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IP DSLAM

User Guide

Table of Contents

Chapter 1 Preface

This preface discusses the following topic:

- Purpose
- Organization
- Conventions

Purpose

The purpose of this guide is to provide the basic information and operation of NCT192 IP-DSLAM, which includes both software and hardware architecture and other specific features.

Organization

This guide contains the following information:

- Preface
- System Overview
- Shelf and Card Module Overview
- Prepare for Installation
- Installing the NCT192
- General Troubleshooting
- Appendix

Conventions

This section describes the conventions used in this guide.

NE/NEs mention in this document means NCT192 IP-DSLAM

CLI Ex – Command line management with a local console or Telnet through in-band or out-band IP interface for CIT (Craft Interface Terminal) connection.

This sign indicate the **NOTICE**. A note contains helpful suggestions or reference relay on the topical subjects.

This sign indicate the **TIP**. Performing the information described in the paragraph will help you solve a problem. The tip information might not be troubleshooting or even an action, but could be useful information.

This sign indicate the **CAUTION**. In this situation, you might do something that could result in equipment damage or loss of data.

This sign indicate the DANGER. You are in situation that could cause bodily injury. Before you work on any equipment, you must be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

Chapter 2 System Overview

The NCT192 system contains NCT192 IP-DSLAM and NCT192S Splitter Shelf.

The NCT192 IP-DSLAM is built in 7.88 inch (4.5U) height, 11.8 inch (30 cm) depth, and 19 inch width (23 inch bracket available) compact design. It is composed in one of Network Control Card (NC), four of Subscriber Line Card (LC) in single shelf.

The NCT192S Splitter shelf is built in 5.25 inch (3U) height, 10.8 inch (27.5 cm) depth, and 19 inch width (23 inch bracket available) compact design. It is composed in four of CO POTS Splitter Card (SC) in single shelf.

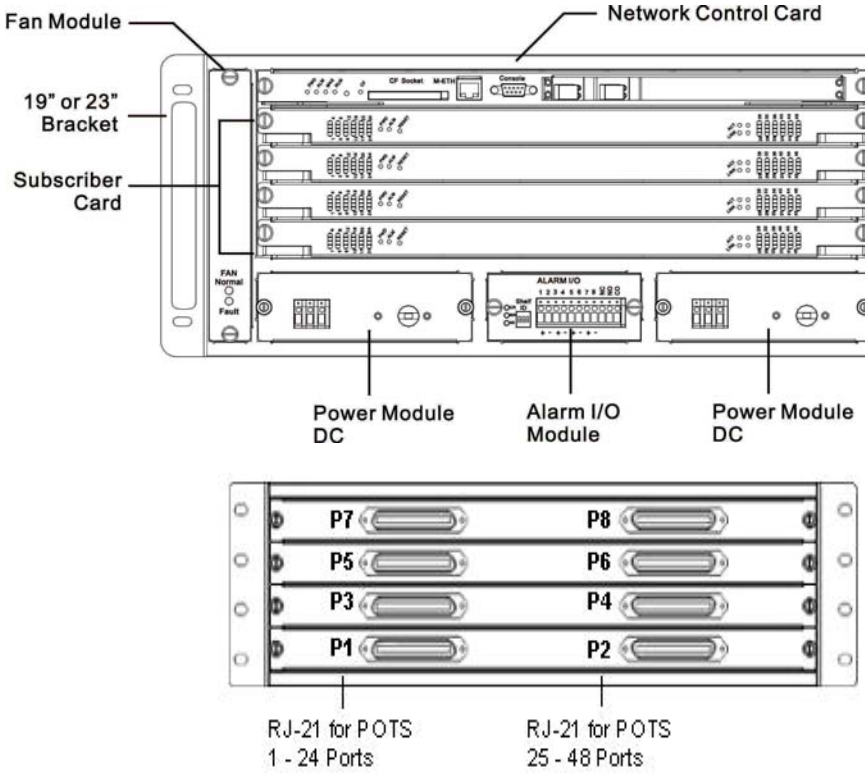
In order to supply permanent services, NCT192 IP-DSLAM provide 1+1DC power redundancy, it also owns 4 of alarm digital input connector for carry housekeeping and 1 alarm relay switch to connect with exterior device.

NCT192 and NCT192S Front View

NCT192 and NCT192S are designed in front access and modular units for easy installation and replacing.

The front shelf of NCT192S provides RJ-21 connector for POTS connection with PSTN networks.

Figure 2-1 NCT192 and NCT192S Front View Illustration



NCT192 and NCT192S Rear View

The NCT192 provides removable rear lid for maintenance purpose. For ADSL application, the rear shelf of NCT192S provides RJ-21 connectors for the ADSL link with NCT192 and Line connection with subscriber networks.

Figure 2-2 NCT192 and NCT192S Rear View Illustration

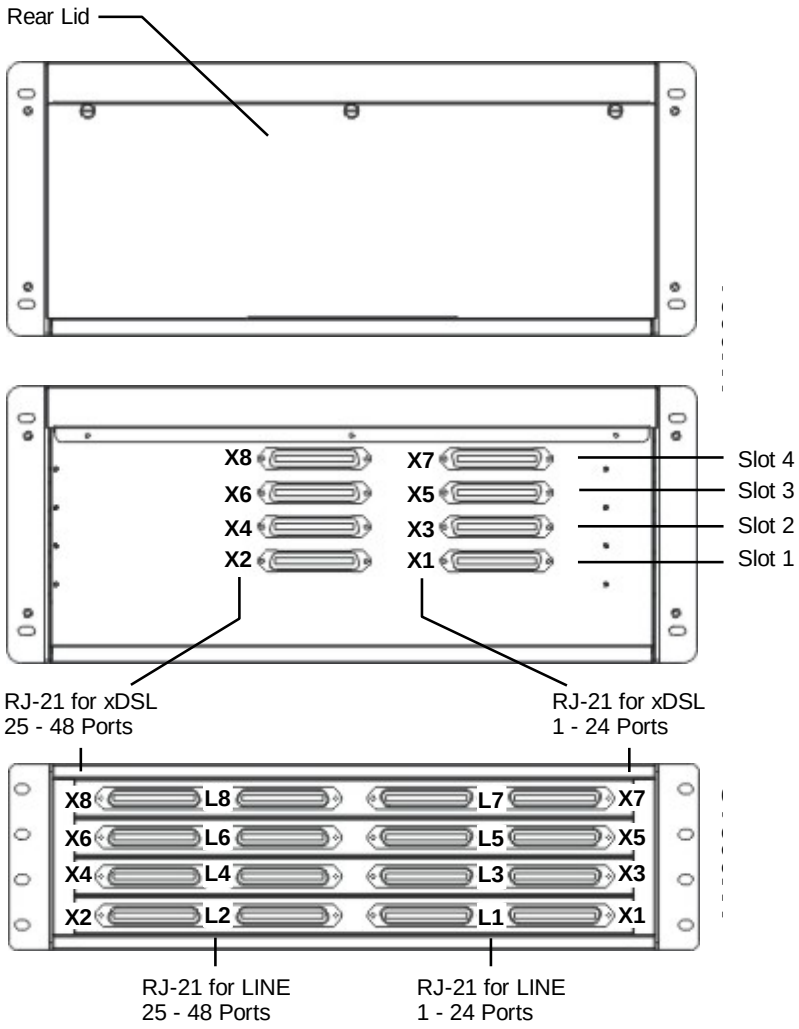


Table 2-1 NCT192 and NCT192S Port Connector

Connector Number	Description
X1 ~ X8	xDSL ports address at specific slot
L1 ~ L8	Line ports address at specific slot
P1 ~ P8	POTS ports address at specific slot

NCT192 and NCT192S Side View

NCT192 shelf provides the wiring handle and ventilation holes on two sides to improve the cabling as well as system thermo control.

Figure 2-3 NCT192 and NCT192S Left-hand Side View

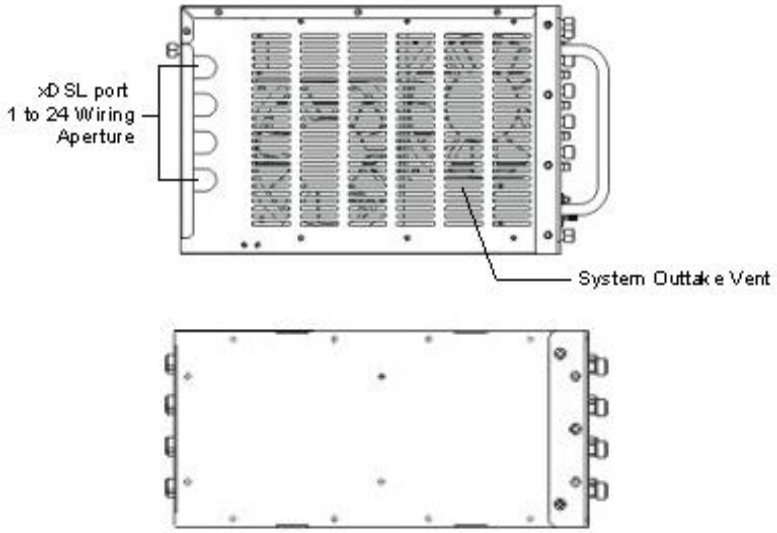
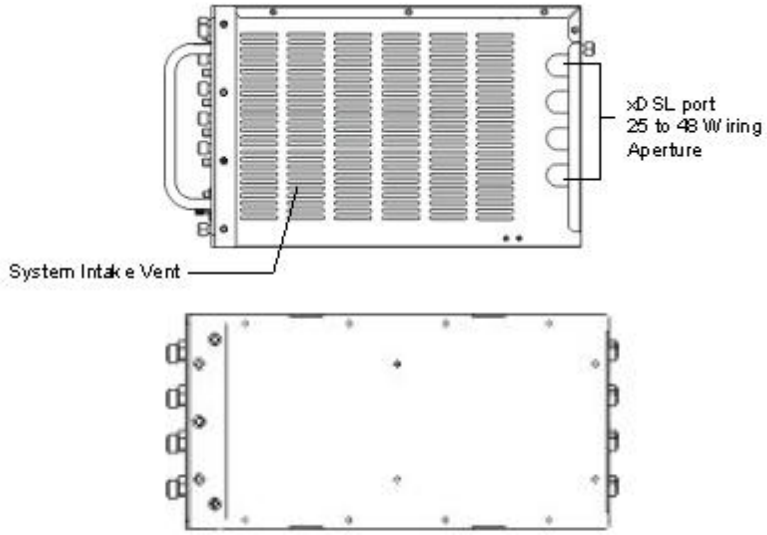


Figure 2-4 NCT192 and NCT192S Right-hand Side View



NCT192 Slot Structure

Figure 2-5 shows the slot structure of NCT192 IP-DSLAM.

Figure 2-5 NCT192 System Slot Structure

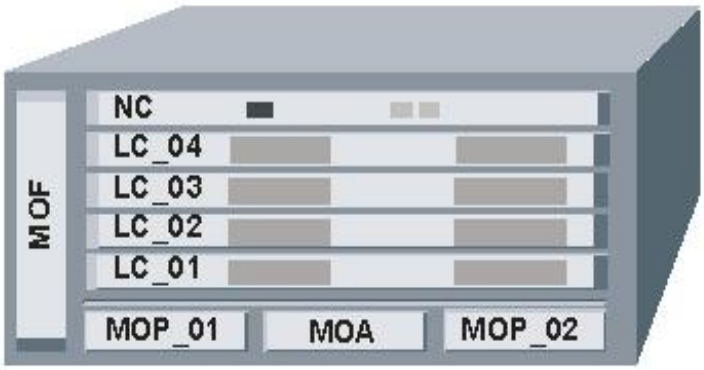


Figure 2-6 NCT192S POTS Splitter Slot Structure

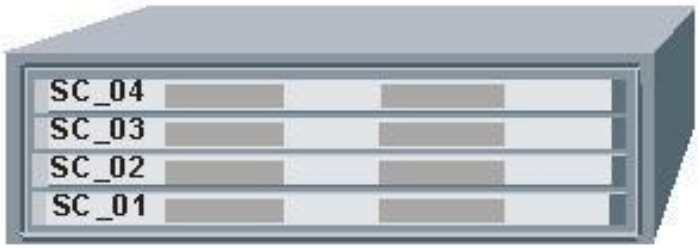


Table 2-2 Slot Structure V.S. Card/Module Notation

Slot	Card/Model Notation
NC	NCT1902 – two ports GE Network Control card
LC_01 ~ LC_04	NCT1901 – 48 ports ADSL Subscriber Line card
SC_01 ~ SC_04	NCT1901S – 48 ports ADSL CO POTS Splitter card
MOP_01 ~ MOP_02	DC power module
MOA	Alarm I/O module
MOF	System Fan module

Chapter 3 Card Module Overview

The card modules can be separated into three types, Network Control (NC) card, Subscriber Line card, and CO POTS Splitter card.

The NC card contains function of Control, Switch, and Network Trunk, while Subscriber Line card provides the xDSL subscriber interface.

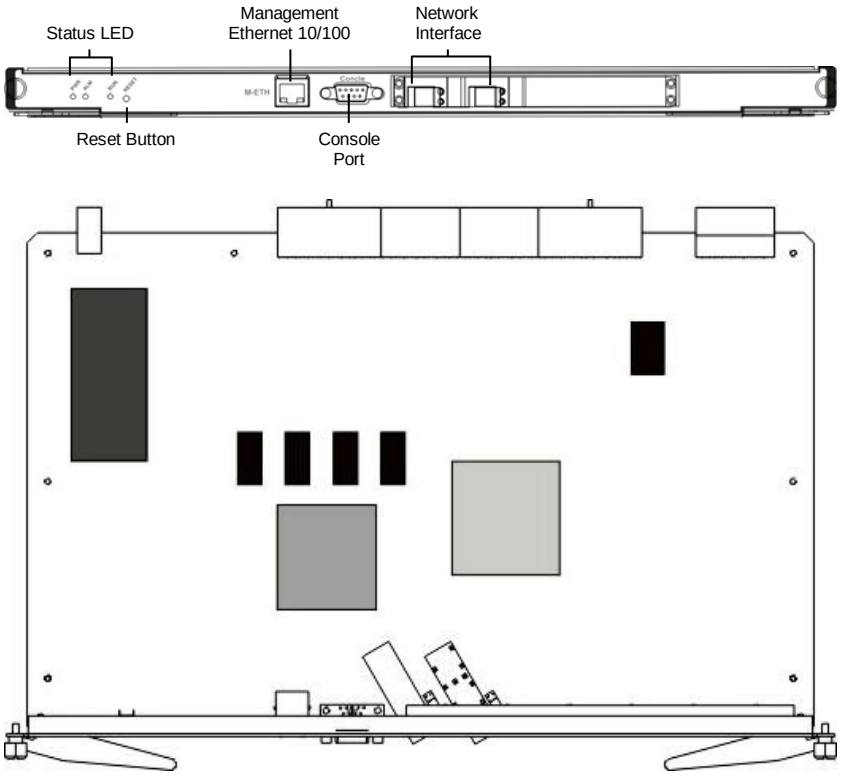
Network Interface – NCT1902 (1000 Base-SX, 1000 Base-LX, 1000 Base-LHX, 1000 Base-ZX)
Subscriber Line Interface – NCT1901 (ADSL)
POTS Splitter Interface – NCT1901S (ADSL)
Management Interface – NCT1902 (10/100 Base-T and Serial Console)

NCT192 Network Control Card

The NCT1902 Network Control (NC) card support 2 of pluggable mini-GBIC network interfaces.

- Performs central processor, host, and system controller functions
- Provides Wire-speed switch fabric
- Provides CO facility alarm relay contact interfaces associate with Alarm I/O module
- Provides Hot-swappable

Figure 3-1 NCT1902 Network Control Card Illustration



Faceplate Feature

The following list details of the NCT1902 Network Control (NC) card faceplate features:

- A maintenance RESET switch is located at the faceplate
- Two levers with locking tabs
- Provide operating system interface and internet ports:
  - RS-232 – DB-9 connector for a DTE device that complies with the EIA/TIA-232 standard and that provides connection to the CIT (Craft Interface Terminal) using command line operation
  - Ethernet – RJ-45 10/100 Base-T connector that complies with Ethernet standards and that provides connection to a system Ethernet for management access
- The LED indicates the Ethernet and Network Control card operating status

Table 3-1 NCT1902 LED Function Description

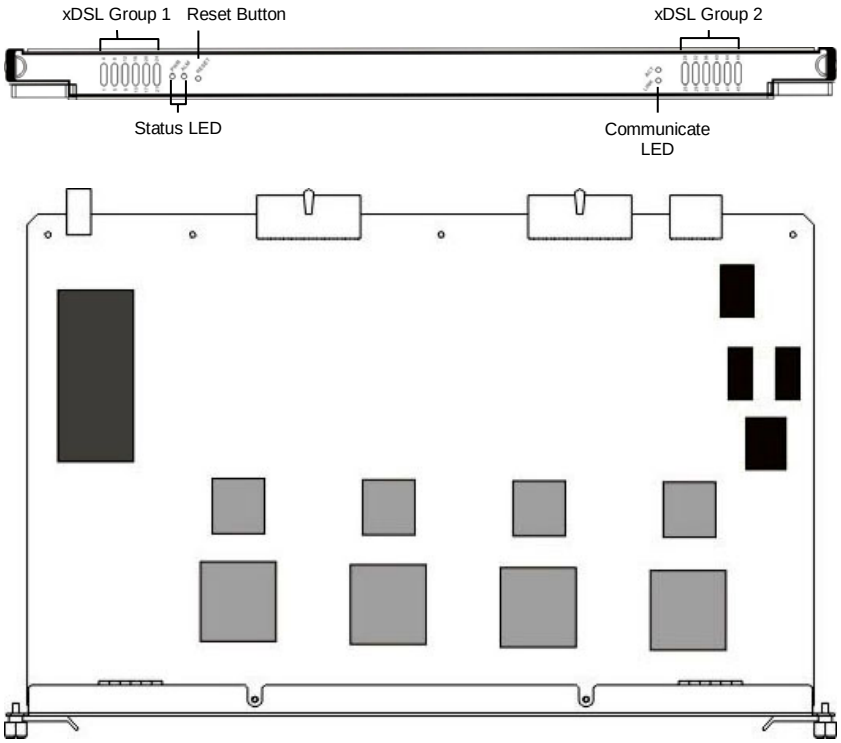
LED	State	Function
Status LED		
PWR	Green solid	NC card power normal
	Off	Card fault
ALM	Red solid	NC card alarm occurs
	Off	No NC card alarm occurs
RUN	Green solid	Indicates card module is activate on live
	Off	Card fault
Management Ethernet 10/100		
Yellow LED	Yellow blinking	Management Ethernet interface is activate
	Off	Management Ethernet interface is inactivate
Green LED	Green solid	Management Ethernet interface is link
	Off	No cable connect or port fault
Network Interface mini-GBIT Adaptor Module		
Orange LED	Orange Solid	GE interface is link
	Off	LOS is detect or no fiber cable connect
Green LED	Green Blinking	GE interface is activate
	Off	GE interface is inactivate

NCT192 Subscriber Line Card

The NCT1901 48 ports ADSL Subscriber Line card

- Supports 48 ADSL (ATU-C) modem connections
- Negotiates the line rate with the CPE when it trains and bases the rate on line quality
- Provides Hot-swappable

Figure 3-2 NCT1901 ADSL Subscriber Line Card Illustration



Faceplate Feature

The following list details the Subscriber Line card faceplate features:

- A maintenance RESET switch is located at the faceplate.
- Two levers with locking tabs.
- The LED indicates the Subscriber Line card operating, connection, and alarm status.

Table 3-2 NCT1901 LED Function Description

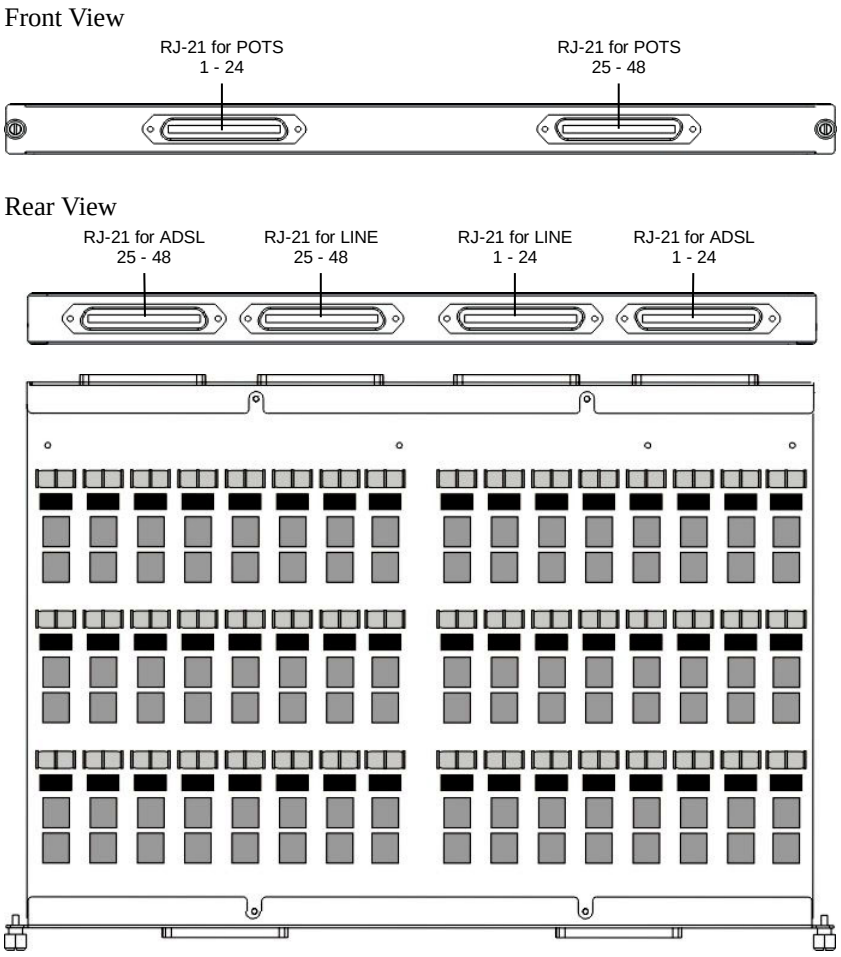
LED	State	Function
Status LED		
PWR	Green solid	Line card power normal
	Off	Card fault
ALM	Red solid	Line card alarm occurs
	Off	No Line card alarm occurs
Communicate LED		
LINK	Green solid	Line card is well link to NC card
	Off	No NC card occupied or Line card fault
ACT	Orange blinking	Line card is activate with NC card
	Off	No NC card occupied or inactivate with NC card
xDSL Group 1		
1 to 24	Green solid per port	The xDSL link is currently connect
	Green blinking 1 sec.	The xDSL link is down or link down
	Green blinking 1/4 sec.	The xDSL link is in handshaking
	Off	Port disable or no profile applied.
xDSL Group 2		
25 to 48	Green solid per port	The xDSL link is currently connect
	Green blinking 1 sec.	The xDSL link is down or link down
	Green blinking 1/4 sec.	The xDSL link is in handshaking
	Off	Port disable or no profile applied.

NCT1901S POTS Splitter Card

The NCT1901S ADSL POTS Splitter card:

- NCT1901S supports 48 ports of ADSL Line and Phone connections
- Compose in passive elements

Figure 3-3 NCT1901S ADSL POTS Splitter Card Illustration



NCT192 Alarm I/O Module

The Alarm I/O Module contains alarm I/O relay, system alarm LED, and Shelf ID switch.

Figure 3-4 Alarm I/O Module Illustration

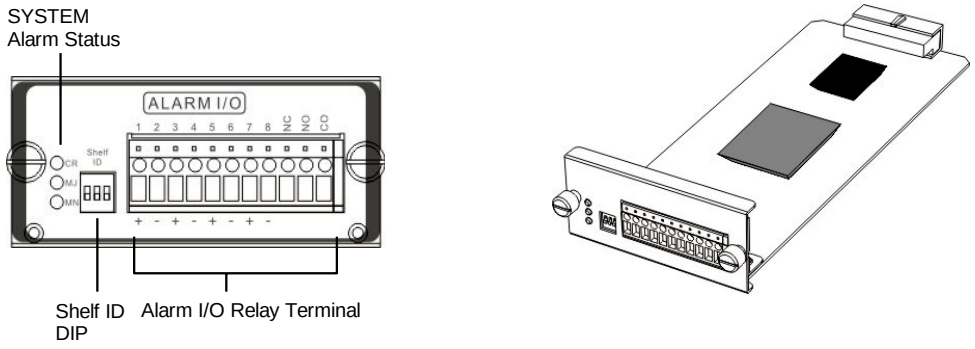


Table 3-3 NCT192 Alarm I/O Relay Pin Description

Digital I/O Pin	Description
Output Pin (for alarm output receptacle)	
CO	Common pin
NO	Circuit with normal open pin
NC	Circuit with normal close pin
Input Pin (for alarm input relay)	
1 (+), 2 (-)	First pair of input signal terminal
3 (+), 4 (-)	Second pair of input signal terminal
5 (+), 6 (-)	Third pair of input signal terminal
7 (+), 8 (-)	Fourth pair of input signal terminal
Power Rating	-48 VDC 0.5 A

Table 3-4 NCT192 System Alarm LED Function Description

LED	State	Function
System Alarm Status		
CR	Red solid	Detect Critical alarm occurring in system
	Off	No Critical alarm detected
MJ	Orange solid	Detect Major alarm occurring in system
	Off	No Major alarm detected
MN	Yellow solid	Detect Minor alarm occurring in system
	Off	No Minor alarm detected

Shelf ID is of no use now.

NCT192 Power Module

The NCT192 is equipped with two DC power modules to support the power redundancy function.

DC Power Module Terminal

Figure 3-5 DC Power Module Illustration

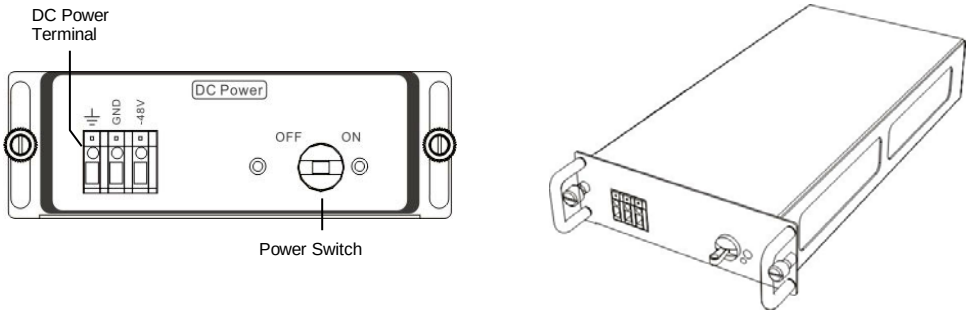


Table 3-5 DC Power Module Description

LED	State	Function
DC Power Module Status		
Terminal Block	-48V	The -48 VDC block
	GND	The GND block
	Ground	The Shelf and Power Grounding

NCT192 Fan Module

The fan module use to control the system temperature, the module has ability to detect and reporting if fan speed is abnormal.

Figure 3-6 Fan Module Illustration

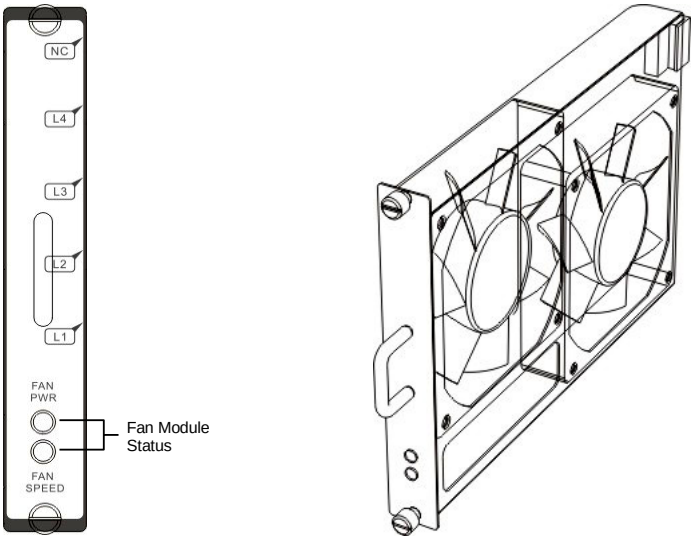


Table 3-6 Fan Module Description

LED	State	Function
Fan Module Status		
FAN PWR	Green solid	Fan module working normal
	Off	System power is no connect or module fault
FAN SPEED	Red solid	Fan module detect fault
	Off	System power is no connect or module fault

Chapter 4 Prepare for Installation

This chapter tells you how to prepare for the installation of the NCT192 Medium Capacity IP-DSLAM.
The chapter contains the following sections:

- Safety Requirements
- Site Requirements
- Tools and Equipment Required
- Unpacking the NCT192 System
- Verifying the Contents
- Inspecting for Damage

Safety Requirements

This section describes safety requirement of NCT192 system. Before you install the NCT192 system, ensure that all the criteria in this section are met. The section describes the following safety requirements:

- Safety Guidelines
- Preventing Electrostatics Discharge Damage
- General Maintenance Guidelines

Safety Guidelines

Before working on the equipment, be aware of standard safety guidelines and the hazards that are involved in working it electrical circuitry to prevent accidents. Adhere to the following cautions and warnings and those throughout the guide for safe and hazard-free installation.

Only trained and qualified personnel should be allowed to install or replace this equipment.

Before removing the equipment, disconnect the telephone-network cables to avoid contact with telephone-network voltages.

Do not work on system or connect or disconnect cables during periods of lightning activity.

Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

Read the power instructions before you connect the system to its power source.

For safety reason, the ground wire must connect to safety (earth) ground; ensure that the host is connected to earth ground during the normal use.

To reduce the risk of electric shock when servicing any individual unit, disconnect the power cord or cords that connect the unit to the DC bus bar.

Two people are required to lift the shelf. Grasp the shelf underneath the lower edge and lift with both hands. To prevent injury, keep your back straight and lift with your legs, not your back.

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

Ethernet cable must be shielded when used in a central office environment.

This unit is intended for installation in restricted access areas, A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

To reduce the risk of fire, use only No. 36 AWG or larger telecommunication line cord.

Use copper conductors only.

Never touch un-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

Use caution when installing or modifying telephone lines.

Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.

To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.

Ultimate disposal of this product should be handled according to all national laws and regulations.

Do not use this product near water; for example, near bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool.

Never install telephone RJ-21 connector in wet locations unless the connector is specifically designed for wet locations.

Do not use a telephone to report a gas leak in the vicinity of the leak.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) is a transfer of electrostatic charge between bodies of different electrostatic potentials, such as an operator and a piece of electrical equipment. It occurs when electronic components are improperly handled, and it can damage equipment and impair electrical circuitry. Electrostatic discharge is more likely to occur with the combination of synthetic fibers and dry atmosphere.

Use an antistatic strap during removing and replacing NCT192 units.

Always use an ESD ankle or wrist strap and ensure that it makes good skin contact.

To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively.

Do not touch any exposed contact pins or connector shells of interface ports that do not have a cable attached. If cables are connected at one end only, do not touch the exposed pins at the unconnected end of the cable.

This equipment is intended for use in residential and commercial environments only.

Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

General Maintenance Guidelines

The following maintenance guidelines apply to NCT192 system units:

Keep the NCT192 shelf area clear and dust-free during and after installation.

If you remove the chassis cover for any reason, store it in a safe place.

Do not perform any action that creates a hazard to people or makes equipment unsafe.

Keep walk areas clear to prevent falls or damage to equipment.

Site Requirements

This section describes requirements for the site in which the NCT192 system is to be installed. Before you install the NCT192 system, ensure that all the criteria in this section are met. The section describes the following:

- Environmental Requirements
- Power
- Cabling
- Rack Mounting

Environmental Requirements

To have proper operation of the NCT192 system depends on a proper environment. This section describes environmental requirements for the site in which you intend to install the NCT192 system.

Temperature Humidity and Altitude

The system can tolerate a wide range of temperatures. Table 4-1 shows the recommendation for temperature, humidity, and altitude conditions in a central office (CO) environment.

Table 4-1 CO Operating Environment Requirements

Environmental Specifications	Descriptions
Temperature	32º to 149ºF (0º to 65ºC) – Operating 23º to 149ºF (-5º to 65ºC) – Short-term Operating 5º to 158ºF (-15º to 70ºC) – Storage Humidity of 95% at 35ºC
Humidity	5 to 95% (non condensing)
Altitude	0 to 10,000 ft (0 to 3048 m)

To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 149ºF (65ºC).

Dimension

The NCT192 IP-DSLAM is designed to mount in 19” or 23” or ETSI (mounting bracket replaceable) standard rack in the multiple shelves configuration.

Table 4-2 Maximum Space Require for Installation

Dimension	NCT192 standalone	NCT192 + NCT192S (Splitter Shelf)
Max. Height	7.88 inches (4.5U)	13.13 inches (7.5U)
Max. Width	19” or 23”	19” or 23”
Max. Depth	11.8 inches without handle. 13.3 inches with handle.	11.8 inches without handle. 13.3 inches with handle.

Ventilation

The NCT192 fans maintain a suitable operating temperature for the internal circuitry. Ensure that the air intake vents at the left-hand side of the shelf and the air exhaust vents at the right-hand side of the shelf are not obstructed in anyway.

Figure 4-1 NCT192 Ventilation Control Diagram

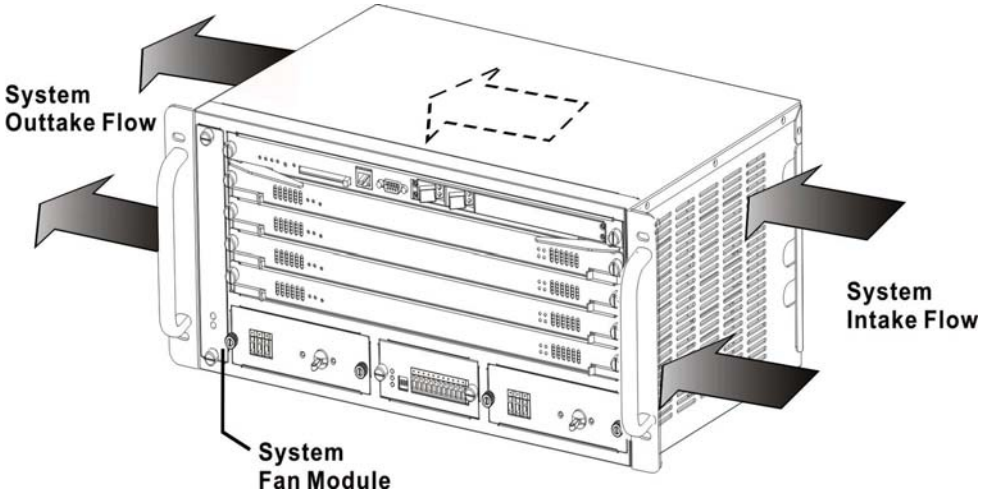


Table 4-3 System Air-Flow Specification

Field	Description
Fan unit	2
Air flow	200 (CFM)
Air pressure	10 (mm-Aq)
Speed per fan	3200 (RPM)
Noise level	44 (dBA)

Power

The NCT192 IP-DSLAM using distributed inbuilt power unit on each card board, the inbuilt power unit is required a VDC power source for it needs. For VDC (DC), the normal voltage is -48 VDC; the minimum operating value is -36 VDC; and the maximum operating value is -72 VDC.

The NCT192 IP-DSLAM supports hot-swappable redundant power supplies for the DC Power Converter Module.

Before you connect the system to a power source, verify that the power source is properly grounded and that it falls within the internal power supply rating.

The total power consumption of NCT192 is 223 W in full load. Table 4-4 lists the power consumption and heat dissipation of system and each card module.

Table 4-4 NCT192 IP-DSLAM Card Module Power Consumption

System/Card Model	Consumption	Heat Dissipation
NCT1902	15.2 W (0.31 A at -48 VDC)	3.8 W
NCT1901	49 W (1.02 A at -48 VDC)	12 W
Alarm module	2.6 W (0.05 A at -48 VDC)	0.65 W
Fan module	10 W (0.21 A at -48 VDC)	2.5 W
Full load	223 W (15.8 A at -48 VDC)	56 W

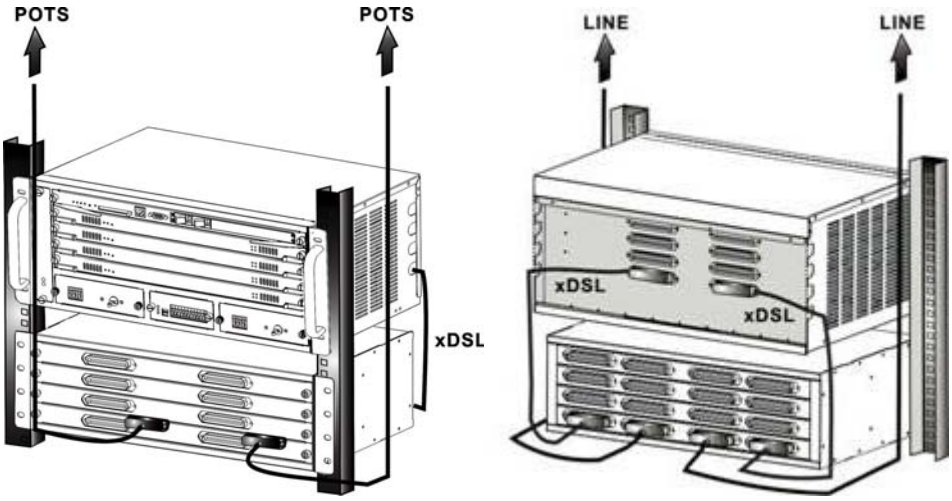
Cabling

The female RJ-21 (Champ) subscriber connectors are located at rear shelf of NCT192 as well as the NCT1901S POTS Splitter card of NCT192S Splitter Shelf.

NCT192 Cabling

The Figure 4-2 illustrates the NCT192 and NCT192S system cabling. Connect your Telco-50 xDSL cable between NCT192 and NCT192S, Line cable from NCT192S to Subscriber MDF, and POTS (phone) cable from NCT192S to PSTN MDF, respectively.

Figure 4-2 NCT192 Cabling Diagram



Rack Mounting

Mount your NCT192 and NCT192S system shelf in a rack is highly recommend. Ensure that vertical holes spacing on the rack rails meets standard EIA-310-C or ETS300 requirements.

NCT192 fits into a 19 inch wide rack or an ETSI 600 mm wide (23 inch) cabinet by replacing the ear bracket.

Tools and Equipment Required

The Table 4-5 lists the tools and equipment you need to install and remove the NCT192 system components.

Table 4-5 Installation Tools Lists

Check	Tools and Equipment
Hardware Components	
	NCT192 System
	NCT192S Splitter Shelf (Optional)
	2x NCT2030 PSU O/P -48V/6.7A
	RS-232 (DB-9) straight through serial cable to connect the console
	RJ-45 connector, cross over 10Bast/100Base-T Ethernet, half/full-duplex compliant with IEEE 802.3 (Optional)
	RJ-21 Telco-50 DSLAM Cables
	Mini-GBIC SFP module/s
	SM or MM fiber optic cable
Tools	
	A 3/16 inch flat-head screwdriver
	A Phillips-head screwdriver
	Necessary equipment for ESD protection
	Mounting screw – To mount the NCT192 system to the rack
	Tie wraps

Unpacking the NCT192 System

Each NCT192 system units is securely packaged in a shipping box.

To unpack the NCT192 units, complete the following steps:

Step 1 Inspect the packing containers.
If any damage or other signs of mishandling are evident, inform both the local freight carrier and Turbo Networks before unpacking. Your freight carrier can provide you with the procedures necessary to file a claim for damages.

Step 2 Carefully open the box.

Step 3 Remove all packing material.

Step 4 Remove the unit form the box.

Step 5 Open the accessory kits and boxes that contain the cables, documentation, and management software. Do not use a knife to open these boxes.

Verifying Contents

To verify that your shipment is complete, make sure that you received everything on your packing list, and then compare your packing list to your order. If any items are missing or you need additional information, contact your local supporter.

Inspecting for Damage

After you verify that all of the equipment is included, carefully examine the assemblies, units and cables for any damage resulting from shipping. If you suspect any damage form shipping, contact your local freight carrier for procedures on damage claims.

If you observe any physical defects in the items you ordered, obtain standard warranty service by delivering the defective part to your local supporter during the applicable warranty period.

Chapter 5 Installing the NCT192

This chapter describes how to install the NCT192 Medium Capacity IP-DSLAM.
This chapter contains the following sections:

- Installation Overview
- Installing and Removing Card Module
- System Mounting Procedure
- System Connecting Procedure

Installation Overview

Be sure that you follow the installation procedures in the proper sequence for your configuration.
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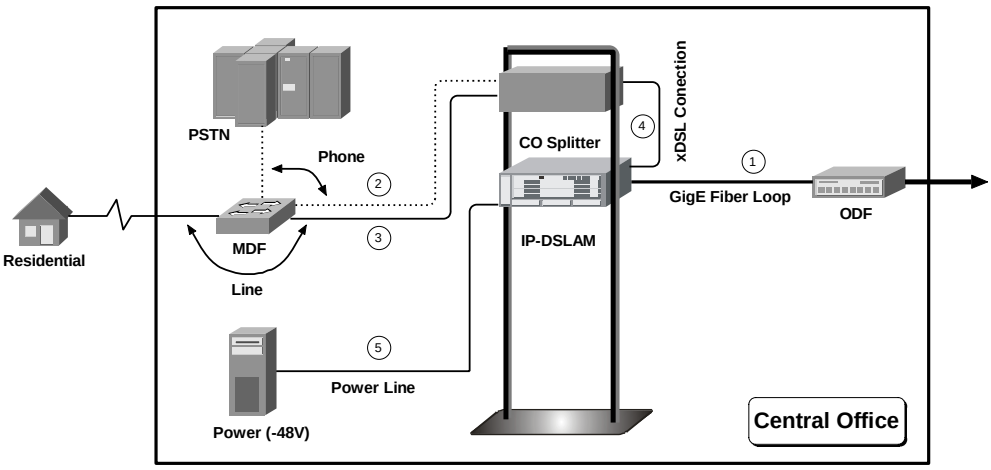
The sketch below indicates the NCT192 IP-DSLAM connection structure with equipment relational at CO (Central Office).

Figure 5-1 NCT192 Medium Capacity IP-DSLAM CO Installation Diagram



ADSL Development

GigE Fiber Loop (1) – Connect the IP-DSLAM Network Uplink gigabit Ethernet interface to the ODF or IP switch.

Phone (2) – Connect the phone line from POTS splitter to PSTN.

Line (3) – Connect the out-door subscriber loop from residential to POTS splitter.

xDSL Connection (4) – Connect the xDSL line from IP-DSLAM to the CO POTS Splitter.

Power Line (5) – Connect the IP-DSLAM to the CO power source (-48 VDC) and grounding.

Installing and Removing Card Module

The NCT192 system is hot swap design, it enables you to install, remove, or replace card module without shutting off. However, you may choose to power down the system as a precaution, if the unit is not currently operational.

Never attempt to remove or install modules without using appropriate ESD ankle.

If the unit is not powered down, an electrical energy hazard will be present within the card cage. Remove all metallic objects from hands and wrist to prevent bridging of live contact points.

Holding the card module from the edge or lever, do not hands on the components and hard metric bus.

Installation and Replacement Considerations

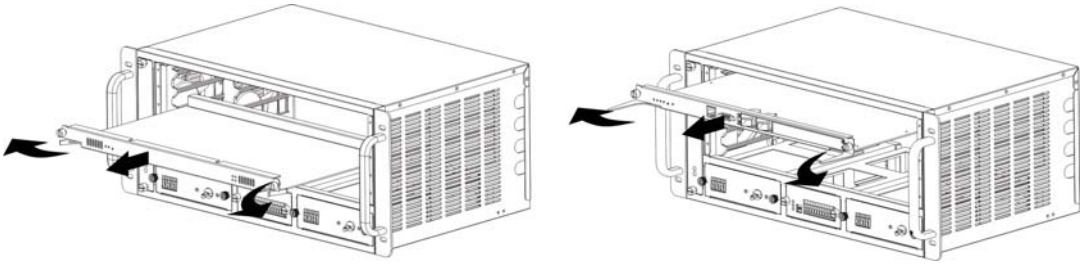
The following are recommended installation and replacement practices for the NCT192 system card modules.

- Do not force the card module into its slot. This action can damage the pins on the backplane if they are not aligned properly with the line card.
- Ensure every card module is place in the right slot.
- Ensure that the card module is straight and not at an angle when you install it in the slot. Installing the card module at an angle can damage it.
- Firmly seat the card module in the slot, fully depress and make sure the both side levers hook up the curb.

System Card Installation and Replacement

Ensure the card module is place into the right slot, fool-proof will prevent the wrong card module to plug into specify slot, but improper operation may still cause the damage.

Figure 5-2 System Card Install Sketch



Installing a System Card

To installing a system card:

Step 1 Put on the both side levers to the unlock location.

Step 2 Using both hands to expend the lever and align the card module to the proper slot.

Step 3 Holding the both levers in expends position, and carefully slide-in the card into the unit.

Step 4 Depress and shrink both levers simultaneously to seat the card module into the plane.

Step 5 Ensure the both side levers has hooked up the curb without swing.

Removing a System Card

To removing a system card:

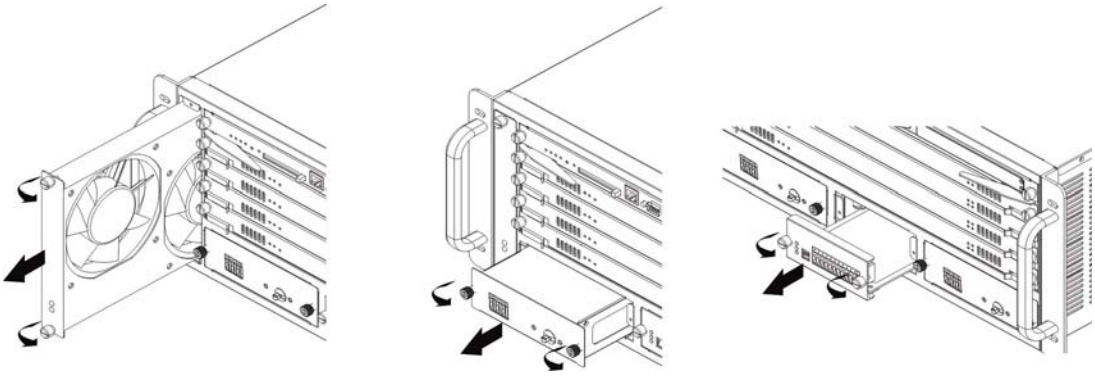
Step 1 Press the button on both side levers simultaneously to lift in extend position.

Step 2 Slide-out the card with both levers.

System Module Installation and Replacement

The NCT192 system has using 1 fan module, 1+1 protection power module, and 1 alarm I/O module.

Figure 5-3 System Module Replace Sketch



Replacing a System Module

To replacing a system module:

Step 1 Using a Phillips screwdriver to loosen the thumb screws on the both side levers.

Step 2 Slide-out the module from the tray and replace the new one.

System Mounting Procedure

This section provides step-by-step instructions for setting up and installing the NCT192 system.

Before you begin, verify that you have completed the following tasks:

- Select the installation site
- Unpack the NCT192 system
- Gather the tools and equipment needed for installation
- Check the card module configuration in the unit

Measuring the Rack Space

For remain rack to be stable, you must install your NCT192 system from the bottom to the top of the rack. Before you install any of the shelf chassis, measure the total rack space required to install your system. The required rack space depends on the number of NCT192 shelf chassis that you plan to use.

The NCT192 system contains NCT192 IP-DSLAM and NCT192S Splitter Shelf.

The NCT192 IP-DSLAM is built in 7.88 inch (4.5U) height, 11.8 inch (30 cm) depth, and 19 inch width (23 inch bracket available).

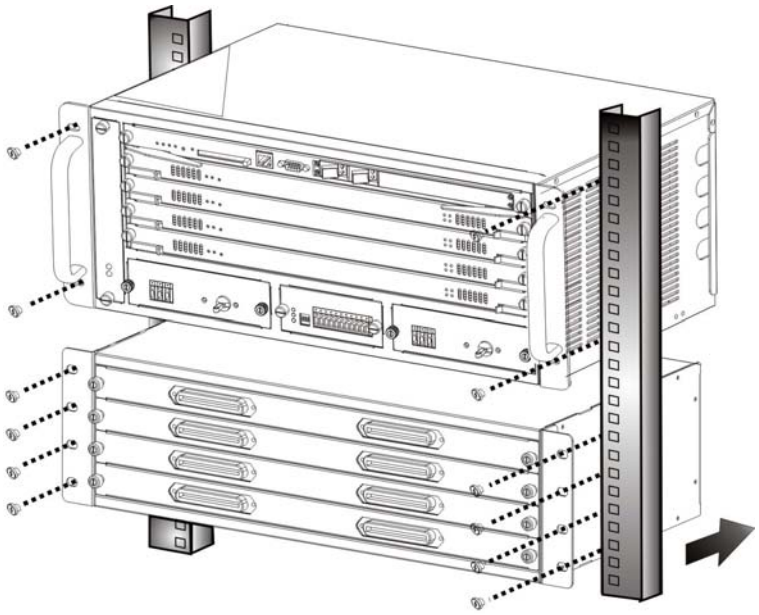
The NCT192S Splitter shelf is built in 5.25 inch (3U) height, 10.8 inch (27.5 cm) depth, and 19 inch width (23 inch bracket available).

Mounting the NCT192 and NCT192S Shelf Chassis

Complete the following steps to install the NCT192 and NCT192S shelf chassis.

Two people are required to lift the shelf. Grasp the shelf underneath the lower edge and lift with both hands. To prevent injury, keep your back straight and lift with your legs, not your back.

Figure 5-4 Install the NCT192 Shelf Chassis



Step 1 Put on an antistatic wrist strap and attach it to the rack.

Step 2 Attach the mounting aids to the rack, different rack will provide different aids, make sure the mounting aids is attach stable before setting NCT192 and NCT192S.

Step 3 Carefully lift the shelf chassis from underneath and rest it on the mounting aids.

Step 4 Push the shelf chassis back into the rack.

Step 5 Using a Phillips-head screwdriver; screw the ear brackets to the rack. Use six screws at each bracket.

Step 6 Repeat Step 1 through Step 5 for each NCT192 and NCT192S as necessary.

System Connecting Procedure

Connecting a Console

Complete the following steps to connect the NCT192 Console management.

Step 1 Connect the DB-9 (Male) cable to the Console port on the NCT1902 NC card.

Step 2 Connect the other end (Female) to the computer’s COM port. If your computer is equipped only with DB-25 serial port, you need a DB-9-male-to-DB-25-female adapter.

Figure 5-5 DB-9-male-to-DB-9-female Console Management Cable

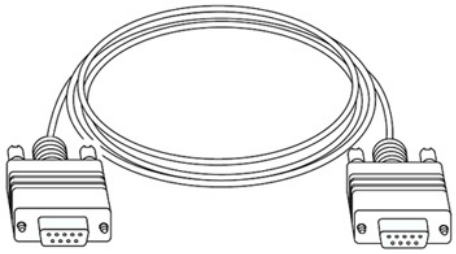
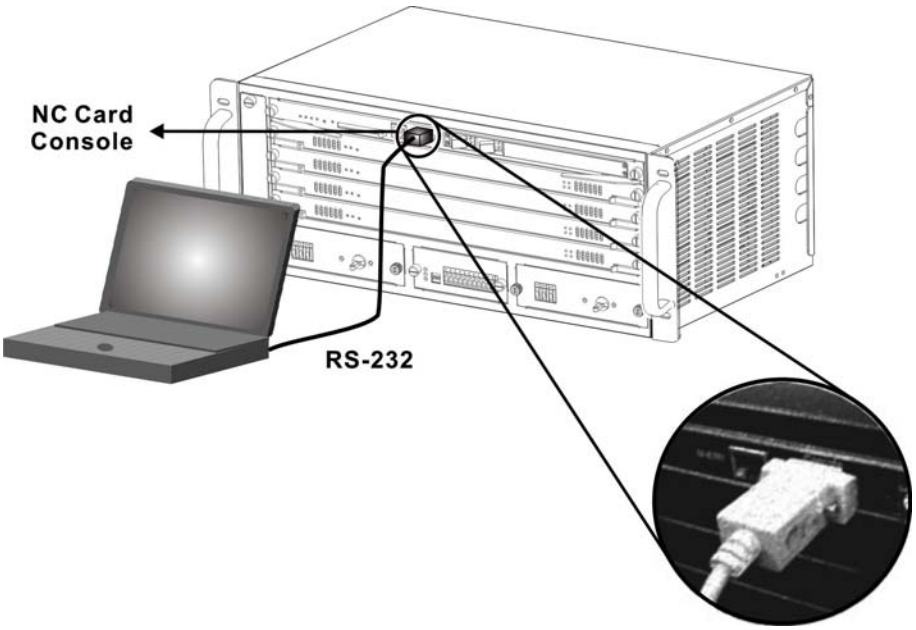


Figure 5-6 NCT192 Console Port Management Cabling



Connecting a Management Ethernet

Complete the following steps to connect the NCT192 M-ETH to the management network.

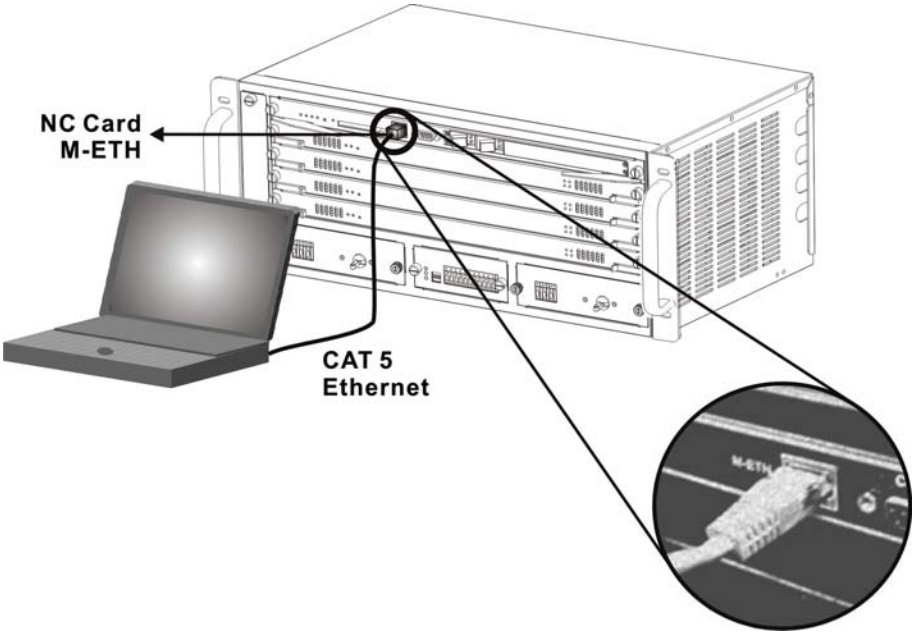
We recommend that you label each data cable at both ends to identify its destination.

Step 1 Connect the 10/100 Base-T RJ-45 connector to the NCT1902 NC card M-ETH receptacle.

Step 2 Arrange the cable and consolidate nicely.

Step 3 Connect the other end of the cable to the management network or your PC (crossover), e.g. LAN.

Figure 5-7 NCT192 Management Ethernet Port Cabling



Connecting the RJ-21 Subscriber Interface

Complete the following steps to connect the Telco-50 cable from RJ-21 Subscriber interface to the MDF:

Step 1 Attach the Telco-50 champ cable to connect from NCT192 RJ-21 to the NCT192S where the RJ-21 sockets with "**ADSL**" labels.

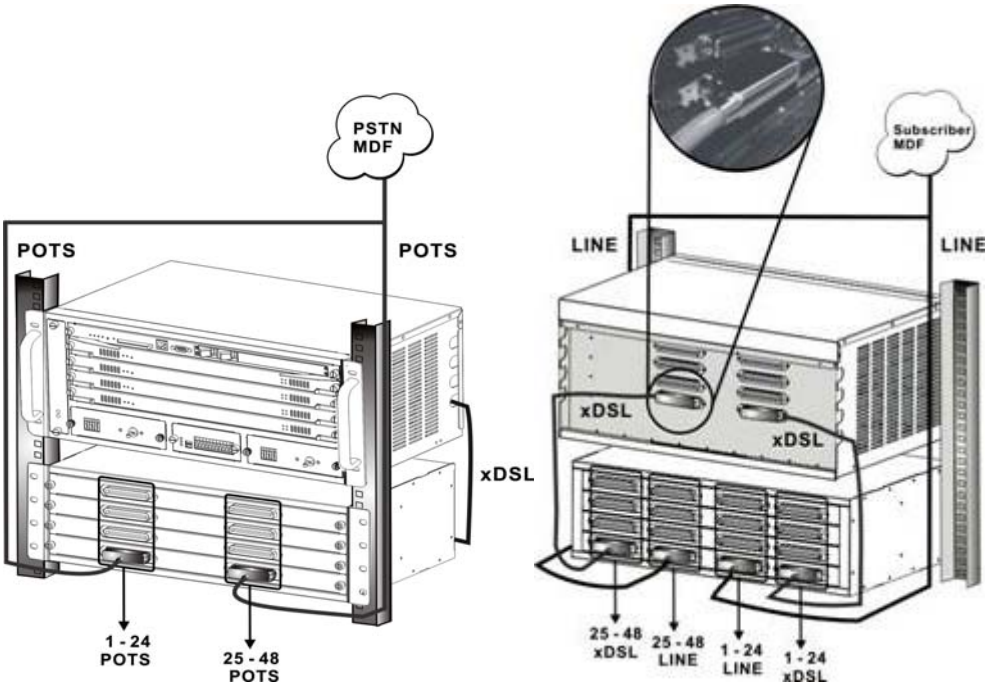
Step 2 Attach the Telco-50 champ cable to connect from NCT192S (rear-end) RJ-21 to the Subscriber MDF where the RJ-21 sockets with "**Line**" labels.

Step 3 Attach the Telco-50 champ cable to connect from NCT192S (front-end) RJ-21 to the PSTN MDF where the RJ-21 sockets with "**Phone**" labels.

Step 4 Screw tight the Telco-50 champ with RJ-21 connect socket, make sure the connection is tight enough due to cabling.

Step 5 Repeat Step 1 through Step 4 for each RJ-21 socket as necessary.

Figure 5-8 NCT192 RJ-21 Subscriber Connector Cabling



Connecting the Network Uplink Interface

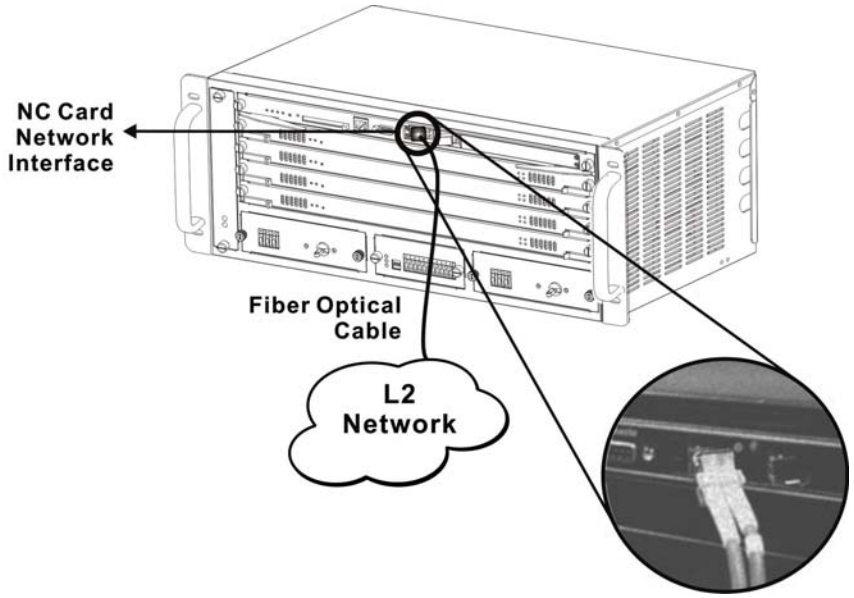
Complete the following steps to connect the Gigabit Ethernet fiber optic cable.

We recommend that you label each data cable at both ends to identify its destination.

Step 1 Connect one end of the fiber optic cable to the mini-GBIC SFP module on the NCT1902 front panel.

Step 2 Connect the other end of fiber optic cable to the Layer 2/Layer 3 switch routers or ODF of provider's IP network.

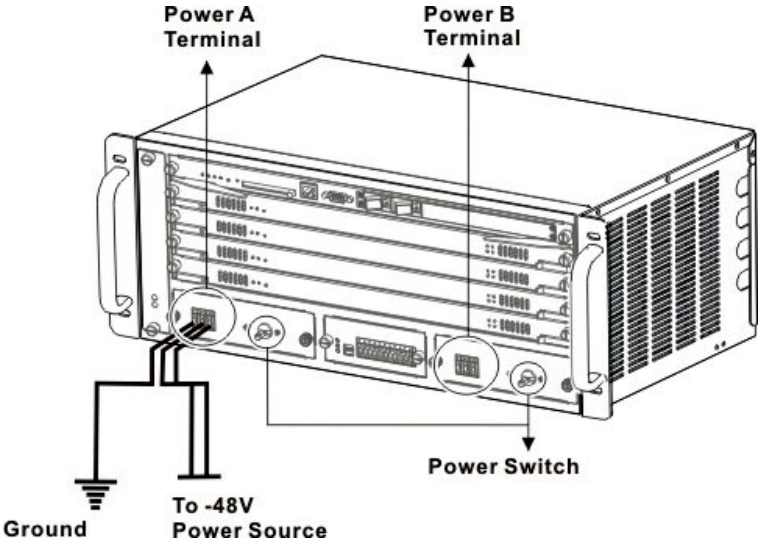
Figure 5-9 Front Panel RJ-45 Network Uplink Cabling for NCT192



Attach and Apply the Power

Complete the instruction below to connect the VDC power and ground your NCT192.

Figure 5-10 VDC Power Connection for NCT192



Step 1 Ensure the power button is set to the off position.

Step 2 Use a flat-head screwdriver to turn all three screws on the terminal block counterclockwise to open the terminal connectors, GND (positive), -48V (negative), and ground.

Step 3 Insert the end of the wire into the corresponded receptacle with the terminal block on the PEM. The stripped part of the wire must be fully inserted into the terminal block, so that no bare wire is exposed.

Step 4 Ensure that no wire stands are left outside the connector.

Step 5 Pull on the wire to verify that it is held firmly in place.

Step 6 Make sure that the other end of the grounding wire is connected to ground at the VDC power source.

Step 7 If you are connecting a second power source, repeat Step 2 to Step 6 for the second PEM.

Step 8 Turn on the breakers on the front panel of power module.

Step 9 Visually check that the Power LED at front panel is On.

Chapter 6 General Troubleshooting

This chapter explains how to troubleshoot the NCT192 system.

The PWR LED Does Not Turn On

The card module PWR LED does not turn on after installed.

Step 1 Ensure the power wires are properly connected to the power terminal and the power supply is operating normally. Make sure you are using the correct power source.

Step 2 Make sure the power wires are connected properly.

Step 3 Make sure the card module is properly installed in the shelf.

Step 4 Make sure the power fuses are not burnt-out, replace any burnt out fuses.

Step 5 The LED itself or the unit may be faulty; contact your vendor.

The Alarm Status LED is On

The alarm status LED contains CR (Critical), MJ (Major), and MN (Minor) alarm of system itself, the CR alarm lights when the system is overheated and/or the system fans are not working properly and/or voltage readings are outside the tolerance range.

The ALM (alarm) LEDs on the NC/LC cards light when the card is overheated and/or voltage readings are outside the tolerance range.

Step 1 Check the system active alarm status from **NCT192 LCT** or **CLI Ex** mode to verify the cause of the alarm.

Step 2 Ensure the system is installed in a well-ventilated area and that normal operation of the fans is not inhibited. Keep the front, rear sides clear of obstructions and away from the exhaust of other equipment.

Step 3 Make sure you can feel and/or hear the fans working, working fans emit a low buzz and blow air of system outtake vent. If the fans are not working properly, contact your vendor.

Step 4 If the voltage levels are outside the allowed range, take a screen shot from **NCT192 LCT** or **CLI Ex** configuration screen and report to your vendor.

The xDSL LED Does Not Turn On

The xDSL LEDs shows the operational status of the xDSL port connections, if an xDSL LED is off, it means the connection link to the adjacent CPE is down.

Step 1 Ensure that all hardware connections are properly mode (including the CPE on the subscriber's side) and that all devices are turned on.

Step 2 Make sure the corresponding xDSL port is enabled.

Step 3 Check the xDSL line pin assignments. Refer to "NCT192 System Installation Guide".

Step 4 Check the telephone wire connections between the CPE and the MDF(s).

Step 5 Check the telephone wire and connections between the MDF(s) and CO LINE port(s).

Step 6 Check the telephone wire mapping on the MDF(s).

Step 7 Make sure the configuration of line rate is trainable between the NCT192 and the CPE.

Step 8 If the line quality is low, you may need to reduce the line rate. Refer to "NCT192 System Configuration Guide".

No Voice on an ADSL Connection

The NCT1901S allow the telephone wiring used for ADSL connections, it also simultaneously carry normal voice conversations.

Step 1 Make sure the subscriber has a POTS splitter properly installed.

Step 2 Check the telephone wire connections between the subscriber and the MDF(s).

Step 3 Check the telephone wire and connections between the MDF(s) and subscriber CPE port(s).

Step 4 Check the telephone wire and connections between the MDF(s) and the CO (LINE and POTS) port(s)

Step 5 Check the connection from the MDF(s) to the PBX or PSTN or ISDN switch

Step 6 Make sure the in-house wiring works and is connected properly.

Step 7 Repeat the steps above using a different ADSL port.

The Network Uplink is Down

The NCT1902 NC card provides pluggable socket for high performance of Gigabit Ethernet mini-GBIC SFP module, there are two LEDs to indicate the Network uplink interface.

Step 1 Make sure the mini-GBIC SFP module is installed properly.

Step 2 Make sure the fiber optic cable is connecting properly with the mini-GBIC SFP.

Step 3 If the LOS LED is light; check the fiber optic Tx and Rx pair is reverse with peer equipment.

Step 4 Make sure the peer equipment has it port interface enabled.

Appendix A System Connector Pin-Outs

NCT192 IP-DSLAM System connector Pin-outs contains RJ-21 subscriber connector, RS-232 DB-9 local craft management and RJ-45 Management Ethernet interface.

A.1 RJ-21 xDSL Connector Port Mapping

The female RJ-21 (Champ) subscriber connectors are located at the rear of shelf chassis. Table A-1 shows subscriber connectors correspond to ports on every slot.

Figure A-1 RJ-21 xDSL Subscriber Connector

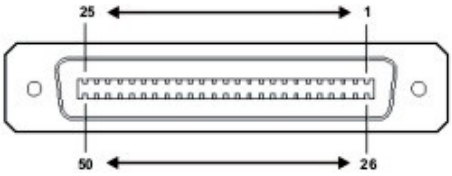


Table A-1 RJ-21 xDSL Connector Pin Assignment

Line Port	Champ Pin	
	Tip	Ring
1 / 25	1	26
2 / 26	2	27
3 / 17	3	28
4 / 28	4	29
5 / 29	5	30
6 / 30	6	31
7 / 31	7	32
8 / 32	8	33
9 / 33	9	34
10 / 34	10	35
11 / 35	11	36
12 / 36	12	37
13 / 37	13	38
14 / 38	14	39
15 / 39	15	40
16 / 40	16	41
17 / 41	17	42
18 / 42	18	43
19 / 43	19	44
20 / 44	20	45
21 / 45	21	46
22 / 46	22	47
23 / 47	23	48
24 / 48	24	49
None	25	50

A.2 Standard Telco Color Chart

Table A-2 lists the reference colors that are used for the NCT192 IP-DSLAM system cables.

Table A-2 Telco Color Chart Mapping Table

Wire Color	LINE /POTS Ports Pin No.	ADSL Port No.	Wire Color	LINE / POTS Ports Pin No.	ADSL Port No.
Blue	1	P1 or P25	White	38	P13 or P37
White	26		Orange/Grey	14	P14 or P38
Orange	2	P2 or P26	White	39	
White	27		White/Green	15	P15 or P39
Green	3	P3 or P27	White	40	
White	28		Green/Brown	16	P16 or P40
Brown	4	P4 or P28	White	41	
White	29		Grey/Green	17	P17 or P41
Grey	5	P5 or P29	White	42	
White	30		White/Brown	18	P18 or P42
White/Blue	6	P6 or P30	White	43	
White	31		Brown/Grey	19	P19 or P43
Orange/Blue	7	P7 or P31	White	44	
White	32		White/Grey	20	P20 or P44
Green/Blue	8	P8 or P32	White	45	
White	33		Blue	21	P21 or P45
Brown/Blue	9	P9 or P33	Yellow	46	
White	34		Orange	22	P22 or P46
Grey/Blue	10	P10 or P34	Yellow	47	
White	35		Green	23	P23 or P47
White/Orange	11	P11 or P35	Yellow	48	
White	36		Brown	24	P24 or P48
Orange/Green	12	P12 or P36	Yellow	49	
White	37		Grey	25	Nil/Nil

A.3 RJ-45 Management Ethernet Connector Pin-Outs

The Management Ethernet port, a 10/100 Base-T interface with RJ-45 receptacle connector is on the NCT1902 NC card faceplate.

It is used to connect the NCT192 to the management station. Table A-3 shows the pin assignments of RJ-45 Ethernet interface.

Figure A-2 RJ-45 Ethernet Connector

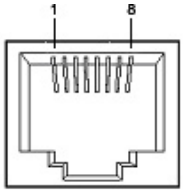


Table A-3 RJ-45 Ethernet Connector Pin Assignment

Pine	Description
1	Tx +
2	Tx -
3	Rx +
4	None
5	None
6	Rx -
7	None
8	None

A.4 Local Console DB-9 Connector Pin-Outs

DB-9 connector on the NCT1902 NC card faceplate is use for Console management, a female DB-9 connector is use to connect on PC's COM port. Table A-4 list the pin assignment of DB-9 local console interface.

The attribute of DB-9 connector is RS-232 DTE interface.

Figure A-3 Female DB-9 Connector

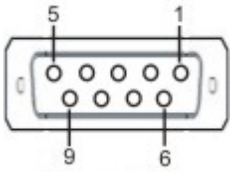


Table A-4 Female DB-9 Connector Pin Assignment

Pine	Description
1	None
2	RD
3	TD
4	DTR
5	GND
6	None
7	RTS
8	None
9	None

Appendix B Abbreviations and Acronyms

The abbreviations and acronyms used in this document.

Table B-1 Abbreviations and Acronyms Table

Abbreviations	Full Name
AAL	ATM Adaptation Layer
ADSL	Asymmetric Digital Subscriber Line
AIS	Alarm Indication Signal
ATM	Asynchronous Transfer Mode
ATU-C	ADSL Transceiver Unit at the central office end
ATU-R	ADSL Transceiver Unit at the remote end
CBR	Constant Bit Rate
CV	Coding Violation
DSLAM	Digital Subscriber Line Access Multiplexer
ES	Error Seconds
EOA	Ethernet over ATM
GE	Gigabit Ethernet
IP	Internet Protocol
LAN	Local Area Network
LOF	Loss of Frame
LOS	Loss of Signal
LPR	Loss of Power
OAM	Operation, Administration, and Maintenance
PCR	Peak Cell Rate
PSD	Power Spectral Density
PVC	Permanent Virtual Channel
rtVBR	Real time Variable Bit Rate
SCR	Sustainable Cell Rate
SNR	Signal-to Noise Ratio
SNMP	Simple Network Management Protocol
UAS	Unavailable Seconds
UBR	Unspecified Bit Rate
VC	Virtual Channel
VCI	Virtual Channel Identify
VCL	Virtual Channel Link
VDSL	Very high-speed Digital Subscriber Line
VLAN	Virtual Local Area Network
VP	Virtual Path
VPI	Virtual Path Identifier
VTU-O	VDSL Transmission Unit at the Optical network interface
VTU-R	VDSL Transmission Unit at the remote end
WAN	Wide Area Network
xDSL	ADSL/VDSL

Appendix C: Legal & Regulatory Information

Customer Information

ACA (Australian Communications Authority) requires you to be aware of the following information and warnings:

(1) This unit shall be connected to the Telecommunication Network through a line cord which meets the requirements of the ACA TS008 Standard.

(2) This equipment has been tested and found to comply with the Standards for C-Tick and or A-Tick as set by the ACA . These standards are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio noise and, if not installed and used in accordance with the instructions detailed within this manual, may cause interference to radio communications. However, there is no guarantee that interference will not occur with the installation of this product in your home or office. If this equipment does cause some degree of interference to radio or television reception, which can be determined by turning the equipment off and on, we encourage the user to try to correct the interference by one or more of the following measures:

- Change the direction or relocate the receiving antenna.
- Increase the separation between this equipment and the receiver.
- Connect the equipment to an alternate power outlet on a different power circuit from that to which the receiver/TV is connected.
- Consult an experienced radio/TV technician for help.

(3) The power supply that is provided with this unit is only intended for use with this product. Do not use this power supply with any other product or do not use any other power supply that is not approved for use with this product by NetComm. Failure to do so may cause damage to this product, fire or result in personal injury.

Product Warranty

The warranty is granted on the following conditions:

1. This warranty extends to the original purchaser (you) and is not transferable;
2. This warranty shall not apply to software programs, batteries, power supplies, cables or other accessories supplied in or with the product;
3. The customer complies with all of the terms of any relevant agreement with NetComm and any other reasonable requirements of NetComm including producing such evidence of purchase as NetComm may require;
4. The cost of transporting product to and from NetComm's nominated premises is your responsibility; and,
5. NetComm does not have any liability or responsibility under this warranty where any cost, loss, injury or damage of any kind, whether direct, indirect, consequential, incidental or otherwise arises out of events beyond NetComm's reasonable control. This includes but is not limited to: acts of God, war, riot, embargoes, acts of civil or military authorities, fire, floods, electricity outages, lightning, power surges, or shortages of materials or labour.
6. The customer is responsible for the security of their computer and network at all times. Security features may be disabled within the factory default settings. NetComm recommends that you enable these features to enhance your security.

The warranty is automatically voided if:

1. You, or someone else, use the product, or attempts to use it, other than as specified by NetComm;
2. The fault or defect in your product is the result of a voltage surge subjected to the product either by the way of power supply or communication line, whether caused by thunderstorm activity or any other cause(s);
3. The fault is the result of accidental damage or damage in transit, including but not limited to liquid spillage;

4. Your product has been used for any purposes other than that for which it is sold, or in any way other than in strict accordance with the user manual supplied;
5. Your product has been repaired or modified or attempted to be repaired or modified, other than by a qualified person at a service centre authorised by NetComm; and,
6. The serial number has been defaced or altered in any way or if the serial number plate has been removed.

Limitations of Warranty

The Trade Practices Act 1974 and corresponding State and Territory Fair Trading Acts or legalisation of another Government ("the relevant acts") in certain circumstances imply mandatory conditions and warranties which cannot be excluded. This warranty is in addition to and not in replacement for such conditions and warranties.

To the extent permitted by the Relevant Acts, in relation to your product and any other materials provided with the product ("the Goods") the liability of NetComm under the Relevant Acts is limited at the option of NetComm to:

- Replacement of the Goods; or
- Repair of the Goods; or
- Payment of the cost of replacing the Goods; or
- Payment of the cost of having the Goods repaired.

All NetComm ACN 002 490 486 products have a standard 12 months warranty from date of purchase. However some products have an extended warranty option (refer to packaging). To be eligible for the extended warranty you must supply the requested warranty information to NetComm within 30 days of the original purchase by registering on-line via the NetComm web site at

www.netcomm.com.au

NetComm®
www.netcomm.com.au

Product Warranty

NetComm products have a standard 12 months warranty from date of purchase. However some products have an extended warranty option, via registering your product online at the NetComm website **www.netcomm.com.au**.

Technical Support

If you have any technical difficulties with your product, please refer to the support section of our website.

www.netcomm.com.au/support

Note: NetComm Technical Support for this product only covers the basic installation and features outlined in the Quick Start Guide. For further information regarding the advanced features of this product, please refer to the configuring sections in the User Guide or contact a Network Specialist.

NetComm®
www.netcomm.com.au

NETCOMM LIMITED PO Box 1200, Lane Cove NSW 2066 Australia
P: 02 9424 2070 **F:** 02 9424 2010
E: sales@netcomm.com.au **W:** www.netcomm.com.au

Dynalink
www.dynalink.co.nz

DYNALINK NZ 224b Bush Road, Albany, Auckland, New Zealand
P: 09 448 5548 **F:** 09 448 5549
E: sales@dynalink.co.nz **W:** www.dynalink.co.nz