Quick Guide
1:N Protection
(V4150/Protection Relay Shelf)

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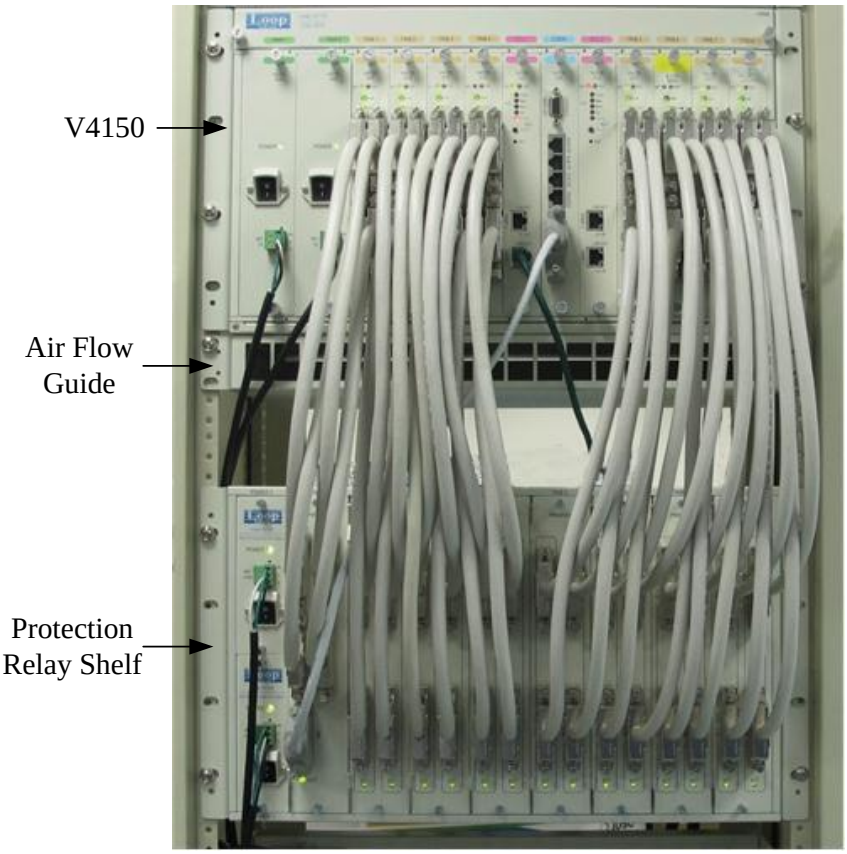
1 Introduction

The Protection Relay Shelf support with 1:N (N ≤ 7) protection for 63/32/16 High Density E1/T1 cards of Loop-V4150, this protection scheme allows up to N multiple working lines to be protected by 1 protection line. If a failure (alarm) occurs, it will be switch over from working lines traffic to the protection facility, the N multiple working lines could be bridged to the protection line, but only one path can be protected at a time.

Protection function actives when the Line of High Density E1/T1 Card in V4150 occur Loss Inter Package Communication (IPC) or Card Pull Out.



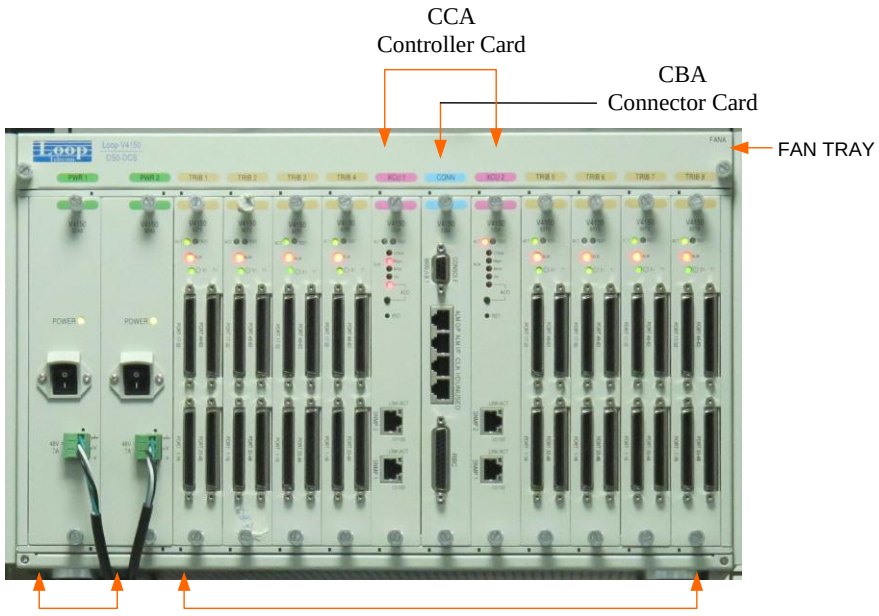
2 Physical Requirement

The physical configuration shall have one V4150 unit and one protection relay shelf.

V4150:

Loop-V4150 DS0 Cross Connect System is a standard compliant high density DCS systems with full T1/E1 cross-connect rack system. With system capacity support up to 1008E1/1344T1 DS0 non-blocking cross connect matrix, the V4150 DS0 Cross Connect System can offer high density capacity up to 504E1/T1. The V4150 DS0 Cross Connect System offers the service provider protection schemes including 1+1, 1:1 and 1:N protection for tributary cards.

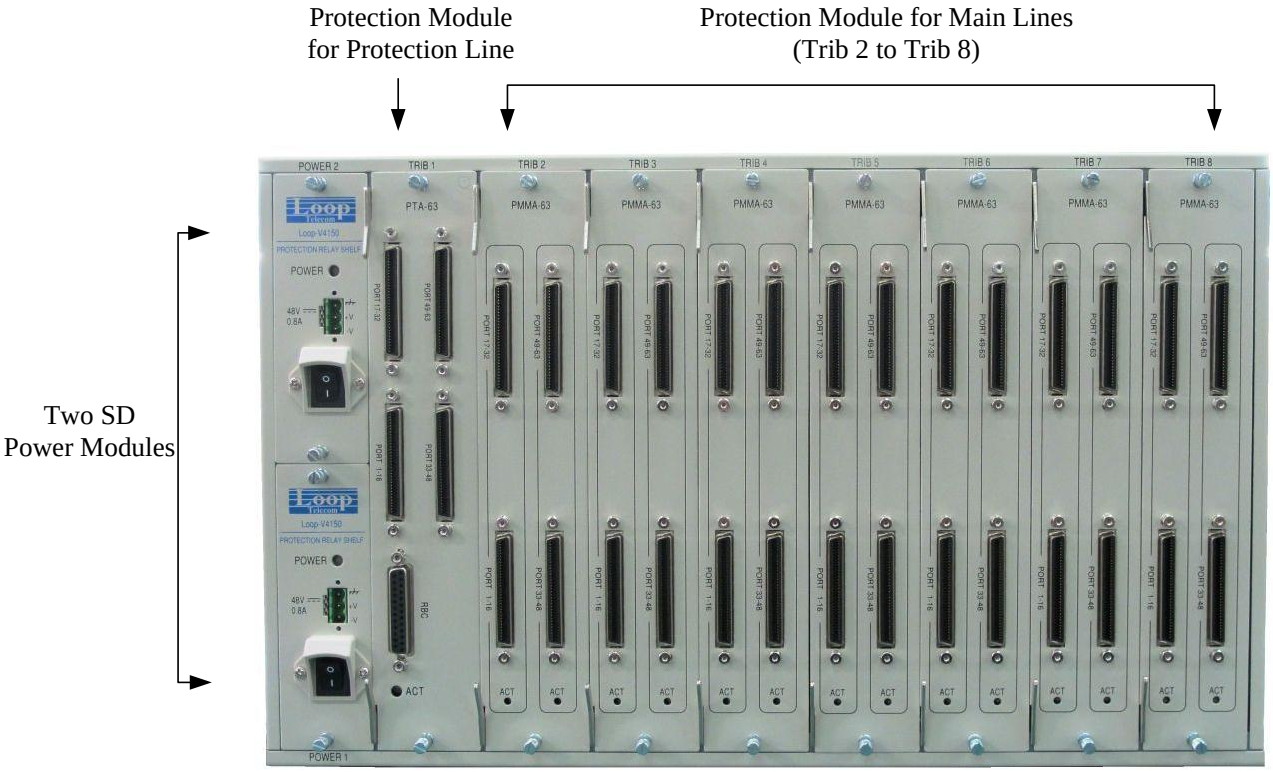
All interfaces are fully compliant with the relevant ETSI standards and ITU recommendations. The V4150 DS0 Cross Connect System provides powerful Operation, Administration, Maintenance and Provisioning (OAM&P) functionality, including fault management, performance monitoring, configuration management, and network security management. Through console port, LAN port, the OAM&P can achieve both locally and remotely via SNMP or menu-driven interfaces.



Required:

- One 63/32/16E1/T1 card must install in Trib 1
- At least Two and Up to Seven 63/32/16 E1/T1 card install from Trib 2 to Trib 8
- At least One power module

Protection Relay Shelf:

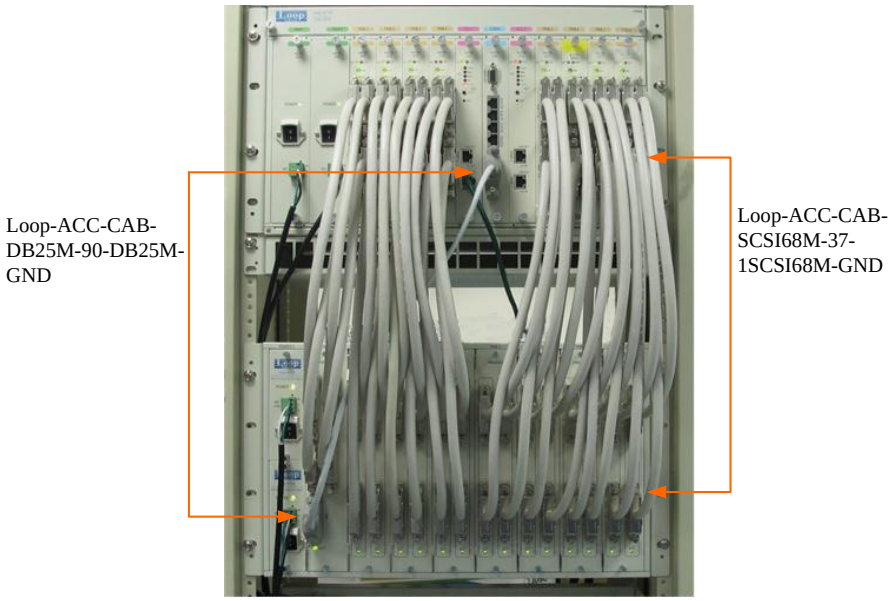


Required:

- One Protection Module for Protection Line card (PTA card) must install in Trib 1
- At least One and up to Seven Protection Module for Main Line card (PMMA) card install from Trib 2 to Trib 8
- At least One power module

Cables:

- Loop-ACC-CAB-SCSI68M-37-1SCSI68M-GND: Connects to Port 1-16, Port 17-32, Port 33-48, and Port 49-63 in both V4150 and Protection Relay Shelf and MUST be parallel. In order word, the cable needs to connect to Port1-16 of V4150 and Port1-16 of Protection Relay Shelf. At least 12 cables needed each 4 for Trib 1, Trib 2, and Trib 3. The maximum is 32 cables.
- Loop-ACC-CAB-DB25M-90-DB25M-GND: Connects to RBC port of Connect Card in V4150 and RBC port of Protection Module for Protection line (PTA) card in Protection Relay Shelf. One cable required only.


Loop-ACC-CAB-DB25M-90-DB25M-GND
Loop-ACC-CAB-SCSI68M-37-1SCSI68M-GND

3 Installation

3.1 Site Preparation

Ensure that your installation site conforms to all environmental and structural regulations. A power supply must be available that conforms to the V4150 power requirements.

3.2 Mechanical Installation

Wear a grounding wrist strap while installing the equipment. Familiarize yourself with the instructions in this manual before commencing any work.

3.2.1 Installation Overview

When installing V4150 equipment into racks, follow these guidelines:

- Consider the effect of additional electronic equipment and its generated heat on the V4150 system equipment.
- Make sure the equipment rack is properly secured to the ground and, if required, to the ceiling.
- Ensure that the weight of the equipment does not make the rack unstable.
- When mounting equipment between two posts or rails, ensure that the minimum clearance between the sides is 485 mm (19 in.).
- Maintain a minimum clearance of 500 mm (19.7 in.) in front of the equipment and 500mm (19.7 in.) at the rear.
- Maintain a minimum clearance of 44 mm (1U height) above and below the equipment.

3.2.2 Chassis Grounding

The chassis is grounded when rack mounted. However, if extra grounding protection for rack mounted units is desired, a dedicated chassis ground screw and lock washer is provided. The chassis ground screw is located on the right hand side of the rear panel as shown in Figure 2-3, below.

Figure 3-1Ground Screw Location

When attaching a ground wire to the chassis ground screw, please follow these instructions.

- Use copper grounding conductors of 18 AWG
- Conductors should not be of dissimilar metals.
- The bare conductors should be coated with anti-oxidant before crimp connections are made.
- Any unplated connection surfaces, connectors, braided strap and bus bars must be bought to a bright finish and coated with anti-oxidant before connections are made.

3.2.3 Power Connection

The power connection on your unit will be either AC 90-240 Vac, 50 - 60Hz (3 pronged plug) or DC - 48Vdc (-36 to -72Vdc) 3 pin block. The power switch should be in the OFF position while you connect the power source.

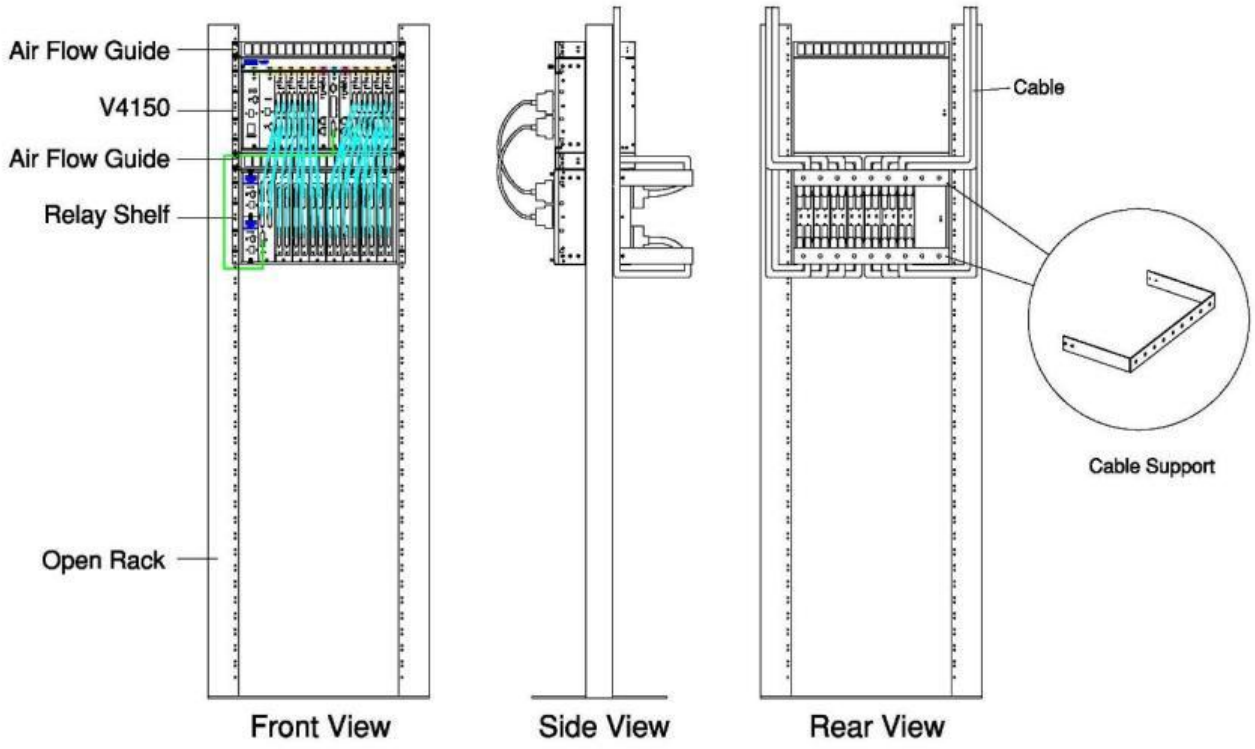
Caution: Do not (under any circumstances) connect the V4150 to a power source that is inconsistent with the power rating labeled on the rear of the device. Do not (under any circumstances) remove the power module from the V4150 while it is connected to live power source. Disconnect the module from the power source before removing it from the V4150.

3.3 Setup Procedure

IMPORTANT:

The # 2-56 UNC screw is for SCSI 68 cable use and the outer diameter is 2.0 mm, to avoid excessive force to cause screw slip teeth or broken. While install the SCSI68 cable between V4150 & Protection Relay Shelf, the use of electric screw driver torque setting should be <= 2.2pound or 1 kg or the use of mechanical screw driver go to tight then stop.

The figures shown below are the front, side and rear views of Rack Mounted



Hardware Procedure:

1. Connect four cables: Loop-ACC-CAB-SCSI68M-37-1SCSI68M-GND to Port 1-16, Port 17-32, Port 33-48, and Port 49-63 of Trib 1 for V4150 and Protection Relay Shelf.
2. Connect one cable: Loop-ACC-CAB-DB25M-90-DB25M-GND to RBC port of CBA in V4150 and RBC port of PTA in Protection Relay Shelf.
3. Connect four cables: Loop-ACC-CAB-SCSI68M-37-1SCSI68M-GND to Port 1-16, Port 17-32, Port 33-48, and Port 49-63 of Trib 2 for V4150 and Protection Relay Shelf.
4. Repeat step 3 up to 1:N (N ≤ 7)protection for 63TE cards of V4150.
5. Turn on the power.
6. Go to VT-100 in V4150 to do the 1:N Protection setup.

VT-100 Menu Setup

The following VT-100 screens are the step by step procedure of 1:N Protection Setup.

1. The user needs to assign the unit registration to E1-1:N to the desire slots first. To enable the 1: N protection, the slot 1 MUST register as E1-1:N or T1-1:N.

Path: Controller Menu > (N) Unit Registration

```
V4150              === Tributary Card Information ===   16:00:33 06/13/2012

SL.  REG. Model/Mode       Card Model      Software Version    Remark
===  ====================  ==============  ==================  ==============
#1   E1-1:N(63Port)        E1/T1(63Port)   V1.01.01 06/12/2012
#2   E1-1:N(63Port)        E1/T1(63Port)   V1.01.01 06/12/2012
#3   E1-1:N(63Port)        E1/T1(63Port)   V1.01.01 06/12/2012
#4   E1-1:N(63Port)        E1/T1(63Port)   V1.01.01 06/12/2012
#5   E1-1:N(63Port)        E1/T1(63Port)   V1.01.01 06/12/2012
#6   E1-1:N(63Port)        E1/T1(63Port)   V1.01.01 06/12/2012
#7   E1-1:N(63Port)
#8   E1-1:N(63Port)        E1/T1(63Port)   V1.01.01 06/12/2012
                                  (PRTD = Protected, NP = No Protection)

<< ESC key to return to previous menu, SPACE bar to refresh >>
```

Note: The user can go to Controller Menu T -> Tributary Card Information to view the current status of all the tributary cards.

2. To enable the protection. There are two protection modes: non-revertive and revertive.

   Path: Controller Menu > (S) System Config Setup > (L) 1:N Protection Setup

   Below screen is to enable the protection function with non-revertive mode. In this setup, when any one of E1/T1 cards from slot 2 to 7 is fail, it will switch to slot 1(PTA card) to enable the protection. With the non-revertive mode, even when the card works again, it will stay in slot 1 (PTA card).

```
V4150                 === 1:N Protection Setup ===     15:19:44 06/13/2012
ARROW KEYS: CURSOR MOVE, TAB/`: ROLL UP/DOWN OPTIONS
Protection: 1:7 Enable
Mode      : non-revertive

Slot#    Role        Status
--------------------------------
  1      Protection   ON
  2      Working      ON
  3      Working      ON
  4      Working      ON
  5      Working      ON
  6      Working      ON
  7      Working      ON
  8      Working      OFF


Switch command: Off



>> Change configuration (Y/N)? (Note:to save,please use V-command)
```

Below screen is to enable the protection function with revertive mode. In this setup, when any one of E1/T1 cards from slot 2 to 7 is fail, it will switch to slot 1 (PTA card) to enable the protection. With the revertive mode, even when the card works again, it will switch back to the card automatically.

```
V4150                 === 1:N Protection Setup ===     15:19:44 06/13/2012
ARROW KEYS: CURSOR MOVE, TAB/`: ROLL UP/DOWN OPTIONS
Protection: 1:7 Enable
Mode      : revertive

Slot#    Role        Status
--------------------------------
  1      Protection   ON
  2      Working      ON
  3      Working      ON
  4      Working      ON
  5      Working      ON
  6      Working      ON
  7      Working      ON
  8      Working      OFF


Switch command: Off



>> Change configuration (Y/N)? (Note:to save,please use V-command)
```

3. If the user wants to do switch manually, turn on the switch command to desire slot. In this setup, the switch command slot card will switch to slot 1 (PTA card) to enable the protection.

```
V4150                 === 1:N Protection Setup ===     15:19:44 06/13/2012
ARROW KEYS: CURSOR MOVE, TAB/`: ROLL UP/DOWN OPTIONS
Protection: 1:7 Enable
Mode     : revertive

Slot#    Role        Status
--------------------------------
  1      Protection   ON
  2      Working      ON
  3      Working      ON
  4      Working      ON
  5      Working      ON
  6      Working      ON
  7      Working      ON
  8      Working      OFF


Switch command:slot2


>> Change configuration (Y/N)? (Note:to save,please use V-command)
```

After the configuration has change, you need to save the configuration to enable the function.

4 Reference

4.1 LED indicator

The table below shows all LED indicators for Protection Relay Shelf.

Table 4-1 LED Indicator Table

LED	Color	Indicator
DC Power Card		
POWER	OFF	Power off
	GREEN	Normal
PMMA Cards		
ACT	OFF	Not active
	GREE	Normal
	RED	The card is in protection mode
PTA Card –RBC LED indicator		
ACT	GREEN	RBC normal but not in protection mode
	FLASHING GREEN	Protection mode enable
	RED	RBC disconnect
Telco 64 Connectors		
ACT	GREEN	RBC normal but not in protection mode
	FLASHING GREEN	Protection mode enable

4.2 Pin Assignments

4.2.1 SCSI 68 female connector

Each of PTA and PMMA cards contains 4 SCSI female connectors. The pin assignment defines and tables as follows:

Table 4-2 E1/T1 SCSI 68 Pin Assignment (Port 1~32)

E1/T1 Pin Number (Port 1-16)	SCSI 68 Pin Number	E1 Signal	SCSI 68 Pin Number	E1/T1 Port Number (Port 17~32)
1	15	Tx Tip	15	17
	16	Tx Ring	16	
	49	Rx Tip	49	
	50	RX Ring	50	
2	13	Tx Tip	13	18
	14	Tx Ring	14	
	47	Rx Tip	47	
	48	RX Ring	48	
3	11	Tx Tip	11	19
	12	Tx Ring	12	
	45	Rx Tip	45	
	46	RX Ring	46	
4	9	Tx Tip	9	20
	10	Tx Ring	10	
	43	Rx Tip	43	
	44	RX Ring	44	
5	7	Tx Tip	7	21
	8	Tx Ring	8	
	41	Rx Tip	41	
	42	RX Ring	42	
6	5	Tx Tip	5	22
	6	Tx Ring	6	
	39	Rx Tip	39	
	40	RX Ring	40	
7	3	Tx Tip	3	23
	4	Tx Ring	4	
	37	Rx Tip	37	
	38	RX Ring	38	
8	1	Tx Tip	1	24
	2	Tx Ring	2	
	35	Rx Tip	35	
	36	RX Ring	36	
9	31	Tx Tip	31	25
	32	Tx Ring	32	
	65	Rx Tip	65	

E1/T1 Pin Number (Port 1-16)	SCSI 68 Pin Number	E1 Signal	SCSI 68 Pin Number	E1/T1 Port Number (Port 17~32)
	66	RX Ring	66	
10	29	Tx Tip	29	26
	30	Tx Ring	30	
	63	Rx Tip	63	
	64	RX Ring	64	
11	27	Tx Tip	27	27
	28	Tx Ring	28	
	61	Rx Tip	61	
	62	RX Ring	62	
12	25	Tx Tip	25	28
	26	Tx Ring	26	
	59	Rx Tip	59	
	60	RX Ring	60	
13	23	Tx Tip	23	29
	24	Tx Ring	24	
	57	Rx Tip	57	
	58	RX Ring	58	
14	21	Tx Tip	21	30
	22	Tx Ring	22	
	55	Rx Tip	55	
	56	RX Ring	56	
15	19	Tx Tip	19	31
	20	Tx Ring	20	
	53	Rx Tip	53	
	54	RX Ring	54	
16	17	Tx Tip	17	32
	18	Tx Ring	18	
	51	Rx Tip	51	
	52	RX Ring	52	

Table 4-3 E1/T1 SCSI 68 Pin Assignment (Port 33~63)

E1/T1 Pin Number (Port 33-48)	SCSI 68 Pin Number	E1/T1 Signal	SCSI 68 Pin Number	E1/T1 Port Number (Port 49 ~ 63)
33	15	Tx Tip	15	49
	16	Tx Ring	16	
	49	Rx Tip	49	
	50	RX Ring	50	
34	13	Tx Tip	13	50
	14	Tx Ring	14	
	47	Rx Tip	47	
	48	RX Ring	48	
35	11	Tx Tip	11	51
	12	Tx Ring	12	
	45	Rx Tip	45	
	46	RX Ring	46	
36	9	Tx Tip	9	52
	10	Tx Ring	10	
	43	Rx Tip	43	
	44	RX Ring	44	
37	7	Tx Tip	7	53
	8	Tx Ring	8	
	41	Rx Tip	41	

E1/T1 Pin Number (Port 33-48)	SCSI 68 Pin Number	E1/T1 Signal	SCSI 68 Pin Number	E1/T1 Port Number (Port 49 ~ 63)
	42	RX Ring	42	
38	5	Tx Tip	5	54
	6	Tx Ring	6	
	39	Rx Tip	39	
	40	RX Ring	40	
39	3	Tx Tip	3	55
	4	Tx Ring	4	
	37	Rx Tip	37	
	38	RX Ring	38	
40	1	Tx Tip	1	56
	2	Tx Ring	2	
	35	Rx Tip	35	
	36	RX Ring	36	
41	31	Tx Tip	31	57
	32	Tx Ring	32	
	65	Rx Tip	65	
	66	RX Ring	66	
42	29	Tx Tip	29	58
	30	Tx Ring	30	
	63	Rx Tip	63	
	64	RX Ring	64	
43	27	Tx Tip	27	59
	28	Tx Ring	28	
	61	Rx Tip	61	
	62	RX Ring	62	
44	25	Tx Tip	25	60
	26	Tx Ring	26	
	59	Rx Tip	59	
	60	RX Ring	60	
45	23	Tx Tip	23	61
	24	Tx Ring	24	
	57	Rx Tip	57	
	58	RX Ring	58	
46	21	Tx Tip	21	62
	22	Tx Ring	22	
	55	Rx Tip	55	
	56	RX Ring	56	
47	19	Tx Tip	19	63
	20	Tx Ring	20	
	53	Rx Tip	53	
	54	RX Ring	54	
48	17	Tx Tip		
	18	Tx Ring		
	51	Rx Tip		
	52	RX Ring		

4.2.2 DB25 female connector

The PTA card has one RBC connector which is DB25 female connector. The pin assignment defines and table as follows:

Table 4-4 DC25 Pin Assignment

Pin Number	Signal
1	Transmit Data TIP
14	Transmit Data RING
2	Receive Data TIP
15	Receive Data RING
3 to 13 and 16 to 25	Unassigned

4.2.3 Telco 64 female connector

The rear panel of Protection Relay shelf has 27 Telco 64 female connectors. The pin assignment defines and table as follows:

Table 4-5 Telco 64 Pin Assignment

Telco 64	POTs Definition
Pin 1	RX port-1_RING
Pin 33	RX port-1_TIP
Pin 2	TX port-1_RING
Pin 34	TX port-1_TIP
Pin 3	RX port-2_RING
Pin 35	RX port-2_TIP
Pin 4	TX port-2_RING
Pin 36	TX port-2_TIP
Pin 5	RX port-3_RING
Pin 37	RX port-3_TIP
Pin 6	TX port-3_RING
Pin 38	TX port-3_TIP
Pin 7	RX port-4_RING
Pin 39	RX port-4_TIP
Pin 8	TX port-4_RING
Pin 40	TX port-4_TIP
Pin 9	RX port-5_RING
Pin 41	RX port-5_TIP
Pin 10	TX port-5_RING
Pin 42	TX port-5_TIP
Pin 11	RX port-6_RING
Pin 43	RX port-6_TIP
Pin 12	TX port-6_RING
Pin 44	TX port-6_TIP
Pin 13	RX port-7_RING
Pin 45	RX port-7_TIP

Telco 64	POTs Definition
Pin 14	TX port-7_RING
Pin 46	TX port-7_TIP
Pin 15	RX port-8_RING
Pin 47	RX port-8_TIP
Pin 16	TX port-8_RING
Pin 48	TX port-8_TIP
Pin 17	RX port-9_RING
Pin 49	RX port-9_TIP
Pin 18	TX port-9_RING
Pin 50	TX port-9_TIP
Pin 19	RX port-10_RING
Pin 51	RX port-10_TIP
Pin 20	TX port-10_RING
Pin 52	TX port-10_TIP
Pin 21	RX port-11_RING
Pin 53	RX port-11_TIP
Pin 22	TX port-11_RING
Pin 54	TX port-11_TIP
Pin 23	RX port-12_RING
Pin 55	RX port-12_TIP
Pin 24	TX port-12_RING
Pin 56	TX port-12_TIP
Pin 25	RX port-13_RING
Pin 57	RX port-13_TIP
Pin 26	TX port-13_RING
Pin 58	TX port-13_TIP
Pin 27	RX port-14_RING
Pin 59	RX port-14_TIP
Pin 28	TX port-14_RING
Pin 60	TX port-14_TIP
Pin 29	RX port-15_RING
Pin 61	RX port-15_TIP
Pin 30	TX port-15_RING
Pin 62	TX port-15_TIP
Pin 31	RX port-16_RING
Pin 63	RX port-16_TIP

Telco 64	POTs Definition
Pin 32	TX port-16_RING
Pin 64	TX port-16_TIP