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Installation Guide

NCT240
IP DSLAM

Table of Content

1.   Introduction

This document is intended for First Office Acceptance test plan for NetComm's **ADSL2+ Broadband Access Switch solution (BAS)**. The Netcomm NCT240 Broadband Access Switch contains 24 ADSL2/2+ circuits to deliver high-speed data, video and voice service over traditional twisted copper pairs by using DSL technology.

To meet the increasing demand for high-speed internet access and triple play application services. The next generation network offers a feasible functionality of integrated services with the most cost effective architecture. Next generation broadband access networks are designed to provide rich video contents, DSL, POTS and VoIP services over traditional copper wire infrastructure. These types of services will be supported on NGN architecture simultaneously. DSL is used as the data service platform for traditional POTS technology which is used for voice services. The multimedia and local content-rich applications can also be easily implemented on this NGN architecture.

xDSL (Digital Subscriber Line) is a technology for delivering high-bandwidth information over copper telephone lines. xDSL service can deliver POTS and high date rate services simultaneously over a single twisted-wire pair. The POTS and data service are simultaneous and independent; the xDSL data service does not affect the POTS service. xDSL uses the bandwidth above the 4-kHz POTS frequency to transmit duplex data using digital modulation techniques from the C.O side to the Customer Premises Equipment (CPE).

ADSL is a form of xDSL service that delivers an asymmetric data rate over a twisted copper pair. ADSL delivers a higher rate downstream, towards the customer premises and lower rate upstream, from the customer premises. ITU standard compliant Full-Rate ADSL2+ can deliver data rates up to 25 Mbps downstream and 1 Mbps upstream; Full-Rate ADSL can deliver data rates up to 8 Mbps downstream and 800 kbps upstream; G.Lite ADSL can deliver up to 1.5 Mbps downstream and 512 kbps upstream. The actual data rate depends on the length, gauge, and condition of the twisted-wire pair, the bandwidth of the uplink depends on the data network, and the capacity of the network service provider.

Digital Subscriber Line (DSL) dominates broadband market. The position of national telecom operators in most countries has given the advantage in reaching out to customers with broadband services over DSL.

The NCT240 Access system contains 24 ADSL2/2+ circuits to deliver high-speed data service over twisted copper pairs using industry standard Discrete Multi-Tone (DMT) line coding technology. The NCT240 complies with full-rate ADSL in accordance with ANSI T1.413 Issue 2, ITU-T G.992.1 (G.dmt), ITU-T G.992.2 (G.lite)ITU-T G.992.3 (ADSL2) and ITU G.992.5 (G.ADSL2+) protocols.

The NCT240 greatly expand broadband capabilities in the access network, enhancing the infrastructure for emerging services. With simple in-service upgrades, service providers obtain the capacity and Quality of Service (QoS) to support larger populations of narrowband and broadband users. For management, NCT240 can be easily configured by SNMP, Telnet, SSH, HTTP, HTTPS and RS-232 console.

Features

- Complete Intelligent L2 switch feature
- Intelligent DSL interworking feature
  - RFC2684 MpoA
  - VPN pass-through
  - RFC2516 PPPoE packet forwarding.
- Advanced L2+/higher layer protocol & policy control
  - GVRP (IEEE 802.1q)
  - STP/RSTP (IEEE 802.1d/w)
  - IGMP Snooping
  - DHCP relay and relay agent option 82
  - Packet inspection and do policy control (filtering, forwarding..)
- Security of authentication mechanism and encryption
  - SSH/SSL
- Rich user interface for management including security
  - CLI/Telnet/SSH/SNMP/HTTP/S-HTTP
- Variety of uplink interface
  - SFP for 1000 Base-SX, LX, LHX and ZX.
  - RJ45 for 1000 Base-TX.
- Remote software upgrade

2. System Application

The following figures present the system application in the access network. NCT240 provides video, voice and data service for different users, such as Hotels, SOHOs, residential users and enterprises. The end user can use DSL for Various applications such as Telecommuting, Video streaming, On-line game, IPTV, Distance learning, Telemedicine, Voice over IP and Video conferencing…etc.
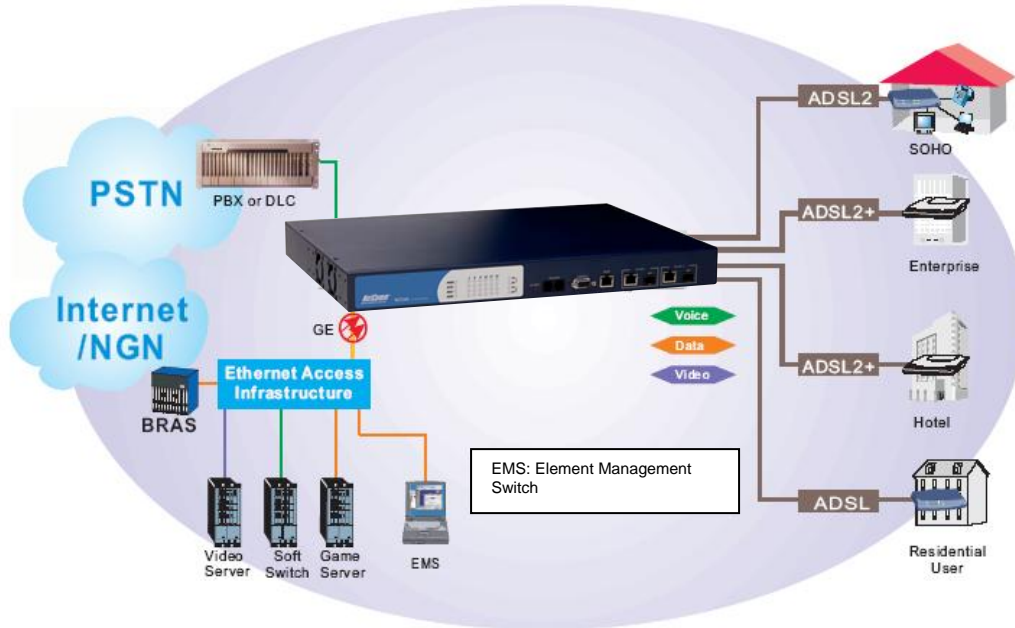
Basic System Application
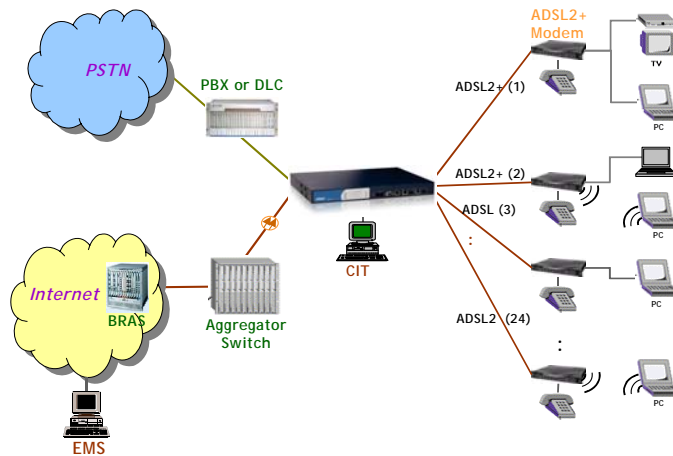
3. System Requirement
LED Definition

Items	LED color	Function
PWR (power)	GREEN – SOLID	Power on
SYS (system)	GREEN – SOLID	System finished initializing stage
	Flashing GREEN – 2Hz	System is booting up
SYS (system) - When the ACO/RST button is pressed	Flashing GREEN – 4Hz	System is ready to restart – release the ACO/RST button to restart
	Flashing GREEN – 1Hz	System is ready to reset to Factory default – release the ACO/RST button to reset to factory default
MAJ (Major alarm)	RED	Major alarm reporting
MIN (Minor alarm)	AMBER	Minor alarm reporting
ADSL link	GREEN	ADSL link is UP
	Flashing GREEN	DSL line is training (to linkup)
GE-FX Link	AMBER	Ethernet Fiber port is UP
	Flashing AMBER	Dataflow activity in the port
GE-TX Link	GREEN	Ethernet Copper port is UP
	Flashing GREEN	Dataflow activity in the port

Hardware

Dimensions & Capacity
1. 19″ wide rack mount available.
2. 1U height
3. Provide 24 DSL ports and built-in splitters.

Uplink Interfaces
1. The connector is SFP type at optical interface port.
2. The connector is RJ-45 at copper interface port.
3. When plug in SFP, the work interface will select optical interface automatic and copper interface is assistant interface. And when plug out SFP, the copper interface will change to work interface automatic.
4. Supported SFP optical module types have 1000 Base-SX, 1000 Base-LX, 1000 Base-LHX and 1000 Base-ZX.

Line Interfaces
1. Support 24 ports ADSL2+ line interface module (ATU-C).
2. Build in Splitter/Filter internal.
3. The connectors are wire-wrapping; a converter device can be connected in between interfaces and user device at both ADSL2+ line interface and PSTN interface.

Management Interfaces

1. One Ethernet interface (RJ45) support Full Duplex and Half Duplex transceiver function, conforms to IEEE 802.3 Auto-Negotiation standard and comply with IEEE802.3 Ethernet, IEEE802.3u Fast Ethernet.
2. One RS232 console interface (DB9) support Full Duplex, 1、2 stop bits and odd、even、none parity check. The baud rate range：1200 baud rate ~ 921000 baud rate.

Power Supply
1. 60Wt. (input 90~260 VAC(10%), 50~60Hz)
2. 60Wt. (input -36~-72 VDC)

Operating Requirement
1. **Temperature**: -10ºC ~ 60ºC.
2. **Humidity**: 10~90% (non-condensing).
3. **EMC/ESD Certification**: FCC Part15 Class A.
4. **Safety Certification** : UL60950

ADSL/ADSL2+ Interface
1. ITU-T G.992.1 (G.dmt) [Annex A], ITU-T G.992.2 (G.lite) [Annex A]
2. ITU-T G.992.3 (ADSL2) [A,L], ITU-T G.992.5 (ADSL2+) [A,L]
3. OAM functionality according to ITU-T G.997.1 (G.ploam)
4. ANSI T1.413 Issue 2
5. Line loop back and diagnostic

Software Feature

L2/L3 Functionality
1. Switch capability: IEEE802.3x flow control, IEEE802.1d bridging.
2. VLAN: IEEE802.1p/q VLAN (4094), stacked VLAN, Port-based and Tag-based.
3. Multicasting: IGMP snooping, 250 groups, Dynamic & Static Configuration.
4. QoS: IEEE802.1p based COS, 4 priority output queue per port, RFC 2475 DiffServ/TOS.
5. DHCP: DHCP relay and relay agent option 82.
6. Rate Limitation: from 64K to Maximum rate, the step is 64K.
7. Security: Packet policy control (filtering/forwarding) and ACL function.

Interworking
1. RFC2684 MPoA LLC/VCMUX.
2. VPN pass-through
3. RFC2516 PPPoE packet forwarding.

Trouble Shooting
1. LED indicator for power, varied interfaces and system alarms.
2. Cable labeling
3. Local and remote management by using serial and uplink interface
   - On-line show link status, quality and traffic counters
   - Loop back test
   - Log event/alarm of system level
   - Log event/alarm of GE and ADSL2+ interfaces

Management
1. CLI support for local management
2. SNMP V1/V2c
3. Telnet/SSH

4.   Web-based
5.   Support FCAPS management for EMS
6.   Syslog
7.   SNTP
8.   Remote software upgrade
9.   Remote file backup and restore

4. Installation Procedure

Equipment Checklist

Before installing the access switch please verify that you have received all the items listed under "Package Contents." If any of the items are missing or damaged, contact your local distributor. Also, be sure you have all the necessary tools and cabling before installing the switch and splitter. Note that these devices can be installed on any suitably large flat surface or in a standard EIA 19-inch rack.

Package Contents
1. A NCT240 ADSL2+ IP DSLAM
2. A Bracket Mounting Kit containing two brackets and four screws for attaching the brackets to the DSLAM
3. One Power Cord
4. Four adhesive foot pads
5. One CD containing installation Guide and Management Guide
6. One RS-232 console cable (Optional)
7. Two RJ-21 cables (Optional)

Mounting

The NCT240 may be mounted on any flat surface, such as a shelf, or in a rack. Before you start installing the access switch, make sure you can provide the right operating environment, including power requirements, sufficient physical space, and proximity to other network devices that are to be connected. Verify the following installation requirements:

•   Power requirements: 100 to 240 VAC (± 10%) at 50 to 60 Hz (± 3 Hz). The access switch power supplies automatically adjust to the input voltage level. Make sure that a properly grounded power outlet is within 2.5 m (8 ft) of the access switch.

•   The access switch should be located in a cool dry place, with at least 10 cm (4 in.)of space on the sides for ventilation.

• Place the access switch out of direct sunlight, and away from heat sources or areas with a high amount of electromagnetic interference. The temperature and humidity should be within the ranges listed in the specifications.

• If you intend to mount the access switch in a rack, make sure you have all the necessary mounting screws, brackets, bolts and nuts, and the right tools.

• Check if network cables and connectors needed for installation are available.

• Be sure the access switch is within reach of the punch-down blocks for rear panel connections that include DSL and splitter interface.

Installing Optional Modules

Before mounting the switch, be sure you install any optional modules. If you have purchased an optional slide-in 1000BASE-T, SFP 1000BASE-X, install it now, and following the instructions below.

To rack-mount devices:

1. Attach the brackets to the device using the screws provided in the Bracket Mounting Kit.

Figure 4-1.   Attaching the Brackets
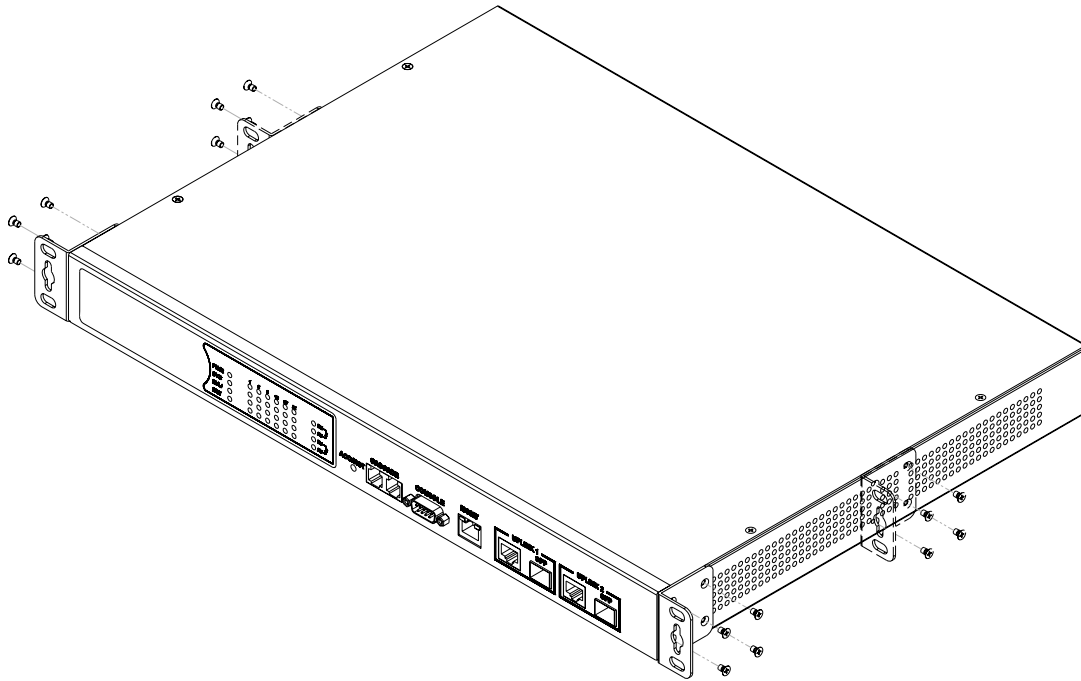
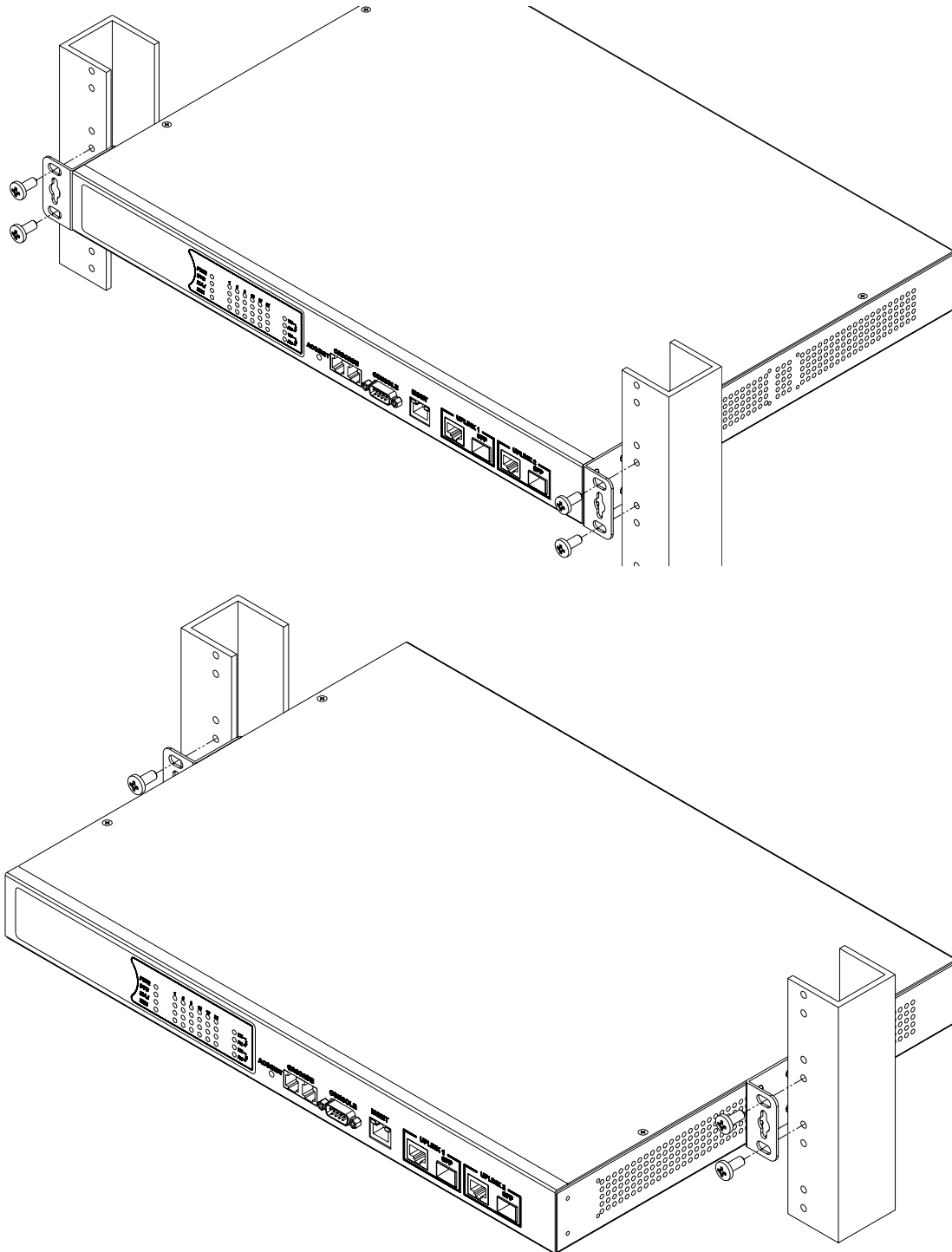2. Mount the device in the rack, using four rack-mounting screws.

Figure 4-2.   Installing the Switch in a Rack

3. If installing a single switch only, turn to "Powering On the Switch" at the end of this chapter.

4. If installing several devices, we recommend using one stack for the switch, and another for the others. This will keep the cabling straight and easy to maintain.

Desktop or Shelf Mounting

1. Attach the four adhesive feet to the bottom of the first switch.

Figure 4-3.   Attaching the Adhesive Feet

2. Set the device on a flat surface near an AC power source, making sure there are at least two inches of space on all sides for proper air flow.

3. If installing a single switch only, go to "Powering On the Switch" at the end of this chapter.

4. If installing multiple switches, attach four adhesive feet to each one. Place each device squarely on top of the one below, in any order.

Wall mount Mounting

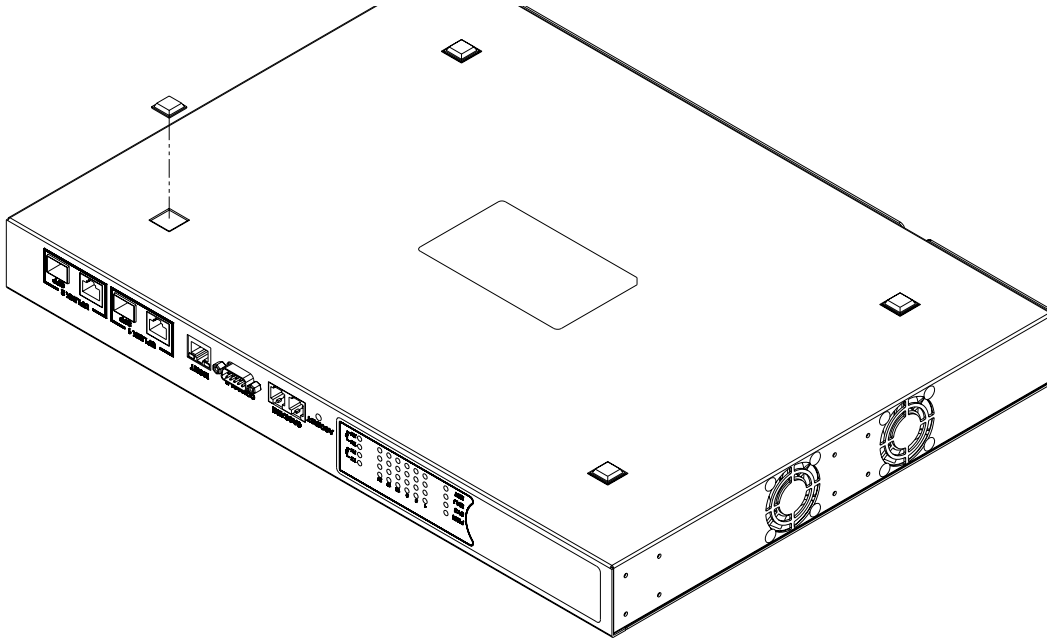1. Attach the four adhesive feet to the bottom of the first switch.
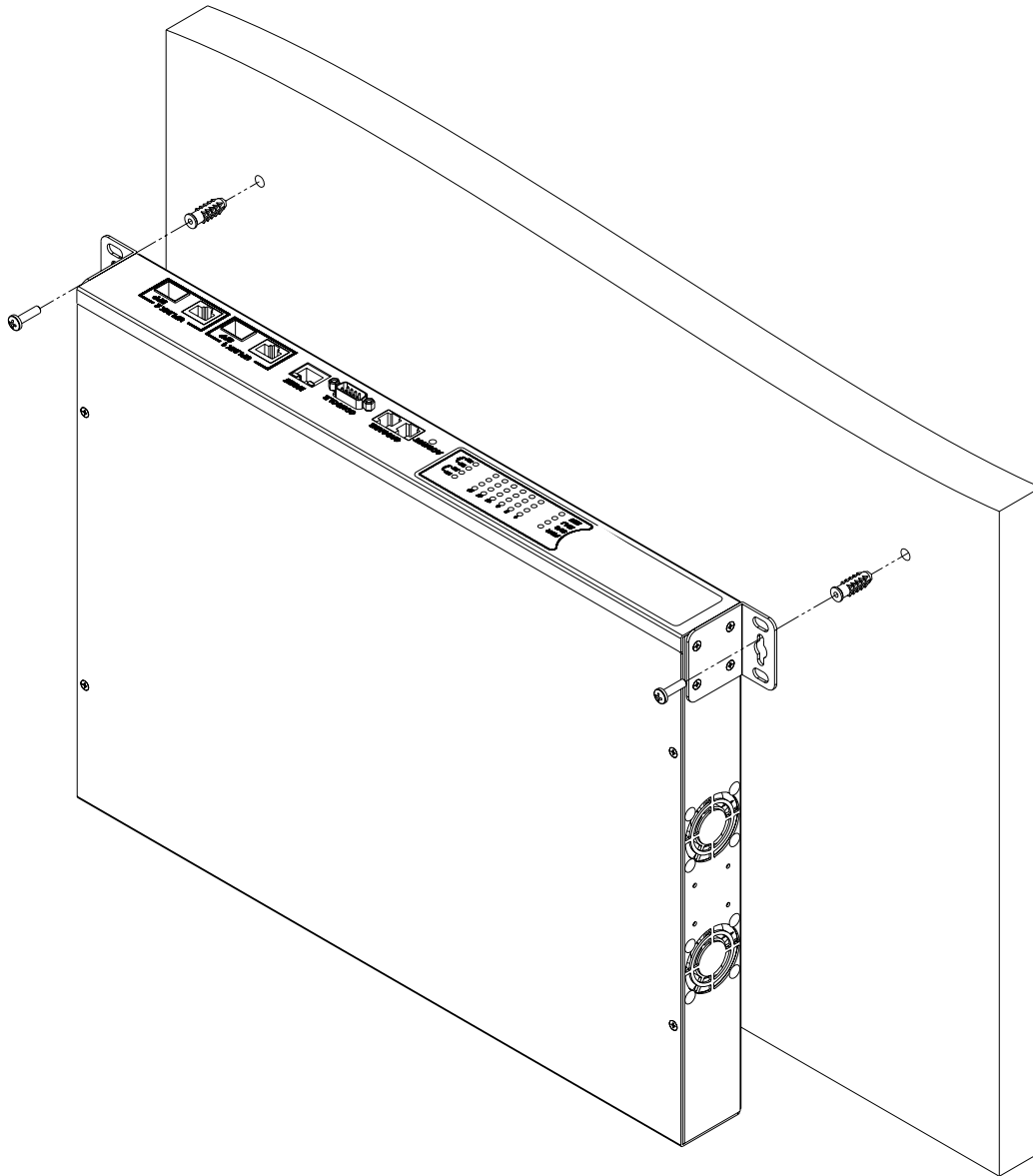
Figure 4-4.   Installing the Switch on a Wall

2. Set the device on a flat surface near an AC power source, making sure there are at least two inches of space on all sides for proper air flow.

3. If installing a single switch only, go to "Powering On the Switch" at the end of this chapter.

4. If installing multiple switches, attach four adhesive feet to each one. Place each device squarely on top of the one below, in any order.

Proper grounding (earth)

Proper Grounding is a very important part of the electrical installation for NCT240, if noise is present in the Electrical ground this noise can leak to the ADSL circuit through the Surge protectors and interfere with the proper operation of ADSL links.

*** both AC/DC power supplies are isolated from the NCT240 ground therefore the Grounding procedure is the same regardless of what the power supply is .

NCT240 Ground:
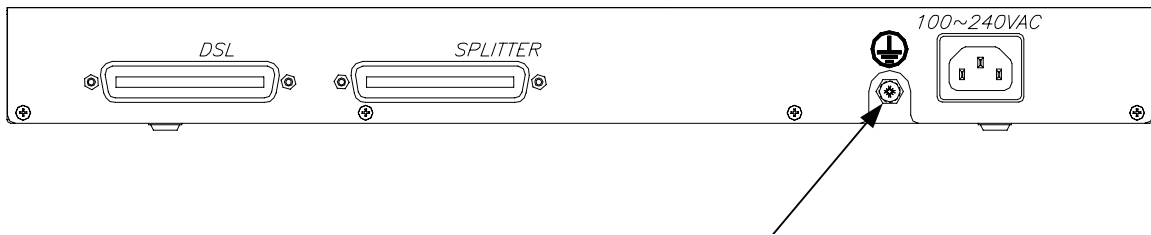
Grounding procedure: (FIX Picture)
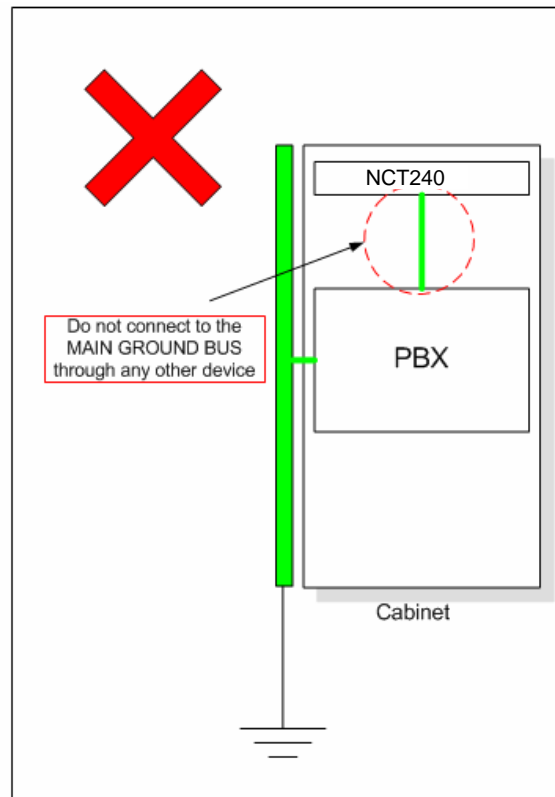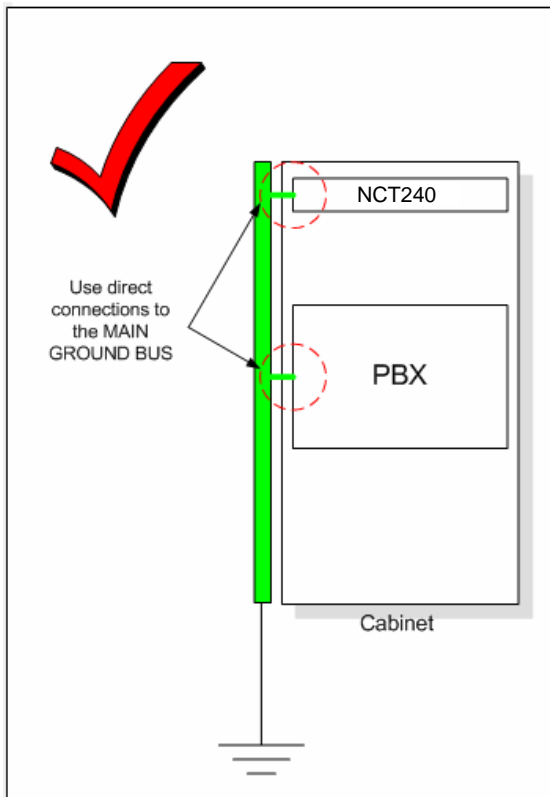
Installing an SFP Transceiver

NCT240
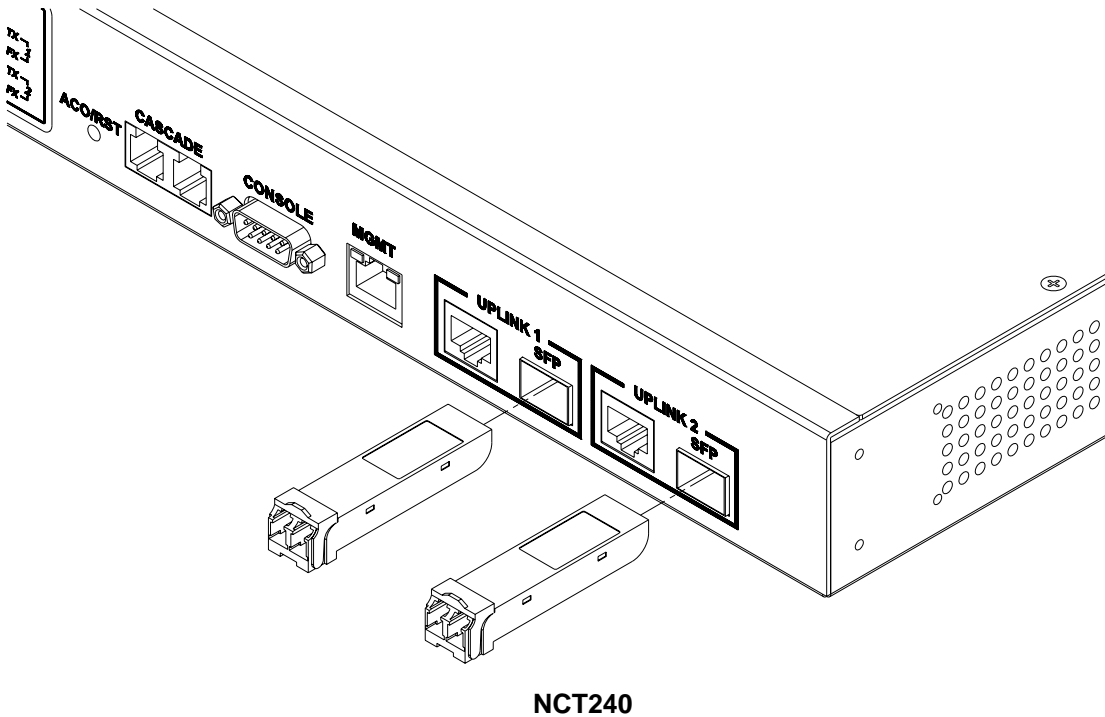
Figure 4-5.   Inserting an SFP Transceiver into the Slot

To install an SFP transceiver, do the following:

1. Use your cabling requirements to select an appropriate SFP transceiver type.

2. Insert the transceiver with the LC connector facing outward and the slot connector facing down.
Note: SFP transceivers are keyed so they can only be installed in one orientation.

3. Slide the SFP transceiver into the slot until it clicks into place.

Notes:
   1. If the stacking ports are connected, the SFP port will be disabled.
   2. SFP transceivers are hot-swappable. You do not need to power off the switch before installing or removing a transceiver. However, you should always first disconnect the network cable before removing a transceiver.

Connecting to the 1000BASE-T and 10/100BASE-TX Interface

Each device requires an unshielded twisted-pair (UTP) cable with RJ-45 connectors at both ends. For 1000BASE-T connections, Category 5, 5e or better cable is required; for 100BASE-TX connections, Category 5 cable is required; for 10BASE-TX, Category 3,4, or 5 cable can be used.

The RJ-45 ports on the NCT240 modules support automatic MDI/MDI-X operation, so you can use standard straight-through twisted-pair cables to connect to any other network device (PCs, servers, switches, routers, or hubs).

Note: Auto-negotiation must be enabled for automatic MDI/MDI-X pin out configuration. See Appendix B for further information on cabling.

Connecting RJ-21 Cables

For incoming phone lines, a splitter can connect directly to a PBX or can be connected via a punch-down block. The particular connection method used will depend on the type of connectors and cables supported on the PBX, and on the existing cabling in the building.
The EE lines from the splitter interface of NCT240 are connected to the punch-down block that connects the phone lines that run up to the end users. If the NCT240 is installed in a rack, it may be convenient to use a patch panel between the splitter interface and the punch-down block.

For all connections to the splitter interface, cables with standard Telco RJ-21 connectors must be used. Some punch-down blocks can be pre-wired with an RJ-21 connector provided, making the connection simple. Otherwise, a cable with an RJ-21 on one end and free wiring on the other end will be required.
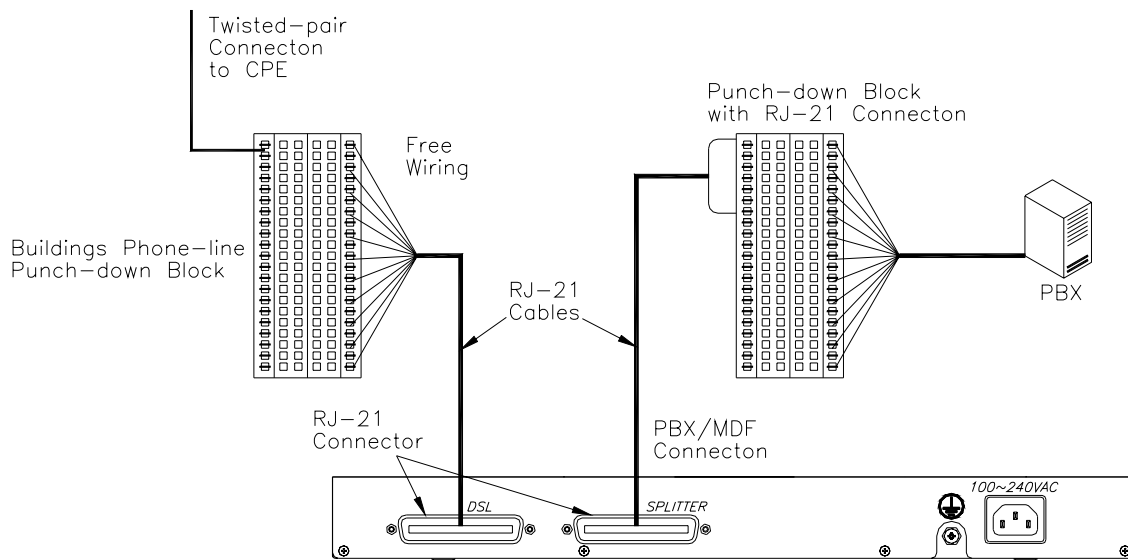
Figure 4-6.   Connecting to the Punch-down Blocks

Follow the steps below to connect an EE Splitter to a building's phone-line system using a punch-down block:

1. Connect one RJ-21 flat cable from the PBX to the connector on the splitter's rear panel labeled "PBX/MDF."
Note: Some installations may also have a separate punch-down block between the PBX and the EE Splitter. In this case, connect an RJ-21 cable from the splitter's "PBX/MDF" connector to the punch-down block.

2. Connect another RJ-21 flat cable from the RJ-21 connector on the front of the splitter labeled "Line" to the building's phone-line punch-down block. Note that the connection to the punch-down block usually requires punching down the free wires from the RJ-21 cable.
Note: If you use pre-wired punch-down blocks with RJ-21 connectors, be sure they are wired to match the pin assignments of ports on the back of the splitter. To ensure that your cables are properly wired, refer to "RJ-21 Port Pin Assignments" on page B-6.

Console management

1. HyperTerminal setting
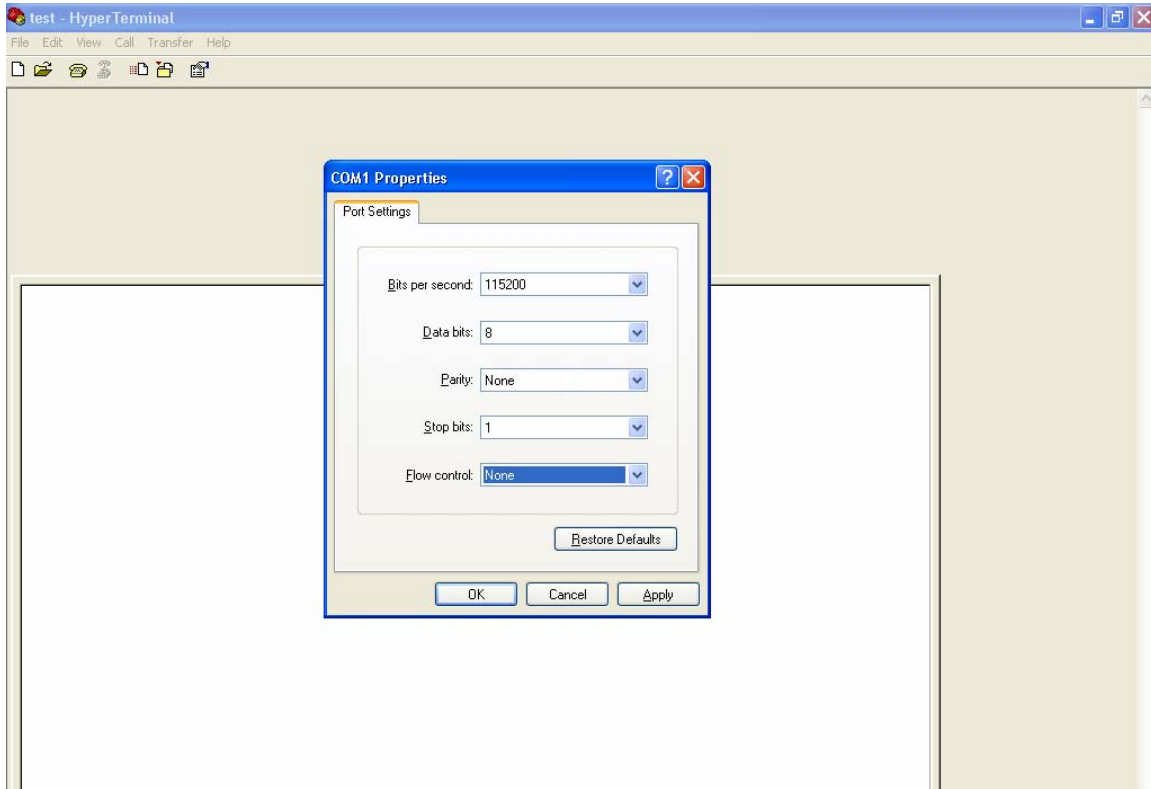
2. Bootloader startup

　　　If you not press any key in the below state, system will load the default startup sequence to do boot our system.

```
U-Boot 1.1.3 (Jun 29 2006 - 16:38:55)  BAS ver:1.00.07

U-Boot code: 00200000 -> 0021CBCC  BSS: -> 0022120C
RAM Configuration:
Bank #0: 00000000 128 MB
Flash: 32 MB
In:    serial
Out:   serial
Err:   serial
Net:  No ethernet found.
Hit any key to stop autoboot:  3
RTC clock initial start !!!
RTC clock initial end !!!
Scanning JFFS2 FS:
U-Boot 1.1.3 (Jun 29 2006 - 16:38:55)  BAS ver:1.00.07

U-Boot code: 00200000 -> 0021CBCC  BSS: -> 0022120C
RAM Configuration:
```

```
Bank #0: 00000000 128 MB
Flash: 32 MB
In:     serial
Out:    serial
Err:    serial
Net:    No ethernet found.
Hit any key to stop autoboot:  3
Please choose booting method:
1--Startup from old kernel and old ramdisk
2--Startup from new kernel and old ramdisk
3--Startup from old kernel and new ramdisk
4--Startup from new kernel and new ramdisk
5--Startup from NFS
6--Startup from RAM
7--U-boot command line
Please choose booting method by pressing the option number:
Your choice is: 4--Startup from new kernel and new ramdisk
Do you want to save it as default booting method? y/n
RTC clock initial start !!!
RTC clock initial end !!!
Scanning JFFS2 FS:   |
```

   If you press a key during this state, there is a menu for you to do a choice the startup sequence you prefer. After you choice a startup sequence this time, system will ask you whether save this choice for next time startup.

```
Your choice is: 4--Startup from new kernel and new ramdisk
Do you want to save it as default booting method? y/n
RTC clock initial start !!!
RTC clock initial end !!!
Scanning JFFS2 FS:   done.
 -rw-------  8068015 Thu Jan 05 12:03:55 2006 uImage.ramdisk
 -rw-------  1081250 Thu Jan 05 12:03:48 2006 uimage.kernel
 drwx-------       0 Thu Jun 08 03:08:47 2006 config
 drwxr-xr-x        0 Thu Jan 05 12:26:25 2006 aa
 -rw-------     1187 Thu Jan 05 19:28:29 2006 telnet_info1
 drwx-------       0 Thu Jan 05 12:01:20 2006 update
### JFFS2 loading ´update/newkernel.image´ to 0x3000000
### JFFS2 load complete: 1081262 bytes loaded to 0x3000000
### JFFS2 loading ´update/newramdisk.image´ to 0x5000000
```

In this state, system will take two~three minutes to do system initialize, so please have patience with this procedure.

```
BAS>
```

Before you connect PC to NCT240 system, you should configure Ethernet first.

```
BAS>ip
```

```
BAS/ip>?

help      Display command list
?         Display command list
show      Display the management ip adress settings
arp       Display, flush the device ARP table
set       Set the management ip address and subnet mask
gateway   Set the default gateway of the device´s default gateway
ping      Ping a remote host
root      Return to the root directory.
exit      Return to upper level
```

```
BAS/ip>set

Set the management ip address and subnet mask

set <ip|netmask>
      ip    .
      netmask   .
BAS/ip>set ip ixp0 192.168.1.1

Done
BAS/ip>set netmask ixp0 255.255.255.0
```

```
BAS/ip>show

ixp0    ip addr:        192.168.1.1
        mac addr:       00:05:ca:00:42:11
        gateway:        0.0.0.0
        net mask:       255.255.255.0

eth0    ip addr:        192.168.0.1
        mac addr:       00:05:ca:00:42:15
        gateway:        0.0.0.0
        net mask:       255.255.255.0
```

After configuring IP and Netmask, you should also configuring gateway of your network.

When the console starts, it will show the command prompt.

```
BAS>
```

You can type help or ?, and it will show all the command groups in this program. This program has seven groups: sys, adsl, switch, isolation, ip, staticstics, and config. User can type end to terminate this program, or to type test to enter the test program.

```
BAS>help
```

```
help            Display command list
?               Display command list
< sys >
< adsl >
< status >
< switch >
< ip >
< statistics >
< config >
exit            Return to upper level
BASO>
```

Type sys to enter the sys group, and then type help or ? to show the information about the sys. User can also type "help argument" to display that how to execute this argument.

```
BAS/sys>help

help            Display command list
?               Display command list
daisycontrol    The management of daisy chain
update          Update system version
info            Show general system information
user            Setup user information
reboot          Reboot the system
snmp            SNMP information
server          The device´s service status and port numbers information
syslog          Log the system status and exception
time            The system´s current time
date            The system´s current date
timeserver      The system´s time server
alarm           The recorded system alarm
exit            Return to upper level
BASO/sys>
```

Ex. type "help info" command, system will show the message about this argument of info. Like following figure, program will display the command of info and its arguments.

```
BAS/sys>help info

Show general system information.

info <show|switchname|location|contact|phone>
     show          Display general system information.
     switchname    Set the switch name.
     location      Set the location information.
     contact       Set the contact person information.
     phone         Set the contact phone number.
```

And we can type the command of exit to leave the group sys, and this program will show following figure

```
BAS>
```

If our location is in top of the level, and we want to terminate this program. We can type end to terminate the program, like following figure.

```
BAS>end

BAS comand line program ended !
```

Above description, we only tell user the method about group sys, and the methods of other groups like the same way. And we can type help to show the purpose of each group and its command.

5. Troubleshooting
Troubleshooting guide

Trouble	Possible cause	Solution
PWR indicator does not light up after Turning on the power.	Power outlet, power cord, or internal power supply may be defective.	• Check the power outlet by plugging in another device that is functioning properly. • Check the power cord with another device.
SYS indicator does not light up after startup.	Microprocessor, SDRAM, Flash or Software may be defective.	• Verify that the switch are powered on. • Check the boot-up statement from console. The boot up procedure is Boot -> kernel->application •
ADSL2+ LINK indicator does not light up after making a connection.	NCT240 Switch, cabling, ADSL Line, or ADSL Switch Ports may be defective.	• Verify that the Access Switch and attached CPE are powered on. • Be sure the RJ-21 cables are plugged into the Access Switch from ADSL2+ modem through the Phone-line punch-down block. • Verify that the cable length does not exceed specified limits. • Check the cable connections on the access Switch, punch-down block/patch panel, and the Extended Ethernet CPE for possible defects. Replace the defective cable if necessary.
UP LINK indicator does not light up after making a connection.	Network cable or Ethernet device attached to this port may be defective.	• Verify that the access switch and attached device are powered on. • Be sure an Ethernet cable is plugged into both the switch and attached device. • Verify that the proper cable type is used and its length does not exceed specified limits. • Check the network cable connections for possible defects. Replace the defective cable if necessary.

Alarm definition

1. Information about this Alarm Definition.

The NCT240 alarm system have two ways that to make a sound by external alarm out or LED signal on faceplate to indicate an error condition. In this document, we declare the alarm as follow format:

Alarm Type Alarm Level Alarm Group Alarm Description

Alarm Level: Major/Minor
Alarm Group: System/CGC group/GEMINAX Group

2. System alarm

The system alarms are triggered by ALARM OUT or kernel oops.

Alarm Type	Alarm Level	Alarm Group	Alarm Description
DoorOpen	Major	sys	Device has been opend
PowerFail	Major	Sys	Power failure
TemDetect	Major	Sys	Fire/ High temperature

Table 1 System Alarm

3. CGC alarm

The CGC alarms are including the GE ports errors.

Alarm Type	Alarm Level	Alarm Group	Alarm Description
GE port0 link down	Major	CGC	GE port0 link down
GE port1 link down	Major	CGC	GE port1 link down

Table 2 CGC Alarm

4. GEMINAX alarm

The GEMINAX alarm includes the alarms on the ports.

Alarm Type	Alarm Level	Alarm Group	Alarm Description

LPR	Major	GEMINAX	Loss-of-power
LOF	Major	GEMINAX	Loss-of-frame
LOS	Major	GEMINAX	Loss-of-signal
LOM	Major	GEMINAX	loss-of-margin
LOL	Major	GEMINAX	Loss of Link
NCD	Major	GEMINAX	No Cell Delineation
LCD	Major	GEMINAX	Loss of Cell Delineation
15M FECS	Major	GEMINAX	15 minutes threshold error Forward Error Correction Seconds
15M ES	Major	GEMINAX	15 minutes threshold error Errored Seconds
15M SES	Major	GEMINAX	15 minutes threshold error Severely Errored Seconds.
15M UAS	Major	GEMINAX	15 minutes threshold error Unavailable Seconds.
15M LOSS	Major	GEMINAX	15 minutes threshold error Loss of Signal Seconds.
15M LOFS	Major	GEMINAX	15 minutes threshold error Loss of Frame Seconds.
15M LOLS	Major	GEMINAX	15 minutes threshold error Loss of Link Seconds.
15M LPRS	Major	GEMINAX	15 minutes threshold error Loss of Power Seconds.
15M FIFAIL	Major	GEMINAX	15 minutes threshold error Failed full initializations
15M SIFAIL	Major	GEMINAX	15 minutes threshold error Failed short initializations
1D FECS	Major	GEMINAX	1 Day threshold error Forward Error Correction Seconds
1D ES	Major	GEMINAX	1 Day threshold error Errored Seconds
1D SES	Major	GEMINAX	1 Day threshold error Severely Errored Seconds
1D UAS	Major	GEMINAX	1 Day threshold error Unavailable Seconds.
1D LOSS	Major	GEMINAX	1 Day threshold error

			Loss of Signal Seconds
1D LOFS	Major	GEMINAX	1 Day threshold error Loss of Frame Seconds
1D LOLS	Major	GEMINAX	1 Day threshold error Loss of Link Seconds.
1D LPRS	Major	GEMINAX	1 Day threshold error Loss of Power Seconds.
1D FIFAIL	Major	GEMINAX	1 Day threshold error Failed full initializations
1D SIFAIL	Major	GEMINAX	1 Day threshold error Failed short initializations
15M FEC	Major	GEMINAX	15 minutes threshold error Forward Error Corrections.
15M CV	Major	GEMINAX	15 minutes threshold error

Coding Violations			
1D FEC	Major	GEMINAX	1 Day threshold error Forward Error Corrections.
1D CV	Major	GEMINAX	1 Day threshold error Coding Violations
15M HEC	Major	GEMINAX	15 minutes threshold error Header Error Control
15M TOTALCELL	Major	GEMINAX	15 minutes threshold error Total cells
15M USERCELL	Major	GEMINAX	15 minutes threshold error User cells
15M IBE	Major	GEMINAX	15 minutes threshold error Cell Bit Error
15M CRC_P	Major	GEMINAX	15 minutes threshold error non pre-emptive packets with CRC error in the bearer channel threshold crossing.
15M CRCP_P	Major	GEMINAX	15 minutes threshold error Pre-emptive packets with CRC error in the bearer channel threshold crossing.

15M CV_P	Major	GEMINAX	15 minutes threshold error non pre-emptive packets with coding violation in the bearer channel threshold crossing.
15M CVP_P	Major	GEMINAX	15 minutes threshold error pre-emptive packets with coding violation in the bearer channel threshold crossing.
1D HEC	Major	GEMINAX	1 Day threshold error Header Error Control
1D TOTALCELL	Major	GEMINAX	1 Day threshold error Total cells
1D USERCELL1D	Major	GEMINAX	1 Day threshold error User cells
1D IBE	Major	GEMINAX	1 Day threshold error Cell Bit Error
1D CRC_P	Major	GEMINAX	1 Day threshold error non pre-emptive packets with CRC error in the bearer channel threshold crossing.
1D CRCP_P	Major	GEMINAX	1 Day threshold error Pre-emptive packets with CRC error in the bearer channel threshold crossing.
1D CV_P	Major	GEMINAX	1 Day threshold error non pre-emptive packets with coding violation in the bearer channel threshold
crossing.			
1D CVP_P	Major	GEMINAX	1 Day threshold error pre-emptive packets with coding violation in the bearer channel threshold crossing.

Table 3 GEMINAX Alarm

6.   Cable and Pin Assignment

Following illustrates how the pins on the RJ-45 connector are numbered. Be sure to hold the connectors in the same orientation when attaching the wires to the pins.
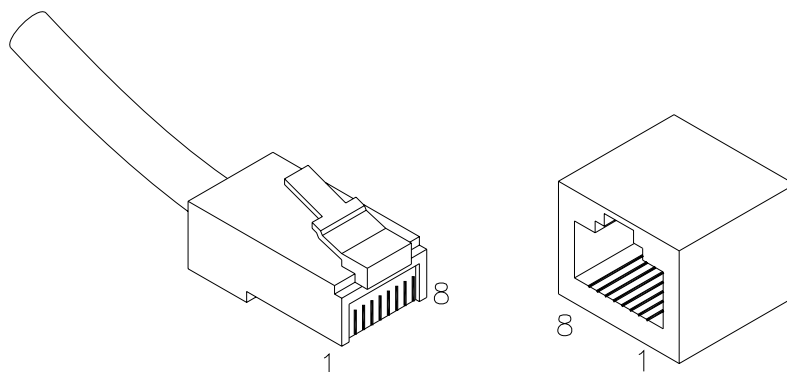
Figure 5-1.   Connecting to the Punch-down Blocks

10BASE-T/100BASE-TX Pin Assignments

For 100BASE-TX/10BASE-T connections, a twisted-pair cable must have two pairs of wires. Each wire pair is identified by two different colors. For example, one wire might be red and the other, red with white stripes. Also, an RJ-45 connector must be attached to both ends of the cable.

With 100BASE-TX/10BASE-T cable, pins 1 and 2 are used for transmitting data, and pins 3 and 6 for receiving data.

Pin Number	Assignment
1	Tx+
2	Tx-
3	Rx+
6	Rx-

Because the ports on the NCT240 support automatic MDI/MDI-X operation, you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. In straight-through cable, pins 1, 2, 3, and 6, at one end of the cable, are connected straight through to pins 1, 2, 3 and 6 at the other end of the cable. The table below shows the 10BASE-T/100BASE-TX MDI and MDI-X port pin outs.

Pin	MDI-X Assignment	MDI Assignment
1	Input Receive Data +	Output Transmit Data +
2	Input Receive Data -	Output Transmit Data -
3	Output Transmit Data +	Input Receive Data +
6	Output Transmit Data -	Input Receive Data -

Note: Auto-negotiation must be enabled for automatic MDI/MDI-X pinout configuration.

1000BASE-T Pin Assignments

1000BASE-T ports support automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. The table below shows the 1000BASE-T MDI and MDI-X port pinouts. These ports require that all four pairs of wires be connected. Note that for 1000BASE-T operation, all four pairs of wires are used for both transmit and receive. Use 100-ohm Category 5, 5e or better unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for 1000BASE-T connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

Pin	MDI Signal Name	MDI-X Signal Name
1	Transmit Data plus (TD1+)	Transmit Data plus (TD2 +)
2	Receive Data minus (RD1-)	Receive Data minus (RD2-)
3	Transmit Data plus (TD2+)	Transmit Data plus (TD1+)
4	Transmit Data plus (TD3+)	Transmit Data plus (TD4+)
5	Receive Data minus (RD3-)	Receive Data minus (RD4-)
6	Receive Data minus (RD2-)	Receive Data minus (RD1-)
7	Transmit Data plus (TD4+)	Transmit Data plus (TD3+)
8	Receive Data minus (RD4-)	Receive Data minus (RD3-)

RJ-21 Port Pin Assignments

The PBX/MDF connector is designed to aggregate 24 POTS/ISDN ports. Each wire pair must be attached to the RJ-21 connector in a specific orientation detailed below. The following table shows the pin assignments.
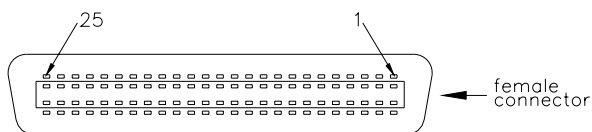
Pins	Circuit	Pins	Circuit	Pins	Circuit	Pins	Circuit
1,26	1,Ring/Tip	7,32	7,Ring/Tip	13,38	13,Ring/Tip	19,44	19,Ring/Tip
2,27	2,Ring/Tip	8,33	8,Ring/Tip	14,39	14,Ring/Tip	20,45	20,Ring/Tip
3,28	3,Ring/Tip	9,34	9,Ring/Tip	15,40	15,Ring/Tip	21,46	21,Ring/Tip
4,29	4,Ring/Tip	10,35	10,Ring/Tip	16,41	16,Ring/Tip	22,47	22,Ring/Tip
5,30	5,Ring/Tip	11,36	11,Ring/Tip	17,42	17,Ring/Tip	23,28	23,Ring/Tip
6,31	6,Ring/Tip	12,37	12,Ring/Tip	18,43	18,Ring/Tip	24,49	24,Ring/Tip

The Extended Ethernet Line connector is designed to aggregate 24 Ethernet ports. The following table shows the pin assignments.

Pins	Circuit	Pins	Circuit	Pins	Circuit	Pins	Circuit
1,26	Port 1	7,32	Port 7	13,38	Port 13	19,44	Port 19
2,27	Port 2	8,33	Port 8	14,39	Port 14	20,45	Port 20
3,28	Port 3	9,34	Port 9	15,40	Port 15	21,46	Port 21
4,29	Port 4	10,35	Port 10	16,41	Port 16	22,47	Port 22
5,30	Port 5	11,36	Port 11	17,42	Port 17	23,28	Port 23
6,31	Port 6	12,37	Port 12	18,43	Port 18	24,49	Port 24

Console Port Pin Assignments

The DB-9 serial port on the switch's rear panel is used to connect to the switch for out-of-band console configuration. The on-board menu-driven configuration program can be accessed from a terminal, or a PC running a terminal emulation program. The pin assignments used to connect to the serial port are provided in the following tables.
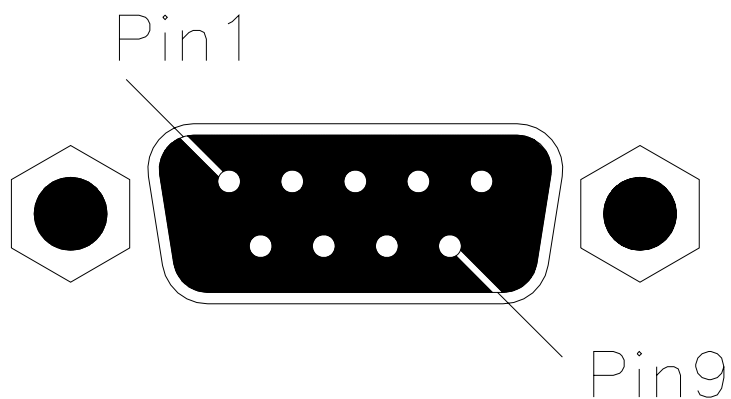
Figure 5-1.   Connecting to the Punch-down Blocks

DB-9 Port Pin Assignments

EIA Circuit	CCITT Signal	Description	Switch's DB-9 DTE Pin #	PC DB-9 DTE Pin #
BB	104	**RxD** (Received Data)	2	2
BA	103	**TxD** (Transmitted Data)	3	3
AB	102	**SGND** (Signal Ground)	5	5

Console Port to 9-Pin DTE Port on PC

Switch's 9-pin Serial Port	CCITT Signal	PC's 9-pin DTE Port
2 RxD	<----------RXD ------------	3 TxD
3 TxD	-------------TXD ----------->	2 RxD
5 SGND	------------SGND -----------	5 SGND

7. Obtaining Technical Assistance

For this NCT240 installation procedures, please contact NetComm Limited.

Accessories for NetComm NCT240

1. A Bracket Mounting Kit

   It contains two brackets and four screws for attaching the brackets to the DSLAM

2. One Power Cord

3. Four adhesive foot pads

4. One CD containing installation Guide and Management Guide

5. One RS-232 console cable (Optional)

6. Two RJ-21 cables which consist of 24-pair Category 3 telephone lines (Optional).

8. Specification

Hardware

Dimensions
◆ (WxDxH): 440 x 320 x 44.4 mm

Weight
◆ 5.2 Kg

LED
◆ System: Power, System, Major and Minor alarm.
◆ ADSL port: link
◆ Uplink Port: TX link and FX link.

Interfaces
◆ One RS232 Serial port for management
◆ One RJ21 for DSL port
◆ One RJ21 for Splitter port
◆ ACO/RST for alarm cut off and system reset
◆ Two RJ45 1000 Base-TX and One SFP interface (w/o optical module) for uplink
   port

Remark: 1000 Base-SX, 1000 Base-LX, 1000 Base-LHX and 1000 Base-ZX.

◆ Ethernet interface comply with IEEE802.3ab Gigabit Ethernet, IEEE802.3z
   Gigabit Ethernet.

Power Supply
◆ 60Wt. (input 90~260 VAC(10%), 50~60Hz)
◆ 60Wt. (input –36~-72 VDC)

Operating Requirement
◆ **Temperature**: -10ºC ~ 60ºC.
◆ **Humidity**: 0~95% (non-condensing).
◆ **EMC/ESD Certification**: FCC Part15 Class A.
◆ **Safety Certification**: UL60950

ADSL/ADSL2+ Interface
◆ ITU-T G.992.1 (G.dmt) [Annex A], ITU-T G.992.2 (G.lite) [Annex A]
◆ ITU-T G.992.3 (ADSL2) [A,L], ITU-T G.992.5 (ADSL2+) [A,L]
◆ OAM functionality according to ITU-T G.997.1 (G.ploam)

◆ ANSI T1.413 Issue 2

◆ Line loop back and diagnostic

Software Feature

L2/L3 Functionality

◆ Switch capability: IEEE802.3x flow control, IEEE802.1d bridging.

◆ VLAN: IEEE802.1p/q VLAN (4094), stacked VLAN, Port-based and Tag-based.

◆ Multicasting: IGMP snooping, 250 groups, Dynamic&Static Configuration.

◆ QoS: IEEE802.1p based COS, 4 priority output queue per port, RFC 2475 DiffServ/TOS.

◆ DHCP: DHCP relay and relay agent option 82.

◆ Rate Limitation: from 64K to Maximum rate, the step is 64K.

Interworking

◆ RFC2684 MPoA LLC/VCMUX.

◆ VPN pass-through

◆ RFC2516 PPPoE packet forwarding.

Trouble Shooting

◆ LED indicator for power, varied interfaces and system alarms.

◆ Local and remote management by using serial and uplink interface

  ➤ On-line show link status monitor, quality and traffic counters

  ➤ Loop back test

  ➤ Log event/alarm of system level

  ➤ Log event/alarm of GE and ADSL2+ interfaces

◆ Cable labeling

Management

◆ CLI support for local management

◆ SNMP V1/V2c

◆ Telnet/SSH

◆ Web-based

◆ Support FCAPS management for EMS

◆ Syslog

◆ SNTP

◆ Remote software upgrade

◆ Remote file backup and restore

9. Glossary

10BASE-T

IEEE 802.3 specification for 10 Mbps Ethernet over two pairs of Category 3, 4, or 5 UTP cable.

100BASE-TX

IEEE 802.3u specification for 100 Mbps Fast Ethernet over two pairs of Category 5 UTP cable.

100BASE-FX

IEEE 802.3u specification for 100 Mbps Fast Ethernet over two strands of 50/125, 62.5/125 or 9/125 micron core fiber cable.

1000BASE-T

IEEE 802.3ab specification for Gigabit Ethernet over 100-ohm Category 5 or 5e twisted-pair cable (using all four wire pairs).

Auto-Negotiation

Signaling method allowing each node to select its optimum operational mode (e.g., 10 Mbps or 100 Mbps and half or full duplex) based on the capability of the node to which it is connected.

Bandwidth

The difference between the highest and lowest frequencies available for network signals. Also synonymous with wire speed, the actual speed of the data transmission along the cable.

Collision

A condition in which packets transmitted over the cable interferes with each other. Their interference makes both signals unintelligible.

Collision Domain

Single CSMA/CD LAN segment.

CSMA/CD

CSMA/CD (Carrier Sense Multiple Access/Collision Detect) is the communication method employed by Ethernet, Fast Ethernet, or Gigabit Ethernet.

End Station

A workstation, server, or other device that does not forward traffic.

Ethernet

A network communication system developed and standardized by DEC, Intel, and Xerox, using baseband transmission, CSMA/CD access, logical bus topology, and coaxial cable. The successor IEEE 802.3 standard provides for integration into the OSI model and extends the physical layer and media with repeaters and implementations that operate on fiber, thin coax and twisted-pair cable.

Fast Ethernet

A 100 Mbps network communication system based on Ethernet and the CSMA/CD access method.

Gigabit Ethernet

A 1000 Mbps network communication system based on Ethernet and the CSMA/CD access method.

Full-Duplex

Transmission method that allows two network devices to transmit and receive concurrently, effectively doubling the bandwidth of that link.

IEEE

Institute of Electrical and Electronic Engineers.

IEEE 802.3

Defines carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications.

IEEE 802.3ab

Defines CSMA/CD access method and physical layer specifications for 1000BASE-T Fast Ethernet.

IEEE 802.3u

Defines CSMA/CD access method and physical layer specifications for 100BASE-TX Fast Ethernet.

IEEE 802.3x

Defines Ethernet frame start/stop requests and timers used for flow control on full-duplex links.

IEEE 802.3z

Defines CSMA/CD access method and physical layer specifications for 1000BASE Gigabit Ethernet.

Local Area Network (LAN)

A group of interconnected computer and support devices.

LAN Segment

Separate LAN or collision domain.

LED

Light emitting diode used for monitoring a device or network condition.

Local Area Network

A group of interconnected computers and support devices.

Media Access Control (MAC)

A portion of the networking protocol that governs access to the transmission medium, facilitating the exchange of data between network nodes.

MDF (Main Distribution Frame)

Equipment where outside telephone lines are terminated at a building or site.

MIB

An acronym for Management Information Base. It is a set of database objects that contains information about the device.

MPOE (Minimum or Main Point of Entry)

The location in a building where cables from the telephone service provider are terminated.

Network Diameter

Wire distance between two end stations in the same collision domain.

Private Branch Exchange (PBX)

A telephone exchange local to a particular organization who use, rather than provide, telephone services.

POTS

Plain Old Telephone Service.

Redundant Power Unit (RPU)

A backup power supply that automatically takes over in case the primary power supply should fail.

RJ-45 Connector

A connector for twisted-pair wiring.

Splitter

A filter to separate DSL signals from POTS signals to prevent mutual interference.

Switched Ports

Ports that are on separate collision domains or LAN segments.

Transmission Control Protocol/Internet Protocol (TCP/IP)

Protocol suite that includes TCP as the primary transport protocol, and IP as the network layer protocol.

UTP

Unshielded twisted-pair cable.

ADSL

asymmetric data rate Digital Subscriber Line: A family of digital telecommunications protocols designed to allow high speed data communication at data rates deliver data rates up to 25 Mbps downstream and 1 Mbps upstream with corresponding maximum reach 18K feet of 24 gauge twisted pair cable over the existing copper telephone lines between end-users and telephone companies.

Virtual LAN (VLAN)

A Virtual LAN is a collection of network nodes that share the same collision domain regardless of their physical location or connection point in the network. A VLAN serves as a logical workgroup with no physical barriers, allowing users to share information and resources as though located on the same LAN.

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**. Refer to the Management Guide for complete product warranty conditions, limitations of warranty and other legal and regulatory information.

Contact Information

If you have any technical difficulties with your product, please do not hesitate to contact NetComm's Customer Support Department.

Email: support@netcomm.com.au

www.netcomm.com.au

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.

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