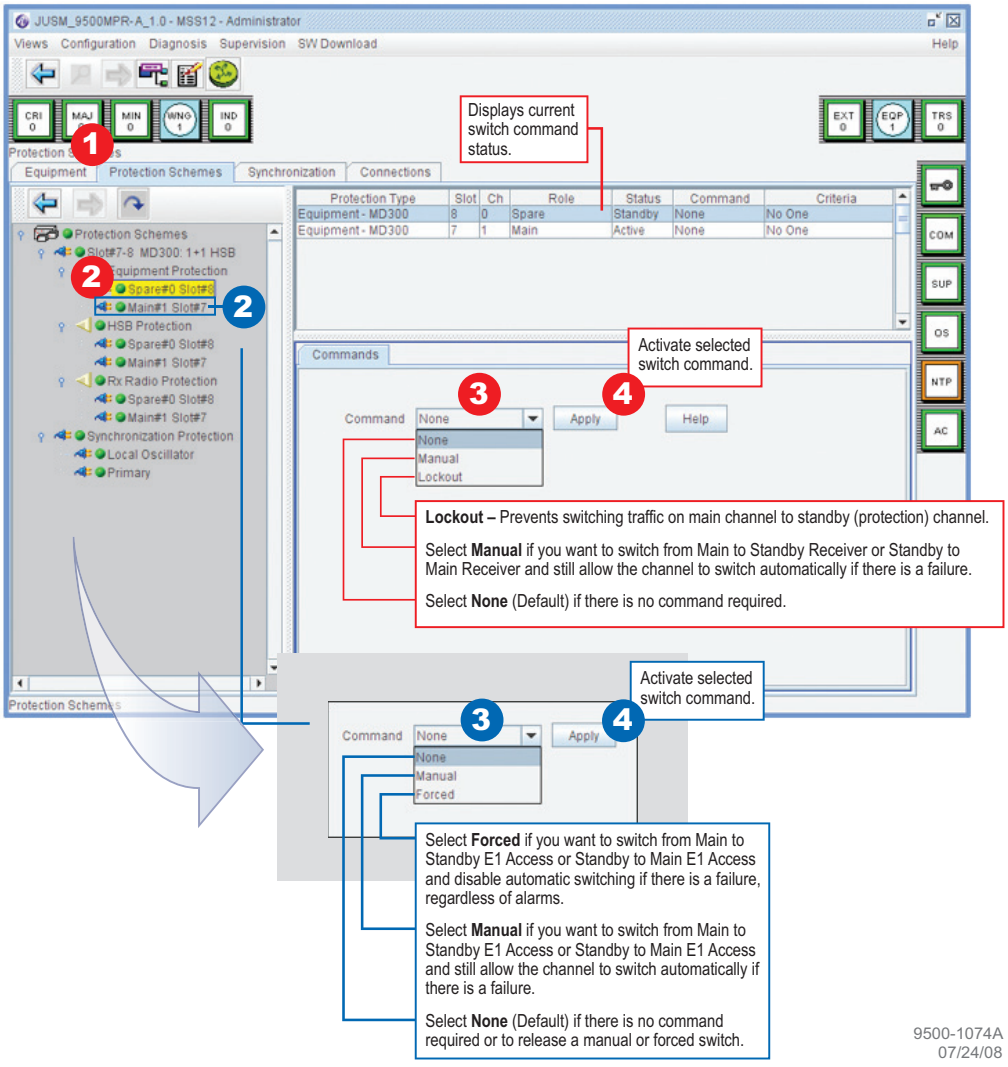

Figure 2-3 Equipment Protection Switch

2.5 TURN-OFF PROCEDURE

The radio is designed for continuous operation. If power must be removed while performing maintenance on a particular cabinet or shelf, power can be removed by turning off associated site/rack circuit breakers.

Note

Normally, the turn-off procedures are not used. System design allows maintenance of the rack without interrupting service. It is recommended that turn-off be performed only in an emergency.

2.6 EMERGENCY OPERATION

If an emergency occurs, such as a short circuit or a fire, turn off the 9500 MPR as quickly as possible.

2.7 MODULE CONTROLS, INDICATORS, AND CONNECTORS

CAUTION

Possibility of Service Interruption

Do not adjust controls unless instructed to do so in an installation or maintenance procedure. Unauthorized adjustment of controls illustrated and described in this section may interrupt traffic and/or degrade system performance.

Module controls, indicators, and connectors used in normal operation or referenced in procedures are shown in Figure 2-4 through Figure 2-7.

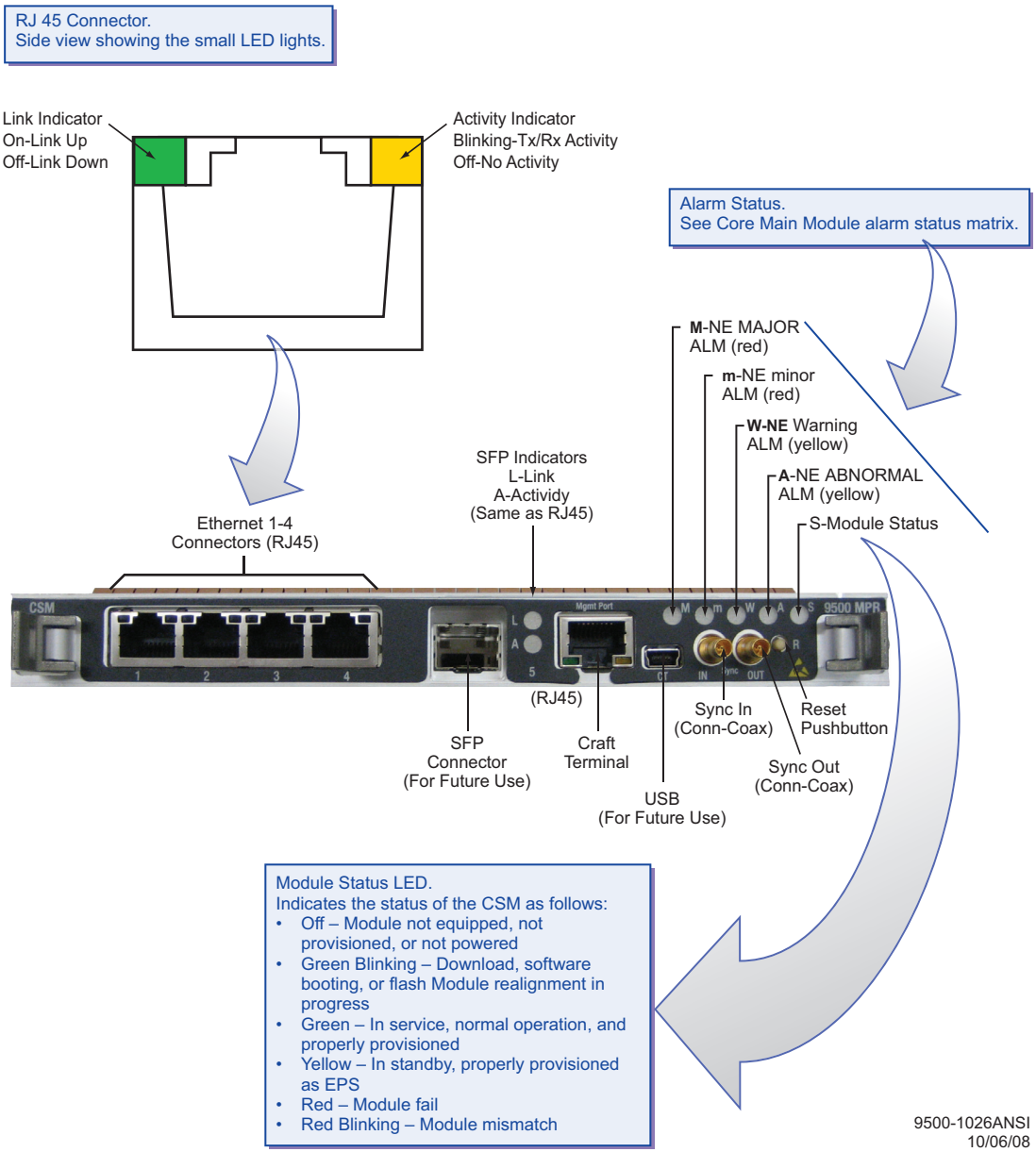

Figure 2-4 Control & Switching Module (CSM), Controls, Indicators, and Connectors

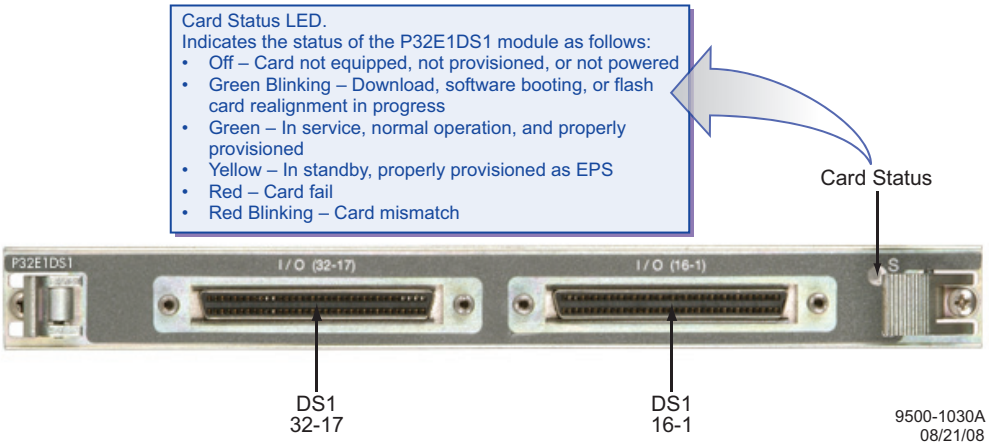

Figure 2-5 P32E1DS1 Module Indicators and Connectors

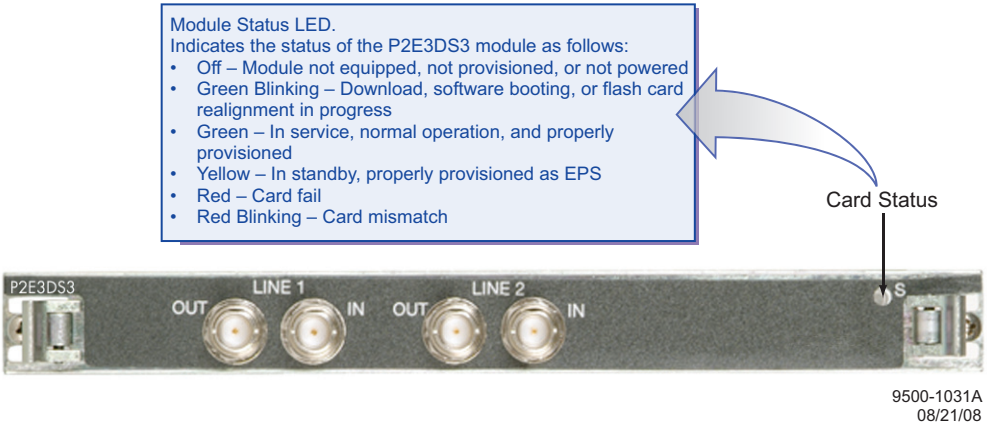

Figure 2-6 P2E1DS1 Module Indicators and Connectors

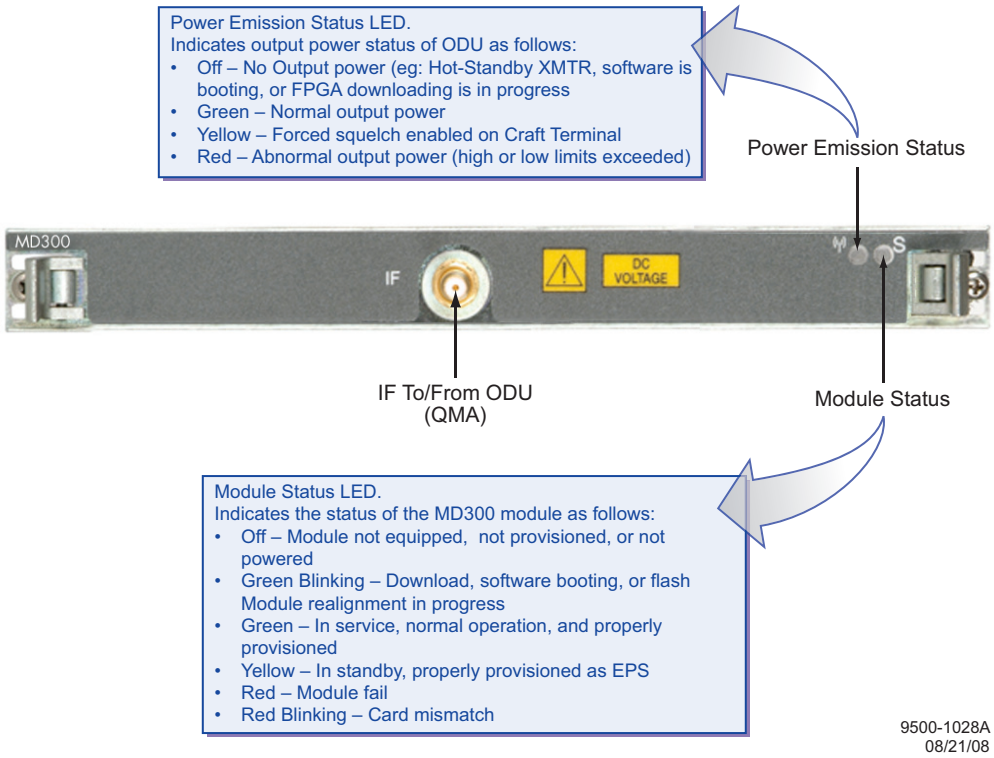

Figure 2-7 MD300 Module Indicators and Connector

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Note

The information contained in this section is a summary of the information on the enclosed CD. "Refer to CD" is used throughout this section to refer the reader to the detail information on the CD.

3 INTERCONNECT

3.1 SECTION INTRODUCTION

This section gives the location and describes power and signal connections for the 9500 MPR.

3.2 POWER CABLE CONNECTION

See Figure 3-1 and Figure 3-2 for power cable connection. The power cable (PN 3DB18271AA) is supplied in the MSS Installation Kit. It is supplied with the connector fitted at one end and wire at the other. The cable is nominally 5 m (16 ft), and the wires are 4 mm^2 (AWG 12).

The red (or blue) wire must be connected to -48 Vdc (live); the black wire to ground/+ve.

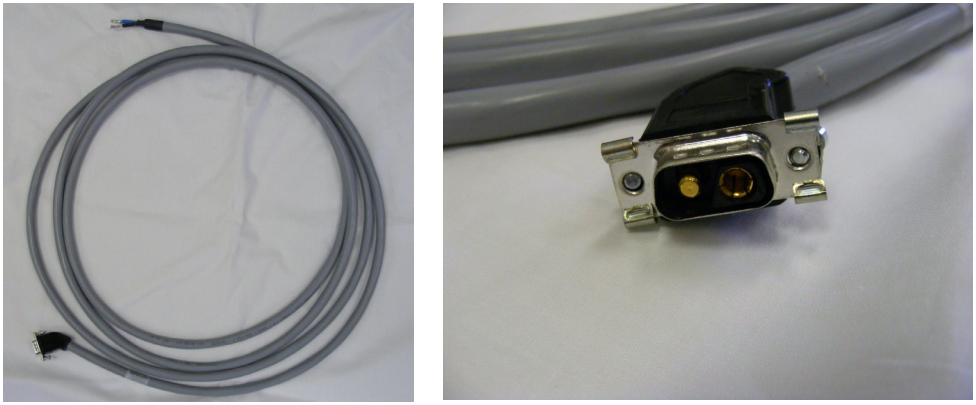


Figure 3-1 Power Cable and Connector

WARNING
Possibility of Damage to Equipment

To prevent connector damage, always check to ensure corresponding rack circuit breaker is off before connecting/disconnecting power cable.

DANGER

Possibility of Injury to Personnel

Short circuiting low-voltage, low-impedance dc circuits can cause arcing that may result in burns or eye injury. Remove rings, watches, and other metal jewelry while working with primary circuits. Exercise caution to avoid shorting input power terminals.

WARNING

Possibility of Damage to Equipment

To protect maintenance personnel from antenna tower lightning strikes, the ground system must be integrated by bonding frame ground and dc battery return together.

Figure 3-2 Battery Power Connection

WARNING

Possibility of Damage to Equipment

Do not apply battery power until it is determined that A and B battery cables with isolated returns and power cables are wired correctly. With power applied, reverse polarity on wiring (+batt wired to -batt pin on connector) can cause power supply fuse to blow.

Note

Grounding of pole, antenna, customer interfaces, and all entrances to the building interior shall meet local electrical code and standard business practices.

3.3 IF CONNECTIONS

IF connections between the MSS and ODU require connectors, cables, brackets, lightning arrestors, cable hangers, and grounding kits. The following paragraphs describe cables and connectors and associated brackets. Refer to Installation section on CD for descriptions and details for the recommended lightning arrestors and grounding kits.

3.3.1 MOD-300 to Type N Adapter Bracket Connections

The IF input/output of the MOD-300 module is connected to the type N adapter bracket (PN 3DB18197AA) via a coax cable jumper. Recommended jumper cable PN 3DB18205AA (shielded coax cable, 12 in, with QMA slip-fit connector on one end type N bulkhead style connector on other end). See Figure 3-3.

3.3.2 Type N Adapter Bracket to ODU Cable Connections

IF input/output to/from ODU is connected to type N connector on jumper cable at type N adapter bracket. Recommended LMR 400 coax cable PN 1AC14320002 (low-loss RG-8 shielded coax cable that uses type N connector both ends). Typically, cable is cut to length and connectors installed on site. Maximum cable length is 1000 ft.

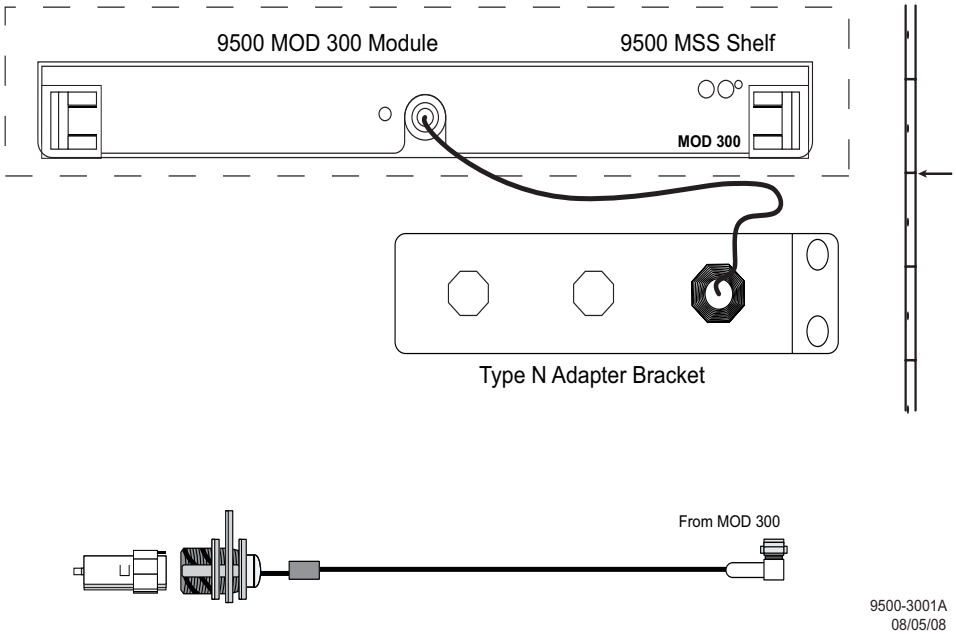


Figure 3-3 IF Connections

3.4 DS1 CONNECTIONS

Recommended connectorized cable assembly – PN 3CC52118AA (22 AWG 34 pair shielded, jacketed cable with 68-pin SCSI connector on each end). See Figure 3-4, Figure 3-5, and Figure 3-6 for connections. Refer to Table 3-1 and Table 3-2 for mating cable wiring.

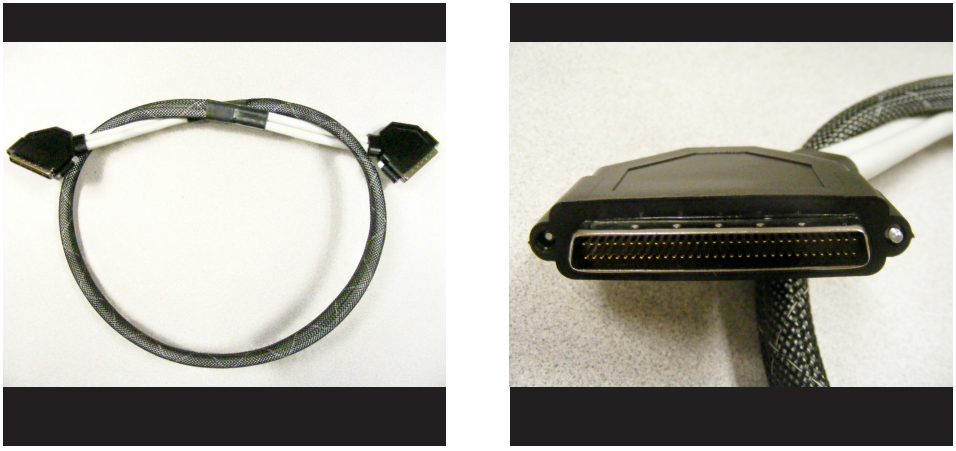
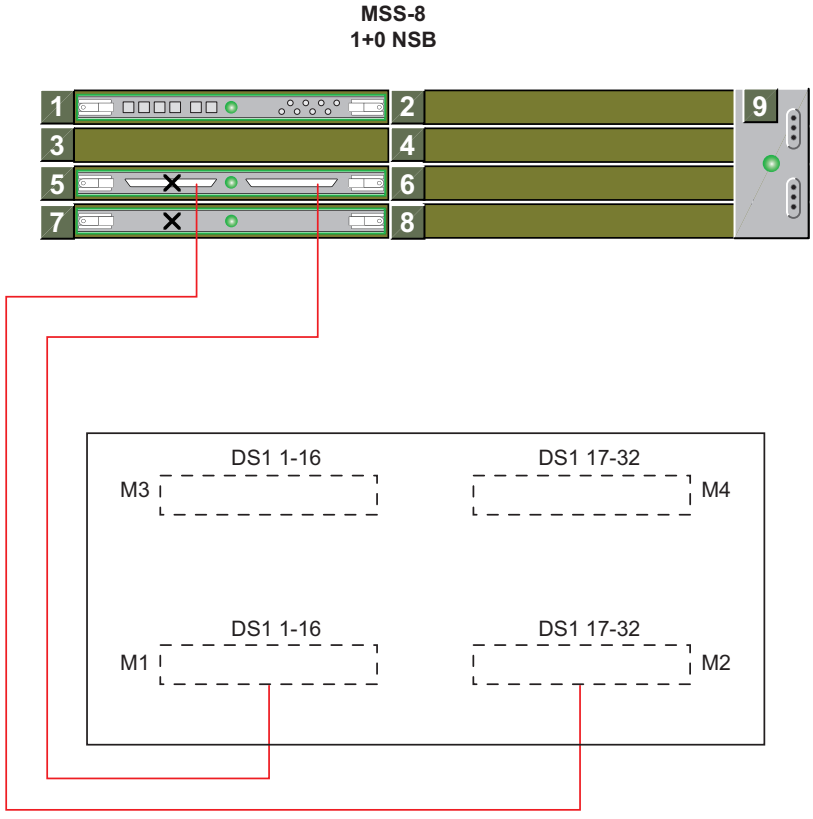


Figure 3-4 DS1 Signal Cable and Connector



Note

All cables PN 3CC152118AA mating to SCSI Connectors on rear of patch panel.

9500-1402ANSI
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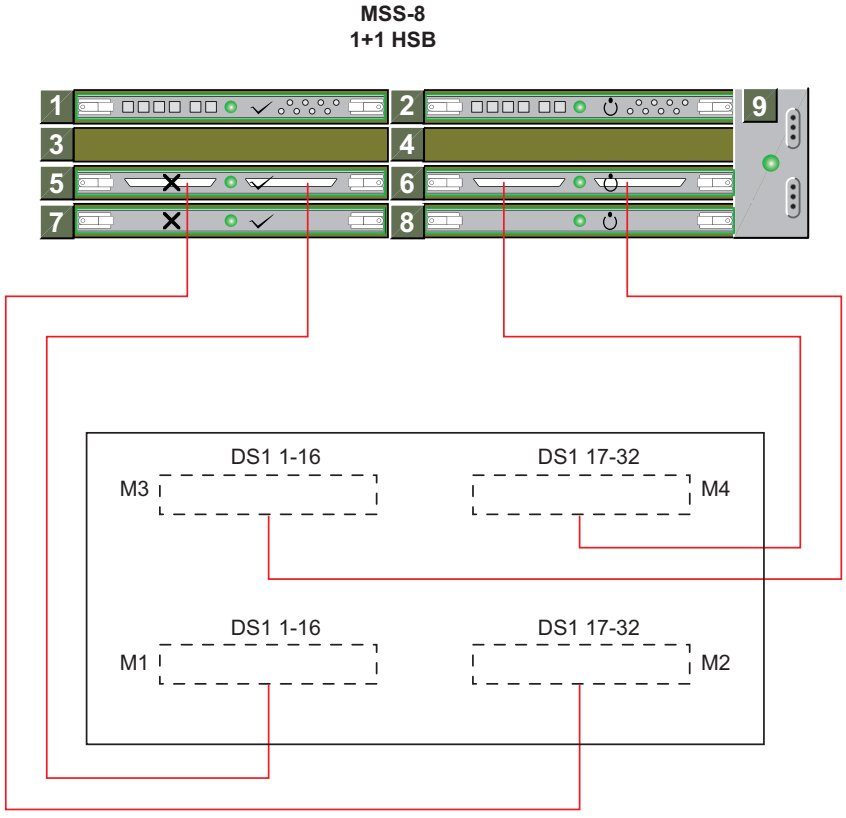
Figure 3-5 DS1 Cable Connections Unprotected Radio



Note

All cables PN 3CC152118AA mating to SCSI Connectors on rear of patch panel.

9500-1403ANSI
06/24/08

Figure 3-6 DS1 Cable Connections Protected Radio

Table 3-1 Pin Function: Tributaries 1-16

Description			SCSI Pin #	SCSI Pin #	Description		
GND			1	35	GND		
Tx_Tip	DS1/E1	Line 1	2	36	Line 1	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 1	3	37	Line 1	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 2	4	38	Line 2	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 2	5	39	Line 2	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 3	6	40	Line 3	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 3	7	41	Line 3	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 4	8	42	Line 4	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 4	9	43	Line 4	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 5	10	44	Line 5	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 5	11	45	Line 5	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 6	12	46	Line 6	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 6	13	47	Line 6	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 7	14	48	Line 7	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 7	15	49	Line 7	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 8	16	50	Line 8	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 8	17	51	Line 8	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 9	18	52	Line 9	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 9	19	53	Line 9	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 10	20	54	Line 10	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 10	21	55	Line 10	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 11	22	56	Line 11	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 11	23	57	Line 11	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 12	24	58	Line 12	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 12	25	59	Line 12	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 13	26	60	Line 13	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 13	27	61	Line 13	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 14	28	62	Line 14	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 14	29	63	Line 14	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 15	30	64	Line 15	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 15	31	65	Line 15	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 16	32	66	Line 16	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 16	33	67	Line 16	DS1/E1	Rx_Ring
GND			34	68	GND		

Table 3-2 Pin Function: Tributaries 17-32

Description			SCSI Pin #	SCSI Pin #	Description		
GND			1	35	GND		
Tx_Tip	DS1/E1	Line 17	2	36	Line 17	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 17	3	37	Line 17	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 18	4	38	Line 18	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 18	5	39	Line 18	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 19	6	40	Line 19	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 19	7	41	Line 19	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 20	8	42	Line 20	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 20	9	43	Line 20	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 21	10	44	Line 21	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 21	11	45	Line 21	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 22	12	46	Line 22	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 22	13	47	Line 22	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 23	14	48	Line 23	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 23	15	49	Line 23	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 24	16	50	Line 24	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 24	17	51	Line 24	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 25	18	52	Line 25	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 25	19	53	Line 25	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 26	20	54	Line 26	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 26	21	55	Line 26	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 27	22	56	Line 27	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 27	23	57	Line 27	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 28	24	58	Line 28	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 28	25	59	Line 28	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 29	26	60	Line 29	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 29	27	61	Line 29	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 30	28	62	Line 30	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 30	29	63	Line 30	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 31	30	64	Line 31	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 31	31	65	Line 31	DS1/E1	Rx_Ring
Tx_Tip	DS1/E1	Line 32	32	66	Line 32	DS1/E1	Tx_Ring
Rx_Tip	DS1/E1	Line 32	33	67	Line 32	DS1/E1	Rx_Ring
GND			34	68	GND		

3.5 DS3 CONNECTIONS

DS3 cable requirements depend on MSS shelf/module application.

3.5.1 Unprotected Configuration Cabling

See Figure 3-7. Recommended connectorized cable assembly PN 3EM22687AA/AB (male mini BNC-to-male mini BNC, 2/5 meter lengths).

3.5.2 Protected Configuration Cabling

See Figure 3-7. Recommended splitter assembly – PN 3EM22900AA (splitter in/combiner out-bulkhead female mini BNC; splitter out combiner in – two male mini BNC, 2/5 meter lengths). The mini BNC bulkhead connector can be permanently installed on the rack-mounted DS3 interface panel – PN TBD.

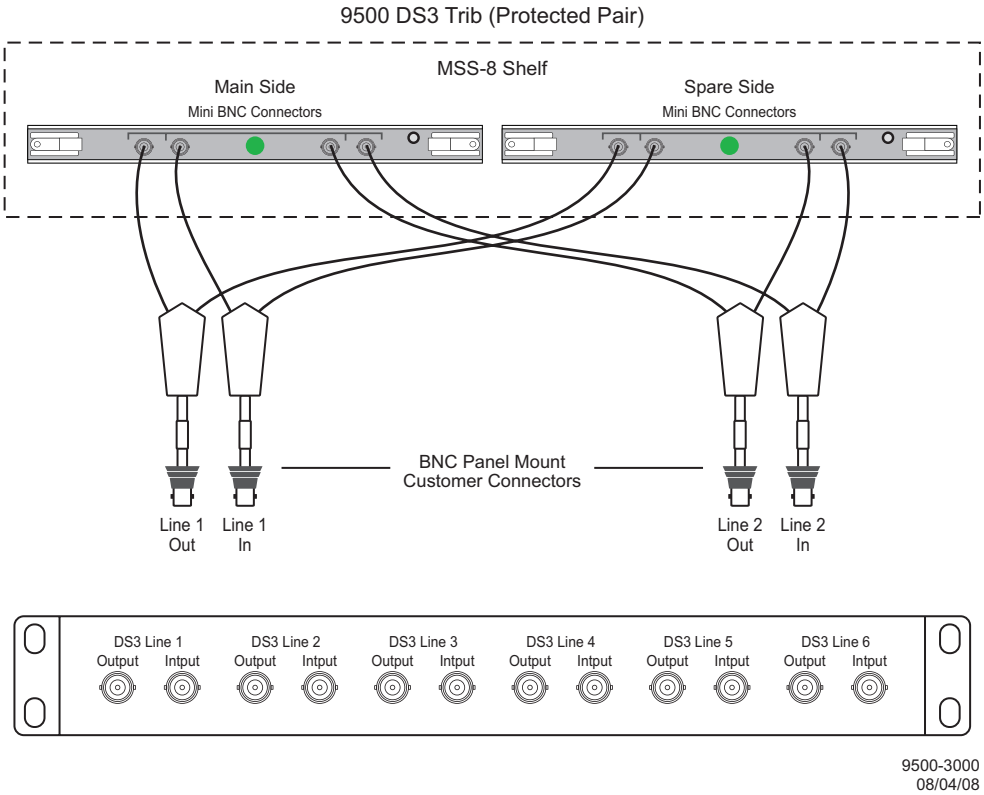


Figure 3-7 DS3 Connections

3.6 ETHERNET CABLE CONNECTIONS

Part numbers are assigned for unshielded, straight-through CAT5 UTP (PN 3AL48960AA-AL) and CAT5E UTP (PN 3AL15052AA-AL) cables. The CAT5 or CAT5E cables can be used for 10/100/1000BASE-T applications, however the CT5E cable is the recommended cable for 1000BASE-T applications. The CAT5E cable has a tighter, higher quality twisting on the wire pairs and is less susceptible to crosstalk. Refer to Table 3-3 and Table 3-4 for pinout. See Figure 3-8 for pair wire colors. See Figure 3-9 and Figure 3-10 for interconnect information.

3.6.1 Automatic MDI/MDI-X Configuration

The Ethernet PHY provides automatic Medium Dependent Interface (MDD/Medium Independent Interface-crossover (MDI-X). Automatic MDI/MDI-X configuration eliminates the need for crossover cables.

3.6.2 Crossover Cable Option

Crossover type cables with pin 1 wired to pin 3 and pin 2 wired to pin 6 can be used, but are not necessary. Crossover is automatically performed by the Control & Switching Module (CSM), resulting in a straight-through interface to the link partner.

Table 3-3 10/100BASE-T Ethernet Connector Pinout

PIN	FUNCTION	PORT	
		MDI	MDI-X
1	TD+	Output	Input
2	TD-	Output	Input
3	RD+	Input	Output
4/5	GND	N/A	N/A
6	RD-	Input	Output
7/8	GND	N/A	N/A

Table 3-4 1000BASE-T Ethernet Connector Pinout

PIN	FUNCTION	DIRECTION
1	TRDA+	Input/Output
2	TRDA-	Input/Output
3	TRDB+	Input/Output
4	TRDB-	Input/Output
5	TRDC+	Input/Output
6	TRDC-	Input/Output
7	TRDD+	Input/Output
8	TRDD-	Input/Output

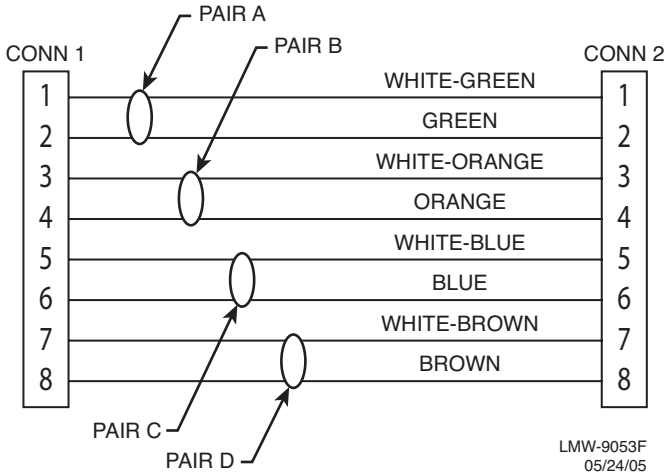


Figure 3-8 Straight-Through Mating Cable

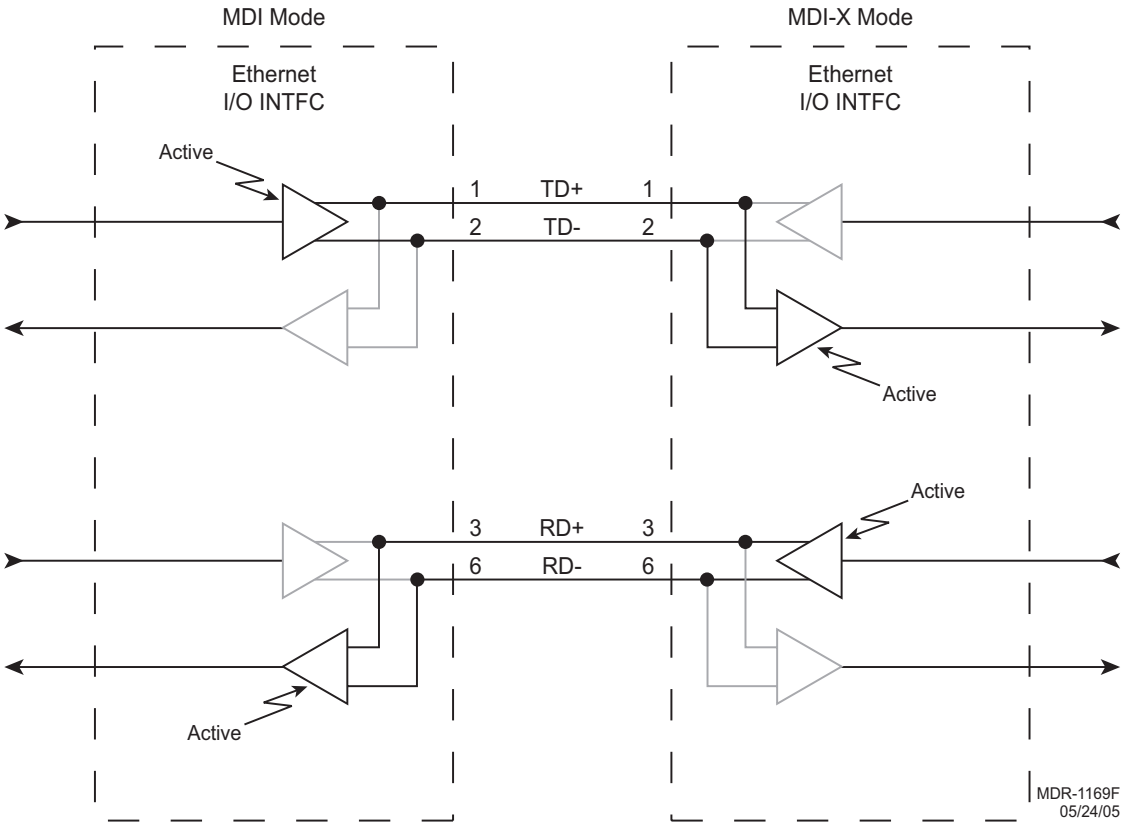


Figure 3-9 10/100BASE-T Interconnect

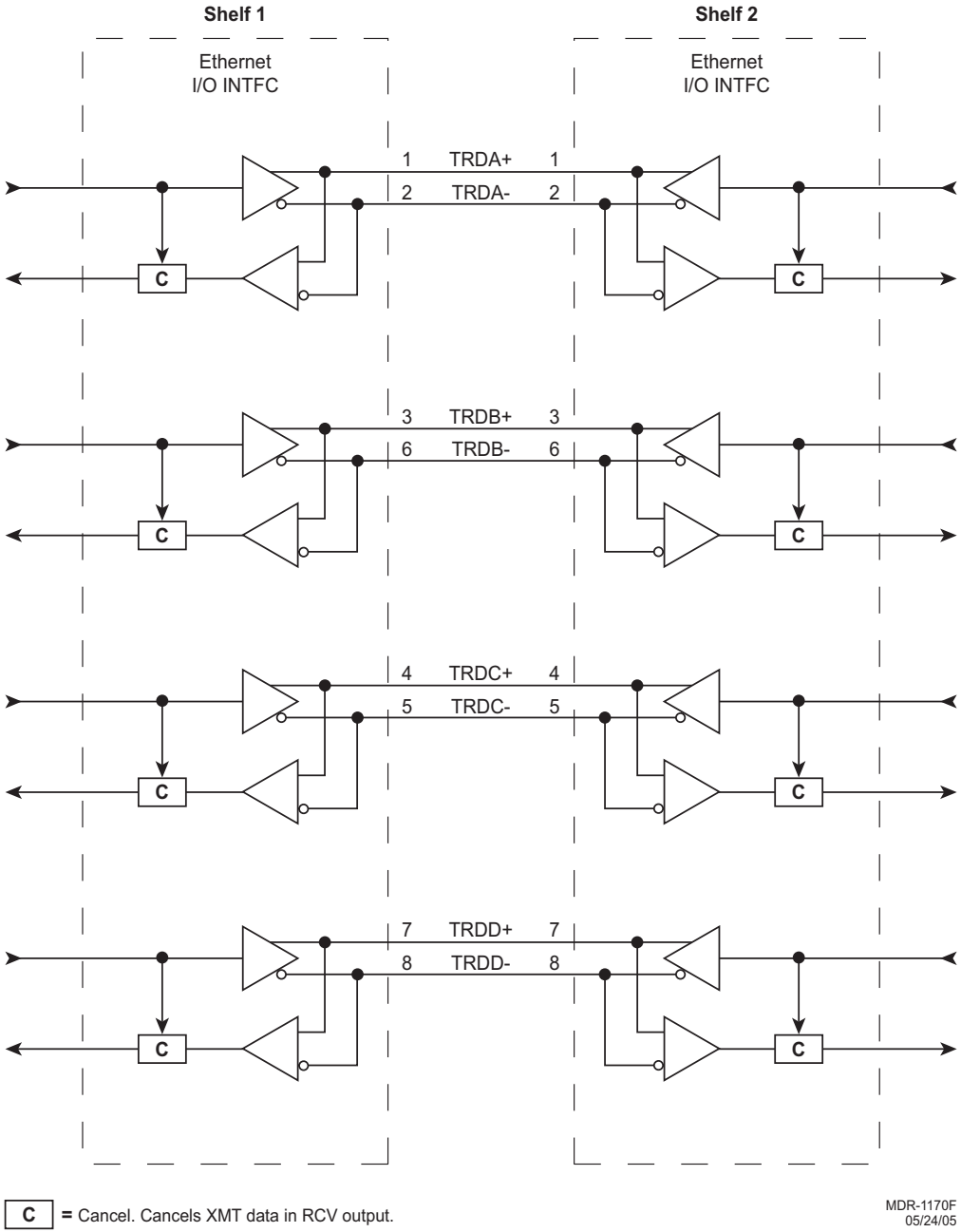


Figure 3-10 1000BASE-T Interconnect

Note

Transmit data (TRD) is both directions, simultaneously. Unwanted data is cancelled.

3.7 NETWORK MANAGEMENT SYSTEMS (NMS) CONNECTION

Recommend standard CAT5/5E cable with RJ45 connectors for NMS mating cable between NMS connector on the CSM and the PC. Refer to Ethernet Cable Connections for details. Refer to Table 3-5 for pinout and color code.

Table 3-5 NMS RJ45 to RJ45 Mating Cable Pinout

Function	End 1 Core (RJ45)	Pair	Wire Color	End 2 PC (RJ45)
TD+	1	1	WHT/GRN	1
TD-	2		GRN	2
RD+	3	2	WHT/ORN	3
RD-	6		ORANGE	6
Not Used	4	3	WHT/BLU	4
Not Used	5		BLUE	5
Not Used	7	4	WHT/BRN	7
Not Used	8		BROWN	8

3.8 DEBUG PORT CONNECTION

Recommend standard CAT5/5E cable with an RJ45 connector on one end to interface with the NMS connector on the CSM and a 9-pin D-type connector on the other end to connect to the PC. Refer to Table 3-6 for pinout and color code.

Table 3-6 NMS RJ45 to D-Type Mating Cable Pinout

Function	End 1 Core (RJ45)	Pair	Wire Color	End 2 PC (DB9)
Not Used	1	1	WHT/GRN	1 NC
Not Used	2		GRN	6 NC
Not Used	3	2	WHT/ORN	7 NC
Not Used	6		ORANGE	8 NC
D0	4	3	WHT/BLU	2
D1	5		BLUE	3
DTR	7	4	WHT/BRN	4
GND	8		BROWN	5

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Note

The information contained in this section is a summary of the information on the enclosed CD. "Refer to CD" *is used throughout this section to refer the reader to the detail information on the CD.*

4 INITIAL TURNUP

4.1 SECTION INTRODUCTION

This section describes the procedures required to turn up the 9500 MPR Microwave Packet Radios after installation.

This provisioning part of the section describes provisioning options available with the 9500 MPR software application. Provisioning allows for the definition, editing, and storing of specific functions.

4.2 RECOMMENDED SEQUENCE

Perform the following initial turnup procedures in sequence:

A. Install software on PC (2 CDs).

Note

Software installed at the factory before delivery should not be overwritten by downloading to the radio controller at initial turnup. Refer to Maintenance section on the attached CD for procedure to upgrade existing software.

B. Turn on the radio.

C. Establish communication between radio and PC.

Note

Saving provisioning on disk provides a reference for any future provisioning changes.

D. Provision radio and save to disk.

4.3 SECURITY MANAGEMENT

Note

A password is required to operate the 9500 MPR. The radio is shipped with a default password and if a new password is desired, it must be entered using the Change Password screen. Once entered initially, the password must be entered each time the user wants to access the NE.

The 9500 MPR application software offers user password security management using four different levels of passwords. User security deals with access level assigned to specific users. The level of user security affects the type and number of commands an individual user may execute. This prevents an unqualified user's access to high-level commands.

There are four user profiles defined for NMS systems.

- Administrator (full access also for NMS local system security parameters)
- Craft Person (person in charge for network design; full access to NEs but not for security parameters and backup/restore feature)
- Operator (access to network only; No access to radio)
- Viewer (view screens only)

At the NE installation time, two default user accounts are created on NE independently from the SNMP operating mode.

- Username: initial
- Password: adminadmin
- Profile: administrator
- Username: craftperson
- Password: craftcraft
- Profile: CraftPerson

4.4 SOFTWARE

Software Kit PN 3EM23502AAAA is delivered with each 9500 MPR. The software kit consists of the following three CD ROMs:

- MPRA_CT_R01.01.00 – Craft Terminal (CT) software - hereafter called CT SW - installed on the PC at initial turnup
- 9500 MPR-A SWP R01.01.00 – radio application software - not required for initial turnup - hereafter called SWP
- v404 MIB – SNMP MIB software - not required for initial turnup - hereafter called MIB on the Control & Switching Module (CSM) at the factory. It is not necessary to install SWP and MIB software on the PC at initial turnup. The SWP CD is supplied with the equipment for backup. The MIB CD is supplied for use by third party SNMP applications.

4.4.1 Flash Card

The flash card consists of:

- License Key
- MAC Address
- SW Load

4.4.2 Software Load/License Key Upgrade

Refer to the Maintenance section for software upgrades after initial turnup.

4.5 SOFTWARE INSTALLATION

This section explains how to prepare the Craft Terminal application in your PC.

4.5.1 Getting Started

Note

Read the following before getting started.

- The operator must be familiar with the use of personal computers in WINDOWS environment, internally from which the NE application software operates.
- To properly install Craft Terminal application, a PC is required, having the characteristics specified below.

PC Characteristics

The PC to use for Craft Terminal application must meet following characteristics:

PC HW Configuration:

- CPU: Pentium III 850 MHz
- RAM: 512 Mbytes (minimum), 1 Gbyte (suggested)
- Min. disk space: 1.5 Gbytes (available space needed, JRE excluded)
- Min. resolution: equal or higher than 1024x768 pixel
- CD-ROM Drive: 24x
- Primary Interface: Ethernet Card 10/100 Mbits/sec.

Operating Systems Supported:

- Microsoft Windows 32-bit versions: Microsoft Windows XP Professional Service Pack 2

Additional requirements:

- Microsoft Internet Explorer 6.0 6.02900.2180 SP1+ or higher, Microsoft Internet Explorer 7 7.0.5730.11CO + or higher
- Administrator or Power User rights
- Java Runtime Environment (JRE) 6 Update 3 (it is available on the CT CD-ROM)
- Disable all Firewall software on PC used if possible. If a firewall must be used, refer to Configuring Windows Firewall procedure on the attached CD.

4.5.2 Download Overview

See Figure 4-1 for an overview of the download/startup procedures.

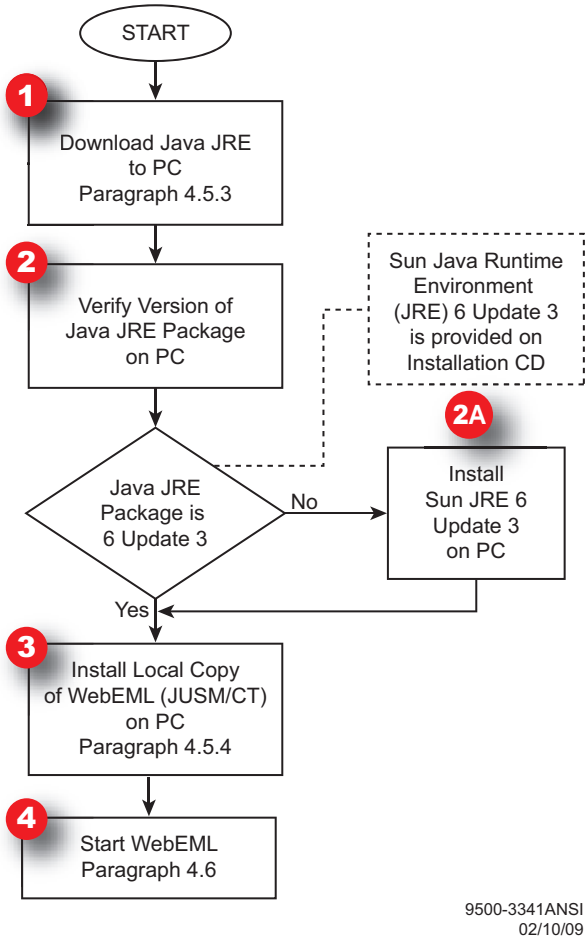
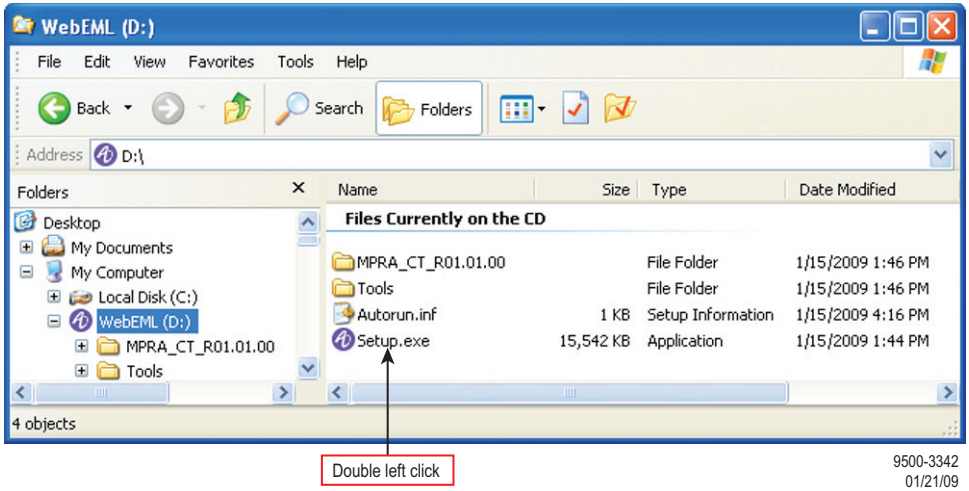


Figure 4-1 Download Sequence

1. Insert the WebEML (JUSM/CT) CD into the CD-ROM drive. The CD will auto-run (if auto-run is enabled on the user's PC) and open the Installation Wizard.

Note

If auto-run does not start, user must run (double-click with left mouse button) the Setup.exe file, available in the WebEML (JUSM/CT) CD-ROM root directory, in order to launch the WebEML (JUSM/CT) installation wizard. See the example screen below on how to manually start the CD.



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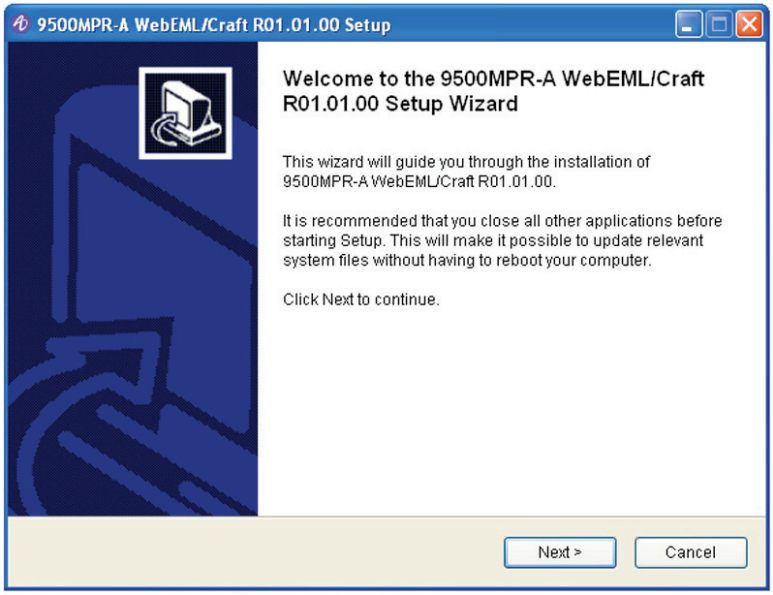
2. The Installation Wizard Welcome Screen will display after auto-run starts or manually running the CD. Click **Next** to continue.



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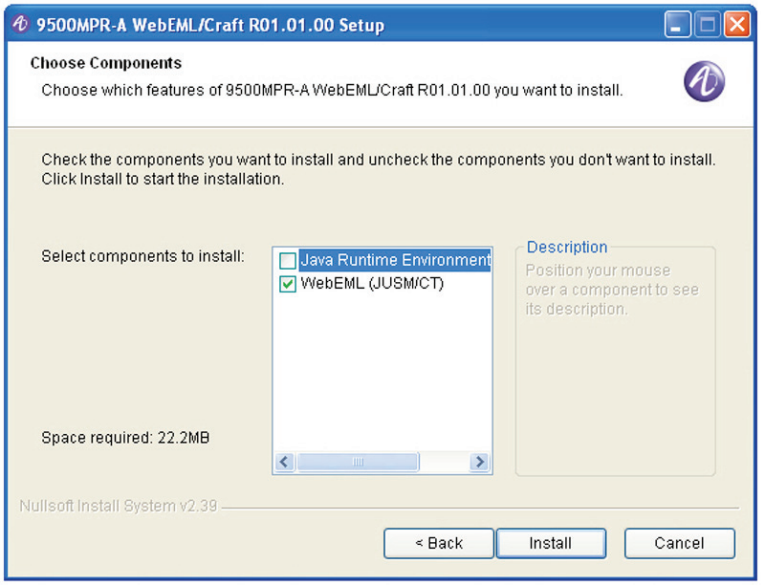
3. Click **Next** to choose the components to install.



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4. Select the WebEML (JUSM/CT) option.

   Is Java Runtime Environment checked

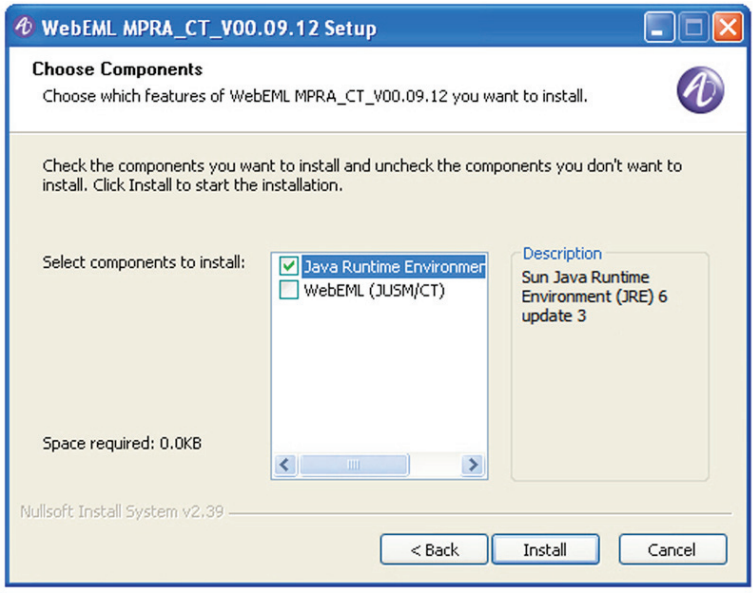
   Yes, refer to paragraph 4.5.3.

   No, only WebEML is checked. Refer to paragraph 4.5.4.

4.5.3 Java JRE Installation

Use the following procedure to install Java 6 update 3.

1. On the Setup screen, select the **Java Runtime Environment** option.



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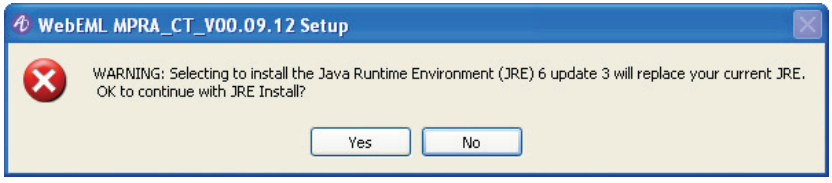
2. Click **Install**.

   The warning message below will appear.



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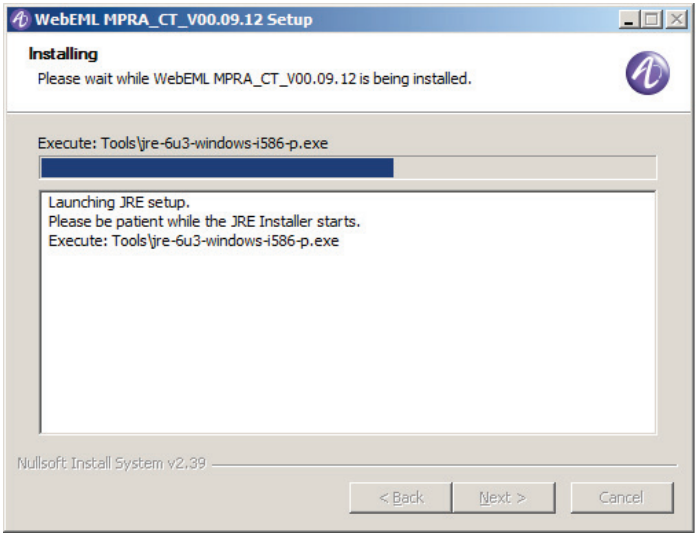
3. Click **Yes** to install the JRE 6 update 3 or **No** to cancel the Java installation. Clicking **Yes** will begin the installation. The screen below will appear. Click **Next**.



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4. The License Agreement screen will appear. Click **Accept**.

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5. The progress screen below will appear. Wait.

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08/25/08

6. The following screen will appear when the installation is complete. Click **Finish**.

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08/25/08

Note

If the user's PC has JRE 6 update 3 or a newer Java version installed, clicking Yes will install the JRE 6 update 3 over the existing JRE 6 update 3 but the newer version will not be deleted. The PC will still run the most current Java version regardless if the JRE 6 update 3 is installed.

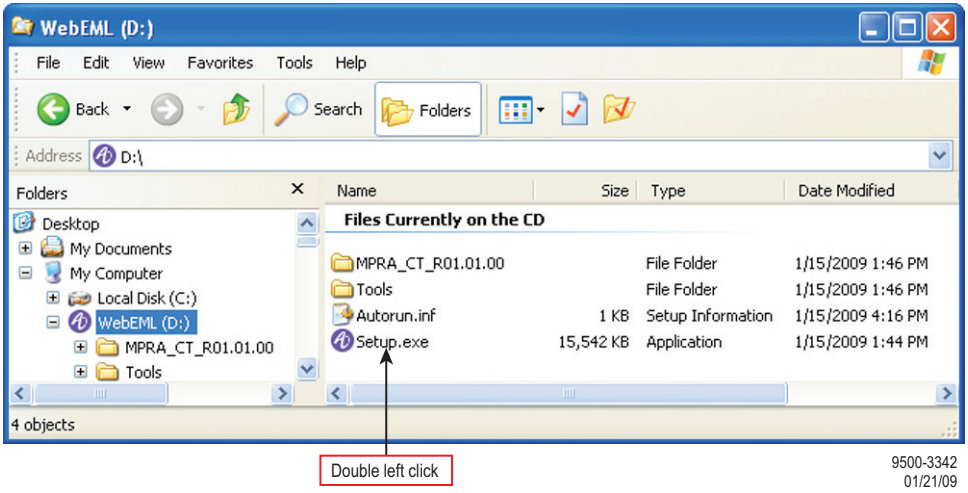
4.5.4 Install WebEML (JUSM/CT) Software

Follow these steps to install the WebEML (JUSM/CT) on the PC.

1. Insert the WebEML (JUSM/CT) CD into the CD-ROM drive. The CD will auto-run (if auto-run is enabled on the user's PC) and open up the installation wizard.

Note

If auto-run does not start, user must run (double-click with left mouse button) the **Setup.exe** *file, available in the WebEML (JUSM/CT) CD-ROM root directory, in order to launch the WebEML (JUSM/CT) installation wizard. See the example screen below on how to manually start the CD.*



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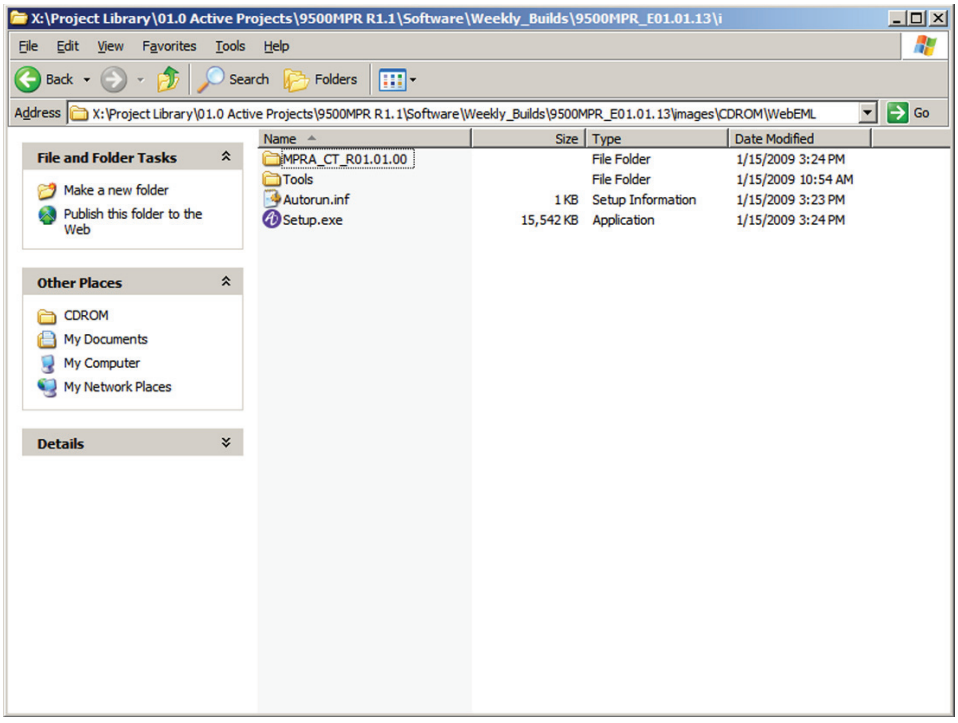
2. Installation wizard welcome screen will display after the auto-run or running the CD manually. Click **Next** to continue.



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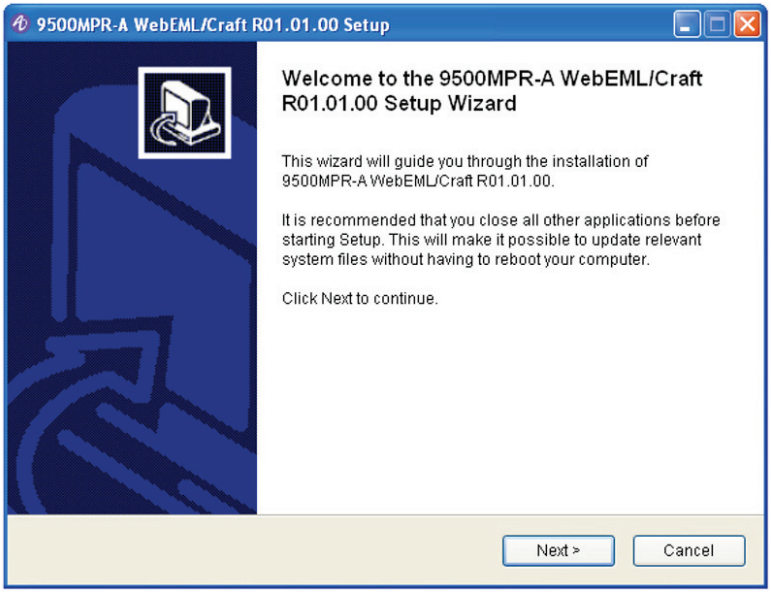

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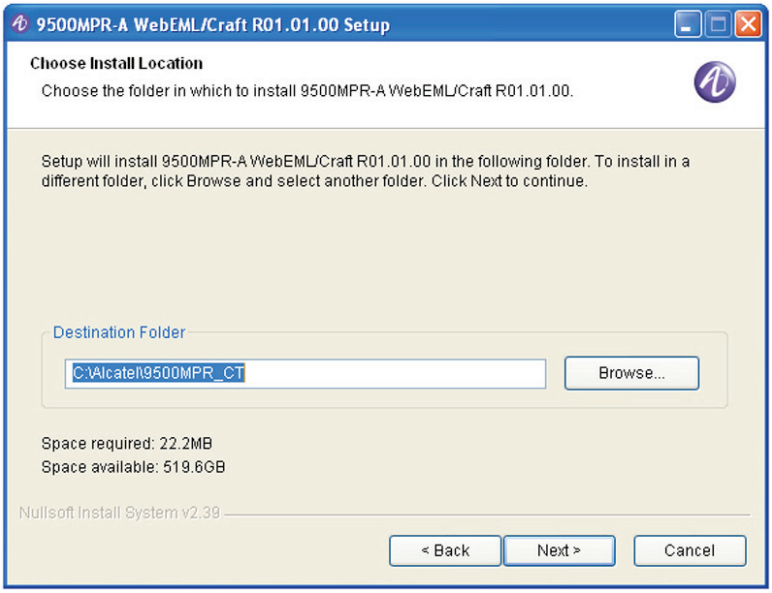
3. Click **Next** to choose the components to install.



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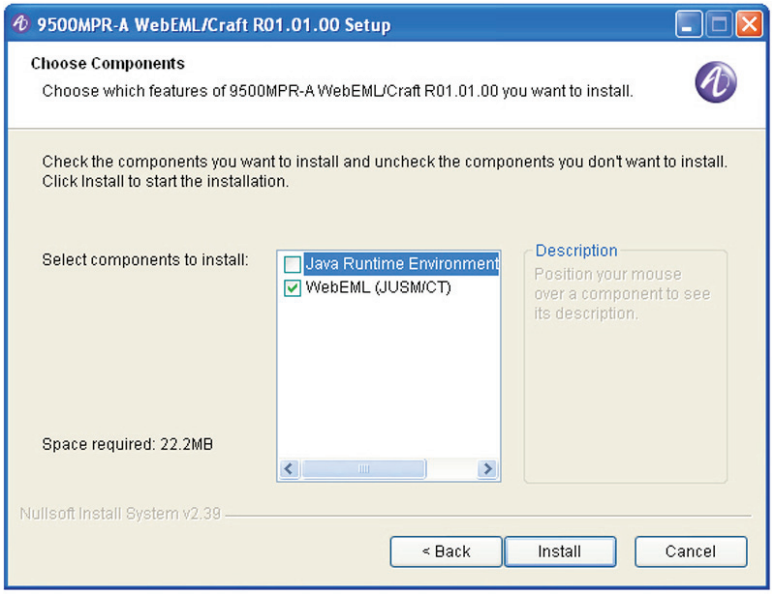
4. Choose one/both of the components and click **Install**.



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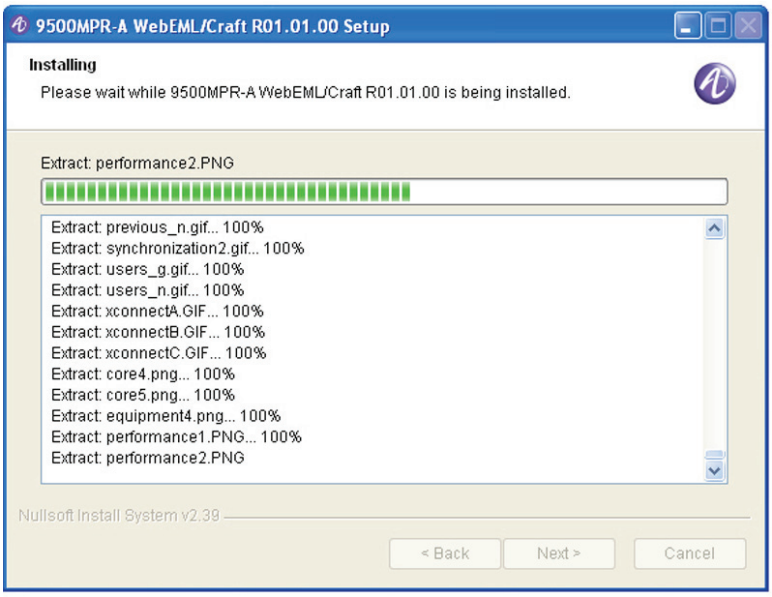
5. Select the **WebEML (JUSM/CT)** option on the screen above. Click **Install**. The following screen appears and **WebEML** is installed on the PC.



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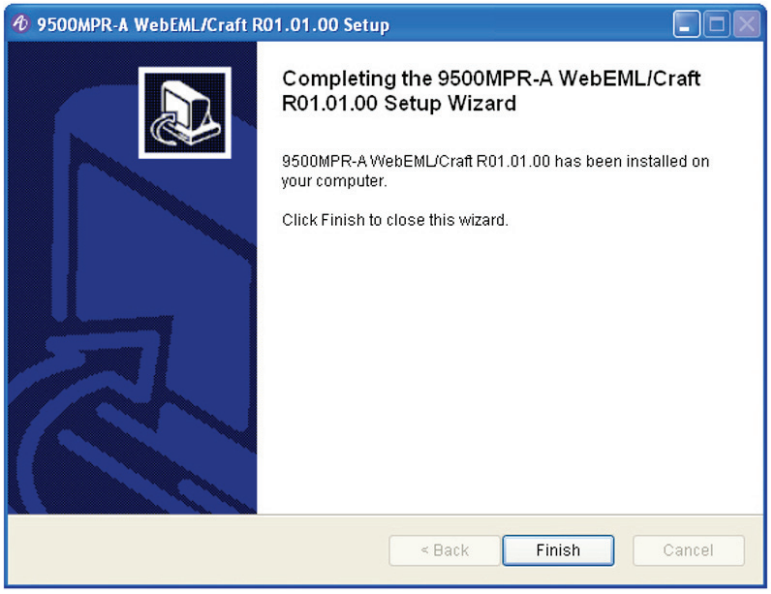
6. Click **Finish** to complete the **WebEML (JUSM/CT)** installation and exit the installation wizard.



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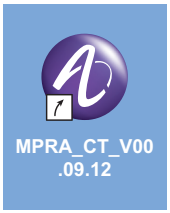
An icon similar to the one below will be created automatically on the desktop after the installation process is complete.



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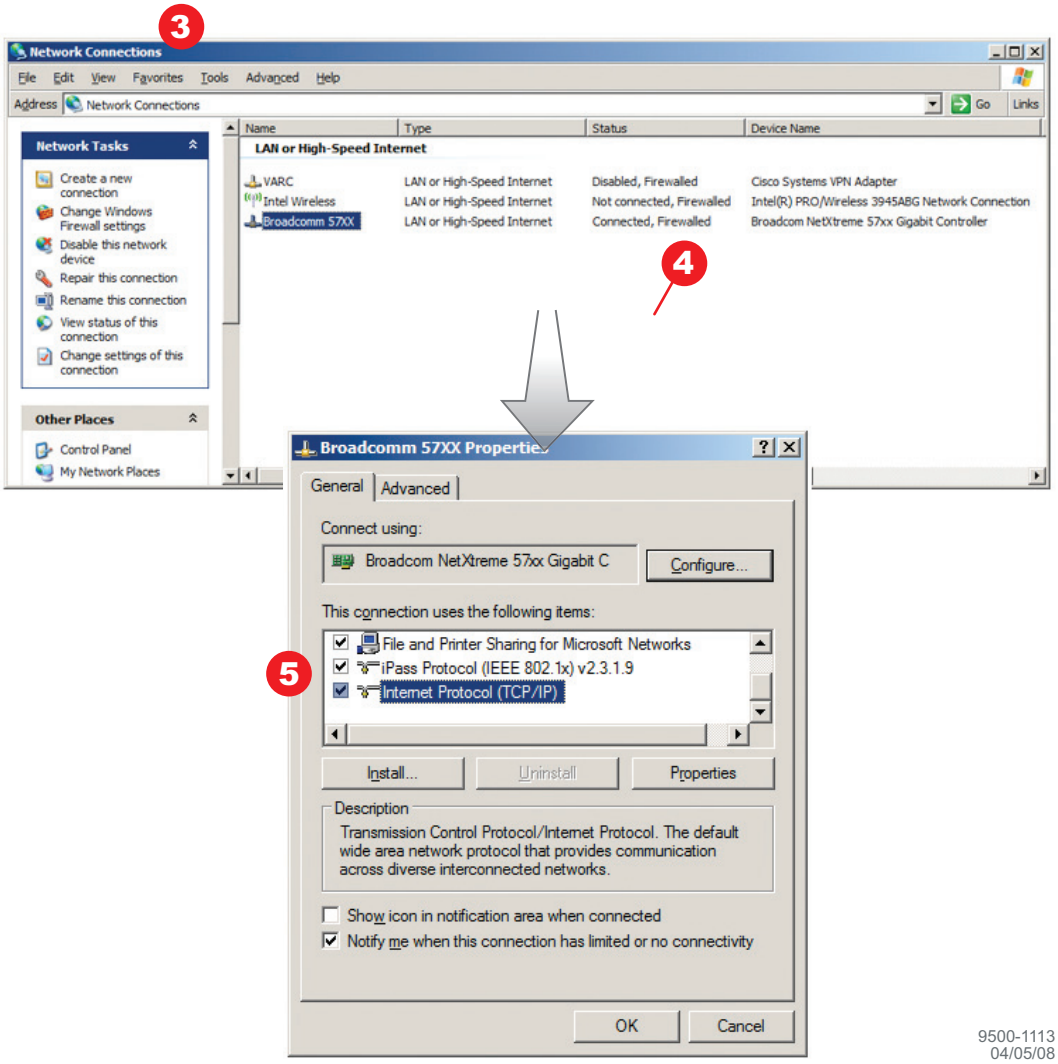
4.5.5 Configure PC Network Card to Connect to NE

This example uses a Microsoft Windows XP Professional system.

1. Connect a CAT 5/5E cable from the PC network card to NMS connector on Slot 1 Core (CSM - Control and Switch Module) module.
2. Click on the **START** menu on the Windows desktop and open the **CONTROL PANEL**..
3. Open **NETWORK CONNECTIONS**. Highlight the network card as shown below.
4. Right click and select **Properties** to display the Properties screen.
5. Scroll down the list to highlight the **Internet Protocol (TCP/IP)** line. Click **OK**.



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6. Record IP address currently shown under “Use the following IP address for future reference”.

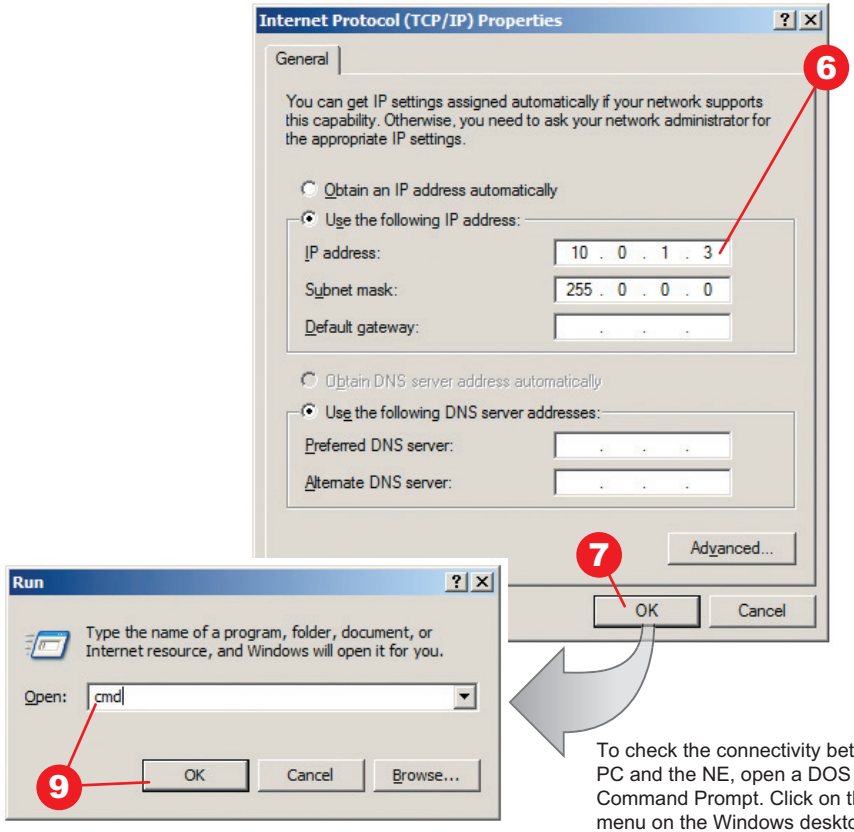
7. Click the selection for Using the following IP address. Enter the IP address of 10.0.1.3 for the PC network card as shown below. Click **OK**.

Note

The 10.0.1.3 address example shown below is derived from the default NE IP address (10.0.1.2) plus 1. If there is an IP address conflict within your network, increment the last number by two.

8. To check the connectivity between the PC and the NE, open a DOS window or Command Prompt. Click on the **START** menu on the Windows desktop and open the **RUN** window as shown below.

9. Type **cmd** and click **OK** to open a DOS window.



To check the connectivity between the PC and the NE, open a DOS window or Command Prompt. Click on the **START** menu on the Windows desktop and open the **RUN** window as shown below.

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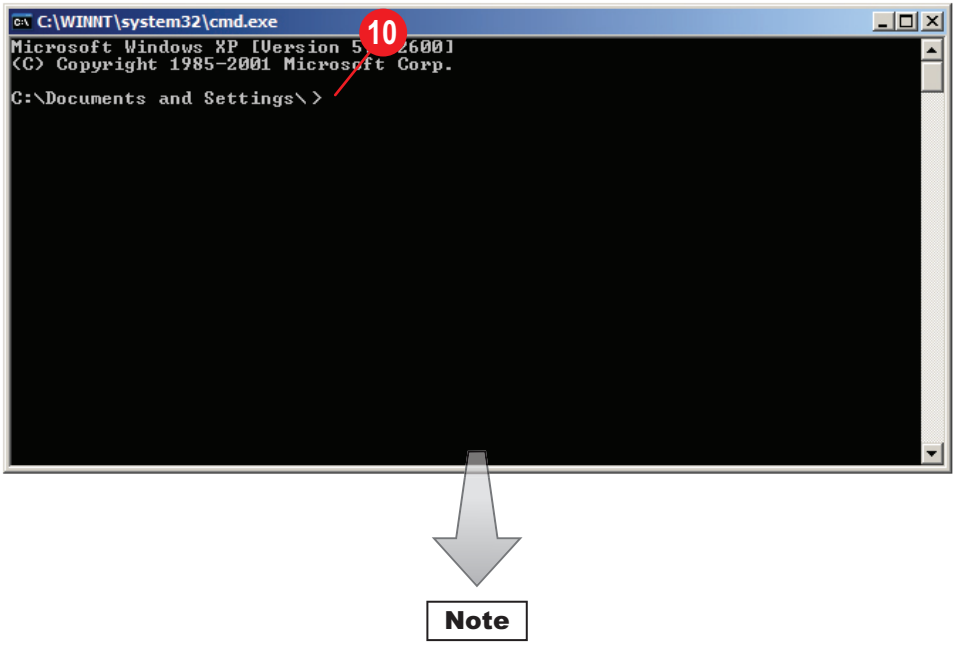
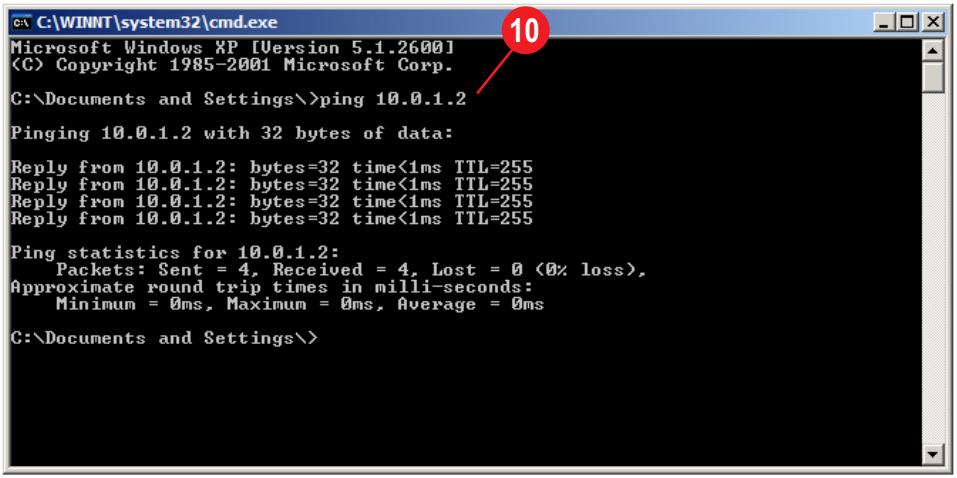
The DOS window will display.

10. In the DOS window, place the cursor after the > and type **ping 10.0.1.2** to verify a connection between the PC and the NE. The Ping statistics for the IP address 10.0.1.2 should display 4 packets sent and 4 packets received.



Note

The 10.0.1.2 IP address is the default NE IP address.



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4.6 START WebEML

1. Click on the shortcut icon on the desktop to start WebEML.

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There are three methods available to access the NE CT screens, based on the status of the NE configuration tables that identify the NE in the system. If the NE is already listed in the NE Table as part of the system, a simple procedure (Startup WebEML From An Existing Configuration) allows this information to be downloaded to the NE Configuration screen.

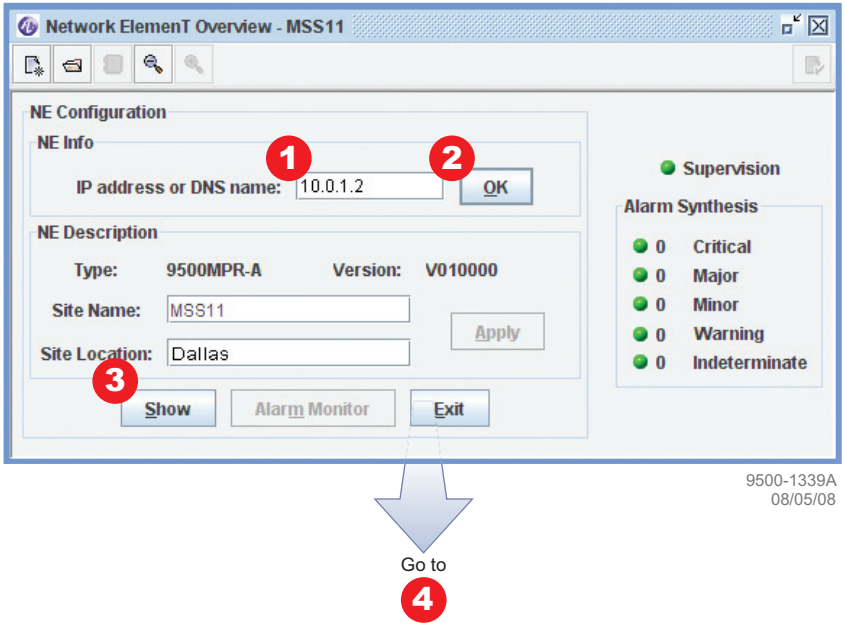
If the system is new or the NE is being added to an existing system, the Startup WebEML With A New Configuration method can be used to create a new table or add a new NE to the table.

The Manual WebEML Startup method can be used anytime to access the NE. This entails writing in the NE information in the fields on the NE Configuration screen. Manual WebEML Startup is shown here.

Manually Enter the Information

Follow default procedure below to manually start up the application.

1. Enter the IP Address 10.0.1.2.
2. Click **OK**.
3. Click **Show**.



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The **application has been started** pop-up will automatically close in a few seconds. The user can click the **OK** but it is not necessary. The **Login** screen will appear.

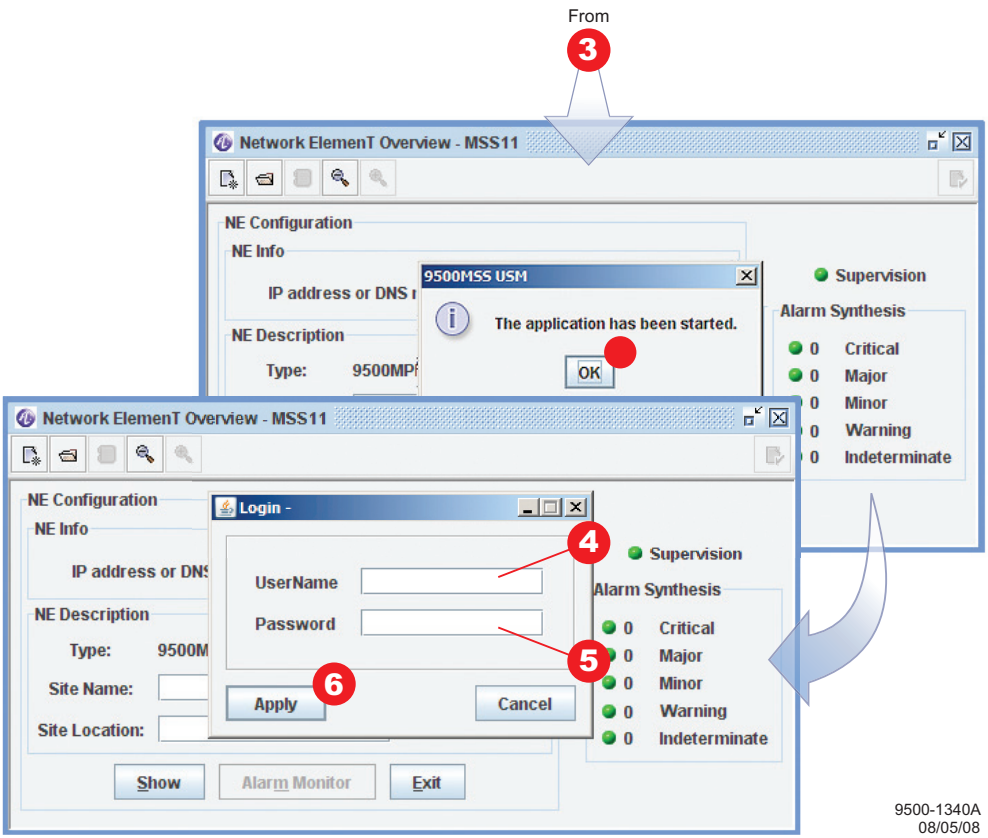
4. Type your username – must not be more than 20 characters.
5. Type your password – must not be less than six (6) or more than 20 characters and must be composed of full ASCII characters set (UPPER/lower case, numeric and special characters).

Note

Default User Accounts – at the NE installation time, two default user accounts are created on NE independently from the SNMP operating mode.

Username: initial	Username: Craftperson
Password: adminadmin	Password: craftcraft
Profile: administrator – full access	Profile: craftPerson – limited access

6. Click **Apply.** WebEML main screen opens.



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08/05/08

4.7 PROVISIONING RADIO

Note

Changes to provisioning do not have to be made in any particular order.

Click on Provisioning. Check current provisioning and change as required. See Figure 4-2 for recommended sequence.

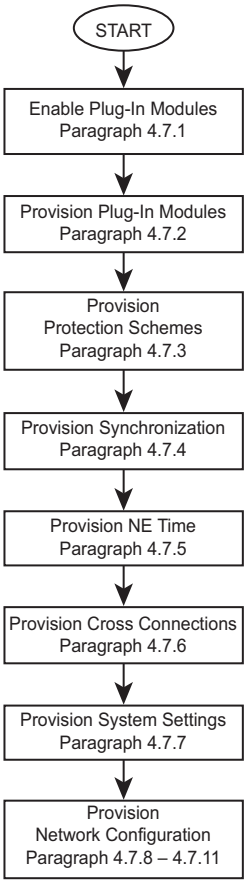


Figure 4-2 Provisioning Sequence

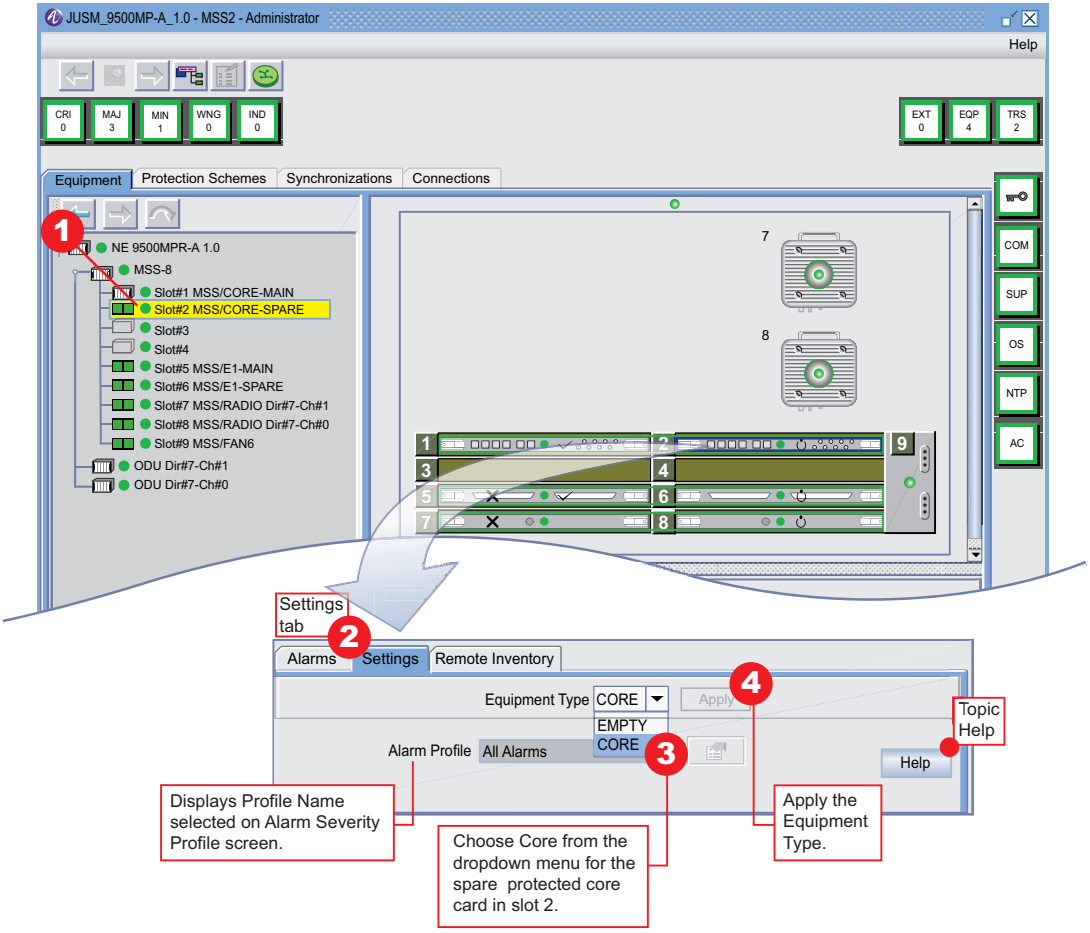
4.7.1 Enable Plug-In Modules

P32E1DS1, P2E3DS3, and MD300 modules must enabled in order to communicate what type of module is in what MSS slot to the microprocessor on the Control & Switching Module (CSM). This is accomplished on the Settings screen for that module. The CSM in MSS slot 1 is enabled by default. The ODU is enabled concurrently with the associated MD300 module. The Fan Unit must be enabled.

Enable MSS modules using the following procedures. See Figure 4-3 through Figure 4-10.

4.7.1.1 Enable Spare CSM

See Figure 4-3. Follow the steps to enable the Spare CSM in Slot 2.



Note

Screen shows CSM in slot 2 after Apply *has been activated.*

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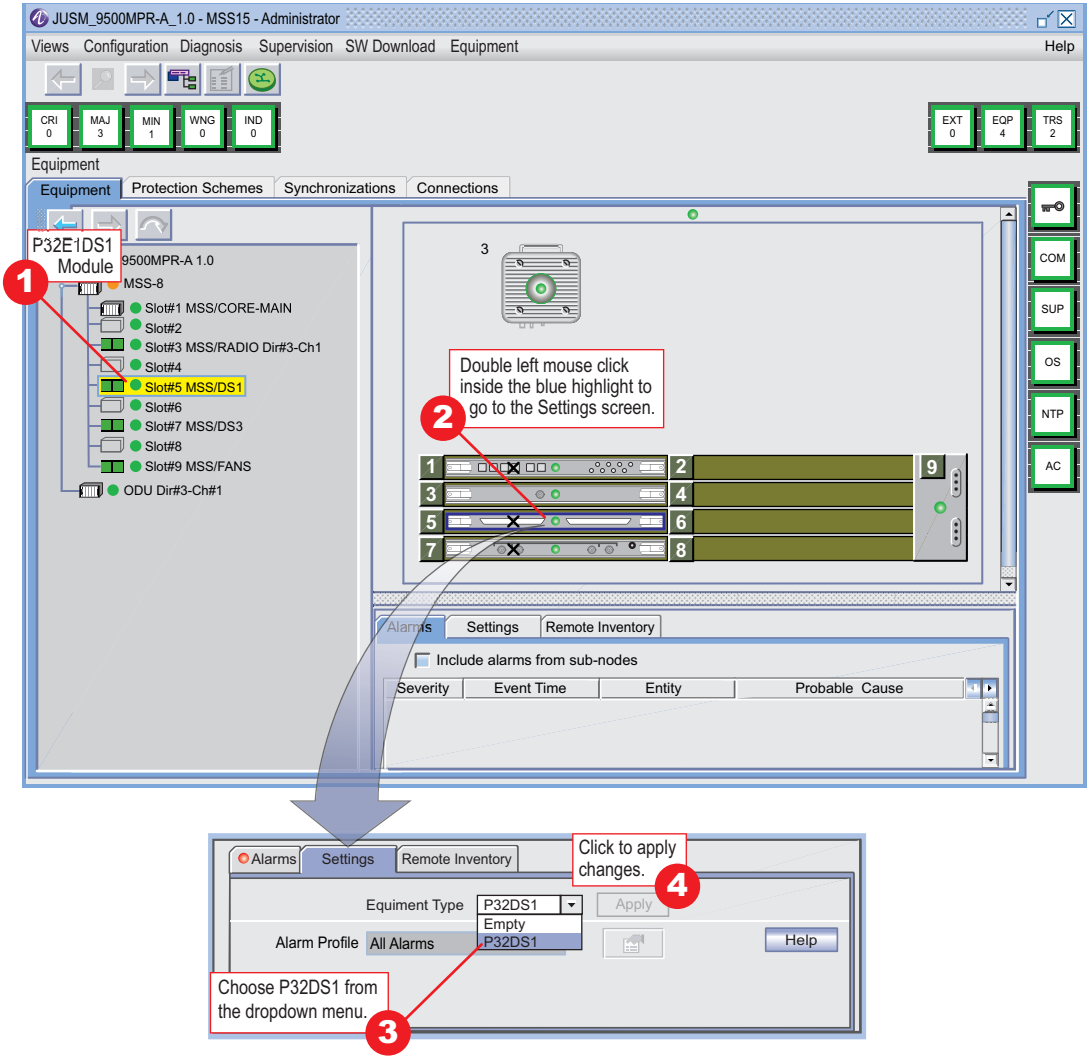
08/21/08

Figure 4-3 Enable Spare CSM

4.7.1.2 Enable Unprotected P32E1DS1 Module

See Figure 4-4. Follow the steps to enable the unprotected P32E1DS1 module(s).



Note

Screen shows DS1 module in slot 5 after Apply *has been activated.*

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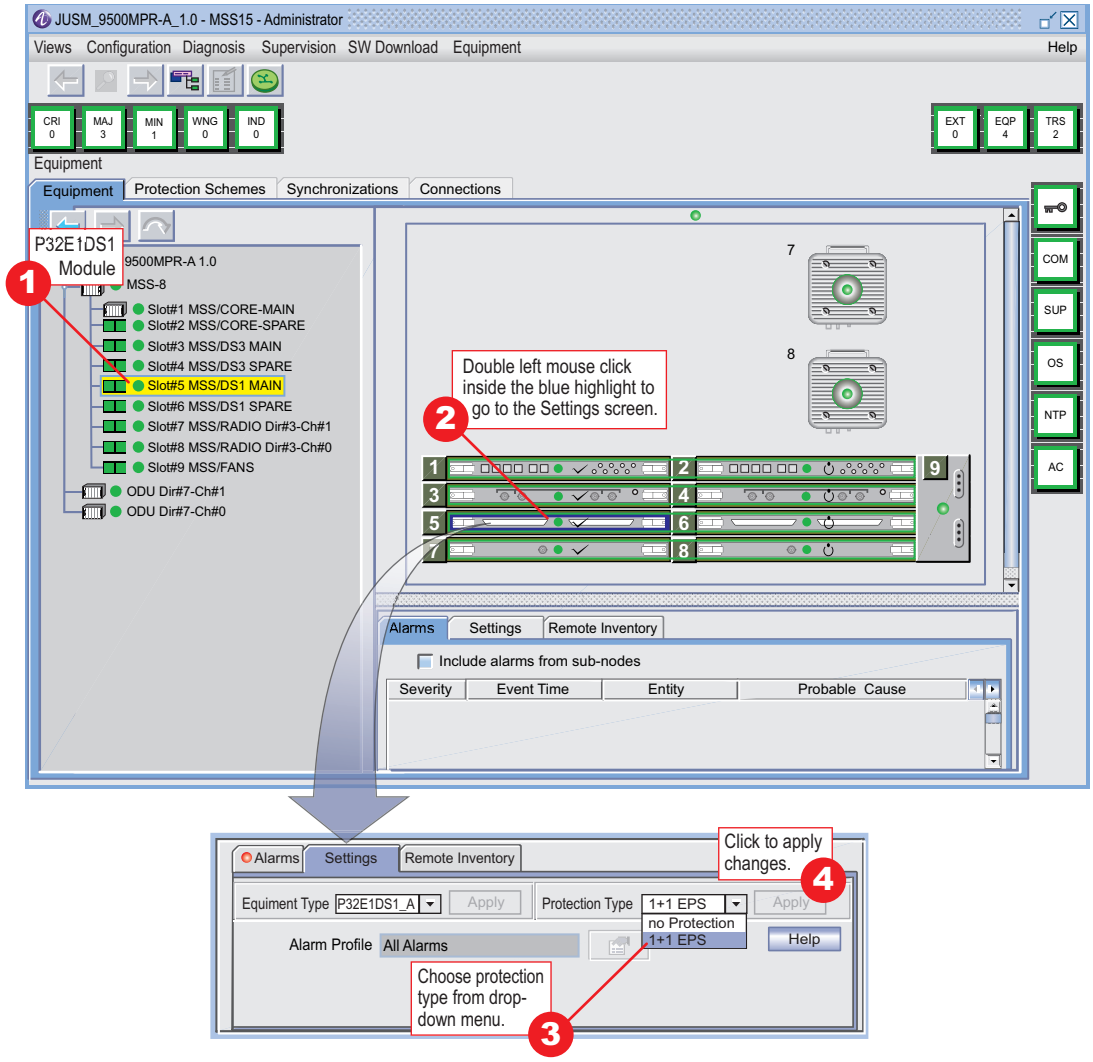
08/11/08

Figure 4-4 Enabling Unprotected P32E1DS1 Module

4.7.1.3 Enable Protected P32E1DS1 Module

See Figure 4-5. Follow the steps to enable the P32E1DS1 module(s).



Note

Screen shows P32E1DS1 module in slot 5 after Apply *has been activated.*

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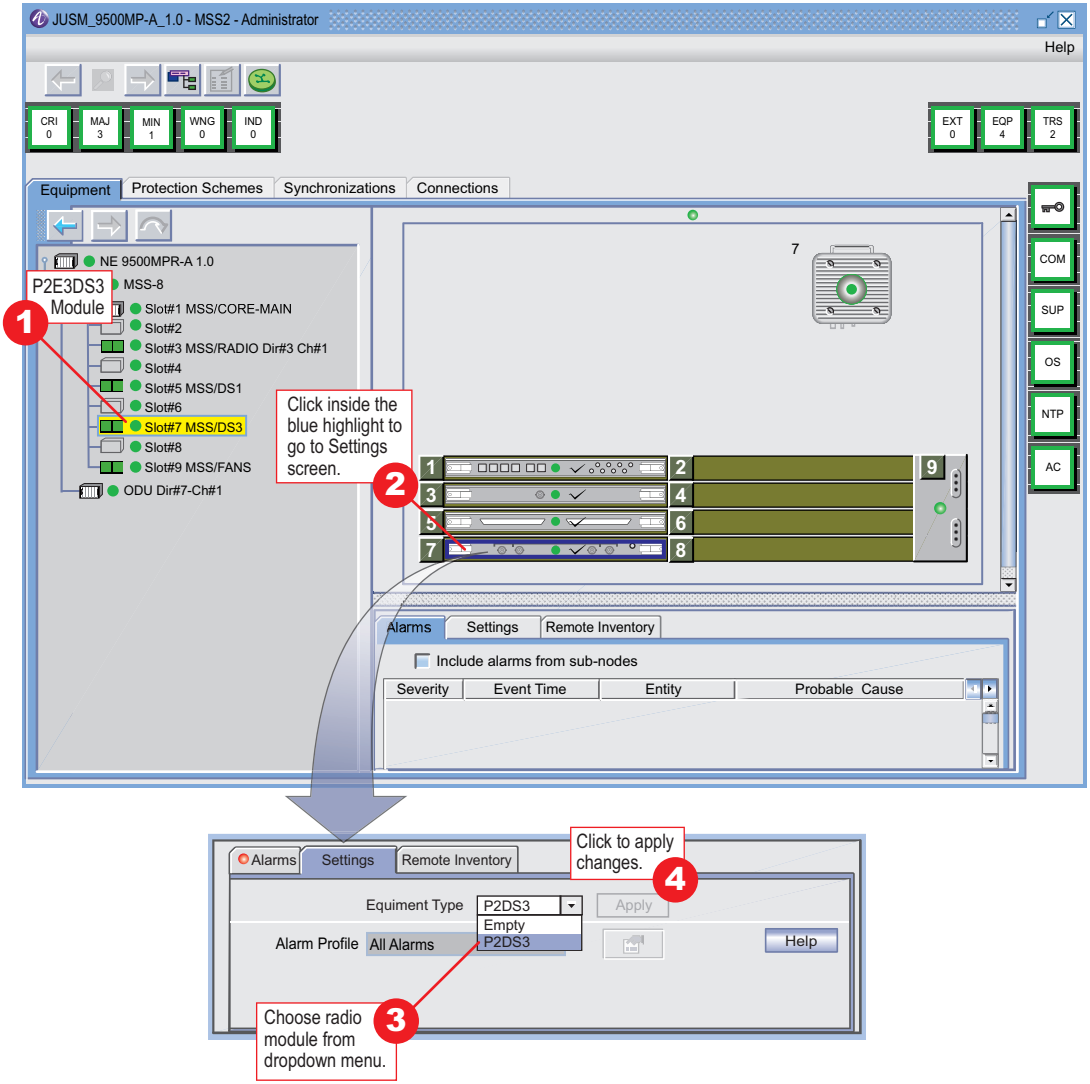
Figure 4-5 Enabling Protected P32E1DS1 Module

4.7.1.4 Enable Unprotected P2E3DS3 Module

See Figure 4-6. Follow the steps to enable the unprotected P2E3DS3 module.



Note

Screen shows P2E3DS3 module in slot 7 after Apply *has been activated.*

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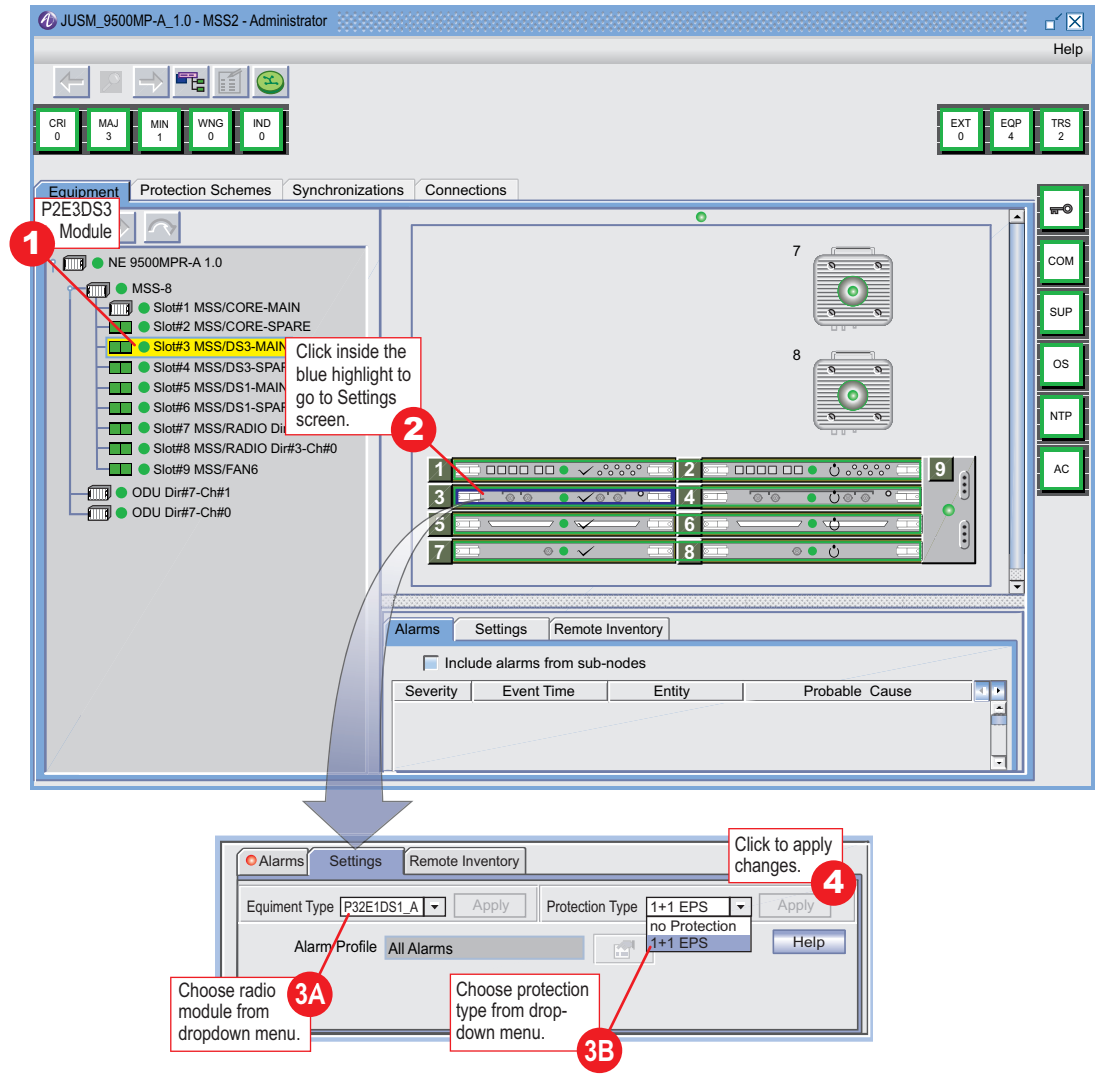
Figure 4-6 Enabling Unprotected P2E3DS3 Module

4.7.1.5 Enable Protected P2E3DS3 Module

See Figure 4-7. Follow the steps to enable the P2E3DS3 module.



Note

Screen shows P2E3DS3 module in slot 3 after Apply *has been activated.*

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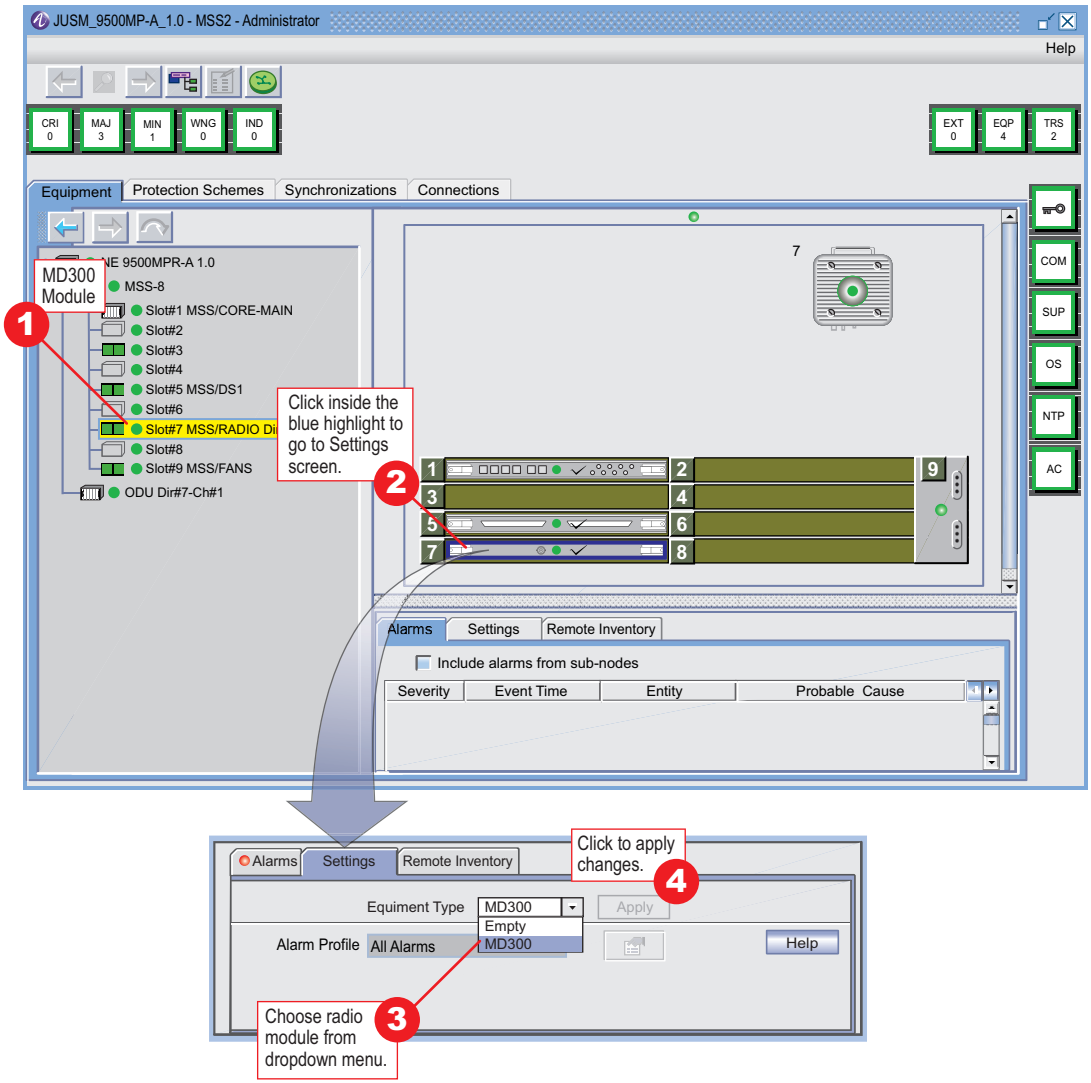
Figure 4-7 Enabling Protected P2E3DS3 Module

4.7.1.6 Enable Unprotected MD300 Module

See Figure 4-8. Follow the steps to enable the unprotected MD300 module(s).

Note

ODU is automatically enabled when MD300 module is enabled.



Note

Screen shows MD300 module in slot 7 after Apply *has been activated.*

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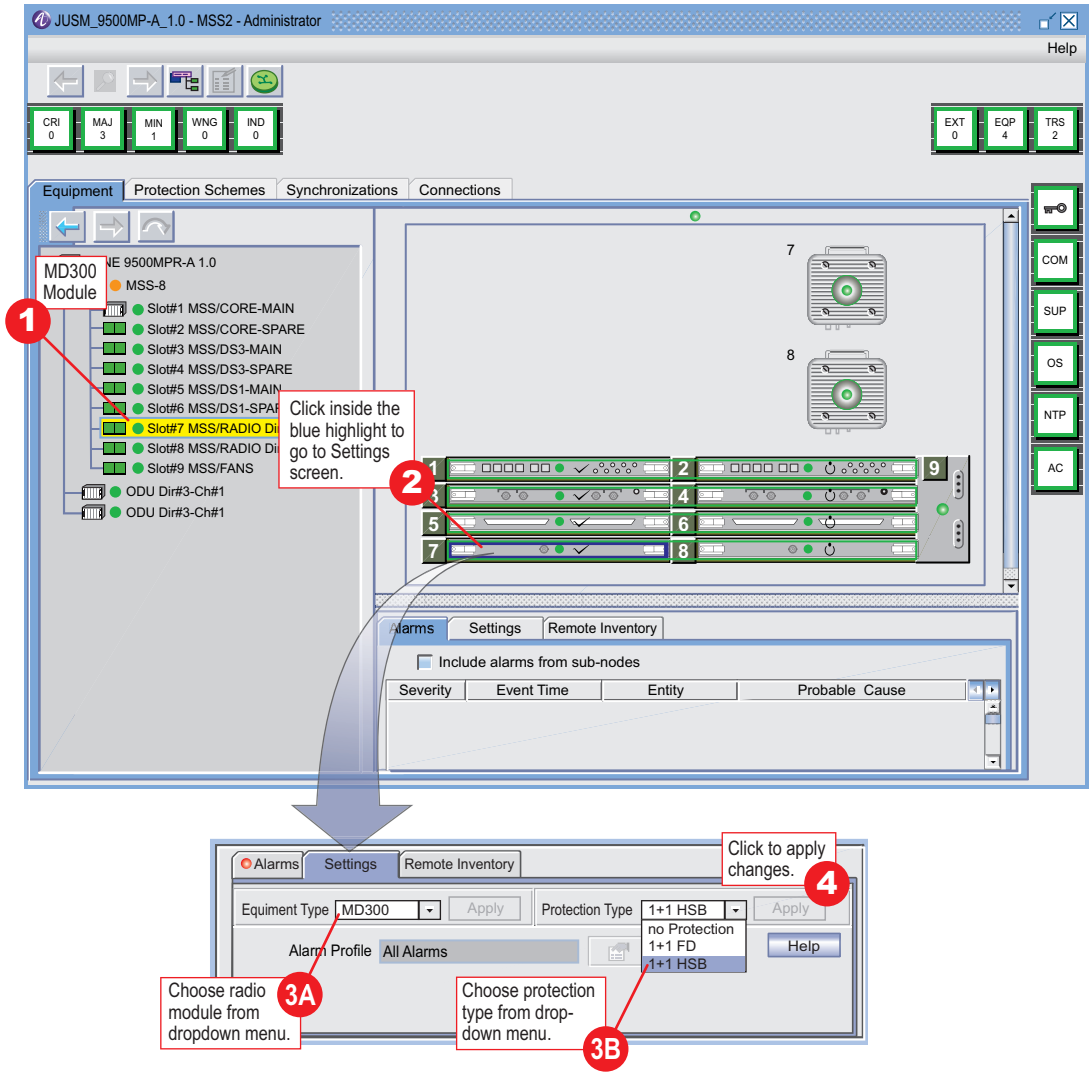
Figure 4-8 Enabling Unprotected MD300 Module

4.7.1.7 Enable Protected MD300 Module

See Figure 4-9. Follow the steps to enable the MD300 module(s).

Note

ODU is automatically enabled when MD300 module is enabled.



Note

Screen shows MD300 module in slot 7 after Apply *has been activated.*

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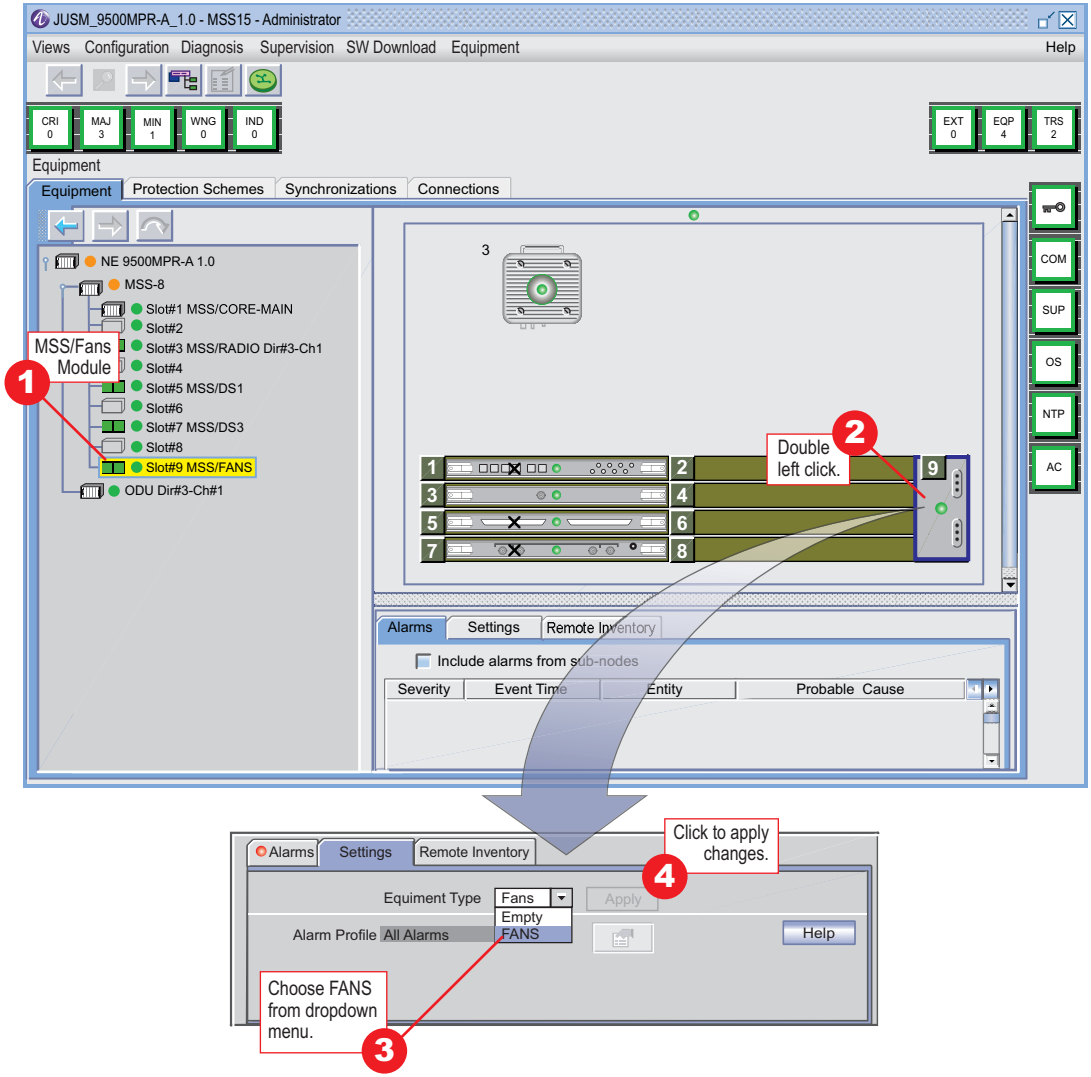
Figure 4-9 Enabling Protected MD300 Module

4.7.1.8 Enable Fan Unit

See Figure 4-10. Follow the steps to enable the Fan Unit.



Note

Screen shows Fans module in slot 9 after Apply *has been activated.*

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Figure 4-10 Enabling Fan Unit

4.7.2 Provision Plug-In Modules

See Figure 4-12 through Figure 4-19 to provision MSS plug-in module parameters after the modules have been enabled.

4.7.2.1 Provision Control & Switching Module (CSM)

CSM provisioning requirements depend on how the Ethernet and NMS ports on the front panel of the module are being used. If the CSM Ethernet ports are being used to interface external Ethernet equipment and TMN (SNMP) is not being used to monitor and control the NE, then only the Ethernet Physical interface needs to be provisioned. The TMN Interface is disabled. If Ethernet port 4 or the NMS port on the CSM is being used to transport TMN data, then both the Ethernet Physical Interface and TMN Interface need to be provisioned.

The NMS port is normally reserved for Craft Terminal interface with the PC. When enabled, the NMS port can be used to daisy chain TMN data to other equipment at the site. The serial data interface with the PC for the Craft Terminal on the NMS port is always enabled and requires no special provisioning.

See the flow chart (Figure 4-11) for a quick guide for provisioning the Ethernet Physical Interface and TMN Interface functions on the CSM.

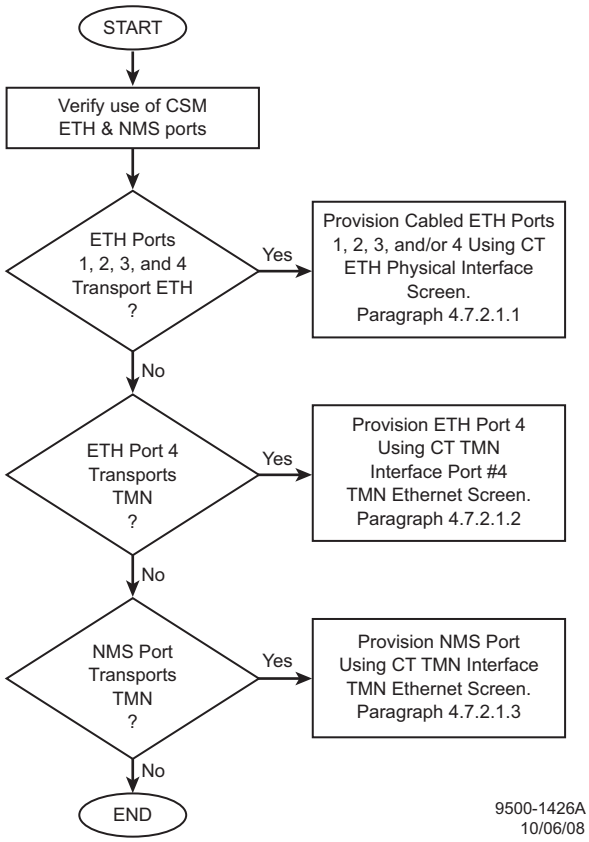
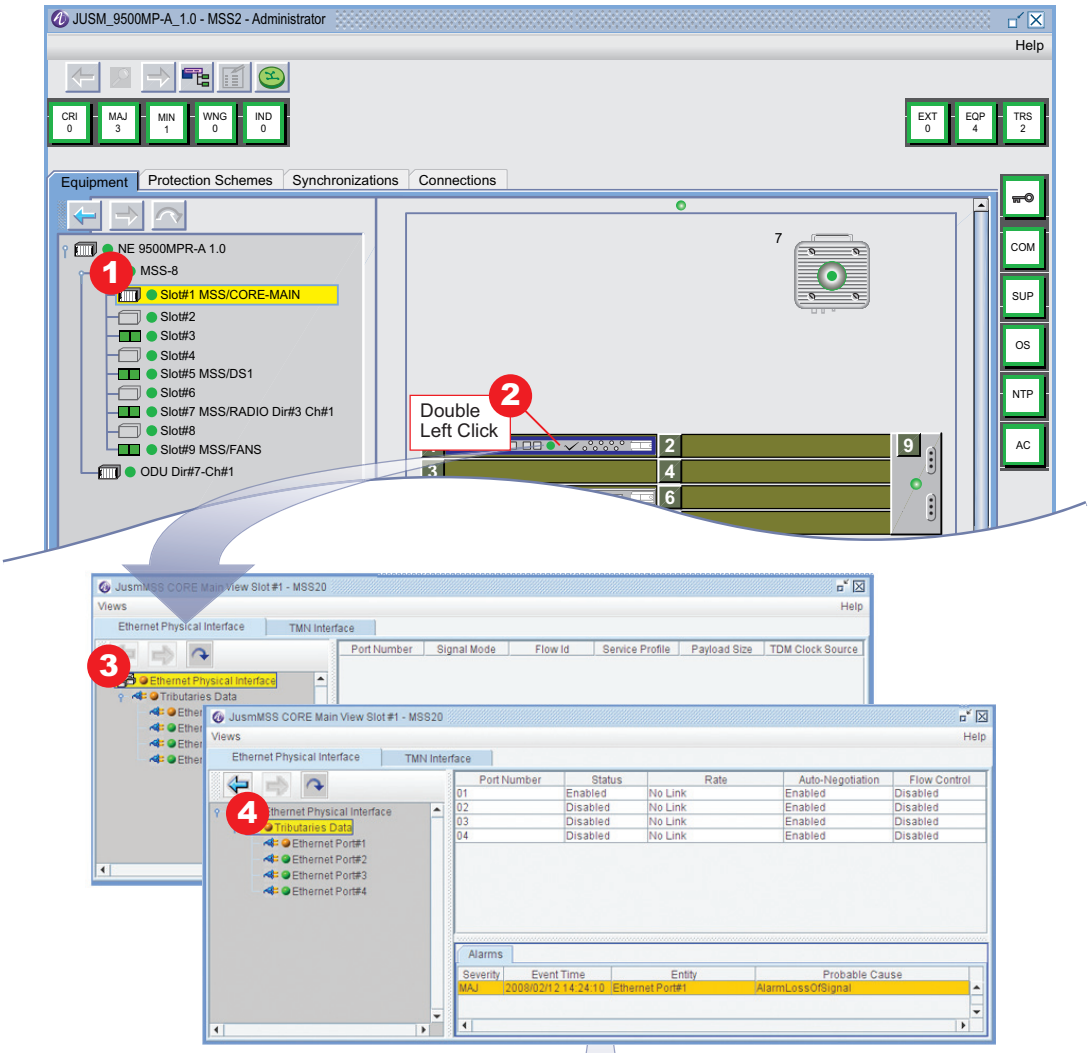


Figure 4-11 Core Provisioning Flow Chart

4.7.2.1.1 Ethernet Physical Interface Provisioning

See Figure 4-12. Follow the steps to provision ETH ports 1-4 on the CSM.



Changing provisioning for any Ethernet port (1-4) consists of:

1. Selecting Ethernet Port number
2. Selecting Settings
3. Setting auto-negotiation parameters to correspond to capabilities of link partner (steps A1 through A4).
4. Enabling selected Ethernet port (steps B1 and B2).

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Figure 4-12 CSM Ethernet Provisioning (Sheet 1 of 2)

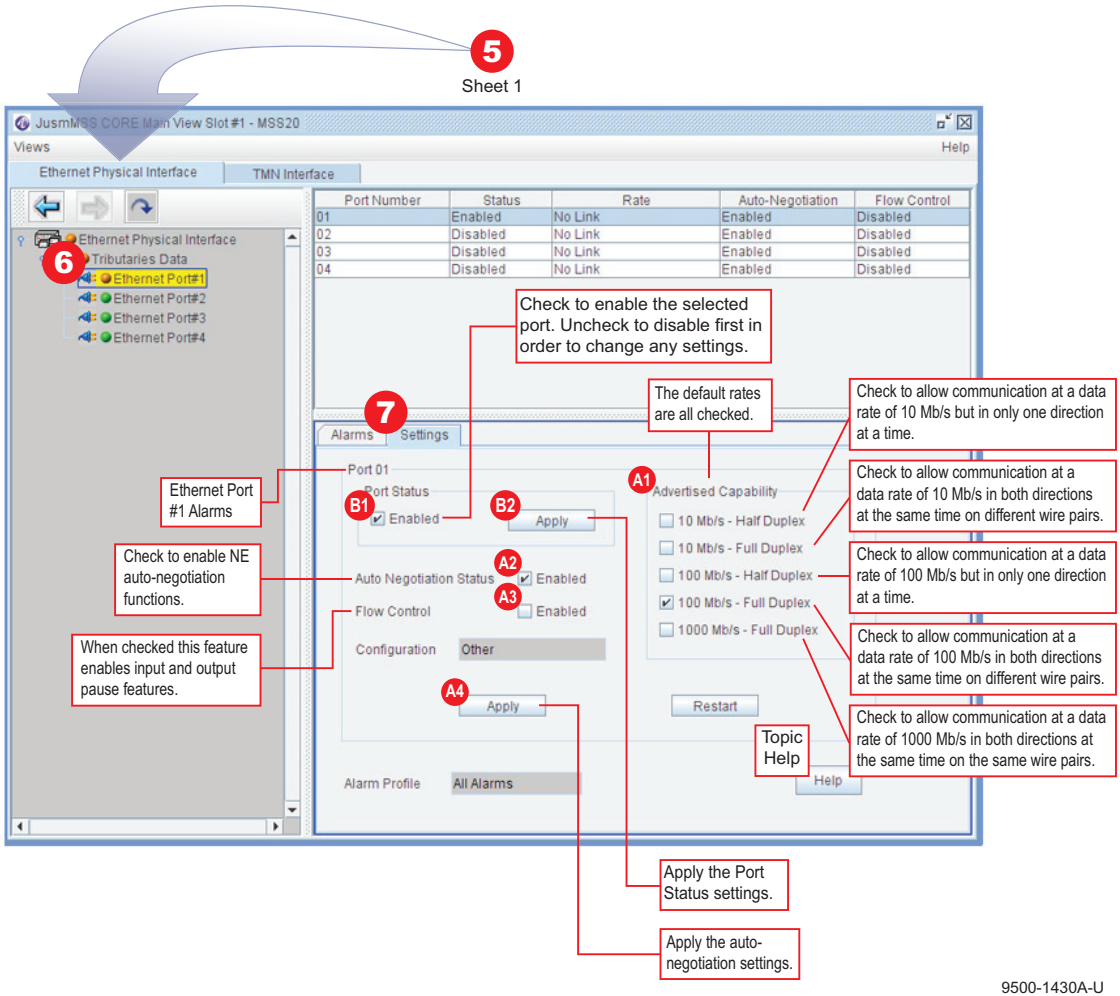

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Figure 4-12 CSM Ethernet Provisioning (Sheet 2 of 2)

4.7.2.1.2 NMS Port TMN Ethernet Provisioning

See Figure 4-13. Follow the steps to provision the Mgmt Port (NMS) on the CSM to support TMN routing.

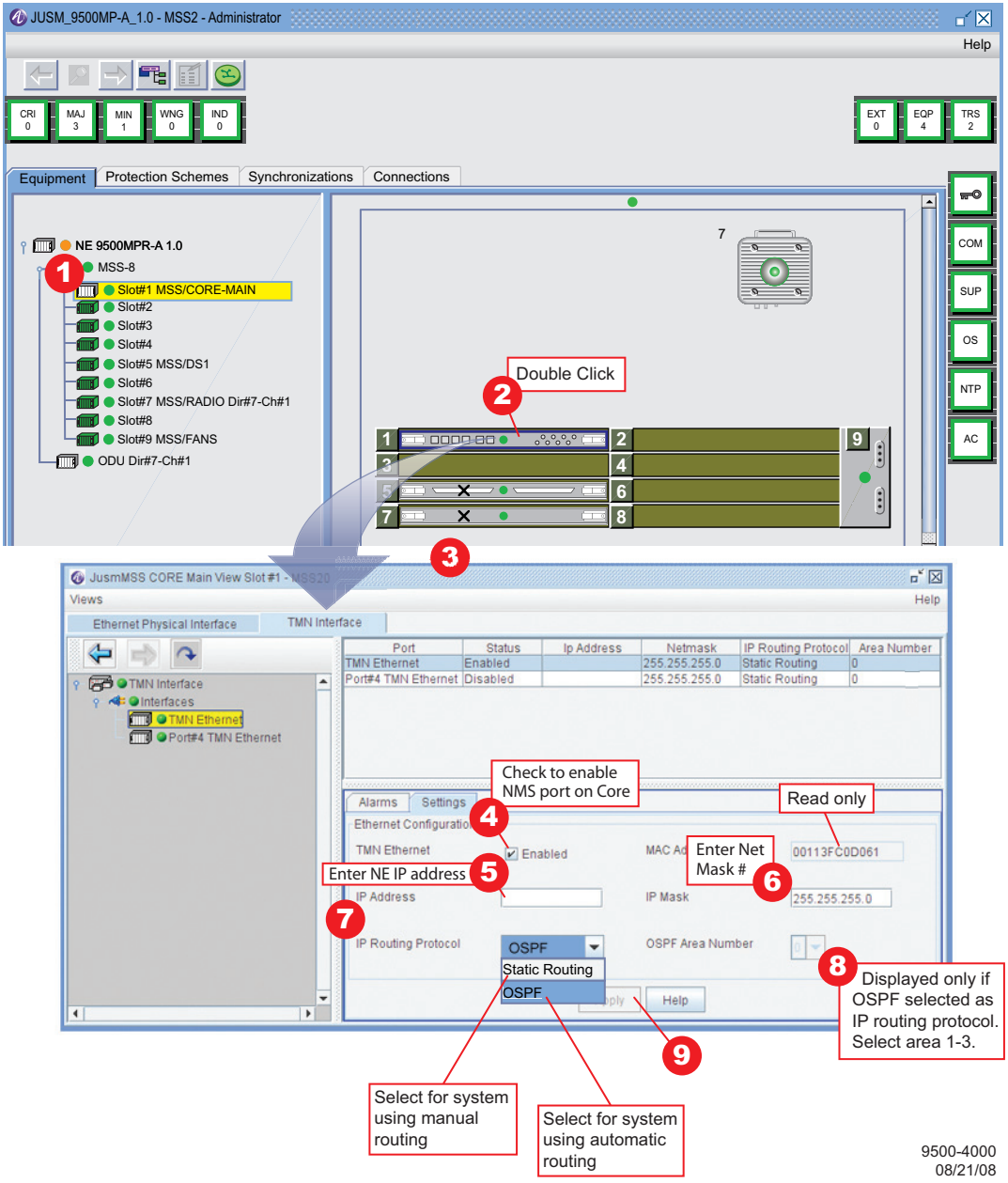


Figure 4-13 CSM TMN Ethernet Provisioning

4.7.2.1.3 Eth Port 4 TMN Ethernet Provisioning

See Figure 4-14. Follow the steps to provision port 4 on the CSM to support TMN routing.

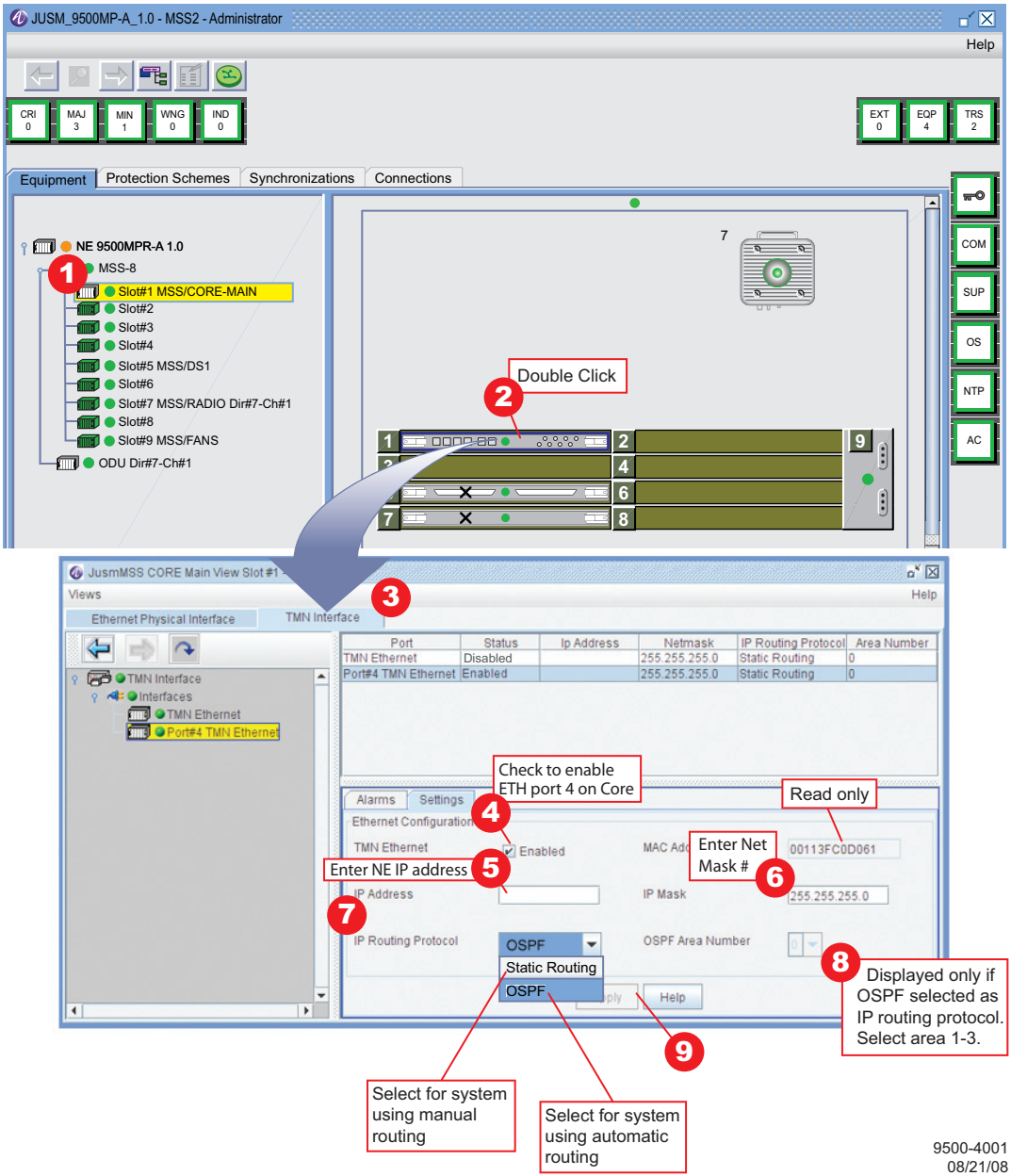
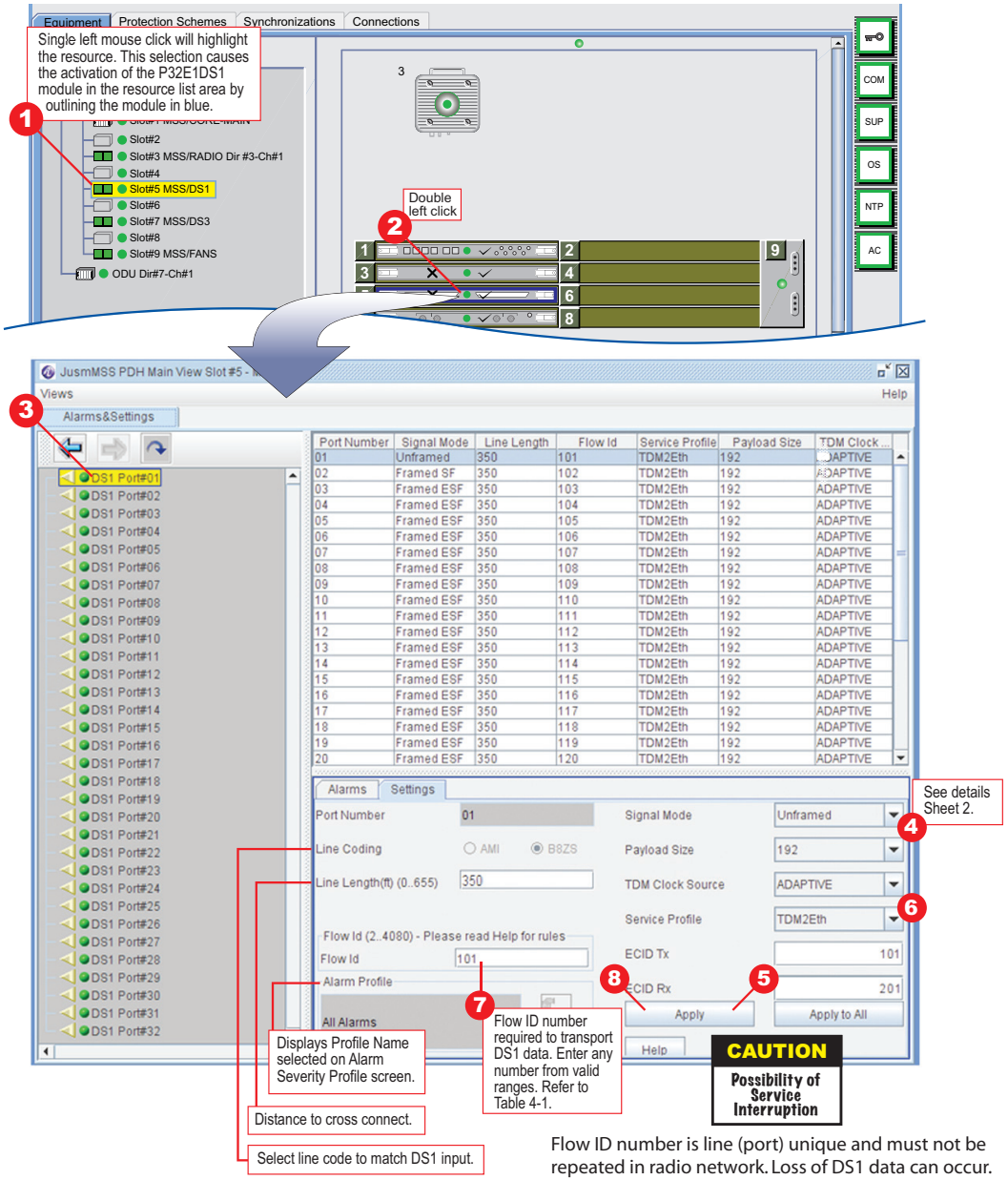


Figure 4-14 CSM Port 4 TMN Ethernet Provisioning

4.7.2.2 Provision P32E1DS1 Module TDM2TDM

See Figure 4-15. Follow the steps to provision DS1 lines (ports) 1-32 configured for TDM2TDM Service profile.



Flow ID number is line (port) unique and must not be repeated in radio network. Loss of DS1 data can occur.

Note

The purpose of TDM Clock Source provisioning is to select the mode that will be used to sync TDM DS1 data to the node Synchronization source. The user can select one of three modes: Adaptive, Differential, and TDM_Line_In for all 32 lines. All lines must be the same.

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Figure 4-15 P32E1DS1 Module Provisioning TDM2TDM (Sheet 1 of 2)

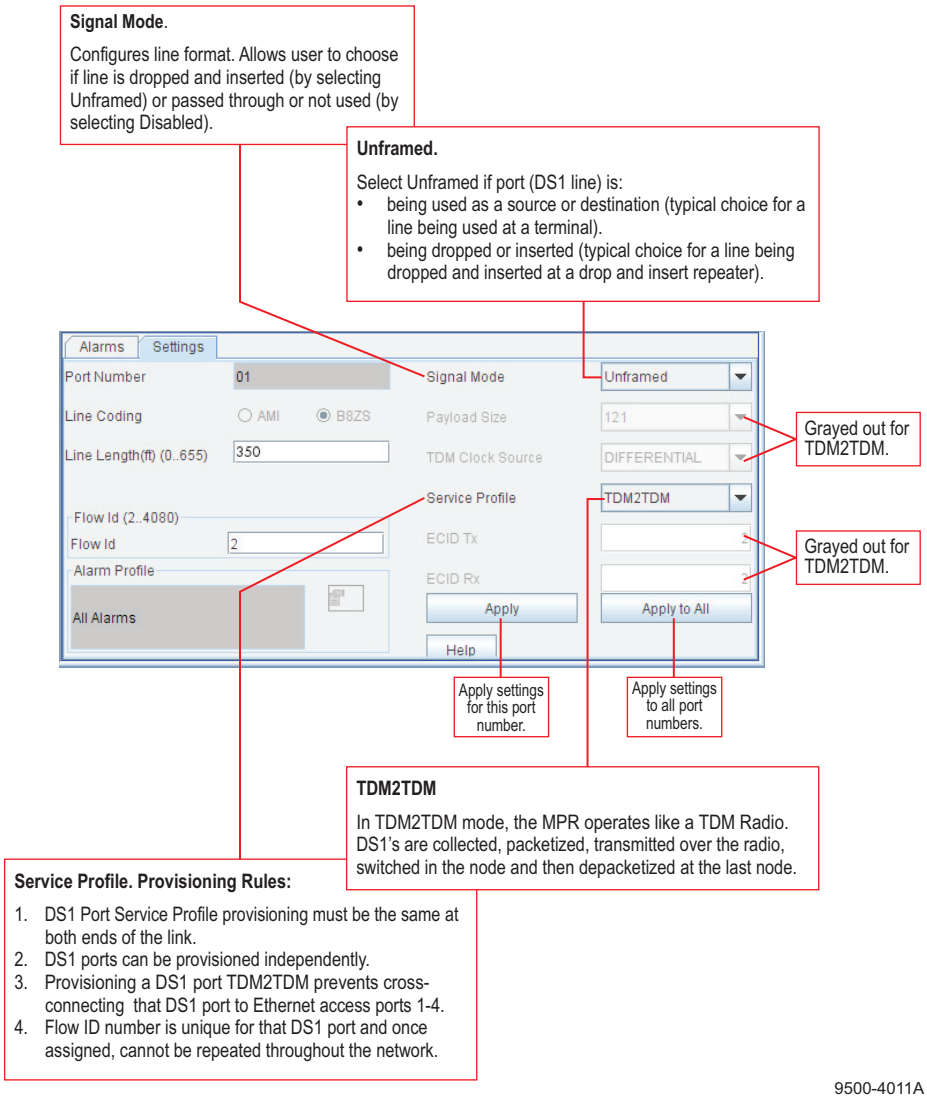


Figure 4-15 P32E1DS1 Module Provisioning TDM2TDM (Sheet 2 of 2)

4.7.2.2.1 Flow ID Number Rules

4.7.2.2.2 Cross Connecting Rules and Guidelines

Follow the Flow ID Number Rules carefully to prevent loss of traffic.

The Flow ID number entered by the operator on the P32E1DS1/P2E3DS3 (DS1/DS3) provisioning screen is one of the parameters the software management uses to determine source, destination, and direction of the DS1/DS3 port when the data is switched in the CSM. The following rules apply to the Flow ID:

1. Number is unique to the entire network. It cannot be used in any other radio or hop in the network.
2. Range of Flow ID numbers from which to choose is determined by total number of Flow ID's in the network. Refer to Table 4-1 for range of flow ID's. If there are fewer than 256 crossconnects in the network, select Flow ID from the *Less Than or Equal To 256* Range. If there are more than 256 but less than 512 crossconnects, select Flow ID from the *More Than 256, Less Than 512 Range*.

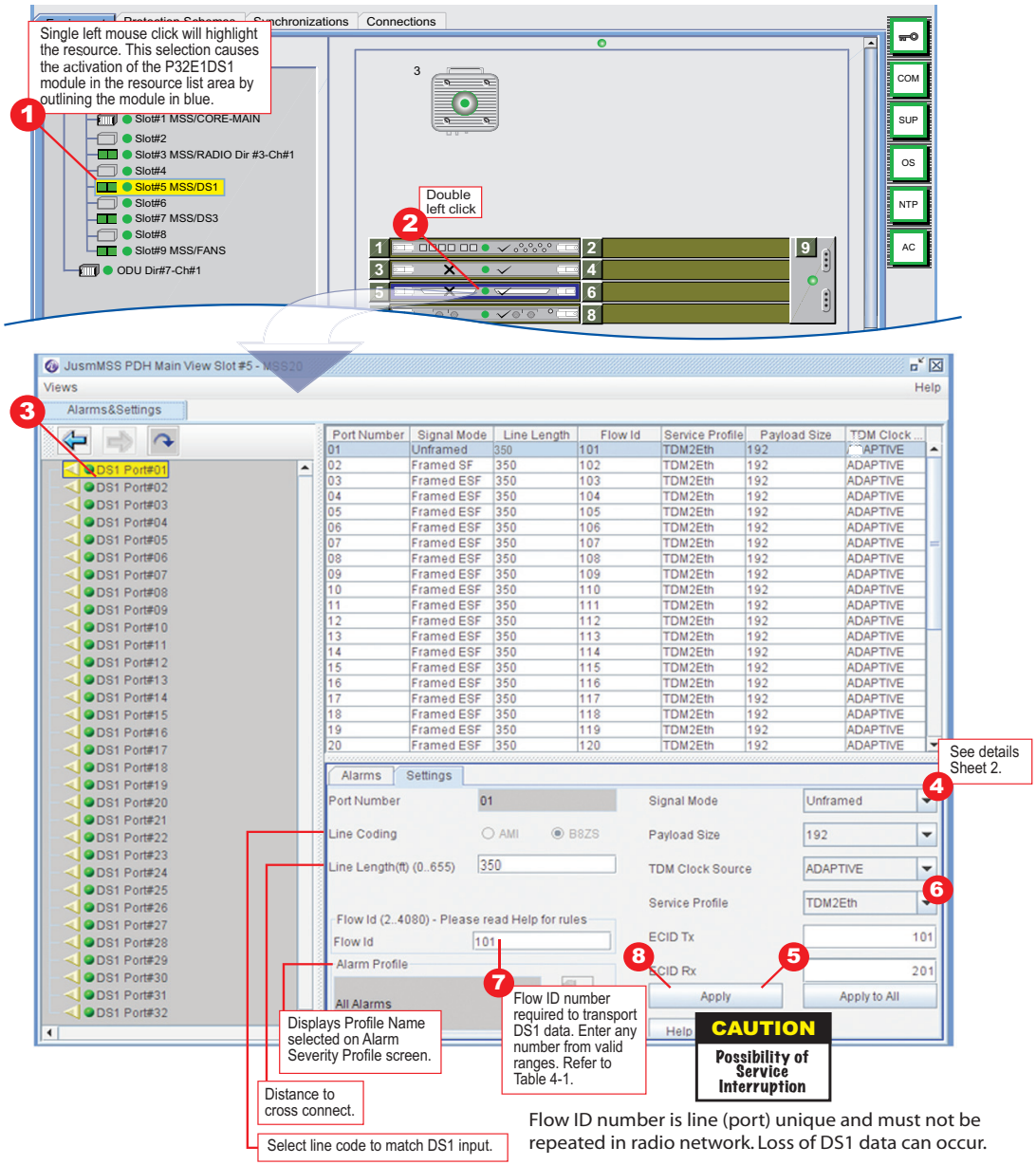
Table 4-1 Valid Ranges

Flow ID	Range
Less Than or Equal to 256	2-255, 256-511,512-767, 768-1023, 1024-1279, 1280-1535, 1536-1791, 1792-2047, 2048-2303, 2304-2559, 2560-2815, 2816-3071, 3072-3327, 3328-3583, 3584-3839, 3840-4080
More Than256, Less than 512	2-511, 512-1023, 1024-1535, 1536-2047, 2048-2559, 2560-3071, 3072-3583, 3584-4080

Note: Flow ID is total number of flow IDs to be configured.

4.7.2.3 Provision P32E1DS1 Module TDM2ETH

See Figure 4-16. Follow the steps to provision DS1 lines (ports) 1-32 configured for TDM2ETH service profile.



Note

The purpose of TDM Clock Source provisioning is to select the mode that will be used to sync TDM DS1 data to the node Synchronization source. The user can select one of three modes: Adaptive, Differential, and TDM_Line_In for all 32 lines. All lines must be the same.

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Figure 4-16 P32E1DS1 Module Provisioning TDM2ETH (Sheet 1 of 2)

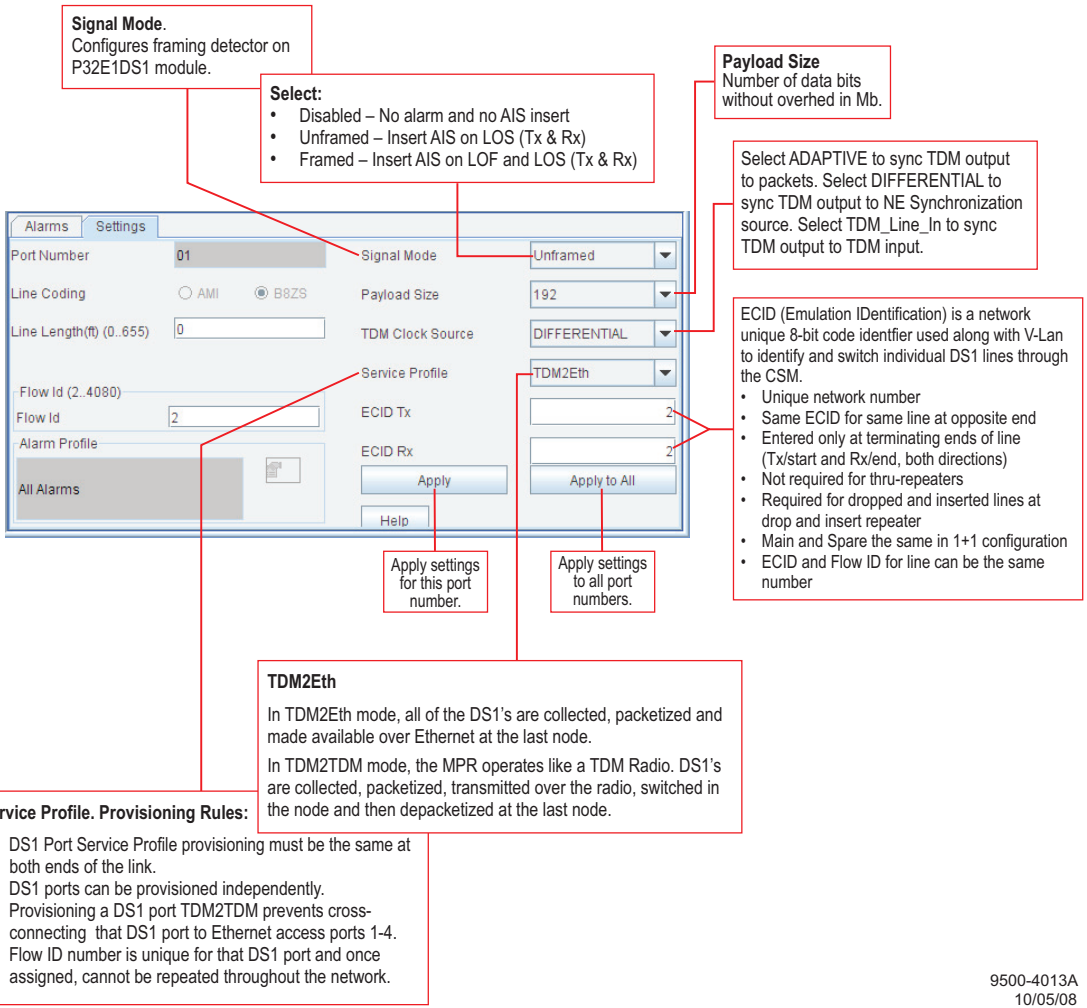

Figure 4-16 P32E1DS1 Module Provisioning TDM2ETH (Sheet 2 of 2)

4.7.2.4 Provision P2E3DS3 Module TDM2TDM

See Figure 4-17. Follow the steps to provision DS3 lines 1 and 2 configured for TDM2TDM service profile.

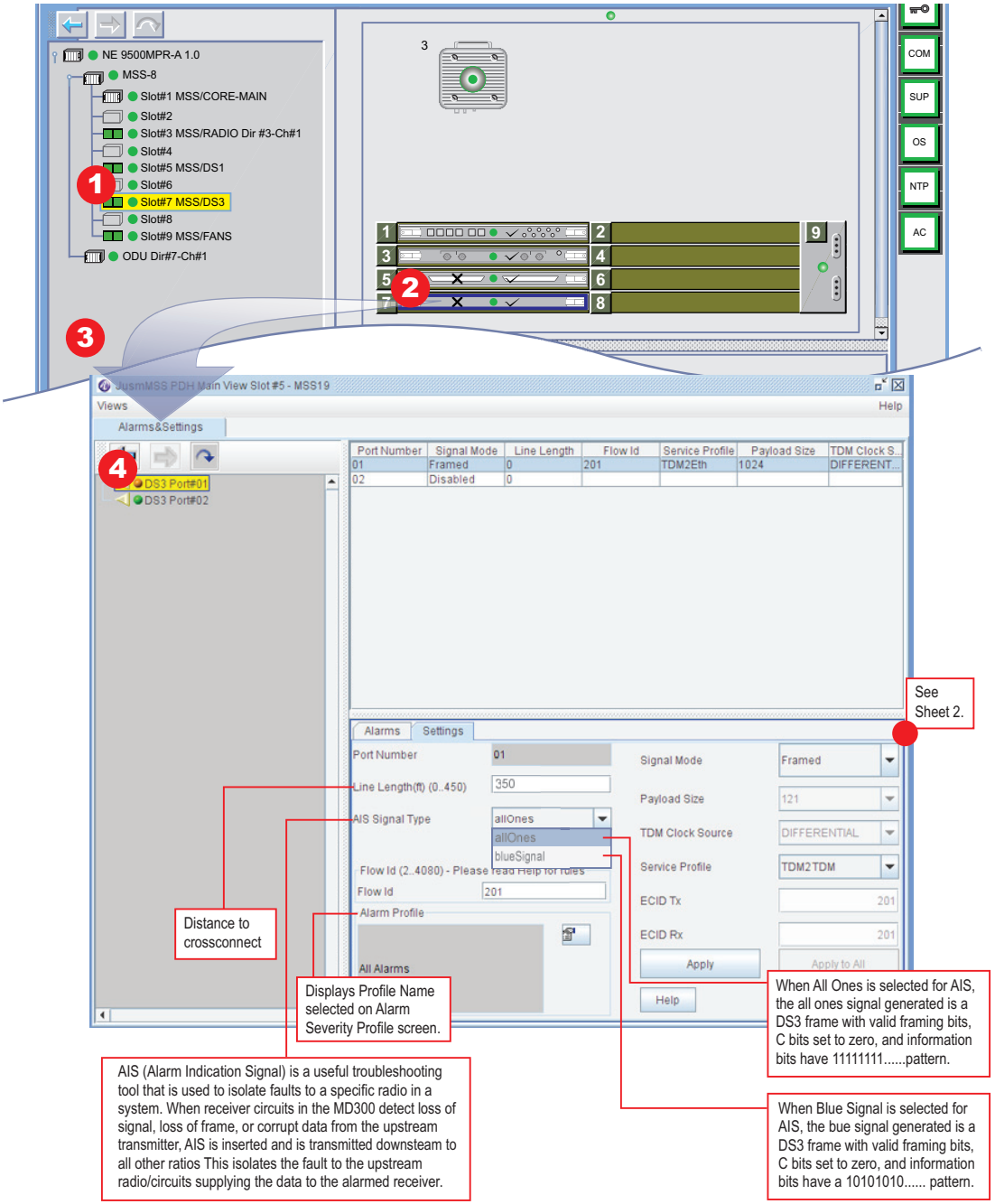

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Figure 4-17 P2E3DS3 Module Provisioning TDM2TDM (Sheet 1 of 2)

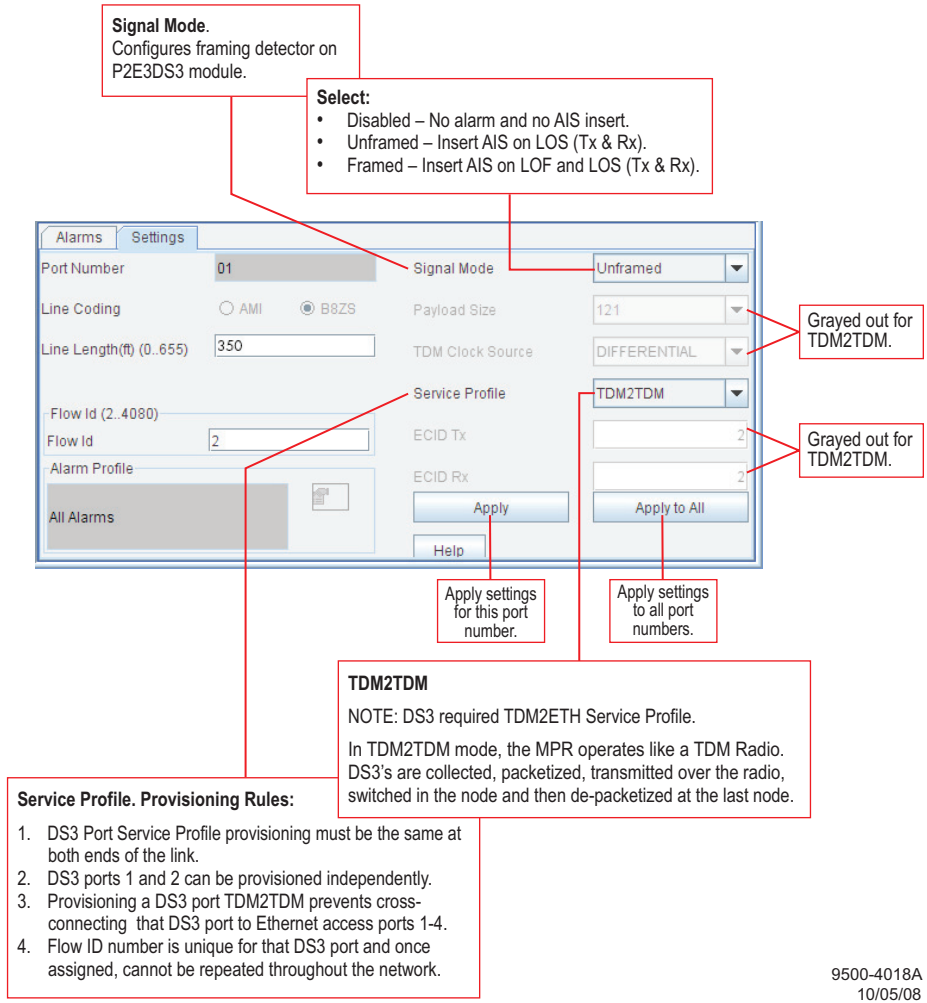

Figure 4-17 P2E3DS3 Module Provisioning TDM2TDM (Sheet 2 of 2)

4.7.2.5 Provision P2E3DS3 Module TDM2ETH

See Figure 4-18. Follow the steps to provision DS3 lines 1 and 2 configured for TDM2ETH service profile.

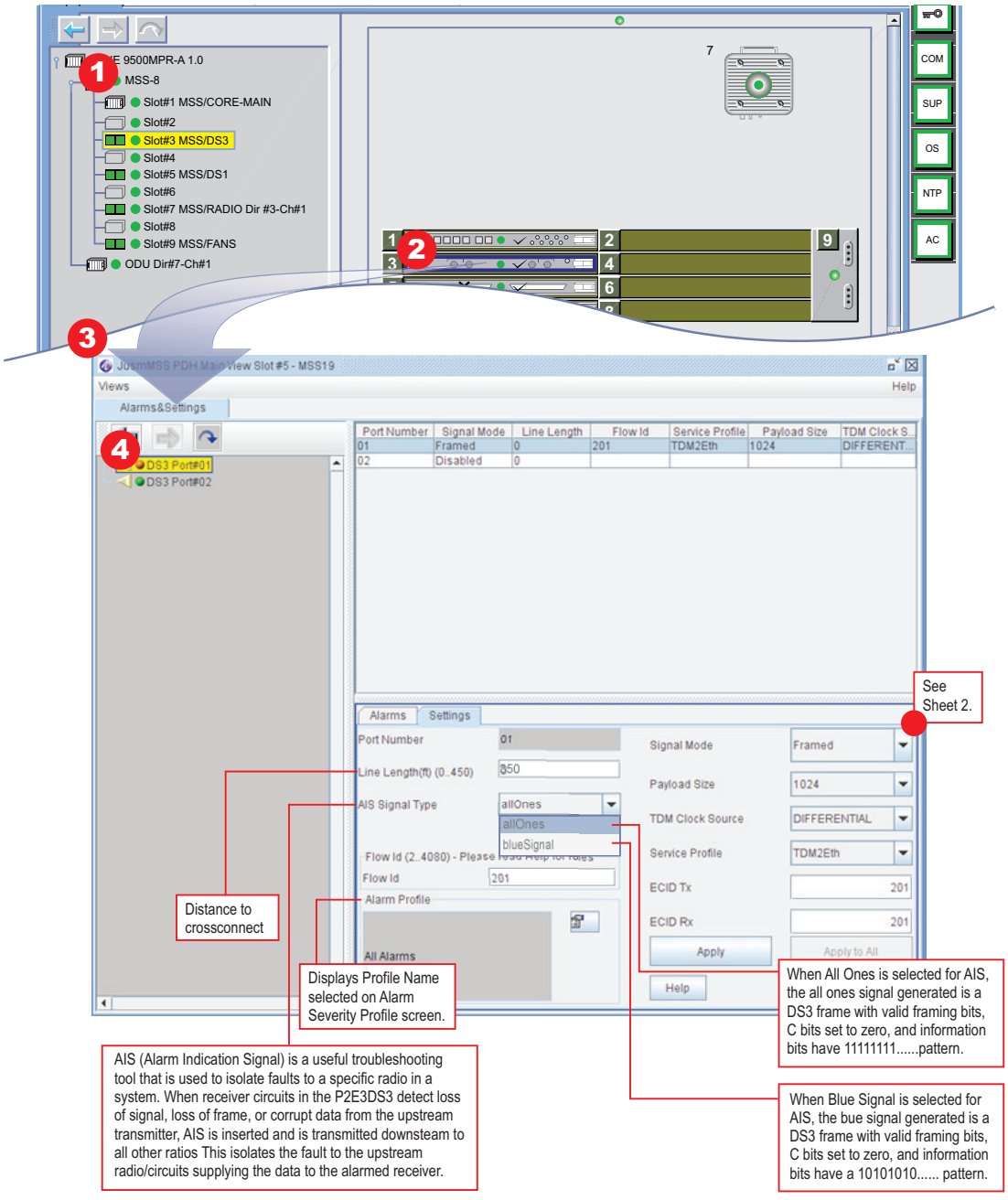

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Figure 4-18 P2E3DS3 Module Provisioning TDM2ETH (Sheet 1 of 2)

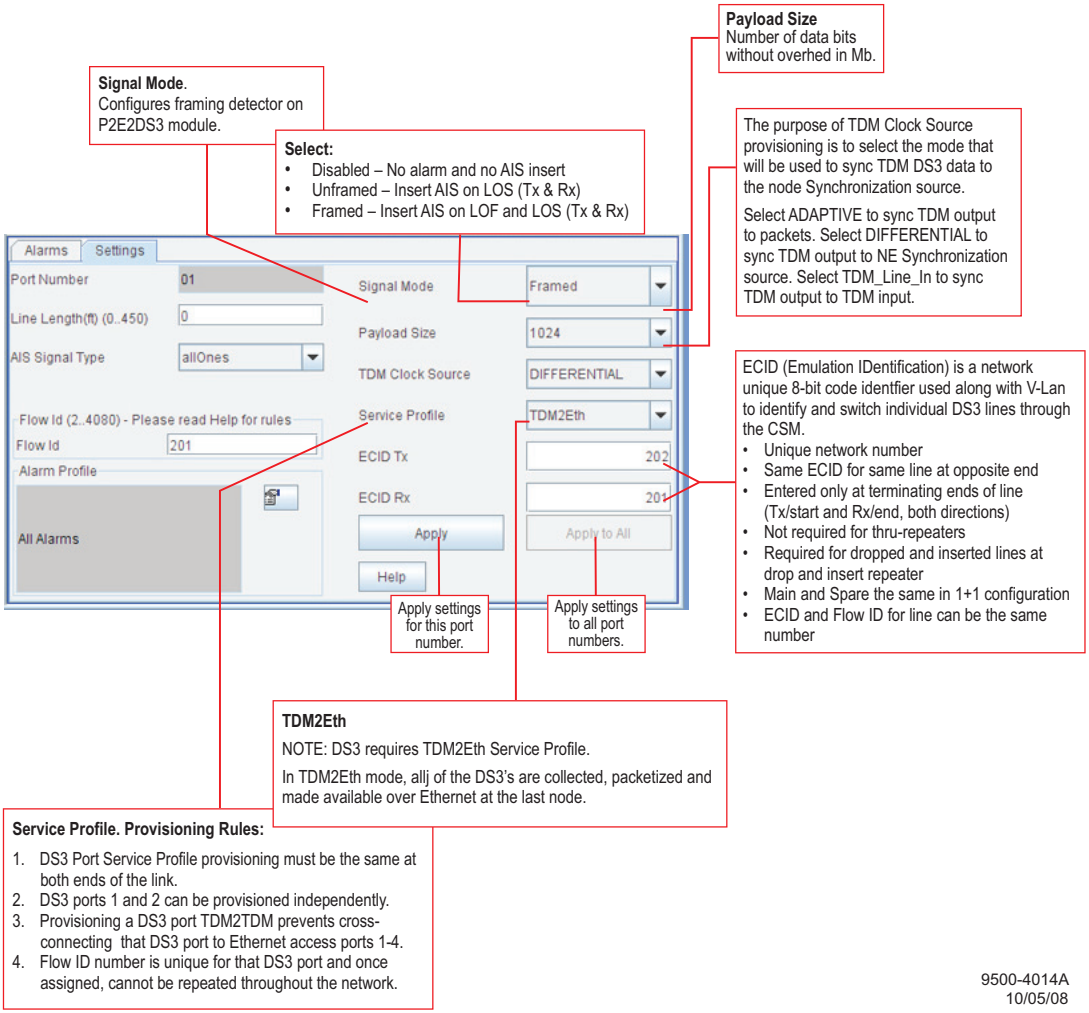

Figure 4-18 P2E3DS3 Module Provisioning TDM2ETH (Sheet 2 of 2)

4.7.2.6 Provision MD300 Module

See Figure 4-19. Follow the steps to provision the MD300 module for Presetting Mode. See Figure 4-20 and follow the steps to provision the MD300 module for Adaptive Modulation mode.

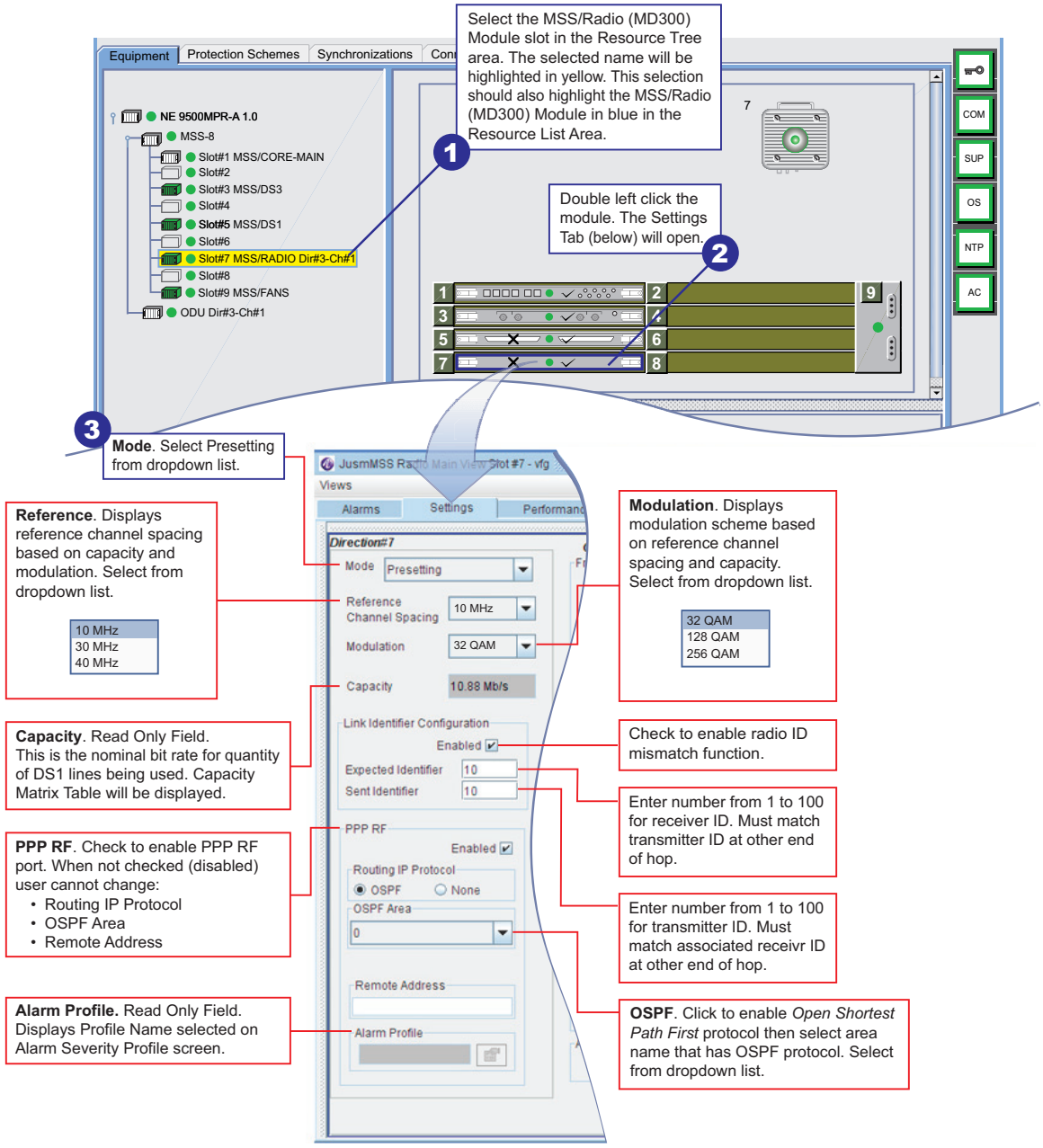

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Figure 4-19 MD300 Module Provisioning, Presetting Mode (Sheet 1 of 2)

Note

The ODU synthesizer is hard-coded for 250 kHz steps. Therefore the Tx frequency is a multiple of 250 kHz. For frequency channel plans that do not fall on 250 kHz steps, the user will have to set the Tx frequency to the nearest allowed value.

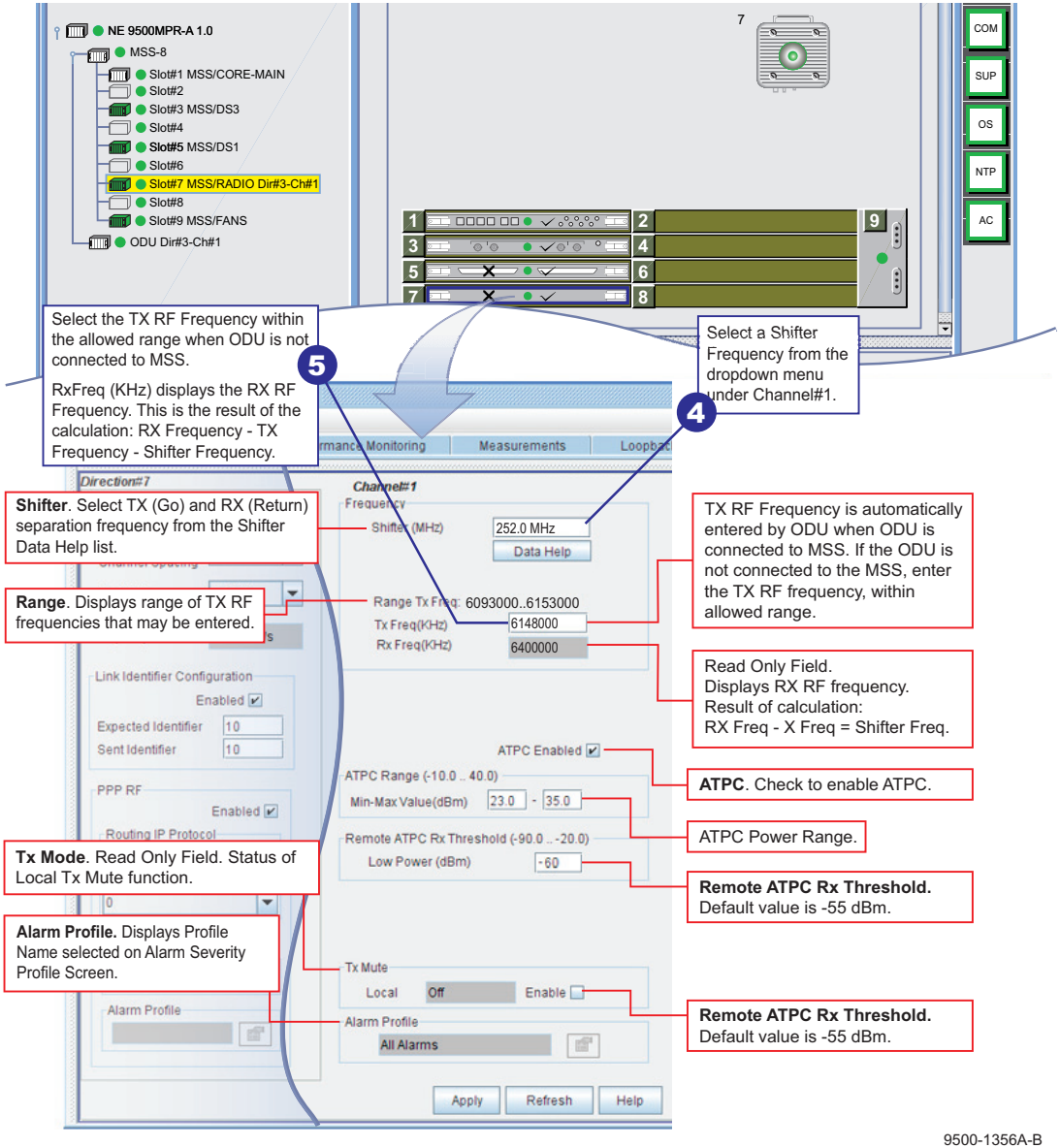

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Figure 4-19 MD300 Module Provisioning, Presetting Mode (Sheet 2 of 2)

Note

When the Mode *is changed from* Presetting *to* Adaptive Modulation*, the radio defaults to 10 MHz bandwidth at 4 QAM. If the capacity of the radio (number of E1 lines cross connected) exceeds the available capacity of a 10 MHz Channel at 4 QAM, Adaptive Modulation will not enable. It may be necessary to perform one of the following provisioning changes:*

1. Reduce the quantity of E1 lines being transported to meet the required capacity.
2. Increase Reference Channel Spacing.

Refer to the CD for Modem Profiles.

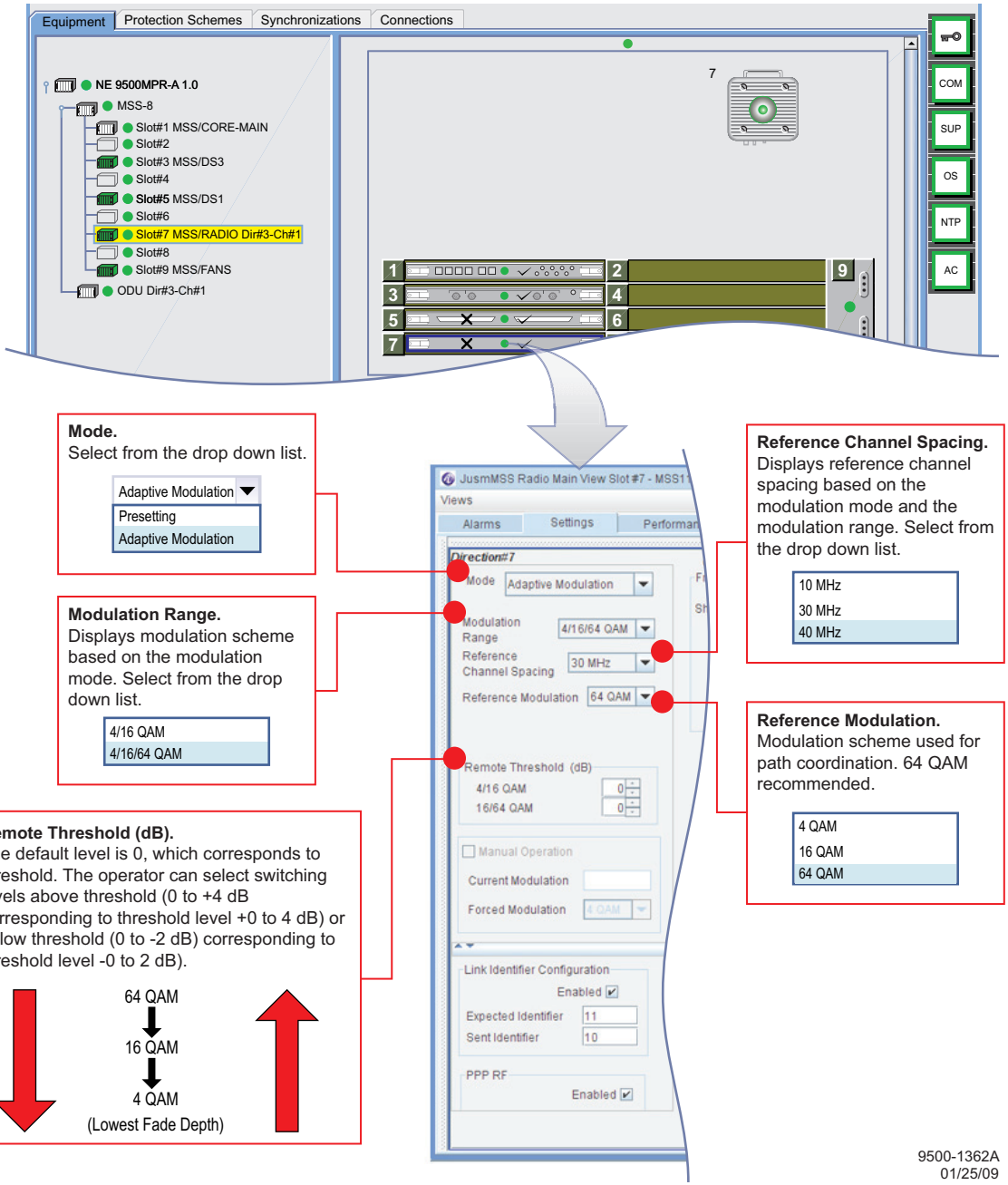

Figure 4-20 MD300 Module Provisioning, Adaptive Modulation Mode (Sheet 1 of 3)

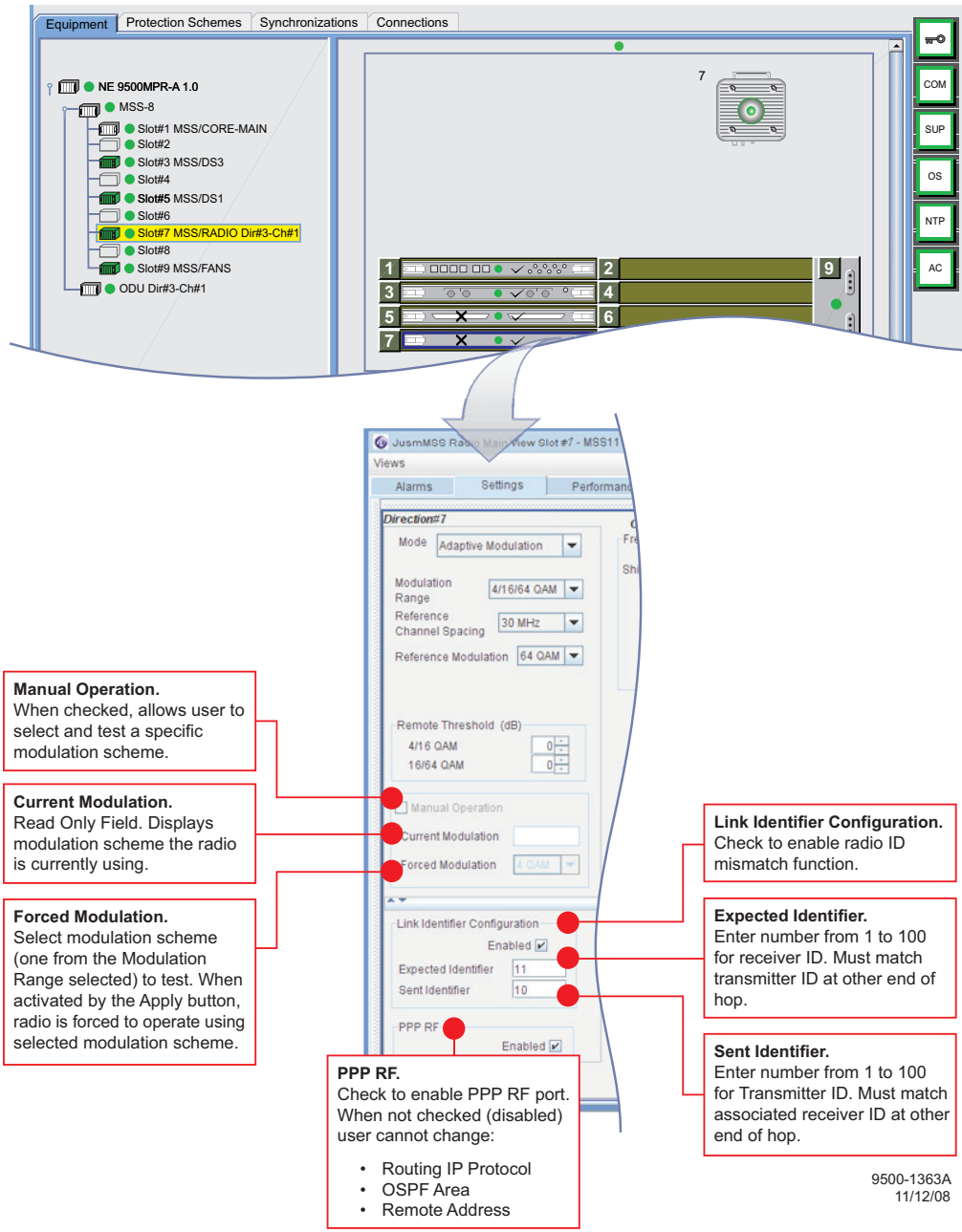

Figure 4-20 MD300 Module Provisioning, Adaptive Modulation Mode (Sheet 2 of 3)

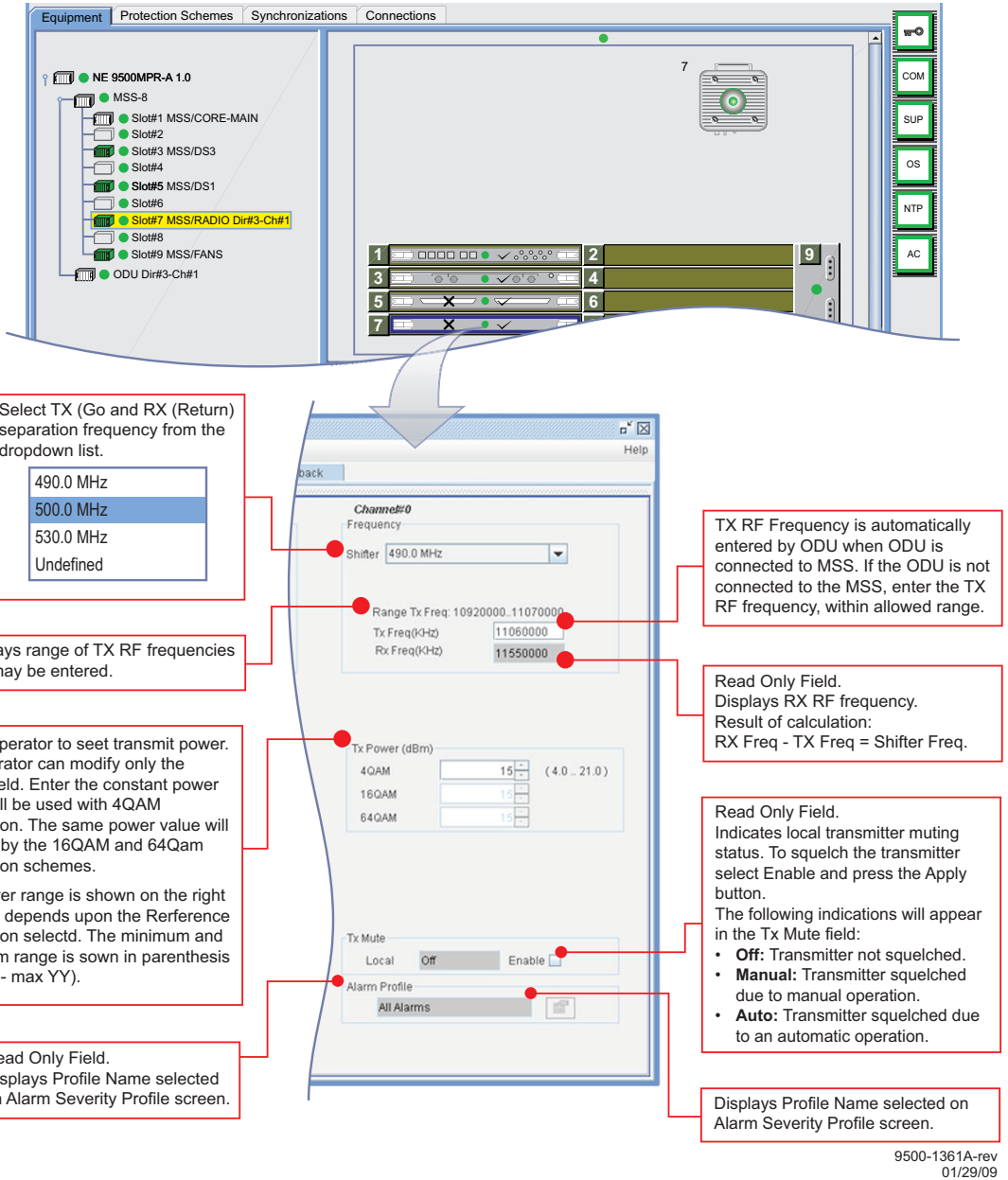

Figure 4-20 MD300 Module Provisioning, Adaptive Modulation Mode (Sheet 3 of 3)

4.7.3 Protection Scheme Provisioning

Protection functions that can be controlled via provisioning include:

- CSM (Slot#1-2 CORE)
- P32E1DS1/P2E3DS3 (Slot#5-6 P32E1DS1/P2E3DS3: 1+1 EPS)
- MD300 (Slot#7-8 MD300: 1+1 HSB)
  - Equipment Protection
  - HSB Protection
  - Rx Radio Protection
  - Synchronization Protection

4.7.3.1 CORE (Slot#1-2 CORE)

Core Peripherals Protection (EPS) - shown as Core Equipment Protection on CT screen. See Figure 4-21.

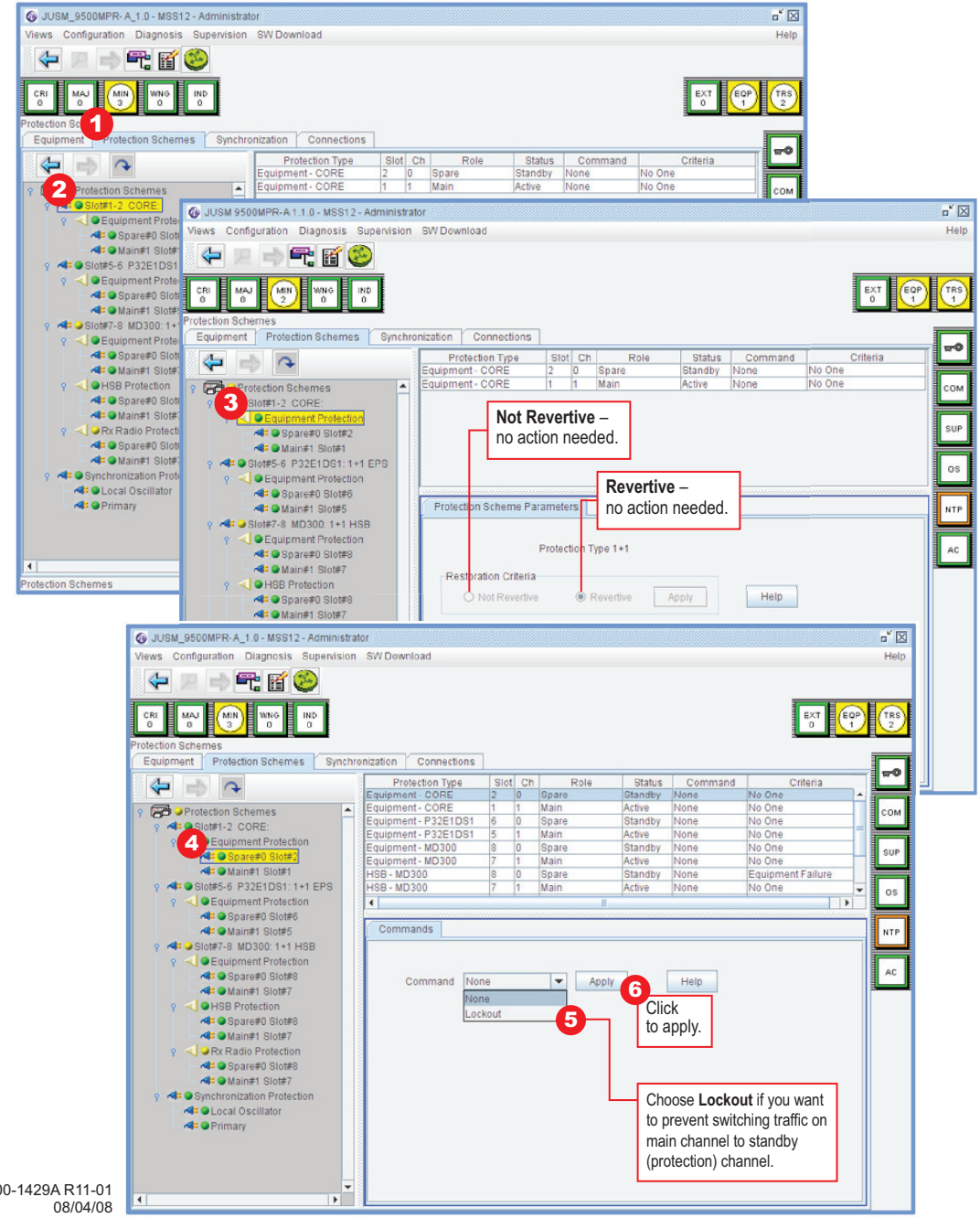

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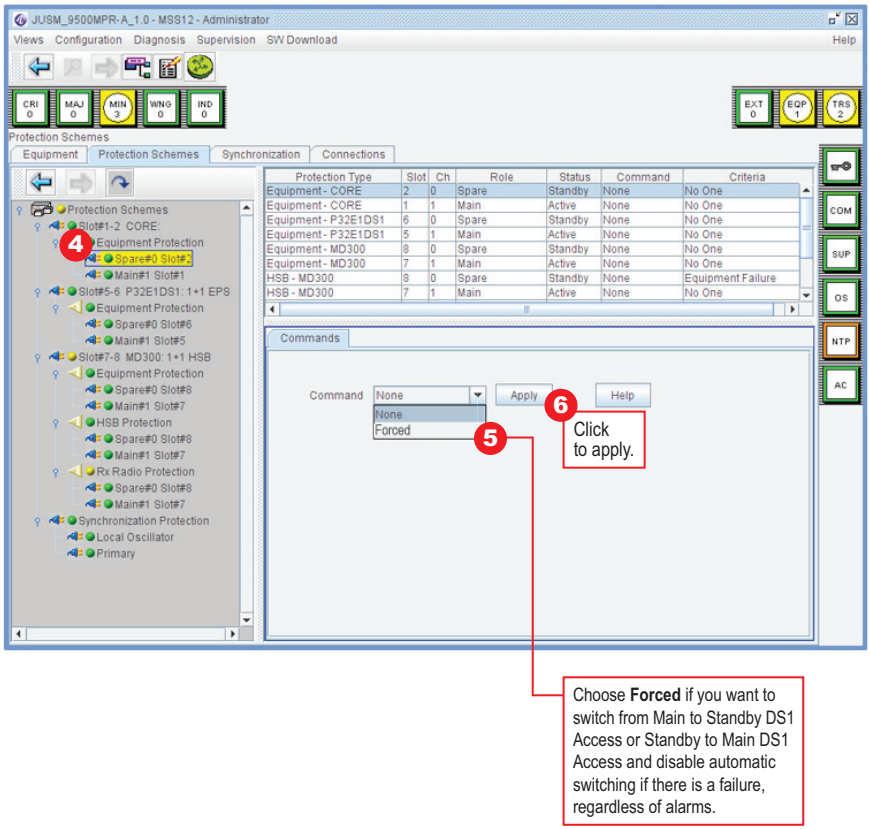
Figure 4-21 Core (CSM) Protection Provisioning (Sheet 1 of 2)



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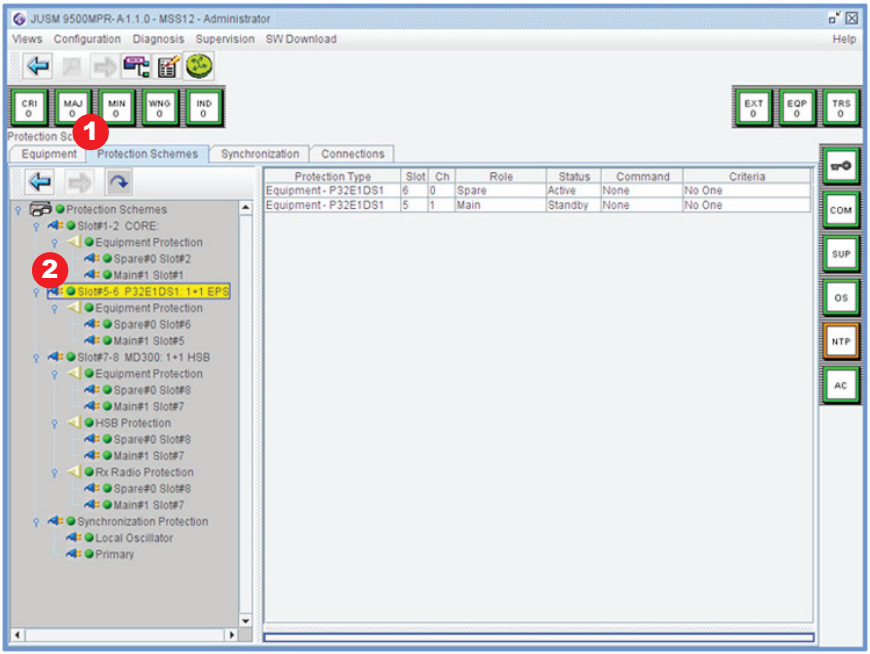
08/28/08

Figure 4-21 Core (CSM) Protection Provisioning (Sheet 2 of 2)

4.7.3.2 P32E1DS1/P2E3DS3 (Slot #5-6 P32E1DS1/P2E3DS3: 1+1 EPS)

Traffic Peripherals Protection (EPS) - PDH Local Access Peripherals Protection - shown as P32E1DS1: 1+1 EPS Equipment Protection or P2E3DS3: 1+1 EPS Equipment Protection on CT screen. See Figure 4-22. Only DS1 is shown.



Note

Only DS1 is shown.

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Figure 4-22 P32E1DS1/P2E3DS3 Protection Provisioning (Sheet 1 of 3)

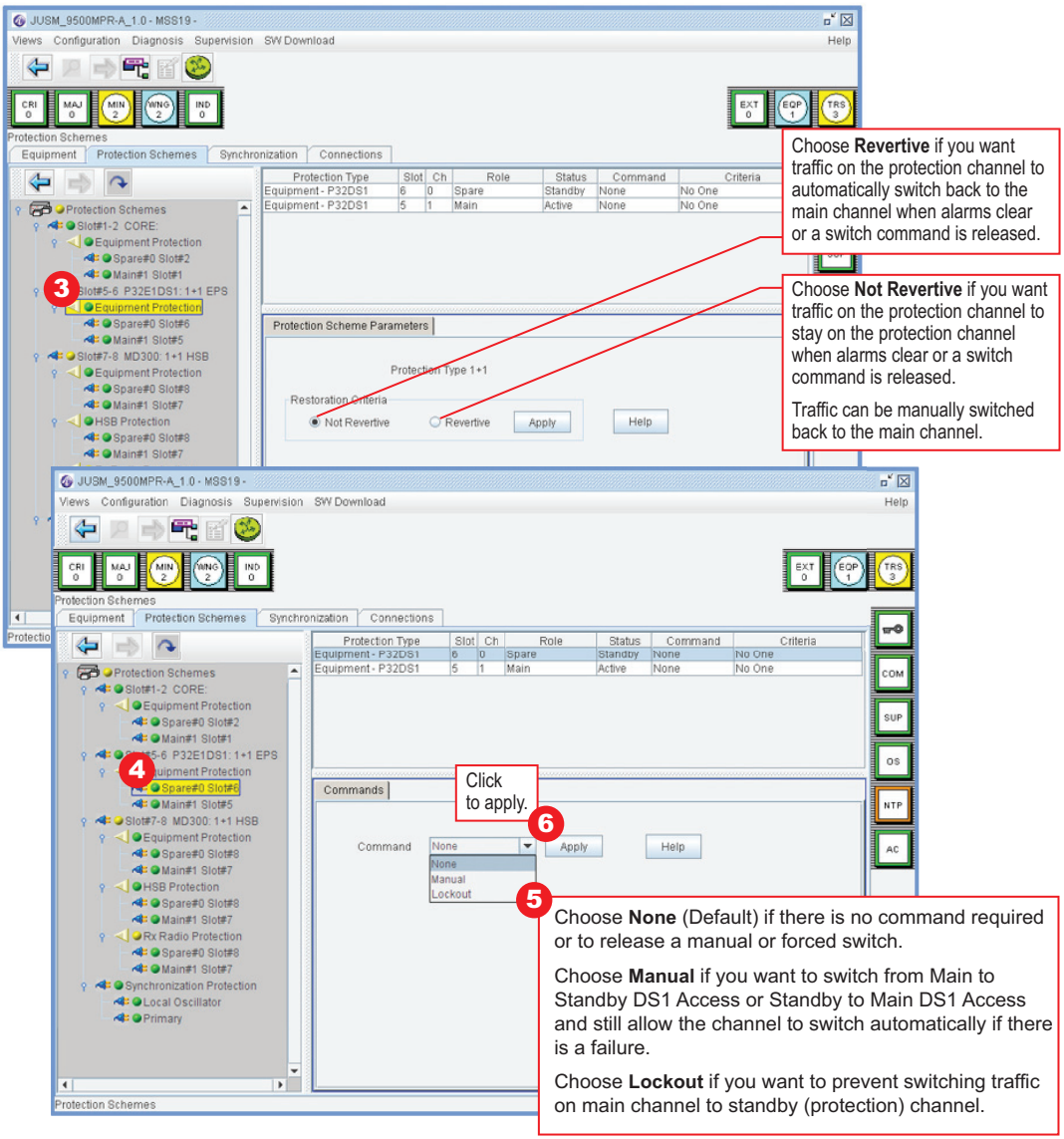

Figure 4-22 P32E1DS1/P2E3DS3 Protection Provisioning (Sheet 2 of 3)

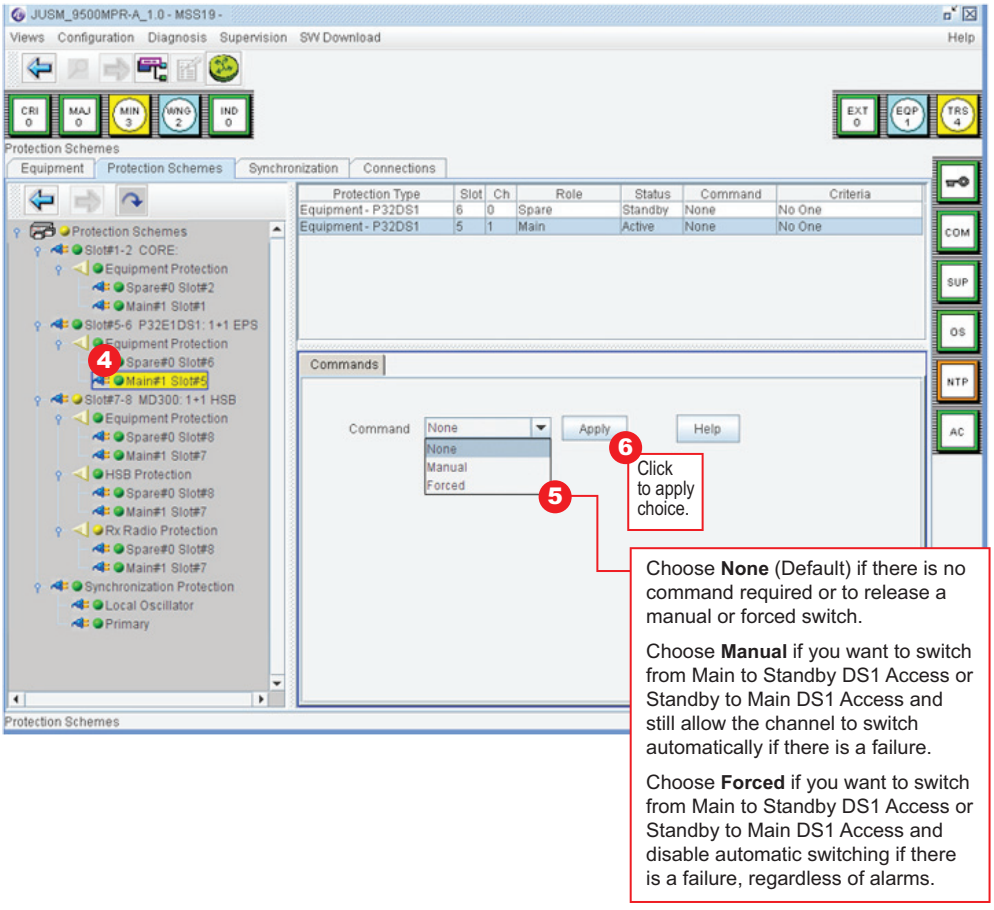

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Figure 4-22 P32E1DS1/P2E3DS3 Protection Provisioning (Sheet 3 of 3)

4.7.3.3 MD300 (Slot#7-8 MD300: 1+1 HSB) Equipment Protection

Radio Traffic Peripherals Protection - shown as MD300: 1+1 HSB Equipment Protection on CT screen. See Figure 4-23.

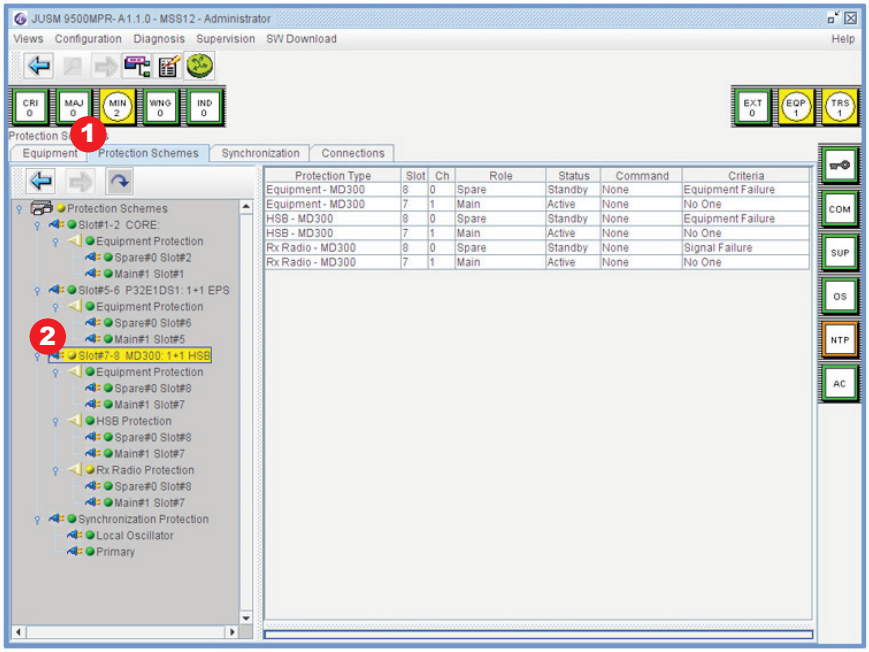

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Figure 4-23 MD300 Equipment Protection Provisioning (Sheet 1 of 3)

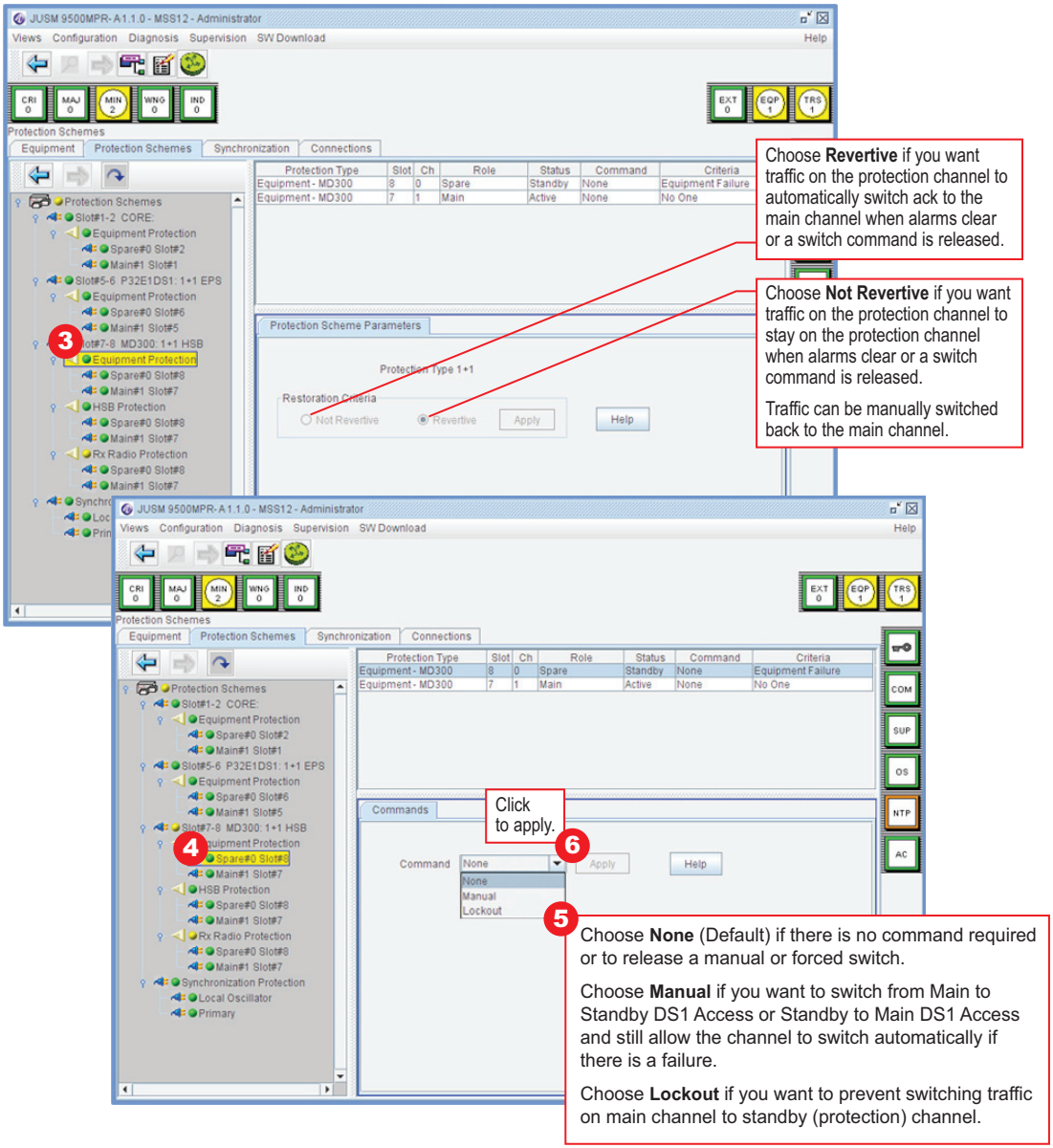

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Figure 4-23 MD300 Equipment Protection Provisioning (Sheet 2 of 3)

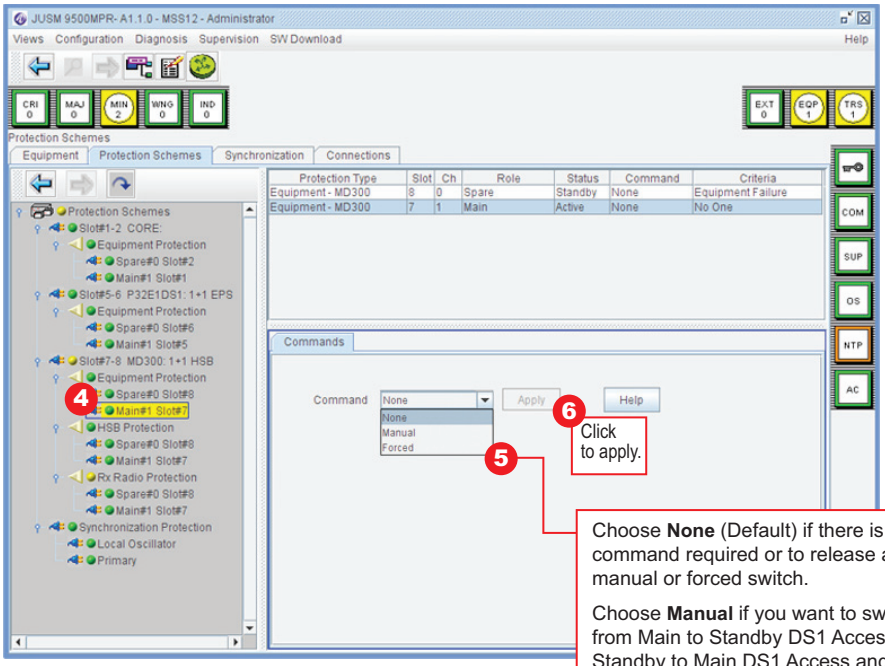

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Figure 4-23 MD300 Equipment Protection Provisioning (Sheet 3 of 3)

4.7.3.4 MD300 (Slot#7-8 MD300: 1+1 HSB) Equipment Protection

Hot Standby (HSB) Transmission Protection Switching (TPS) - shown as HSB Protection on CT screen. See Figure 4-24.

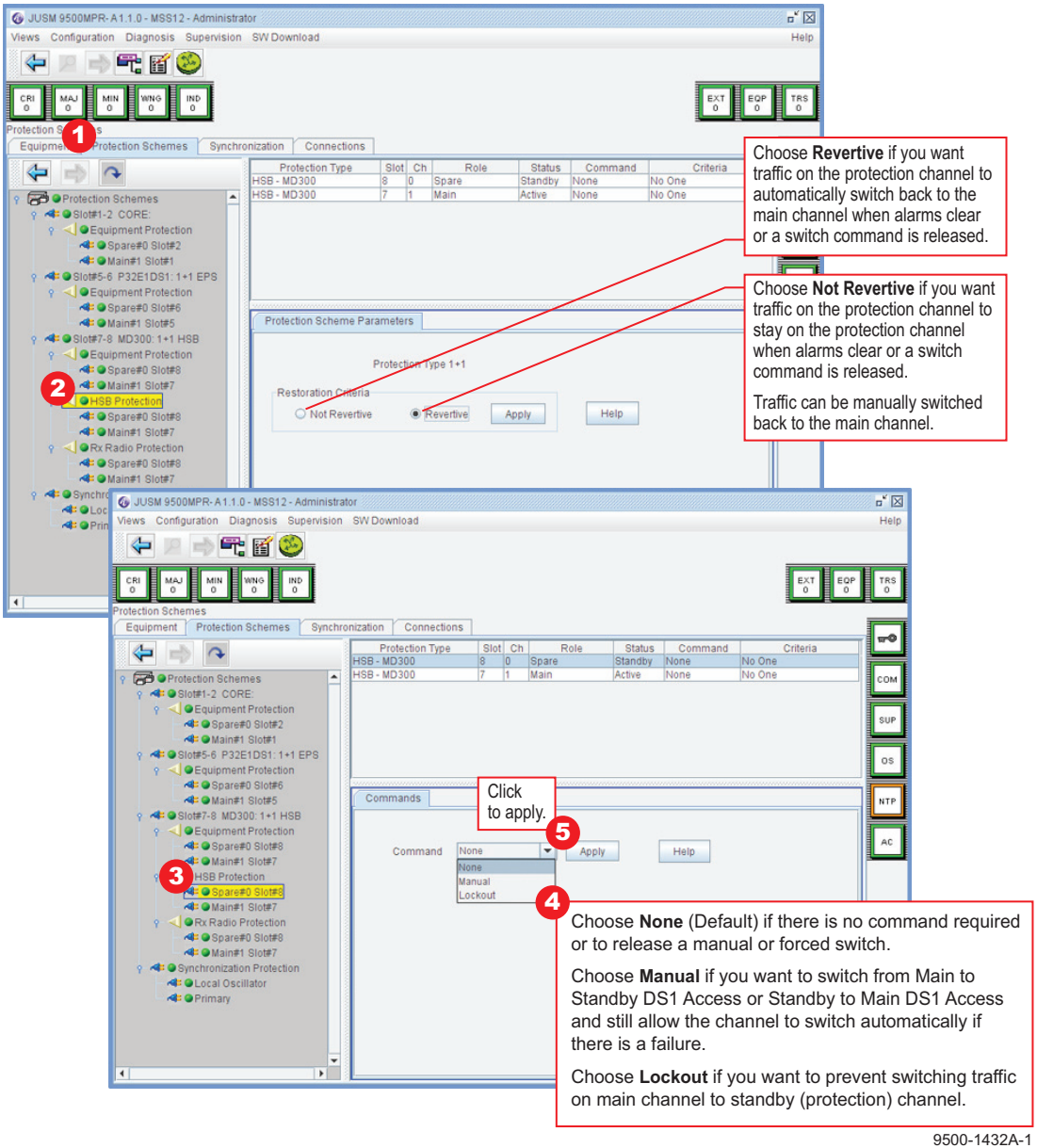
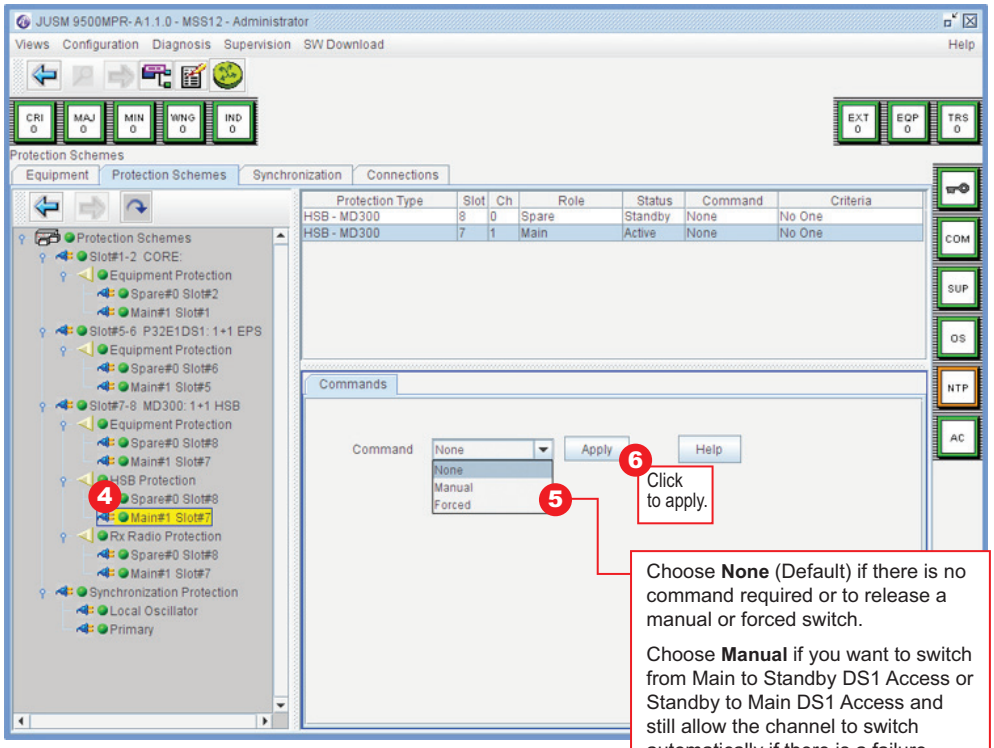


Figure 4-24 MD300 HSB Protection Provisioning (Sheet 1 of 2)



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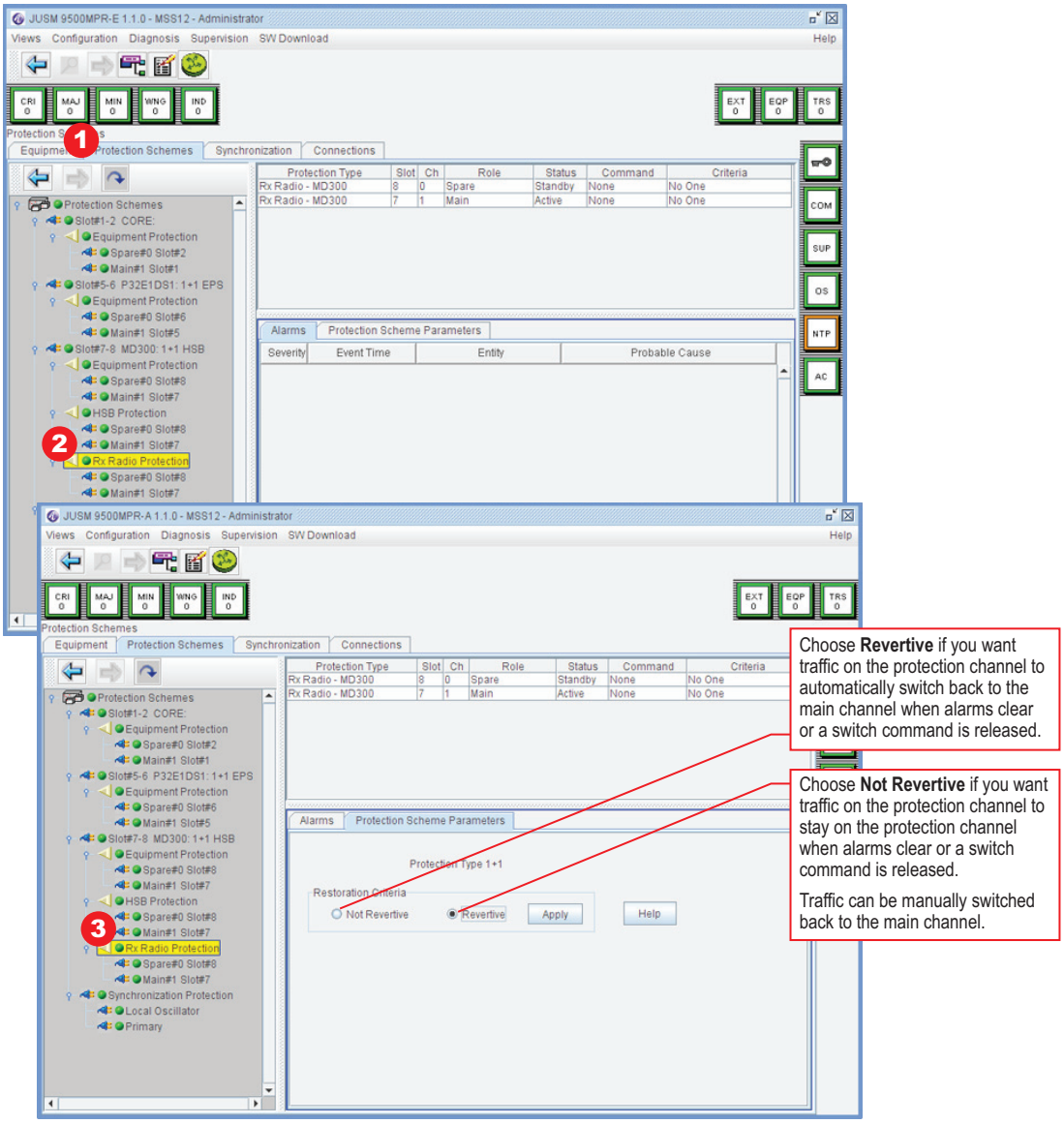
07/30/08

Figure 4-24 MD300 HSB Protection Provisioning (Sheet 2 of 2)

4.7.3.5 MD300 (Slot#7-8 MD300: 1+1 HSB) Rx Radio Protection

Rx Radio Protection Switching (RPS), Hot Standby and Diversity. See Figure 4-25.



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08/02/08

Figure 4-25 MD300 Rx Radio Protection Provisioning (Sheet 1 of 3)

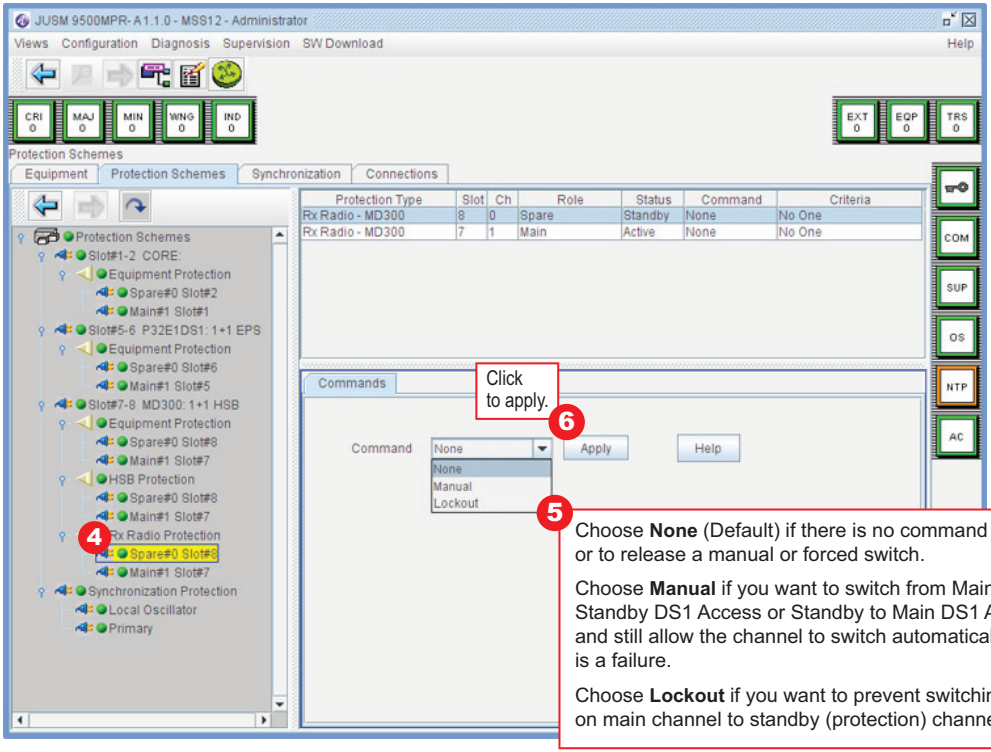

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Figure 4-25 MD300 Rx Radio Protection Provisioning (Sheet 2 of 3)

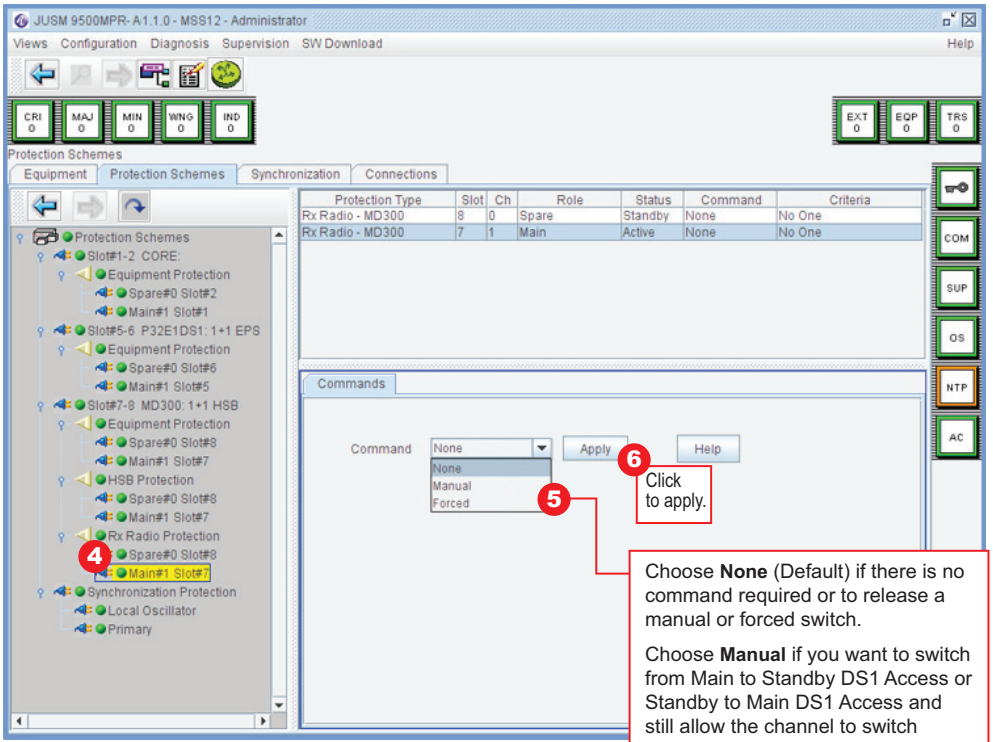

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Figure 4-25 MD300 Rx Radio Protection Provisioning (Sheet 3 of 3)

4.7.3.6 Synchronization Protection

Refer to paragraph 4.7.4.

4.7.4 Provision Synchronization

All 9500 MPR radios in the network must be synchronized to the same clock. One radio in the network is provisioned Master. All other radios in the network must be provisioned Slave. The slave radios all sync to the clock provided by the master.

4.7.4.1 Normal Operation

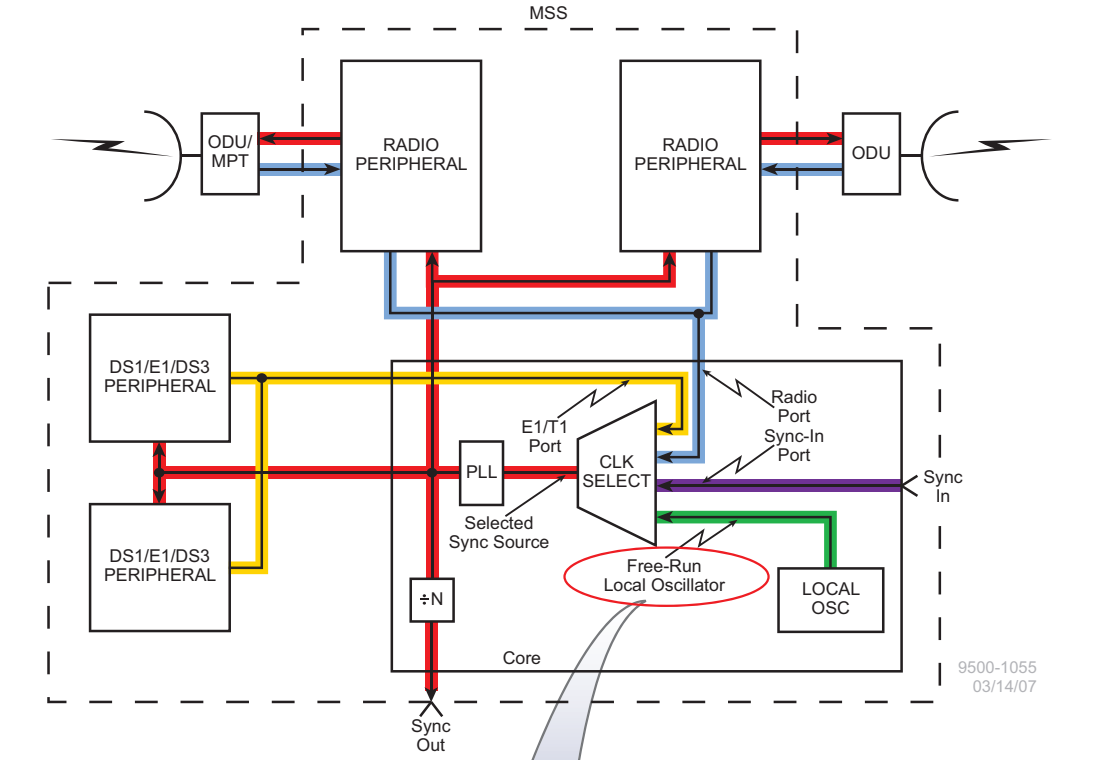
During normal operation, the master can be provisioned to get sync clock from two separate sources: an internal local oscillator (most common source) or external clock from customer provided equipment. The slave radios can be provisioned to receive the sync clock from one of two sources: clock recovered by the radio receiver or the sync clock from another radio in the network. Normally at a repeater, the sync clock is received over the RF path and recovered by the radio receiver. A typical slave terminal uses the clock from an adjacent radio. See Figure 4-26 for typical master terminal provisioning. See Figure 4-27 for typical slave terminal provisioning.

4.7.4.2 Failed Primary Operation

With the exception of the master when the radio is provisioned to sync off the local oscillator, the provisioned secondary sync source is enabled if the primary source fails. When the master, provisioned to accept sync clock at the core from an external source, fails, the internal free-running local oscillator is enabled. Provisioning choices for the secondary source for slave radios are dependent upon the choices made from the primary source.

4.7.4.3 Sync Switching

With the exception of the master when the radio is provisioned to sync off the local oscillator, the sync clock source is switched from primary to secondary if the primary source fails. Sync clock switching provisioning is dependent on the role of the radio in the network (master or slave) and on user preference. A revertive switching feature is a provisioning option that restores the sync clock to the original source when the alarm on the primary source is cleared. If revertive switching is not selected, the secondary sync source will continue to provide sync clock, and if the secondary source fails, must be manually switched to the primary source.



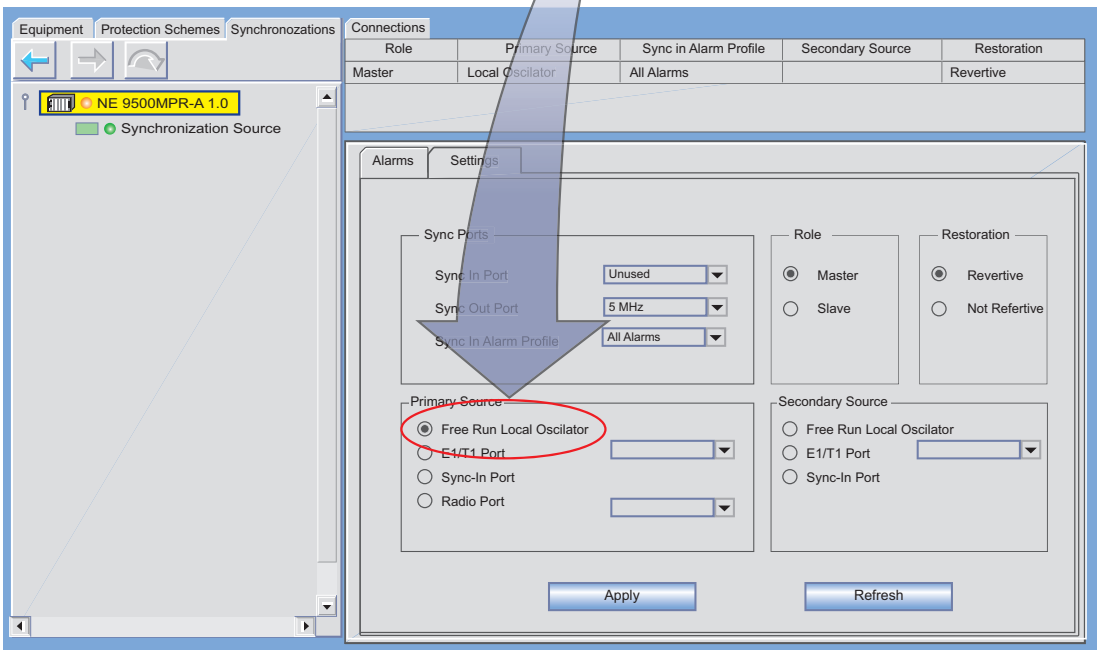
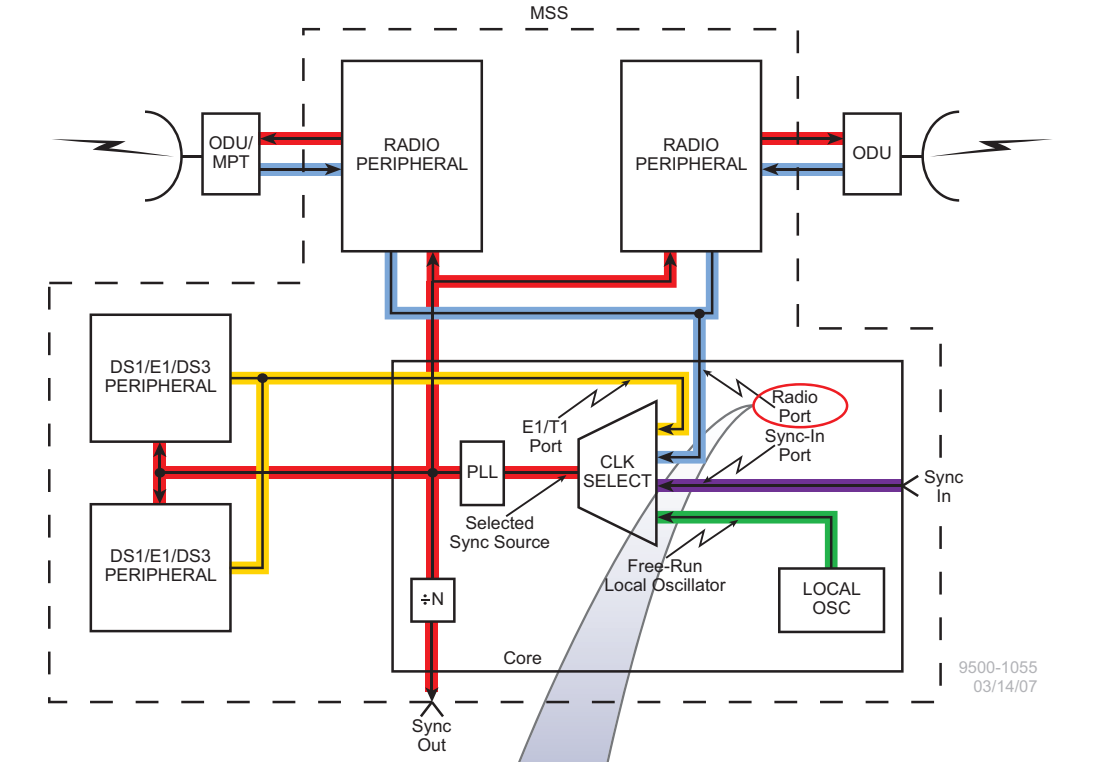


Figure 4-26 Provisioning Master With Free Run Local Oscillator as Primary Source



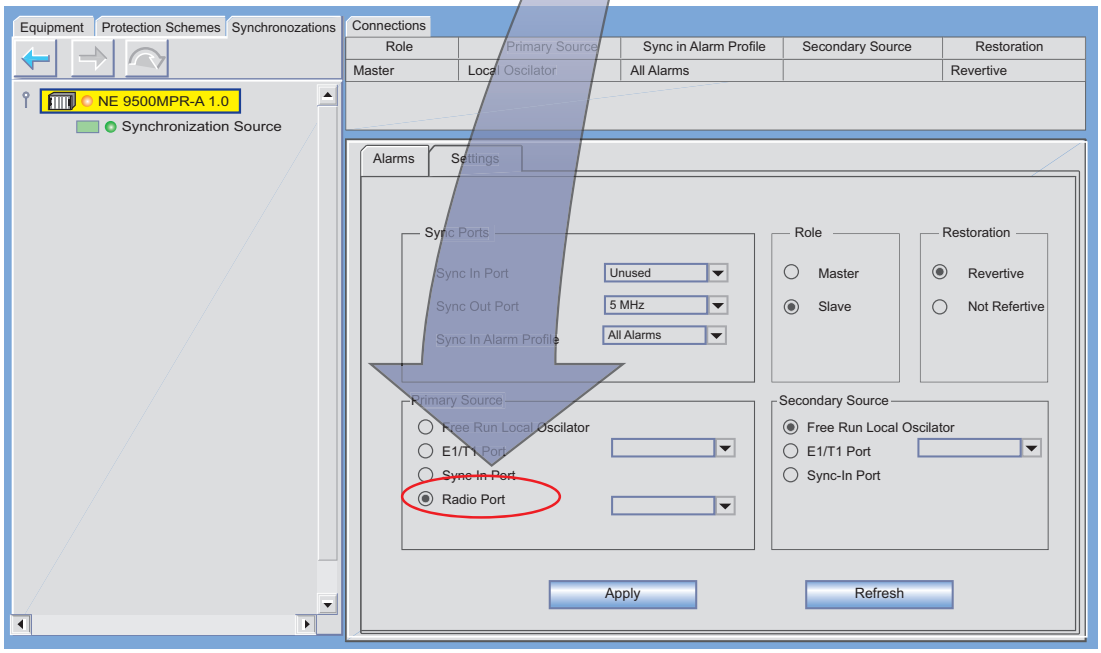


Figure 4-27 Provisioning Slave with Radio Port as Primary Source

4.7.5 Provision NE Time

Use the NE Time Configuration Screen to provision the operating system (PC/laptop) to manage time and date stamping functions. See Figure 4-28. NTP protocol is not currently available and is disabled.

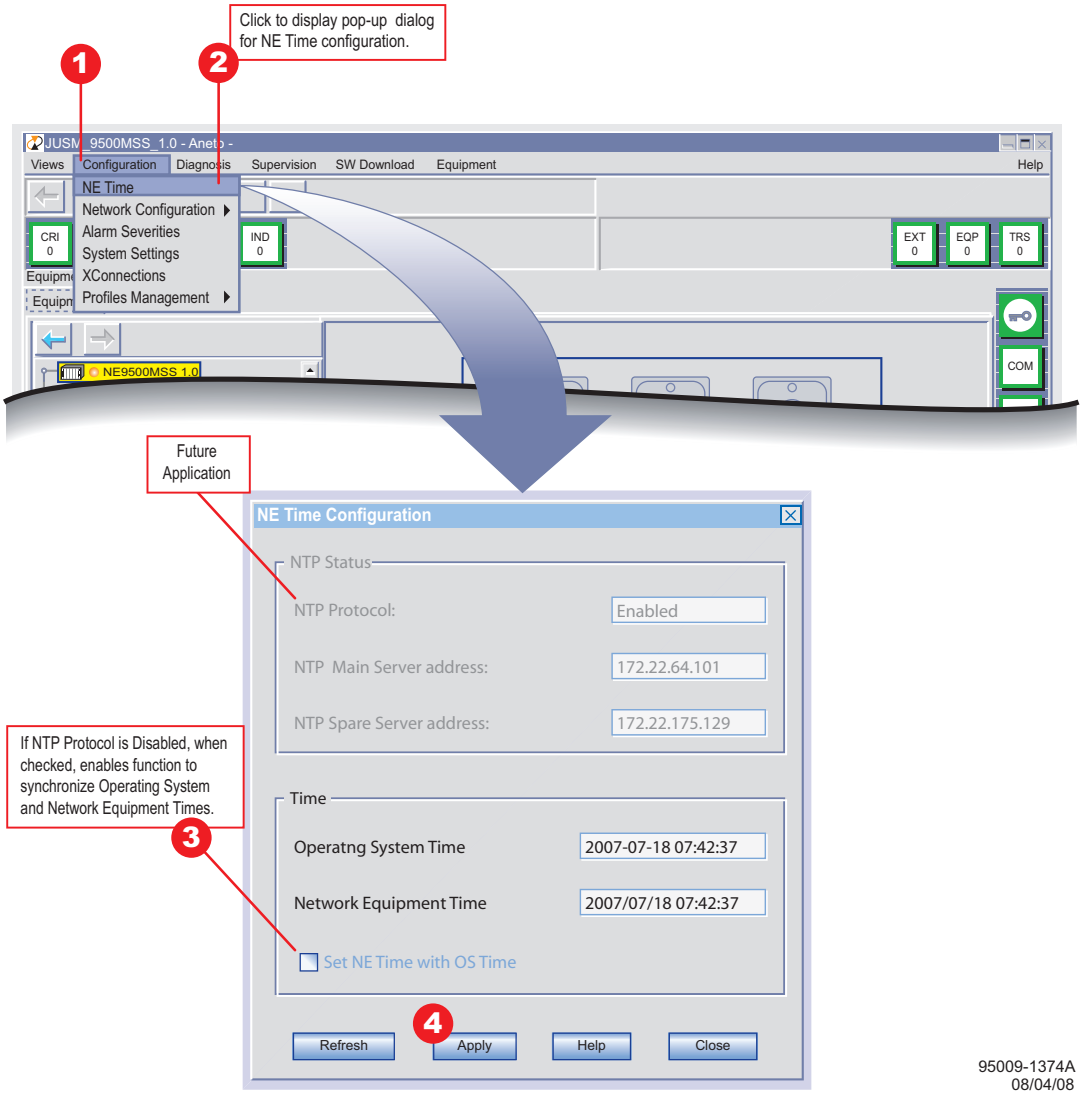


Figure 4-28 NE Time Provisioning

4.7.6 Cross Connections

Note

Cross connection is only required for TDM traffic. Generic Ethernet traffic is handled automatically via MAC Address learning in the Ethernet switch. Cross connections can also be used with point-to-point VLAN Ethernet traffic to direct traffic based on VLAN tag rather than MAC address.

The cross connections screen is used to configure switching of packetized data through the CSM (Control and Switching Module - Core) module. Using this screen, the operator can switch:

- DS1/DS3 (ports) lines from/to a P32E1DS1/P2E3DS3 (PDH DS1/DS3 icons) module to/from an MD300 (RADIO icons) module and/or any of four Ethernet (ETH icons) ports on the CSM module.
- Ethernet (ETH icons) data from/to an external source to/from an MD300 (RADIO icons) module and/or to/from a P32E1DS1/P2E3DS3 (PDH DS1/DS3 icons) module.

The screen allows the operator to select DS1/DS3 (PDH icons), Ethernet (ETH icons), and/or MD300 module (RADIO icons) ports as source and destination ports and provides a graphical presentation of the switch functions.

Valid Cross Connections:

- PDH to RADIO
  - PDH (P32E1DS1 module) to RADIO (MD300 module)
  - PDH (P2E3DS3 module) to RADIO
- PDH to ETH
  - PDH (P32E1DS1 module) to ETH (Ethernet)
  - PDH (P2E3DS3 module) to ETH (Ethernet)
- ETH to RADIO
- RADIO to RADIO

After a cross-connection has been created, two cross-connected slots are visually linked by a line: a line in the context of this application represents a bundle of flows, which share same source and destination entity. In addition, all 802.1Q tagged Ethernet traffic having the same VLAN ID as cross-connection Flow ID number will only be forwarded between these cross-connected slots.

Point to Point VLAN

The Point to Point (P2P) VLAN cross-connect feature allows the user to direct VLAN-tagged traffic between specified Ethernet and/or radio ports. Rather than directing all traffic to and from the cross-connected ports, the feature directs Ethernet traffic where the VLAN tag matches the cross-connect Flow ID.

– When making the connection for a P2P VLAN flow (Ethernet port to radio), the user should enter a MAC address of all O's (0000000000000000). P2P VLAN cross-connects will direct matching VLAN-tagged Ethernet traffic to the cross-connected ports regardless of the destination MAC address in the Ethernet frames.

– Ethernet traffic entering the cross-connected port with a VLAN tag matching the flow ID will be directed only to the port on the other end of the cross-connect. Traffic will not be flooded. This will also take precedence over any MAC address learning for VLAN-tagged traffic that matches the flow ID in the cross-connect.

– Ethernet traffic entering the cross-connected port with no VLAN tag or VLAN tags that do not match the flow ID specified in the cross-connect will flood to all ports until MAC address learning takes place. The P2P VLAN cross-connect will have no effect on this traffic.

– VLAN tagged Ethernet traffic that enters a port will be dropped if the VLAN tag matches the flow ID of a cross-connect that is on a different port.

4.7.6.1 Cross Connecting PDH (P32E1DS1/P2E3DS3 module) to RADIO (MD300 module)

See Figure 4-29. The following procedure applies to switching any or all DS1 ports 1 through 32 and/or DS3 ports 1 and 2 through the CSM module to the MD300 (RADIO) module.

Note

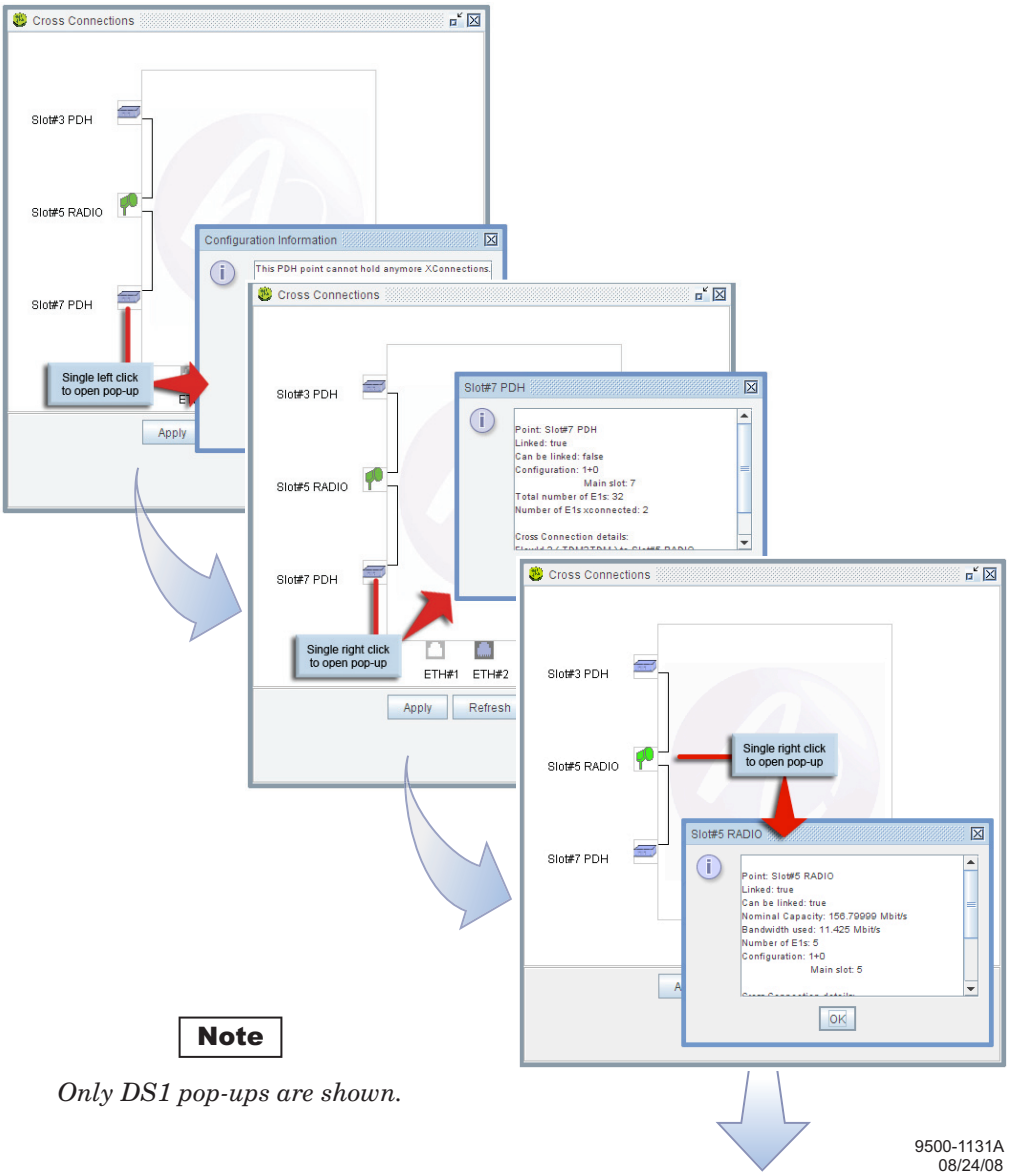
The license key installed on the CSM determines the Ethernet data capacity that can be cross connected.

Prerequisites:

- The P32E1DS1/P2E3DS3 module and MD300 module must be enabled on the respective CSM and MD300 module provisioning screens.
- The Service Profile on the P32E1DS1/P2E3DS3 module Settings screen must be set to TDM2ETH for each DS1/DS3 cross connected.
- Each DS1/DS3 line to be cross connected must have a Flow ID number assigned to it on the respective P32E1DS1/P2E3DS3 module Settings screen.

Procedure:

1. Drag mouse and draw line between PDH port and RADIO. PDH-RADIO pop-up displays.
2. On the PDH-RADIO pop-up, check box next to Flow ID number of all DS1/DS3 lines to be cross connected.
3. On the PDH-RADIO pop-up, click OK.
4. On the Cross Connections screen, click Apply.



Note

Only DS1 pop-ups are shown.

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Figure 4-29 PDH-to-Radio Crossconnect (Sheet 1 of 3)

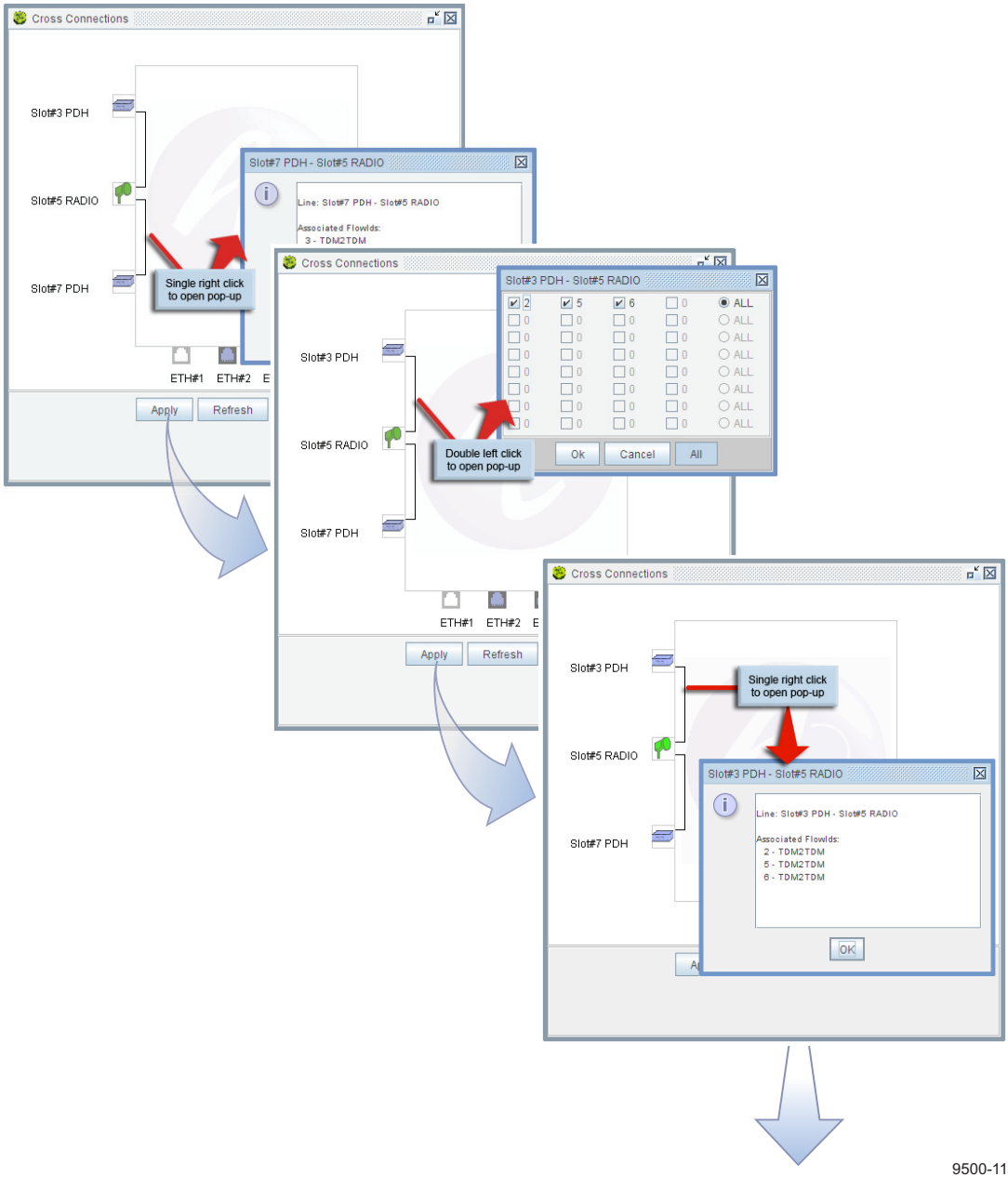

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Figure 4-29 PDH-to-Radio Crossconnect (Sheet 2 of 3)

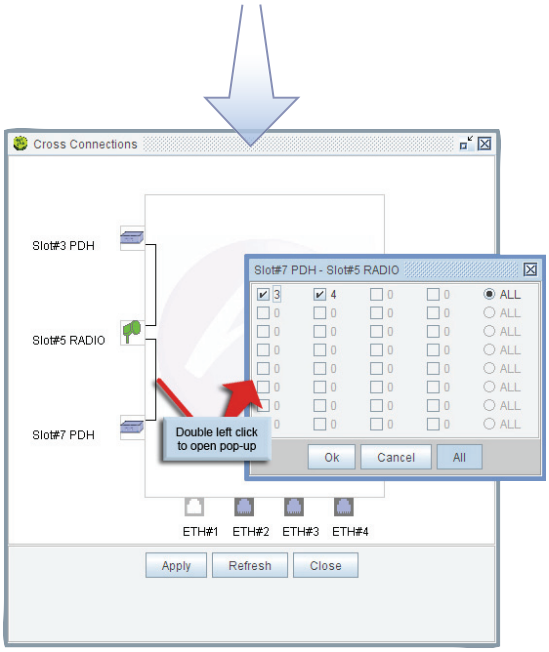

Figure 4-29 PDH-to-Radio Crossconnect (Sheet 3 of 3)

4.7.6.2 Cross Connecting PDH (P32E1DS1/P2E3DS3 module) to ETH (Ethernet)

See Figure 4-30. The following procedure applies to switching DS1 ports 1 through 32 and/or DS3 ports 1 and 2 through the CSM to Ethernet ports 1 through 4.

Note

The license key installed on the CSM determines the Ethernet data capacity that can be cross connected.

Prerequisites:

- The Ethernet port (source) and MD300 module (destination) must be enabled on the respective CSM and MD300 module provisioning screens.
- The Service Profile on the P32E1DS1/P2E3DS3 module Settings screen must be set to TDM2ETH for each DS1/DS3 cross connected.

Procedure:

1. Drag mouse and draw line between ETH port and PDH. PDH-ETH pop-up displays.
2. Select Flow ID of DS1/DS3 line to be cross connected from Flow ID drop-down list on the pop-up.
3. The destination MAC Address of the MEF-8 Interworking Function (IWF) device where the DS1 /DS3 flow will be terminated must be entered in the MAC Address field on the pop-up.

Note

When cross connecting multiple lines, the original line drawn between the two ports remains in place. The new line is drawn over the top of the original line.

4. Repeat steps 1, 2, and 3 as many times as necessary to cross connect up to 32 DS1 lines and/or twice to cross connect 2 DS3 lines.
5. On the PDH-ETH pop-up, click **OK**.
6. On the Cross Connections screen, click **Apply**.

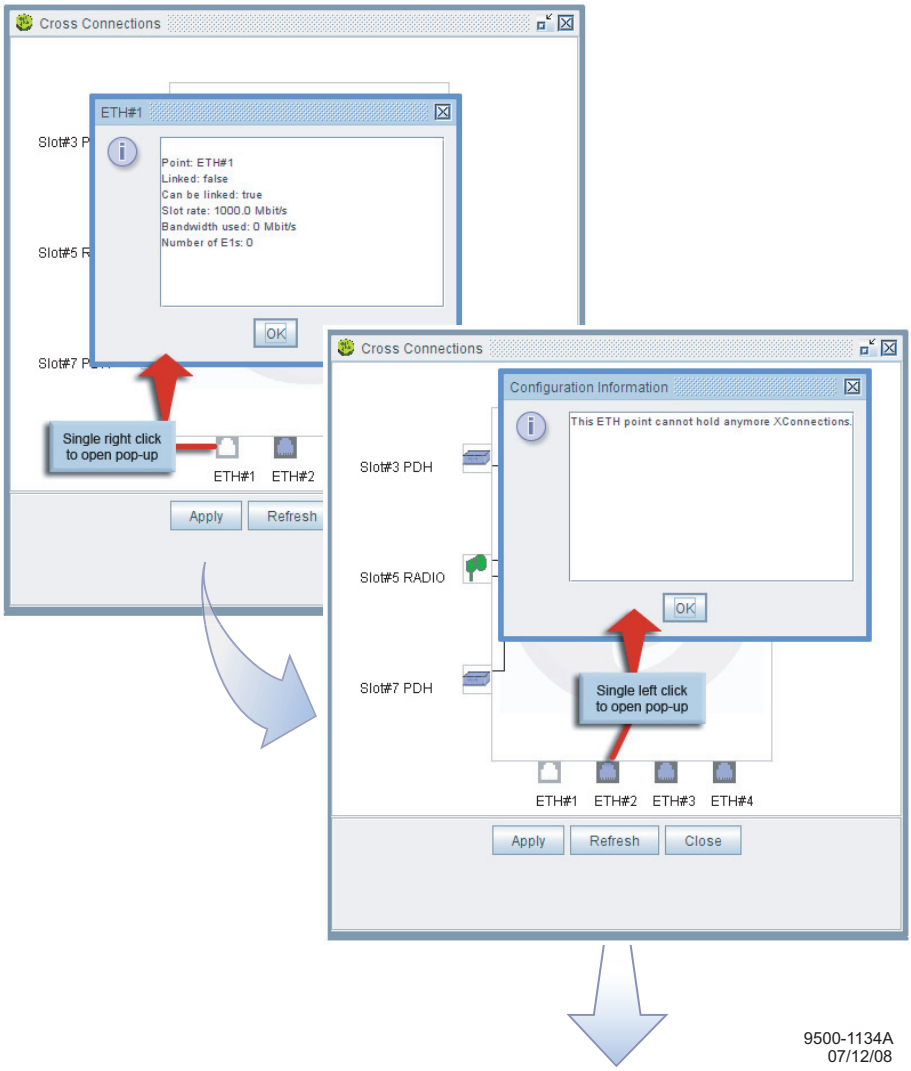

Figure 4-30 PDH-To-ETH Crossconnect (Sheet 1 of 2)

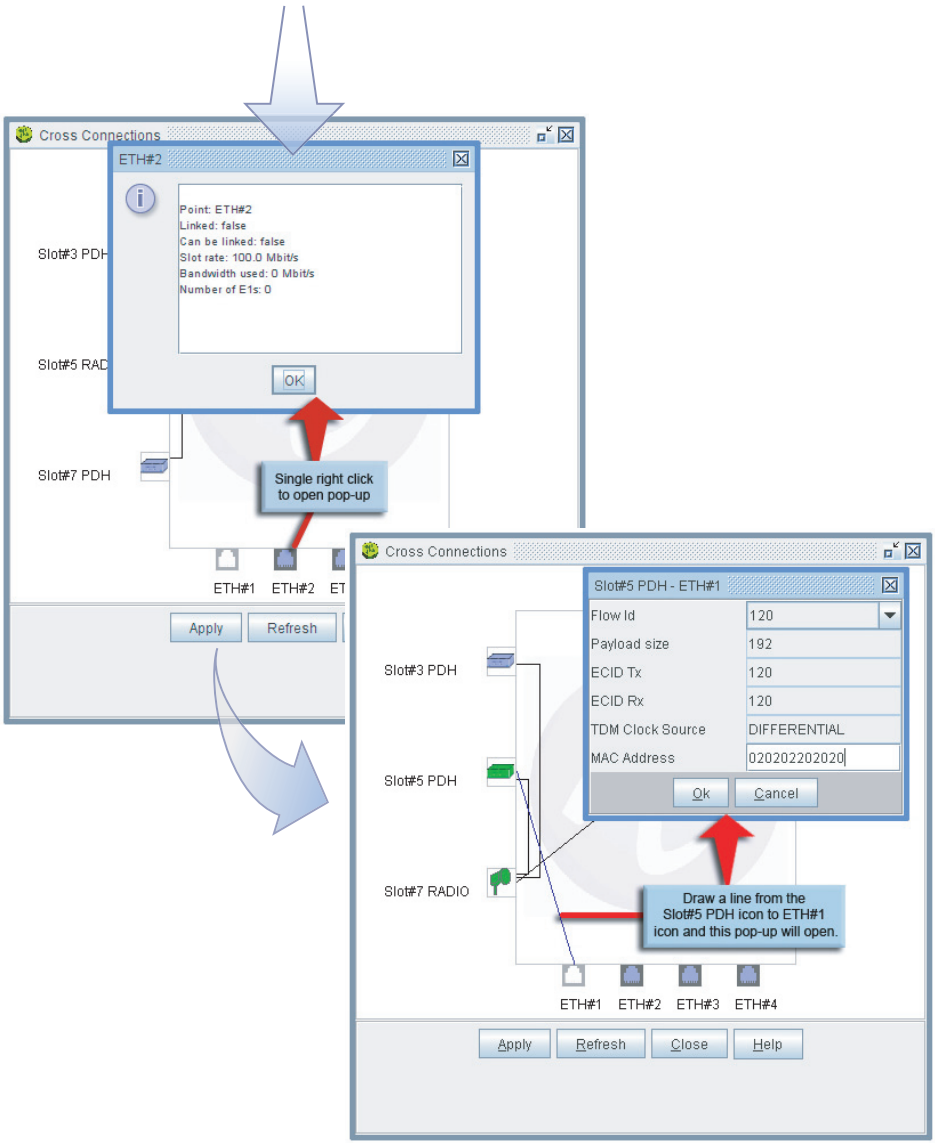

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Figure 4-30 PDH-To-ETH Crossconnect (Sheet 2 of 2)

4.7.6.3 Cross Connecting ETH (Ethernet) to RADIO (MD300)

The following procedure applies to switching Ethernet ports 1 through 4 on the CSM to the MD300 module. See Figure 4-31.

Prerequisites:

- The Ethernet port (source) and MD300 module (destination) must be enabled on the respective CSM and MD300 module provisioning screens.
- The Service Profile on the P32E1DS1/P2E3DS3 module Settings screen must be set to TDM2ETH for each DS1/DS3 cross connected.

Procedure:

1. Drag mouse and draw line between ETH port and RADIO. RADIO-ETH pop-up displays.
2. Enter Flow ID of DS1/DS3 line to be cross connected in Flow ID field on the pop-up.
3. The destination MAC Address of the MEF-8 Interworking Function (IWF) device where the DS1 /DS3 flow will be terminated must be entered in the MAC Address field on the pop-up.

Note

When cross connecting multiple lines, the original line drawn between the two ports remains in place. The new line is drawn over the top of the original line.

4. Repeat steps 1, 2, and 3 as many times as necessary to cross connect up to 32 DS1 lines and/or twice to cross connect 2 DS3 lines.
5. On the RADIO-ETH pop-up, click **OK**.
6. On the Cross Connections screen, click **Apply**.

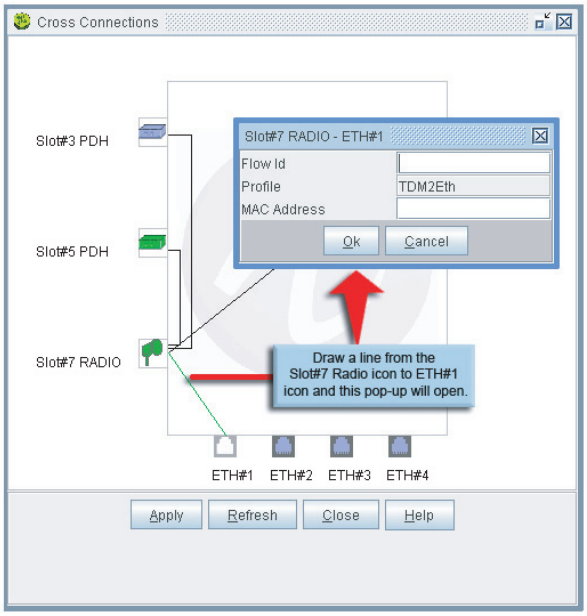

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Figure 4-31 ETH-To-Radio Cross Connect

4.7.6.4 Cross Connecting RADIO (MD300 module) to RADIO (MD300 module)

The following procedure applies to switching data between two radios, such as a repeater. See Figure 4-32.

Prerequisites:

- Both MD300 modules must be enabled on the respective MD300 module provisioning screens.

Note

When making a cross connection between two radio modules, use the TDM2TDM service profile if the termination points of the circuit are configured TDM2TDM.

Use the TDM2ETH service profile if the termination points of the circuit are configured TDM2ETH.

Use the TDM2ETH service profile when making the point-to-point VLAN connection.

- The Service Profile on the P32E1DS1/P2E3DS3 module settings screen must be set for each DS1/DS3 cross connected.

Procedure:

1. Drag mouse and draw line between radios. RADIO-RADIO pop-up displays.
2. Enter Flow ID of DS1/DS3 line to be cross connected in Flow ID field on the pop-up.

Note

When cross connecting multiple lines, the original line drawn between the two ports remains in place. The new line is drawn over the top of the original line.

3. Repeat steps 1 and 2 as many times as necessary to cross connect up to 32 DS1 lines and/or twice to cross connect 2 DS3 lines.
4. On the RADIO-RADIO pop-up, click **OK**.
5. On the Cross Connections screen, click **Apply**.

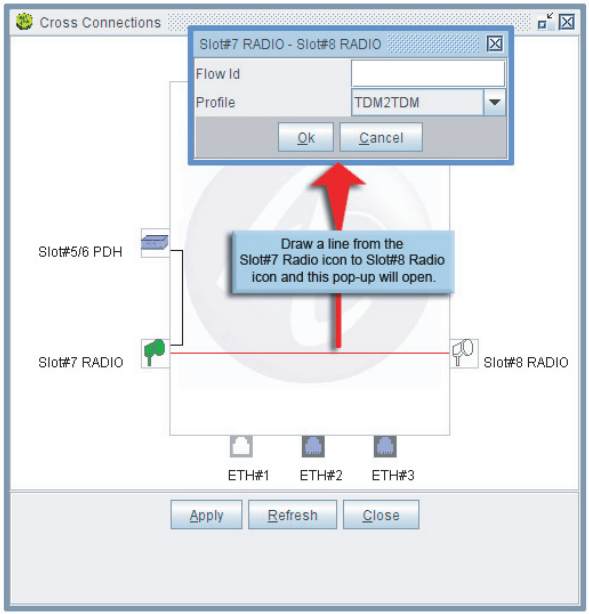

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Figure 4-32 Radio-To-Radio Cross Connect

4.7.7 Provision System

See Figure 4-33. Follow the steps to provision tributary port impedance, quality of service classification, and enter NE MAC address.

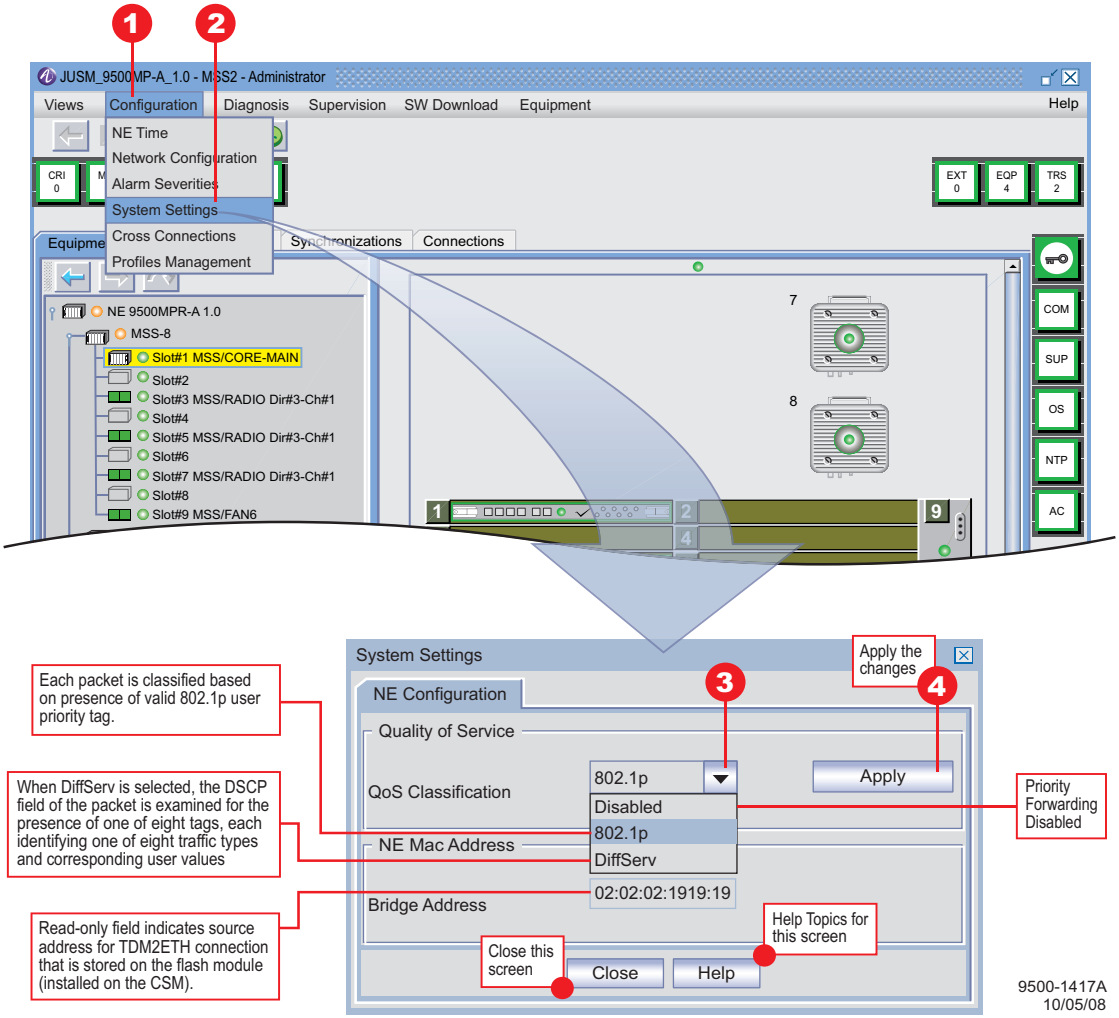

Figure 4-33 System Setting

4.7.8 Provision IP Static Routing

See Figure 4-34. Follow the steps to provision manual routing.

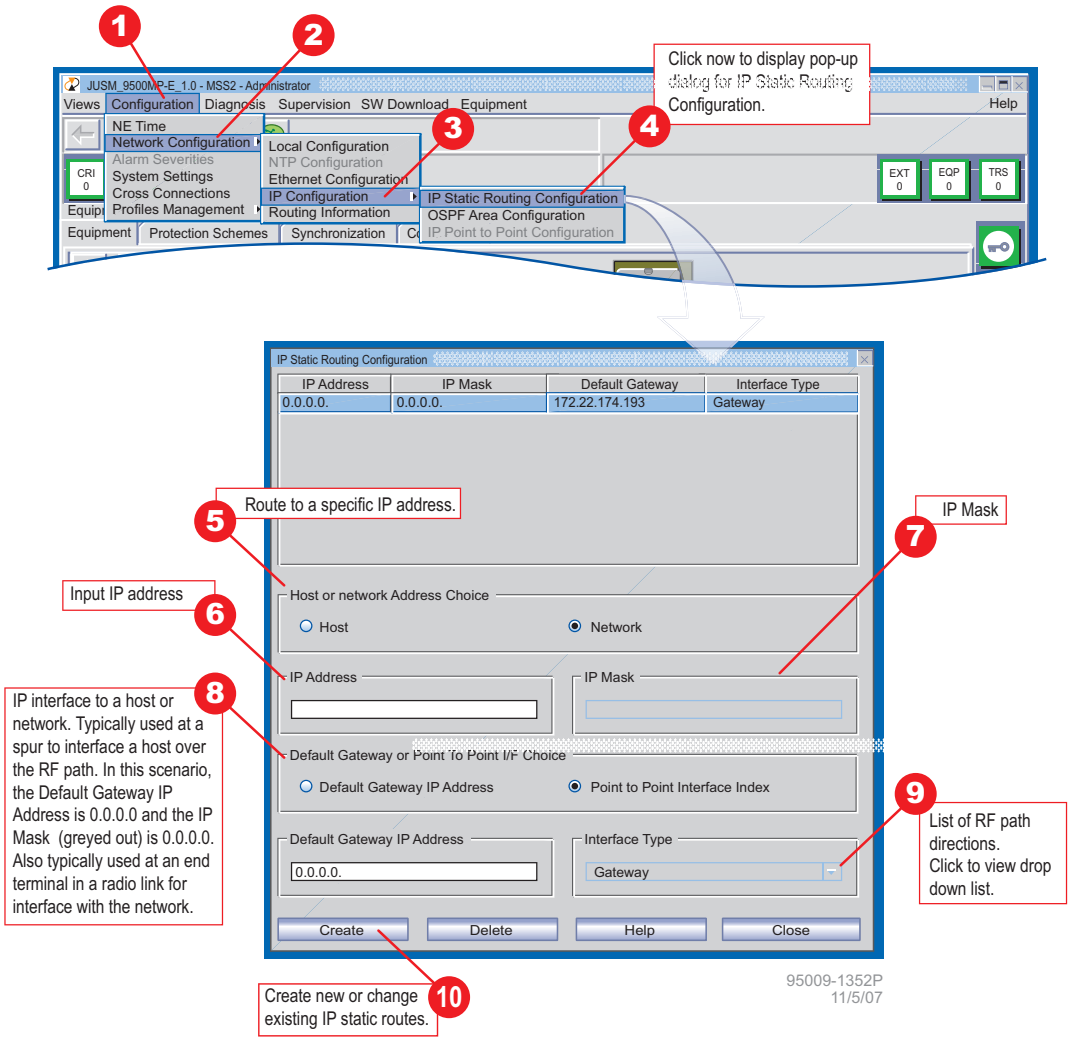

Figure 4-34 IP Static Routing Provisioning

4.7.9 Provision OSPF Static Routing

See Figure 4-35. Follow the steps to provision Open Shortest Path First (OSPF) protocol (automatic) routing.

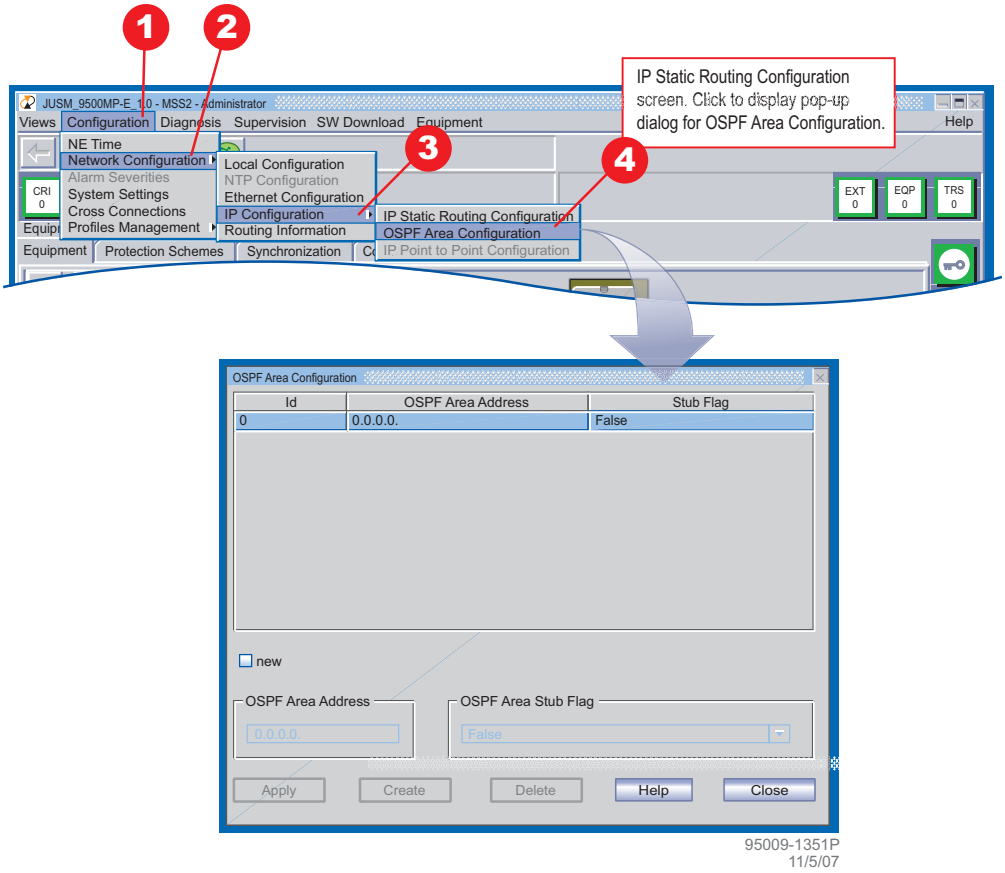

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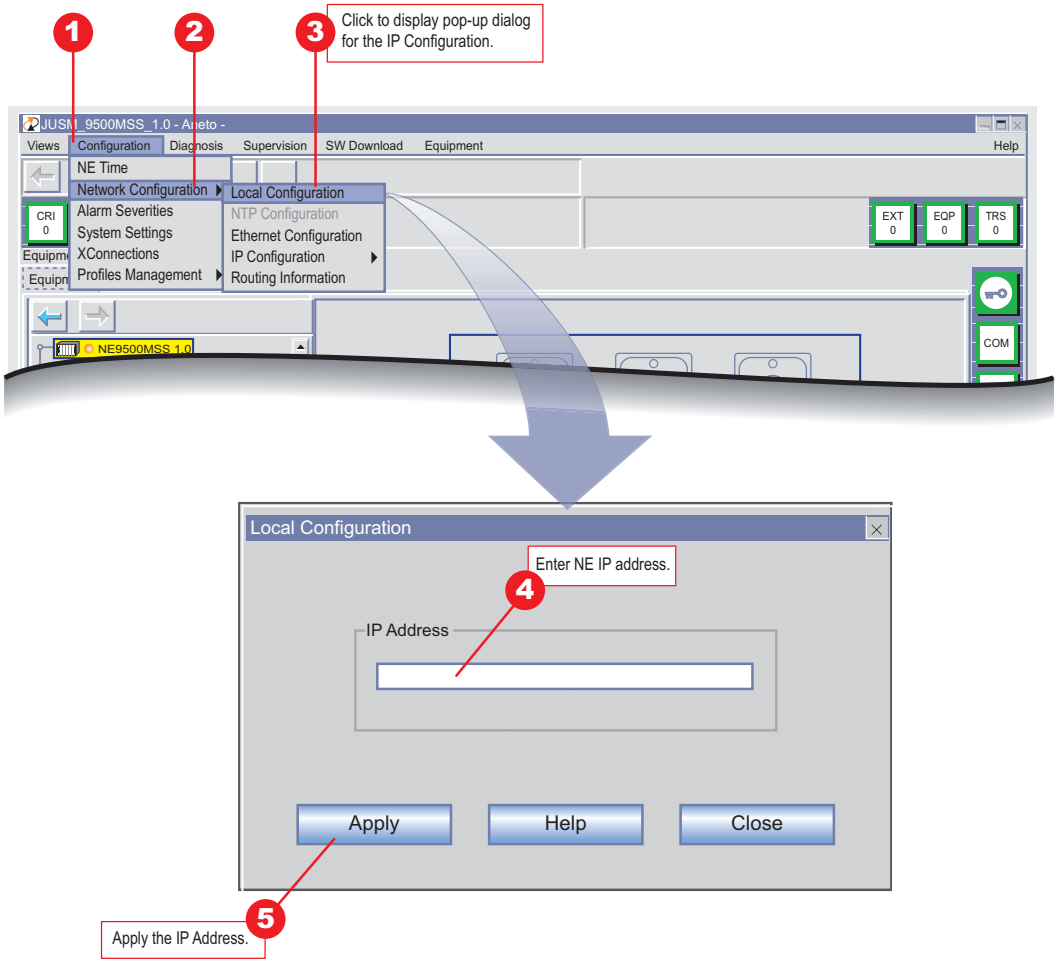
Figure 4-35 OSPF Static Routing Provisioning

4.7.10 Provision Local NE IP Address

See Figure 4-36. Follow the steps to enter the NE IP address, allowing the network to communicate with the NE.



Note

After IP address change, the NE restarts.

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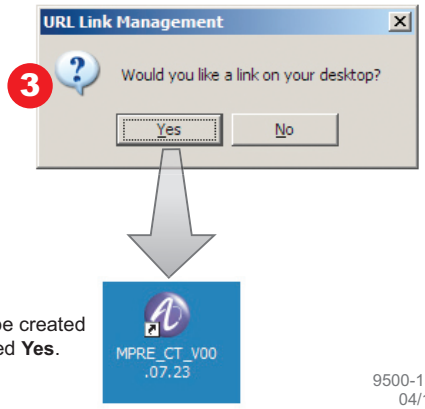
Figure 4-36 Local Configuration Provisioning



An icon similar to this one will be created on the desktop if the user clicked **Yes**.

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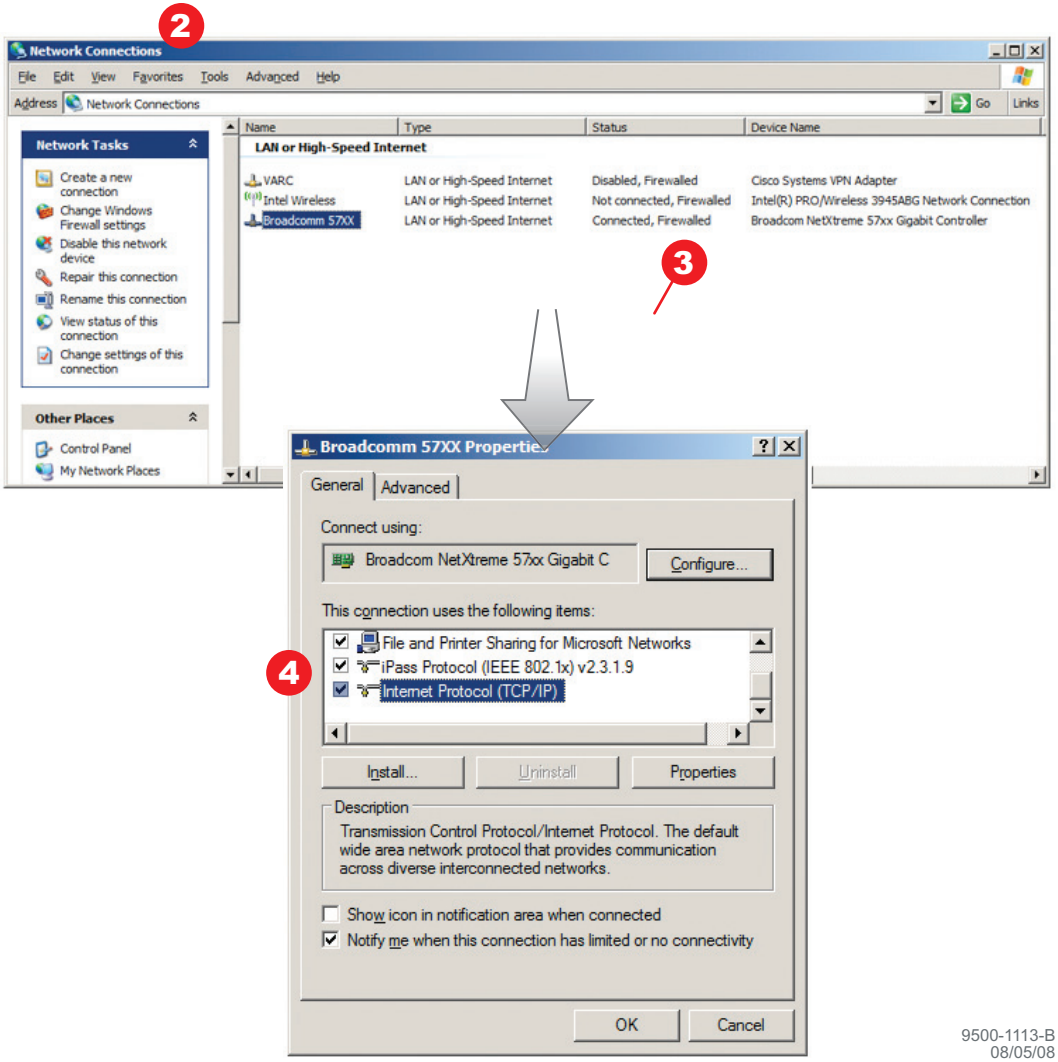
4.7.11 Re-configure PC Network Card

This example uses a Microsoft Windows XP Professional system.

1. Click on the **START** menu on the Windows desktop and open the **CONTROL PANEL**.
2. Open **NETWORK CONNECTIONS**. Highlight the network card as shown below.
3. Right click and select **Properties** to display the Properties screen.
4. Scroll down the list to highlight the **Internet Protocol (TCP/IP)** line. Click **OK**.



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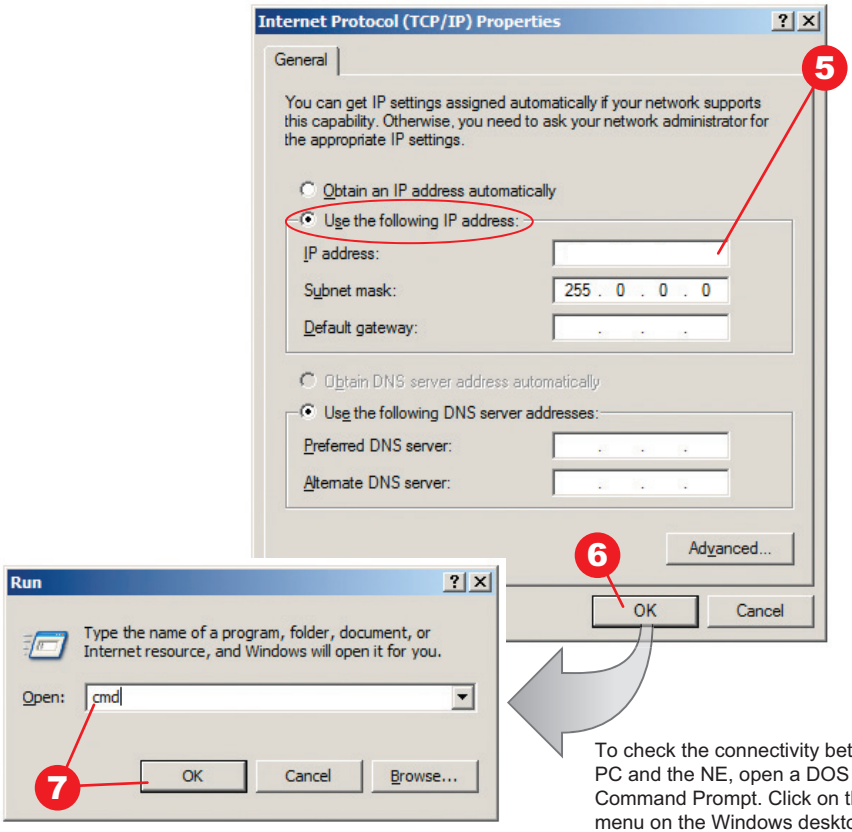
5. Click the selection for Using the following IP address. Enter the IP address recorded in paragraph 4.5.5, Step 6. Click **OK**.
6. To check the connectivity between the PC and the NE, open a DOS window or Command Prompt. Click on the **START** menu on the Windows desktop and open the **RUN** window as shown below.
7. Type **cmd** and click **OK** to open a DOS window.



To check the connectivity between the PC and the NE, open a DOS window or Command Prompt. Click on the **START** menu on the Windows desktop and open the **RUN** window as shown below.

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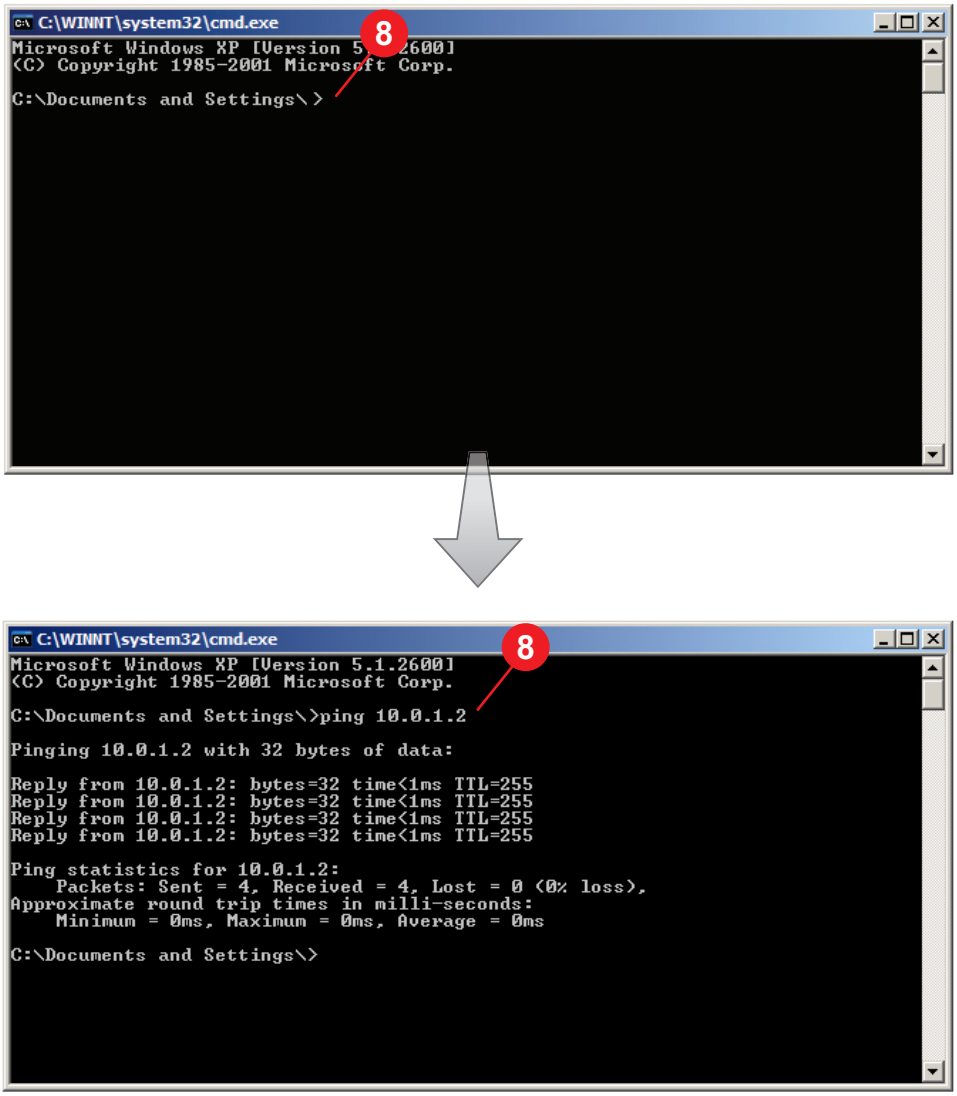
The DOS window will display.

8. In the DOS window, place the cursor after the > and type **ping (IP address)** to verify a connection between the PC and the NE. The Ping statistics for the IP address should display packets sent and packets received.



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Note

The information contained in this section is a summary of the on the enclosed CD. "Refer to CD" *is used throughout this section to refer the reader to the detail information on the CD.*

5 MAINTENANCE

5.1 INTRODUCTION

This section contains information and procedures to aid in restoring the equipment to its proper operating condition after it has been determined that a problem exists.

The following warnings and cautions apply while operating, performance testing, troubleshooting, or repairing the 9500 MPR series radios.

Short circuits in low-voltage, low-impedance dc circuits can cause severe arcing that may result in burns or eye injury. Remove rings, watches, and other metal jewelry while working with primary circuits. Exercise caution to avoid shorting power input terminals.

Units with the electrostatic-sensitive (ESS) symbol contain ESS devices. Store these units in an antistatic container when not in use, and anyone handling a unit should observe antistatic precautions. Refer to the Special Precautions pages in the front of the instruction book for detailed handling information.

Note

Ensure that all antennas are properly aligned and waveguide is in good physical condition.

Note

Before performing procedures that might in any way affect transmission, it is recommended that the person performing the procedure understand the FCC Rules and Regulations pertaining to the equipment and be properly authorized to operate the equipment.

5.2 MAINTENANCE PHILOSOPHY

This section provides information and procedures for equipment maintenance down to the Card level. Card repair is not covered in this manual.

The use of maintenance procedures in this section may result from failure of a periodic check, an alarm indication, or unacceptable performance.

5.3 PERSONAL COMPUTER (PC)/LAPTOP

Connect the RJ 45 Interface cable between Craft Terminal connector on the Control & Switching Module (CSM) and the PC.

5.4 TROUBLESHOOTING

This section provides guidance on:

- Before Going to Site Checklist
- Troubleshooting Basics
- Troubleshooting Path Problems
- Troubleshooting Configuration Problems
- Troubleshooting Ethernet Problems
- Troubleshooting TMN Problems

5.4.1 Before Going to Site Checklist

Where possible, before going to site obtain the following information:

- Does the fault require immediate attention?
- Determine who is the best-placed person to attend the fault.
- Confirm the nature and severity of the reported fault, its location, 9500 MPR type, frequency band, high/low end ODU, capacity modulation and configuration (nonprotected, protected, diversity). Ask:
    - Is just one 9500 MPR link affected, or a number of links in the same geographical area?
    - Is the path down completely or is traffic passing but with a BER alarm?
    - Is only one or a number of tributaries affected?
    - Could the fault be in the equipment connected to 9500 MPR, rather than in 9500 MPR? Are there alarms on other, connected equipment?
    - Is it a hard or intermittent fault?
    - Do alarms *confirm* which end of an alarmed link is faulty?
- Could the weather (rain, ice, high wind, temperature) be a factor in the reported fault?

Note

If the fault suggests a rain fade or other weather related fade condition and it matches the prevailing weather conditions, do not take any action until the weather abates.

- Does link history suggest any fault trends?
    - Does the fault history for the link indicate a likely cause?
    - Is the 9500 MPR link newly installed?
    - Has there been any recent work done on the link?
- Ensure that you have with you:
    - Appropriate spares. Where an equipment failure is suspected, these should include replacement Cards/plug-ins and ODU. If an ODU is suspected then local/national climbing safety requirements must be adhered to.
    - A laptop PC loaded with Craft Terminal, and an Ethernet cable. If an Ethernet connection is to be used, you need the 9500 MPR Node/Terminal IP address and also the addresses for any remote sites to be accessed.
    - If login security has been enabled, you need the 'engineer' password for the local and also any remote sites to be accessed.
    - Any special test equipment that may be needed, such as a BER tester.
    - Toolkit.
    - Key(s) for access to the site.

5.4.2 Troubleshooting Basics

This section provides general guidance on 9500 MPR troubleshooting:

- **Check front-panel LED indications.** These provide summary alarm indications, which can help narrow down the location and type of failure. Refer to Operation section for details.
    - Where a Status LED on a plug-in is off (unlit), but power to the MS is confirmed by LEDs on other plug-ins, check the seating of the affected plug-in.
- **Check Main Screen.** When logging into 9500 MPR with Craft Terminal, the opening screen is the Main Screen. Use the information provided to check for severity and problem type. Refer to Table 5-1, Alarm Matrix, for probable cause and recommended action.

Table 5-1 Alarm Matrix

Equipment	Alarm Description	1+0	1+1 HS	1+FD	Most Probable Cause	Action
CSM	Card Fail	Major	Minor	Minor	Core module failed	Replace Core module
	Equipment Mismatch	N/A	Minor	Minor	Module in slot does not match module configured in Core memory	Install correct configured module
	Card Missing	N/A	Minor	Minor	Core module is missing from slot.	Install Core module in slot
	Unconfigured Equipment	N/A	Minor	Minor	Module in slot is not provisioned (enabled)	Provision module
	LOS on ETH TMN Interface	Minor	Minor	Minor	No Ethernet input signal detected on ETH 4 on Core module	Check link partner and cable between link partner and ETH 4 connector
	PPP IP Fail	Minor	Minor	Minor		
	LOS on Gigabit ETH Interface	Major	Major	Major	Loss of Ethernet in detected on ETH 1-4 on Core module	Check link partner and cable between link partner and ETH 1-4 connector
	Firmware Download In Progress	Minor	Minor	Minor	Status of download	Wait for downloading to complete
	LOS on Sync Interface	Minor	Minor	Minor	No sync clk detected at Sync In port on Core module	Check sync source and cable between sync source and Sync In port.
	Degraded Signal on Sync Interface	Minor	Minor	Minor	Sync clk errors detected at Sync In port on Core module	Check sync source for errors
	License Mismatch for Equipment Provisioned	Major	Major	Major	Wrong flash card installed on Core module	Install correct flash card for license
P32E1DS1 Module	Card Fail	Major	Minor	Minor	Failure of P32E1DS1 module	Replace P32E1DS1 module
	Equipment Mismatch	Major	Minor	Minor	Module in slot does not match module configured in Core memory	Install correct configured module
	Card Missing	Major	Minor	Minor	P32E1DS1 module is missing from slot.	Install P32E1DS1 module in slot.
	Unconfigured Equipment	Minor	Minor	Minor	Module is not Enabled on the Settings screen	Enable module
	LOS on PDH Tributary	Major	Minor	Minor	No DS1 input signal detected on any one or more of 32 lines	Check DS1 source and or cable

Table 5-1 Alarm Matrix (Cont.)

Equipment	Alarm Description	1+0	1+1 HS	1+FD	Most Probable Cause	Action
	Degraded Signal	Minor	Minor	Minor	Low quality sync signal for P32E1DS1 module	Replace P32E1DS1 module
	AIS on PDH Tributary (RX)	Major	Major	Major	AIS detected by the receive circuits on one or more DS1 lines, indicating upstream failure	Check for upstream DS1 source for errors
	AIS on PDH Tributary (TX)	Major	Major	Major	AIS detected on one or more DS1 lines at input to P32E1DS1 module	Check DS1 source
	Loss of CESoETH Frame	Major	Major	Major	Packets are not being received by the emulation circuits	1. Check/troubleshoot far end alarms. 2. Replace alarmed P32E1DS1 module.
	Firmware Download In Progress	Minor	Minor	Minor	Status of download	Wait for downloading to complete
P2E3DS3 Module	Card Fail	Major	Minor	Minor	Failure of P2E3DS3 module	Replace P2E3DS3 module
	Equipment Mismatch	Major	Minor	Minor	Module in slot does not match module configured in Core memory	Install correct configured module
	Card Missing	Major	Minor	Minor	P2E3DS3 module is missing from slot.	Install P2E3DS3 module in slot.
	Unconfigured Equipment	Minor	Minor	Minor	Module is not Enabled on the Settings screen	Enable module
	LOS on PDH Tributary	Major	Minor	Minor	No DS3 input signal detected on any one or more of 32 lines	Check DS3 source and or cable
	Degraded Signal	Minor	Minor	Minor	Low quality sync signal for P2E3DS3 module	Replace P2E3DS3 module
	AIS on PDH Tributary (RX)	Major	Major	Major	AIS detected by the receive circuits on one or more DS3 lines, indicating upstream failure	Check for upstream DS3 source for errors
	AIS on PDH Tributary (TX)	Major	Major	Major	AIS detected on one or more DS3 lines at input to P2E3DS3 module	Check DS3 source

Table 5-1 Alarm Matrix (Cont.)

Equipment	Alarm Description	1+0	1+1 HS	1+FD	Most Probable Cause	Action
	Loss of CESoETH Frame	Major	Major	Major	Packets are not being received by the emulation circuits	1. Check/troubleshoot far end alarms. 2. Replace alarmed P2E3DS3 module.
	Firmware Download In Progress	Minor	Minor	Minor	Status of download	Wait for downloading to complete
Fans module	Card Fail	Major	—	—	Fan failed	Replace Fan module
	Card Missing	Major	—	—	Fan module is missing from slot	Install Fan module
	Unconfigured Equipment	Minor	Minor	Minor	Module is not Enabled on the Settings screen	Enable module
MD300 Module	Card Fail	Major	Minor	Minor	MD300 module failed	Replace MD300 module
	Equipment Mismatch	Major	Minor	Minor	Module in slot does not match module configured in Core memory	Install correct configured module
	Card Missing	Major	Minor	Minor	MD300 module is missing from slot	Install MD300 module in slot.
	Unconfigured Equipment	Minor	Minor	Minor	Module is not Enabled on the Settings screen	Enable module
	PNU Cable Loss	Major	Minor	Minor	Bad cable connection at IF in/out connector on MD300 module	Check/repair IF cable connection on alarmed MD300 module.
	Loss of Radio Frame	Minor	Minor	Minor	Far end TX problems, RF path problems, or local circuit failures have caused BER to increase to the point that frames are being lost	1. Switch far end transmitters (in a protected system). If alarm clears, replace far end off-line MD300 module. 2. Check/troubleshoot far end alarms. 3. Replace alarmed MD300 module.
	Loss of Alignment	N/A	Minor	Minor	Delay between main and protect RF paths detected	1. Replace main MD300 module. 2. Replace protected MD300 module. 3. Replace main ODU. 4. Replace protected ODU.

Table 5-1 Alarm Matrix (Cont.)

Equipment	Alarm Description	1+0	1+1 HS	1+FD	Most Probable Cause	Action
	Demod Function Fail	Major	Minor	Minor	Internal receive circuit failure	Replace MD300 module
	High BER	Major	Minor	Minor	Bit Error Rate threshold ($10E^{-4}$) exceeded on receiver input circuits on MD300 module.	1. Verify RF path is clear, antenna is aligned, and no existing weather related problems. 2. Verify RSL is above RX threshold. a. If not - check upstream transmitter output/ troubleshoot transmitter.
	Early Warning	N/A	MInor	Minor	$10E^{-9}$ BER detected	No action is required at this time. Monitor receive signal for increased degrading.
	Link Identifier Mismatch	Major	Major	Major	Link identifier number provisioned on MD300 module settings screen is different from link identifier number provisioned at other end of hop	Set numbers at both ends of hop to match
	TCA on Radio Link	N/A	N/A	Major	Alarm threshold exceeded on main MD300 module	Switch far end transmitters (in a protected system). If alarm clears, replace far end off-line MD300 module.
	TCA on Radio Hop	Major	N/A	Minor	Alarm threshold exceeded on protect MD300 module after switching from main to protect	
	UAT on Radio Link	N/A	N/A	Major	10 consecutive SES (unavailable time period) detected on main MD300 module	Switch far end transmitters (in a protected system). If alarm clears, replace far end off-line MD300 module.
	UAT on Radio Hop	Major	N/A	Minor	10 consecutive SES (unavailable time period) detected on protect MD300 module after switching from main to protect	

Table 5-1 Alarm Matrix (Cont.)

Equipment	Alarm Description	1+0	1+1 HS	1+FD	Most Probable Cause	Action
	Firmware Download In Progress	Minor	Minor	Minor	Download status	Wait for downloading to complete
	Degraded Signal	Minor	Minor	Minor	Low quality sync signal from MD300 module	Replace MD300 module
	License Mismatch for Equipment Provisioned	Major	Major	Major	MD300 module type does not match module type stored in memory on the Core module flash card	Replace MD300 module with correct module type
ODU	Card Fail	Major	Minor	Minor	ODU failed	Replace ODU
	Equipment Mismatch	Major	Minor	Minor	ODU does not match ODU configured in Core memory	Replace ODU
	RX Function Fail	Major	Minor	Minor	ODU receiver circuit failed	Replace ODU
	RF Frequency Mismatch	Major	Minor	Minor	Frequency out-of-range of configured TX frequency	Re-configure frequency
	Shifter Frequency Mismatch	Major	Minor	Minor	Configured shifter value not supported by ODU	Re-configure shifter value
	TX Power Mismatch	Minor	Minor	Minor	Configured TX power value not supported by ODU	Re-configure TX power value
	Software Mismatch	Minor	Minor	Minor	Software version on ODU does not match software version on Core	Download correct software version
	ODU Not Responding	Minor	Minor	Minor	Loss of communication with ODU.	1. Replace ODU._2. Replace alarmed MD300 module.
	Firmware Download In Progress	Minor	Minor	Minor	Download status	Wait for downloading to complete

EPS - Equipment Protection Switching
LOS - Loss of Signal
RPS - Radio Protection Switching
TCA - Threshold Crossing Alarm
UAT - Un-Available Time

- **Check the basics first.**
    - For example, if multiple alarms are present, and these include power supply voltage or hardware alarms, always check their cause before looking at resultant down-stream path failure or path warning (signal) alarms.
    - Similarly, if a path-related failure is indicated (no hardware or software alarms), investigate the path. Go to the Craft Terminal History screen (15 minute view) to check supporting data, such as low RSL and incidence of intermittent pre-failure BER alarms, which if present are evidence of a path-related failure. Refer to Para. 5.4.3 for more information.
- **Check if symptoms match the alarm.** Alarms reflect the alarm state, but in exceptional circumstances an alarm may be raised because of a failure to communicate correctly with the alarm source, or a failure in alarm management processing. Always check to see if symptoms match the alarm, using LED indications and the Craft Terminal.
- **Check if recent work may be a cause.** Recent work at the site may be a cause or contributing factor. Check for a configuration change, software upgrade, power recycling (reboot), or other site work:
    - Many hardware alarms are only initiated as a loss-of-communications alarm during a reboot, software upgrade, or reconfiguration. By not being able to communicate with the Core, their settings cannot be loaded. The fault may be at the hardware device (most likely), communications to it, or the Core.
    - Hardware/software compatibility alarms will be raised when a new plug-in is installed that needs a later version of 9500 MPR software.
    - Hardware incompatible alarms will be raised when a plug-in is installed in a slot that has been configured for a different plug-in.
- **MSS before an ODU.** If there is doubt about whether a fault is in the MSS or ODU, always troubleshoot the MSS first.
- **Hot-pluggable.** MSS cards are hot-pluggable. There is no need to power-down before replacing, but traffic will be lost unless the plug-in is protected.
- **Plug-in restoration time.** Ensure adequate time is allowed for services to resume when a plug-in is replaced.

5.4.3 Troubleshooting Path Problems

A path-related problem, with the exception of interference, is characterized by traffic being similarly affected in both directions. Generally, if you are experiencing only a one-way problem, it is not a path problem.

Note

A path extends from ODU antenna port to ODU antenna port.

- Normally a path problem is signalled by a reduced RSL, and depending on its severity, a high BER.
- Only in worst case situations, such as an antenna knocked out of alignment, will a path fail completely, and stay that way.
- For weather-related problems, such as rain or ducting, the path problem will disappear as the weather returns to normal.

5.4.3.1 Path Problems on a Commissioned Link

A path problem on an existing link, one that has ben operating satisfactorily may be caused by:

- **Weather-related path degradation**

If BER alarms are fleeting/not permanent and RSL returns to its normal, commissioned level after the alarm is cleared, rain, diffraction, or multipath fading is indicated. Rain fade is the likely cause of fade for links 13 GHz and higher. Diffraction and multipath/ducting for links 11 GHz and lower. If these alarms are persistent, there could be a problem with the link design or original installation.

- **Changed antenna alignment or antenna feed problem**

If RSLs do not return to commissioned levels after a period of exceptionally strong winds, suspect antenna alignment. Also, check the antenna for physical damage, such as may occur with ice-fall. For a remote-mounted ODU, check its antenna feeder.

- **New path obstruction**

Where all other parameters check as normal, *and* the path has potential for it to be obstructed by construction works, view/survey the path for possible new obstructions.

- **Interference from other signal sources**

Interference usually affects traffic in just one direction. Unlike other path problems, RSL is not affected. If suspected, check for new link installations at, or in the same geographical area, as the affected site. Ultimately, a spectrum analyzer may have to be used to confirm interference, which is not an easy task given the need to connect directly to the antenna port, after removing the ODU.

5.4.3.2 Path Problems on a New Link

For a new link, potential problems can extend to also include:

- **Incorrect antenna alignment**

One or both antennas incorrectly aligned. Refer to Installation alignment procedure on CD.

- **Mismatching antenna polarizations**

Given a typical polarization discrimination of 30 dB, for most links it is not possible to capture a signal to begin the antenna alignment process.

- **Incorrect path calculations**

If the RSLs are too low or too high, antenna alignment is correct, and Tx power settings are correct, check the path calculations used to determine the link performance. A good calculation match is +/- 2dB. Disagreements in excess of 3 dB should be investigated.

- **Reflections**

Reflection (path cancellation) problems may not have been picked up at the path planning stage, particularly if the survey was a simple line-of-sight. If suspected, resurvey the path.

5.4.4 Troubleshooting Configuration Problems

Configuration problems should only occur during the setup of a new link, or reconfiguration of an existing link. The more common problems may be broadly categorized as:

- **Compatibility Problems**

The two alarms that may activate are Configuration Not Supported and SW/HW Incompatible:

> **Configuration Not Supported:** The plug-in installed is not enabled or is incorrect for the configuration.
>
> **SW/HW Incompatible:** Typically raised when new hardware is plugged into an existing MSS that has software from an earlier release. To remove the alarm, compatible 9500 MPR software is required; install the latest software.

- **Incorrect circuit connections**

No alarms are activated for incorrect circuit connections. An incorrect assignment means the expected end-to-end circuit connectivity will not happen. Re-check circuit assignments for all nodes carrying the lost circuit(s).

Take extra care when configuring ring circuits.

- **Incorrect ID naming and commissioning**

All traffic-carrying circuits must have a unique flow ID for the cross-connect capability to operate.

- **Incorrect/incompatible trib settings**

Trib line interface settings incorrect, or line levels incompatible. While no alarm activates for an incorrect setting, its effect may result in line levels being too low (LOS alarm), or too high, resulting in a high BER.

5.4.5 Troubleshooting Ethernet Problems

This section gives general guidance on troubleshooting problems related to the four Ethernet ports on the Core Card.

The most common Ethernet problems are network and connectivity related and therefore always check the following first:

- Verify link partner capability, provisioning, and connection
- Verify radio provisioning matches link partner
- Verify cabling between radio and link partner

The LEDs on the Core Card front panel for each Ethernet connector are a good indicator of correct connectivity and activity on the Ethernet port. Refer to Table 5-2 for detail troubleshooting using the LEDs locally at the alarmed site.

Table 5-2 Troubleshooting Ethernet Problems

LED	Indication	Probable Cause	Corrective Action
ETH IN LOS	Green LED Not Lit	Loss of Ethernet RCV/radio XMT signal in. Most probable causes:	
		1. Cable between link partner and radio is disconnected/broken.	Connect/repair cable.
		2. Speed/Mode provisioning mismatch between link partner and radio	1. Check local Ethernet provisioning screen. 2. Check link partner provisioning.
ETH OUT LOS	Green LED Not Lit	Loss of Ethernet XMT/radio RCV signal out. Most probable causes:	
		1. Loss of RF input to Radio Modem Card	Check local RSL screen on CT. Is RSL ok? Yes - Check farend for Ethernet alarm. No - Check farend Tx output. Is farend Tx Out ok? Yes - Check path, antenna, waveguide/ cabling No - Check/replace farend Radio Modem Card.
		2. Loss of Ethernet input to Radio Modem Card	Check farend for Ethernet alarms. Are any alarms indicated? Yes - Troubleshoot farend alarms No - Check farend Ethernet status. Is only abnormal status indicated? Yes - Troubleshoot farend Ethernet status. No - 1. Replace local alarmed Core Card. 2. Replace local Radio Modem Card.

In order for the green Link LED to light:

1. Cable must be connected to Ethernet port
2. Ethernet port must be enabled (provisioned Enabled on Core Settings Screen)
3. Speed and mode (on Core Settings Screen) must be provisioned the same as the link partner.

The yellow LED opposite the green on the connector indicates activity only. The flashing yellow LED is not an indicator of signal type or quality.

5.4.6 Troubleshooting TMN Problems

This section gives general guidance on troubleshooting TMN problems related to Ethernet port 4 on the Core Card. Ethernet port 4 on the Core Card can be used to transport SNMP IP data. Troubleshoot port 4 connectivity alarms the same as Ethernet ports 1-3. Refer to Para. 5.4.5.

The most common TMN problems are network related and first alert is normally observed by improper operation at the SNMP master. Always check the following first:

- Verify master is properly registered in NE to receive traps.
- Verify SNMP version matches system requirements
- Verify correct community string and privileges
- Verify proper network routing.

Refer to Table 5-3 for detail TMN network troubleshooting.

Table 5-3 TMN Network Troubleshooting

Problem	Possible Cause	Possible Solution
Unusually slow communication in radio network	1. Normal network management traffic is saturating the communications channel. 2. Polling radios for PM data or missed alarms too rapidly 3. Multiple remote software downloads in process 4. IP traffic other than network management traffic being routed through radio network	1. There may be too many radios being managed within a single region. Split the radio network management into different regions and backhaul the traffic for each region through separate channels. 2. Poll the radios more slowly. 3. Download to fewer radios at a time. 4 Configure external routers to allow only network management related traffic through the Management network of the radios. Dynamic route updates (OSPF, RIP) may attempt to reroute high speed traffic through the TMN network if a high speed ink fails.
Unable to operate controls using SNMP	To perform control operations, the Manager must be registered as a craft device.	Register the Manager as a craft device. Manager registration type can be changed as needed to type 'ct' to allow control operation and then be changed back to 'nml' for normal operation.
Can Read SNMP objects but cannot Write to SNMP objects	1. Incorrect community string 2. If the TMN Interface is configured for SNMPv2, the write community string is probably wrong.	1. Use the correct community string. 2. Use the correct write community string.
No traps being received from NE	1. Manager not registered in NE to receive traps 2. Communication failure in network	1. Register Manager with NE. 2. Check network connectivity. Check redundant network paths and routing. Traceroute (tracert) is useful for locating path or routing faults.
Unable to communicate with the NE through the radio network (unable to 'ping' the NE).	Possible communication path failure or routing failure within the radio network.	Use traceroute (tracert) to help locate for communication path or routing problems.
Can 'ping' the TMN Interface but cannot communicate with the NE using SNMP, or can only see a few SNMP objects in the NE.	If using SNMPv2, using the wrong community string.	Verify community string or username/passphrase.

5.5 MODULE REMOVAL AND REPLACEMENT PROCEDURES

The basic rules for installing plug-in cards are as follows:

Never install, change or remove a module without first connecting to the shelf with an ESD grounding cable. Failure to do so may cause ESD damage to the modules.

When installing a plug-in, ensure its backplane connector is correctly engaged before applying sufficient pressure to bring the plug-in panel flush with the front panel. Improper alignment can result in damaged pins on the backplane connector and/or damage to the plug-in connector.

Plug-ins must be withdrawn and inserted using their finger-grip fastener pulls. Never withdraw or insert using attached cable(s). Pulling on the cables may damage the cable, plug-in connector, and/or plug-in module connector attachment.

All slots must be filled with either a peripheral plug-in module or a blank panel. Failure to do so will compromise EMC integrity and cooling air from the fan.

CAUTION
Possibility of Service Interruption

Use extreme caution when connecting or disconnecting the ODU cable on the MSS/RADIO (MD300) module. The shelf battery voltage is present on the center conductor of the connector. When removing or replacing a MSS/Radio (MD300) module, withdraw the module from the shelf before disconnecting the cable from the ODU. Failure to follow these cautions may cause arcing and/or possible power spikes that could affect traffic on other links installed at the node.

CAUTION
Possibility of Service Interruption

Removing an in-service module in an unprotected link will cause loss of traffic. Removing an in-service module in a protected link requires switching the traffic onto the protected channel.

- The main CSM, protected CSM, and Fan module have dedicated slots.
- The MSS/DS1 (P32E1DS1) module, the MSS/DS3 (P2E3DS3) module and the MSS/Radio (MD300) modules can be installed in any of the universal slots (3 through 8).
- The MSS-8 can be configured with a maximum of six modules; three protected modules, six non-protected modules, or a combination of protected and non-protected modules.
- For protected modules, main and protected modules must be plugged in side-by-side.
- All plug-ins can be removed and installed with power applied.

CAUTION
Possibility of Service Interruption

If the main CSM fails, traffic and platform data will switch to the protected CSM automatically. Do not remove power from the NE during the removal and replacement of the failed main CSM without first reviewing/performing the following procedure:

a. Turn off NE power.

b. Remove failed main CSM.

c. Turn on NE power.

d. Wait two (2) minutes.

e. Install replacement CSM.

5.5.1 CSM Removal and Replacement – In a CSM Protected Radio

If the Main CSM in slot 1 fails, traffic/services protection and control platform protection switches to the protected (spare) CSM in slot 2. Loopbacks and all other manual operations, such as manual switch and tx mute, will be lost (deactivated). Alarms previously active will be newly detected and reported via notification, with a new time stamp.

There are two removal and replacement scenarios:

- Shelf power has not been disturbed on the NE and spare active
- Shelf power has been turned off.

5.5.1.1 Shelf Power Has Not Been Disturbed on the NE and Spare Active

1. Remove main CSM and transfer the flash card to the replacement module.
2. Plug replacement main CSM into shelf and wait for status LED to turn steady green.

5.5.1.2 Shelf Power Has Been Turned Off

1. Leave shelf power turned off.
2. Remove main CSM and transfer the flash card to the replacement module.
3. Turn on shelf power and wait for spare CSM status LED to turn steady green.
4. Plug replacement main CSM into shelf and wait for status LED to turn steady green.

5.5.2 CSM Flash Card Removal and Replacement

CAUTION
Possibility of Service Interruption

In a Protected system, reboot for both Main and Spare Flash Cards can take up to 15 minutes. The flashing status green LED indicates reboot in progress. Status LED turns solid green at completion of reboot.

For a Not Protected system, reboot for the Main Flash Card will take up to three minutes.

Verify the replacement Flash Card being installed on the CSM meets the following compatibility rules:

- Main Flash Card (in slot 1) and Spare Flash Card (in slot 2) must be the same .
- Local and far end Flash Cards must be the same.

5.5.3 ODU Removal and Replacement

WARNING
Possibility of Damage to Equipment

Exposure to energy radiated at microwave frequencies can cause eye injury and eventual blindness. Do not look directly into any unterminated waveguide port.

WARNING
Possibility of Damage to Equipment

Failure to disconnect power to the ODU by disconnecting the associated MD300 module from the MSS backplane can result in damage to the MD300 module and can cause damage to the ODU.

CAUTION

Possibility of Service Interruption

In an unprotected radio, performing the ODU removal and replacement procedure will cause loss of traffic. In a protected system the procedure is an in-service but not a hitless procedure. Disconnecting the MD300 from the MSS backplane to remove power to the ODU can cause a hit on traffic.

Prerequisites

Before starting, verify that the replacement ODU matches the failed ODU using the following procedure:

1. Obtain part number of failed ODU on inventory screen.
2. Verify part number of replacement ODU, located on identification label, matches part number of failed ODU.

Procedure

1. On the MSS, pull out on the MD300 module associated with the failed ODU to disconnect the MD300 module from the MSS backplane.

Note

The procedure to remove an ODU is dependent on the ODU mounting and how the ODU is configured. The procedure to remove is the reverse of ODU installation. Refer to Installation for details.

2. Disconnect and remove failed ODU. Refer to Installation section for details.
3. Install and connect replacement ODU. Refer to Installation section for details.
4. Reinstall MD300 module to restore power to the MD300 and replacement ODU.
5. On MD300 module front panel, verify that there are no alarms.
6. Open WebEML Measurements screens for MD300 module connected to replaced ODU.
7. On Measurements screen, enter 15 minutes Measurement Interval.
8. On Measurements screen, select 2 sec Sample time.
9. On Measurements screen, click **Start** to start measurements. Graphics screen displays.
10. On Measurement graphics screen, check Details box. Tx and Rx dBm Power Levels Details table is displayed.
11. On Tx and Rx dBm Power Levels Details table, verify Tx Local End and Rx Far End power levels.

5.6 CHANGING FREQUENCY

Refer to the attached CD.

5.7 SOFTWARE UPGRADE PROCEDURES

Software Kit

Software Kit PN 3EM23502AAAA is delivered with each 9500 MPR. The software kit consists of the following three CD ROMs:

- 9500MPR-A CT R01.01.00 - Craft Terminal (CT) software - hereafter called WebEML (JUSM/CT) - installed on the PC at initial turnup
- 9500MPR-A SWP R01.01.00- radio application software - not required for initial turnup - hereafter called SWP
- v404 MIB - SNMP MIB software - not required for initial turnup - hereafter called MIB

The SWP and MIB software is downloaded on the NE flash card and the flash card is installed on the CSM at the factory. It is not necessary to install SWP and MIB software on the PC at initial turnup. The SWP CD is supplied with the equipment for backup. The MIB CD is supplied for use by third-party SNMP applications.

Procedure

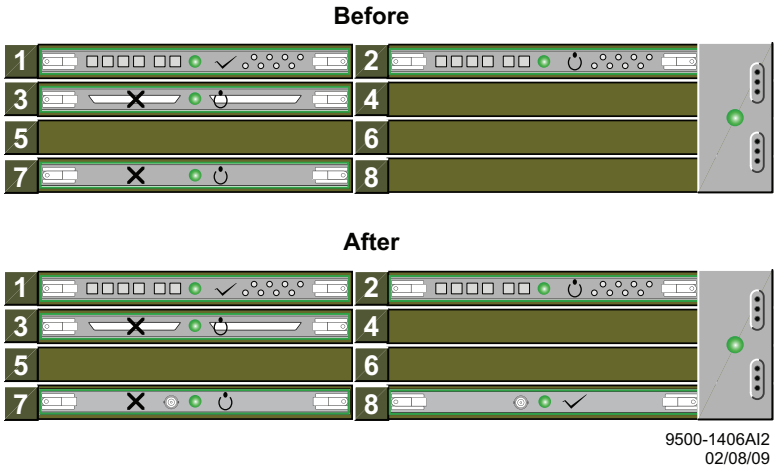
Refer to Software Upgrade Guide 3EM233201107RJZZA.

5.8 UPGRADE FROM AN UNPROTECTED TO A PROTECTED RADIO

5.8.1 1+0 Static Modulation to 1+1 HSB in Static Modulation

Starting from a NSB 1+0 configuration (see graphics below) perform the following procedure to upgrade to a 1+1 HSB radio with Static Modulation.

This is an in-service but not a hitless procedure.



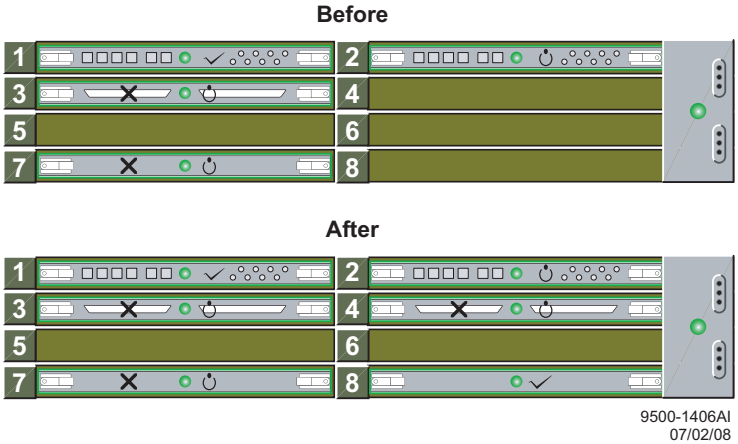
1. Plug-in MD300 module in slot 8 (spare). An Unconfigured Equipment alarm displays.
2. On CT Settings screen enable the MD300 module in slot 8.
3. On CT Settings screen provision the MD300 modules (slots 7 and 8) for HSB Protection Type. Local station and remote station will observe 2 seconds sync loss.
4. Connect the IDU/ODU cable to the spare MD300 module in slot 8.

5.8.2 1+0 to 1+1 Frequency Diversity

CAUTION
Possibility of Service Interruption

This is an in-service but not a hitless procedure.

Starting from a NSB 1+0 configuration (see graphic below) perform the following procedure to upgrade to a 1+1 Frequency Diversity.



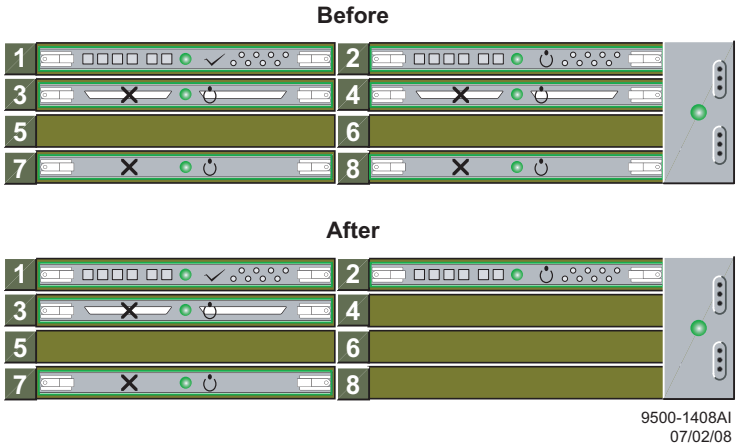
1. Plug-in MD300 module in slot 4 (spare). An Unconfigured Equipment alarm displays.
2. Plug-in Modem module in slot 8 (spare). An Unconfigured Equipment alarm displays.
3. On CT Settings screen enable the MD300 module in slot 4.
4. On CT Settings screen enable the Modem module in slot 8.
5. On CT Settings screen provision the MD300 modules (slots 3 and 4) for 1+1 EPS Protection Type.
6. On CT Settings screen provision the Modem modules (slots 7 and 8) for 1+1 FD Protection Type. Local station and remote station will observe 2 seconds sync loss.
7. Connect the DS1 signal cables to the spare MD300 module in slot 4.
8. Connect the IDU/ODU cable to the spare Modem module in slot 8.
9. Properly configure the protection ODU.

5.9 DOWNGRADE FROM PROTECTED TO A UNPROTECTED RADIO

5.9.1 1+1 HSB in Static Modulation to 1+0 in Static Modulation

CAUTION
Possibility of Service Interruption

Downgrading from 1+1 HSB to 1+0 configuration is an out-of-service procedure. The main channel must be in service including sync source before starting procedure.

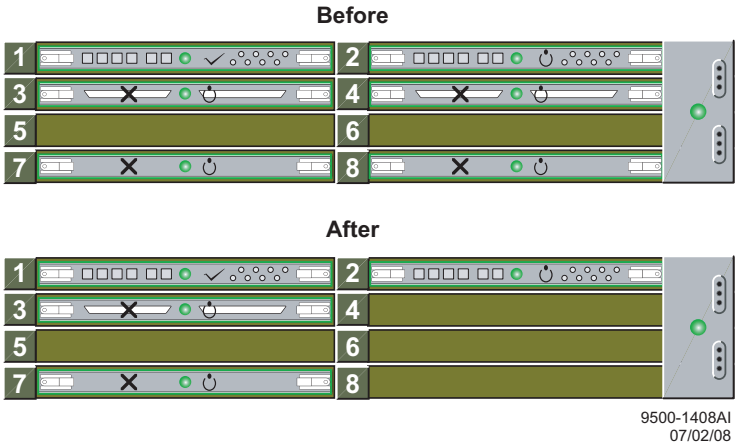


1. Disconnect DS1 signal cables from the spare MD300 module in slot 4.
2. Disconnect IDU/ODU cable on the spare Modem module in slot 8.
3. On CT Settings screen for Modem modules (slots 7 and 8) Enable Local Tx Mute for Channel #1 and Channel #0.
4. On CT Settings screen for Modem modules (slots 7 and 8) set Protection Type to no Protection. Local station will observe 2 seconds AIS.
5. On CT Settings screen for Modem modules (slots 7 and 8) disable Local Tx Mute for Channel #1 and Channel #0.
6. On CT Settings screen for MD300 modules (slots 3 and 4) set Protection Type to no Protection.
7. On CT Settings screen for spare MD300 module (slot 4) set Equipment Type to EMPTY.
8. On CT Settings screen for spare Modem module (slot 8) set Equipment Type to EMPTY.
9. Remove spare Modem module (slot 8).
10. Remove spare MD300 module (slot 4).

5.9.2 1+1 FD to 1+0

CAUTION
Possibility of Service Interruption

Downgrading from 1+1 FD to 1+0 configuration is an out-of-service procedure. The main channel must be in service including sync source before starting procedure.



1. Disconnect DS1 signal cables from the spare MD300 module in slot 4.
2. Disconnect IDU/ODU cable on the spare Modem module in slot 8.

Note

Local AIS will remain active throughout remainder of procedure.

3. On CT Settings screen for Modem modules (slots 7 and 8) set Protection Type
   to no Protection. Local station will observe 2 seconds AIS.
4. On CT Settings screen for MD300 modules (slots 3 and 4) set Protection Type to no Protection.
5. On CT Settings screen for Modem modules (slots 7 and 8) set Protection Type to no Protection.
6. On CT Settings screen for spare MD300 module (slot 4) set Equipment Type to EMPTY.
7. On CT Settings screen for spare Modem module (slot 8) set Equipment Type to EMPTY.
8. Remove spare Modem module (slot 8).
9. Remove spare MD300 module (slot 4).

5.10 CLEANING

Do not use acid, alcohol, or brushes to clean cards because damage to the silkscreen labeling and antistatic coating can result. Cleaning should be confined to the removal of dust and dirt using a damp cloth.

Cleaning should normally be confined to the removal of dust and dirt using a soft bristled (natural fiber) brush and a low velocity blower (such as a vacuum cleaner with a plastic blower nozzle). Do not use acid or synthetic bristled brushes to clean cards that contain electrostatic-sensitive components.

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Note

The information contained in this section is a summary of the information on the enclosed CD. "Refer to CD" is used throughout this section to refer the reader to the detail information on the CD.

6 USER GUIDE

6.1 INTRODUCTION

Note

Some menu functions are purposely faded to indicate they are not currently available. Only available functions are described.

This section contains descriptions of screens not used or described in other sections.

6.2 LOCAL CRAFT CONNECTION

PREREQUISITE

Initial Turnup completed.

Note

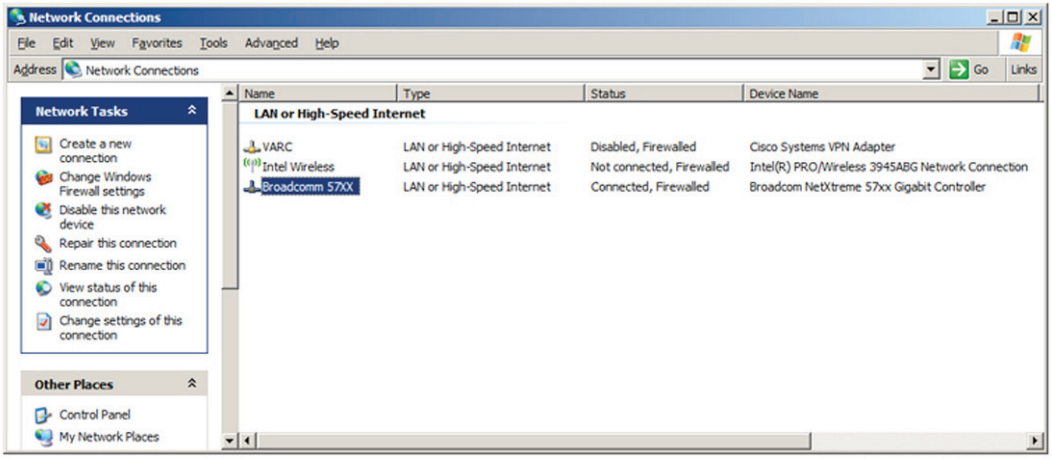
Before starting, the user must know the following information:

- *Local NE IP Address*
- *Local site Subnet Mask*
- *Craft Terminal PC/laptop IP Address*

6.2.1 Using the PC to Monitor and Control Local Radio

Perform the following procedure to monitor and control radio connected directly to PC:

1. Connect PC to **Mgmt Port** on CSM front panel using CAT5 cable.
2. Click on **START** menu on the Windows desktop and open **Control Panel**.
3. On Control Panel, open **Network Connections**.

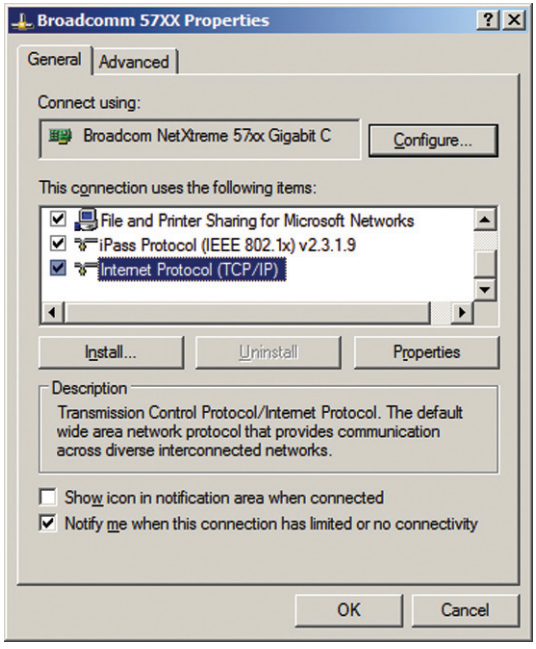


9500-6001A
09/11/08

4 On Network Connections screen, highlight network card. See figure above.

5 Right click on network card and select **Properties** to display the Properties screen.

6 On the Properties screen, scroll down the list and highlight **Internet Protocol (TCP/IP)**.



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09/11/08

7 Click **OK** to display Internet Protocol (TCP/IP) Properties screen.

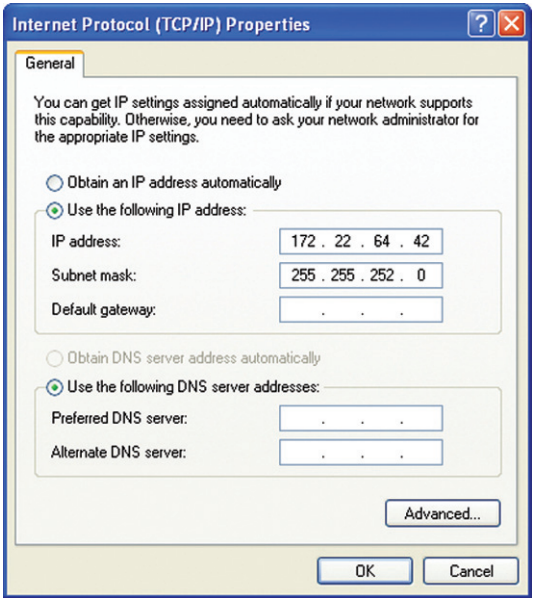
8 On Internet Protocol (TCP/IP) Properties screen, choose **Use the following IP address**.

9 In **IP Address** field, enter the site specific IP address of the craft terminal laptop.

10 In **Subnet Mask** field, enter site subnet mask.

Note

Mgmt Port and Local NE IP addresses must be the same for local craft connections.



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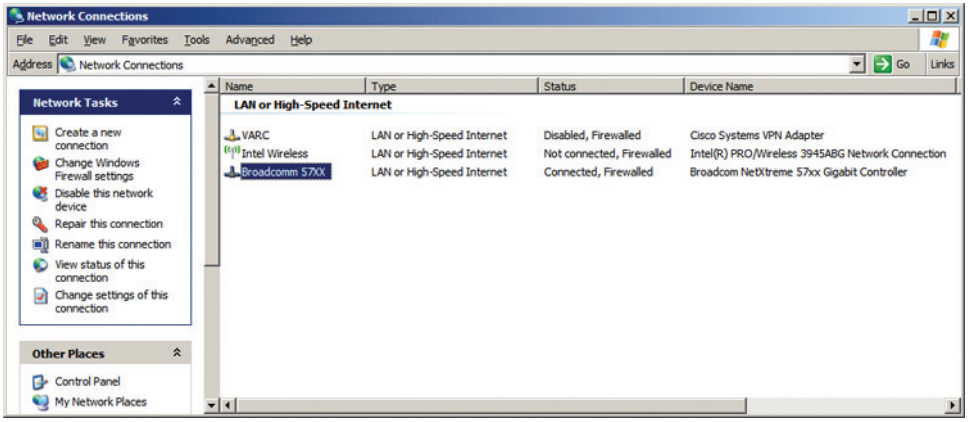
6.2.2 Using the PC to Monitor and Control Remote Radio

Perform the following procedure to monitor and control a remote radio connected to the PC through the network, using a local radio as a gateway to the network.

1 At local radio, connect PC to **Mgmt Port** on CSM front panel using CAT5 cable.

2 Click on **START** menu on the Windows desktop and open **Control Panel**.

3 On Control Panel, open **Network Connections**.

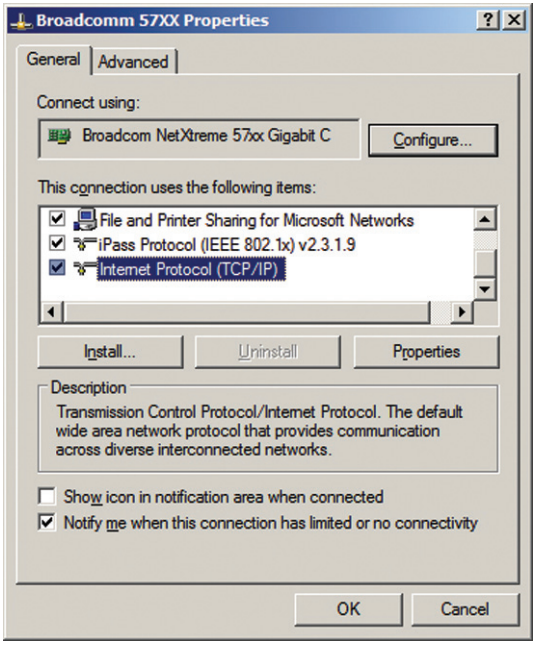


9500-6004A
09/11/08

4 On Network Connections screen, highlight network card. See figure above.

5 Right click on network card and select **Properties** to display the Properties screen.

6 On Properties screen, scroll down the list and highlight **Internet Protocol (TCP/IP)**.



9500-6005A
09/11/08

7 Click **OK** to display Internet Protocol (TCP/IP) Properties screen.

8 On Internet Protocol (TCP/IP) Properties screen, choose **Use the following IP address**.

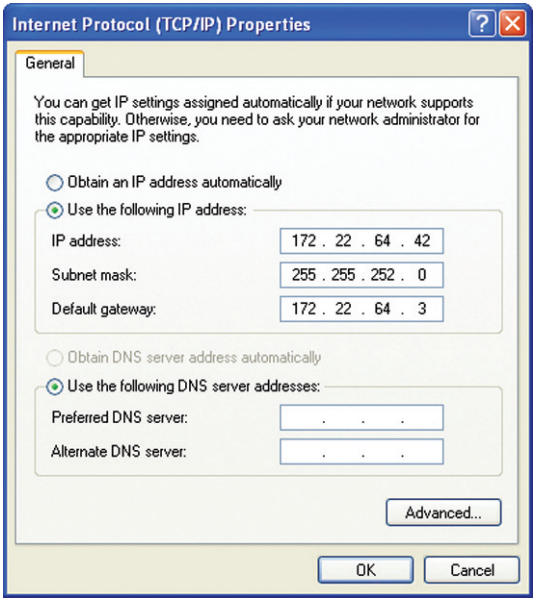
9 In **IP Address** field, enter the IP address of the local site craft terminal laptop.

10 In **Subnet Mask** field, enter local site subnet mask.

11 In **Default Gateway** field, enter IP address of local radio Mgmt Port (and NE TMN_RF port).

Note

Mgmt Port and Local NE IP addresses must be the same for local craft connections.



9500-6006A
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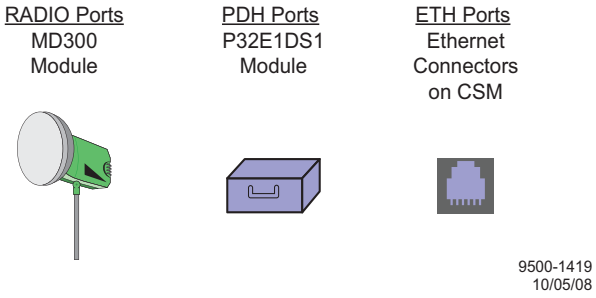
6.3 CONFIGURATION MENU

6.3.1 Cross-Connect Screen

The cross-connect screen is used to configure switching of packetized data through the Core Card. The screen allows the operator to select DS1, Ethernet, and/or radio ports as source and destination ports and provides a graphical presentation of the switch functions.

6.3.1.1 Icon Shapes

The shape of the icon identifies the module in the slot as RADIO (MD300 module) or PDH (P32E1DS1/E3 module) or one of four ETH (Ethernet) connectors on the Control & Switching Module CSM).

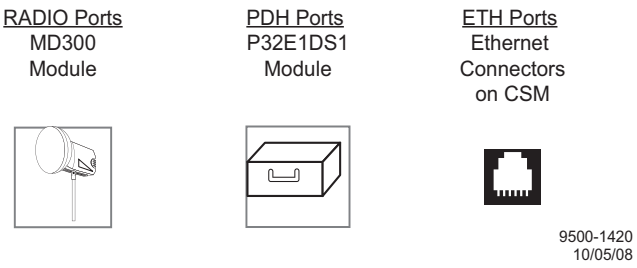


6.3.1.2 Icon Colors

The colors of the icons on the cross connections screen can be used to quickly determine the current state of the source and destination.

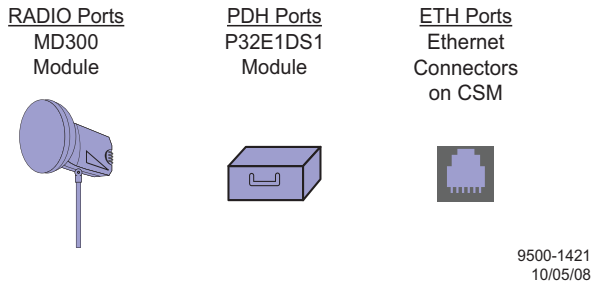
For example:

A white icon indicates the ports are enabled but are not currently cross connected.

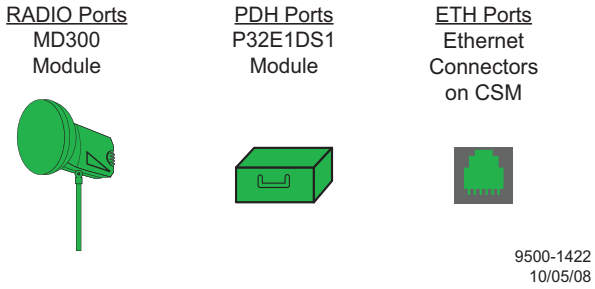


A blue icon on RADIO and PDH (DS1) ports indicates the ports are disabled or fully cross connected.

A blue icon on ETH (Ethernet) ports indicates the ports are disabled.



A green icon indicates that the ports are cross connected.



6.3.1.3 Line Colors

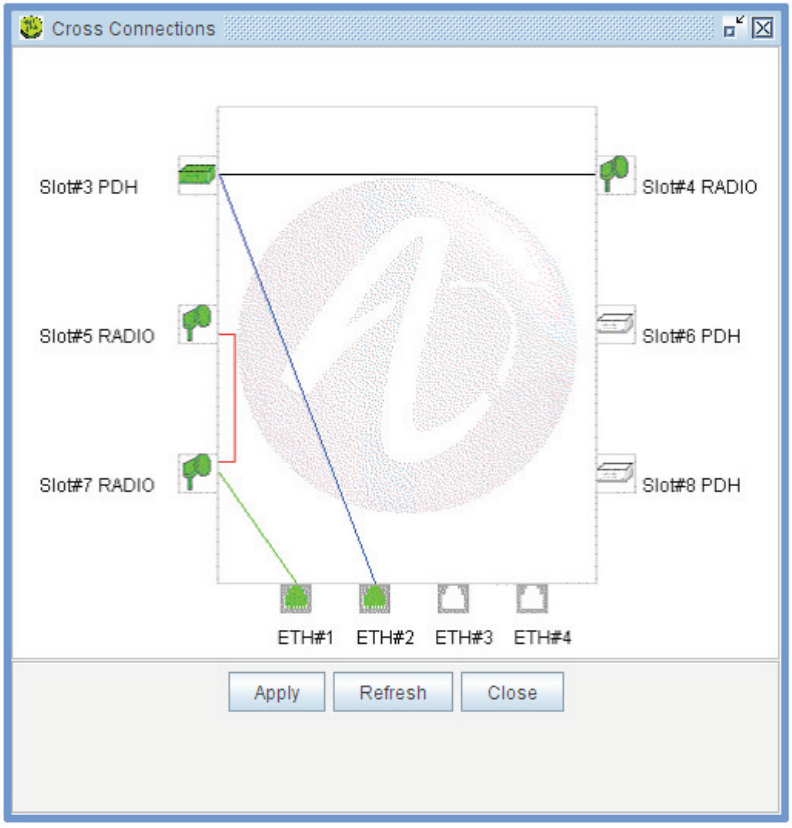
The drag and drop line the operator inserts between icons indicates an electrical connection. The color of the line indicates type of data and direction.

Black Line - PDH (P32E1DS1) to RADIO (MD300)

Blue Line - PDH (P32E1DS1) to ETH (Ethernet)

Red Line - RADIO (MD300) to RADIO (MD300)

Green Line - RADIO (MD300) to ETH (Ethernet)



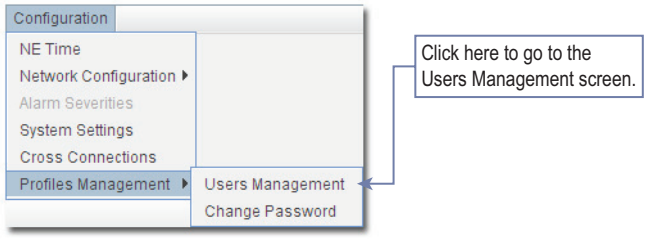
9500-1423
07/24/08

6.3.1.4 Mouse Operation

Single Left Click – A single left button click highlights (selects) the resource and opens up an information window.

Single Right Click – A single right button click highlights (selects) the resource and opens an information window.

6.3.2 Profiles Management Menu



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11/07/08

6.3.2.1 Users Management Screen

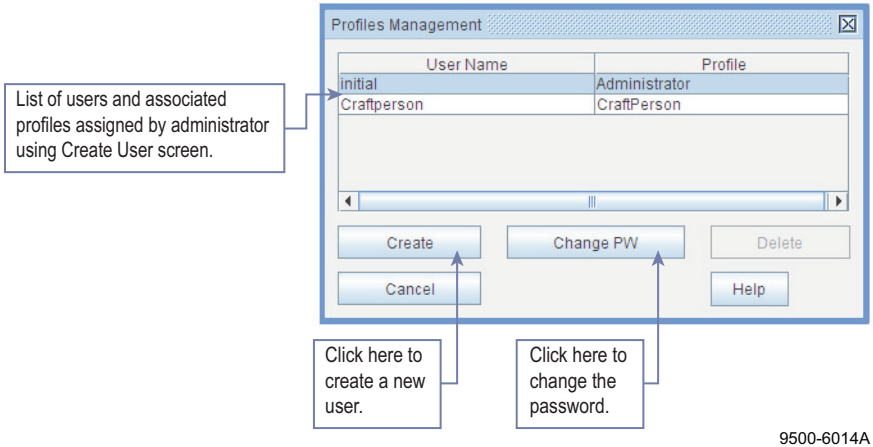
The operator can perform the following actions on the Profiles Management screen:

Create a new user by clicking **Create**.

After the selection of a user in the table, it is possible to:

Delete an existing user (the Admin user cannot be deleted) by clicking **Delete**.

Change password (by Administrator) by clicking **Change PW**.



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11/07/08

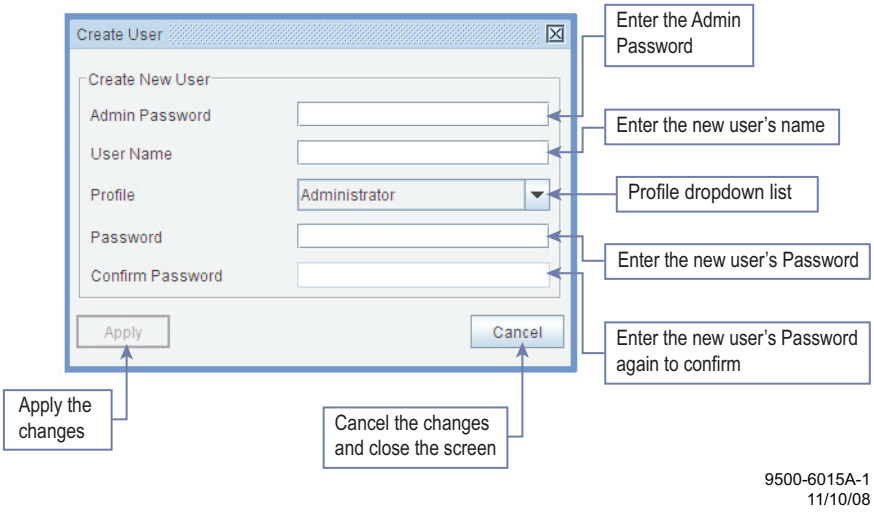
6.3.2.2 Create User Screen

Note

This is an Administrator controlled procedure. Administrator password is required to create a new user.

Perform the following procedure to create a new user that is then displayed on the Profiles Management list.

1 On the Profiles Management screen, click **Create**. Create User screen is displayed.



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11/10/08

2 On the Create User screen, enter **Admin Password**.

3 Enter **User Name**. User Name can be up to 20 characters and is case sensitive.

4 Select **Profile** from list of four profiles to match user's job description.

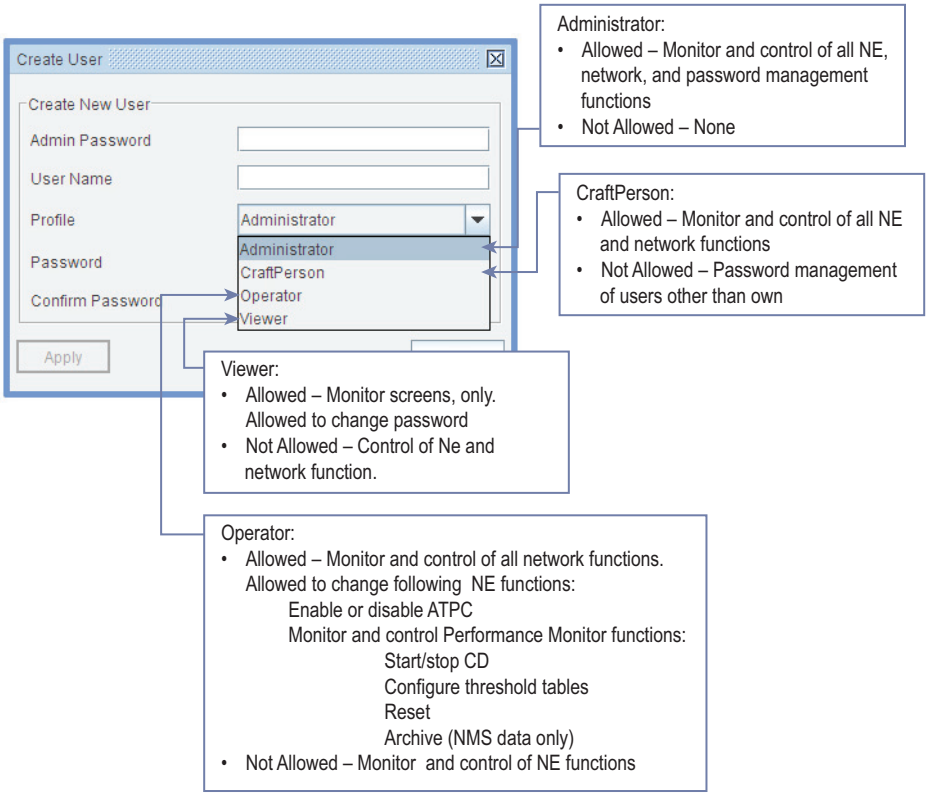
5 Enter User's **Password**. Password can be up to 20 characters and is case sensitive.

6 Enter user's password again to **Confirm Password**.

7 Click **Apply**. JUSM performs a syntax check of each field. An error/action message is displayed if a syntax error is found. If not, Create User screen closes and new user's name and profile are displayed on the Profiles Management screen.

6.3.2.3 Create User Profile Dropdown List

See the following figure for user profile choices displayed in the dropdown.



9500-6015A-2
11/10/08

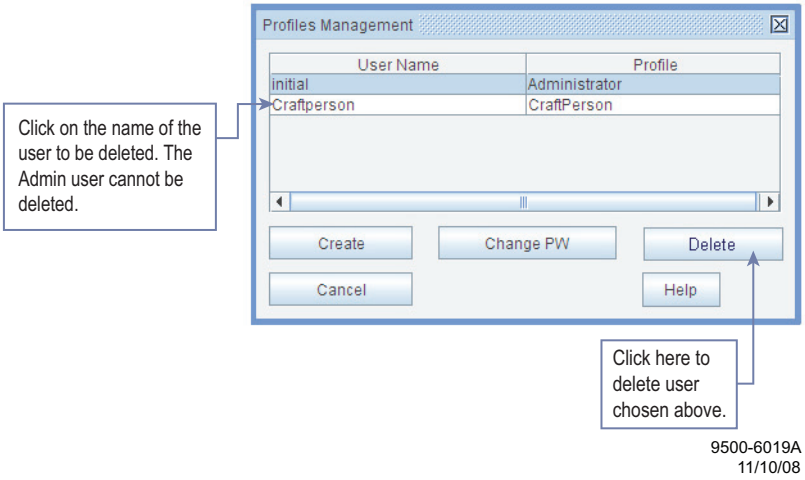
6.3.2.4 Delete User

Note

This is an Administrator-controlled procedure. Administrator password is required to delete a user. The Admin User cannot be deleted.

Perform the following procedure to delete an existing user from the Profiles Management list.

1 On the Profiles Management screen, click on the **User Name** to be deleted.



2 Click **Delete**. Deletion confirm message **Do you really want to delete this user?** is displayed.

3 Click **Yes**. A confirmation screen is displayed. If you click **No**, the screen will close and no action will be performed.

4 On confirmation screen, enter **Admin Password**.

5 Click **Apply**. A deletion complete message is displayed.

6.3.2.5 Changing Password (By The Administrator)

Note

This is an Administrator-controlled procedure. Administrator password is required to change a password using this procedure. Refer to the Change Password (By The Operator) *paragraph if the user is changing own password.*

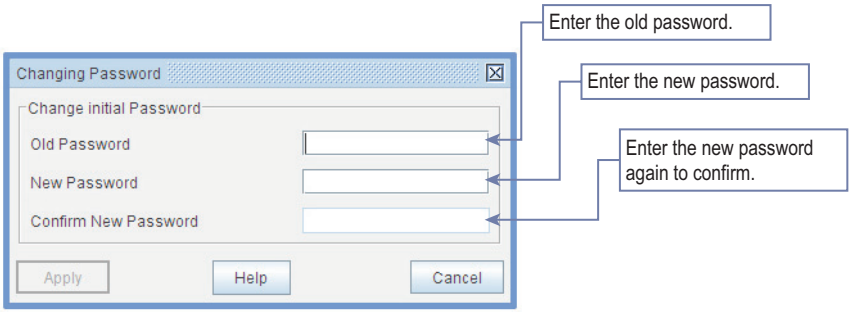
Perform the following procedure to change the password of an existing user listed on the Profiles Management screen.

1. On the Profiles Management screen, click on the user name requiring the password change.
2. Click **Change PW**. The Change Password screen is displayed.
3. Enter **Admin Password**.
4. Enter **New Password**. Password can be up to 20 characters and is case sensitive.
5. Enter users password again in **Confirm New Password** field.
6. Click **Apply**. JUSM performs a syntax check of each field. An error/action message is displayed if a syntax error is found. If not, a password change is complete message is displayed and Change Password screen closes.

6.3.2.6 Change Password (By The Operator)

Perform the following procedure for a user to change own password.

1. On WebEML screen toolbar, click **Configuration**. Configuration dropdown menu displays.
2. On Configuration dropdown menu, click **Profiles Management**. Flyout listing Users Management and Change Password displays.
3. On flyout click **Change Password**. The Changing Password screen is displayed.
4. Enter user's **Old Password**.
5. Enter user's **New Password**. Password can be up to 20 characters and is case sensitive.
6. Enter user's password again in **Confirm New Password** field.
7. Click **Apply**. JUSM performs a syntax check of each field. An error/action message is displayed if a syntax error is found. If not, a password change is complete message is displayed and Changing Password screen closes.



6.4 DIAGNOSIS MENU

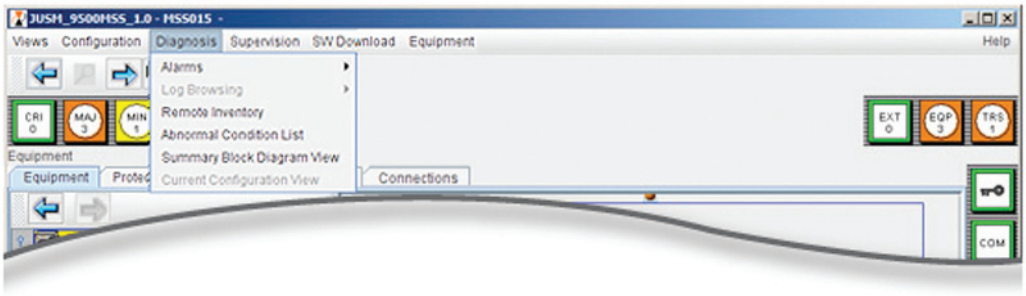


Figure 6-1 Diagnosis Dropdown Menu

6.4.1 Remote Inventory

See Figure 6-2. This screen is a read-only screen that shows all the information on the equipment.

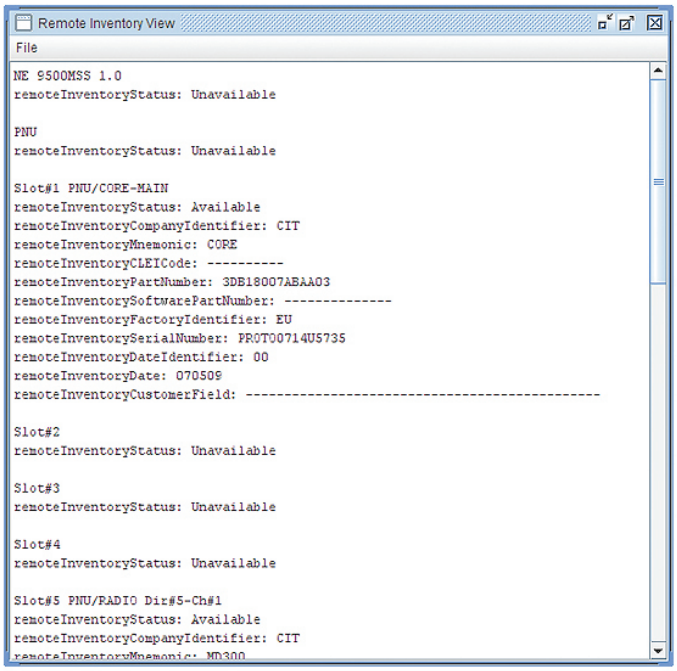


Figure 6-2 Remote Inventory Screen

6.4.2 Abnormal Conditions

See Figure 6-3. This screen is a read-only screen that lists non-usual conditions present in the NE. Events that cause an abnormal condition:

- Forced switch (EPS, RPS, TPS)
- Lockout (EPS, RPS, TPS)
- Loopback activation
- Local radio Tx mute (manual)
- Local radio Tx mute (automatic)
- Remote radio Tx mute (manual)

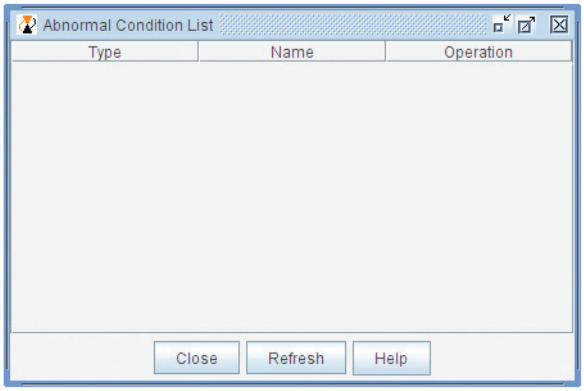


Figure 6-3 Abnormal Condition List

6.4.3 Summary Block Diagram View

Refer to CD for diagrams. These screens show functional block diagrams and signal flows of the current configuration (1+0 with/without Ethernet, 1+1 Hot-Standby, 1+1 Frequency Diversity), and include switching and loopback functions where applicable.

6.5 SUPERVISION MENU

6.5.1 Supervision Dropdown Menu

See Figure 6-4 for the Supervision dropdown menu.

Figure 6-4 Supervision Dropdown Menu

6.5.2 Access State Menu

See Figure 6-5 for the Access State Menu

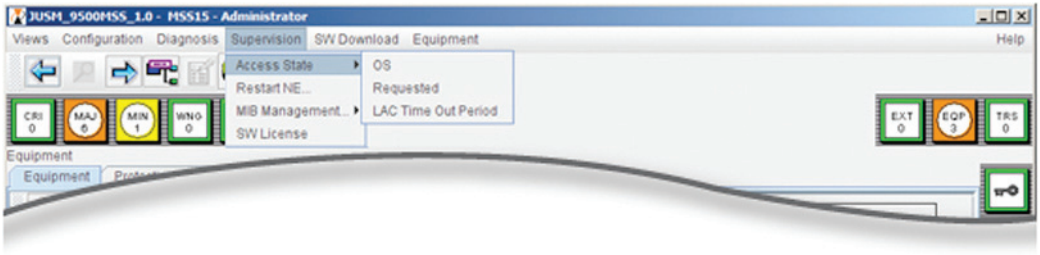


Figure 6-5 Access State Menu

The NE can be managed by the Operating System (OS) or by the Craft Terminal (CT). The selection of the NE manager is controlled by the Local Access Control (LAC) function. The OS manages the NE until a *request to manage* from the Craft Terminal is received (via LAC) and granted. The request is initiated by the user clicking on the *Requested* button on the menu and then answering *yes* to the resulting confirmation message. The LAC request can be denied by the OS (if for example the OS is in a state of recovery from a temporary loss of communication with the NE).

The *request to manage* starts a timer. If the OS doesn't answer a CT *request to manage* in a predefined time, the CT automatically becomes the NE manager. The predefined time is set by the user on the LAC Time Out Period screen (See Figure 6-6).

The manager currently managing the NE is indicated on the Craft Terminal screen by the shape of the icon with the key symbol.

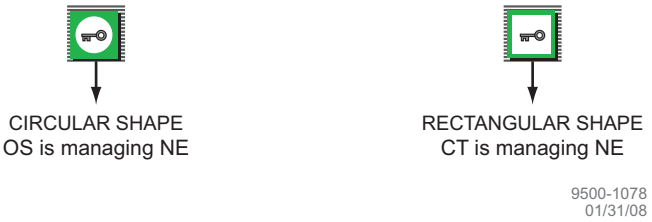


Figure 6-6 LAC Time Out Period

6.5.3 SW License

See Figure 6-8 for the SW License screen. This screen is a read-only screen that shows all the license key information on the flash card installed on the main CSM.

6.5.3.1 Display Current Software License

The operator can display the current software license by performing these steps.

1 From the WebEML screen, select the **Supervision** dropdown menu. See Figure 6-7.

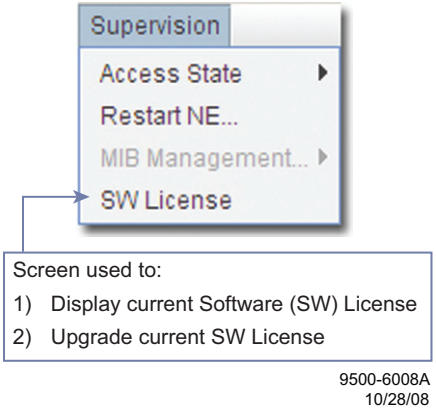
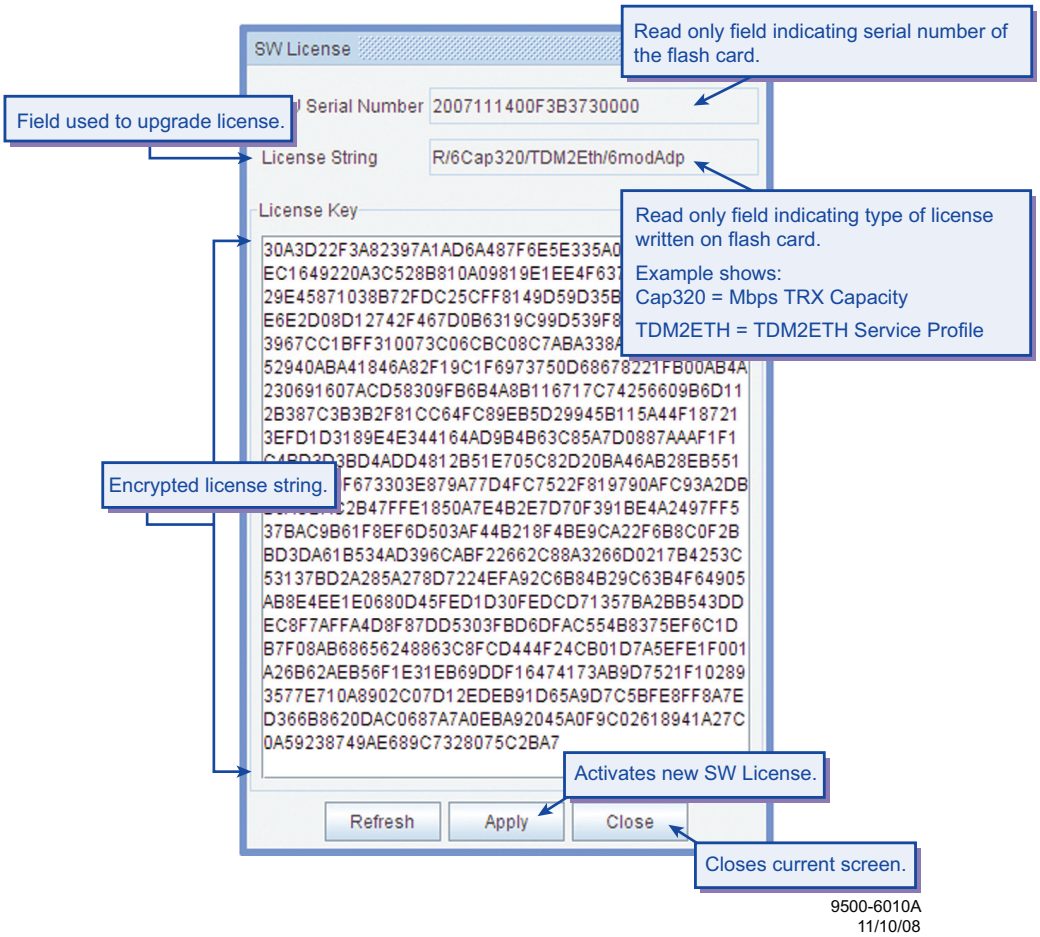


Figure 6-7 Supervision Screen Menu

2 Select the **SW License** option. The SW License screen (Figure 6-8) will display.



9500-6010A
11/10/08

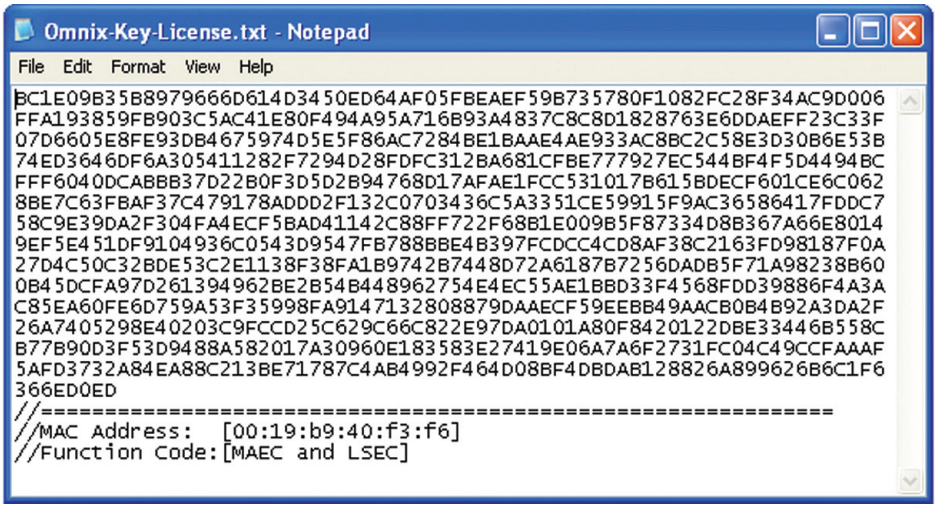
Figure 6-8 SW License Screen

3 Click **Close** to close the screen.

6.5.3.2 Upgrade Current Software License

The operator can upgrade the current software license by performing these steps.

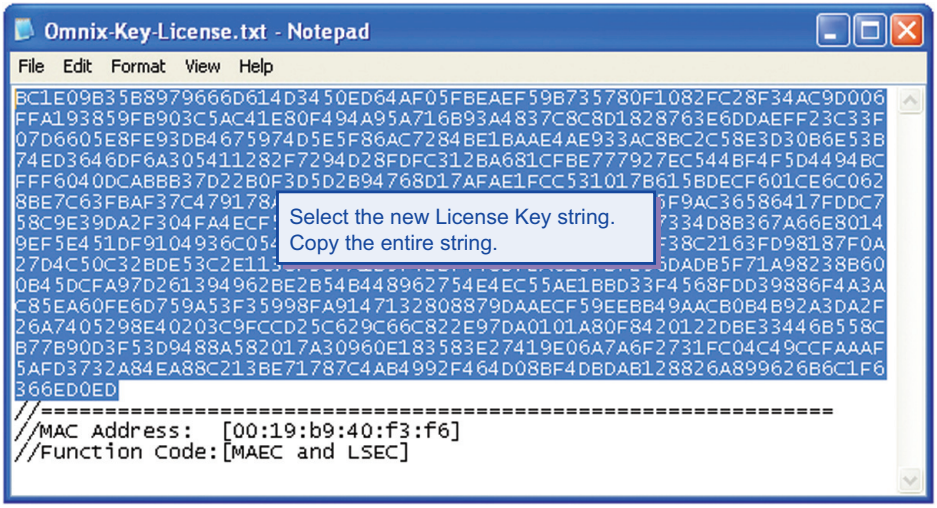
1 Open the **Omnix Key License** text file by using Word Pad. See the example (Figure 6-9).



9500-6012A
10/28/08

Figure 6-9 Omnix Key License Text File

2 See Figure 6-10. Click inside the **License Key** field in front of the first number/character. Hold the mouse button down and drag all the way to the last number/character as shown.

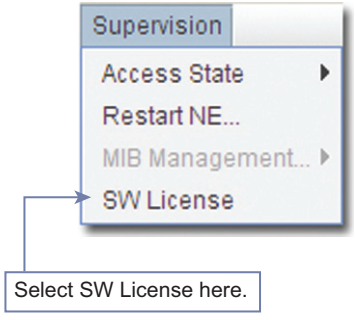


9500-6011A
10/28/08

Figure 6-10 Selecting New License Key String

3 From the menu area of Word Pad, select **Edit**, then **Copy**.

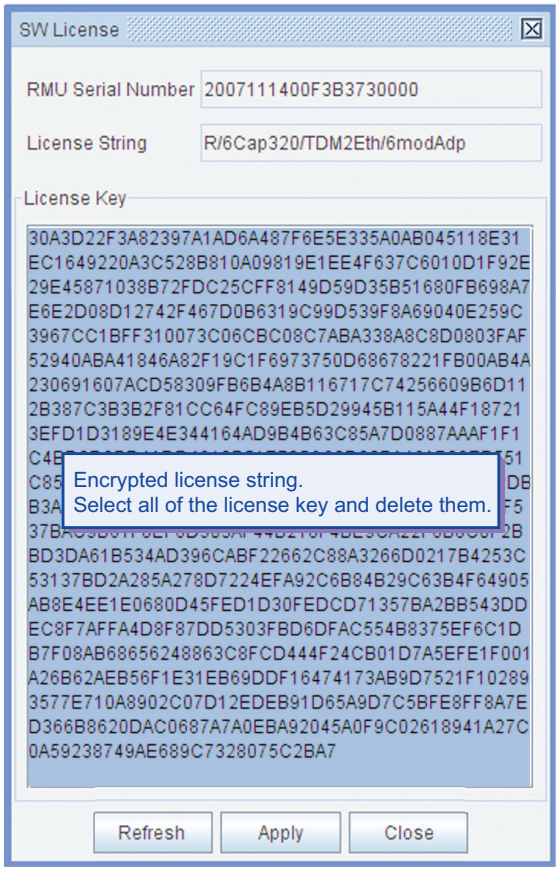
4 From the WebEML screen, select the **Supervision** dropdown menu.



9500-6018A
11/07/08

5 Select the **SW License** option. The SW License screen (Figure 6-8) will display.

6 Move your mouse and click inside the **License Key** field in front of the first number/character. Click and hold the mouse button down and drag down all the way to the last number/character. Verify that the entire license key is highlighted. See Figure 6-11.



9500-6009A
10/28/08

Figure 6-11 Deleting Old License Key String

7 Press **Control (Ctrl)** and the **V** key on your keyboard at the same time to paste the new software license number into the License Key field.

8 Click **Apply** to apply the new software license.

9 Click **Close** to close the screen.