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1. Installing Cabinets

2. PCB Installation and Startup

3. Installing Extensions and Trunks

4. Optional Equipment

5. Data and SMDR

6. LAN Connection

7. Specifications and Parts

Aspíla EX

Hardware Manual

00.24

This manual has been developed by NEC Infrontia Asia Pacific Sdn. Bhd. It is intended for the use of its customers and service personnel, and should be read in its entirety before attempting to install or program the system. Any comments or suggestions for improving this manual would be appreciated. Forward your remarks to:

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www.necinfrontia-ap.com

Table of Contents

1

Section 1: Installing the Main and Expansion Cabinets

GENERAL PRECAUTIONS

- To avoid shock or equipment damage, do not plug in or turn the system power on before completing the installation process.
- Avoid working with the equipment during electrical storms.
- Use only commercial AC power to prevent shock or fire.
- Use the power cord supplied for the cabinet.
- Do not bundle AC power cords together, the cords may overheat.
- Make sure the cabinet has a proper Earth ground.
- Install batteries with the correct polarity to prevent damaging equipment.
- The cabinet should not be placed on unstable surfaces.

GETTING STARTED

Additional parts supplied with the Aspila EX

Technical CD

The Aspila EX Technical CD contains all the manuals required to install the Aspila EX system.

- Aspila EX Hardware Manual
  How to install the parts of the Aspila EX system includes how to make connection to all ports within the system.
- Aspila EX Software Manual
  Explains the operation for all features on the system.
- Aspila EX Programming Manual
  How to configure the Aspila EX system.

System Phone Label Maker

Software that allows the installer to customise the button designation for System Phones. There is a standard inlay already fitted to the system phones. Label Maker allows this inlay to be replaced with the button configuration setup by the installer.

Declaration of Conformity

This is a regulatory document that must be passed to the customer. The documant explains the R&TTE standards to which the Aspila EX system is approved.

INSTALLING THE MAIN CABINET

Unpacking

Unpack the equipment and check it against your equipment lists. Inspect for physical damage. If you are not sure about a component's function, review the information for the component within this manual. Contact your Sales Representative if you have additional questions.

Make sure you have appropriate tools for the job, including: a test set, a punch down tool, and a digital voltmeter.

Before Installing

Make sure you have a building plan showing common equipment, extensions, the telecom demarcation, and earth ground location. The installation site must meet the Enviromental Requirements.

Site Requirements

The system can be floor-mounted, wall mounted, or rack mounted. Each cabinet is supplied with a bracket which can be used to secure the cabinet in floor or wall mounting, for rack mounting the bracket supplied can be used only if there are rear mounting strips within the rack cabinet, if not a seperate bracket can be used. Ensure that enough space is available to allow the installation of an expansion cabinet above the Main Cabinet.

The system requires a three-prong dedicated 200-240 VAC 50 Hz circuit located within 2.0 metres of the AC receptacle.
The cabinet is shipped fully assembled. The following is enclosed with the cabinet:

- 1 power cord with IEC 320/CEE 22 Angled socket (packed outside the cabinet)
- 1 mounting bracket for floor or wall mounting (can be used for rack mounting where possible see Securing the Main Cabinet to a Rack (Figure 1-13 - Figure 1-17) packed outside the cabinet

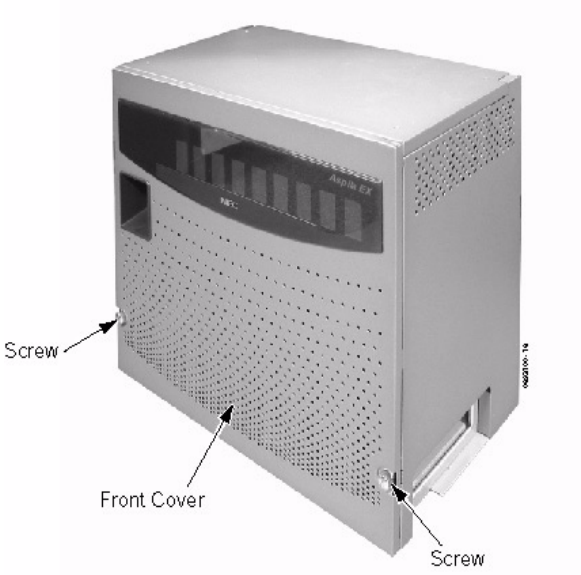
Environmental Requirements

Meeting and maintaining established environmental standards maximizes the life of the system. Be sure that the site selected for the cabinet is not:

1. In direct sunlight or in hot, cold, or humid places.
2. In dusty areas or in areas where sulfuric gases are produced.
3. In places where shocks or vibrations are frequent or strong.
4. In places where water or oil comes in contact with the unit.
5. In areas near high-frequency machines or electric welders.
6. Near computers, telexes, microwaves, air conditioners, etc.
7. Near radio antennas (including shortwave).

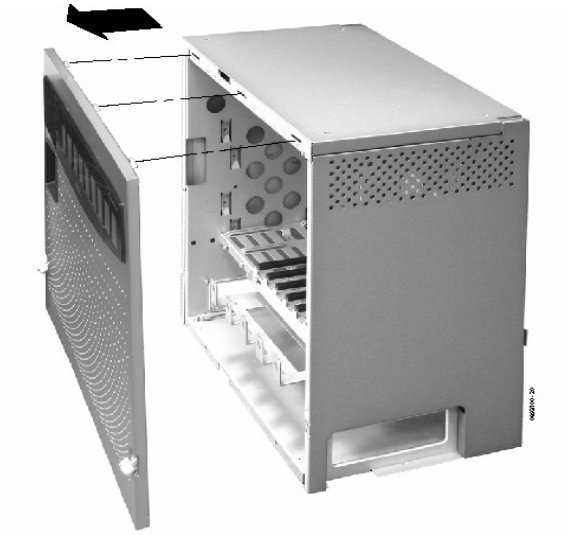
Removing the Front Cover (Figure 1-1)

1. Position the cabinet on the floor near the MDF within 2 metres of the dedicated AC outlet. (Do not secure the cabinet to the wall at this time).
2. Loosen two front panel retaining screws.
3. Slide the front cover to the right then pull straight out.



Step 1

Step 2



Step 3

Figure 1-1: REMOVING THE FRONT COVER

1

Removing the Side Panels (Figure 1-2)

1. Loosen the side panel retaining screws located on the front of the cabinet. Remove the side panel covers of the Main Cabinet by pulling out slightly then moving it towards the back of the cabinet to unhook the panel.

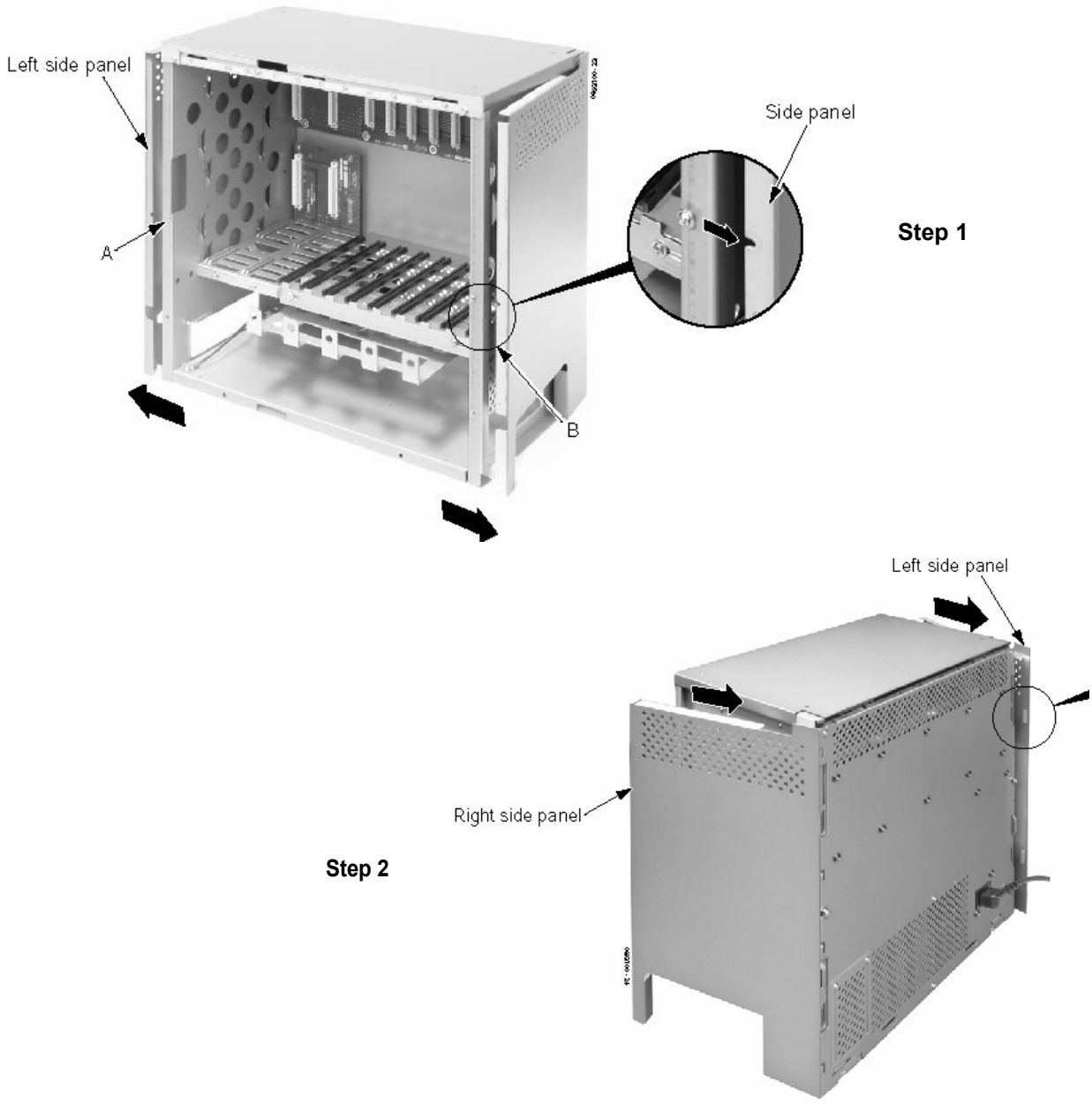


Figure 1-2: REMOVING THE SIDE PANELS

Securing the Main Cabinet to the Floor (Figure 1-3 - Figure 1-7)

1. Install the wall bracket on the floor providing the appropriate spacing as shown below.

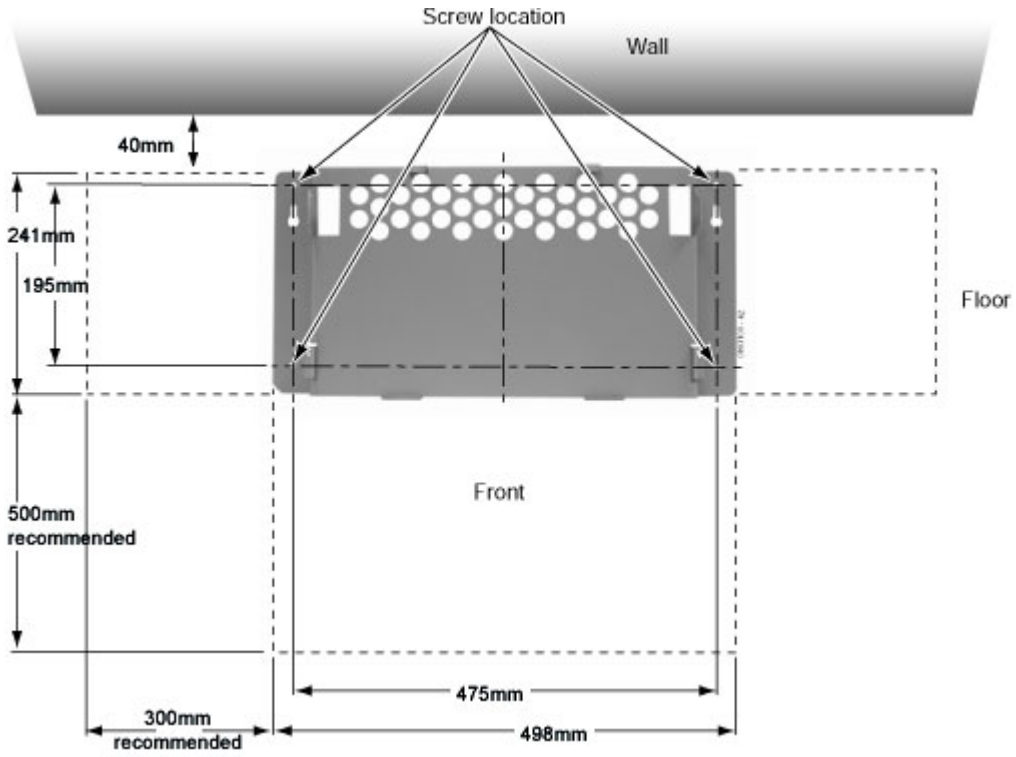


Figure 1-3: INSTALLING THE MOUNTING BRACKET

2. Secure the mounting bracket to the floor using four 6mm anchor bolts.

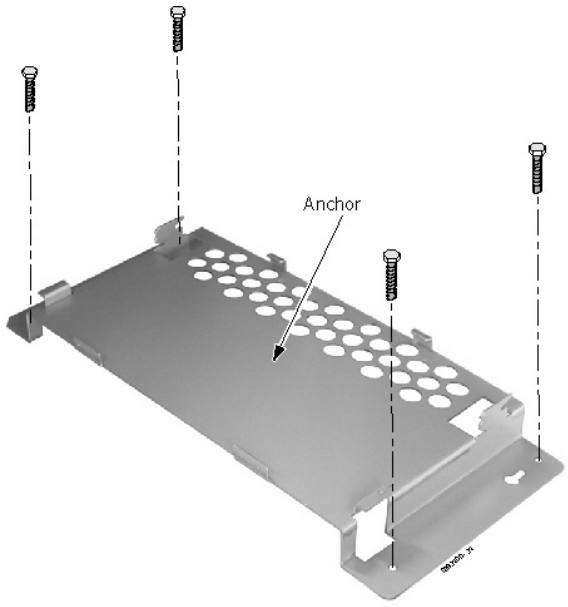


Figure 1-4: SECURE THE MOUNTING BRACKET WITH THE SCREWS

3. Remove the 2 screws from the front of the mounting bracket.

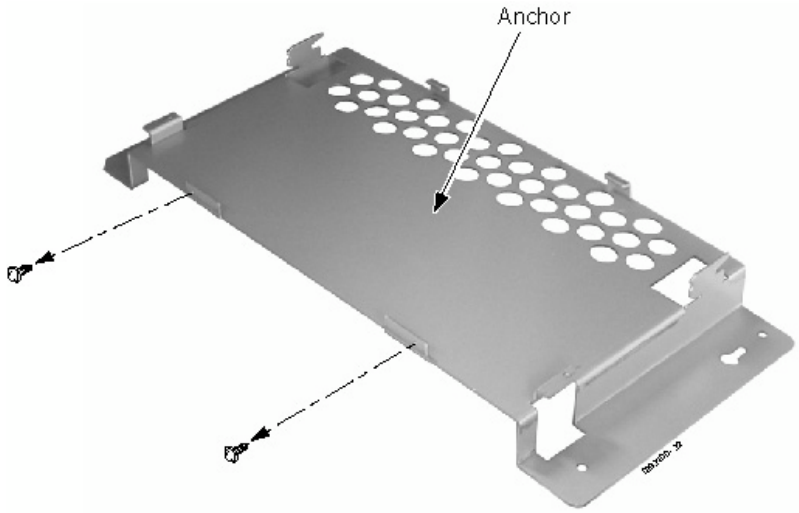


Figure 1-5: REMOVE THE SCREWS FROM THE MOUNTING BRACKET

4. Place the cabinet on the secured mounting bracket and slide backwards.

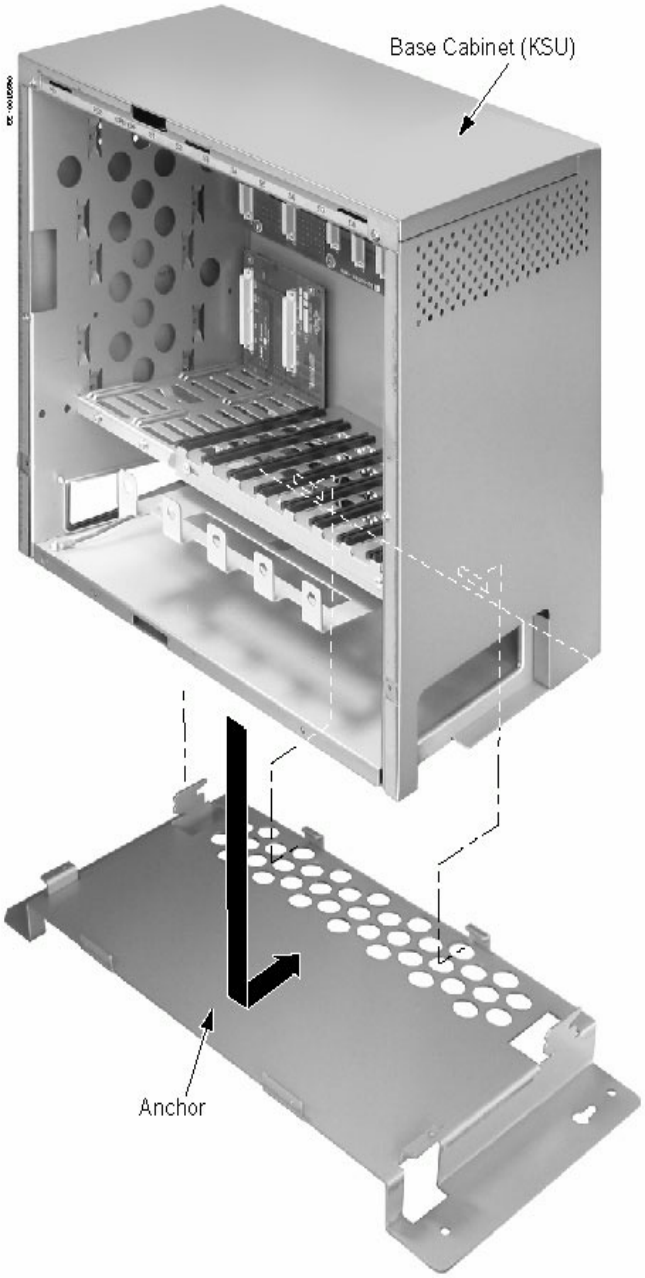


Figure 1-6: ATTACHING THE CABINET TO THE MOUNTING BRACKET

5. Secure the cabinet to the mounting bracket by reinstalling the two screws removed from the mounting bracket in step 2.

Figure 1-7: REINSTALL SCREWS

Securing the Main Cabinet to the Wall (Figure 1-8 - Figure 1-12)

1. Install the wall bracket to the wall providing the appropriate spacing as shown below. The two top key-hole screws should protrude from the wall about 3mm to allow the bracket to slide over the screw heads.

   It is suggested that plywood first be installed on the wall where the cabinet will be positioned. This allows for secure anchoring of the screws which will be supporting the weight of the cabinet.

   Note: Only one cabinet should be wall mounted. Two cabinets may result in too much weight to be safely mounted together. The weight of a two cabinet system can be up to 50kg.

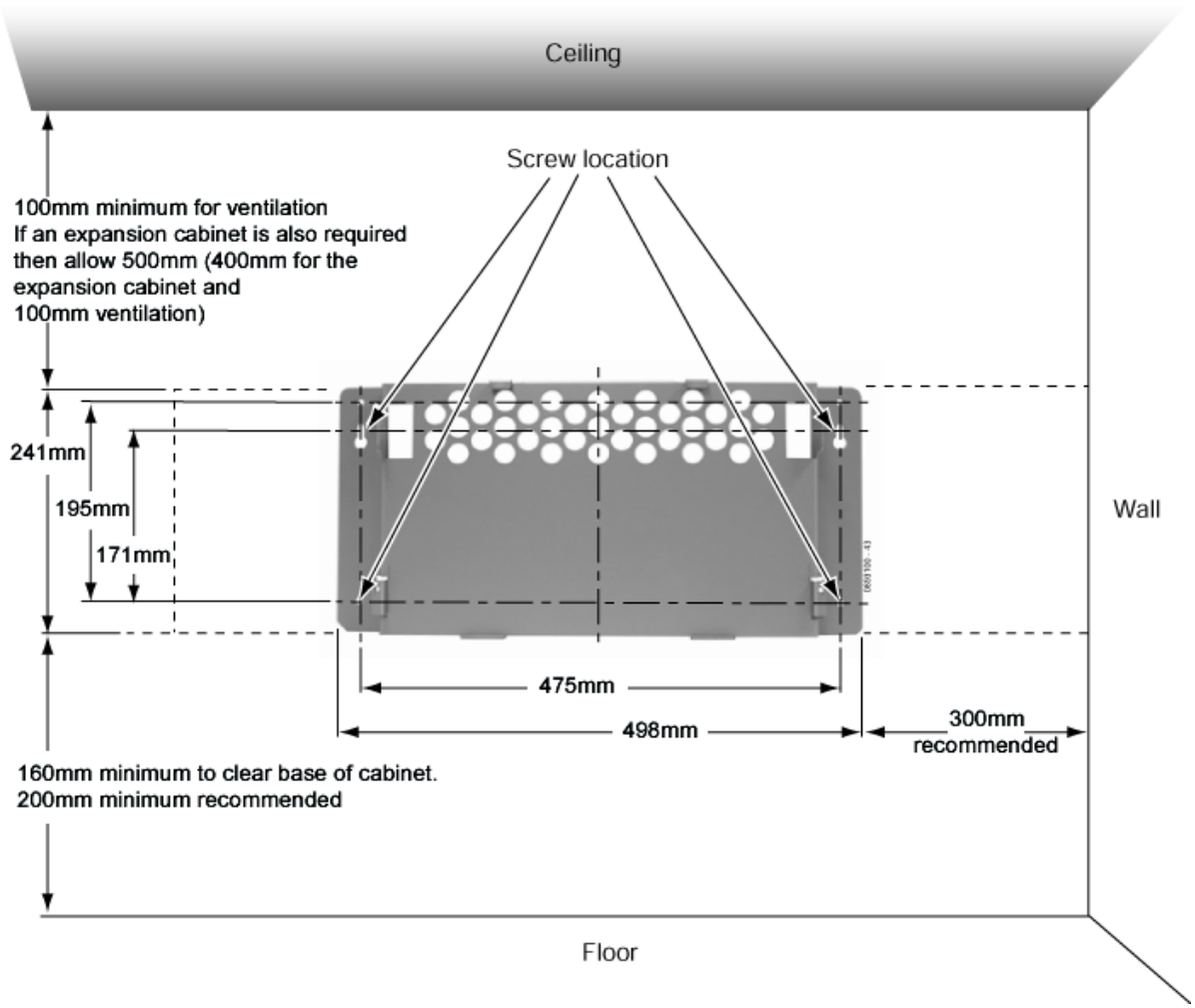


Figure 1-8: INSTALLING THE MOUNTING BRACKET

2. Remove the two screws from the back of the cabinet.

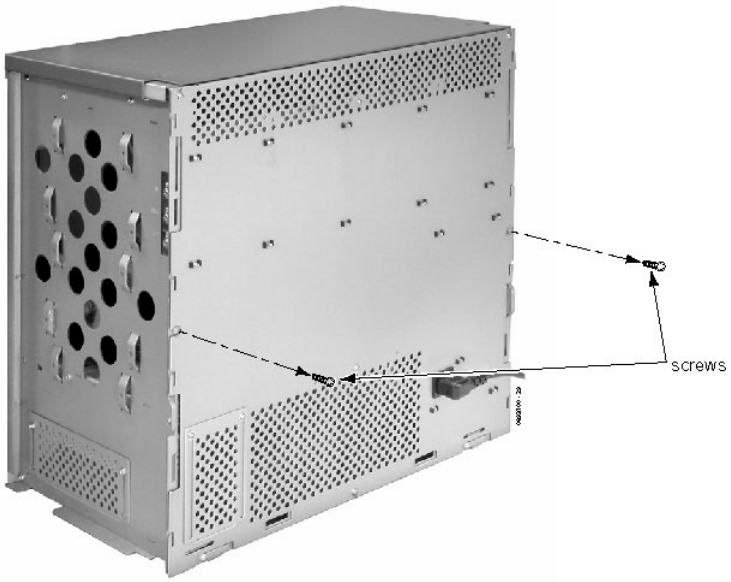


Figure 1-9: REMOVE THE SCREWS FROM THE CABINET

3. Hook the mounting bracket onto the back of the cabinet.

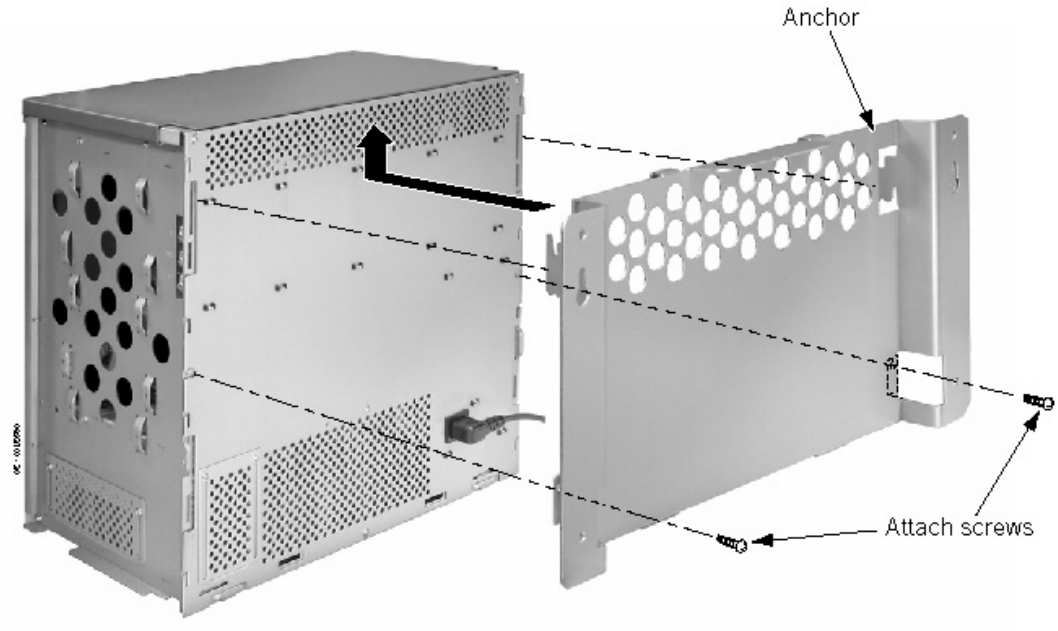


Figure 1-10: ATTACH BRACKET TO THE CABINET

4. Replace the two screws removed in step 2 to secure the bracket to the cabinet.
5. Plug the power cord into the back of the cabinet.

Due to the spacing between the cabinet and the wall, this cannot be done once the cabinet is fixed to the wall.

6. Lift the cabinet into position and slide the mounting bracket over the screws attached to the wall.

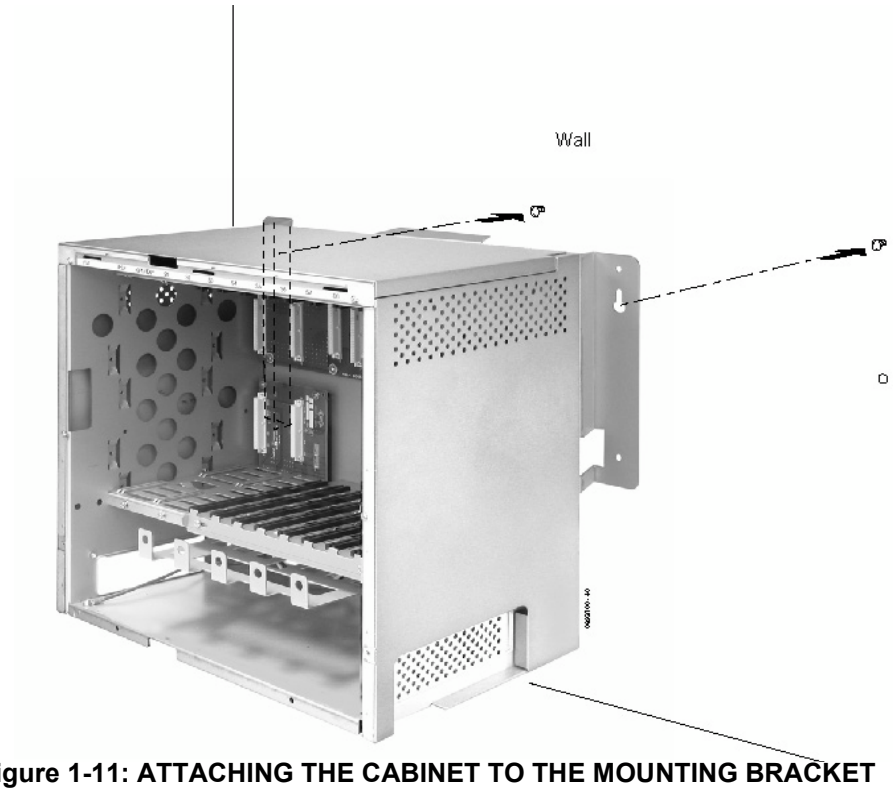


Figure 1-11: ATTACHING THE CABINET TO THE MOUNTING BRACKET

7. Secure the cabinet to the wall by inserting the two screws into the bottom half of the mounting bracket.

Figure 1-12: FASTEN BRACKET TO WALL

1

Securing the Main Cabinet to a Rack (Figure 1-13 - Figure 1-17)

1. Install the 19” rack mount bracket. The 19” rack mount bracket is not supplied with the cabinet and must be ordered seperately.

   The cabinet will require approximately 400mm (9U) of height within the rack.

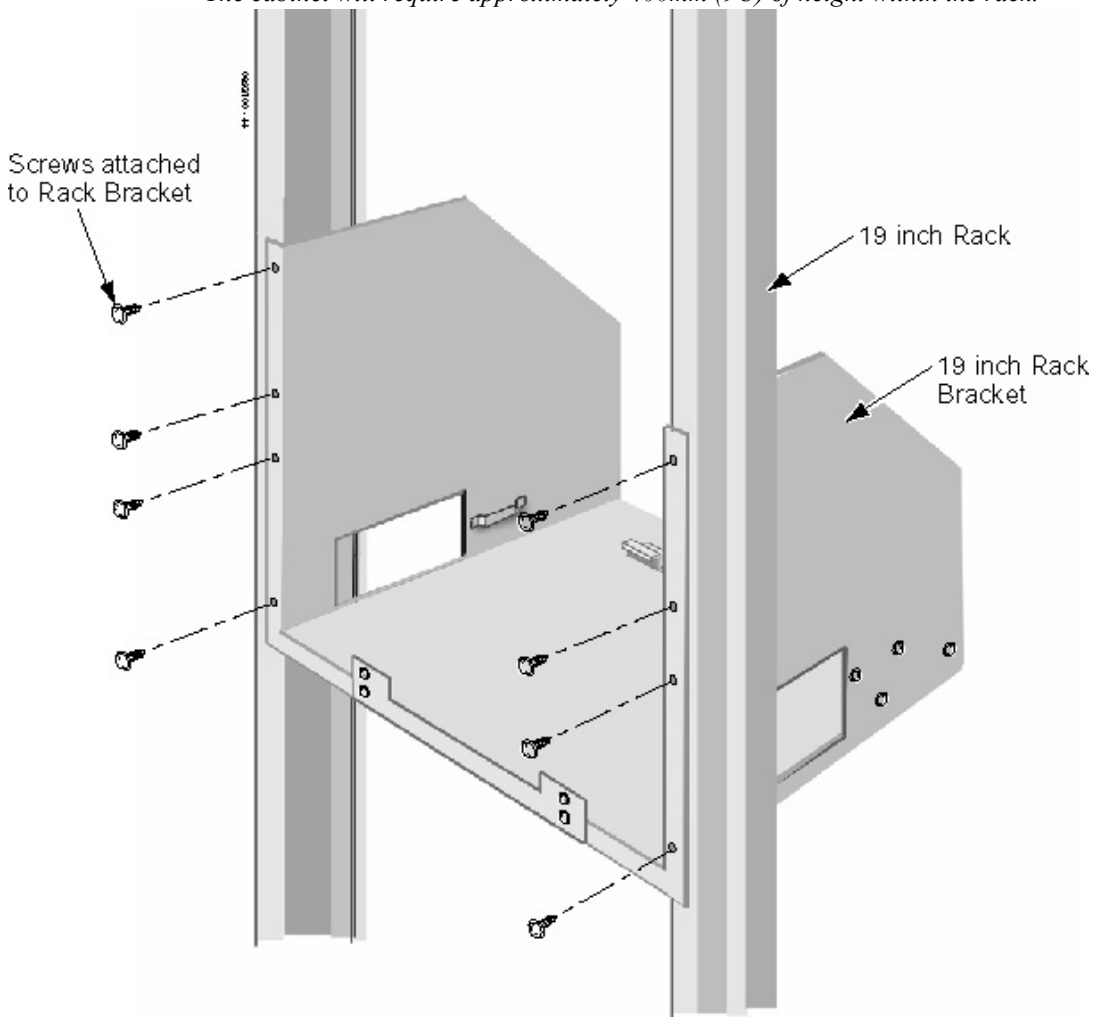


Figure 1-13: INSTALLING THE MOUNTING BRACKET ON THE RACK

Note that the floor/wall mounting bracket supplied with each cabinet can be used for rack mouning ONLY IF the rack enclosure has the mounting strips at the rear. The mounting bracket is installed onto the rear mounting strips and the instructions for Securing the Main Cabinet to the Wall (Figure 1-8 - Figure 1-12) are followed to install the cabinet(s)

2. Remove the two screws from the front of the rack mount bracket.

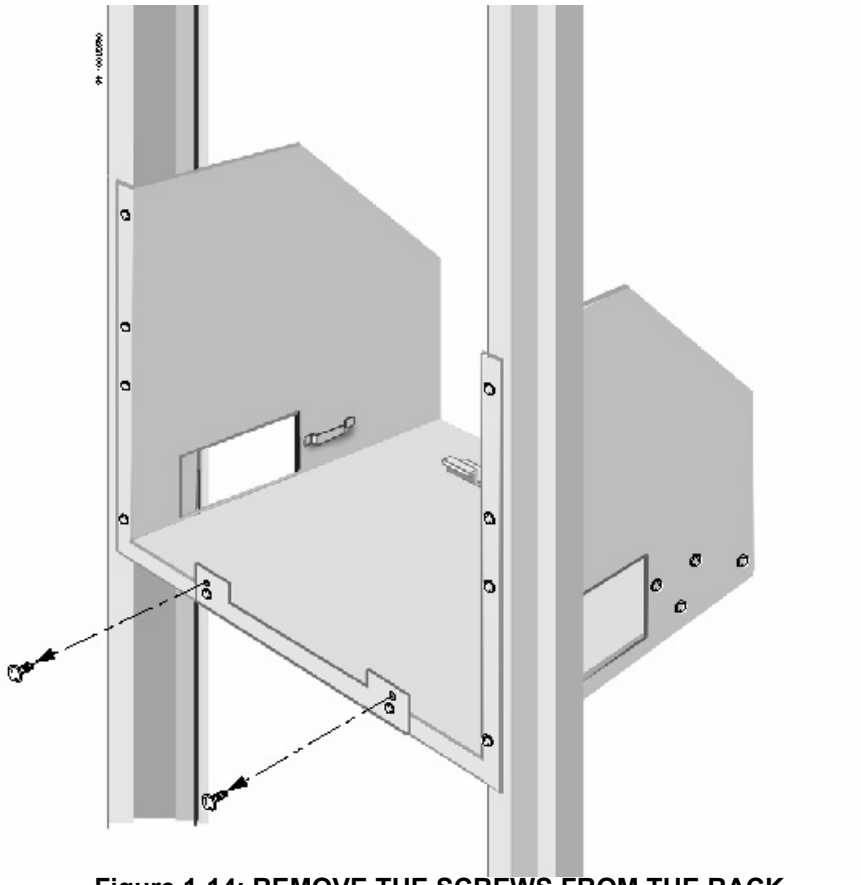


Figure 1-14: REMOVE THE SCREWS FROM THE RACK

3. Connect the Earth ground wire to the cabinet. See *GROUNDING THE CABINETS* on page 1-32 for complete details on grounding the system.

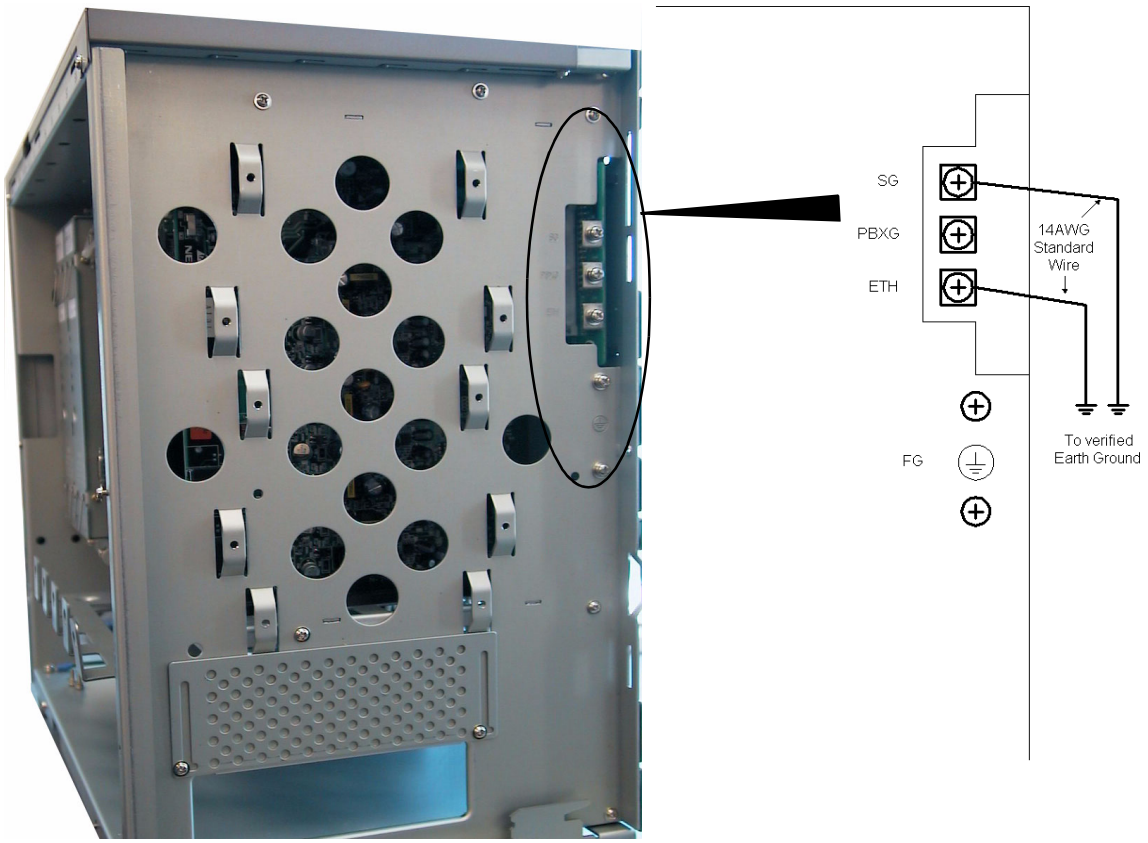


Figure 1-15: CONNECTING THE EARTH GROUND

4. If an expansion cabinet is to be added then you should also connect the 4 wire DC power cable to the BATT2 connector.
5. Replace the side panels of the cabinet.
   This must be done at this point as the panels cannot be accessed once the cabinet is mounted in the rack.
6. Place the cabinet in the rack, making sure the hooks on the mounting bracket are inserted into the back of the cabinet, securing it in place.

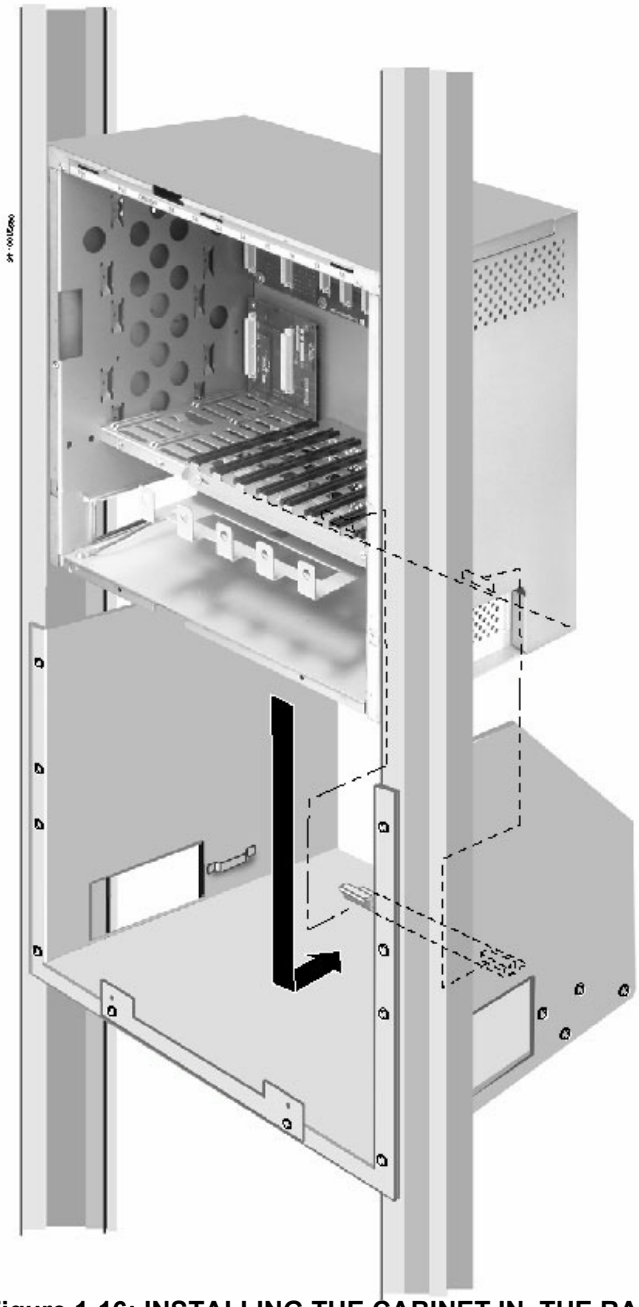


Figure 1-16: INSTALLING THE CABINET IN THE RACK

7. Replace the screws in the front of the rack which were removed in step 2.

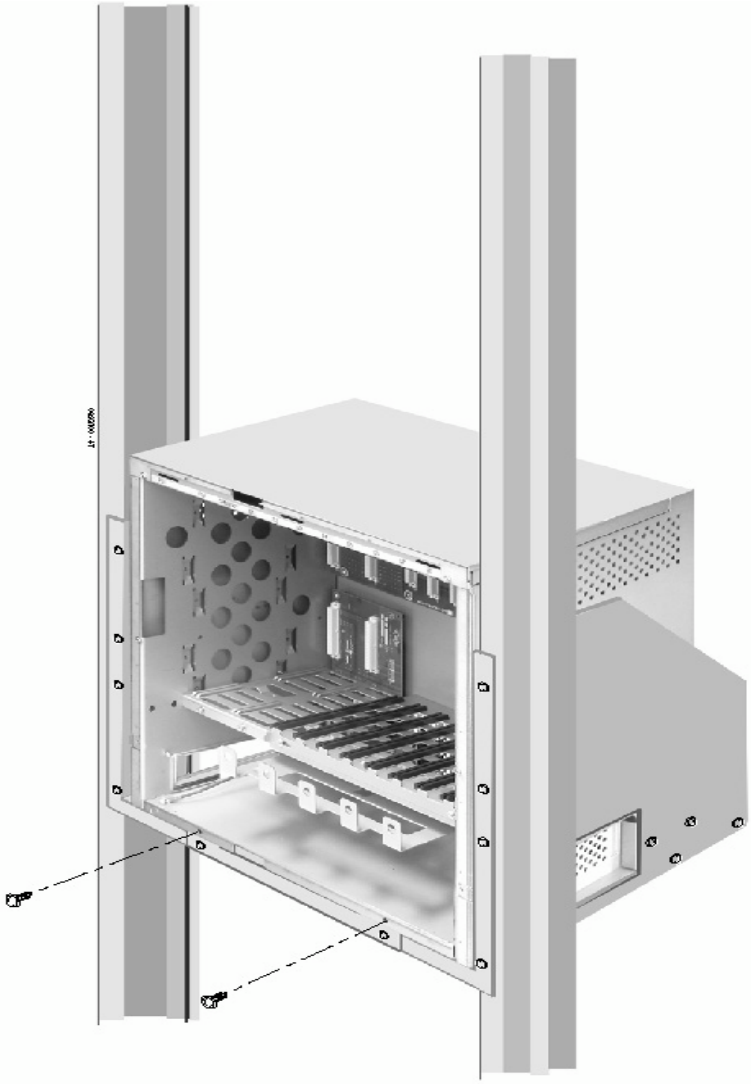


Figure 1-17: SECURING THE CABINET TO THE RACK

INSTALLING AN EXPANSION CABINET

Expansion Cabinet

The Expansion Cabinet uses an expansion bracket which attaches to the top cover of the Main Cabinet. An Expansion Cabinet cable is also required to connect the Main Cabinet NTCPU to the Expansion Cabinet. The following parts are supplied with the expansion kit:
Expansion interface PCB (EXIFU)
Expansion cable (NTCPU-EXIFU)
4 way DC power cable (BATT2)
Expansion bracket & 4 screws (to join the cabinet together)

Note: Only one cabinet should be wall mounted. Two cabinets may result in too much weight to be safely mounted together. The weight of a two cabinet system can be up to 50kg.

Before Installing an Expansion Cabinet

1. Power down the Main Cabinet.
2. Remove the Main Cabinet from the wall (if necessary).
3. Remove the front and side covers from the Main Cabinet. Refer back to Figure 1-1 and Figure 1-2 if necessary.
4. Remove the front and side covers of the Expansion Cabinet.

Expanding a Floor System (Figure 1-18 - Figure 1-26)

It is strongly recommended to secure the expansion cabinet to the wall.

1. Remove the two screws from the expansion bracket.

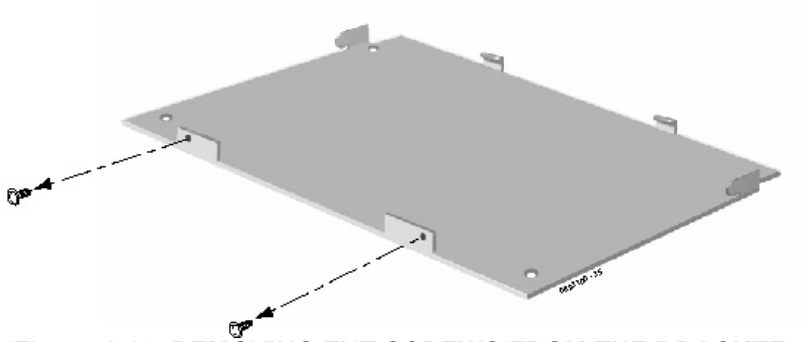


Figure 1-18: REMOVING THE SCREWS FROM THE BRACKET

2. Place the expansion bracket on the top of the main cabinet. Using the screws provided with the expansion bracket, secure the bracket to the top of the main cabinet.

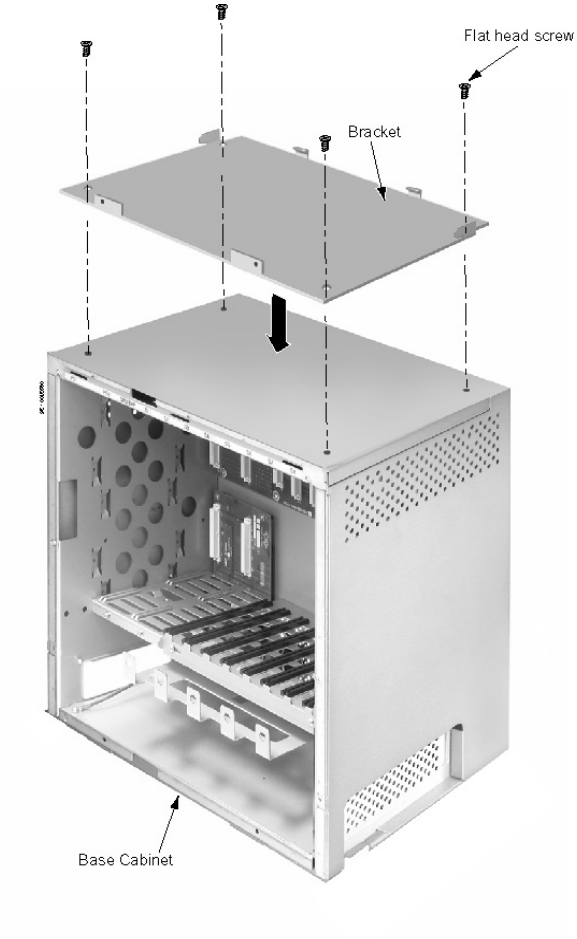


Figure 1-19: SECURE THE EXPANSION BRACKET TO THE MAIN CABINET

3. Remove the 2 screws from the back of the expansion cabinet.

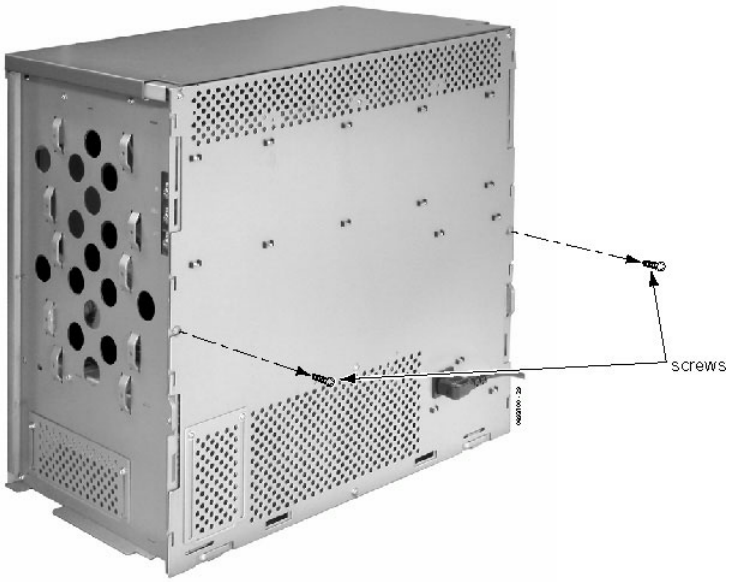


Figure 1-20: REMOVE THE SCREWS FROM THE CABINET

4. Hook the mounting bracket onto the back of the expansion cabinet.

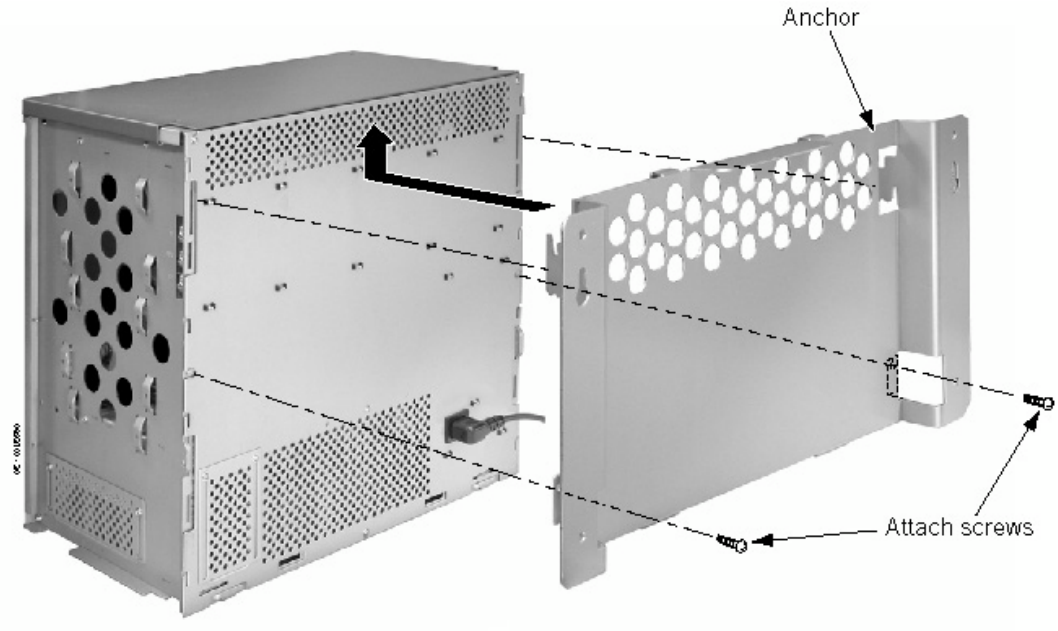


Figure 1-21: ATTACH BRACKET TO THE CABINET

5. Replace the two screws removed in step 3 to secure the bracket to the expansion cabinet.
6. Place the expansion cabinet on the secured mounting bracket and slide backwards.

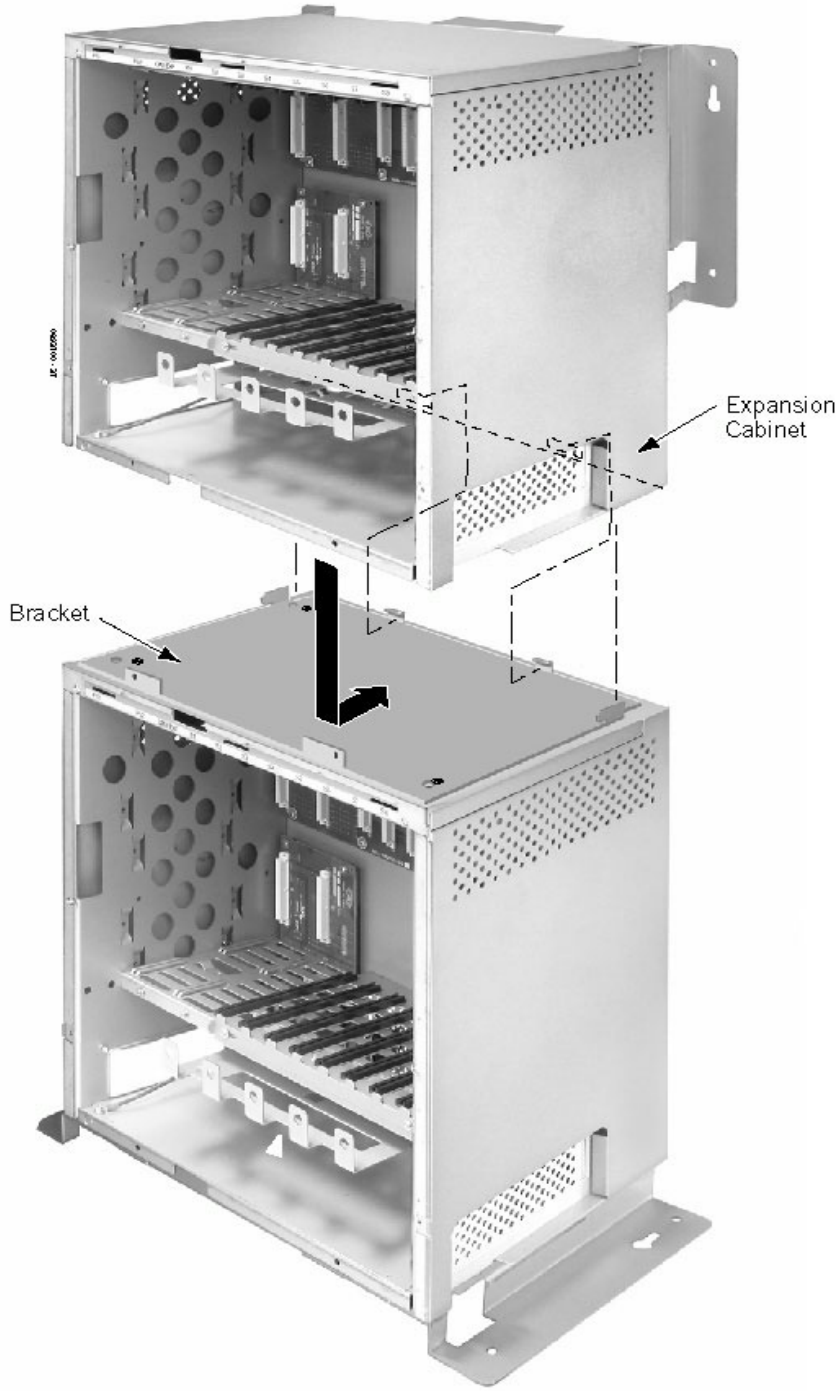


Figure 1-22: ATTACHING THE EXPANSION CABINET TO THE MOUNTING BRACKET

7. Secure the expansion cabinet to the wall using four screws.

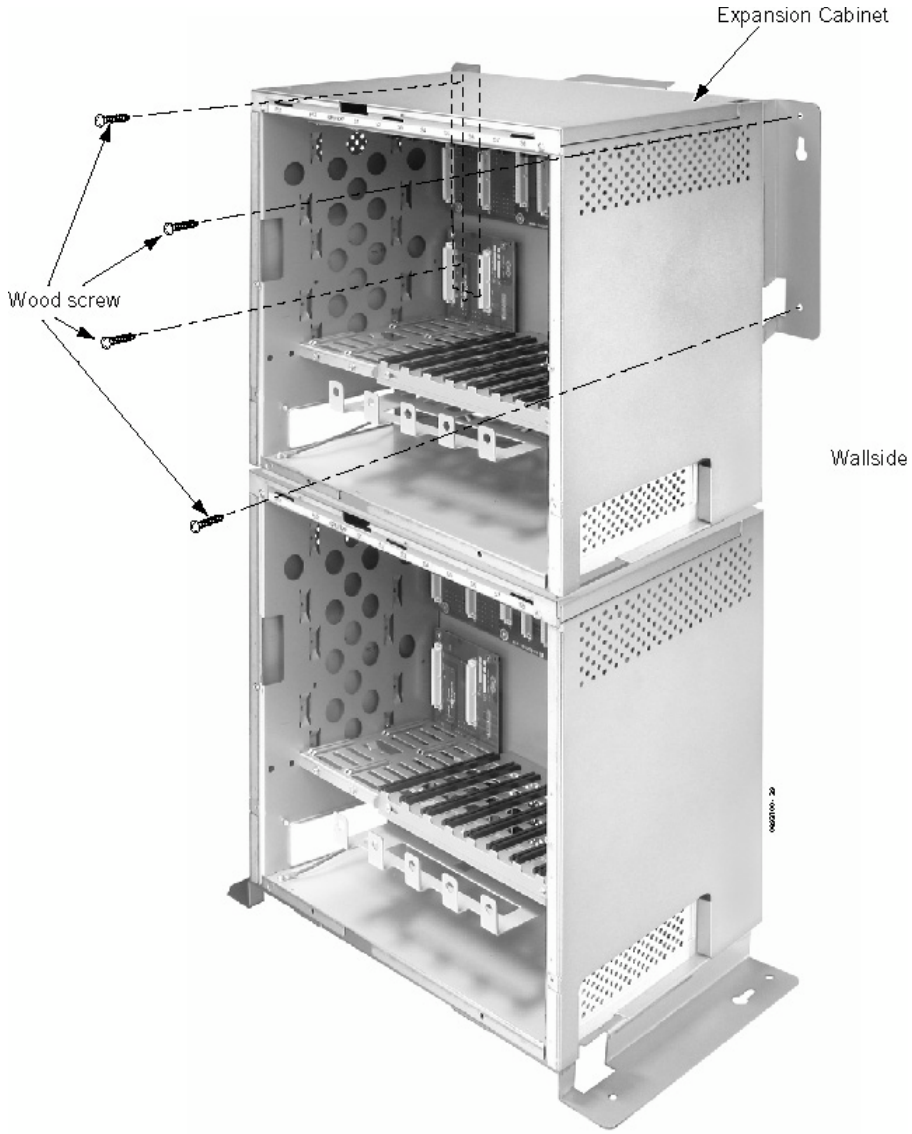


Figure 1-23: SECURE MOUNTING BRACKET TO THE WALL

8. Secure the expansion cabinet to the main cabinet by reinstalling the two screws removed from the expansion bracket in step 1.

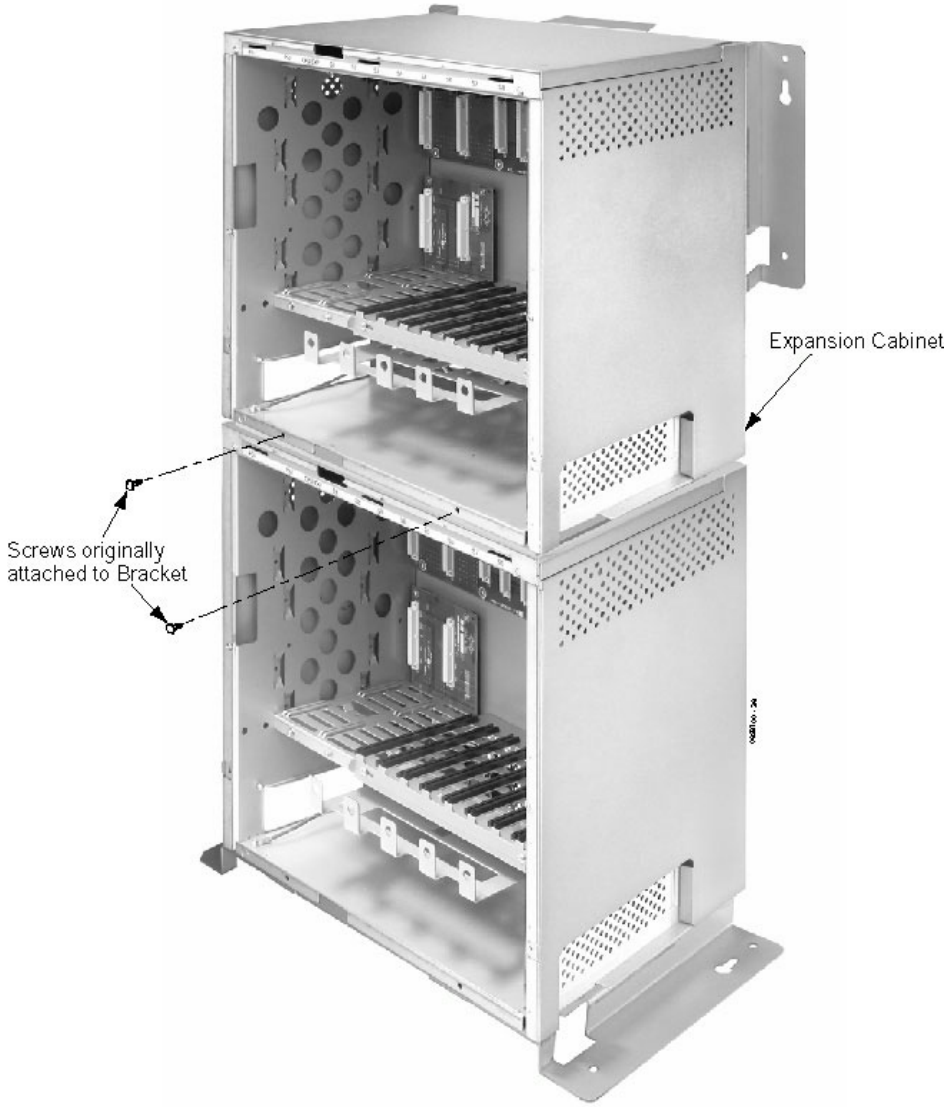


Figure 1-24: REINSTALL SCREWS

9. On the inside of the front covers, loosen the screws for the top or bottom shutters (the top shutter for the main cabinet cover, bottom for expansion cabinet cover).

10. Slide the shutters to the left to allow a pass-through for the EXIFU cables. Retighten these screws.

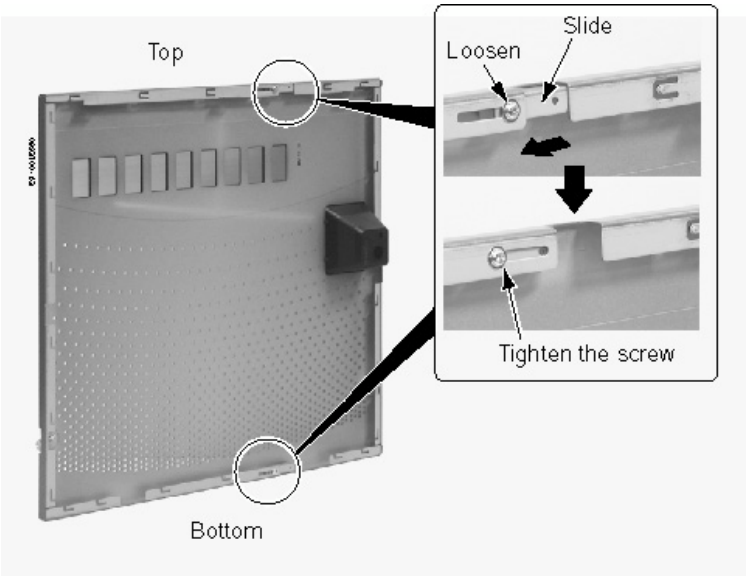


Figure 1-25: MOVING THE FRONT PANEL SHUTTERS

11. Fit the DC power cable between the main cabinet BATT2 socket and the expansion cabinet BATT2 socket located on the left hand side of each cabinet. The DC power cable is required when battery backup is installed, it is used to power both cabinets from a single battery box. Unscrew the cable guide at the rear left side of the main cabinet to allow access for the DC power cable.

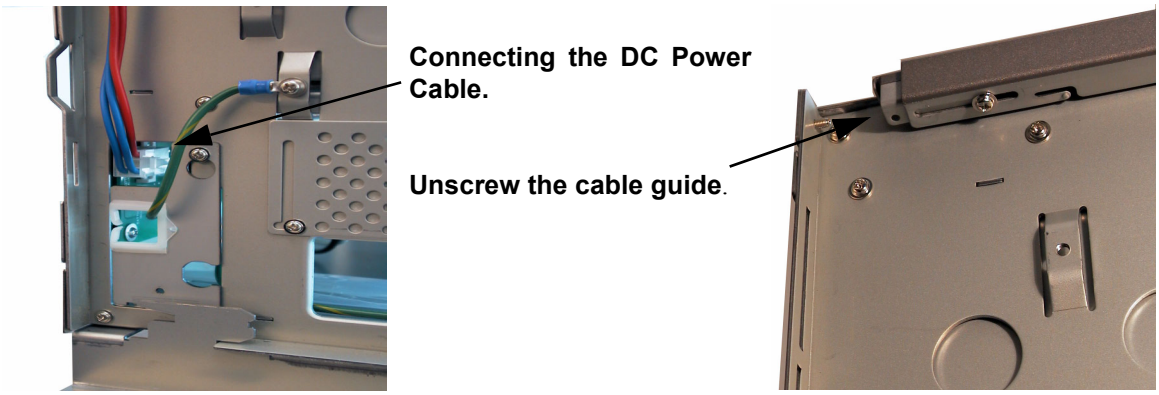


Figure 1-26: Fitting the DC Power Cable to the BATT2 socket

1

Expanding a Rack Mounted System (Figure 1-27 - Figure 1-34)

1. Remove the two screws from the expansion bracket.

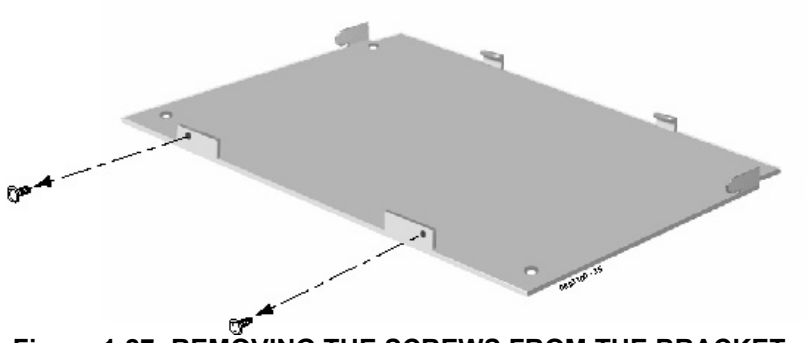


Figure 1-27: REMOVING THE SCREWS FROM THE BRACKET

2. Place the expansion bracket on the top of the base cabinet. Using the screws provided with the expansion bracket, secure the bracket to the top of the main cabinet. Note that the base cabinet will need to be removed from the rack (in order to fit the DC power cable and belt straps).

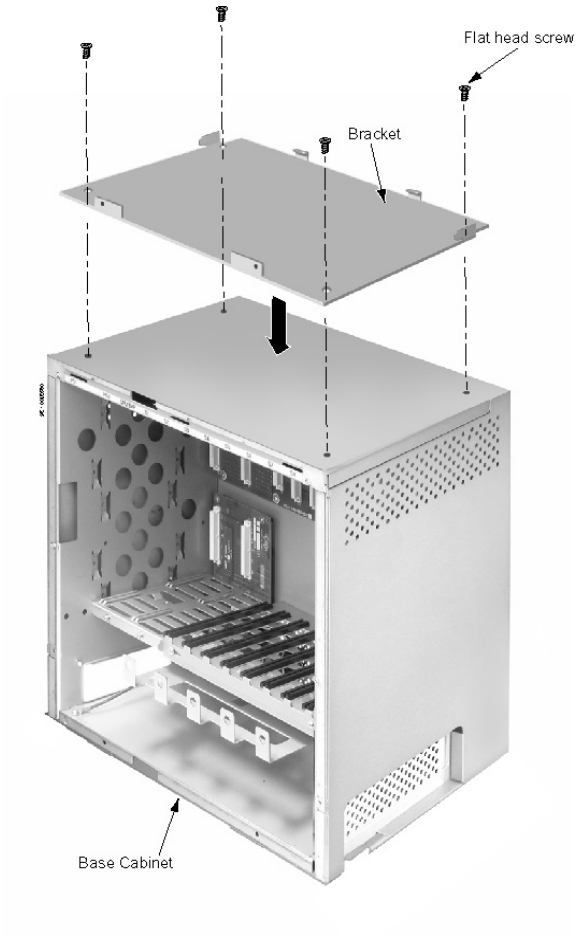


Figure 1-28: SECURE THE EXPANSION BRACKET TO THE MAIN CABINET

3. Connect the earth ground wire to the expansion cabinet. See *GROUNDING THE CABINETS* on page 1-32 for complete details on grounding the system.

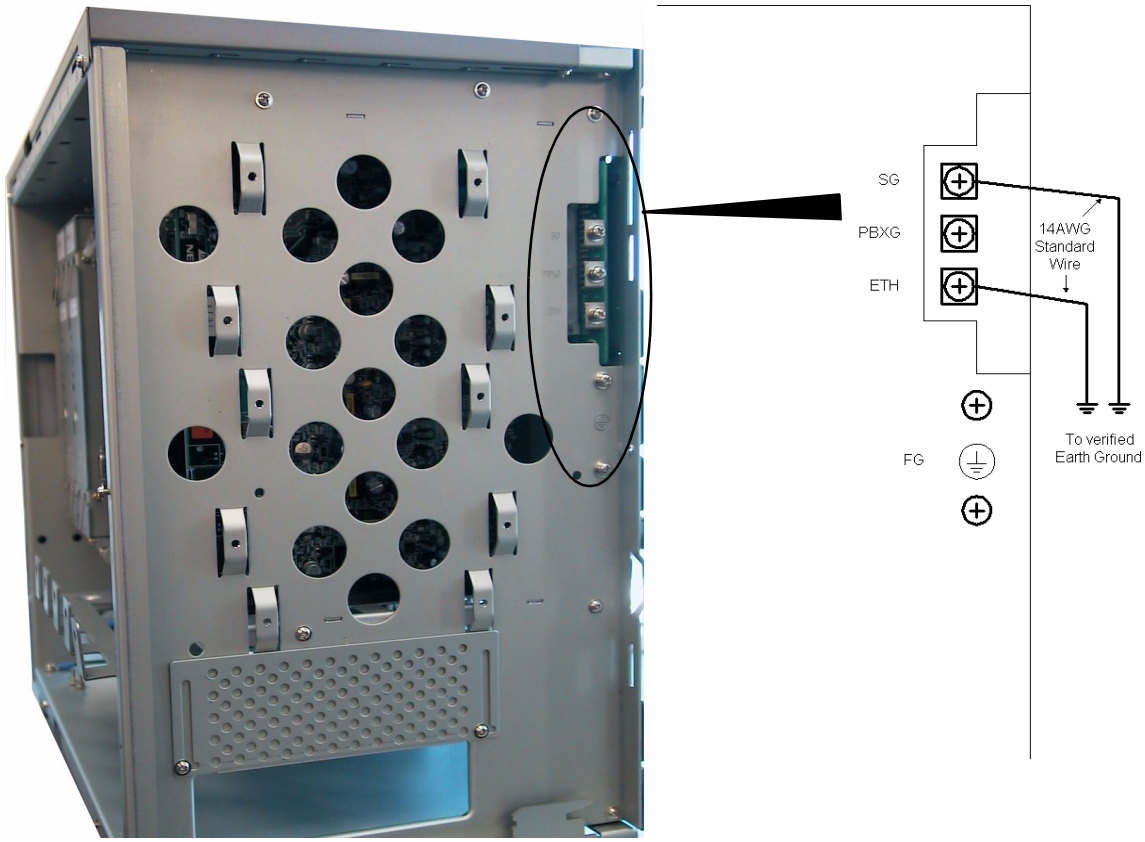
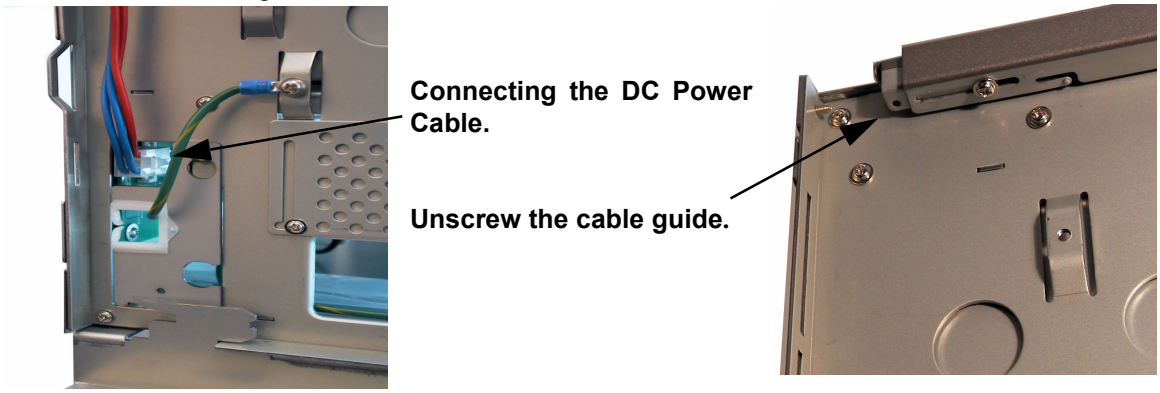


Figure 1-29: CONNECTING THE EARTH GROUND

4. Fit the DC power cable between the main cabinet BATT2 socket and the expansion cabinet BATT2 socket located on the left hand side of each cabinet. The DC power cable is required when battery backup is installed to allow both cabinets to be powered from a single battery box. Unscrew the cable guide at the rear left side of the main cabinet to allow access for the DC power cable.



5. Replace the side panels of the cabinets.
   This must be done at this point as the panels cannot be accessed once the cabinets are mounted in the rack.

6. Install the expansion cabinet onto the base cabinet.
   The expansion cabinet will require 400mm (9U) of height within the rack.
   See ATTACHING THE EXPANSION CABINET TO THE MOUNTING BRACKET on page 1-21 *for details of fitting the expansion cabinet onto the base cabinet.*

7. Using the belt provided by the rack mount system, connect the belt to the rack bracket.

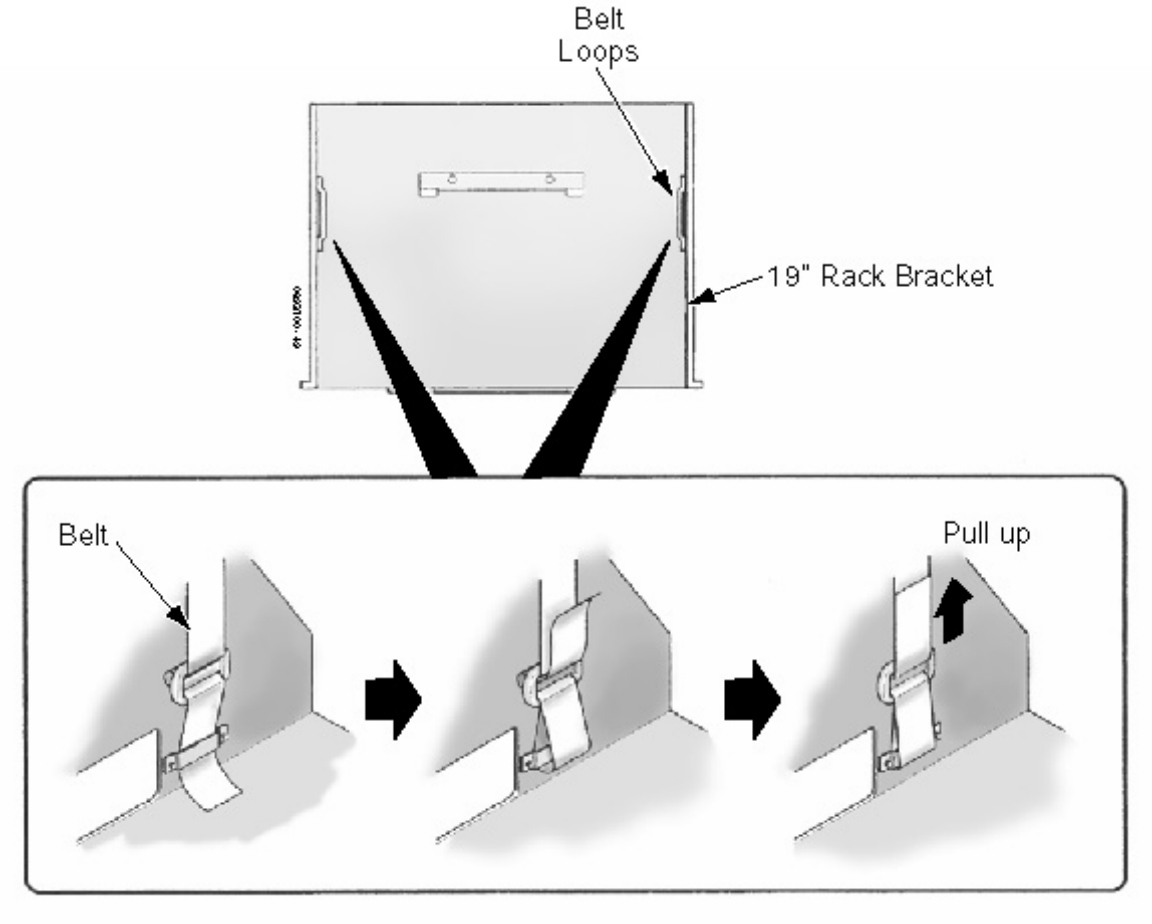


Figure 1-30: CONNECTING THE BELT TO THE RACK BRACKET

8. Place the cabinets in the rack, making sure the hooks on the mounting bracket are inserted into the back of the cabinet, securing it in place.

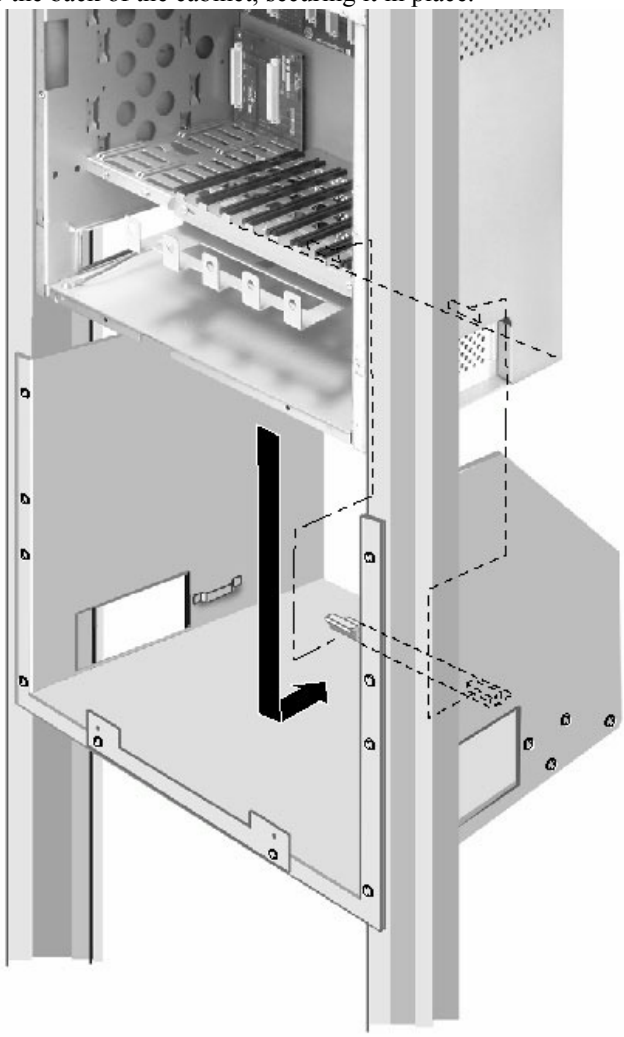


Figure 1-31: INSTALLING THE CABINETS IN THE RACK

9. Secure the two cabinets by tightening the belt around both cabinets.

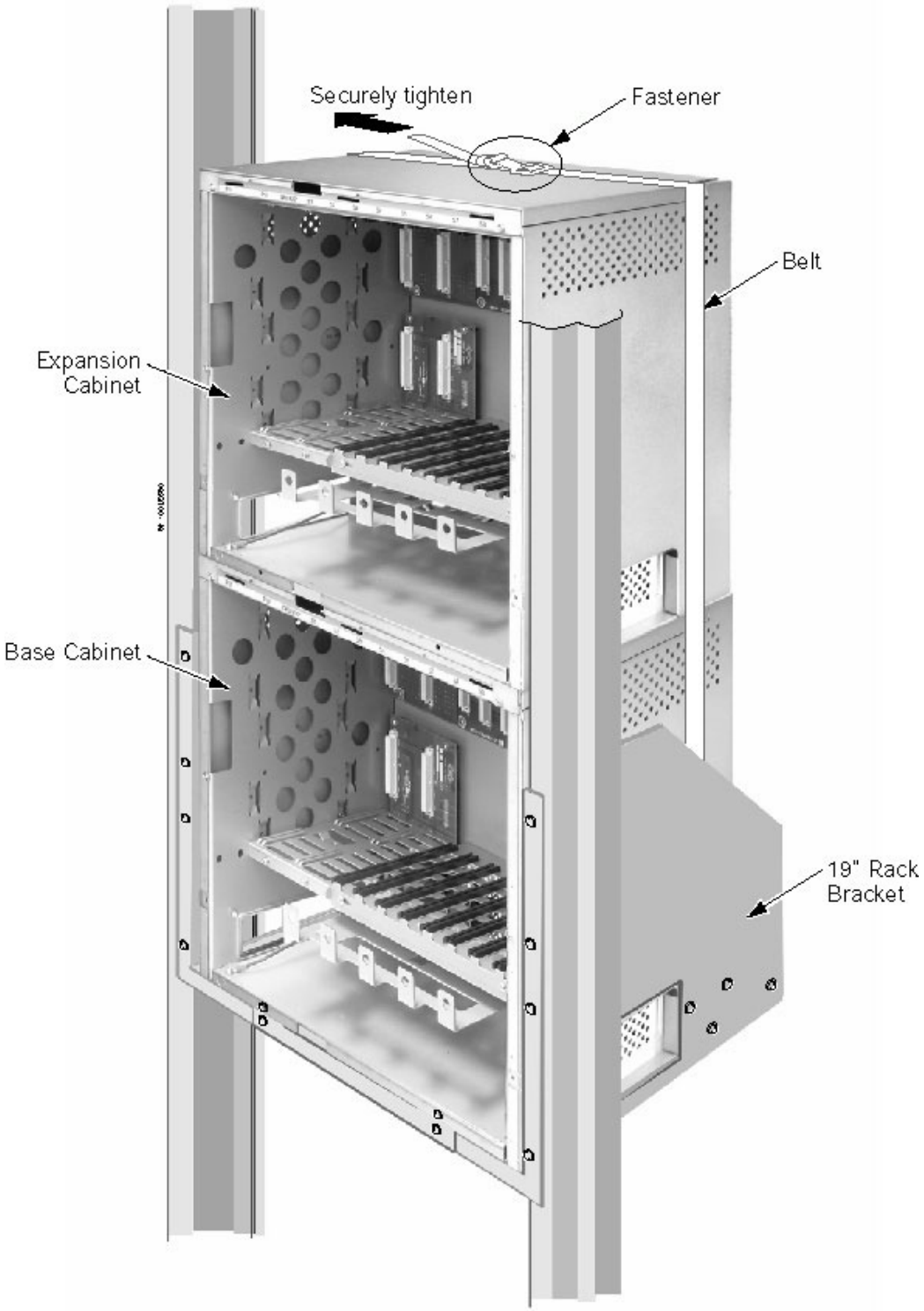


Figure 1-32: SECURING THE CABINETS TOGETHER

10. Replace the screws in the front of the rack.

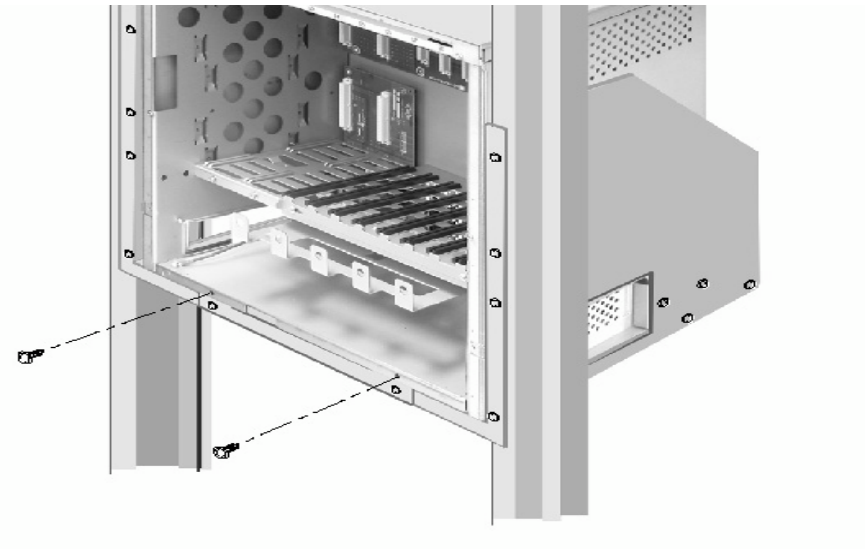


Figure 1-33: SECURING THE CABINETS TO THE RACK

11. On the inside of the front cover, loosen the screws for the top and bottom shutters.
12. Slide the shutters to the left to allow a pass-through for the EXIFU cables. Retighten these screws.

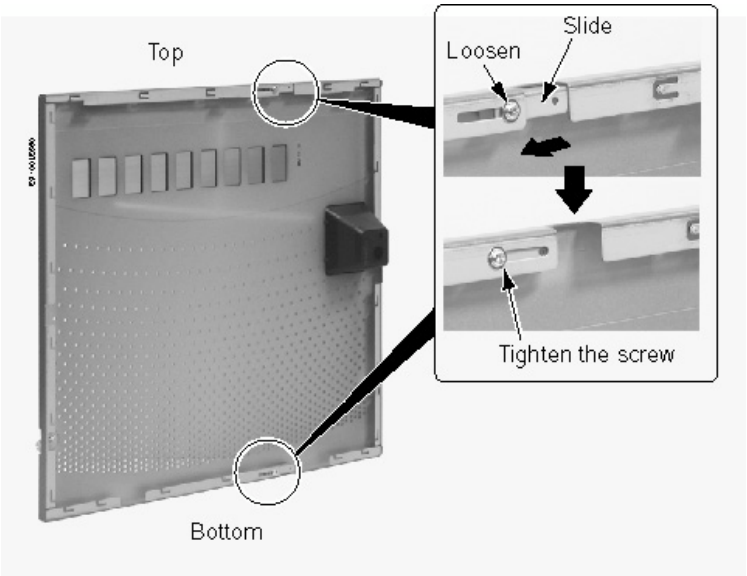


Figure 1-34: MOVING THE FRONT PANEL SHUTTERS

REPLACING THE POWER SUPPLY

Power Supplies in the Main and Expansion Cabinets

Caution
Double Pole/Neutral Fusing
(power supply fuses located at both the L and N side)

The power supply is installed in the PS1/PS2 slots on the left side of the cabinet.
If power is turned off on the expansion cabinet's power supply, it only affects that particular cabinet. The main cabinet continues to operate normally. To turn off power with two cabinets, only the power switch on the main cabinet needs to be turned off.

To Replace the Power Supply:

Note: Remove the Cabinet's AC power cord from the AC receptacle.
Disconnect the from the battery box (if installed).

1. Remove the four power supply mounting screws from the PS slot in the cabinet and remove the PSU by sliding out on the guides.
2. Re-insert the new PSU and replace the four screws.
3. Re-connect to the AC power source.
4. Re-connect to the battery box (if installed)

GROUNDING THE CABINETS

Connecting the System Ground (Figure 1-35)

The SG, PBXG, ETH and FG ground lugs are located on the right side of the cabinet. The side panel must be removed in order to access them. There is also an FG lug on the inside of the cabinet, on the lower left.

1. ***In each cabinet***, connect the SG (Signal ground) lug to the verified Earth Ground point using 14 AWG ($2mm^2$) wire.
2. ***In each cabinet***, connect the ETH (Earth ground) lug to the verified Earth Ground point lug using 14 AWG ($2mm^2$) wire.
3. From the factory, the FG (Frame ground) is already connected to the Earth point of the AC power source.
4. The PBXG (PBX ground) is optional, see description below

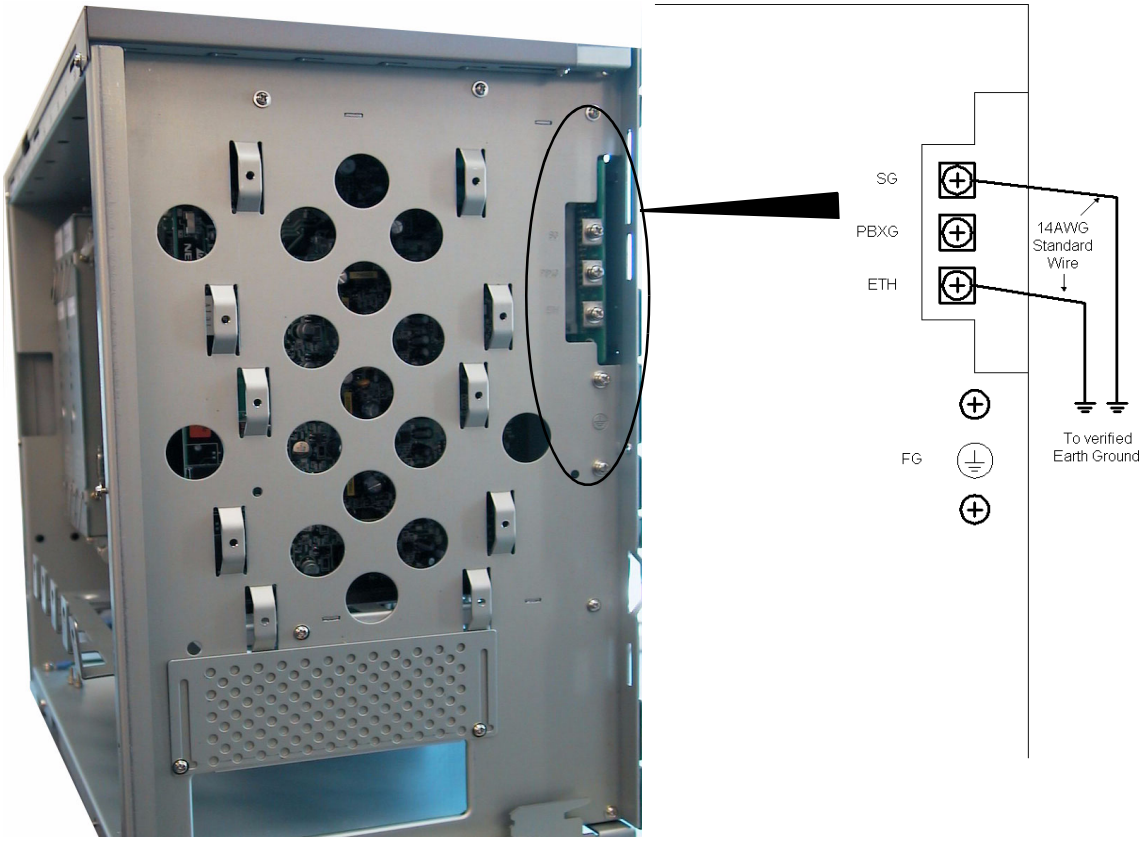


Figure 1-35: GROUNDING THE CABINET

The ground lug descriptions are as follows:

- **SG (Signal Ground)**
  The plus side of the supplied voltage to single line telephones in the PBX requires a connection to the earth. The SG ground lug should be connected to the verified Earth point. The SG lugs on both cabinets must be connected with a seperate cable to Earth ground.

- **PBXG (CO/PBX Ground Start Trunk Ground)**
  The PBXG line on the backplane is connected to this ground lug. This ground lug should be connected to the earth when using analogue DID, E&M or ground start trunk cards in the system. The PBXG lugs on both cabinets can share a single cable to Earth ground

- **ETH (Earth Ground)**
  This ground lug is used for lightning protection. It should always be connected to the earth. The ETH lugs on both cabinets must be connected with a seperate cable to Earth ground.

- **FG (Frame Ground)**
  This ground lug is connected to the earth wire of the AC power supply cable and also connected to the metal frame of the main equipment. This ground lug must be connected to the verified Earth ground point if the earth cable of the AC power supply cable is not connected to Earth ground.

COMPLETING THE INSTALLATION

Reinstalling the Front Cover (Figure 1-36)

1. Line up the brackets on the front cover with the slots in the cabinet and insert the cover.

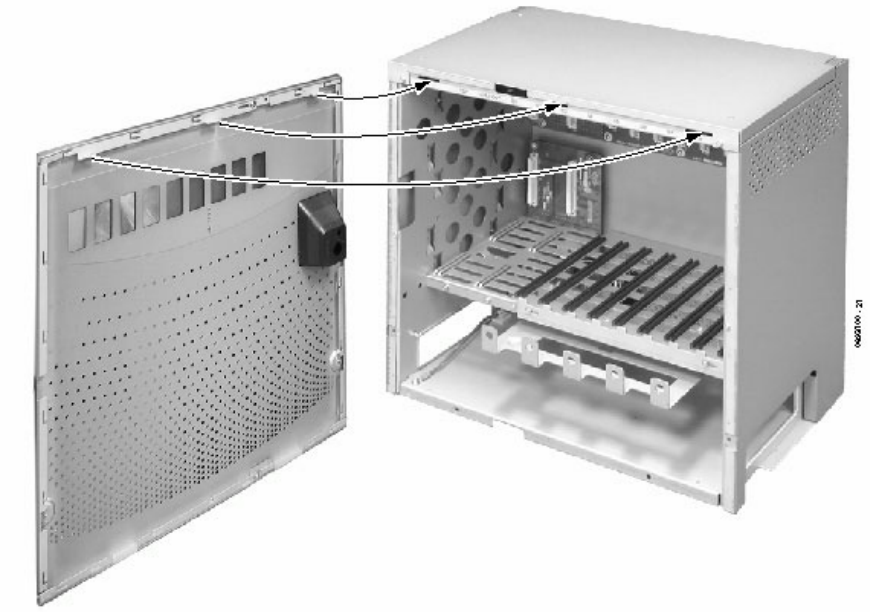


Figure 1-36: RE-INSTALLING THE FRONT COVER

2. Slide the cover to the left.

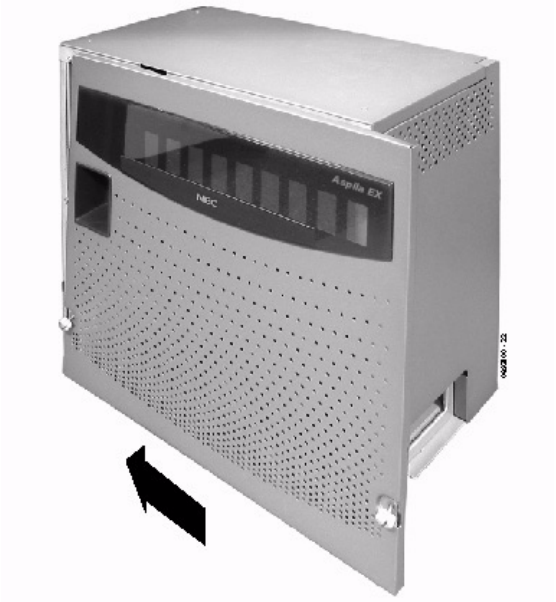


Figure 1-37: RE-INSTALLING THE FRONT COVER

3. Tighten the two cover retaining screws.

The each cabinet has three cable pass-throughs - one on the left panel, right panel, and rear panel. The shutters on the unused pass-throughs should be closed in order to help keep dust out of the cabinet.

1. Loosen the two screws holding the shutter open.
2. Slide the shutter to the left or right and let the shutter drop closed.
3. Tighten the screws.

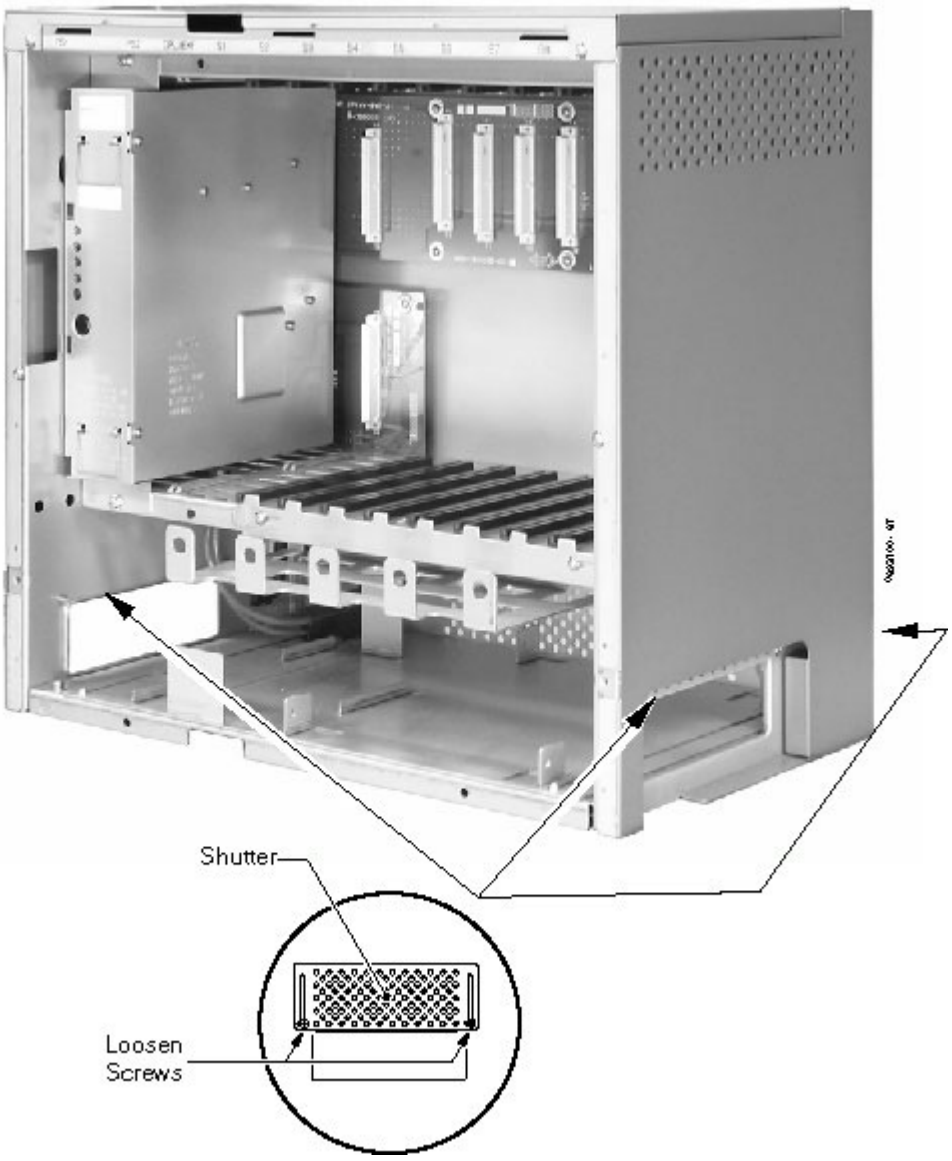


Figure 1-38: CLOSING THE CABINET SHUTTERS

Section 2: 2
PCB Installation and Startup

PCB LAYOUT

PCB Location

Determine the slot position for each PCB in the Main Cabinet:
- CPU/EXP slot - dedicated for the NTCPU
- Slot 1-8 are universal (any type of PCB can be installed).

In the Expansion Cabinet:
- CPU/EXP slot - dedicated for the Expansion PCB
- Slots 9-16 are universal (any type of PCB can be installed).

Use the table below to determine the PCB for each slot.

EXIFU	9	10	11	12	13	14	15	16
NTCPU	1	2	3	4	5	6	7	8

Important Notes
• Make sure to follow the steps indicated in **Powering up the System** (page 2-50) for an initial system install. This will ensure that you start the system with the default system settings.
• To delete a PCB from the system, *the PCB must first be removed from the system slot*, then Program 90-05-01 can be used to delete the slot definition.

Order of Installing Extension PCBs

The order that the station PCBs (e.g. ESIU and SLIU) are physically inserted determines the numbering plan.

For example, with a digital station card (16ESIU) in slot #1 (ext. 301-316), when 3 additional digital station cards are installed ***in the following order,*** the numbering plan below applies:

Order of Install	PCB Slot #	Ext Numbers
1	1	200-215
2	2	216-231
3	4	232-247
4	3	248-263

After the initial powering up of the system, subsequent powering up or resets will not change the slot identification. System programming (Program 90-05) must be performed to change the slot identification.

Order of Installing Trunk PCBs

Installing COIU-LS1/LG1, 4TLIU, DIOPU, or BRI PCB's:

The order in which trunk PCBs are physically inserted determines the numbering plan. For example, if four PCBs are installed *in the following order,* the numbering plan below would apply:

Order of Install	PCB Slot #	PCB	Line Circuits
1	4	8COIU	1-8
2	5	4COIU	9-12
3	7	4TLIU	13-16
4	6	4TLIU	17-20

Installing PRI PCBs

The PRI Interface PCB uses the first block of 32 consecutive trunks.

For example, if you have an 8COIU PCB installed for trunks 1-8, the PRI PCB will automatically use trunks 9-40. If you have 8COIU PCBs installed for trunks 1-8 and 17-24, the PRI PCB will use trunks 25-56. The PRI PCB cannot use trunks 9-16 (even if available) since they are not part of a consecutive block of 32 trunks.

PCB INSTALLATION

Handling the PCBs

The PCBs are sensitive to static discharge. To minimize static discharge, keep PCBs in static free bags when not installed. Observe the following when installing or removing a PCB:

- Ground Main Cabinet and Expansion Cabinets
- Wear a grounded wrist strap to install/remove any PCBs
- Do not touch PCB components. Handle with card pulls or card edges.
- Although it is recommended to installed the PCBs with the system power off, all PCBs can be installed hot ***(except the CPRU, 4VMSU, 2/4FMSU, and APSU PCBs).***
- The power supply units must only be installed with the system power OFF.

"Busying Out" Extension/Line PCBs

The run/block switch on extension/trunk PCBs "busies out" idle circuits. Extensions/lines cannot make a call or be called. Calls in progress before the PCB is "made-busy" are not affected. The PCB can be pulled out without interrupting a call in progress.

An extension/line PCB Status LED:

- Normally flashes
- Lights steady when "made-busy" with an extension/line in use
- Goes out when the all extensions/lines are "made-busy" (idle)

Installing an Extension or Trunk PCB (Figure 2-1, Figure 2-2)

To install an extension/trunk PCB with the system running:

1. Set the run/block switch to **BLOCK.**
2. Loosen the two screws holding the PCB retaining bar in place and slide the bar to the right.

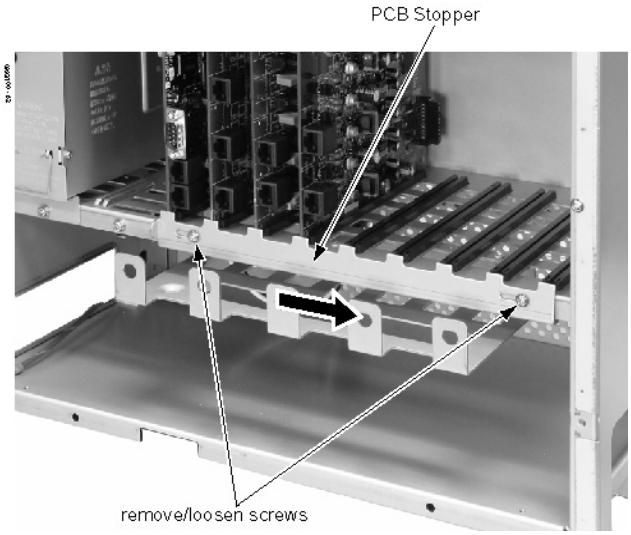


Figure 2-1: MOVING RETAINING BAR

3. Insert the PCB within the guide rail and push the PCB securely into position. After installing all the PCBs, the PCB retaining bar should be moved back into position and the screws should be tightened.

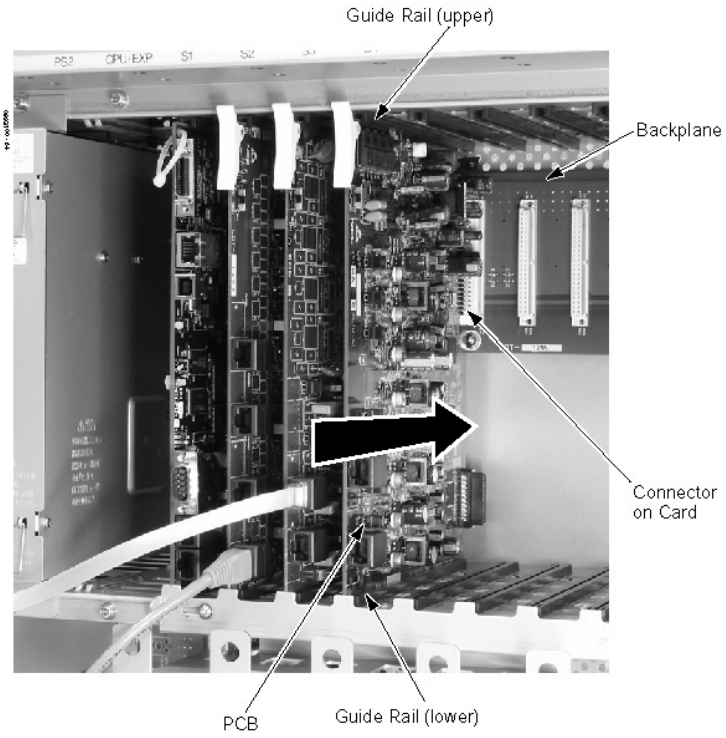


Figure 2-2: INSERTING PCBS

4. Set the run/block switch to **RUN**. The Status LED starts flashing when the PCB starts processing (15 seconds).

Removing an Extension or Trunk PCB

To remove an extension/trunk PCB with the system running:

1. Set the run/block switch to **BLOCK.**
2. When the STATUS LED stops flashing, all extensions/trunks are idle.
3. Remove the PCB by lifting the white pull clip on the top of the PCB and pull the PCB out.

Uninstalling a PCB Slot Through Software

The installer can turn off (busy out) and delete (remove from software) PCB slots in the Main and Expansion Cabinets in programming for port re-numbering purposes or to replace it with a different type of PCB. Deleting a PCB may affect PCB slot programming capability. Refer to Program 90-05 in the Software Manual for further details.

Where to Install the PCBs

Maximum Configuration: **200 Trunks**
512 Extensions Including IP
(256 maximum digital/analogue extensions)

The system's universal architecture gives you great flexibility when installing PCBs. You can install a PCB in any slot, provided you follow the guidelines in the chart below.

þItem	Description	Max.
NTCPU	32-Bit Central Processing Unit	1 in main cabinet
8ESIU	8 Digital Stations	16 per system
16ESIU	16 Digital Stations	16 per system
8SLIU	8 Analogue Stations	16 per system
8SLIDB	8 Analogue Stations - Daughter Board	16 per system
4COIU-LS1	4 Analogue/Loop Start Trunks (no ground start)	16 per system
8COIU-LS1	8 Analogue/Loop Start Trunks (no ground start)	16 per system
4COIU-LG1	4 Analogue/Loop Start Trunks (with ground start)	16 per system
8COIU-LG1	8 Analogue/Loop Start Trunks (with ground start)	16 per system
2BRIU	2 Two-Channel BRI Circuits	16 per system
4BRIU	4 Two-Channel BRI Circuits	16 per system
8BRIU	8 Two-Channel BRI Circuits	As T-Bus: 12 per system As S-Bus: 16 per system
1PRIU	30 PRI Trunks/Channels	As T-Bus: 6 per system As S-Bus: 8 per system
4TLIU	4 E&M Tie Line Trunks	16 per system
4DIOPU	4 DID/OPX Trunks	16 per system
8DIOPU	8 DID/OPX Trunks	16 per system
2FMSU	2 Flash Memory Voice Mail	1 per system
4FMSU	4 Flash Memory Voice Mail	1 per system
4VMSU	4 HDD Voice Mail	1 per system
4VMDB	4 HDD Voice Mail - Daughter Board	1 per system
8SHUBU	8 Switch Hub	6 per system
16VOIPU	16 VoIP Media Gateway	6 per system
16VOIPDB	16 VoIP Media Gateway - Daughter Board	6 per system
APSU	In-Skin Server without O/S	1 per system

Central Processing Unit (NTCPU) PCB (Figure 2-3)

The NTCPU controls all the functions and operations of the Aspila EX system using the system software loaded into the NTCPU memory. One 32-bit NTCPU PCB must be installed in the CPU slot in the Main Cabinet.

The NTCPU provides:

- 200 trunk ports maximum
- 256 extension ports maximum (System phones and Single line phones)
- 512 extensions maximum including IP Phones and DECT handsets
- 256 virtual extensions

Note that limitations on the maximum ports available depend on the

The NTCPU provides the following:

- Five diagnostic LEDs which indicate the status of various system functions
  During normal operation, the "RUN" LED will be flashing and the remaining LEDs will be off.
- 1019x1019 Time Division Multiplex Switch (TDM Switch)
- Digital Phase Locked Loop (DPLL)
- Tone Generator
- DTMF Tone Sender/Receiver; 32 Channels
- System Tone Sender
- DTMF Tone Sender
- Call Progress Tone Detector
- Conference; 64 Channels
- Caller ID Receiver/Sender; 64 Channels
- A reset switch (RES) which can be used to reset the system
- A load switch (LOAD) which is used for initial system startup or when upgrading system software
- One Serial Port
- One USB Port
- One Ethernet Port (10 Base-T/100 Base-TX)
- One PCMCIA Slot
- One EXIFU Interface Connector
- Two Audio Input Terminals (EXMOH & BGM)
- One Audio Output Terminal (External Page)
- One Night Mode Terminal for External Switch
- One Music On Hold External Source
- HDLC Packet Processing
- Real Time Clock (tolerance 30 seconds/month)
- Internal MOH Generation
- One Connector for DSPDBU Daughter Board
- One Connector for PAL EPROM
- One lithium battery (Sony CR2032 or equivalent) which provides battery back-up of system data and RAM memory for approximately 30 months

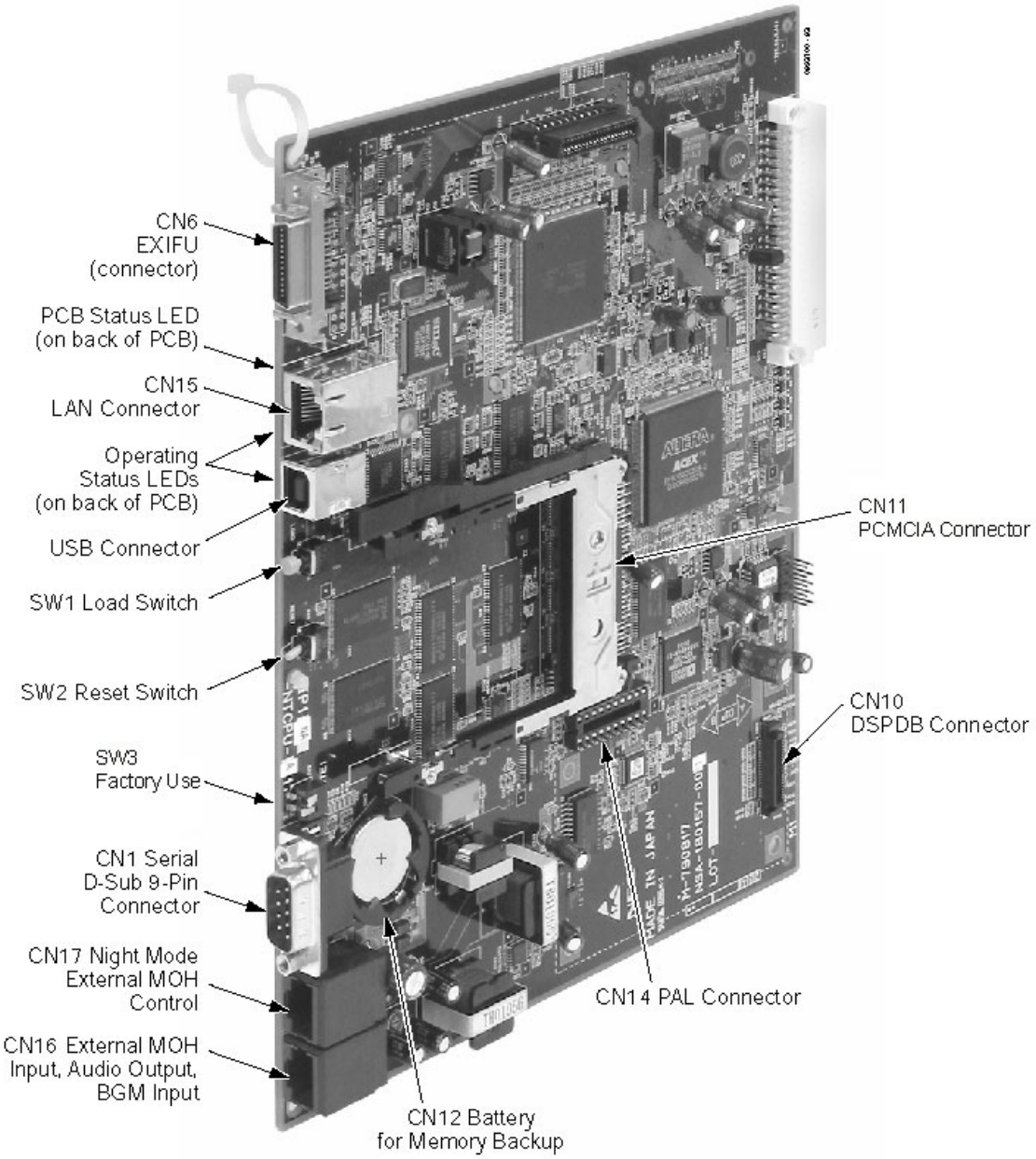


Figure 2-3: CPRU PCB

NTCPU Options

There are three NTCPU PCB's available.
IP1E-NTCPU-A0 :Maximum 72 trunk/extension ports and limited features.
IP1E-NTCPU-A1 :Maximum 128 trunk/extension ports and limited featues.
IP1E-NTCPU-B1 :Maximum 200 trunk ports, maximum 512 extension ports and no limitation of features.

There is an upgrade available for the A0 and A1 PCB's. It is not possible to upgrade to the B1.

Details of NTCPU Options

IP1E-NTCPU-A0

- Trunk and ESIU/SLIU extension port : Combined maximum of 36 ports.
- DECT and IP extension port : Combined maximum of 36 ports.
- Virtual extension : maximum 256.

Limited Features: The following are NOT permitted.

- Expansion cabinet
- DSPDB PCB
- ACD
- VoIP
- PRI Trunk PCB
- E&M Trunk PCB
- Networking Feature
- 16VOIPU PCB

IP1E-NTCPU-A1

- Trunk and ESIU/SLIU extension port : Combined maximum of 64 ports.
- DECT and IP extension port : Combined maximum of 64 ports.
- Virtual extension : maximum 256.

Limited Features: The following are NOT permitted.

- Same as IP1E-NTCPU-A0

IP1E-NTCPU-B1

- Trunk port : Maximum 200
- ESIU/SLIU extension port : Combined maximum of 256 ports.
- DECT and IP extension port : Combined maximum of 256 ports.
- Virtual extension : maximum 256.

There are no limitations on the features available.

Details of Upgrades Available

There are two PAL devices available that can be plugged onto the NTCPU PCB to increase either the ports or features.
IP1E-PALA0-UGD : To increase the maximum ports from 72 to 128 with limited features.
Can only be applied to the IP1E-NTCPU-A0.
IP1E-PALA1-UGD : To remove the feature limitation.
Can only be applied to the IP1E-NTCPU-A1.

Switch Settings and LED Indications

Switch	Switch Setting	Operation
SW1 - Load Switch Push Switch	-	**With a system restart or a system reset while holding the SW1 switch (SW3-2 switch set to off):** • With a flash card installed: System software is updated from the flash card to the NTCPU. • Without a PC-ATA: System boots loading software stored on the NTCPU. • With a Card Other Than a PC-ATA: The card is ignored and the system boots loading software stored on the NTCPU.
		With a system restart or a system reset without holding the SW1 switch: • The system boots loading software stored on the NTCPU.
SW2 - Reset Switch	-	The system resets when the toggle switch is lifted and released using the stored software and customer data on the NTCPU (Hot Start).
SW3 - 1 Must be set to OFF	On Off	Debugging Mode (CN1 connector used for debugging) Normal Mode (CN1 connector used for serial interface)
SW3 - 2 Must be set to OFF	On Off	(Factory Use) Used to initially load system software Normal Mode

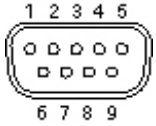
The LED indications on the NTCPU represent the following:
- RUN LED 1 = Indicates the NTCPU is operating
- LED 0, 2 and 3 = Indicate system alarms
- LED 4 = Indicates the status of the PCMCIA slot (off with no PC-ATA card installed)

LED Indication					Status
RUN (LED1)	LED0	LED2	LED3	LED4	
On	Off	Off	Off	-	System starting up
Off	Off	Off	Off	-	System initializing
Off	On	Off	Access Blink	-	Initializing the disk or formatting
Off	Off	On	On	-	Boot program is initializing in the flash memory
Off	On	On	Access Blink	-	Reading system software
On	Blinking	Blinking	Blinking	-	Upgrading system software
On	Blinking	Off	Off	-	Upgrading boot software
On	Blinking	Blinking	Off	-	Finish formatting (SRAM, Flash)
Blinking	Off	Off	Off	-	DRAM error
Blinking	Off	Off	On	-	FPGA version error
Blinking	Off	On	Off	-	SRAM error
Blinking	Off	On	On	-	Flash memory booting error

LED Indication					Status
RUN (LED1)	LED0	LED2	LED3	LED4	
Blinking	On	On	On	-	Flash memory data error
Blinking	Blinking	Blinking	Blinking	-	Reading error of system program
Blinking	Off	Off	Off	-	System running

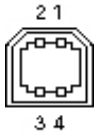
Connector Pin-Outs on NTCPU

Serial Cable Connector - CN1 (D-Sub 9-Pin Male)



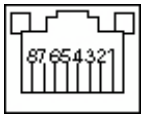
Pin No.	Signal
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	-

USB Cable Connector - CN13 (Standard)

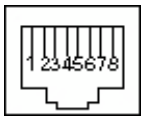


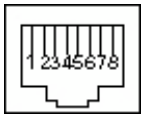
Pin No.	Signal
1	Vcc
2	-D
3	+D
4	GND

Ethernet Cable Connector - CN15 (RJ45)
(10Base-T/100Base-TX Port)
The LAN cable must pass one time (2 turns) through the ferrite supplied.



Pin No.	Signal
1	Tx+
2	Tx-
3	Rx+
4	
5	
6	Rx-
7	
8	

RJ61 Cable Connector - CN16 (External MOH Source/External Paging)		
NTCPRU Connector	**Modular Connector Pin No.**	**Signal**
	1	-
	2	EXMOH
	3	BGM
	4	EXPG
	5	EXPG
	6	BGM
	7	EXMOH
	8	-
• Pins 3 and 6: BGM Input, Input Impedance = 47 kohm/1 kHz • Pins 4 and 5: External Paging Output • Pins 2 and 7: External Music on Hold Input, Input Impedance 47 kohm/1 kHz		

RJ61 Cable Connector - CN17 (External Speaker and Night Mode Relay)		
NTCPRU Connector	**Modular Connector Pin No.**	**Signal**
	1	-
	2	NTMOD
	3	-
	4	EXCNT
	5	EXCNT
	6	-
	7	NTMOD
	8	-
• Pins 4 and 5: External Music, Speaker or BGM Control Relay • Relay = DC (Max. 24 VDC, 0.5A - AC (Max.) 120VAC, 0.25A • Pins 2 and 7: Night Mode Switch Connection, Input Voltage: = +5VDC to +48 VDC, current drawn = 7 mA		

CPRU Installation (Figure 2-4)

1. Install the battery on the CPRU. The polarity "+" symbol must be on top.
2. Install the DSPDBU daughter board if required. Refer to **DSPDB Daughter Board (Figure 2-6, Figure 2-7)** (page 2-15).
3. Install the PAL EPROM as needed on a basic NTCPU.

   - When installing the chip, be careful not to bend the EPROM pins. Also note that the keyed end of the EPROM should be positioned closest to the '1' pin position. After lining up the pins with the connector, firmly push the EPROM into place.

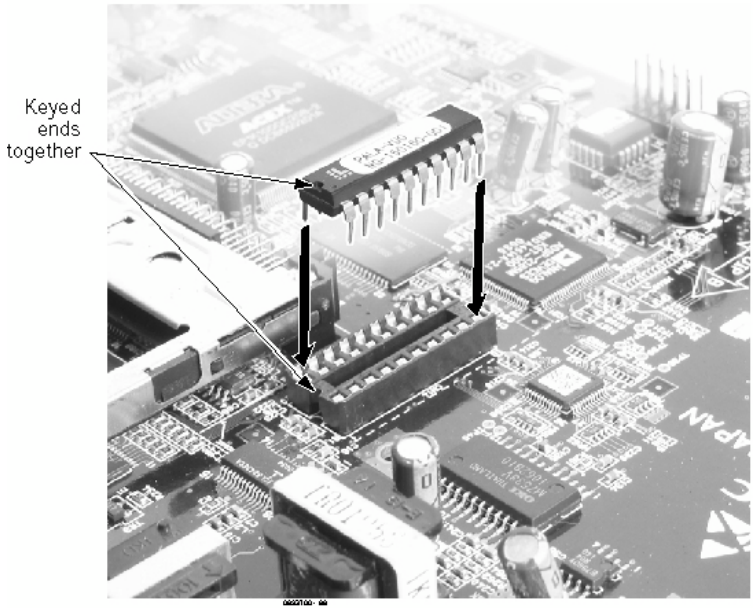


Figure 2-4: INSTALLING THE PAL EPROM

- When removing the chip, use a flat-head screwdriver to gently pry each end of the EPROM up, being careful not to bend the EPROM pins.

4. After being certain that the power supply is shut off, slide the NTCPU into the CPU slot in the main cabinet.

   Note that the component side of the PCBs should always be facing to the right side of the cabinet (away from the power supply).
5. If external BGM or MOH is being installed, plug an RJ61 connector into the CN16 connector on the NTCPU. The other end of the cable plugs into the music source.

   Refer to the PGDAD Module in the Optional Equipment section for details on connecting to a music source.
6. Power on the system.
7. It is recommended that a Cold Start is performed when the system is powered on for the first time. This will ensure that the customer data is set to factory defaults.

To Perform a Cold Start:

System software loaded from flash memory and the customer data is erased from RAM memory.

1. Power off the main cabinet PSU. Push and release the switch on the PSU.
2. Wait for the system to power down.
3. Push in and hold the Load button SW1 on the NTCPU.
4. Power on the main cabinet PSU. Push and release the switch on the PSU.
5. Continue holding the Load button for approximately 3 seconds.
6. When the system has completed reloading the software (2 minutes), the Status LED will be flashing on the NTCPU.

To Perform a Hot Start:

System software loaded from flash memory and the customer data is loaded from RAM memory.

1. Power off the main cabinet PSU. Push and release the switch on the PSU.
2. Wait for the system to power down.
3. Power on the main cabinet PSU. Push and release the switch on the PSU.
4. When the system has completed reloading the software, the Status LED will be flashing on the NTCPU.

To Perform a Software Upgrade:

The existing system software in the flash memory on the NRCPU is replaced by the version on the PC-ATA card, the customer data (stored in the RAM) is saved.

To save customer data prior to updating, a blank PC-ATA card is required. Insert the card into the NTCPU and, using Program 90-03, save the software to the PC-ATA card. (Program 90-04 is used to reload the customer data if necessary.) Note that a PC-ATA card can only hold one customer database. Each database to be saved will require its own separate card. ALternatively the database can be copied to a PC (with a suitable PC-ATA drive). The customer database is saved to a folder called DATA on the PC-ATA card, copy this folder to the PC.

1. Insert the PC-ATA card containing the software upgrade into the PCMCIA card slot on the NTCPU.
2. Power off the main cabinet PSU. Push and release the switch on the PSU.
3. Push in and hold the Load button SW1 on the NTCPU.
4. Power on the main cabinet PSU. Push and release the switch on the PSU.
5. Continue holding the Load button for approximately 3 seconds.
6. Release the Load button.
7. Wait until all the Status LED's on the NTCPU starts flashing (approximately 2 minutes), then remove the PC-ATA card.
8. Lift and release the Reset lever SW2 on the NTCPU.
9. When the system has completed reloading the software, the Status LED will begin flashing on the NTCPU.

Expansion (EXIFU) PCB (Figure 2-5)

The EXIFU PCB provides a connection from the main cabinet to the expansion cabinet. This connection is required with any 2-cabinet setup. Included with the EXIFU PCB is a proprietary cable which must be used to connect the main cabinet and expansion cabinets together.

To install an EXIFU PCB:

1. Ensure that both the Main and expansion cabinets are powered off.
2. Install the EXIFU into the CPU/EXP slot in the expansion cabinet.
   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.
3. Install the EXIFU cable to the CN2 connector on the EXIFU PCB. Connect the opposite end to the CN6 connector on the NTCPU.

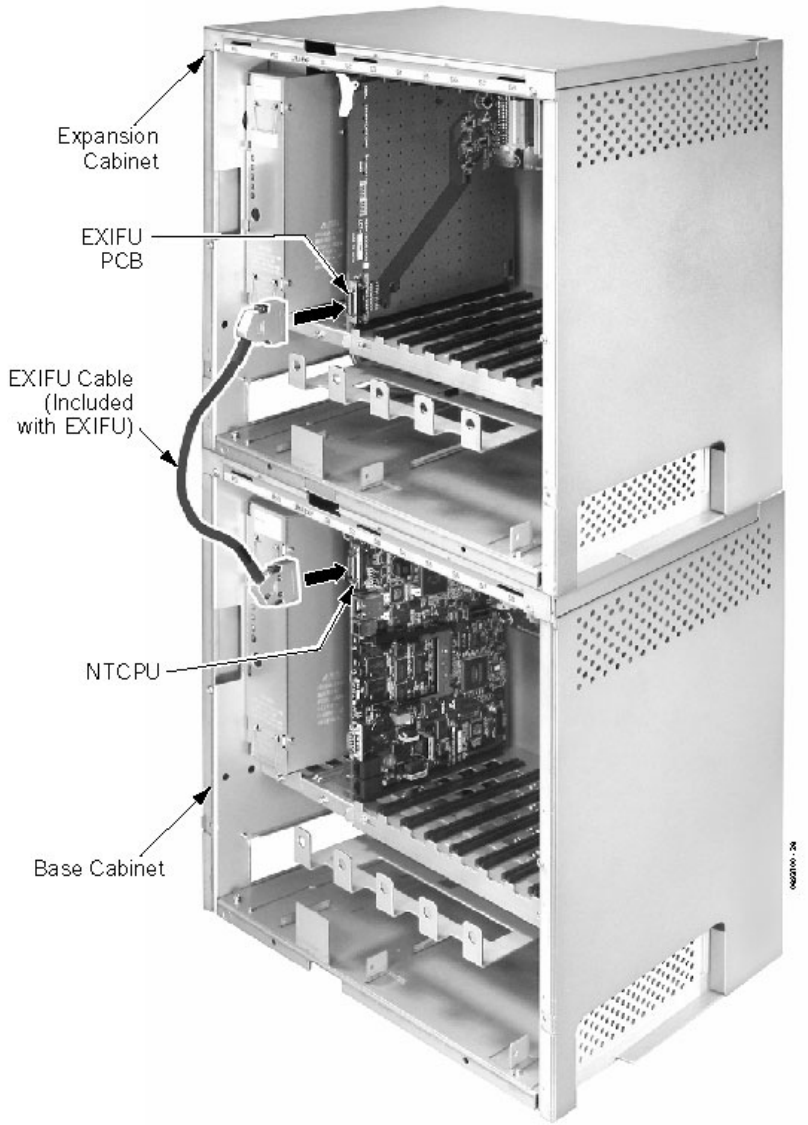


Figure 2-5: EXIFU PCB INSTALLATION

DSPDB Daughter Board (Figure 2-6, Figure 2-7)

The DSPDB provides additional DSP resources as well as VRS (Voice Response System). This daughter board is mounted on the NTCPU and provides:

- 32 Receiver Circuits. The receiver circuits are used for DTMF receivers, call progress tone detection, and Caller ID receivers.
- 16 VRS Circuits (plays up to 16 circuits simultaneously, recording up to 8 circuits simultaneously)
- 16 Caller ID Sender Circuits (for sending caller ID to SLIU ports)
- Compact Flash Slot (must have the compact flash card installed)

To install a DSPDB Daughter Board:

1. Power off the Main cabinet and remove the NTCPU card.
2. Included with the DSPDB are four spacers. Install one spacer in each corner of the daughter board. Make sure to attach the spacers from the back of the daughter board so when installed, the compact flash slot is facing up.
3. Position the daughter board over the CN10 connector on the NTCPU. Push the board into the connector on the NTCPU. Gently push the corners of the daughter board down so the spacers lock into the NTCPU.

   To remove the daughter board, use pliers to squeeze the top of the spacers together, then gently pull the daughter board off.

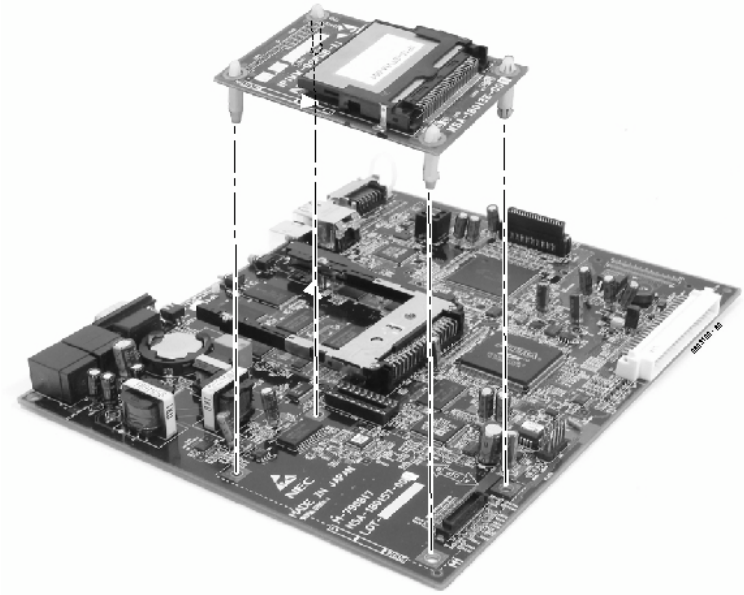


Figure 2-6: DSPDB DAUGHTER BOARD INSTALLATION

To Upgrade the DSPDB Compact Flash Card:

1. With the system power off, remove the NTCPU.
2. Remove the compact flash card from the DSPDB daughter board.
3. Insert the new compact flash card.
4. Reinstall the NTCPU.

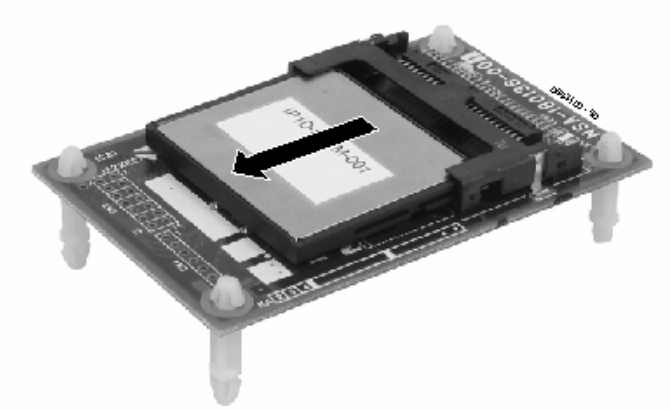


Figure 2-7: REMOVING THE COMPACT FLASH CARD

Digital Station (8/16ESIU) PCB (Figure 2-8)

The ESIU PCB provides:

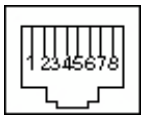
- 8 (8ESIU) or 16 (16ESIU) digital extension circuits (used for digital telephones, DSS consoles, 1SLTAD adapters, 2PGDAD adapters)
- 2 (8ESIU) or 4 (16ESIU) extension status LEDs (each LED indicates status for 4 extensions - BL1 used for ports 1-4, BL2 for ports 5-8, BL3 for ports 9-12, and BL4 for ports 13-16).
- 1 PCB status LED
- 1 run/block switch

The CN102, CN103, CN202, and CN203 connectors each provide connection to 4 digital station ports. With the 8ESIU PCB the CN202 and CN203 connectors and the BL3 and BL4 LEDS are removed from the PCB.

In order to program the system with a multibutton telephone, an 8ESIU or 16ESIU PCB should be installed. However, system programming can be done using the PCPro or WebPro applications or through a VoIP telephone. The ESIU requires one universal slot, with a maximum of 16 PCB's per system.

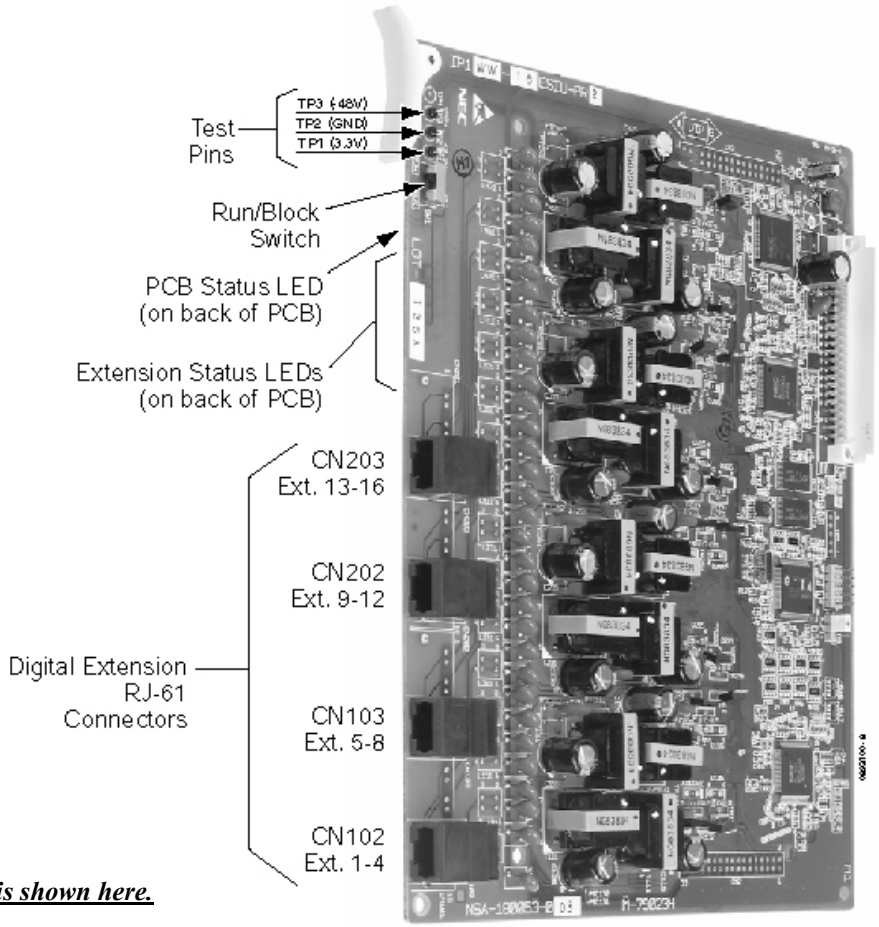
The ESIU connections are not polarity sensitive to the digital extensions.

Connector Pin-Outs on ESIU

RJ61 Cable Connector - CN102, CN103, CN202, CN203		
	**Pin No.**	**Connection**
	1	port 4
	2	port 3
	3	port 2
	4	port 1
	5	port 1
	6	port 2
	7	port 3
	8	port 4

To install the ESIU PCB:

1. Set the run/block switch to block, **DOWN**.
2. Install the ESIU into a slot.
   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.
3. Set the ESIU run/block switch to run, **UP**.
4. The 8ESIU will use the first block of 8 extension ports available, the 16ESIU will use the first block of 16 extension ports. Confirm the ports used with Program 10-03.



The 16ESIU PCB is shown here.

Figure 2-8: ESIU INSTALLATION

Analogue Station (8SLIU) PCB (Figure 2-9)

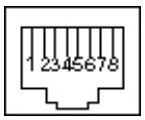
The 8SLIU PCB provides:

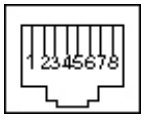
- 8 analogue extension ports (used for analogue telephones, fax machines, analogue modems and connection to voice mail systems)
- 16 extension status LEDs
- 1 PCB status LED
- 1 run/block switch
- 8 SW1 switches which select the constant current battery feeding of 20mA or 35mA (factory set to 20mA)
- Connector for 8SLIDB Daughter Board
- Ring Generator
- Message Wait Lamping Ability

Note: When connecting a fax machine, analogue modem or voice mail make sure to set Program 15-03-03 to '1' (special terminal) to allow DTMF tones during call.

The CN3 and CN5 connectors each provide connection to 4 analogue station ports which are not polarity sensitive. The 8SLIU is installed in a universal slot, with 16 maximum per system.

Connector Pin-Outs on 8SLIU

RJ61 Cable Connector - CN3		
	**Pin No.**	**Connection**
	1	CH4 L1 (tip for port 4)
	2	CH3 L1 (tip for port 3)
	3	CH2 L1 (tip for port 2)
	4	CH1 L2 (ring for port 1)
	5	CH1 L1 (tip for port 1)
	6	CH2 L2 (ring for port 2)
	7	CH3 L2 (ring for port 3)
	8	CH4 L2 (ring for port 4)

RJ61 Cable Connector - CN5		
	**Pin No.**	**Connection**
	1	CH8 L1 (tip for port 8)
	2	CH7 L1 (tip for port 7)
	3	CH6 L1 (tip for port 6)
	4	CH5 L2 (ring for port 5)
	5	CH5 L1 (tip for port 5)
	6	CH6 L2 (ring for port 6)
	7	CH7 L2 (ring for port 7)
	8	CH8 L2 (ring for port 8)

Installing an 8SLIU PCB:

1. Set the run/block switch to block, **DOWN.**
   If the 8SLIDB is to be used, install this prior to inserting the 8SLIU PCB into the cabinet.
2. Install the 8SLU into the slot.
   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.
3. Set the 8SLIU's run/block switch to run, **UP.**
4. The 8SLIU will use the first block of 8 extension ports available. Confirm the ports used with Program 10-03

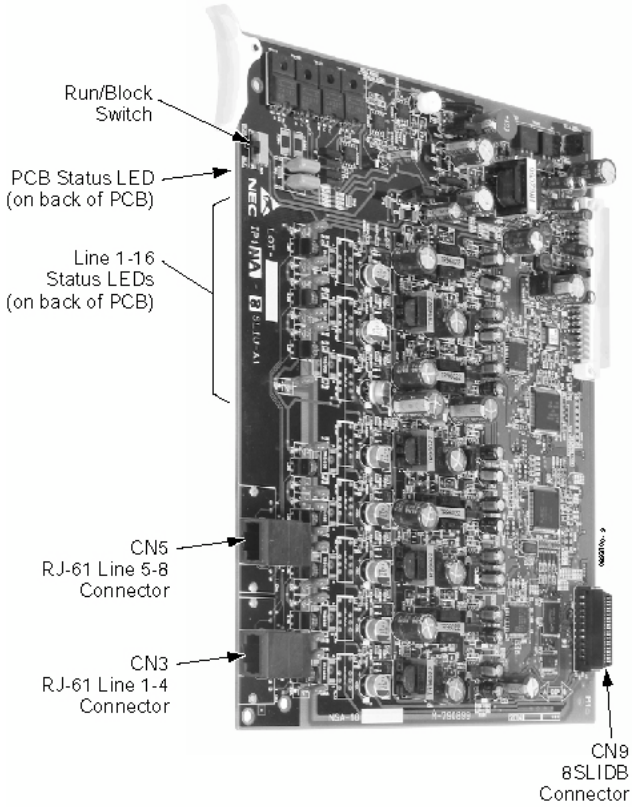


Figure 2-9: 8SLIU INSTALLATION

Analogue Station (8SLIDB) Daughter Board (Figure 2-10 - Figure 2-11)

The 8SLIDB daughter board provides:

- 8 analogue extension ports (used for analogue telephones, fax machines, analogue modems and connection to voice mail systems)
- 8 SW1 switches which select constant current type battery feeding (factory set to 20mA)
- Connector for 8SLIU PCB
- Ring Generator
- Message Wait Lamping Ability

Note: When connecting a fax machine, analogue modem or voice mail make sure to set Program 15-03-03 to '1' (special terminal) to allow DTMF during call.

The CN3 and CN5 connectors each provide connection to 4 analogue station ports and are not polarity sensitive. The 8SLIDB is installed on the 8SLIU PCB, with 16 maximum per system.

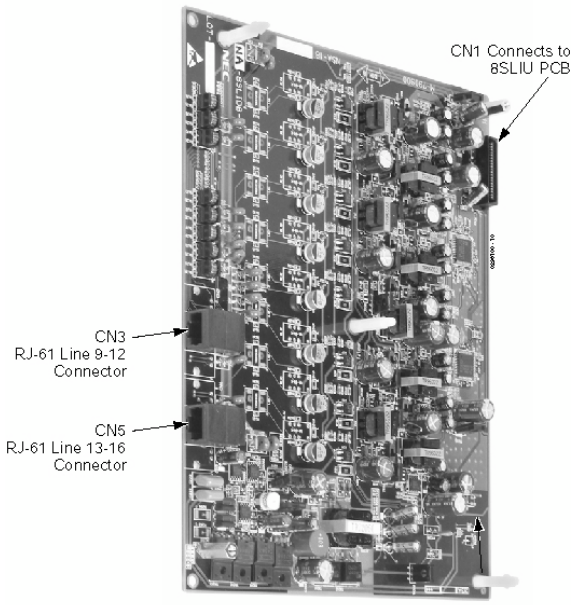
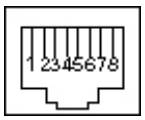
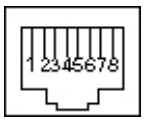


Figure 2-10: 8SLIDB PCB

Connector Pin-Outs on 8SLIDB

RJ61 Cable Connector - CN3		
	**Pin No.**	**Connection**
	1	CH12 L1 (tip for port 12)
	2	CH11 L1 (tip for port 11)
	3	CH10 L1 (tip for port 10)
	4	CH9 L2 (ring for port 9)
	5	CH9 L1 (tip for port 9)
	6	CH10 L2 (ring for port 10)
	7	CH11 L2 (ring for port 11)
	8	CH12 L2 (ring for port 12)

RJ61 Cable Connector - CN5		
	**Pin No.**	**Connection**
	1	CH16 L1 (tip for port 16)
	2	CH15 L1 (tip for port 15)
	3	CH14 L1 (tip for port 14)
	4	CH13 L2 (ring for port 13)
	5	CH13 L1 (tip for port 13)
	6	CH14 L2 (ring for port 14)
	7	CH15 L2 (ring for port 15)
	8	CH16 L2 (ring for port 16)

Installing an 8SLIDB Daughter Board:

1. Included with the 8SLIDB are three plastic spacers and two metal spacers. The plastic spacers are installed diagonally across the daughter board. The metal spacers are then installed in the remaining two corners. The metal spacers are each secured by a screw, securing the two boards together. Make sure to attach the spacers on the front of the daughter board so when installed, the components are facing the 8SLIU PCB.
2. Position the 8SLIDB's CN1 connector over the CN9 connector on the 8SLIU PCB. Press the boards together, ensuring the plastic spacers lock in place.
3. Install the screws for the metal spacers.
4. Install the 8SLIU PCB into the slot.

   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.
5. Set the 8SLIU's run/block switch to block, **UP.**
6. The 8ESIU with an 8SLIDB installed will use the first block of 16 extension ports available. Confirm the ports used with Program 10-03

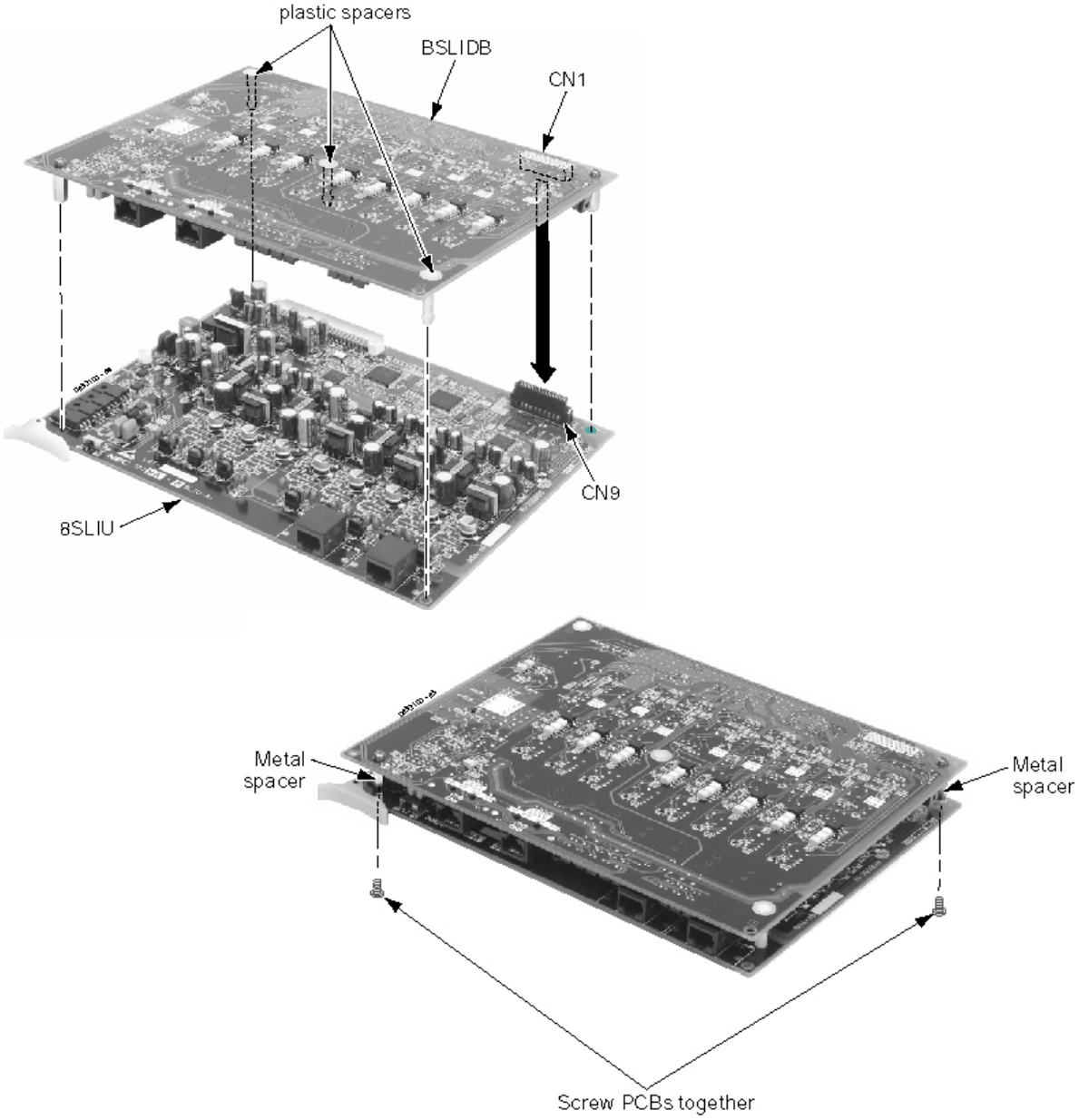


Figure 2-11: 8SLIDB INSTALLATION

Analogue Trunk (4/8COIU) PCB (Figure 2-12)

There are two different types of the COIU PCB. One providing ground start trunks - the other is for loop start trunks only.

The COIU-LS1 PCB provides:

- 4 (4COIU-LS1) or 8 (8COIU-LS1) analogue loop start line/trunk circuits - no ground start is provided
- 4 (4COIU-LS1) or 8 (8COIU-LS1) trunk status LEDs
- 4 (4COIU-LS1) or 8 (8COIU-LS1) Caller ID Circuits
- 2 (4/8COIU-LS1) Power Failure Transfer Circuits
- 1 PCB status LED
- 1 run/block switch

The COIU-LG1 PCB provides:

- 4 (4COIU-LG1) or 8 (8COIU-LG1) analogue ground start line/trunk circuits
- 4 (4COIU-LG1) or 8 (8COIU-LG1) trunk status LEDs
- 4 (4COIU-LG1) or 8 (8COIU-LG1) Caller ID Circuits
- 2 (4/8COIU-LG1) Power Failure Transfer Circuits
- 1 PCB status LED
- 1 run/block switch

The CN3 and CN5 connectors each provide connection to 4 analogue trunk ports, the analogue trunks and power failure circuits are not polarity sensitive. A maximum of 16 4/8COIU-LS1 PCBs per system is allowed.

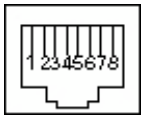
! Important !

- When using the COIU-LG1 PCB for ground start trunks, the PBX ground ***must*** be connected as described on page 1-32 or the trunks will not function correctly.

- When connecting the RJ61 cables to the COIU PCB, note the position of the Power Failure connector. Do not confuse this connector as the trunk connector.

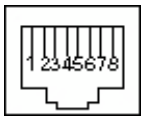
Connector Pin-Outs on COIU PCB

RJ61 Cable Connector - CN3, Trunks
The CN3 and CN5 connectors



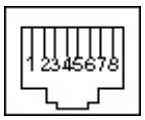
Pin No.	Connection
1	Circuit 4 - Tip
2	Circuit 3 - Tip
3	Circuit 2 - Tip
4	Circuit 1 - Ring
5	Circuit 1 - Tip
6	Circuit 2 - Ring
7	Circuit 3 - Ring
8	Circuit 4 - Ring

RJ61 Cable Connector - CN5, Trunks (8COIU Only)



Pin No.	Connection
1	Circuit 8 - Tip
2	Circuit 7 - Tip
3	Circuit 6 - Tip
4	Circuit 5 - Ring
5	Circuit 5 - Tip
6	Circuit 6 - Ring
7	Circuit 7 - Ring
8	Circuit 8 - Ring

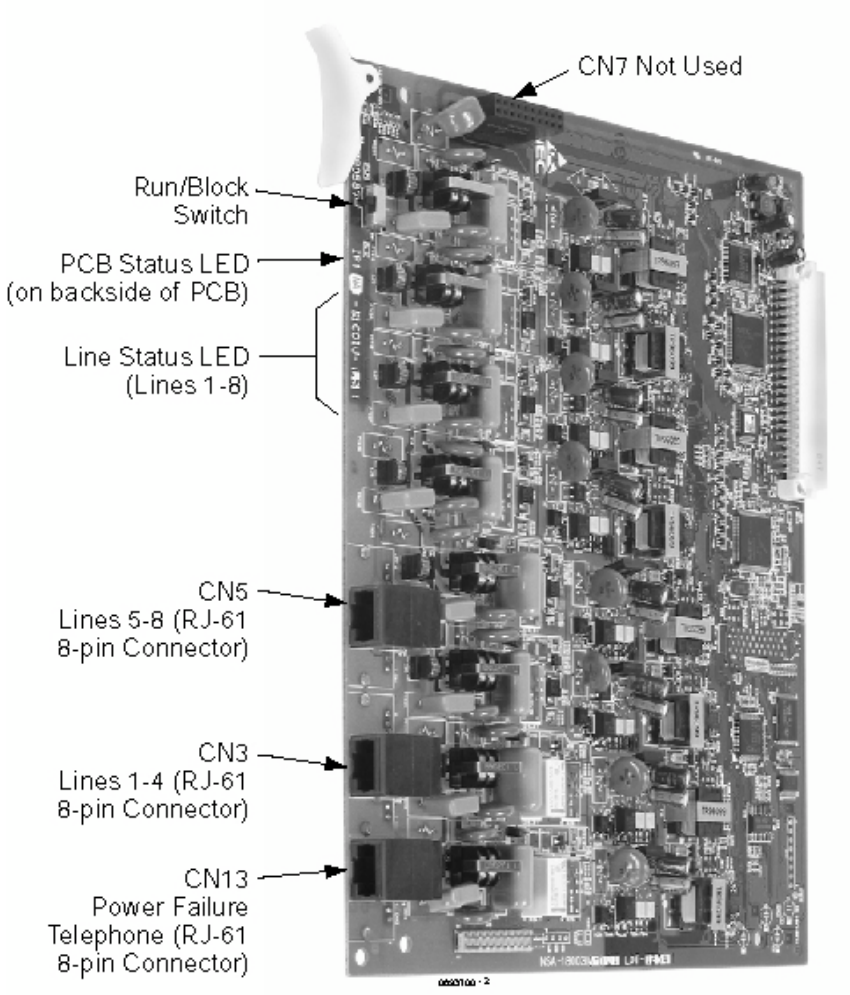
RJ61 Cable Connector - CN13, SLT Interface for Power Failure



Pin No.	Connection
1	-
2	-
3	Circuit 2 - Tip
4	Circuit 1 - Ring
5	Circuit 1 - Tip
6	Circuit 2 - Ring
7	-
8	-

Installing the Analogue Trunk PCB:

1. Set the run/block switch to block, **DOWN**.
2. Install the COIU into a slot.
   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.
3. Set the COIU run/block switch to run, **UP.**
   With normal operation, the status LED will flash fast. If trouble was found during the self diagnostics routine, the status LED will flash slowly.
4. The 4COIU will use the first block of 4 trunk ports available, the 8COIU will use the first block of 8 trunk ports. Confirm the ports used with Program 10-03
   .



The 8COIU PCB is shown here.

Figure 2-12: 4/8COIU INSTALLATION

Direct Inward Dial (DID) (4/8DIOPU) PCB (Figure 2-13)

The 4/8DIOPU PCB supports the analogue DID and single line telephone interface functions (such as Off-Premise Extension). The function type is assigned in programming for each port. The circuit types, however, should be grouped together. For example, with 3 DID circuits and 1 OPX circuit, they should be grouped as DID, DID, DID and OPX and not DID, DID, OPX and DID.

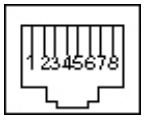
The DIOPU PCB provides:

- 4 (4DIOPU) or 8 (8DIOPU) DID trunk circuits
- 4 (4DIOPU) or 8 (8DIOPU) DID trunk status LEDs
- 1 PCB status LED
- 1 run/block switch

The CN3 and CN5 connectors each provide connection to 4 analogue DID trunk ports, ***which are polarity sensitive (tip to tip, ring to ring)***. The OPX circuits, however, are not polarity sensitive. The DIOPU requires one universal slot, with 16 maximum PCBs per system.

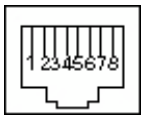
Connector Pin-Outs on DIOPU PCB

RJ61 Cable Connector - CN3



Line No.	Pin No.	Connection
1	5	Tip
	4	Ring
2	3	Tip
	6	Ring
3	2	Tip
	7	Ring
4	1	Tip
	8	Ring

RJ61 Cable Connector - CN5 (8DIOPU Only)



Line No.	Pin No.	Connection
5	5	Tip
	4	Ring
6	3	Tip
	6	Ring
7	2	Tip
	7	Ring
8	1	Tip
	8	Ring

Installing the Direct Inward Dial PCB:

1. Set the run/block switch to block, **DOWN.**
2. Install the DIOPU PCB into a slot.
   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.
3. Set the run/block switch to run, **UP.**
   With normal operation, the status LED will flash fast. If trouble was found during the self diagnostics routine, the status LED will flash slowly.
4. The 4DIOPU will use the first block of 4 trunk ports available, the 8DOIPU will use the first block of 8 trunk ports. Confirm the ports used with Program 10-03

The 8DIOPU PCB is shown here.

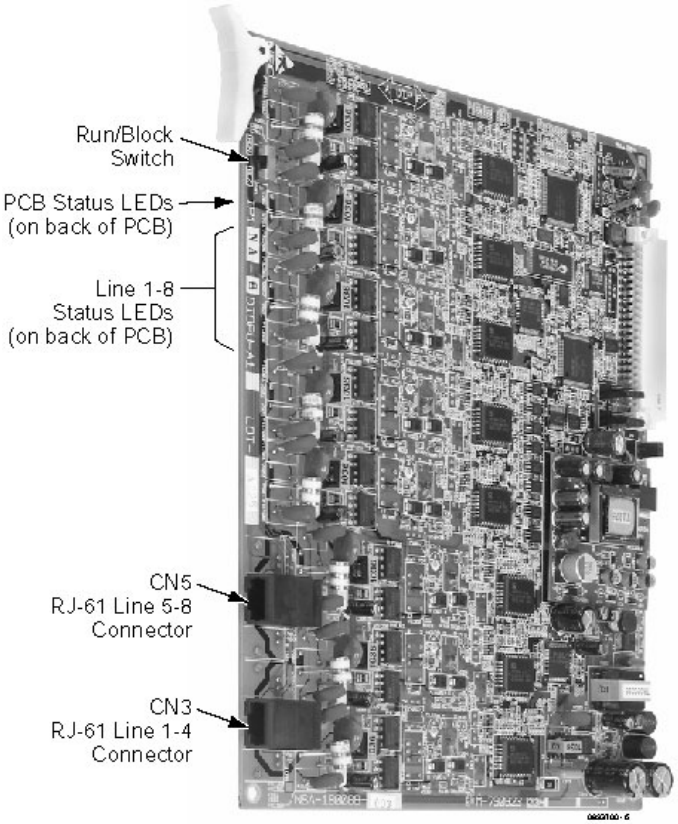


Figure 2-13: DIOPU PCB INSTALLATION

Tie Line (4TLIU) PCB (Figure 2-14)

The 4TLIU Tie Line PCB is an out band dial type analogue tie line interface PCB. The PCB supports system connections to either 2-wire (four lead, tip/ring) or 4-wire (eight lead, tip/ring/tip 1/ring 1) E&M signalling tie lines (determined in Program 10-03). Using switches on the PCB, each circuit type can be set as Type I, II, III, IV, or V. Each PCB provides:

- 4 4-circuit tie line interfaces
- 4 tie line status LEDs
- 1 PCB status LED
- 1 run/block switch
- 2 straps and 1 switch per circuit to determine the circuit type

A maximum of 16 PCBs per system are allowed, providing 64 tie line trunks and it can be plugged into any universal slot.

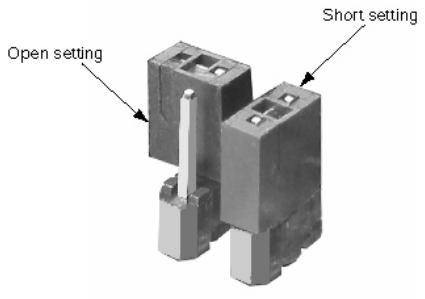
! Important !

When a router or multiplexer is connected instead of a trunk, the SG terminal of the router or multiplexer must be connected to the PBXG and FG grounding terminals on the Aspila EX cabinet. When a trunk is connected, the PBXG and FG terminals must be connected to Earth. If the PBXG terminal is not connected correctly, the signal may fail.

The PCB contains 2 straps and 1 switch. How these items are set determines the type of signaling the system uses. The type of lines the central office provides the customer determines how these switches should be set.

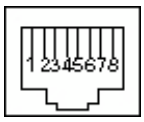
Circuit Type	Channel/Circuit Number 1-4 (CN100-CN400)		
	SWn01 Setting [1]	Sn01 Setting [1]	Sn02 Setting [1]
I	I	Short	Short
II	I	Open	Open
III	V	Open	Short
IV	I	Open	Open
V	V	Short	Short

[1] The “n” is the circuit number (1-4) being set.



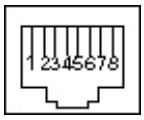
Connector Pin-Outs on 4TLIU PCB

RJ61 Cable Connector - 2-Wire E&M, CN100 - CN400



Pin No.	Connection	Description
1	SB	Ground wire for control
2	M	Control signal to trunk
3	-	
4	R	Voice signal both ways
5	T	Voice signal both ways
6	-	
7	E	Control signal from trunk
8	SG	Ground wire for control

RJ61 Cable Connector - 4-Wire E&M, CN100 - CN400



Pin No.	Connection	Description
1	SB	Ground wire for control
2	M	Control signal to trunk
3	R	Voice signal to trunk
4	R1	Voice signal from trunk
5	T1	Voice signal from trunk
6	T	Voice signal to trunk
7	E	Control signal from trunk
8	SG	Ground wire for control

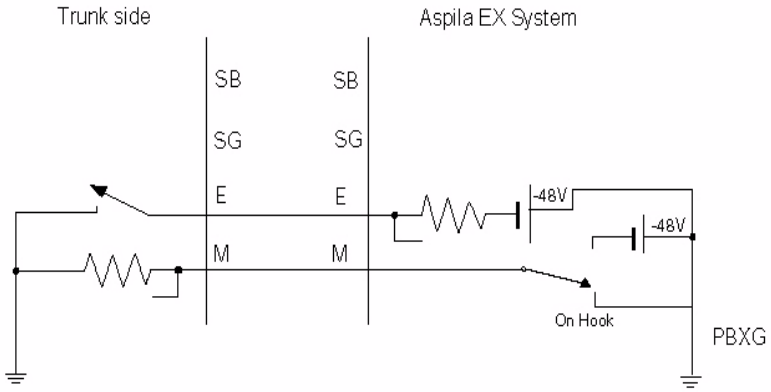
- Note: Using Type I or Type V, a system loop back test can be performed by connecting CN100 to CN200.

CN100		CN200
E	→	M
M	→	E
R	→	R
T	→	T

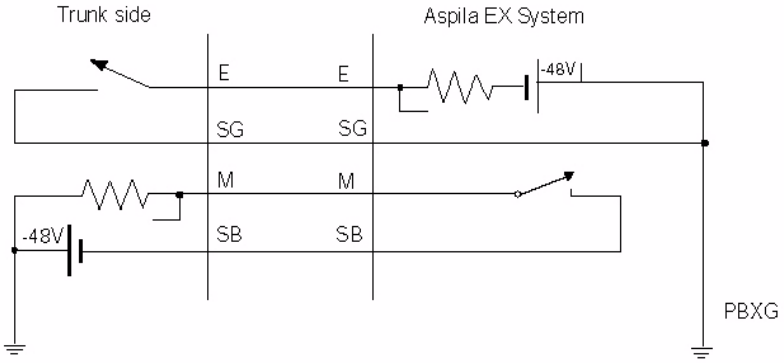
Signaling Method for Circuit Types

Control Signal Connection for Type 1

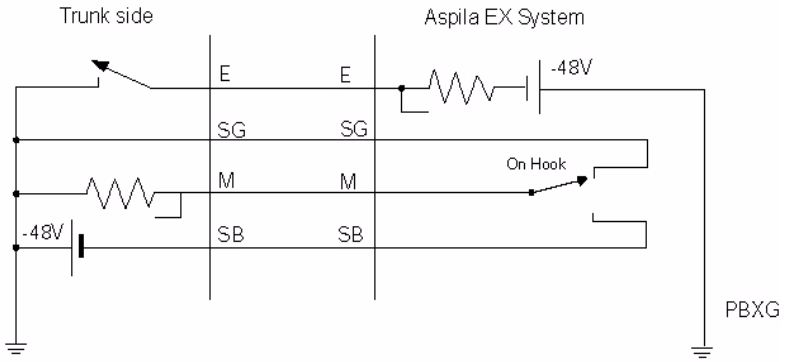
Type 1



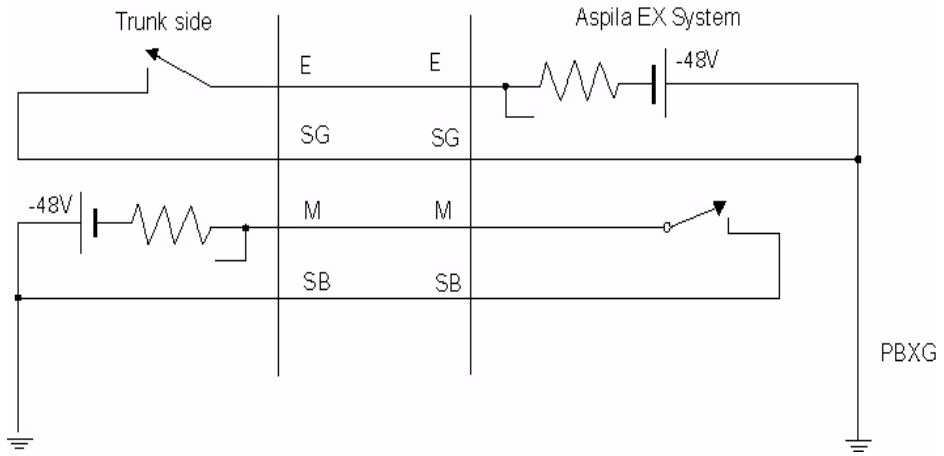
Type II



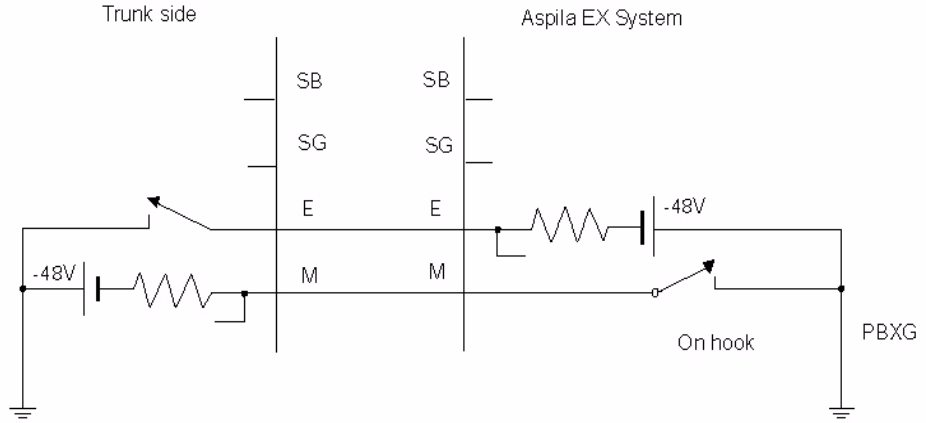
Type III



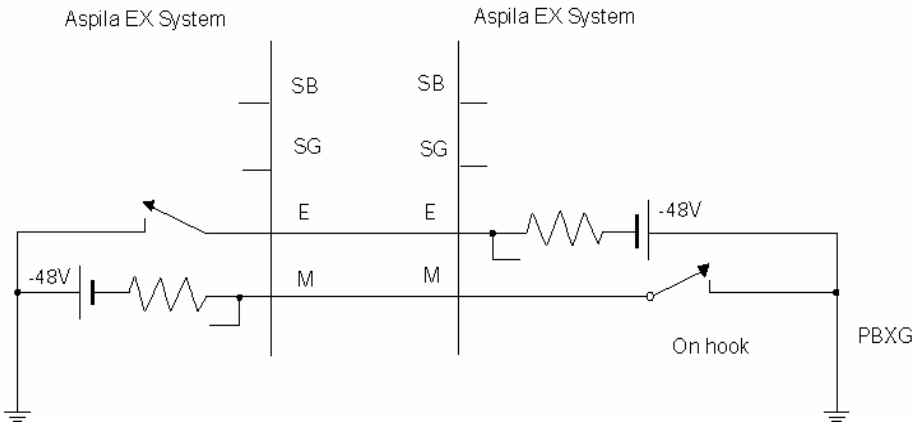
Type IV



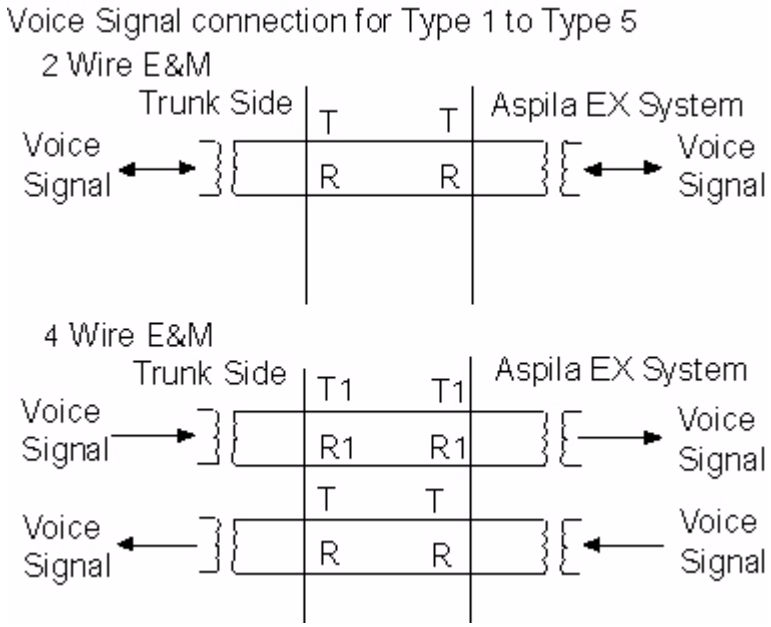
Type V



Type V (Back to Back Connection)



Voice Signal Connection for all Circuit Types



Installing the 4TLIU PCB:

1. Set the run/block switch to block, **DOWN.**
2. Set the straps for either the 2-wire or 4-wire (see Figure 2-14).
3. Set the straps for signaling type (1-5).
4. Install the 4TLIU into a slot.
   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.
5. Set the run/block switch to run, **UP.**
   With normal operation, the status LED will flash fast. If trouble was found during the self diagnostics routine, the status LED will flash slow.
6. The 4TLIU will use the first block of 4 trunk ports available. Confirm the ports used with Program 10-03

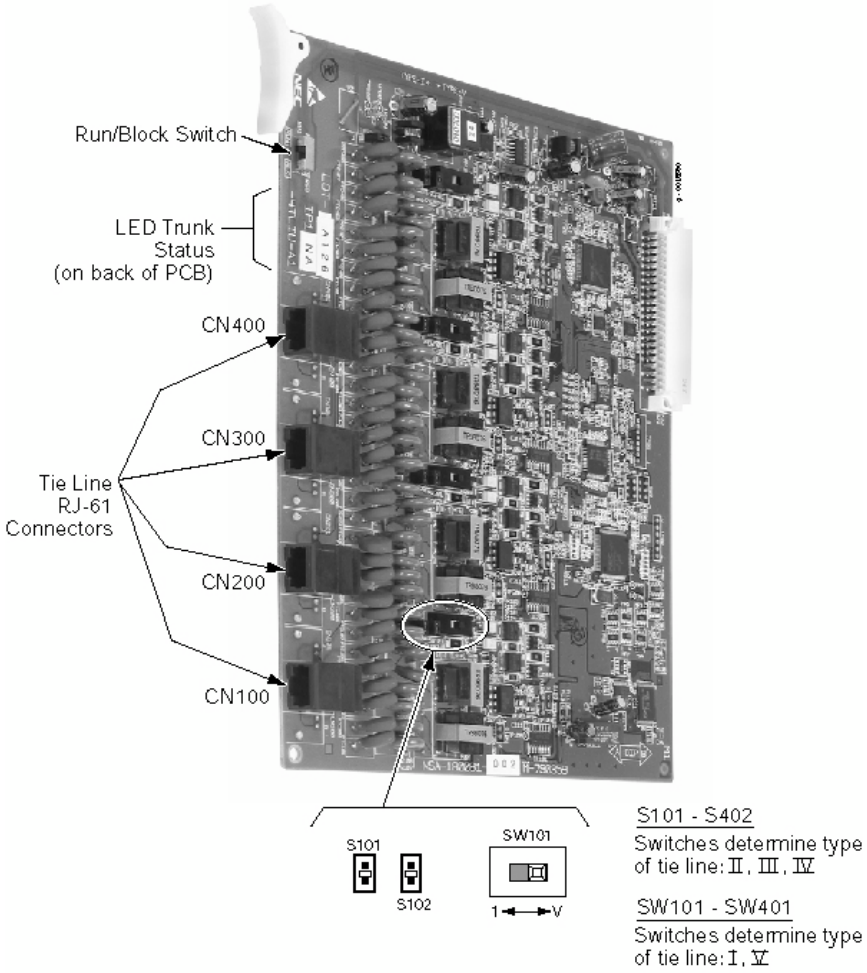


Figure 2-14: 4TLIU TIE LINE PCB INSTALLATION

BRI (2/4/8BRIU) Interface PCB (Figure 2-15)

The BRI PCB provides:

- 2 (2BRIU), 4 (4BRIU), or 8 (8BRIU) 2-Channel Circuits (2B + D) configured as T-Bus or S-Bus
- 64 Kb/s B-Channel and 16 Kb/s D-Channel
- 2 (2BRIU), 4 (4BRIU) or 8 (8BRIU) trunk/extension status LEDs
- 1 PCB status LED
- 1 run/block switch

The BRI Interface PCB uses a single universal slot. A maximum of 16 2/4BRIU PCBs can be installed. With the 8BRIU PCBs, a maximum of 13 PCBs can be installed when used for T-Bus connections - 16 PCBs can be installed when used for S-Bus connections. Each circuit connects to the network via an NTI Network Termination. With the maximum number of PCBs installed, the following can be provided:

- Sixteen 2BRI cards provide 32 BRI circuits (64 BRI channels).
- Sixteen 4BRI cards provide 64 BRI circuits (128 BRI channels).
- Twelve 8BRI cards, when used as T-Bus, provide 96 BRI circuits (192 BRI channels).
- Sixteen 8BRI cards, when used as S-Bus, provide 128 BRI circuits (256 S-Bus station ports).

The BRI circuit can be connected to either an ISDN trunk or ISDN telephone set, depending on the setting of program 10-03, the polarity of the Tx & Rx of each circuit is set by SW102 through SW802 switch settings on the BRI PCB. When used for S-Bus, a maximum of 8 ISDN terminals can be connected to each circuit.

The first 4 circuits (1-4) are supplied with DC power from the Aspila EX system when set to S-Bus mode in program 10-03. If the last four circuits (5-8) are to be used for S-Bus, they must use ISDN telephone sets which provide their own local power supply as the system does not provide DC power to these circuits.

Setting the SW100-SW800 Switches

In the following cases, the SW100-SW800 switches should be set to the ON position: (SW100-SW800 are set ON at the factory).

- When the channel is assigned as a T-Bus Point-to-Point.
- With T-Bus Point-to-Multipoint and if the system is connected at the end of the multipoint.
- If the channel is assigned as S-Bus.

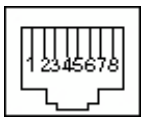
Otherwise, the SW100-SW800 switches should be set to the OFF position.

Switch Name	Switch Position	Result	Comments
SW2	RUN	PCB Active	Normal operating mode
	BLK	PCB Not Active	A new incoming call or new outgoing call will not be initiated on the ISDN line when the switch is set to “BLK”.
SW102 SW202 SW302 SW402 SW502 SW602 SW702 SW802	T	T-Bus Connection	The polarity of the Tx and Rx are defined in the T-Bus table
	S	S-Bus Connection	The polarity of the Tx and Rx are defined in the S-Bus table

Switch Name	Switch Position	Result	Comments
SW100 SW200 SW300 SW400 SW500 SW600 SW700 SW800	ON	Termination resistor is ON	This switch should be set to ON: 1. When T-Bus with Point-to-Point is selected. 2. When T-Bus with Point-to-Multipoint is selected and if the connection to the Aspila EX system at the last port of the Bus connection. 3. When S-Bus is selected.
	OFF	Termination resistor is OFF	When T-Bus with Point-to-Multipoint is selected and if the Aspila EX system is not connected to the last port of the Bus connection, this switch should be OFF.
CN102 CN202 CN302 CN402	ON	With S-Bus selected, the Feeding Power is supplied to the terminal.	If S-Bus is selected, this switch should be ON if the connected device requires line power.
	OFF	With T-Bus selected, the Feeding Power is not required	If T-Bus is selected, this switch should be OFF.

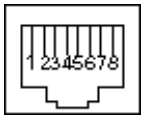
Connector Pin-Outs on BRIU PCB

RJ45 Cable Connector - CN5, CN6, CN7, CN8
S-Bus Connection



Pin No.	Connection
1	-
2	-
3	RA
4	TA
5	TB
6	RB
7	-
8	-

RJ45 Cable Connector - CN5, CN6, CN7, CN8
T-Bus Connection



Pin No.	Connection
1	-
2	-
3	TA
4	RA
5	RB
6	TB
7	-
8	-

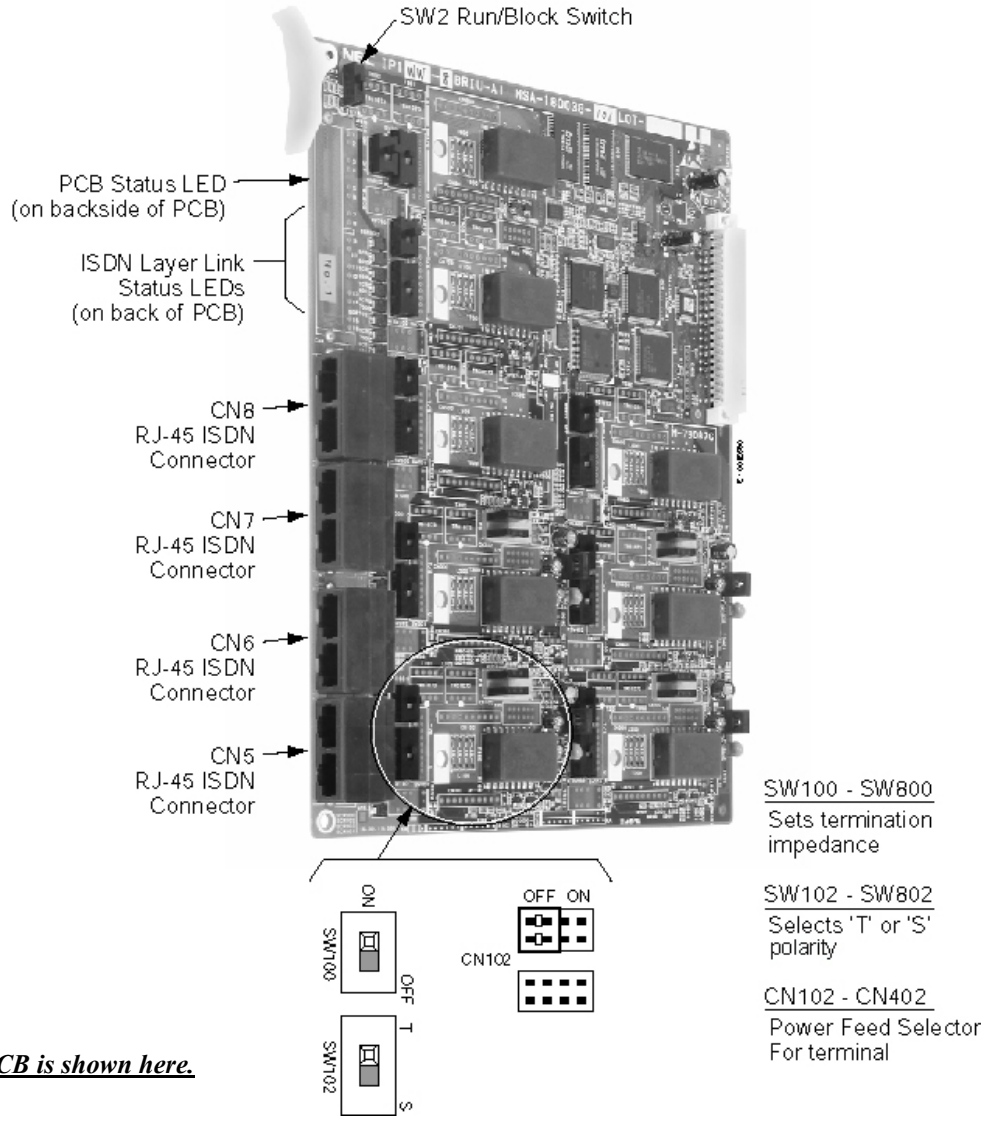
To install a BRI Interface PCB:

1. Set the run/block switch to block, **DOWN**.
2. Set the SWn02 jumpers on the BRI PCB for either T-Bus or S-Bus.
3. Set the SWn00 jumpers as either terminated or unterminated.
4. Set the CNn02 jumpers to either provide power (with S-Bus) or not to supply power (with T-Bus).
5. Plug the BRI PCB into the system cabinet.

   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.
6. Set the run/block switch to run, **UP**. Before proceeding to Step 7, wait to verify that the STATUS LED starts to flash.

   With normal operation, the status LED will flash fast. If trouble was found during the self diagnostics routine, the status LED will flash slow.

   Once connected, the ISDN Layer Link Status LEDs will be on steady when the Layer 1 link is established. If there is no link, the LED will be off.
7. Connect the cable from the NT1 Network Termination cable to the CN5, CN6, CN7, or CN8 connector on the BRI PCB.



The 8BRIU PCB is shown here.

Figure 2-15: BRI PCB INSTALLATION

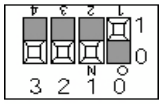
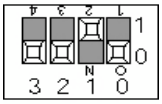
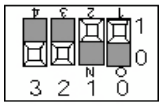
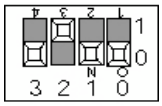
PRI (1PRIU) Interface PCB (Figure 2-16)

For ISDN Primary Rate Interface (PRI) applications, install a PRI Interface PCB. This PCB has a single 32-channel (30B plus 2D) 2.048Mb/s digital signal circuit which can be configured for either PRI trunks or PRI S-Bus. Each PCB connects to the network via an NTI Network Termination.

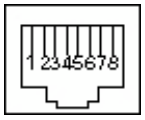
If set for PRI trunks, each PCB provides 30 PRI channels. The PCB supports the following PRI services:

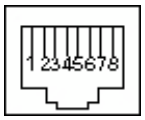
When installed, the PRI Interface PCB uses the first block of 32 consecutive trunks. For example, if you have a COIU PCB installed for trunks 1-8, the PRI Interface PCB will automatically use trunks 9-40. If you have COIU PCBs installed for trunks 1-8 and 17-24, the PRI PCB will use trunks 25-56. The PRI Interface PCB cannot use trunks 9-16 (even if available) since they are not part of a consecutive block of 32 trunks.

The PRI PCB requires one universal slot and provides a Block switch to busy out the PCB. When used for T-Bus, up to 6 PCBs can be installed in the system (total 192 trunk ports). When used as S-Bus, up to 8 PCBs can be installed (total 256 extension ports).

Switch Name	Switch Position	Result
SW100	1.5M (PI/T1)	Connecting a PRI/T1 (1.544Mb/s) line. USA Only
	2M (PRI/E1)	Connecting a PRI/E1 (2.048Mb/s) line. Europe only
SW101	T	T-Bus polarity
	S	S-Bus polarity
SW3 (4 bit dip switch)		PRI (1.544Mb/s)
		T1 (1.544Mb/s)
SW3 (4 bit dip switch) (Cont'd)		PRI (2.048Mb/s)
		E1 (2.048Mb/s)
CN11	Normal	Idle
	Loop	Used with Loop Back testing only.

Connector Pin-Outs on 1PRIU PCB

RJ45 Cable Connector - CN3 S-Bus Connection		
	**Pin No.**	**Connection**
	1	TA
	2	TB
	3	-
	4	RA
	5	RB
	6	-
	7	-
	8	-

RJ45 Cable Connector - CN3 T-Bus Connection		
	**Pin No.**	**Connection**
	1	RA
	2	RB
	3	-
	4	TA
	5	TB
	6	-
	7	-
	8	-

To install a PRI Interface PCB:

1. Set the run/block switch to block, **DOWN**.
2. Make sure the SW100 switch on the PRI Interface PCB is set to 2.048Mb/s (PRI).
3. Set the SW101 dip switches on the PRI PCB for either T-Bus or S-Bus mode.
4. Set the SW3 dip switches on the PRI PCB for either PRI Mode or T1 Mode.
5. Plug the PRI Interface PCB into any universal slot.

   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.
6. Set the run/block switch to run, **UP**.

   With normal operation, the status LED will flash fast. If trouble was found during the self diagnostics routine, the status LED will flash slowly.

   Once connected, the ISDN Layer Link Status LEDs will be on steady when the Layer link is established. If there is no link, the LED will be off.
7. Connect the cable from the NT1 Network Termination cable to the CN3 connector on the PRI PCB.

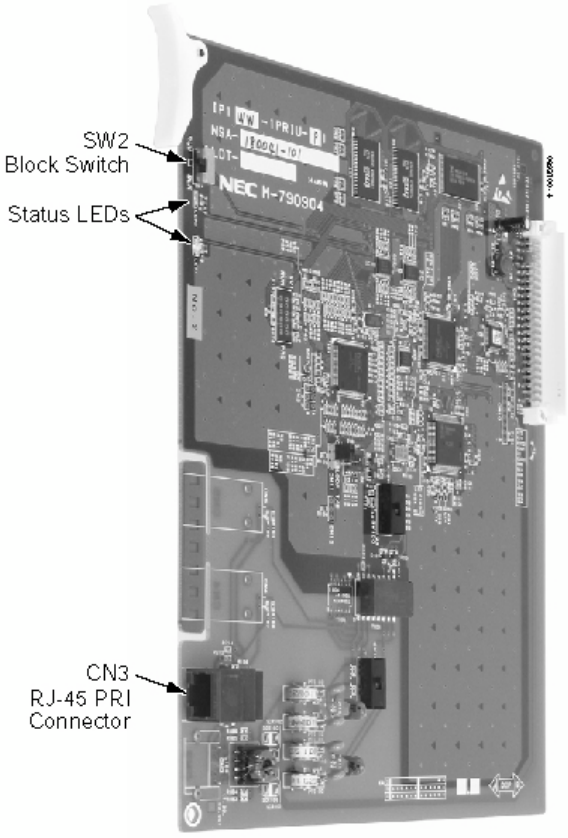


Figure 2-16: PRI Interface (1PRIU) PCB

In-Skin Server/Router (APSU) PCB (Figure 2-17)

The In-Skin Server/Router PCB provides server functionality within the Aspila EX system with a hard drive or IDE flash memory. The hard disk or IDE flash memory can provide an operating system and application software ability which can be used with CTI applications. The In-Skin/Server/Router PCB provides:

- Status LED
- HDD LED for HDD access
- Power monitor LED
- Server status LED
- PCMCIA card slot
- Run/Block switch
- Server reset switch (used to reset the server when necessary)
- CRT connector
- WAN connector
- RJ-45 LAN connector
- PS/2 mouse connector
- PS/2 keyboard connector (keyboard required for maintenance purposes only)
- 44-pin connector for 2.5" HDD or IDE flash memory connection
- 10-pin connector for an external unit with a serial interface
- 6-pin connector for an external unit with a USB interface

The system allows 1 PCB per system. This can be plugged into any universal slot.

! Important !

Do not remove this PCB with the power on.

LED Indications

LED	Function	LED Status	Operation Status
LED 1 Status (Live)	PCB Status	Green Steady	Initializing, downloading the software or shutting down the server, but not ready for PCB to be removed.
		Green Flashing	Normal (working)
		Off	Signal received that server is suspended or is ready to be removed.
HDD	HDD Access	Red Steady	Accessing the HDD
LED 1 (Power Monitor)	Supervising Power	Off	Normal (working)
		Red Steady	Power shutdown condition
LED 2 (Server Status)	Supervising the Server Suspending Condition	Off	Normal (working)
		Red Steady	Suspending the server.
Speed	Data Transmission Speed Indication	Orange Steady	Connecting with 100Mbps
		Off	Connecting with 10Mbps
ACT/LINK	Condition of Link	Green Steady	Link established.
		Green Flashing	Data transmitting
		Off	Not active

In-Skin Server/Router PCB Installation (Figure 2-17)

1. Install the battery on the APSU PCB. The polarity "+" symbol must be on top.
2. If required, install the HDD or IDE Flash Memory to the CN4 connector.

   When using an HDD or IDE Flash Memory, it should have an OS (operating system) installed and application software.

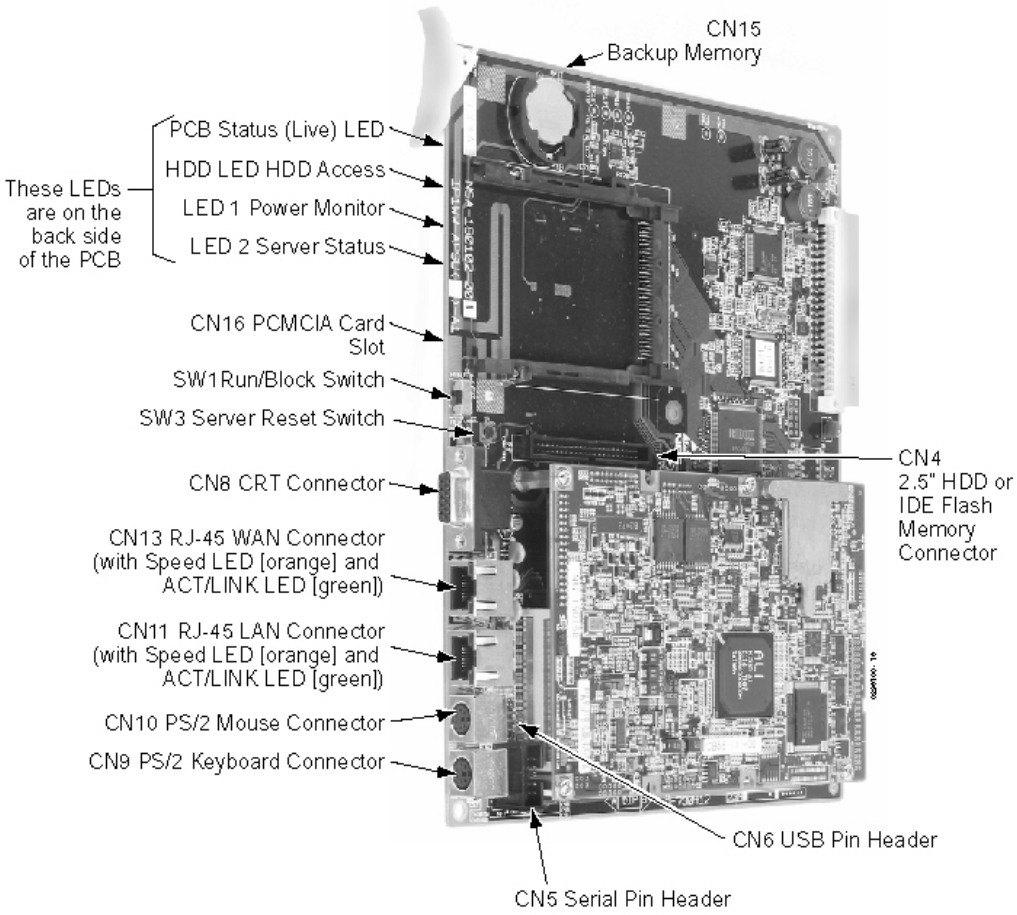


Figure 2-17: INSTALLING THE APSU PCB

3. To insert the PC-ATA card, simply slide the card into the CN16 card slot, pushing firmly to ensure proper connection.

   To remove the card set the run/block switch to BLOCK and wait for the Status LED to turn off before removing the card, this may take up to 3 minutes.

LAN 8-Port Switching Hub (8SHUBU) PCB (Figure 2-18)

The LAN PCB is an 8-port switching hub which complies with the ethernet specification for both 100Base-TX and 10Base-T. This PCB is compatible in LAN applications using 10Mbps and 100Mbps. All ports will automatically identify and switch 100Base-TX, 10Base-T and Full/Half Duplex.

The 16VOIPU PCB, which is required in order for IP telephones to communicate with non-VoIP Aspila EX phones, as well as to place or receive outside calls, must be connected to either an external switching hub or to the 8SHUBU PCB.

The PCB plugs into a universal slot, with a maximum of 6 PCB per system. Each PCB provides 8 RJ45 port connectors. These are used to connect to LAN terminals. Depending the on the type of LAN terminal, the PCB may not be able to detect the difference between straight cable and cross-cable automatically. If auto-crossover is not functioning, use straight cable for that terminal connection.

LED Indications

LED	Function	LED Status	Operation Status	Comments
CN2, CN3 LINK/ACT	LAN Operation Status	Green On	Link Established	Individually for Ports 1-8
		Green Flashing	Communicating Data	Individually for Ports 1-8
		Green Off	Not Activated	Individually for Ports 1-8
CN2, CN3 10/100	LAN Speed Status	Orange On	100Mbps	Individually for Ports 1-8
		Orange Off	10Mbps	Individually for Ports 1-8

Installing the 8SHUBU:

1. Set the run/block switch to block, **DOWN**.
2. Plug the LAN 8-Port Switching Hub PCB into any universal slot.
   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.
3. Set the RUN/BLOCK switch to run, **UP**.
   With normal operation, the status LED will flash fast. If trouble was found during the self diagnostics routine, the status LED will flash slowly.
4. Refer to the **VoIP Feature Supplement** for required programming.

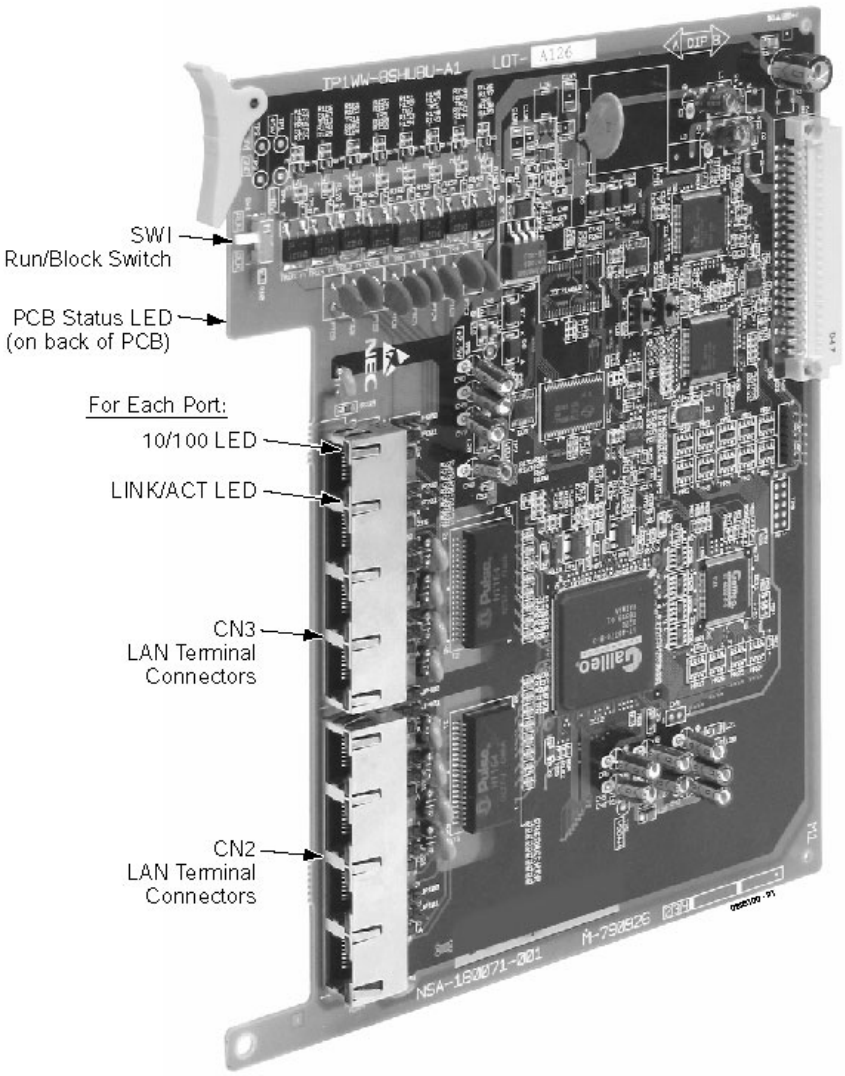


Figure 2-18: 8SHUBU INSTALLATION

VoIP (16VOIPU) PCB (Figure 2-19)

The VoIP PCB is used for converting the RTP (Real Time Transfer Protocol) packets via the IP network and PCM highway. The IP telephones are connected directly to the IP bus. When IP phones need to be connected to a conventional PCM-based digital circuit, this PCB converts the IP packet signal into a PCM signal format and connects to the PCM time division switch.

The 16VOIPU PCB is required in order for IP telephones to communicate with non-VoIP Aspila EX phones, as well as to place or receive outside calls.

The 16VOIPU PCB provides:

- 16VOIPU PCB provides up to 16 channels
- Connector for the VOIPDB daughter board (providing an additional 16 channels)
- 1 PCB status LED
- 1 run/block switch

A maximum of 6 PCBs per system are allowed, providing 96 channels (with the daughter board, 192 channels), it can be plugged into any universal slot.

If a separate software hub is used (and not the 8SHUBU PCB), it should be a 100Base/full duplex hub. To avoid network problems and to ensure good voice quality, do not use a Repeater Hub/10Base.

LED Indications

LED	Function	LED Status	Operation Status	Comments
DB Run	Status of 16VOIPDB	Red	16VOIPDB is operating normally.	
		Off	16VOIPDB is not functioning correctly.	
RTP Session Status	Status of RTP Session	Red	RTP session is established.	LED is on if one of the channels is established.
		Off	RTP session is not established.	
PCMCIA	Status of PCMCIA Slot	Red	PC-ATA card installed.	
		Off	PC-ATA card not installed.	
LED A (On CN4)	Data Transmission and Reception	On	Data is being transmitted or received.	
LED B (On CN4)	Status of Link	On	Link is established.	

Installing the VoIP PCB:

1. Set the run/block switch to block, **DOWN.**
   If the VOIPDB is to be used, install this prior to inserting the 16VOIPU PCB into the cabinet. Refer to **VoIP (VOIPDB) Daughter Board (Figure 2-20 - Figure 2-21)** (page 2-47) *for more details.*
2. Install the 16VOIPU PCB into a slot.
   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.
3. Set the run/block switch to run, **UP.**
   With normal operation, the status LED will flash fast. If trouble was found during the self diagnostics routine, the status LED will flash slowly.
4. The 16VOIPU PCB will use the first block of 16 trunk ports available. Confirm the ports used with Program 10-03.
5. Connect the 16VOIPU PCB to the 8SHUBU PCB or to an external switching hub using an ethernet cable.
6. Refer to the **VoIP Feature Supplement** for required programming.

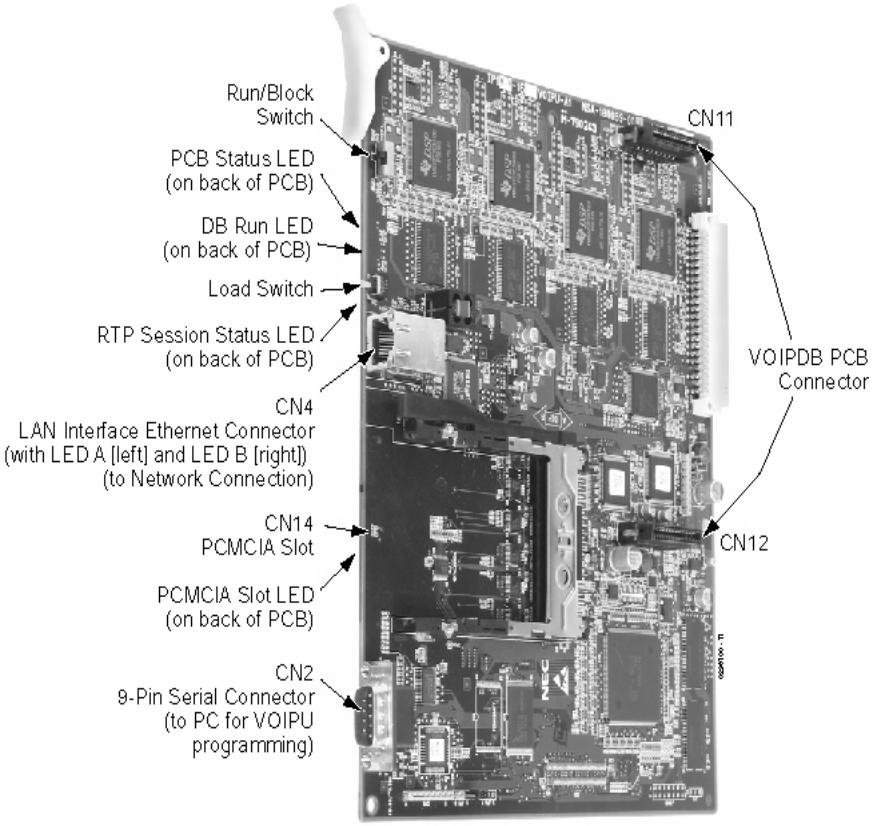
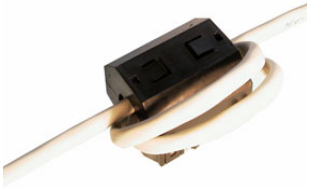


Figure 2-19: 16VOIPU PCB INSTALLATION

The LAN cable that will be connected to the VOIPU PCB must pass three times (2 turns) through the ferrite sleeve supplied to comply with EMC requirements.
The ferrite must be located, on the cable, as near as possible to the plug that will be connected to the PCB.



VoIP (VOIPDB) Daughter Board (Figure 2-20 - Figure 2-21)

The VOIPDB daughter board provides:

- 16 channels
- Connector for the 16VOIPU PCB (combination provides a maximum of 32 channels per slot)

The VOIPDB is installed on the 16VOIPU PCB with a maximum of 6 daughter boards per system, providing 192 channels (when combining the 16VOIPU and VOIPDB).

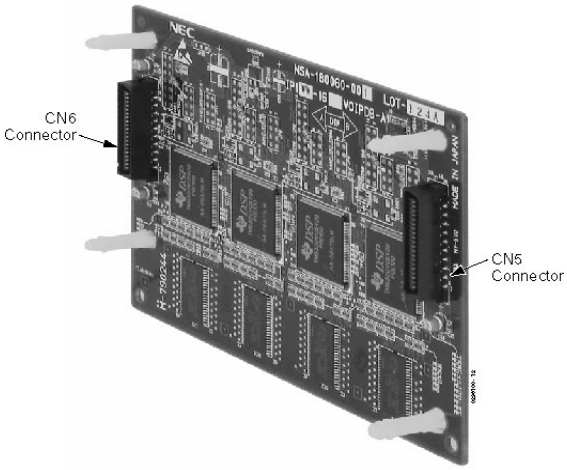


Figure 2-20: VOIPDB

Installing an VOIPDB Daughter Board:

1. Included with the VOIPDB are four plastic spacers. These are installed in each of the four corners of the daughter board. Make sure to attach the spacers on the front of the daughter board so when installed, the components are facing the 16VOIPU PCB.
2. Position the VOIPDB'S CN6 connector over the CN12 connector on the 16VOIPU PCB. The CN5 connector on the VOIPDB should then be over the CN11 connector on the 16VOIPU PCB. Press the boards together, ensuring the plastic spacers lock in place.
3. Install the 16VOIPU PCB into the slot.
   Note that the white PCB Pull Tab should always be positioned closest to the top of the cabinet.

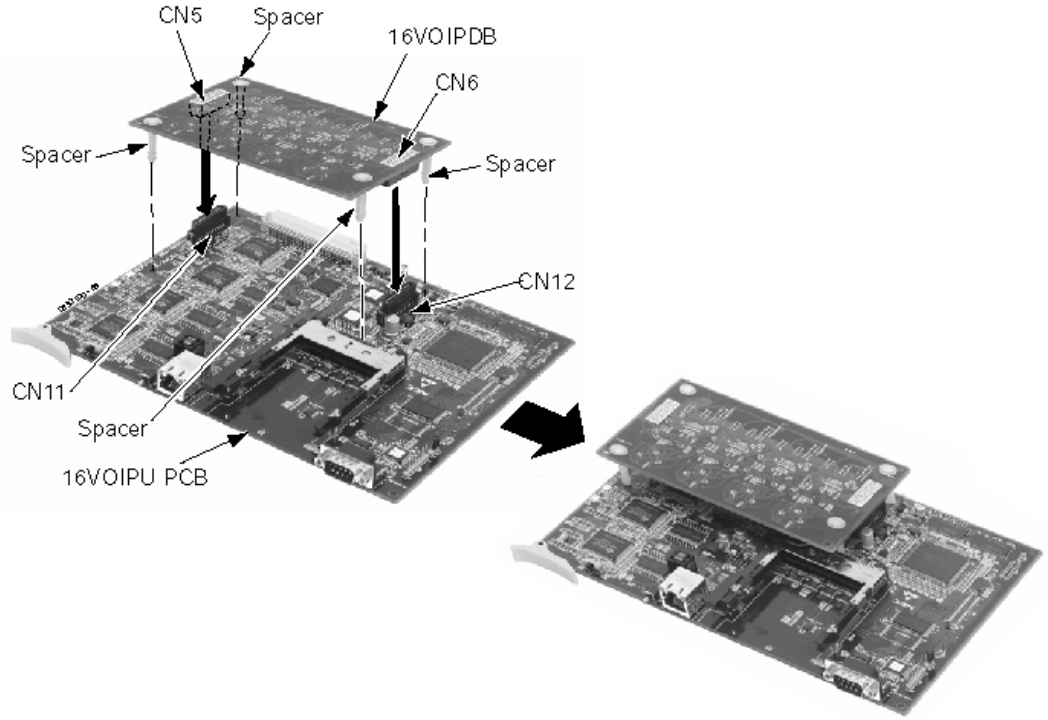


Figure 2-21: INSTALLING THE VOIPDB

4. Set the 16VOIPU's run/block switch to run, **UP.**
5. The 16VOIPU PCB with the VOIPDB installed will use the first block of 32 trunk ports available. Confirm the ports used with Program 10-03.
6. Refer to **VoIP Feature Supplement** for required programming.

PCB STARTUP

Initial PCB Installation

When first installing the system:

1. Ensure the cabinets are powered off.
2. Insert the NTCPU PCB into the CPU slot.
3. Insert an ESIU PCB in slot 1 of the Main Cabinet.
   PCBs for slots 2-16 are not installed at this time.
4. Plug in all system telephones. A display telephone should be plugged into port 001 (extension 200).
5. **When starting the system for the first time,** hold the LOAD button on the NTCPU and turn the AC Power Panel switch to ON. After approximately 3 seconds, release the LOAD button.
   This performs a cold start on the Aspila EX system to make sure you're starting with a defaulted system.

   When powering up any other time, simply turn the AC Power Panel switch to ON.
   Refer to *Switch Settings and LED Indications* on page 2-9 for NTCPU LED status.
6. Wait about three minutes for the system to boot. The telephone display at extension 200 will show the Time/Date and extension number when the boot sequence completes.
7. Set the run/block switch to run **UP** on the ESIU in slot 1.
8. After setting the run/block switch **DOWN** for all SLIU/ESIU PCBs, insert SLIU/ESIU PCBs in the Main Cabinet in sequential order.

   The order in which SLIU and ESIU PCBs are physically inserted determines the numbering plan. *The installer must install extension PCBs in order (i.e.; slot 1 first, slot 2 next, slot 3 next, etc.) for a sequential numbering plan.*

   For example, with a 16ESIU in slot #1 (ext. 200-215), when 3 more 16ESIU PCBs are installed in the following order, the numbering plan below would apply:

Order of Install	PCB Slot #	PCB	Extension Numbers
1	1	16ESIU	200-215
2	2	16ESIU	216-231
3	4	8SLIU (no daughter board)	232-239
4	3	8ESIU	240-247

9. Set the run/block switch **UP** on each PCB.

Initial Installation of Trunk PCBs

When first installing the system:

1. Set the run/block switch **DOWN** on all COIU-LS1, COIU-LG1, 4TLIU, DIOPU, 1PRIU or BRIU PCBs.
2. Insert all PCBs in sequential order. *The installer must install trunk PCBs in order (i.e.; slot 5 first, slot 6 next, slot 7 next, etc.) for a sequential numbering plan.*

Installing COIU-LS1/LG1, 4TLIU, DIOPU, or BRI PCB's:

The order in which trunk PCBs are physically inserted determines the numbering plan. For example, if four PCBs are installed *in the following order,* the numbering plan below would apply:

Order of Install	PCB Slot #	PCB	Line Circuits
1	4	8COIU	1-8
2	5	4COUI	9-12
3	7	4TLIU	13-16
4	6	4TLIU	17-20

Installing PRI PCBs

The PRI Interface PCB uses the first block of 32 consecutive trunks.

For example, if you have an 8COIU PCB installed for trunks 1-8, the PRI PCB will automatically use trunks 9-40. If you have 8COU PCBs installed for trunks 1-8 and 17-24, the PRI PCB will use trunks 25-56. The PRI PCB cannot use trunks 9-16 (even if available) since they are not part of a consecutive block of 32 trunks.

3. Set the run/block switch **UP** on each PCB.

SYSTEM STARTUP

System Startup

You can now briefly check its operation. Before proceeding, be sure that:

- The common equipment is installed correctly.
- All extensions are cabled correctly.
- All earth ground and telco connections are installed correctly.
- PCBs are configured, equipped, and strapped correctly.

Powering up the System

1. With the NTCPU in the CPU slot and all other cards installed.
2. Plug in all system telephones. A display telephone should be plugged into port 001 (extension 200).
3. **When starting the system for the first time,** hold the LOAD button on the NTCPU and turn the AC Power Panel switch to ON. After approximately 3 seconds, release the LOAD button.
   This performs a cold start on the Aspila EX system to make sure you're starting with a defaulted system.

   When powering up any other time, simply turn the AC Power Panel switch to ON.
   Refer to *Switch Settings and LED Indications* on page 2-9 for NTCPU LED status.
4. Wait about three minutes for the system to boot. The telephone display at extension 200 will show the Time/Date and extension number when the boot sequence completes.

   Note: Refer to **Basic Troubleshooting** (page 2-54) if the system does not boot.

The system will automatically recognize each PCB installed in the system. *If a PCB has previously been installed* in a slot and another type of PCB is to be installed in that same slot, the PCB must be first be removed from the cabinet and then the slot definition removed using Program 90-05 prior to installing the new PCB.

This same condition applies to extensions and other devices connected to the system. For example, if a port was previously used for a system phone and a DSS Console is to be installed in that same port, it must first be undefined in Program 10-03 before the console is connected.

For more information on Cold and Hot system starts, refer to **Central Processing Unit (NTCPU) PCB (Figure 2-3)** (page 2-6).

Initial Programming (Figure 2-22)

The system can be programmed using three methods:

- Programming through a digital system phone with LCD display
- PC Programming
  Refer to the PCPro/WebPro Installation Manual, for complete installation details.
- Web Programming
  Refer to the PCPro/WebPro Installation Manual, for complete installation details.

Refer to the Aspila EX Software Manual for complete details on programming.

Entering the Programming Mode

Enter the system programming mode at any system phone with an LCD display:

1. Press CALL1. (You hear dial tone).
2. Dial # * # *.
3. Dial the system password.

Password	Level
12345678	2 (IN)
0000	3 (SA)
9999	4 (SB)

4. Press HOLD.
   The system allows up to two people to be in program mode at one time. If both programmers are making entries to the same program, the system will accept the entries made by the last person in that program.

Port Defaults

With the default settings, the ports are assigned as follows:

Station Ports:	1-512 (ports 1-300 = extensions 200-499)
Virtual Station Ports:	1-256 (extensions not assigned)
Trunk Ports:	1-200

Figure 2-22: TELEPHONE KEY LAYOUT

Setting Up Extension Circuit Types

Run Program 10-03 to set up extension circuit types as required. The system will automatically detect and assign most circuit types when the device is connected. Refer to the Software Manual for programming information.

1. Dial 10-03-01.
2. Press HOLD.
3. Select the slot, port or channel (with ESIU PCBs) to be programmed by pressing FLASH.
4. Set the terminal type or option as needed.
   Refer to the Software Manual for this information.
   If the system has DSS Consoles, Program 30-02 must be used to define DSS extension assignments.

As the system recognizes the extension devices automatically, when replacing the type of device connected, the type must be undefined in Program 10-03 prior to connecting the new device. For example, if a port was previously used for a system phone and a DSS Console is to be installed in that same port, it must first be undefined in Program 10-03 before the console is connected.

Saving Your Configuration

When you are done programming, you must be out of a program's options to exit (pressing the MSG key will exit the program's option). Press the SPK key. Any changes made will be saved to the NTCPU.

1. Press MSG key to exit the program's options, if needed.
2. Press SPK. You see, "Saving System Data" if changes to were to the system's programming.
3. The display shows "Complete Data Save" when completed and will exit the phone to an idle mode.

Upgrading Your Software

! Important !

To save customer data prior to updating, a blank PC-ATA card is required. Insert the card into the NTCPU and, using Program 90-03, save the software to the PC-ATA card. (Program 90-04 is used to reload the customer data if necessary.) Note that a PC-ATA card can only hold one customer database. Each database to be saved will require its own separate card.

After uploading programming data to the system using Program 90-04, reset the system and wait a few minutes for the programming to take affect before accessing any lines or special system features. Otherwise some unusual LED indications may be experienced.

1. Insert the PC-ATA card containing the software upgrade into the PCMCIA card slot on the NTCPU.
2. Push in and hold the Load button.
3. Lift the Reset lever and release.
4. Continue holding the Load button for approximately 3 seconds.
5. Release the Load button.
6. Wait until the Status LED's (LED 0, 2 & 3) on the NTCPU start flashing (approximately 2 minutes), then remove the PC-ATA card.
7. Lift and release the Reset lever to restart the NTCPU.
8. When the system has completed reloading the software, the Status LED will begin flashing on the NTCPU.
   To confirm the new software version has been installed, the system version number can be viewed by pressing CHECK and then the HOLD key on any display system phone. This can also be confirmed in Program 90-16-01.

Making Test Calls

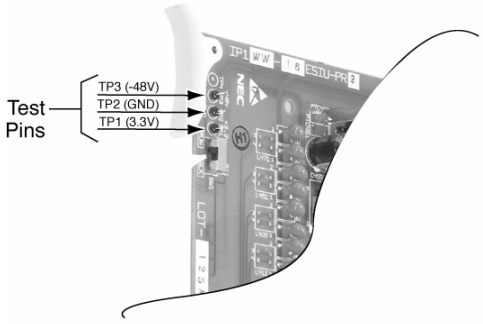
In the initial configuration:

- All Programmable Function keys are line keys (e.g., key 1 is line 1).
- All trunks are loop start DTMF.

Basic Troubleshooting

To troubleshoot extensions:

1. Verify the Run/Block switch is set in the RUN position for the PCB.
2. Check and verify extension. The ESIU PCB has test points located on the top edge of the PCB.



3. The voltages at the extension's modular jack should be:

Test Point	Voltages
TP3 - TP2	-54 to -47V DC
TP1 - TP2	+3.3 to +3.5V DC

4. Check and verify the phone is working correctly by connecting it to another extension.
5. Check and verify programming. Refer to the Software Manual if necessary.
6. Check and verify extension wiring.
7. Check and verify cable connection of the EXIFU if two cabinets are used.
8. Check and verify the correct LED indication on the PCB.
9. Check and verify extension PCB installation.

To troubleshoot lines:

1. Verify the Run/Block switch is set in the RUN position for the PCB.
2. Check and verify each line before the system with a test set.
3. Measure loop current on each line with a digital voltmeter.
4. Check and verify programming. Refer to the Software Manual if necessary.
5. Check and verify trunk wiring.
6. Check and verify cable connection of the EXIFU if two cabinets are used.
7. Check and verify the correct LED indication on the PCB.
8. Check and verify trunk PCB installation.
9. Check and verify the proper earth grounding is made for the system.

Identifying Port Location

Port information such as PCB type, port numbers, PCB status, and individual port status can be obtained from the system. To obtain a System Report containing PCB information, the system must be connected to a PC or terminal using the serial, USB, or LAN port connector on the NTCPU.

Running program 90-13-03 in MAINTENANCE PROGRAMS prints a system PCB report. Refer to *Program 90-13-03 : System Information Output* in the Software Manual. The following is a typical report:

<<SYSTEM INFORMATION>> 01/03/03 09:49

slot	location	type	assign port	condition	note
1	1-1	ESIU	1- 16	Running	****---- -------- Connect:*
2	1-2	ESIU	1- 8	Running	
3	1-3	SLIU	1- 8	Running	
4	1-4	COIU	1- 16	Running	
5	1-5	COIU	1- 16	Running	
6	1-6	DIOPU	1- 8	Not Install	
7	1-7	- none -			
8	1-8	- none -			
9	2-1	- none -			
10	2-2	- none -			
11	2-3	- none -			
12	2-4	- none -			
13	2-5	- none -			
14	2-6	- none -			
15	2-7	- none -			
16	2-8	- none -			

SYSTEM SHUTDOWN

Powering Off the System

Observe the following when powering off the system.

- It is advisable to make a back up of the customer configuration before powering off.

> To save customer data a blank PC-ATA card is required. Insert the card into the NTCPU and, using Program 90-03, save the software to the PC-ATA card. (Program 90-04 is used to reload the customer data if necessary.) Note that a PC-ATA card can only hold one customer database. Each database to be saved will require its own separate card.

- DO NOT power off by disconnecting the AC (or DC for battery back up) power. ALWAYS use the push button switch on the front of the PSU. There may a short delay whilst the NTCPU becomes idle before the system powers down.
- For systems with an expansion cabinet installed powering off the expansion cabinet's PSU will not power off the system. Power off the main cabinet's PSU, this will power off both the main and expansion cabinet.
- All calls in progress will be cut off when the system is powered off, if COIU power fail ports are installed they will become operational.
- All user's setting (e.g call forward, camp-on etc) will be kept.

Resetting the System (Hot Start)

Observe the following when resetting the system.

- DO NOT reset a system with the RESET switch on the NTCPU (SW2), this performs a forced reset regardless of the operating state of the NTCPU.
- Always reset the system by powering off (and then on) the PSU (see instructions above). This will wait for the NTCPU to become idle before powering down.

For further information on Hot Start and Cold Start for the system refer to **CPRU Installation (Figure 2-4)** (page 2-12).

Section 3: Installing Extensions and Trunks

3

!! Important !!

Install telephones as on-premise extensions only. (Otherwise, the telephones are highly susceptible to lightning strikes.)

RJ61 WIRING AND PINOUTS

The presentation of the following PCB's is via RJ61 sockets.

- NTCPU
- ESIU
- SLIU/SLIDB
- COIU
- DIOPU
- TLIU

The RJ61 wiring pinouts and colour codes of RJ61 are shown in *Table 1: RJ61 Pinouts & Colour Codes* on page 3-2

Pin Number	RJ61 Colour Code
1	White/Brown
2	White/Green
3	White/Orange
4	Blue/White
5	White/Blue
6	Orange/White
7	Green/White
8	Brown/White

Table 1: RJ61 Pinouts & Colour Codes

INSTALLING EXTENSIONS

Digital Extension Cabling

Each digital extension requires one-pair twisted cable from the MDF to the RJ11/RJ45 socket. Refer to **Section 7: Specifications and Parts List** (page 7-1) for maximum cable lengths.

Installing a Key Telephone

1. Install an RJ11/RJ45 socket for each extension. The socket should be within two metres of the phone due to the length of the line cord supplied.
2. For each extension, run one-pair station cable to an RJ11 (or RJ45) socket.
3. Terminate the pair to pins 3 & 4 for the RJ11 socket (pins 4 & 5 of the RJ45 socket). Refer to **Digital Station (8/16ESIU) PCB (Figure 2-8)** (page 2-17) for details of the RJ61 connector pin outs.

The ESIU extension ports are not polarity sensitive.
The system will automatically set the terminal type when the extension is plugged in for the first time. Confirm the terminal type with Program 10-03. If you need to change the terminal type set Program 10-03 to un-used and then plug in the new extension, it will then be assigned automatically.

INSTALLING SINGLE LINE TELEPHONES

Single Line Extension Cabling

Each single line extension requires one-pair twisted station cable from the MDF to the Master type line jack unit. Refer to **Section 7: Specifications and Parts List** (page 7-1) for maximum cable lengths.

Installing a Single Line Telephone

To install a single line telephone:

1. Install a line jack for each single line telephone. The line jack should be within two metres of the phone.
2. For each extension, run one-pair station cable to a master line jack unit.
3. Terminate the pair to pins 2 & 5 of the line jack. Refer to **Analogue Station (8SLIU) PCB (Figure 2-9)** (page 2-19) for details of the RJ61 connector pin outs.

The SLIU extension ports are not polarity sensitive.

INSTALLING CO/PBX LINES

Ground Start/Loop Start Line Cabling

There are four types of COIU PCB providing loop start or ground start trunks as shown in the table below.

4COIU-LS1	4 loop start lines
8COIU-LS1	8 loop start lines
4COIU-LG1	4 ground start trunks
8COIU-LG1	8 ground start trunks

The CN3 and CN5 connectors each provide connection to 4 analogue trunk ports. The analogue trunks and power failure circuits are not polarity sensitive.

! Important !

- When using the COIU-LG1 PCB for ground start trunks, the PBX and Earth grounds ***must*** be connected as described on page 1-32 or the trunks will not function correctly.
- When connecting the RJ61 cables to the COIU PCB, note the position of the Power Failure connector. Do not confuse this connector as the trunk connector.

Installing Ground Start/Loop Start Lines

To install a ground start trunk/loop start line:

1. For each trunk, run one-pair cable from the PSTN Network Termination point to the COIU PCB. Refer to **Analogue Trunk (4/8COIU) PCB (Figure 2-12)** (page 2-23) for details of the RJ61 connector pin outs.

INSTALLING BRI TRUNKS

BRI Trunks

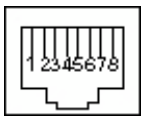
Installing BRI Trunks

1. ***For Trunk Mode:*** The BRI circuit can be plugged directly into the NT1 Termination. Use an RJ45 patch cable.
2. ***For S-Bus Mode:*** The ISDN terminals can be plugged directly into the RJ45 connector on the BRI card. If more than one terminal is connected run a 2 pair cable to an RJ45 socket then daisy-chain the connection to the additional ISDN terminals. For pin-out information for S-Bus connections, refer to **BRI (2/4/8BRIU) Interface PCB (Figure 2-15)** (page 2-34).

   Repeat for each BRI circuit.

   Note that the polarity of the RJ45 connector is set by SW102 to SW802 on the BRI PCB

RJ45 Cable Connector - CN5, CN6, CN7, CN8
T-Bus Connection



Pin No.	Connection
1	-
2	-
3	TA
4	RA
5	RB
6	TB
7	-
8	-

INSTALLING PRI TRUNKS

PRI Trunks

Installing PRI Trunks

1. ***For Trunk Mode:*** The PRI circuit can be plugged directly into the NT1 Termination. Use an RJ45 patch cable.
2. ***For S-Bus Mode:*** The ISDN PRI device can be plugged directly into the RJ45 connector on the BRI card. For pin-out information for S-Bus mode connections, refer to **PRI (1PRIU) Interface PCB (Figure 2-16)** (page 2-37).

Note that the polarity of the RJ45 connector is set by SW101on the PRI PCB

INSTALLING DID TRUNKS

DID Trunks

Installing DID Trunks :

1. For each trunk, run one-pair cable from the PSTN Network Termination point to the DIOPU PCB. Refer to **Direct Inward Dial (DID) (4/8DIOPU) PCB (Figure 2-13)** (page 2-26) for details of the RJ61 connector pin outs.

INSTALLING TIE LINES

Tie Line: 4TLIU

! Important !

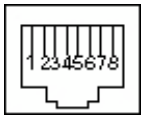
- When using the TLIU PCB, the PBX and Earth grounds ***must*** be connected as described on page 1-32 or the trunks will not function correctly.

Installing 2-wire/4-lead Tie Lines:

1. For each trunk, run two-pair cable from the PSTN Network Termination point to the TLIU PCB. Refer to **Tie Line (4TLIU) PCB (Figure 2-14)** (page 2-28) for details of the RJ61 connector pin outs.

   Note that two pins of the RJ-61 connector are not used for 2-wire tie lines.

RJ61 Cable Connector - 4-Wire E&M, CN100 - CN400

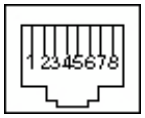


Pin No.	Connection	Description
1	SB	Ground wire for control
2	M	Control signal to trunk
3		
4	R	Voice signal both ways
5	T	Voice signal both ways
6		
7	E	Control signal from trunk
8	SG	Ground wire for control

2. Make sure the strapping on the 4TLIU PCB is set to the proper type (2-wire or 4-wire and Type I, II, III, IV or Type V).
3. Plug in the corresponding RJ-61 connector to the 4TLIU PCB connector.

Installing 4-wire/8-lead Tie Lines:

1. For each trunk, run two-pair cable from the PSTN Network Termination point to the TLIU PCB. Refer to **Tie Line (4TLIU) PCB (Figure 2-14)** (page 2-28) for details of the RJ61 connector pin outs..

RJ61 Cable Connector - 4-Wire E&M, CN100 - CN400			
	**Pin No.**	**Connection**	**Description**
	1	SB	Ground wire for control
	2	M	Control signal to trunk
	3	R	Voice signal to trunk
	4	R1	Voice signal from trunk
	5	T1	Voice signal from trunk
	6	T	Voice signal to trunk
	7	E	Control signal from trunk
	8	SG	Ground wire for control

2. Make sure the strapping on the 4TLIU PCB is set to the proper type (2-wire or 4-wire and Type I, II, III, IV or Type V). Refer to *Tie Line (4TLIU) PCB (Figure 2-14)* on page 2-28 for detail on strapping.
3. Plug in the corresponding RJ-61 connector to the 4TLIU PCB connector.

Adding Ferrites to Tie Line Cables

1. Four ferrite sleeves are supplied with the TLIU PCB
2. Each cable that will be connected to the TLIU PCB must pass two times (one turn) through a ferrite sleeve to comply with EMC requirements.

Figure 3-1: Example of one turn through a Ferrite Sleeve

3. The ferrite must be located, on the cable, as near as possible to the plug that will be connected to the PCB.

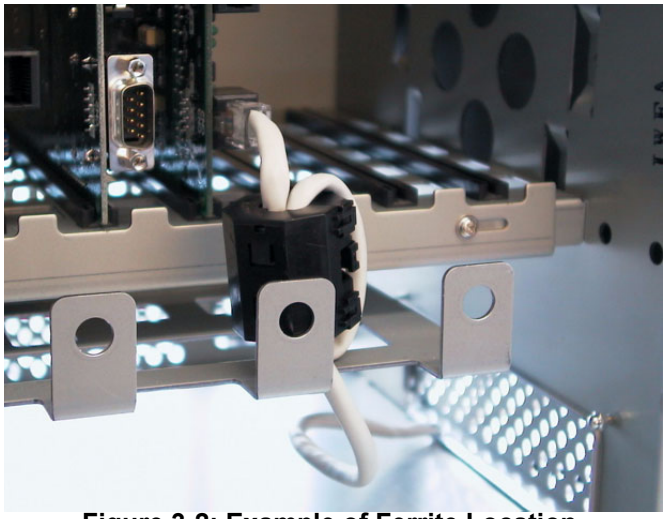


Figure 3-2: Example of Ferrite Location.

TESTING TELEPHONE OPERATION

The following procedure will help you determine if a problem being experienced is due to the telephone or the system. Testing the operation of a system phone allows you to check the lamping of each key, the display, and tones. Follow the procedure below to determine if the phone is operating correctly.

Key Matrix and LED Test

1. Unplug the phone.
2. While holding down dial pad digits 1, 2 and 3, plug the phone back in.
3. Hold down the 1, 2 and 3 digits for approximately 10 seconds then release them.
   If the phone doesn't show "TEST PUSH=" on the display, then repeat Steps 1-3 and hold the keys down a few seconds longer.
4. Press any key and its Logical Name should be displayed.
   The following chart indicates the Logical Name for each key.

Logical Name Table

Keys	Logical Name	Keys	Logical Name
KEYPAD 0 - 9	D 0 - D 9	CALL2	F 8
KEYPAD *	D *	MIC	F 9
KEYPAD #	D #	MSG	F 10
Line Keys 1 - 24 [1]	L 1 - L 24	DIAL	F 11
DSS Keys 1 - 10	O 1 - O 10	CLEAR	F 12
LND	F 1	CHECK	F 13
CONF	F 2	SOFT KEY 1-4	S 1 - S 4
HOLD	F 3	DIRECTORY [2]	TBD
FLASH	F 4	MENU [2]	TBD
DND	F 5	VOL. UP	
CALL1	F 6	VOL. DOWN	
SPK	F 7		

[1] Keys 1, 2 and 3 will also check tones.
[2] 34-Button Super Display telephone only.

Quitting Test Mode

1. Lift the handset and then replace it.
2. The phone returns to an idle condition.

SUPER DISPLAY LCD

Positioning the Super Display LCD(Figure 3-3, Figure 3-4)

The LCD on a super display system phone has two angles which it can be positioned for the best viewing for the customer.

Raising the LCD

1. Gently lift the LCD display up from the top of the phone.
2. You'll hear a click when it locks into the first position. If you wish the display to be at a higher angle, continue to lift the LCD display until a second click is heard. This is the highest angle available for the display.

Figure 3-3: LIFTING THE LCD DISPLAY

Lowering the LCD

1. On the base of the phone, beneath the display, gently pull the lever out.
   This allows the latch holding the display is place to be released.
2. Slowly push the LCD display down.

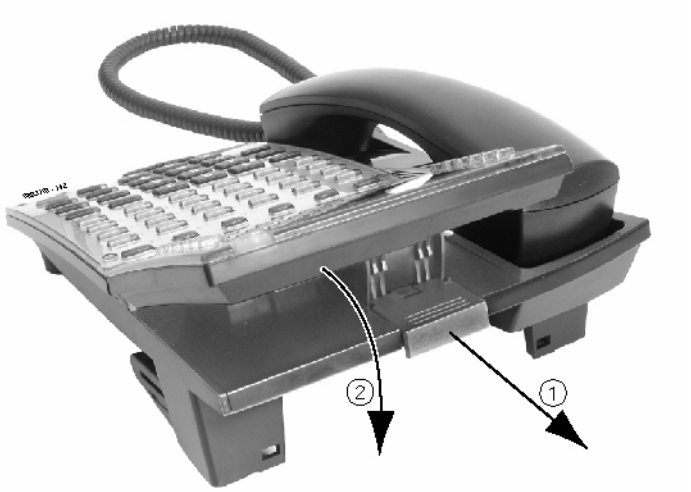


Figure 3-4: LOWERING THE LCD DISPLAY

Section 4:
Optional Equipment

2PGDAD MODULE

Using a 2PGDAD Module (Figure 4-1 - Figure 4-8)

The 2PGDAD module provides two circuits which allow connection to external terminals such as:

- Door Box (8 maximum per system)
- External Speaker with Amplifier (8 maximum with 2PGDAD modules, 1 on the NTCPU)
- External Music Source (external MOH) (96 maximum per system)
- External Recording System (96 maximum per system)

The 2PGDAD module also provides multi-purpose controls. These control relays can be used for controlling the external amplifier, external music source and door lock control with the use of a Door Box. The system allows for up 8 general purpose relays with the 2PGDAD modules and 1 on the NTCPU for a maximum of 9.

The 2PGDAD module connects to any available digital extension port. The terminal connections made within the PGDAD module and the jumper settings determine what features are used for each circuit.

Figure 4-1: 2PGDAD MODULE

LED Indications

LED	Indication	Note
LED 1	Green LED when CH1 in use.	Flashing green LED indicates dipswitch setting and programming for CH1 is conflicting.
LED 2	Green LED when CH2 in use.	Flashing green LED indicates dipswitch setting and programming for CH2 is conflicting.

Setting Up 2PGDAD Module Connections

1. Remove the screw from the front of the 2PGDAD module.

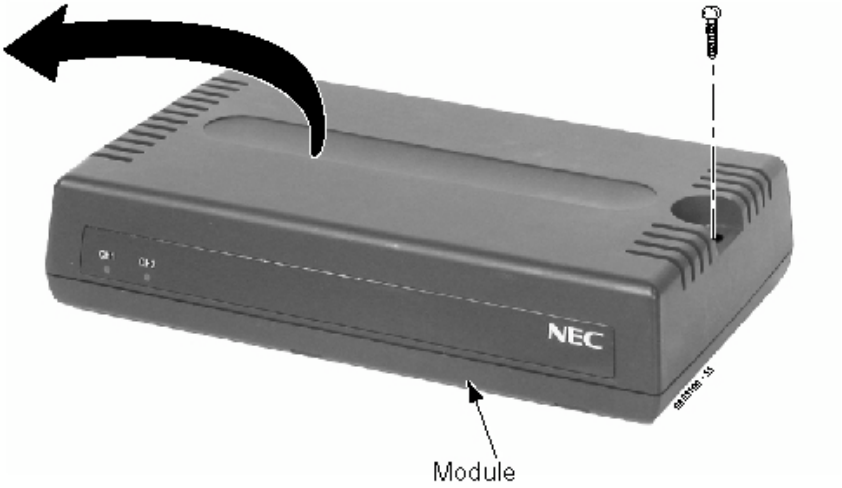


Figure 4-2: REMOVE COVER FROM 2PGDAD MODULE

2. Using a screwdriver, break out the plastic piece covering the cable hole.

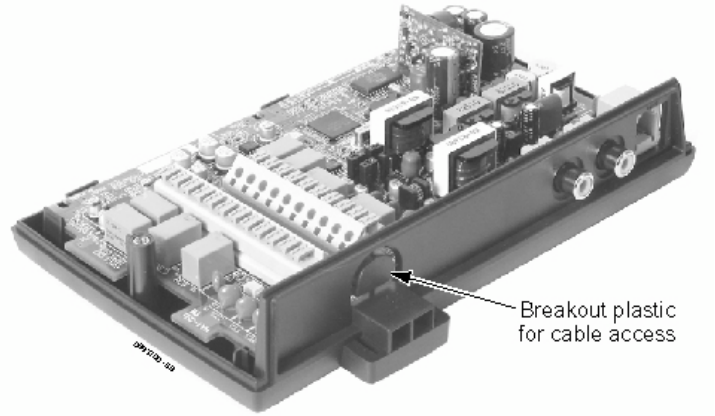


Figure 4-3: REMOVE PLASTIC COVER FROM CABLE HOLE

3. Set the S3 - S6 jumpers to the proper settings for the function to be used.

Channel1	S3	S4	Function
	Open	Open	Door Box
	Open	Short	External Paging Speaker
	Short	Open	External Ringer
	Short	Short	External Music on Hold / Recording System
Channel 2	**S5**	**S6**	**Function**
	Open	Open	Door Box
	Open	Short	External Paging Speaker
	Short	Open	External Ringer
	Short	Short	External Music on Hold / Recording System

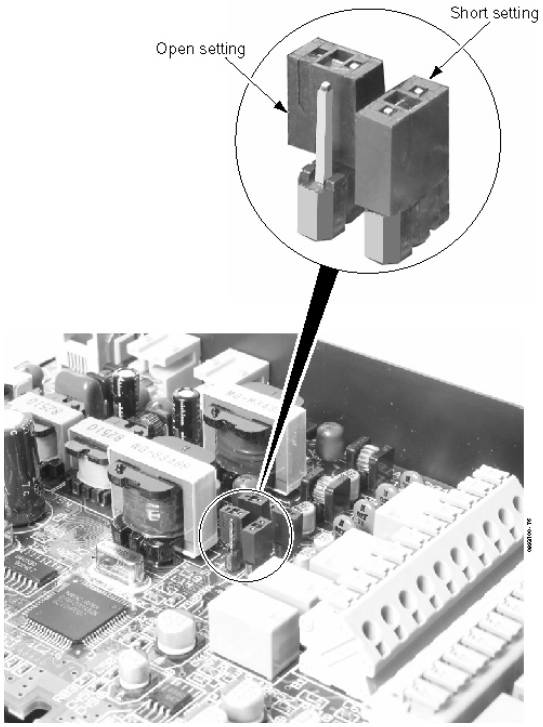
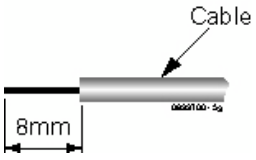


Figure 4-4: JUMPER SETTINGS

4. Strip one end of the cable to be connected to the control relay or door box so that approximately 8 mm of bare wire is exposed.



5. Insert the cable into the proper CN4 or CN5 location while holding down the lock button (holding down this lock button is easiest with a flat-head screwdriver). Once the cable is in place, release the lock button.
   Refer to the specific function being connected for more detail on 2PGDAD connections.

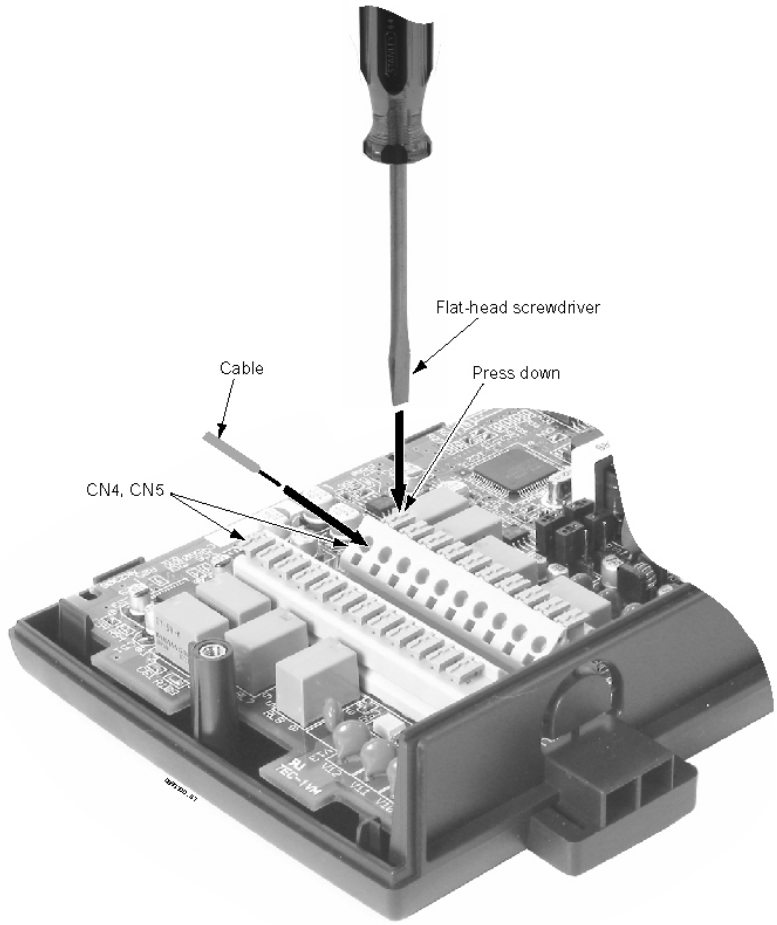


Figure 4-5: CONNECTING CABLE TO THE 2PGDAD MODULE

6. Repeat Steps 4 and 5 for any additional connections required.
7. Replace the cover and tighten the screw to hold the cover in place.
8. If required for the function being used, insert the RCA connectors into the CN3 (Channel 1) and CN (Channel 2) connectors on the back of the 2PGDAD module.

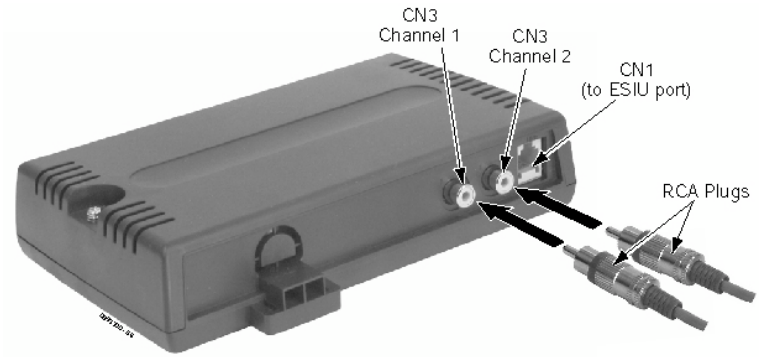


Figure 4-6: 2PGDAD MODULE CONNECTIONS

9. Install a modular jack for each 2PGDAD module. For each module, run one-pair station cable to an RJ11 (or RJ45) socket.
10. Terminate the extension leads to pins 3 & 4 for RJ11 sockets (pins 4 & 5 for RJ45 sockets).
11. Plug a modular line cord from the socket to the CN1 connector on the 2PGDAD module. Ensure that the ESIU port that the PGDAD is to be plugged into is set as Not Used in Program

10-03. The PGDAD will then automatically configure when plugged in.

12. After plugging in the PGDAD confirm with Program 10-03 that the mode of each circuit corresponds to the setting of the jumpers S3-S6
13. **Optional:**
    To wall mount the 2PGDAD module, insert two wood screws 100mm apart. Leave 3mm of the screw exposed. The screws can be installed either vertical or horizontal, depending on which position fits best for your location.

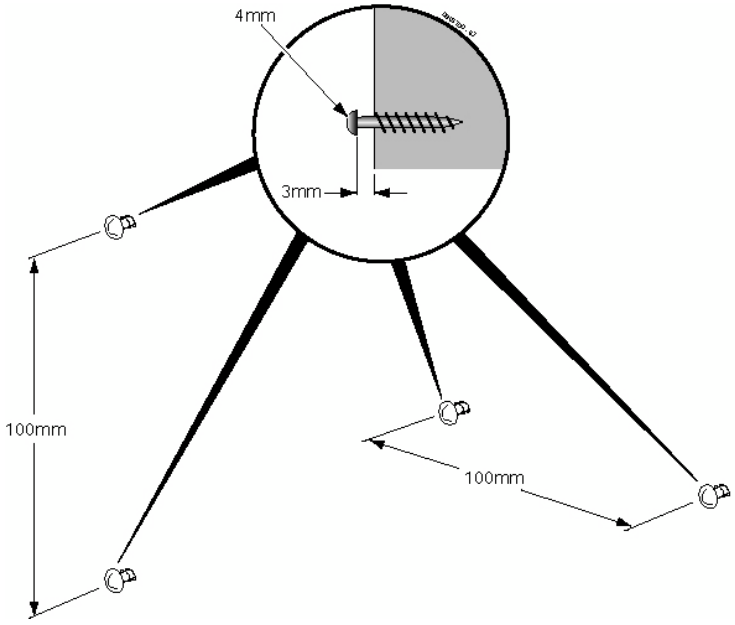


Figure 4-7: INSTALLING THE SCREWS

14. The back of the 2PGDAD module has two key-hole type openings. Place the 2PGDAD module over the two screws and slide it down or over (depending on the positioning) to lock it in place.

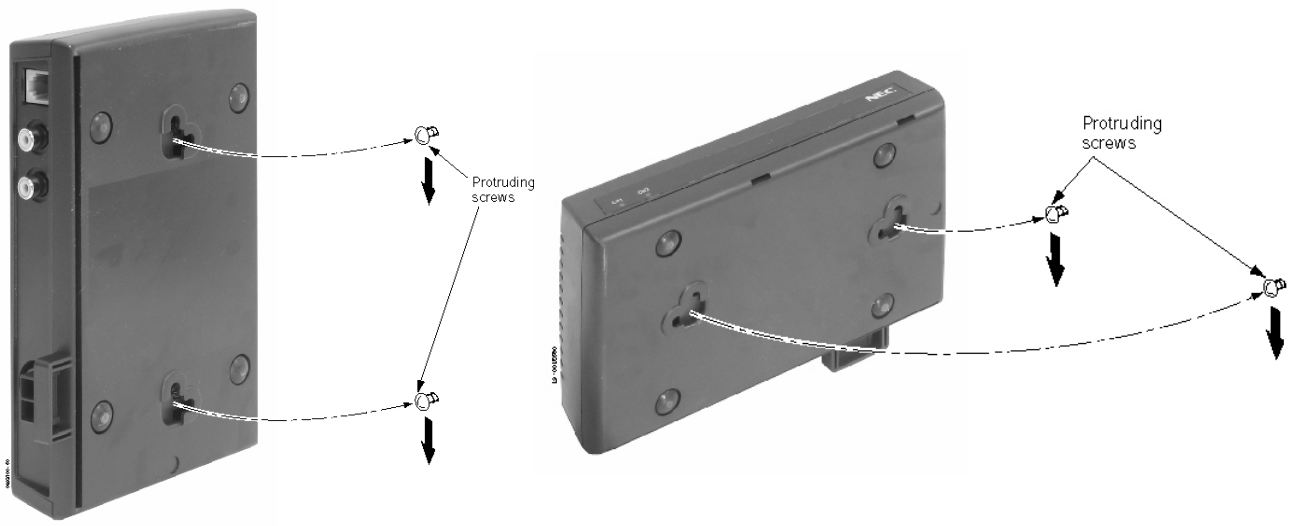


Figure 4-8: WALL MOUNTING THE 2PGDAD MODULE

BACKGROUND MUSIC

Installing Background Music (Figure 4-9)

Background Music (BGM) sends music from a customer-provided music source to speakers in system phones and digital single line telephones. If an extension user activates it, BGM plays whenever the user's extension is idle.

1. Connect an RJ61 modular line cord from the CN16 connector on the NTCPU to the appropriate location on the background music source.
2. The BGM input of CN16 is on pins 3 & 6 of the RJ61 connector.

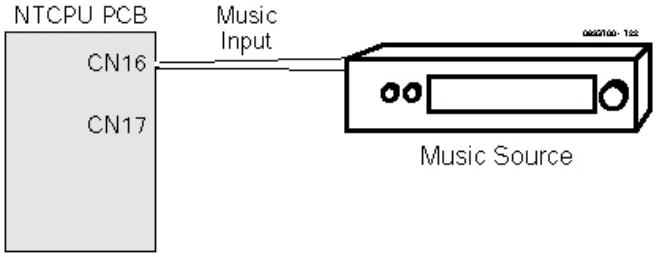


Figure 4-9: CPRU CONNECTIONS

Refer to *Background Music* in the software manual for additional information.

DOOR BOX

Installing a Door Box (Figure 4-10, Figure 4-11)

A 2PGDAD Module is required for this feature.

The Door Box is a self-contained Intercom unit typically used to monitor an entrance door. A visitor at the door can press the Door Box call button (like a door bell). The Door Box then sends chime tones to all extensions programmed to receive chimes.

Each 2PGDAD module audio output can optionally support an analogue Door Box. In addition, you can connect each circuit's control relay to an electric door strike. This allows an extension user to remotely activate the door strike while talking to a visitor at the Door Box. The control relays are normally open. The NTCPU also provides 1 relay. This relay is defined as relay '0' in programming. The relays on the 2PGDAD modules are numbered 1-8. The system can have up to eight Door Boxes.

NOTE: A 2PGDAD circuit used for an analogue Door Box cannot also be used for External Paging.

1. Make sure the jumper in the 2PGDAD module for the associated Door Box is set correctly. (Refer to Figure 4-4 *JUMPER SETTINGS* on page 4-3).
2. If a line cord was not previously connected to the 2PGDAD, complete Steps 3-4. Otherwise, skip to Step 7.
3. Install an RJ11 (or RJ45) socket for each 2PGDAD module. For each module, run one-pair station cable to the RJ11 (or RJ45) socket.
4. Terminate the extension leads to pins 3 & 4 for RJ11 sockets (pins 4 & 5 for RJ45).
5. Plug a modular line cord from the socket to the CN1 connector on the 2PGDAD module.
6. If wall mounting the Door Box, remove the screw on the front of the Door Box.
7. Remove the back half of the Door Box and attach this mounting bracket to the wall with the two screws provided.
8. Connect the two-conductor station cable from the CN4 connectors within the 2PGDAD module to the Door Box terminals. These wires must be routed through the opening in the bottom of the Door Box mounting bracket.

   The connection between the PGDAD and the door box is not polarity sensitive.

   The PGDAD is not compatible with any other type of door box other than the one specified within this manual.
9. Replace the front half of the Door Box and reattach the screw to secure it in place.
10. Refer to External Page Relay on **External Page Relays** (page 4-15) for information on connecting the Door Box to a relay. Relay 6 is used by CH1 of the PGDAD, Relay 5 is used by CH2.

Refer to *Door Box* in the Software Manual for additional details.

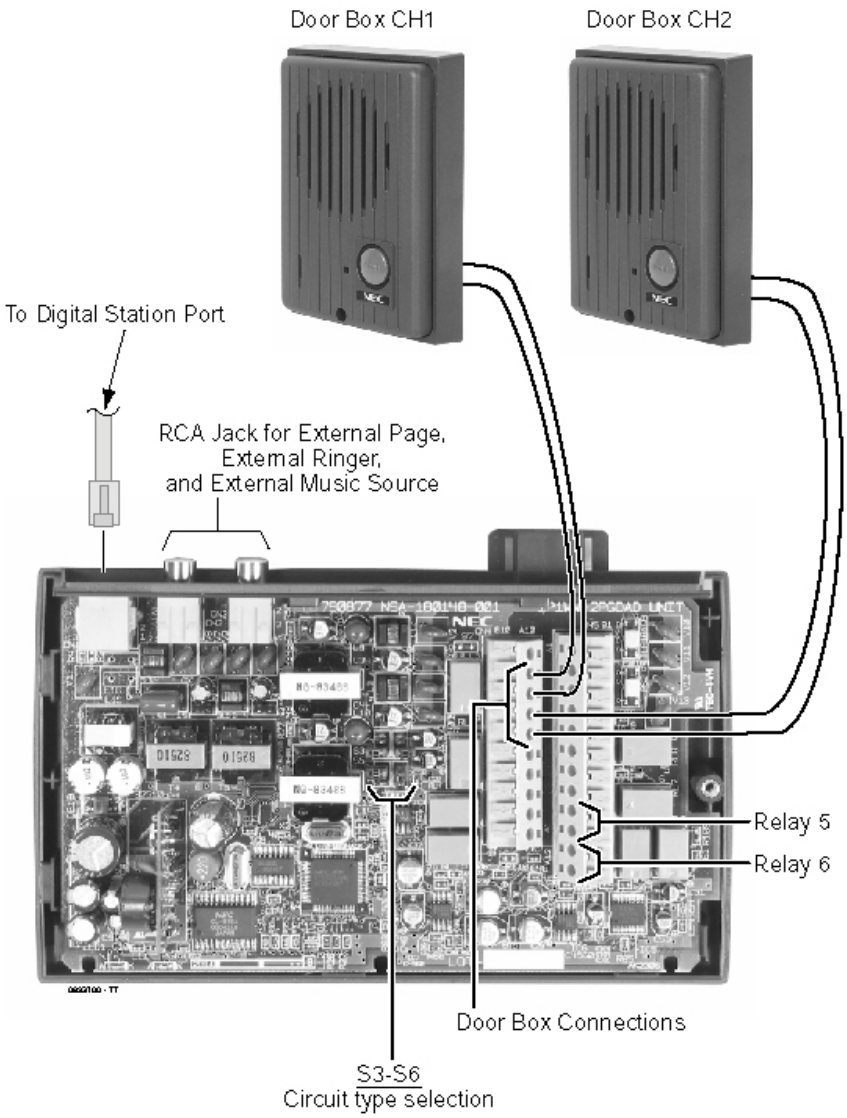


Figure 4-10: SETTING THE 2PGDAD FOR A DOOR BOX

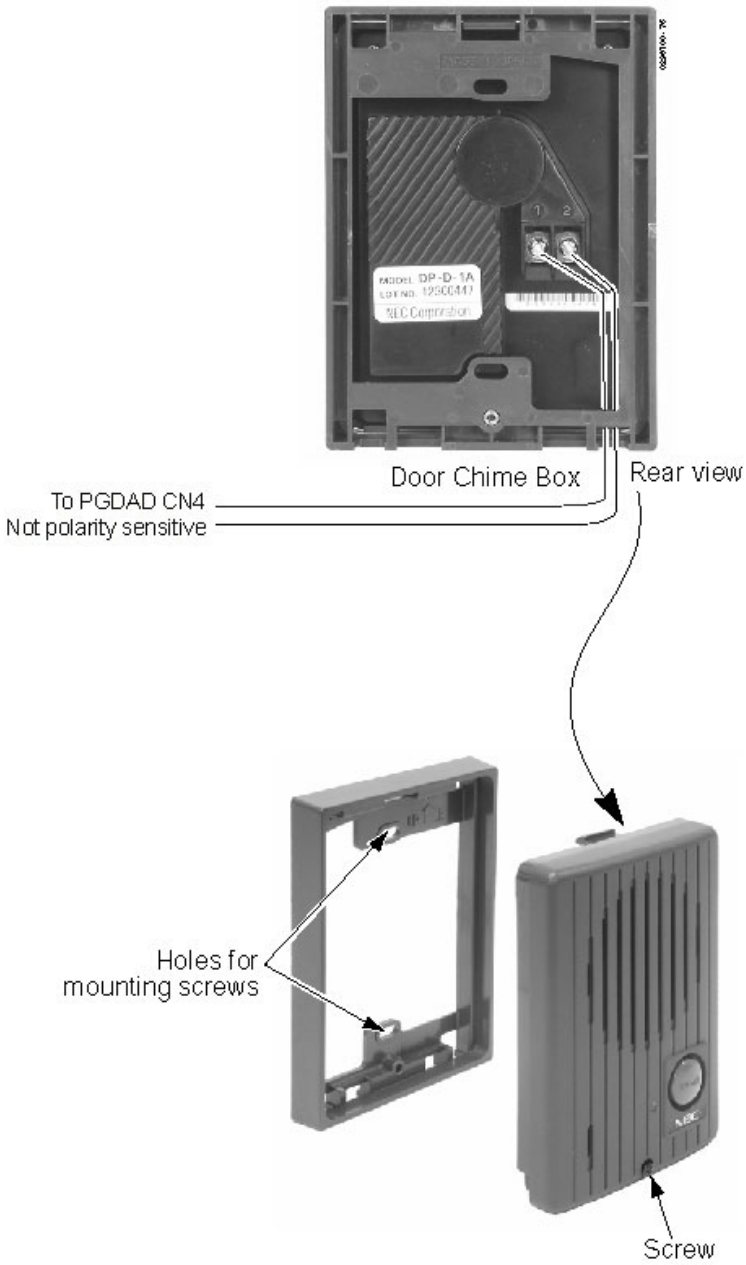


Figure 4-11: INSTALLING A DOOR BOX

DSS CONSOLE

Using a DSS Console (Figure 4-12 - Figure 4-13)

The DSS Console gives a system phone user a Busy Lamp Field (BLF) and one-button access to extensions, trunks and system features. The 110-Button DSS Console provides an additional 100 programmable keys, while the 24-Button DLS Console provides 24 programmable keys. The 110-Button DSS also has 10 fixed feature keys for Paging, calling Door Boxes, activating Night Service and enabling DSS Console Alternate Answer. There are also two keys that allow "shifting" between the first and second set of 100 extensions.

Keep the following in mind when installing DSS Consoles:

- Each DSS Console requires a separate digital station port.
- The system allows for a maximum of 32 110-button DSS Consoles. One extension can have a maximum of 32 110-button DSS Consoles. As the 24-button DLS Console is connected to the system phone, an extension can only have one 24-button DLS Console installed. An extension can have both a 24-button DLS Console and 32 110-button DSS consoles installed/assigned.
- By default, the 24-Button DLS Console has no keys defined. These keys can be programmed as line keys, extension DSS keys, or programmable function keys using Program 15-07. To program the keys, use the extension number to which the DLS is installed and, regardless of the type of system phone connected, ***start programming the DLS keys at key number 25***. Service codes 851 and 852 can also be used to program these keys if allowed by an extension's Class of Service.
- By default, the 110-Button DSS Console has extension DSS keys defined. These keys can be programmed as line keys, extension DSS keys, or programmable function keys using Program 30-03-01.

For additional information, refer to *Direct Station Selection (DSS) Console* in the Software Manual.

Installing a 110-Button DSS Console

1. Install an RJ11 (or RJ45) socket for each 110-Button DSS Console. The socket should be within two metres of the console.
2. For each 110-Button DSS Console, run one-pair station cable to the RJ11 (or RJ45) socket.
3. Terminate the extension leads to pins 3 & 4 for RJ11 sockets (or pins 4 & 5 for RJ45 sockets).
4. Connect a line cord from the socket to the LINE connector on the bottom of the DSS console.
5. **To program a DSS Console . . .**
   With the default settings, there are no DSS Consoles assigned.
   10-03-01 : PCB Setup
   The system automatically assigns the terminal type (10) for the port which has a DSS console installed.
   When installing a DSS, the system must auto-detect the console in order for the LEDS to function correctly. When connecting the DSS to a extension previously defined with another circuit type, undefine the circuit type (enter 00 in Program 10-03 for the extension number), then connect the DSS Console.
   30-02-01 : DSS Console Extension Assignment
   Designate the extensions that have DSS Consoles connected to them.
   30-03-01 : DSS Console Key Assignment
   Customize the functions of the DSS Console keys.
   30-04-01 : Alternate DSS Console Key Assignment
   If the console should have Alternate Answering, use this program to assign the Alternate Answering Destination.

Installing a 24-Button DLS Console

1. The console should be installed on the right-hand side of the phone in order to use the fixing plate supplied with the console.
2. Turn the system phone over which will have the 24-Button DLS Console installed.
3. If more than one adapter is to be installed on the phone, the console should be installed on the connector nearest the right-hand side. Using a flat-head screwdriver, remove the plastic punch-out piece covering the connector.
4. Plug the 24-Button DLS Console into the connector on the bottom of the system phone.
5. Push the cable from the console into the cable channel to allow the phone to rest flat.
6. Install the fixing plate provided with the 24-Button DLS Console to the bottom of the console and phone to join the two sets together.

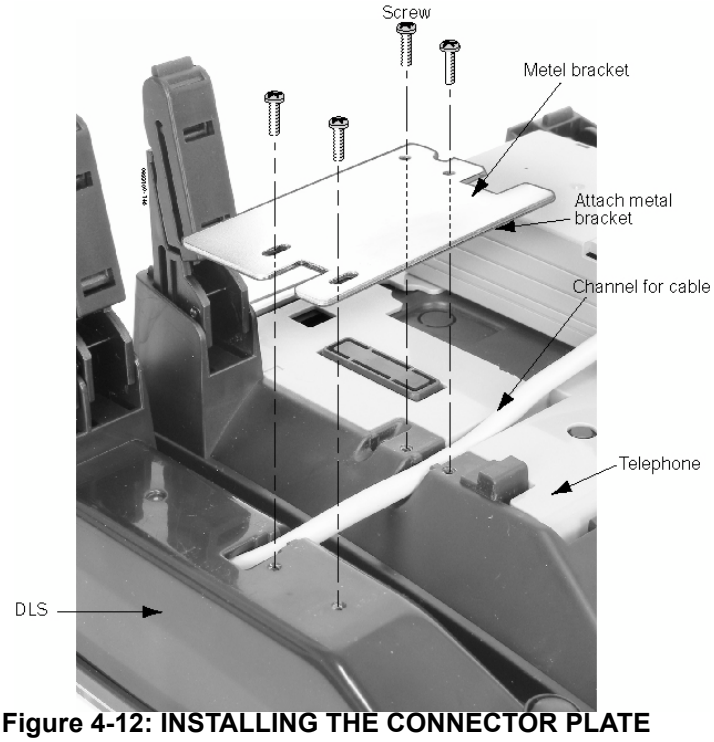


Figure 4-12: INSTALLING THE CONNECTOR PLATE

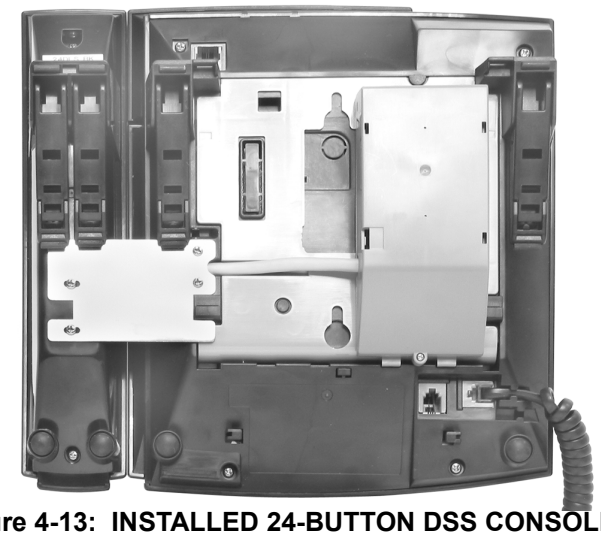


Figure 4-13: INSTALLED 24-BUTTON DSS CONSOLE

EXTERNAL PAGING

External Page (Figure 4-14, Figure 4-15)

Two external page zone/door box circuits are provided by each 2PGDAD installed. Each Door Box/external page circuit provides a dry relay contact. The NTCPU also provides a connection for external paging. The external page on the NTCPU is speaker number 9 in Program 31-04 which is linked to page Page Zone 1 at default. The external page speakers provided by the 2PGDAD modules are 1-8 - the relays on the 2PGDAD modules are numbered 1-8 in Program 31-04. Refer to Paging, External in the Software Manual for additional details. An external paging amplifier and loudspeaker(s) are also required.
Refer to **Section 7: Specifications and Parts List** (page 7-1) for paging specifications.

NOTE: A 2PGDAD circuit used for External Paging cannot also be used for an analogue Door Box.

Installing an External Page System

1. ***Connecting to the NTCPU:***
   Connect an RJ61 modular line cord from the CN16 connector on the NTCPU to the appropriate location on the external paging unit. Pins 4 & 5 are used on the RJ61 connector.
2. The relay contacts on the NTCPU are used for the paging zone only if set in Program 10-21.

OR

1. ***Connecting to the 2PGDAD Module:***
   Make sure the jumper in the 2PGDAD module for the channel is set correctly. (Refer to Figure 4-4 *JUMPER SETTINGS* on page 4-3).
2. If a line cord was not previously connected to the 2PGDAD, complete Steps 3-4. Otherwise, skip to Step 5.
3. Install an RJ11 (or RJ45) socket for each 2PGDAD module. For each module, run one-pair station cable to pins 3 & 4 for RJ11 sockets (pins 4 & 5 for RJ45).
4. Plug a modular line cord from the socket to the CN1 connector on the 2PGDAD module.
5. Connect two single pair cables from the CN5 connectors within the 2PGDAD module to the external relay and external page amplifier unit.

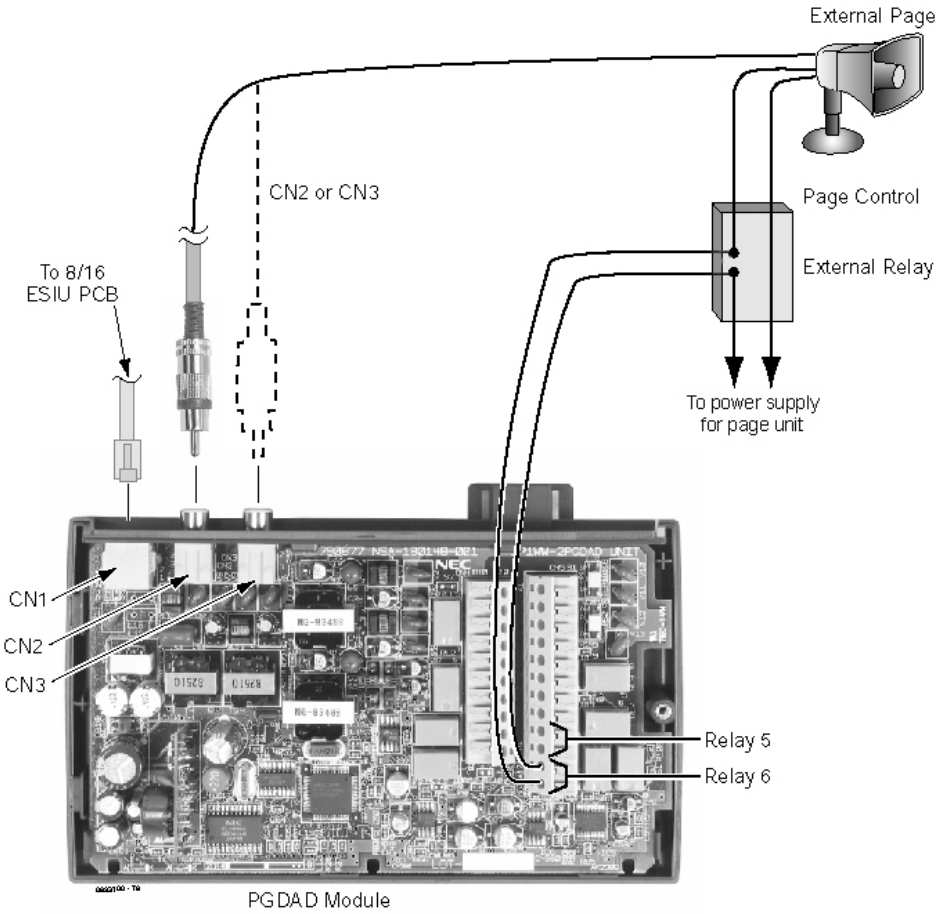


Figure 4-14: 2PGDAD CABLE CONNECTION

Note: **Page amplification is not provided by the 2PGDAD module and must be accommodated by using an external page amplifier.**

EXTERNAL PAGING AND PAGE RELAYS

External Page Relays

Two external dry contact relays are available when a 2PGDAD is installed which can be used to activate ancillary devices (i.e. door unlock devices). The relays on the 2PGDAD modules are numbered 1-8. Each Door Box/external page circuit provides a dry relay contact.

Door Box /External Page Relay Contacts (Figure 4-15)

To connect a dry contact relay device to a Door Box/External Page Relay:

1. ***Connecting to the 2PGDAD Module:***
   Make sure the jumper in the 2PGDAD module for the channel is set correctly. (Refer to Figure 4-4 *JUMPER SETTINGS* on page 4-3).
2. If a line cord was not previously connected to the 2PGDAD, complete Steps 3-4. Otherwise, skip to Step 5.
3. Install an RJ11 (or RJ45) socket for each 2PGDAD module. For each module, run one-pair station cable to pins 3 & 4 for RJ11 sockets (pins 4 & 5 for RJ45).
4. Plug a modular line cord from the socket to the CN1 connector on the 2PGDAD module.
5. Connect the two-conductor cable from the CN5 connectors within the 2PGDAD module to the external relay. Relay 6 is used by CH1 of the PGDAD, Relay 5 is used by CH2.

Note: The relay closes when the Door Box/external page zone is called. The maximum applied voltage is 24VDC at 0.5A or 120VAC at 0.25A .

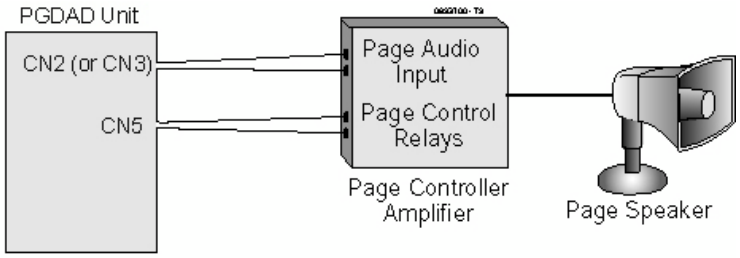


Figure 4-15: PGDAD PAGE CONNECTIONS

1. ***Connecting to the NTCPU:***
2. Ensure that Program 10-21 is set correctly for mode of the relay contact.
3. Connect the two-conductor cable from the CN17 connectors on the NTCPU PCB to the external relay.

Note: The relay closes when the Door Box/external page zone is called. The maximum applied voltage is 24VDC at 0.5A or120VAC at 0.25A

HEADSETS

Connecting a Headset

A system phone user can utilise a customer-provided headset in place of the handset. Like using Handsfree, using the headset frees up the user's hands for other work. However, Headset Operation provides privacy not available from handsfree.

The headset plugs into a separate RJ11 (4/4way) on the bottom of the phone. This allows the use of the handset or headset - whichever is convenient at the time.
Note that the headset socket is not available on the DSLT phone.

Simply connect the headset into the headset socket located on the bottom of the system phone.

To use the headset set a spare function to headset mode (function code 05), Refer to Headset in the Software Manual for further detail.

SYSTEM PHONE LABELING

Labeling Your Phone

The Aspila EX system phones can be easily labeled by removing the clear plastic faceplate on the system phones. These labels can be printed by hand, typewriter, or by using the Aspila EX Labelmaker program. Labels for this are on 8 1/2 x 11" paper, which allows for easy printing by any printer - dot matrix, laser, etc.

Removing the Faceplate:

1. At the lower right-hand corner of the telephone, you'll notice a small notch in the faceplate plastic. Use this notch to help lift the faceplate up.
   Each corner has a plastic locking pin which releases as the faceplate is lifted up.
   If the faceplate is dropped, these pins may pop out of place. Be careful not to lose the pins.

Replacing the Faceplate:

1. Place the faceplate back on the phone.
2. At each corner, press the locking pin back into place.

MUSIC SOURCES

Music on Hold (Figure 4-16, Figure 4-17)

The system can provide Music on Hold from either an internally synthesized source on the NTCPU or from an external source. The external MOH can be a tape deck, CD player, etc. The settings in Program 10-04-01 and 14-08-01 determine whether the source for MOH is internal or external (refer to the Software Manual for further details).

In addition to a connector on the NTCPU, the 2PGDAD modules also provide connections for external MOH sources. When using external music sources for external MOH, programming determines the MOH source for each trunk. Refer to *Music on Hold* in the Software Manual for more details.

The PGDAD and NTCPU provide a dry relay that activates when a call is placed on Hold (Program 10-21 must be set correctly for the NTCPU to support MOH relay contacts). When an external MOH source is connected to the MOH relay and a call is placed on Hold, the MOH relay is activated. This allows an external relay sensor/power supply to turn on the MOH source.

This arrangement allows the MOH source (e.g., a tape deck) to run only when a call is placed on Hold. The *maximum* applied voltage for the relay is 24vDC at .5A (the relays are normally open and close when a call is put on hold).

Installing External Music on Hold

1. ***Connecting to the NTCPU:***
   Connect an RJ61 modular line cord from the CN16 connector on the NTCPU to the appropriate location on the external music source. Pins 2 & 7 are used on the RJ61 connector for external music input.

OR

1. ***Connecting to the 2PGDAD Module:***
   Make sure the jumper in the 2PGDAD module for the channel is set correctly. (Refer to Figure 4-4 *JUMPER SETTINGS* on page 4-3).
2. If a line cord was not previously connected to the 2PGDAD, complete Steps 3-4. Otherwise, skip to Step 5.
3. Install an RJ11 (or RJ45) socket for each 2PGDAD module. For each module, run one-pair station cable to pins 3 & 4 for RJ11 sockets (pins 4 & 5 for RJ45).
4. Plug a modular line cord from the socket to the CN1 connector on the 2PGDAD module.
5. Connect an RCA plug to the audio output(s) on the back of the 2PGDAD module.
6. The opposite end of this cable is connected to the external music source either directly or by connecting to the cross-connect block where the music source is connected.

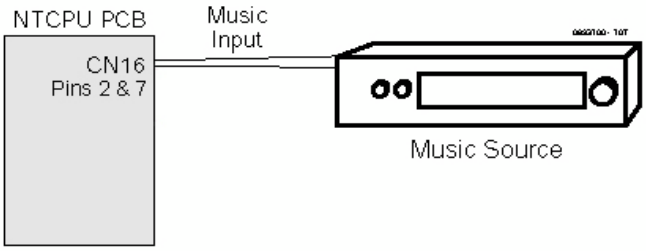


Figure 4-16: CPRU CONNECTIONS

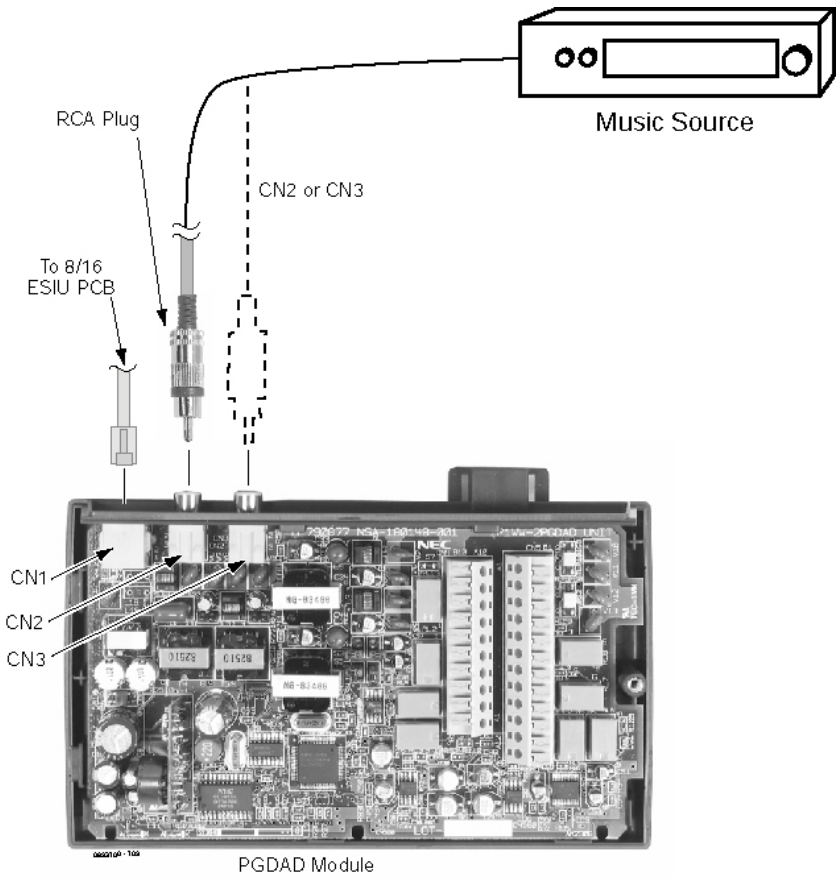


Figure 4-17: 2PGDAD CONNECTIONS

NIGHT MODE SELECTION

Night Mode Selector Switch

The Night Mode Switch detects an input voltage at the NTMOD terminals of the RJ61 connector on the NTCPU card, CN17pins 2 & 7. Maximum input is 48v DC at 7mA. The NTCPU will detect from 5V DC to 48VDC.

Refer to *Night Service* in the Software Manual for additional details.

Connecting a Night Mode Selector Switch

1. Connect an RJ61 modular line cord from the CN17 connector on the NTCPU to the appropriate switched voltage source. +'ve to pin 7 -'ve to pin 2.
2. Use Program 12-01-03 to select the night mode to be used when the input voltage is applied.

OPTIONAL PHONE ADAPTERS

Using Adapters (Figure 4-18)

Each Aspila EX system phone can have two optional adapters installed (unless an IP adapter is used). These adapters provide the system phones different capabilities, depending on the adapters installed.

- ADA - Conversation Recording
- APA - Analogue Port Adapter Without Ringer
- APR - Analogue Port Adapter with Ringer
- CTA - Serial Interface (RS-232C)
- CTU - USB Interface
- IP - VoIP Connection
- 24-Button DLS Console (refer to page 4-10 for complete details on connecting the DLS)

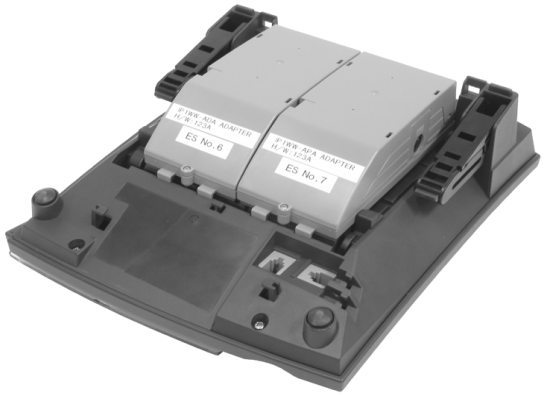


Figure 4-18: INSTALLING ADAPTERS

4

The following chart indicates if there are restrictions when combining certain adapters. Select the adapter in the column and then select the adapter in the row to see if there are any restrictions. For example, using a APA and APR adapter refers you to restriction 3 (only one voice path provided - adapters can not be used together).

	24DLS	IP	CTU	CTA	APR	APA	ADA
ADA	-	1	-	-	-	-	2
APA	-	1	-	-	3	2	-
APR	-	1	-	-	2	3	-
CTA	-	1	4	2	-	-	-
CTU	-	1	2	4	-	-	-
IP	1	2	1	1	1	1	1
24DLS	2	1	-	-	-	-	-

1 = The IP Adapter takes the full space provided for adapters on the system phones. Therefore, if an IP adapter is installed, no other adapters can be used.

2 = Only one adapter of the same type can be used on a system phone.

3 = As there is only one voice path provided for adapters, the APR and APA adapters can not both be used on the same system phone.

4 = Due to protocol collision, the CTU and CTA adapters can not both be used on the same system phone.

When installing the adapters, ***the system phone should first be unplugged from the system***. Also note that the adapters may have an AC/DC power jack. Power is not required for all the adapters. You should refer to the information for the specific adapter to determine whether a power source is needed.

Telephones with any of these adapters installed **cannot be wall-mounted**. The bracket will not accommodate the adapter(s).

Removing the Adapter Cover (Figure 4-19)

1. With certain applications, it may be necessary to remove the cover from an adapter. First, remove the screw on the back of the adapter.
2. Using a small screwdriver, push in the ribs on the sides of the adapter.
   Do not push the ribs in too much or they may break.
3. Remove the cover.

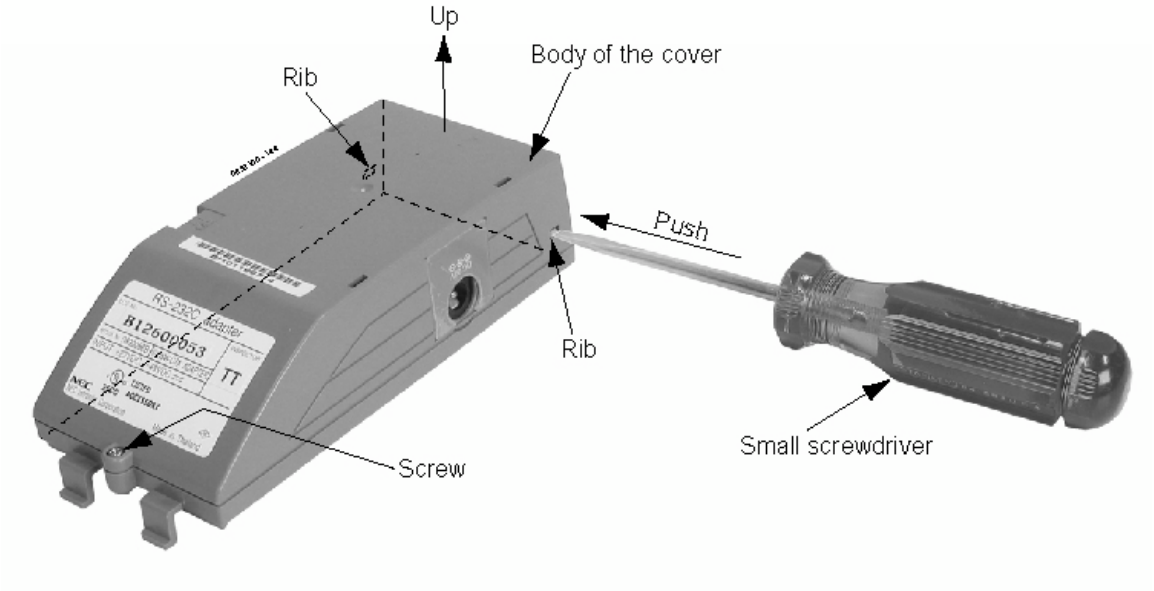


Figure 4-19: REMOVE THE ADAPTER COVER

ADA Adapter (Figure 4-20 - Figure 4-26)

Using the ADA Adapter provides a recording jack connection which provides a connection from a telephone to an external tape recorder or speaker. The adapter output is a 3mm phono jack which you can connect directly to an AUX level input on a recorder or page amplifier. The recorder input can also be wired directly to the terminals on the inside of the adapter.

CAUTION

Be sure the connected audio device provides a standard AUX level input.

The use of monitoring, recording, or listening devices to eavesdrop, monitor, retrieve, or record telephone conversation or other sound activities, may be illegal in certain circumstances. Legal advice should be sought prior to implementing any practice that monitors or records any telephone conversation. Some form of notification to all parties of a telephone conversation may be required, such as using a beep tone or other notification methods or requiring the consent of all parties to the telephone conversation, prior to monitoring or recording the telephone conversation.

The handset is ***always*** recording, even when the handset is idle and in the cradle. This may result in recording undesired conversations.

4

Installing the ADA Adapter:

1. Unplug the line cord from the system phone.
2. If only one adapter is to be installed on the phone, the adapter should be installed on the right-hand side of the phone (beneath the handset). Using a flat-head screwdriver, remove the plastic punch-out piece covering the connector.
3. Set the dip switches on the ADA adapter to the required position. The SW1 and SW2 switches should be set to "1" for either application.

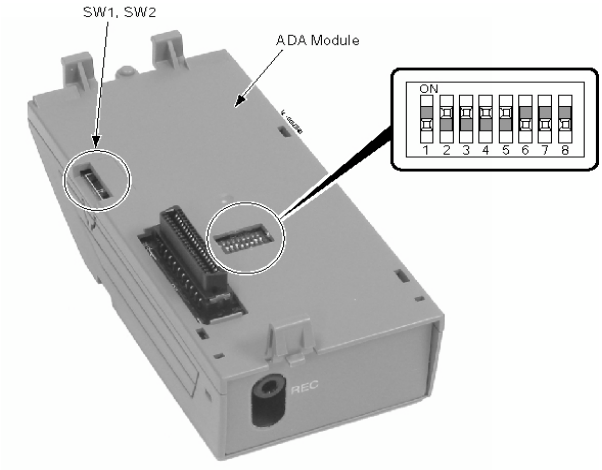


Figure 4-20: PLAYBACK DIP SWITCH SETTINGS

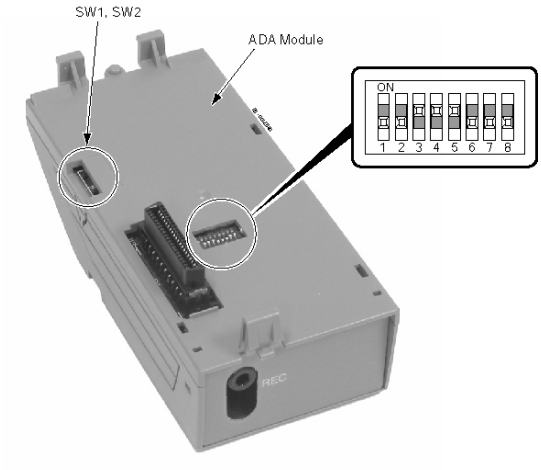


Figure 4-20: RECORDING DIP SWITCH SETTINGS

4. If using the phono jack to connect to the recorder or audio output, plug the phono jack into the REC connector on the ADA and then skip to Step 9. If wiring directly to the terminals inside the adapter, remove the screw on the back of the adapter. Using a small screwdriver, push the ribs on the sides of the adapter in and remove the cover.
   Do not push the ribs in too much or they may break.

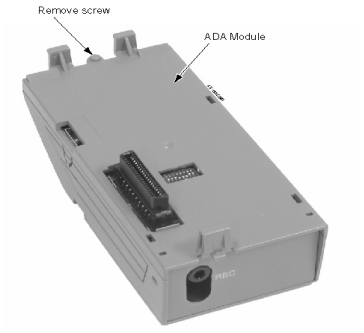


Figure 4-21: REMOVE THE SCREW FROM THE ADA ADAPTER

5. Determine which terminals should be connected. Terminals T6 and T7 are used for wiring to a recorder. If using co-axial cable to connect to the ADA, connect the core wire to T3 and the shielding wire to T4.
6. Run the cable to the ADA adapter through the opening near the phono jack.

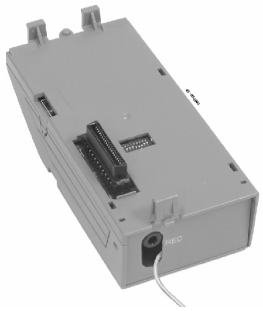


Figure 4-22: RUNNING THE CABLE TO THE ADA

7. Insert the cable into the terminal. Place the cap over the terminal and push down to secure the cable.

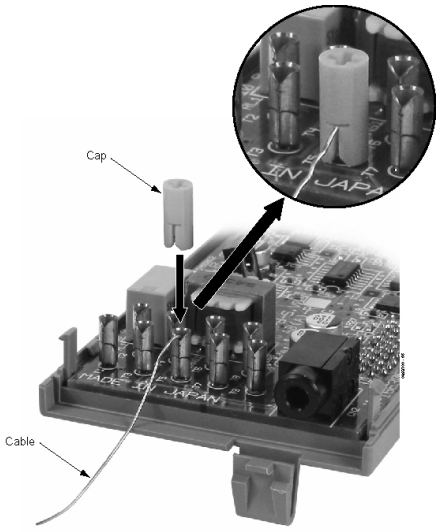


Figure 4-23: WIRING TO THE ADA TERMINAL

8. Replace the adapter cover and reattach the screw.
9. Connect the opposite end of the cable to the recording device or audio output.

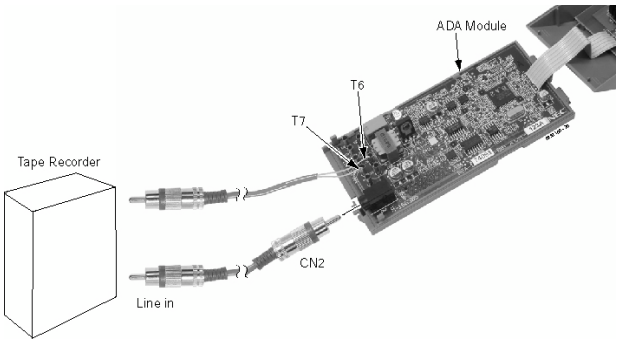


Figure 4-24: CONNECTION FOR RECORDING ONLY

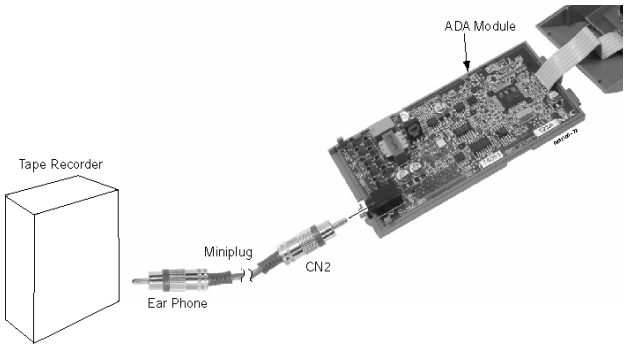
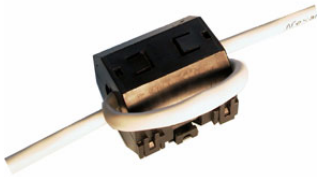


Figure 4-25: CONNECTION FOR PLAYBACK ONLY

10. Any cable connected to the ADA adaptor must pass two times (one turn) through the ferrite sleeve supplied to comply with EMC requirements. The ferrite must be located, on the cable, as near as possible to the ADA adaptor.



4

11. Position the adapter with the connector positioned as shown below.

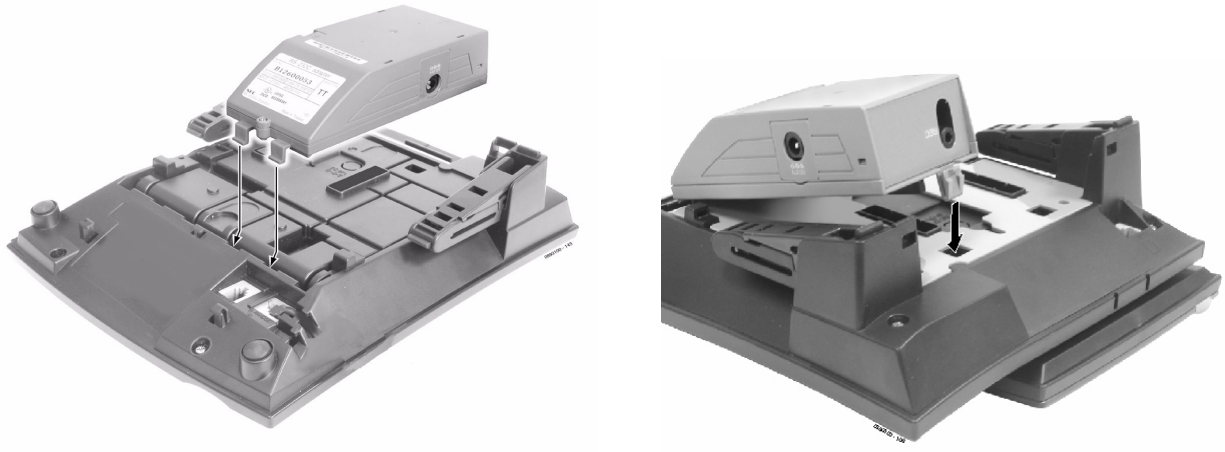


Figure 4-26: POSITIONING THE ADAPTER

12. Hook the two plastic prongs into the bottom of the phone.
13. Push the connector into place. The top latch on the top of the adapter should lock into place when it is properly positioned.
14. Plug the line cord back into the system phone.

APA and APR Adapters (Figure 4-27 - Figure 4-28)

The APA and APR Adapters provide an analogue interface for the system phone. The APR Adapter provides ringing which allows the connected device to be used for incoming and outgoing calls. The APA Adapter does not provide ringing, so the connected device is used for outgoing calls only (for example, when using a modem). One system phone can have either an APA or an APR Adapter. Both adapters ***cannot*** be installed on the same system phone as only one voice path is provided by the system phone for the adapters. When installing the APR Adapter, an AC-R AC/DC adapter is required for power. The maximum distance between the APA or APR Adapter and the analogue terminal is 15 metres.

The APA and APR Adaptors have an RJ11 socket for connection of the single line analogue device. connection to a suitable Master type line jack unit may be required for some analogue devices.

Neither the APA or APR Adapter supports reverse-polarity, message waiting lamping, or Caller ID.

Installing the APA or APR Adapter:

1. Unplug the line cord from the system phone.
2. If only one adapter is to be installed on the phone, the adapter should be installed on the right-hand side of the phone (beneath the handset). Using a flat-head screwdriver, remove the plastic punch-out piece covering the connector.
3. Set the dip switches on the APA/APR adapter to the required position.
   - The SW3 switch is used to set the terminating impedance. Setting to position "1" is for a pure resistance of 600 ohms; position "2" is used for complex impedance (factory setting is set to "1").
   - The SW1 switch should be left at its factory setting of "1". This also applies to the DSW settings (1 and 5 = on; 2-4, 6-8 = off).

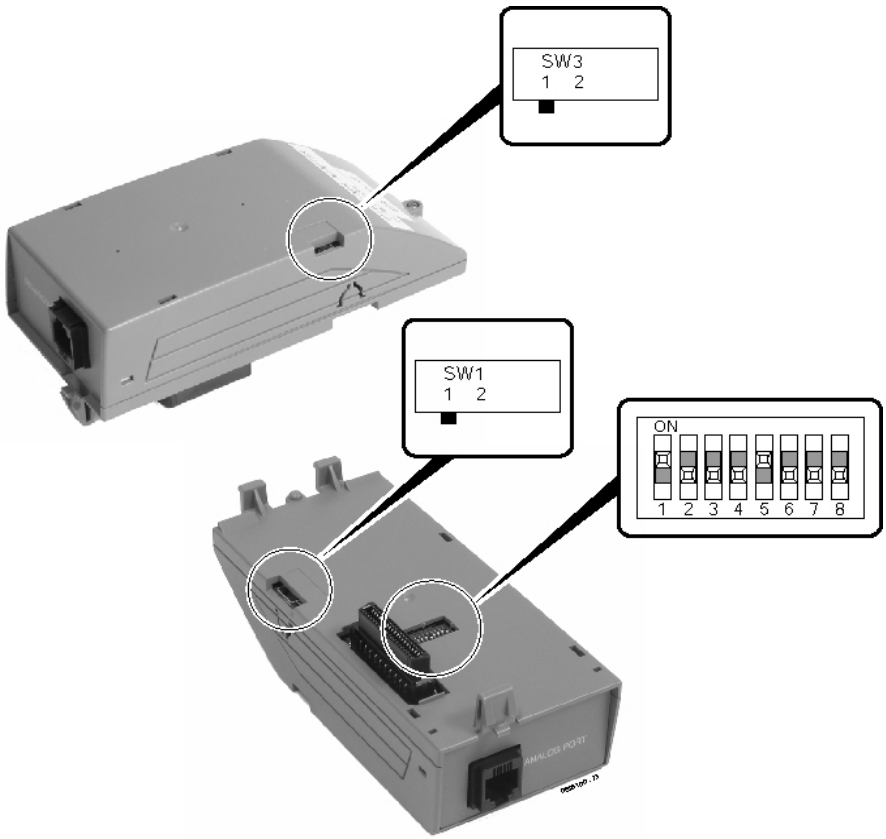


Figure 4-27: RECORDING DIP SWITCH SETTINGS

4. If using an APR Adapter, plug the AC-R AC/DC adapter into the AC jack on the side of the adapter.
   The AC/DC adapter is not required when using the APA Adapter.
5. Position the adapter with the connector positioned as shown below.

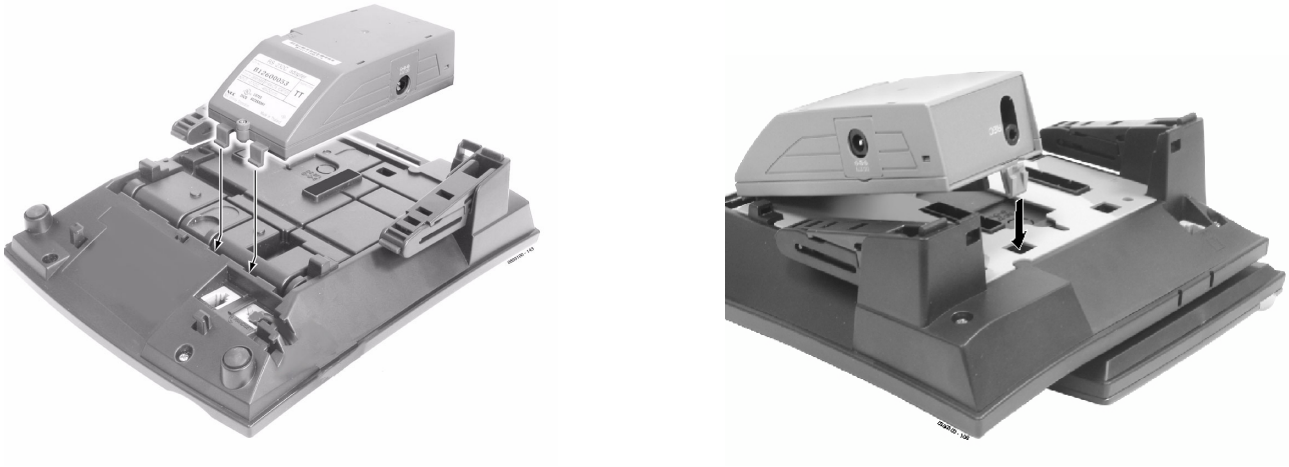


Figure 4-28: POSITIONING THE ADAPTER

6. Hook the two plastic prongs into the bottom of the phone.
7. Push the connector into place. The top latch on the top of the adapter should lock into place when it is properly positioned.
8. Plug the line cord back into the system phone.
9. Using the ferrite bead that was included with the APA/APR Adapter, wrap the line cord once through the ferrite bead and snap it shut.

10. Plug the end of the line cord for the analogue device which has the ferrite bead closest to it into the jack on the adapter. The opposite end should then be connected to the analogue device.
11. **To determine the APR's analogue extension number . . .**
    10-03-06 : PCB Setup
    Assign the terminal type (12) for the system phone's channel which has the APR Adapter installed.
    10-03-07 : PCB Setup
    The port number of the APR Adapter is displayed for the extension (APR ports = 193-256).
    11-02-01 : Extension Numbering
    To determine the extension number assigned for the APR device, refer to the table below.

APR Extension Port Number	Extension Number
193	493
:	:
199	499
200	5000
:	:
256	5056

CTA Adapter (Figure 4-27 - Figure 4-28)

The CTA Adapter provides a serial interface (RS-232C) via a 9-pin male connector. This can be used for SMDR or TAPI (1.4), system reporting, or PC Programming.

Installing the CTA Adapter:

1. Unplug the line cord from the system phone.
2. If only one adapter is to be installed on the phone, the adapter should be installed on the right-hand side of the phone (beneath the handset). Using a flat-head screwdriver, remove the plastic punch-out piece covering the connector.
3. Set the dip switches on the CTA adapter to the required position.
   - The DSW settings are 1 = on, 2-8 = off for a PC connection or 1 and 2 = on, 3-8 = off for a printer connection (factory setting is for a PC connection).

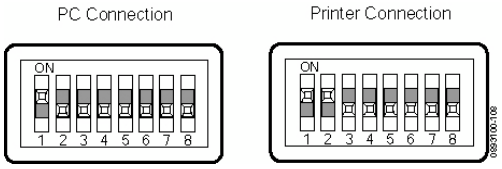


Figure 4-29: RECORDING DIP SWITCH SETTINGS

4. Position the adapter with the connector positioned as shown below.

Figure 4-30: POSITIONING THE ADAPTER

5. Hook the two plastic prongs into the bottom of the phone.
6. Push the connector into place. The latch on the top of the adapter should lock into place when it is properly positioned.
7. Change system programming (15-02-19) to match the CTA module dip switch settings.
8. Plug the line cord back into the system phone.

The RS-232 cable connected to the CTA must pass through (no turns) the ferrite sleeve supplied to comply with EMC requirements.

System Programming

- **Program 15-02-19 : Multi-Line Telephone Basic Data Setup - CTA Data Communication Mode**
  Select '0' if the dip switch settings are set to PC connection or select '1' if printer connection is selected on the CTA adapter.
- **Program 15-02-20 : Multi-Line Telephone Basic Data Setup - Baud Rate for CTA Port**
  Set the baud rate to be used by the CTA (0=4800, 1=9600, 2=19200).

CTU Adapter (Figure 4-31 - Figure 4-32)

The CTU Adapter provides a USB connector. This can be used for either SMDR, TAPI (1.4), system reporting, or PC Programming.

Installing the CTU Adapter:

1. Unplug the line cord from the system phone.
2. If only one adapter is to be installed on the phone, the adapter should be installed on the right-hand side of the phone (beneath the handset). Using a flat-head screwdriver, remove the plastic punch-out piece covering the connector.
3. Set the dip switches on the CTU adapter to the required position.
   - The DSW settings are 1 = on, 2-8 = off for a PC connection or 1 and 2 = on, 3-8 = off for a printer connection (factory setting is for a PC connection).

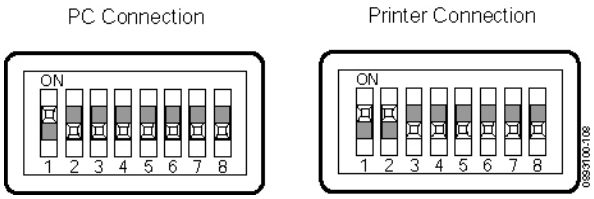


Figure 4-31: RECORDING DIP SWITCH SETTINGS

4. Position the adapter with the connector positioned as shown below.

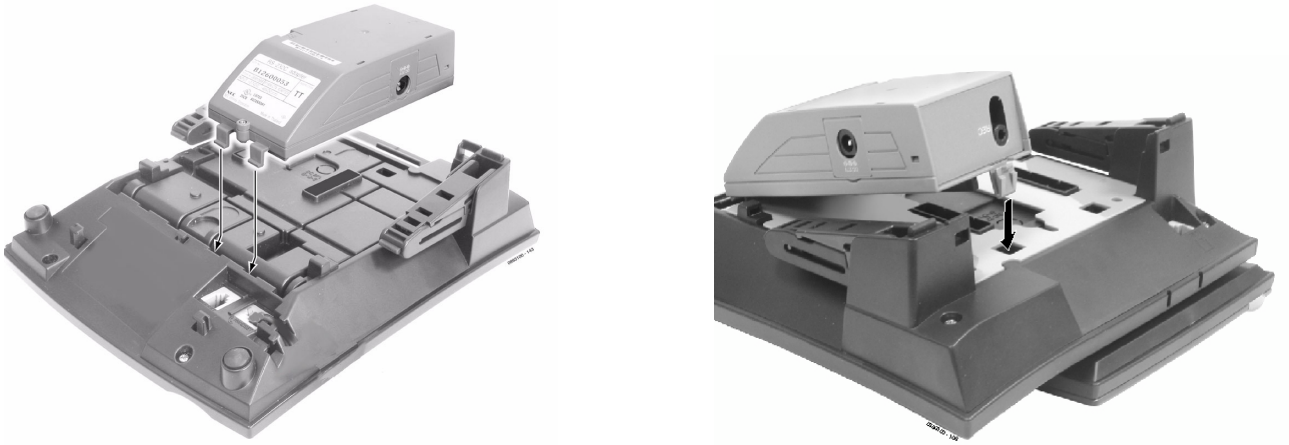


Figure 4-32: POSITIONING THE ADAPTER

5. Hook the two plastic prongs into the bottom of the phone.
6. Push the connector into place. The top latch on the top of the adapter should lock into place when it is properly positioned.
7. Plug the line cord back into the system phone.

The USB cable connected to the CTU must pass two times through (one turn) the ferrite sleeve supplied to comply with EMC requirements.

VoIP Adapter (Figure 4-33 - Figure 4-35)

The VoIP Adapter provides the ability to communicate through a LAN which is connected to a 16VOIPU or 8SHUBU PCB. The 16VOIPU or 8SHUBU PCB is required in order to communicate with non-VoIP Aspila EX phones, as well as to place or receive outside calls.

This feature requires the use of a display system phone. As the VoIP Adapter is double the width of the other phone adapters, only the VoIP Adapter can be used on a system phone. No other space is available for any additional adapter. When installing the VoIP Adapter, an AC/DC adapter is required for local power or, for central power, one of the following must be used:

- 8SHUBU PCB
- Power Supply Patch Panel (SN1604 PWRMS - NEC standard product)
- Power Patch Panel (Cisco)
- Catalyst PWR Series (Cisco)

If a separate software hub is used (and not the 8SHUBU PCB), it should be a 100Base/full duplex hub. To avoid network problems and to ensure good voice quality, do not use a Repeater Hub/10Base.

Installing the VoIP Adapter:

1. Unplug the line cord from the system phone.
   The line cord will not be needed with the VoIP Adapter as the system connection will be made through the LAN connection.
2. Using a flat-head screwdriver, remove the plastic punch-out piece covering the connector.
   Note the position of the connector on the VoIP Adapter in order to remove the correct piece (the adapter uses the connection on the side of the phone which has the line cord connection.
3. Set the dip switches on the top of the VoIP adapter to the required position. The setting is dependent upon the type of power supply being used.
   - The SW1 settings are “1” when using an AC/DC adapter, 8SHUBU, or SN1604 PWRMS, “2’ when using Cisco’s Power Patch Panel or Catalyst PWR panel.

Figure 4-33: SETTING THE DIP SWITCHES

4. Position the adapter with the connector positioned as shown below.

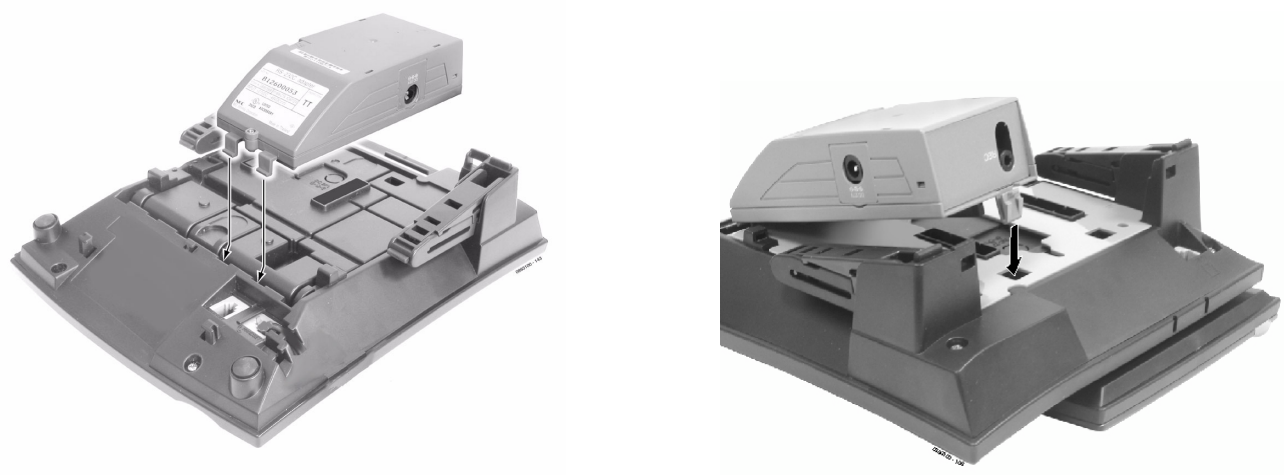


Figure 4-34: POSITIONING THE ADAPTER

5. Hook the two plastic prongs into the bottom of the phone.
6. Push the connector into place. The top latch on the top of the adapter should lock into place when it is properly positioned.
7. Plug an AC/DC adapter into the AC jack on the adapter if power is not supplied by the LAN.
8. Plug in the LAN straight-thru cable from the NTCPU LAN connector or 16VOIPU PCB LAN connector for the phone operation. If needed, connect the PC cross cable to the VoIP Adapter.
9. Refer to the **VoIP Feature Supplement** for required programming.

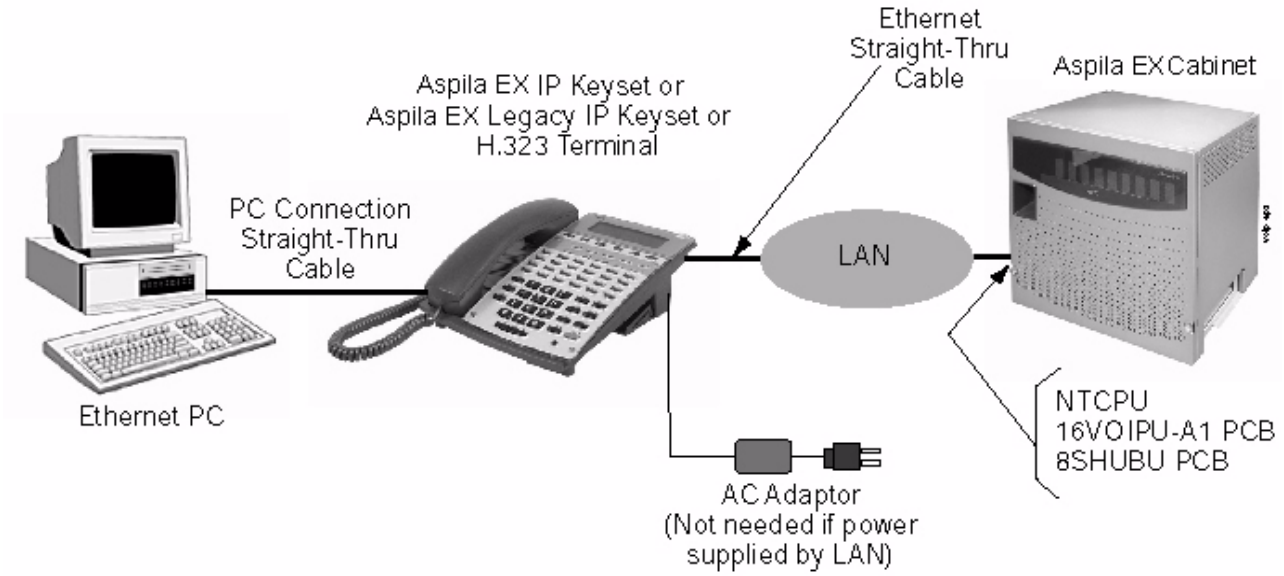


Figure 4-35: WIRING LAYOUT FOR VOIP

POWER FAILURE TELEPHONES

Power Failure (Figure 4-36)

The system allows connection for basic telephone service during a power failure. The power failure operation occurs during a commercial power failure, and is not affected by PCB failure. Power Failure Transfer is provided by connecting PSTN lines to either the COIU-LS1 or COIU-LG1 PCB.

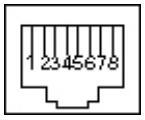
The 4COIU-LS1 or 4COIU-LG PCB provides 1 Power Failure Transfer circuit or using the 8COIU-LS1 or 8COIU-LG1 PCB, 2 circuits are provided.

The CN3 and CN5 connectors each provide connection to 4 analogue trunk ports. A maximum of 16 4/8COIU-LS1 PCBs per system is allowed.

! Important !

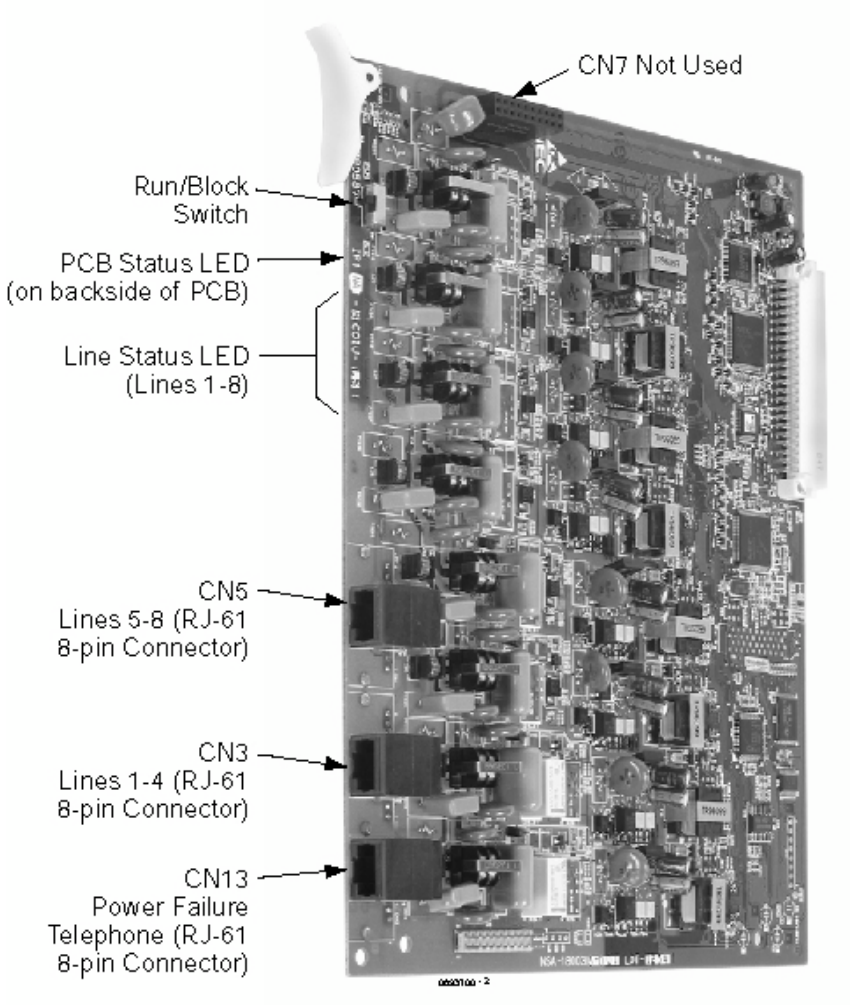
- When connecting the RJ61 cables to the COIU PCB, note the position of the Power Failure connector. Do not confuse this connector as the trunk connector.

Connector Pin-Outs on COIU PCB for Power Failure Circuits

RJ61 Cable Connector		
RJ61 Cable Connector - CN13, SLT Interface for Power Failure		
	**Pin No.**	**Connection**
	1	-
	2	-
	3	Circuit 2 - Tip
	4	Circuit 1 - Ring
	5	Circuit 1 - Tip
	6	Circuit 2 - Ring
	7	-
	8	-

Installing the Power Failure Telephones:

1. Connect an RJ61 connector to the COIU PCB installed in the Aspila EX system.
2. Install a Master type socket for each single line telephone supporting PF operation. The socket should be within 2 mteres of the phone.
3. For each extension, run one-pair station cable from the RJ61 connector to the master socket.
4. Terminate the pair to pins 2 & 5 of the socket..



The 8COIU PCB is shown here.

Figure 4-36: POWER FAILURE CIRCUIT INSTALLATION

SLT ADAPTER

Using the SLT Adapter (Figure 4-37 - Figure 4-38)

The SLT Adapter converts a digital port from an ESIU PCB into an analogue port which can be used for connecting on-premise single line devices (i.e., telephones, fax machines, modems, etc.). Each SLT Adapter requires its own digital port.

The SLT Adapter provides the ring generator circuit used by the analogue device. The unit provides constant current which is fixed at 47 mA.

Maximum Cable Distance From ESIU	600m @ 24 AWG
Loop Resistance	500 ohms

Refer to *Single Line Telephones* in the Software Manual for more details.

Installing the SLT Adapter

1. Run one-pair station cable for each SLT Adapter.
2. Connect the cable to the corresponding RJ-61 connector on the ESIU PCB.
3. Install a Master type socket for the SLT Adapter within 2 metres of the module's location.
4. Terminate the station cable to pins 2 & 5 in the socket.
5. Plug a line cord into the SLT Adapter's connector marked "ESIU". Plug the opposite end of the line cord into the mster socket.
6. Plug a second line cord into the SLT Adapter's connector marked "TEL". The opposite end of the line cord should be plugged into the analogue device to be used.

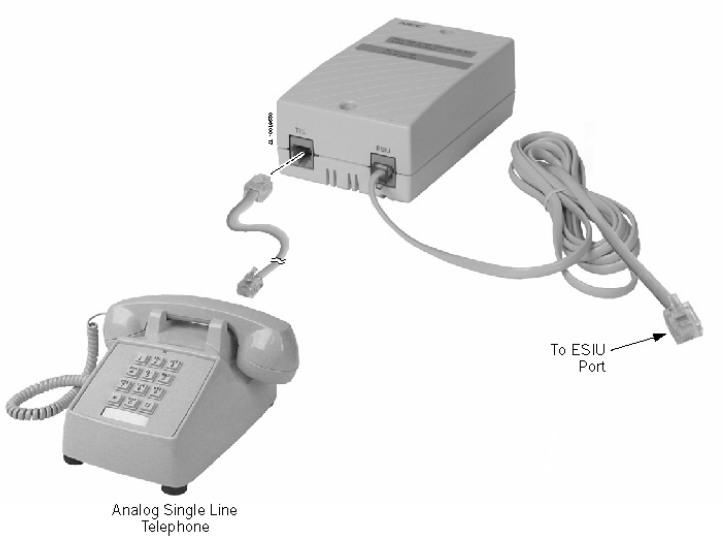


Figure 4-37: INSTALLING THE SLT ADAPTER

Refer to *Single Line Telephones* in the Software Manual for programming details.

Wall-Mounting the SLT Adapter

1. Unplug the two line cords from the SLT Adapter.
2. Fix the two screws provided with the SLT Adapter as shown in the diagram below leaving 3mm protruding from the wall.
3. Attach the SLTAD to the screws. ‘

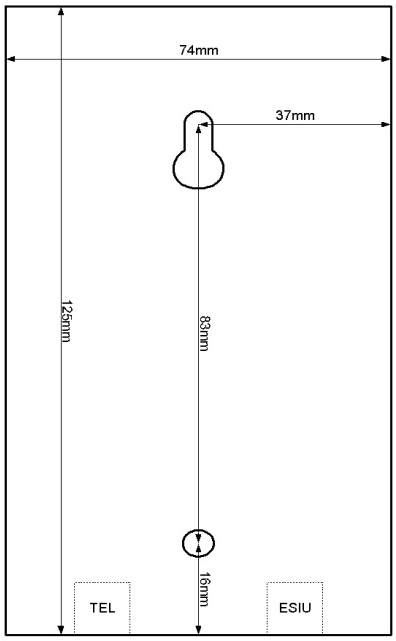


Figure 4-38: Wall Mount Dimensions for SLTAD

4. Plug the two modular line cords back into the SLT Adapter which were removed in Step 1.

TELEPHONE LEGS

Using the Telephone Legs (Figure 4-39 - Figure 4-43)

The Aspila EX system phones provide two legs for angling the phone to best suit each user (this is in addition to the display positioning provided by display system phones). The legs can be set for three different heights.

Adjusting the Leg Height

1. In the first position (flat), the legs are folded in.
2. To set to the second position, fold the leg down then push in slightly toward the phone to set the leg into position.
3. ***To set to the third position starting when set at the first position:*** Fold the leg down and slightly pull the extension out. Tip the extension down then slide it back until the slide reaches the opposite end of the extension. Pull the leg forward and then push the completely extended leg back into the phone to set it into position.
   To set to the third position starting when set at the second position: Pull the extension of the leg out. Tip the extension down then slide it back until the slide reaches the opposite end of the extension. Pull the leg forward. Push the completely extended leg back toward the base of the phone to set it into position.

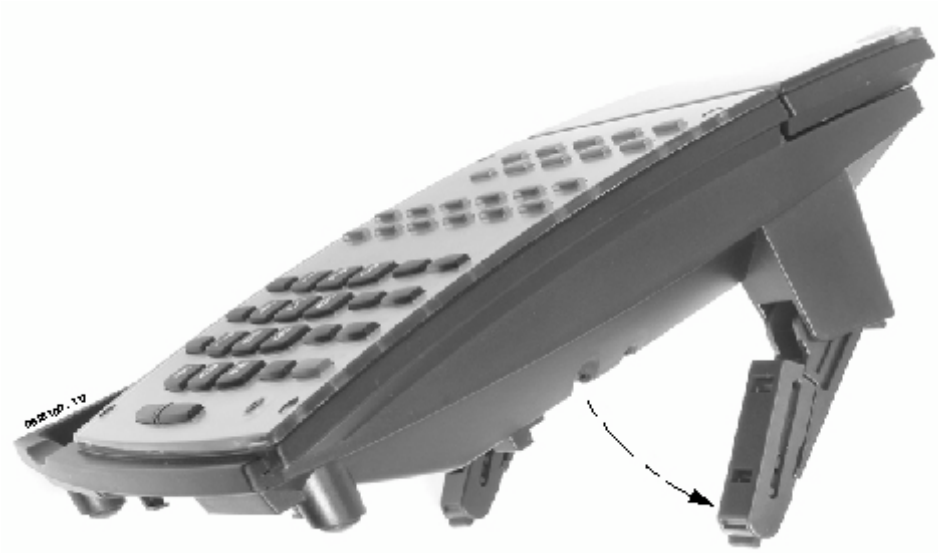


Figure 4-39: ADJUST THE LEG HEIGHT - POSITION 2

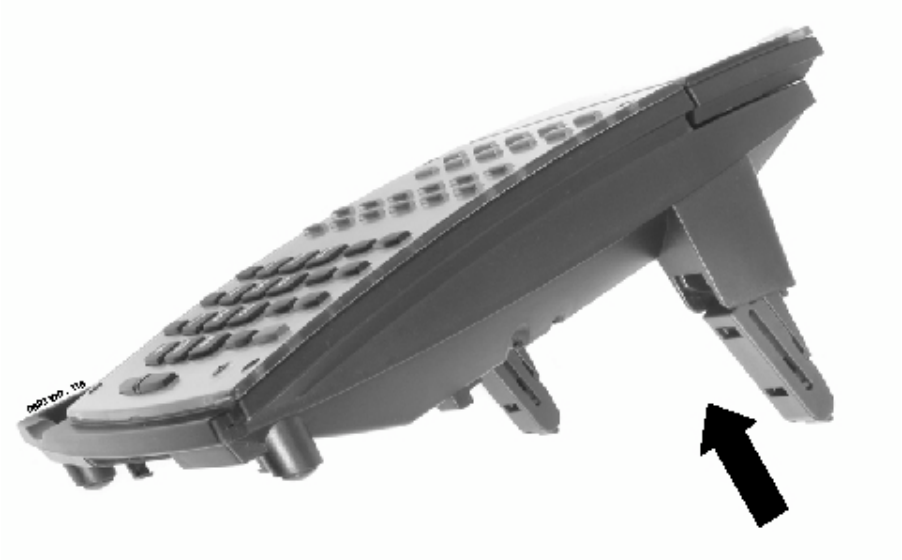


Figure 4-40: SETTING THE LEGS - POSITION 2

Figure 4-41: EXPANDING THE LEG HEIGHT - POSITION 3

Figure 4-42: EXTENDING THE LEGS - POSITION 3

Figure 4-43: SETTING THE LEG POSITION - POSITION 3

WALL-MOUNT BRACKET

Using the Wall-Mount Bracket

Each Aspila EX phone has an integrated wall-mounting bracket. This allows the phone to be mounted to a wall at a convenient location. The mounting bracket also contains the hookswitch hanger, clipped to the inside of the bracket.

Note. Telephones with any optional adapters installed cannot be wall-mounted. The bracket will not accommodate the adapter(s).

Installing the Wall-Mount Handset Bracket (Figure 4-44 - Figure 4-46)

1. Remove the integrated wall bracket from the bottom of the phone. Refer to Figure 4-44.
   - From the center cut-out, pull the bracket up and out.
2. Remove the wall-mount hookswitch tab located on the bracket by gently pulling the locking lever down slightly while lifting the tab out (Figure 4-45).
3. Insert the wall-mount hookswitch tab in the slot below the hookswitch (Figure 4-46).

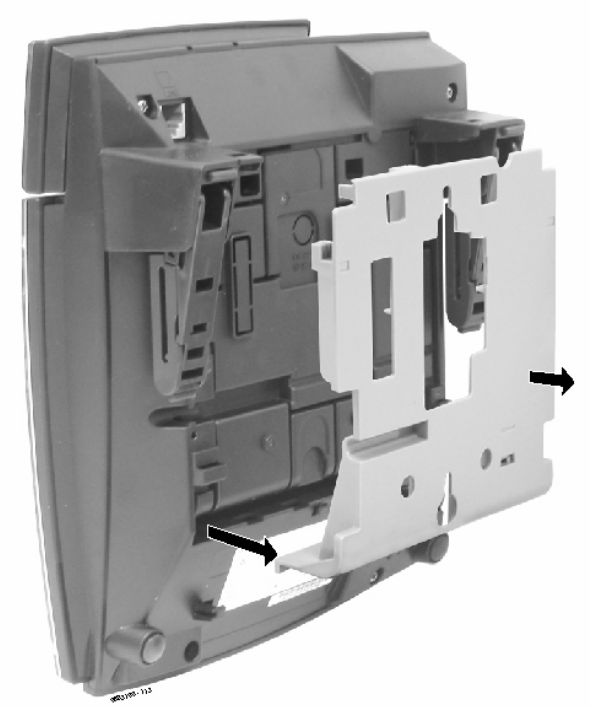


Figure 4-44: REMOVING THE WALL-MOUNT BRACKET

Figure 4-45: REMOVING THE HOOKSWITCH HANGER

Figure 4-46: INSTALLING THE HOOKSWITCH HANGER

Wall-Mounting the Phone (Figure 4-50 - Figure 4-50)

1. After removing the integrated wall bracket from the bottom of the phone. (Figure 4-44), attach the wall bracket to the wall using three screws (in the positions indicated below) to the

desired wall location.

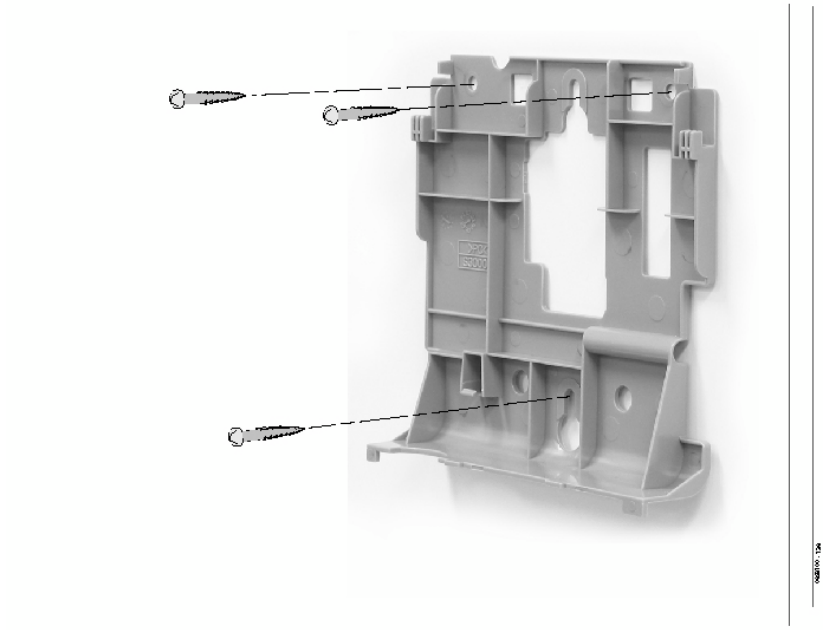


Figure 4-47: ATTACHING THE BRACKET

2. Attach the phone to the wall-mount bracket by inserting the bottom hooks (indicated by "A" in Figure 4-48 *BRACKET HOOKS* on page 4-41) on the bracket into the back of the phone (Figure 4-50).

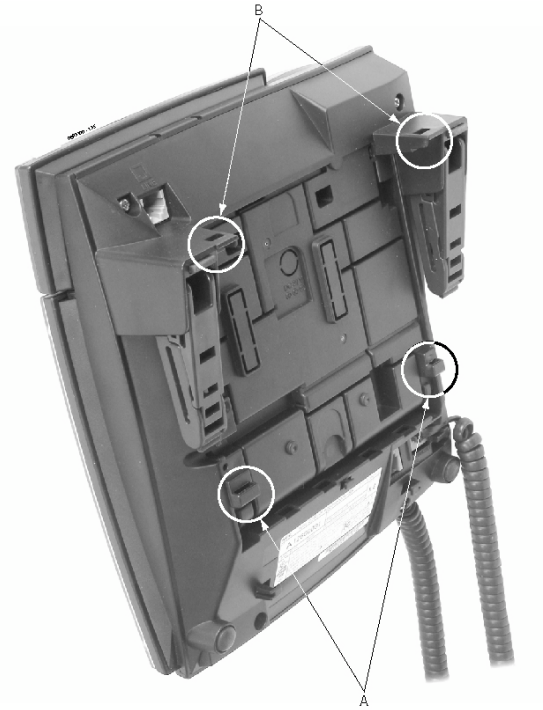


Figure 4-48: BRACKET HOOKS

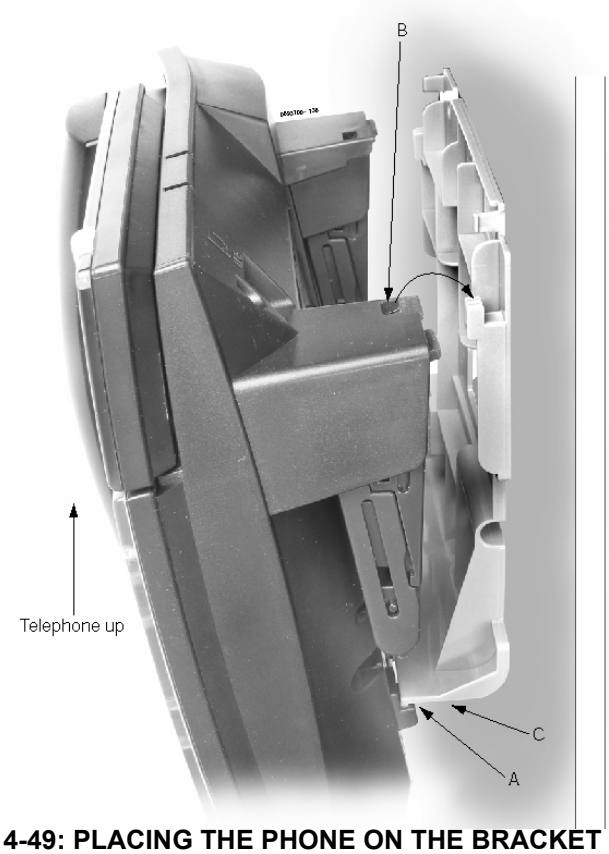


Figure 4-49: PLACING THE PHONE ON THE BRACKET

3. While lifting the bottom of the phone (the wall-mount bracket will bend) and then slightly pushing the top towards the wall, insert the top hooks into the back of the phone.

Figure 4-50: COMPLETED WALL-MOUNT BRACKET INSTALLATION

4. Insert the telephone's line cord from the RJ11 (RJ45) socket into the phone.
   Note that the telephone legs must be completely folded in or the bracket will not reach the wall.

Removing the Phone From a Wall-Mounting Bracket (Figure 4-51 - Figure 4-52)

1. Grip the system phone on both sides in the location shown below by “A”.

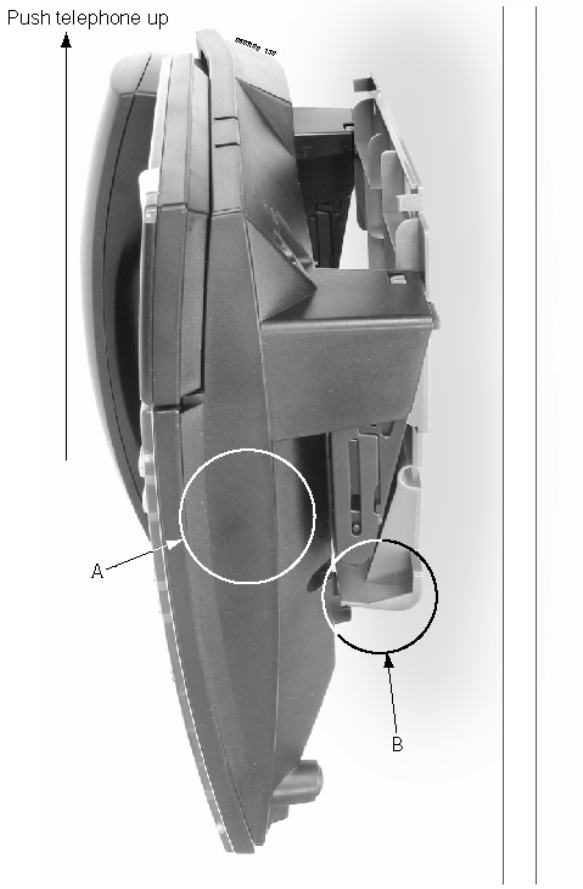


Figure 4-51: GRIP THE SYSTEM PHONE

2. Lift the phone up. The wall-mount bracket will bend slightly (at location “B”).

3. Tilt the top of the system phone forward slightly to remove it from the top bracket hooks ("C"), then unhook the bottom hooks ("D").

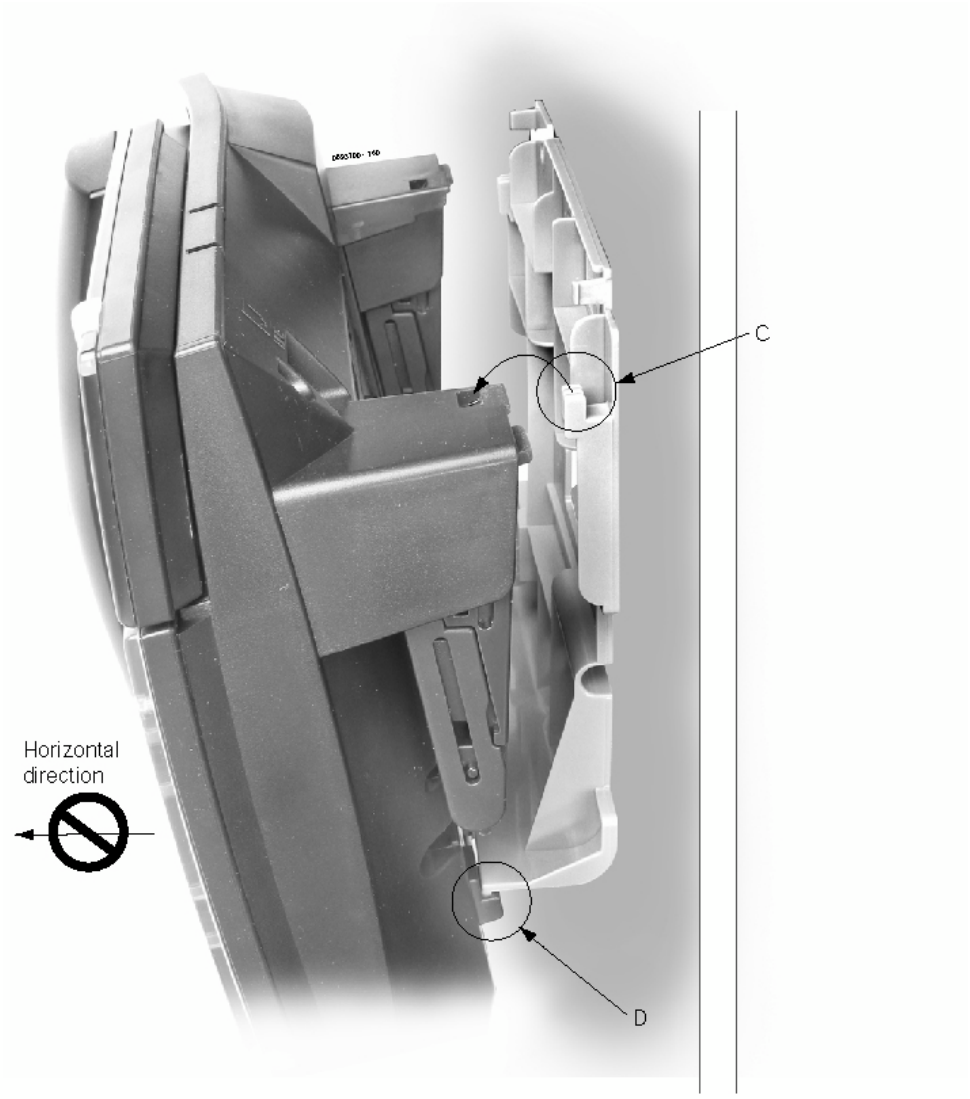


Figure 4-52: REMOVING THE SYSTEM PHONE FROM THE WALL-MOUNT BRACKET

4. Move the phone down to remove it from the bottom bracket hooks.
   It is important to note that the phone should not be pulled out horizontally or the bottom bracket hooks may break.

- For Your Notes -

Section 5: Data and SMDR

DATA OVERVIEW

Data Communications

The system provides up to 192 data device interfaces for data communications. Using data devices allows a network to share a limited number of business resources such as modems, printers, and PC's. The system's data devices can switch asynchronous RS-232-C data at speeds from 300 to 19.2K.

There are four types of data devices available: APA, APR, CTA and CTU.

APA Adapter

The APA Adapter provides an analogue interface for the system phone. The APA Adapter does not provide ringing, so the connected device is used for outgoing calls only (for example, when using a modem). One system phone can have either an APA or an APR adapter. Both adapters ***cannot*** be installed on the same system phone as only one voice path is provided by the system phone for the adapters. The maximum distance between the APA Adapter and the analogue terminal is 15 metres.

The APA Adapter does not support reverse-polarity, message waiting lamping, or Caller ID.

APR Adapter

The APR Adapter provides an analogue interface for the system phone. The APR Adapter provides ringing which allows the connected device to be used for incoming and outgoing calls. One system phone can have either an APA or an APR adapter. Both adapters ***cannot*** be installed on the same system phone as only one voice path is provided by the system phone for the adapters. When installing the APR adapter, an AC/DC adapter is required for power. The maximum distance between the APR Adapter and the analogue terminal is 15 metres.

The APR Adapter does not support reverse-polarity, message waiting lamping, or Caller ID.

CTA Adapter

The CTA Adapter provides a serial interface (9-pin male RS-232C) connector. This can be used for SMDR or TAPI (1.4), system reporting, or PC Programming. When using the adapter for printing, the following printers are recommended:

CTU Adapter

The CTU Adapter provides a USB connector. This can be used for either SMDR, TAPI (1.4), system reporting, or PC Programming.

Data Communication Availability With Hardware

Functions	NTCPU Port			CTA	APSU
	Serial	USB	Ethernet		
Windows PC Programming	Yes	Yes	Yes	No	No
Web Programming for Installer	Yes	Yes	Yes	No	No
Web Programming for User	No	No	Yes	No	No
SMDR Output to Printer	Yes	No	No	Yes	No
SMDR Output to PC	Yes	No	Yes	No	No
SMDR	Yes	Yes	No	Yes	No
ACD MIS	No	No	Yes	No	No
Hotel PMS	No	No	No	Yes	No
Traffic Report	Yes	Yes	No	Yes	No
System Information Print Output	Yes	Yes	No	Yes	No
Alarm Information	Yes	Yes	No	Yes	No
First Party CTI (via serial)	No	No	No	Yes	No
Third Party CTI (via LAN)	No	No	Yes	No	Yes

Ports for APR Adapter

The APR Adapter's extension number is determined when the adapter is connected to the system phone. After assigning the APR Adapter a circuit type of '12' in Program 10-03-06, the system automatically selects the next available port within the APR's range (193-256). The system assigns the ports numbers from highest to lowest (256, 255, 254, etc.). Program 10-03-07 indicates which port is assigned for the APR Adapter. You can reassign the extension number for the port using Program 11-02-01.

Use the table below to determine the extension number associated with the port number.

APR Extension Port Number	Extension Number
193	493
:	:
199	499
200	5000
:	:
256	5056

Programming for System and Alarm Reports

- **90-13-01 : System Information Output - Output Port Type**
  Indicate the type of connection used for the SMDR (0=No setting, 1=COM port (NTCPU), 2=USB port (NTCPU), 4= CTA/CTU).
- **90-13-02 : System Information Output - Destination Extension Number**
  If the output port type (item 1) is set to CTA, enter the extension number with the CTA connection.
- **90-13-03 : System Information Output - Output Command**
  Dialing 1 from this program sends the system report to the connected device.
- **90-12-01 : System Alarm Output - Output Port Type**
  Indicate the type of connection used for the System Alarms. The baud rate for the COM port should be set in Program 10-21-02 (0=No setting, 1=COM port (NTCPU), 2=USB port (NTCPU), 4=CTA/CTU).
- **90-12-02 : System Alarm Output - Destination Extension Number**
  If the output port type (item 1) is set to CTA, enter the extension number with the CTA connection.
- **90-12-06 : System Alarm Output - Output Mode**
  Indicate if the output for the alarms should be manual (0) or automatic (1).

Use the following programs for outputting or clearing the alarm reports:

- **90-12-03 : System Alarm Output - Output All Alarm Reports**
- **90-12-04 : System Alarm Output - Printout New Alarm Reports**
- **90-12-06 : System Alarm Output - Clear All Alarm Reports**

Refer to *Data Communications Interface* in the Software Manual for additional details.

SMDR

Using SMDR (Figure 5-1)

Station Message Detail Recording (SMDR) provides a record of the system's outside calls. Typically, the record outputs to a customer-provided printer, terminal or SMDR data collection device. Use SMDR when you need to monitor the usage at each extension and trunk.

Installing SMDR

1. Install the DCI device to be used (refer to the specific CTA/CTU information described previously).
2. Install the SMDR recording device according to the manufacturer's instructions.
3. Connect the SMDR recording device to the telephone's CTA/CTU.

Note: When using a CTA, a standard RS-232C cable terminated with a 9-pin female connector is required.

Note: When using a CTU, a standard USB cable is required.

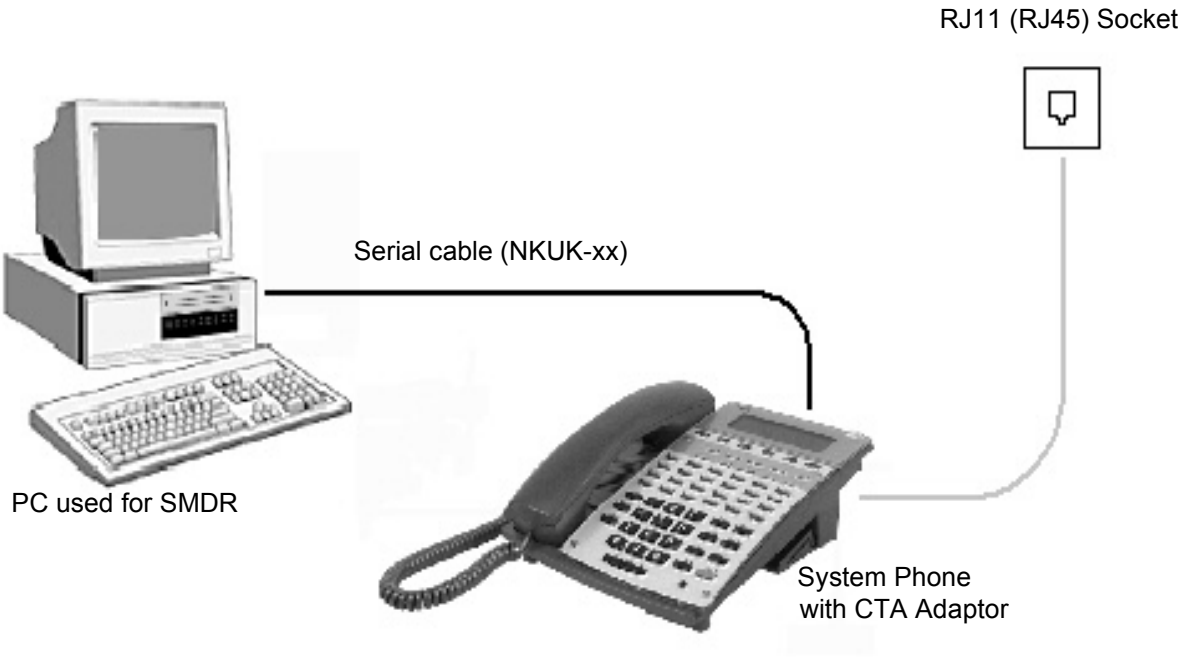


Figure 5-1: CONNECTING AN SMDR DEVICE

Programming SMDR

- **10-21-02 : NTCPU Hardware Setup - Baud Rate for COM Port**
  If the SMDR connection is made using the COM port on the NTCPU, define the baud rate (0=4800, 1=9600, 2=19200, 3=38400).
- **14-01-06 : Basic Trunk Data Setup - SMDR Print Out**
  For each trunk, enter 0 if trunk's calls should not appear on SMDR report. Enter 1 if trunk's calls should appear on SMDR report.
- **15-01-03 : Basic Extension Data Setup - SMDR Printout**
  For each extension, enter 1 if extension's calls should appear on SMDR report. Enter 0 if extension's calls should not appear on SMDR report.
- **35-01-01 : SMDR Options - Output Port**
  Specify the output port type (NTCPU/CTA/CTU) for each SMDR type.
- **35-01-04 : SMDR Options - Omit (Mask) Digits**
  Enter the number of digits (1-24) you want SMDR to block (i.e., "X" out). Enter 0 not to block any digits.
- **35-01-05 : SMDR Options - Minimum Number of SMDR Digits**
  Enter the minimum number of digits a user must dial (1-24) before the system includes a call on the SMDR report. Enter 0 to include all outgoing calls, regardless of the number of digits dialed.
- **35-01-06 : SMDR Options - Minimum Call Duration**
  Enter the minimum duration of a call (1-65535) that will print on the SMDR report. Enter 0 to have calls of any duration print.
- **35-01-07 : SMDR Options - Minimum Ringing Time**
  Enter how long an unanswered call must ring (1-65535) before SMDR logs it as "No Answer". Enter 0 to allow all "No Answer" calls to print.
- **35-02-01 : SMDR Output Options - Toll Restricted Call**
  Enter 1 if you want the SMDR report to include calls blocked by Toll Restriction. Enter 0 to exclude blocked calls.
- **35-02-02 : SMDR Output Options - PBX Calls**
  If system is behind a PBX, enter 1 to have SMDR include all calls to the PBX. Enter 0 to have SMDR include only calls dialed using PBX trunk access code.
- **35-02-04 : SMDR Output Options - Daily Summary**
  35-02-05 : Weekly Summary and
  35-02-06 : Monthly Summary
  Enter 1 to enable a summary report. Enter 0 to disable a summary report. The daily report prints every day at midnight. The weekly report prints every Sunday night at midnight. The monthly report prints at midnight on the last day of the month.
- **35-02-08 : SMDR Output Options - Incoming Calls**
  Enter 0 if you want the SMDR report to include incoming calls. Enter 1 if you want the SMDR report to exclude incoming calls.
- **35-02-09 : SMDR Output Options - Print Name or Number**
  Enter 0 if you want the SMDR report to include the extension's name. Enter 1 if you want the SMDR report to include the extension's number.
- **35-02-16 : SMDR Output Options - Print Trunk Name or Received Dialed Number**
  Enter 0 if you want the SMDR report to print the trunk port name (as assigned in Program 14-01-01). Enter 1 if you want the SMDR report to print the received dialed number. For DID trunks, if the received number is not defined in Program 22-11-01, then no number will be printed.
- **80-05-01 : Date Format for SMDR and System Reports**
  Set the date format for SMDR (0=American, 1=Japanese or 2=European).
- **90-12-01 : System Alarm Output - Output Port Type**
  Indicate the type of connection used for the SMDR (0=No setting, 1=COM port (NTCPU), 2=USB port (NTCPU), 4=CTA/CTU).

- **90-12-02 : System Alarm Output - Destination Extension Number**
  If the output port type (90-12-01) is set to CTA, enter the extension number with the CTA connection.
- **90-13-01 : System Information Output - Output Port Type**
  Indicate the type of connection used for the SMDR (0=No setting, 1=COM port (NTCPU), 2=USB port (NTCPU), 4=CTA/CTU).
- **90-13-02 : System Information Output - Destination Extension Number**
  If the output port type (90-13-01) is set to CTA, enter the extension number with the CTA connection.

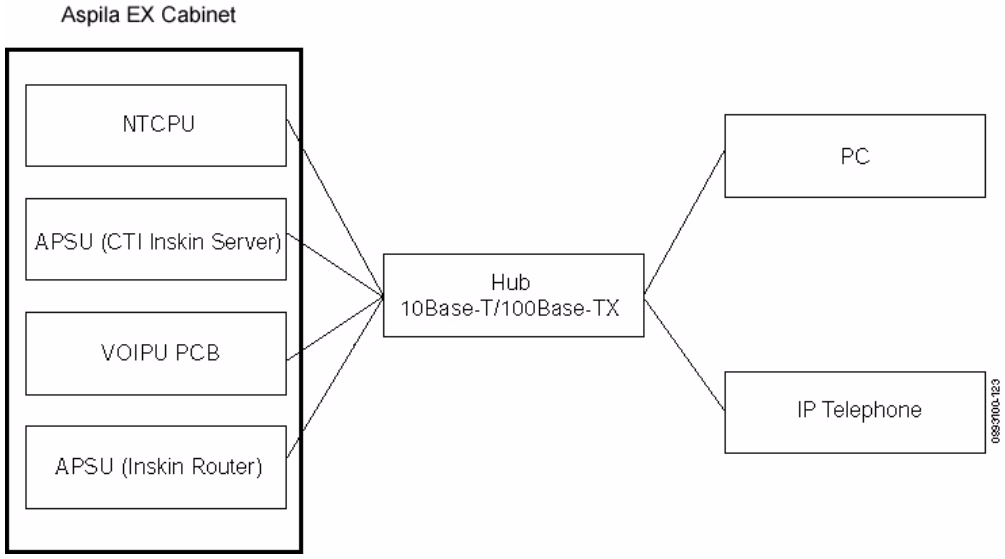
Refer to *Station Message Detail Recording* in the Software Manual for additional details.

Section 6:
LAN Connection

LAN DEVICES

Using LANs

Using a LAN setup (local area network) with the Aspila EX system complies with the ethernet standard (10Base-T/100Base-TX).



To connect a telephone to a LAN connection, the system allows the use of either an Aspila EX digital system phone with an IP Adapter installed or an H.323 IP digital telephone. For details on installing the IP Adapter, refer to **VoIP Adapter (Figure 4-33 - Figure 4-35)** (page 4-30).

If connecting a LAN to a WAN (wide area network), follow the instructions included with the ADSL modem or gateway device.

IP Address

Equipment/devices used in the Aspila EX LAN setup must have an IP address assignment. An IP address assigns a unique address for each device. There are two types of IP addresses: Private and Global. A Private IP Address is not accessible through the internet - a Global IP Address can be accessed through the internet.

With a Private IP Address, with equipment that does not access the internet directly, addresses can be assigned to the equipment within Class A, B or C by assigning a number within the class's range of numbers.

Class	Allowed IP Address	Recommended Environment
A	10.0.0.0 ---10.22.255.255	Large Scale Network
B	172.16.0.0 --- 172.31.255.255	Mid Scale Network
C	192.168.0.0 --- 192.168.255.255	Small Scale Network

With a Global IP Address, connected equipment can be accessed through the internet, so each address must be unique.
The first one to three groups of numbers (depending on the subnet mask) identify the network on which your computer is located. The remaining group(s) of numbers identify your computer on that network.

Subnet Mask

As the IP Address includes information to identify both the network and the final destination, the Subnet Mask is used to set apart the network and destination information.

The default subnet masks are:

Class	Default Subnet Mask
A	255.0.0.0
B	255.255.0.0
C	255.255.255.0

In the above table, you'll see that the Subnet Mask is made up of four groups of numbers. When a group contains the number '255', this is telling the router to ignore or mask that group of numbers in the IP address as it is defining the network location of the final destination. So, for example, if the IP Address were: 172.16.0.10 and the Subnet Mask used was Class B (255.255.0.0), the first two groups of numbers (172.16) would be ignored once they reached the proper network location. The next two groups (0.10) would be the final destination within the LAN to which the connection is to be made.

DHCP

DHCP (Dynamic Host Configuration Protocol) is a protocol which assigns a dynamic IP Address. Network control may be easier with DHCP as there is no need to assign and program individual IP Addresses for the LAN equipment. To use a dynamic IP Address, a DHCP server must be provided. The Aspila EX system provides the ability to use DHCP.

When equipment which is connected to the LAN (the DHCP client) is requesting an IP Address, it searches the DHCP server. When the request for an address is recognized, the DHCP server assigns an IP Address, Subnet definition, and the IP Address of the router, etc., based upon the system programming.

Note that the NTCPU must always have a static IP address. This address is set in ***Program 10-12-01 : NTCPU Network Setup - IP Address*** (default: 172.16.0.10).

Gatekeeper

Whenever an H.323 terminal activates, a check is made of the network to see if there are any gatekeepers available. When a gatekeeper is present, it provides users with:

- Address Translation
  Users typically do not know the IP addresses of other terminals. When a user makes a call, the gatekeeper translates an alias address (name or number) to the destination address.

- Admissions Control
  Users will not all be able to access the network at the same time because of limited shared resources. Gatekeepers may restrict network access based on call authorization, bandwidth usage, or some other criteria. It is important to note that Admissions Control is a way to preserve the integrity of the calls (provide QoS guarantees) that are already up and operating when a user requests access.

- Bandwidth Control
  Besides network access control, the gatekeeper offers network managers the ability to restrict or assign bandwidth to different applications along certain protocol conventions. This is another place network managers can enforce QoS guarantees and other enterprise-wide usage policies.

With the Aspila EX system, a separate external gatekeeper is not required unless connecting to an outside H.323 endpoint/gateway which requires an outer gatekeeper or if over 50 outer addresses must be registered. Otherwise, the Aspila EX provides tables within the system programming for address resolution.

IP Hardware

PCBs:

- **NTCPU** - Signals the gateway with VoIP communication
- **16VOIPU** - VoIP PCB provides a 16-channel voice packet gateway unit and works as a media gateway for VoIP communication. This PCB is required for either VoIP trunks or when using VoIP system phones.
- **16VOIPDB** - VoIP daughter board provides an additional 16 channels when attached to the 16VOIPU PCB
- **8SHUBU** - Provides an 8-port switching hub for use with the Aspila EX system

Terminals:

- **IP System Phone** - Aspila EX 34-button multi-line IP phone
- **IP Adapter** - IP adapter connects an Aspila EX system phone to the VoIP network
  The phone with the adapter installed is referred to as the Legacy IP System Phone or DtermIP phone.
- **ITR-2D-1** - Uniden IP phone

Power must be supplied to the IP system phone or the Legacy IP system phone using either a local or central power supply. The ITR-2D1 phone requires local power. If there is a power outage, the VoIP phones will not work unless the phones are plugged into a UPS (uninterruptible power supply).

- Local Power Supply
  The AC-R Unit is an AC adapter for Aspila EX IP system phone or the Legacy IP system phone. The ITR-2D1 has an AC adapter included that should be used for power. Terminals connected to the 8SHUBU PCB must provide local power.
- Central Power Supply:
  An IEEE 802.3AF Standard Power Supply or Patch Panel

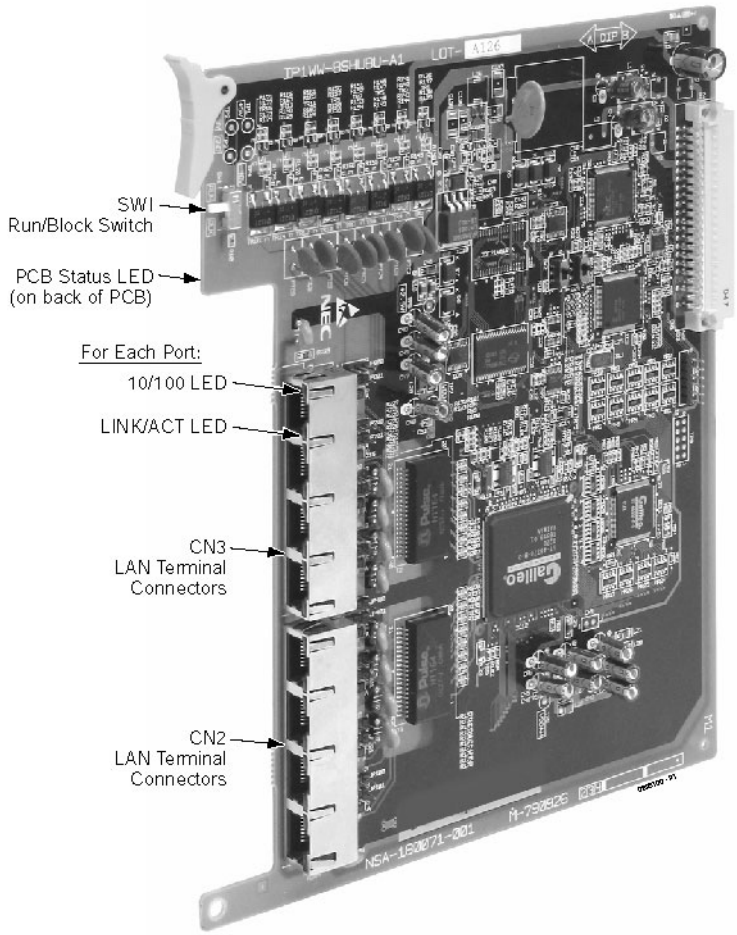
Aspila EX VoIP Specifications

Category	Feature	Note
IP Address	DHCP Server	NTCPU
	DHCP Client	VOIPU PCB or IP Phone
QoS	802.1p/1q	
	L3 QoS (ToS)	Diffserv/IP Precedence
Maintenance	HTTP Server	NTCPU
Server	H.323 Gatekeeper	For H.323 Phone Registration and Routing
VLAN	Tag and port-based VLAN	
VoCoder	G.711 µ-law/a-law	
	G.729a	
	G.723.1	
	Fax Relay	
Jitter Buffer Size	Set by system programming	
RTP Length	Set by system programming	
Echo Canceller Tail Size	Set by system programming	
Level Adjustment	Set by system programming	
Protocol	H.323	
	NGT	
IP Phone	H.323 Phone	Uniden H.323 Phone
	NGT Phone	Maximum 512 Phones
IP Trunk	H.323 Trunk	Maximum 200 Trunks

LAN Connections

Hardware:

- 8SHUBU PCB - Provides 8-port switching hub
  - 802.1p/1q Support
- 24-Port Power Supply PoE-managed switch (NEC BF200/24)
  - PoE (Power over Ethernet) to Legacy IP/Uniden H.323 Phone
  - Spare Pair (4/5, 7/8) / Signal Pair (1/2, 3/6) Selection
- 12-Port Power Supply Patch Panel (NEC SN1604 PWRMS)
  - PoE (Power over Ethernet) to Legacy IP/Uniden H.323 Phone
  - Add this patch to an existing switching hub
  - Spare Pair (4/5, 7/8) / Signal Pair (1/2, 3/6) Selection

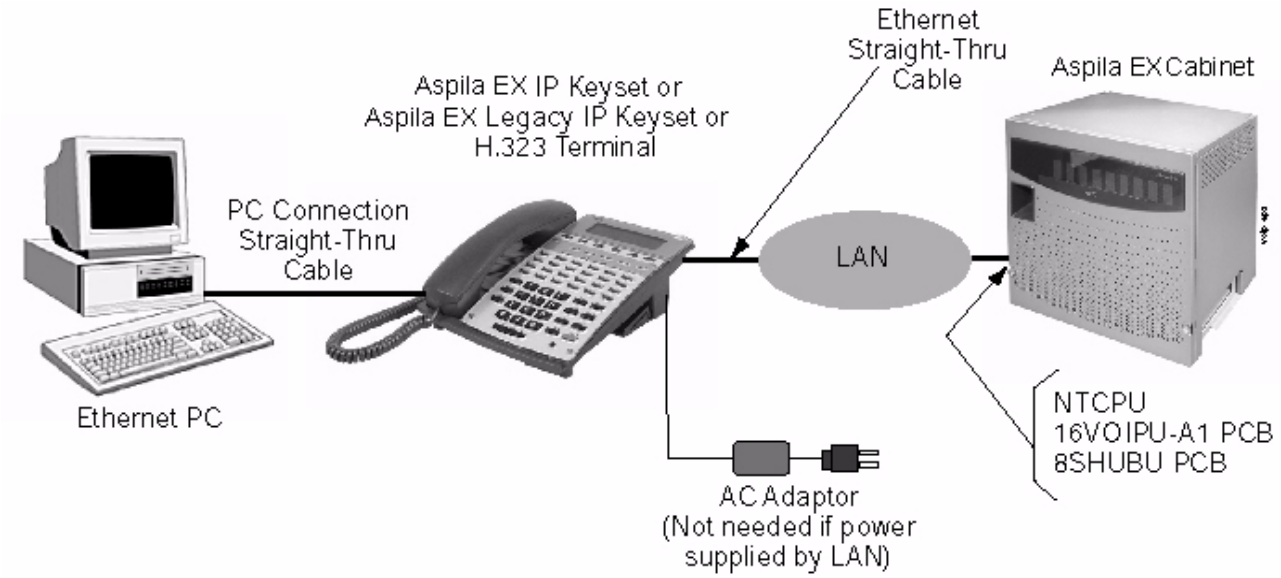


6

Installing a LAN Device or VoIP Telephone

Actual installation will vary depending on each customer's installed Aspila EX and networking hardware.

1. Plug a cable with an RJ-45 modular jack into the PCB or switch which will provide the network connection to the IP telephone or PC.
2. Connect the RJ-45 modular jack on the opposite end of the cable to the IP telephone or PC's network interface card (NIC).
3. If local power is to be provided to the IP telephones, connect the AC adapter to the phone.
4. Plug the AC adapter into an outlet.



For complete programming information, refer to the VoIP Feature Supplement (P/N 0893204).

Section 7: Specifications and Parts List

SYSTEM SPECIFICATIONS

Aspila EX System Capacities		
Cabinets	2 (Main and 1 Expansion Cabinet)	
Power Supplies	2 (1 per cabinet)	
Trunks (CO/PBX lines)	200	
Digital System Phones Analogue Single Line Telephones IP Telephones	256* 256* 256 ** Total extension ports = 512	* combined total to 256 ** in addition to the digital or analogue ports
24-Button DLS Consoles 110-Button DSS Consoles	256 32	
Conference Circuits	64 (32-parties max per Conference)	
ADA Adapter	192	installs on a system phone
APA Adapter	192	installs on a system phone
APR Adapter	192	installs on a system phone
CTA Adapter	128	installs on a system phone
CTU Adapter	128	installs on a system phone
IP Adapter	256	installs on a system phone
Power Failure Telephones	32	provided by COIU PCBs
PGDAD Modules	56	

7

Aspila EX System Capacities (Cont'd)		
Door Box/Door Unlock Contacts	8	
Internal Page Zones	64	
External Page Zones	8	
Dial Tone Detector Circuits	64*	combined total to 64
DTMF Receiver Circuits	64*	
Universal PCB slots		
Main Cabinet	1-8 (Not including NTCPU slot)	
Expansion Cabinet	9-16 (Not including EXIFU slot)	

* ***NOTE:*** Maximum capacities above are determined by maximum PCB configuration allowed. When installing single line sets, DISA, or tie lines, NTCPU circuits must be allocated for DTMF receivers. To install single line sets with CO/PBX line access, or when installing immediate-start tie lines, NTCPU circuits must be allocated for dial tone detection.

Aspila EX PCB Capacities			
NTCPU Central Processing Unit	1	1PRIU 30 PRI Trunks/Channels	6
8ESIU 8 Digital Stations	16	4TLIU 4 E&M Tie Line Trunks	16
16ESIU16 Digital Stations	16	4DIOPU 4 DID/OPX Trunks	16
8SLIU 8 Analogue Stations	16	8DIOPU 8 DID/OPX Trunks	16
8SLIDB 8 Analogue Stations Daughter Board (installs on 8SLIU)	16	2FMSU 2 Flash Memory Voice Mail	1
16DSTU 16 i-Series System Phone Interface	16	4FMSU 4 Flash Memory Voice Mail	1
4COIU-LS1 4 Analogue/Loop Start Trunks (no ground start)	16	4VMSU 4 HDD Voice Mail	1
8COIU-LS1 8 Analogue/Loop Start Trunks (no ground start)	16	4VMDB 4 HDD Voice Mail - Daughter Board	1
4COIU-LG1 4 Analogue/Loop Start Trunks (with ground start)	16	UMSU Unified Messaging System	1
8COIU-LG1 8 Analogue/Loop Start Trunks (with ground start)	16	8SHUBU 8 Switch Hub	6
2BRIU 2 Two-Channel BRI Circuits	16	16VOIPU 16 VoIP Media Gateway	6
4BRIU 4 Two-Channel BRI Circuits	16	16VOIPDB 16 VoIP Media Gateway Daughter Board (installs on 16VOIPU)	6
8BRIU 8 Two-Channel BRI Circuits	As T-Bus: 12 As S-Bus: 16	APSU In-Skin Server without O/S	1

Environmental Requirements

Meeting established environmental standards maximizes the life of the system. Be sure that the site is not:

1. In direct sunlight or in hot, cold or humid places.
2. In dusty areas or in areas where sulfuric gases are produced.
3. In places where shocks or vibrations are frequent or strong.
4. In places where water or other fluids comes in contact with the main equipment.
5. In areas near high-frequency machines or electric welders.
6. Near computers, telexes, microwaves, air conditioners, etc.
7. Near radio antennas (including shortwave).

Environmental Specifications

Cabinets, PCBs and Key Telephones

Temperature: 0°C - +40°C (32 - 104°F)
Humidity: 10-90% RH
CAUTION: The VMSU-A1 and APSU-A1 exceptions.
They are limited to: +5°C - +40°C (41-104°F).

Door Box

Temperature: -20°C - +60°C (-4 - 140°F)
Humidity: 20-80% (non-condensing)

Power Supply

Operating:
Temperature: 0°C - +40°C (32 - 104°F)
Humidity: 20-90% RH

VMSU-A1/APSU-A1 PCBs

Temperature: +5°C - +40°C (41-104°F)
Humidity: 10-90% RH

Power Requirements

A dedicated 240 VAC 50 Hz circuit located within 2 metres of the cabinet is required. You should install a separate dedicated outlet for each cabinet.

Caution
Double Pole/Neutral Fusing
(power supply fuses located at both the L and N side)

Site Requirements

The system can be floor-, wall- or 19” rack-mounted.
Brackets supplied with each cabinet allow wall, floor and rack mounting (rear mounting strips are required for rack mounting using the bracket supplied with the cabinet).
A seperate rack mount shelf is available for 19” rack mounting.

Electrical Specifications

Power Supply

AC Power Supply
Dedicated 13 Amp circuit

Input Voltage:	100V AC to 240VAC
Frequency:	50 Hz / 60 Hz
Power Requirements:	3.8A@100V AC per cabinet (380 VA) 1.7A@240V AC per Cabinet (408 VA)
Power Consumption:	370W per Cabinet, Total = 740W
Phase and Wire:	Single, 2-Wire
Grounding Requirements:	No. 14 AWG copper wire

Caution
Double Pole/Neutral Fusing
(power supply fuses located at both the L and N side)

Output Voltage Types:	+3.42VDC (-3%, +1%)	+5VDC (+/ - 2%)	-48VDC (+/- 5%)
Output Current 1	0.0A - 6.0A	0.0A - 5.0A	0.0A - 1.0A
Output Current 2	0.0A - 3.2A	0.0A - 1.0A	0.0A - 2.0A
Ripple/Noise	50mV p-p	100mV p-p	200mV p-p
Overvoltage Protection	3.7 - 8.0V	5.6 - 13.0V	-55.0 - 64.8V
Overcurrent Protection	6.6 - 7.7A	5.5 - 6.5A	2.2 - 2.6A

Mechanical Specifications

Equipment	Width (mm)	Depth (mm)	Height (mm)	Weight (Kg)
KSU Cabinet Note 1	419	270	394	25.5 fully equipped
2 Button Telephone	170	222	100	0.95
12 Button Non-Display System Phone	200	240	100 no leg extension 163 legs fully extended	1.0
12 Button Display System Phone	200	240	100 no leg extension 163 legs fully extended	1.0
24 Button Display System Phone	200	240	100 no leg extension 163 legs fully extended	1.0
110-Button DSS	200	240	80 no leg extension 145 legs fully extended	0.8
24-Button DLS	50		80 no leg extension 145 legs fully extended	0.34

Note 1. Add 30mm to the height of the main cabinet for the floor mounting bracket. Add 40mm to the depth of each cabinet for the mains cable/wall mounting bracket.

2PGDAD Module/NTCPU Input/Output

Audio/Music Input

Input Impedance:	47 KOhm @ 1Khz

Audio/Paging Output

Output Impedance:	600 Ohms @ 1 KHz
Maximum Output:	+3 dBm

Relay Contacts

Configuration:	Normally Open
Maximum Contact Ratings:	24 VDC, 0.5A 120 VAC, 0.25A

Night Mode Relay Connection, Input

Input voltage:	5 to 48 VDC
Input current:	7 mA

BGM/MOH Music Source Input

Input Impedance:	47K Ohm
Input Level:	Nominal 250 mV (-10 dBm)
Maximum Input:	1V RMS

Inputs for MOH and BGM are located on the NTCPU PCB. The 2PGDAD also provides MOH inputs.

Door Box/External Paging

Output Impedance:	600 Ohm
Output Level:	Nominal 250 mV (-10 dBm)
Maximum Output:	400 mV RMS
Configuration:	Normally open

LAN Specifications

Standard	IEEE802.3 10Base-T and 100Base-TX Compliant
Access	CSMA/CD
Capacity	10Base-T/100Base-TX; 8 Ports for LAN Terminal
I/F (Layer 1)	- Speed; 10Mbps/100Mpbs Auto Negotiation - Cable; Category 5 or better, Straight/Cross Cable Auto Crossover
Switching	- Store and Forward Layer 2 Switching - MAC Address Auto Recognition - Store Max. 1,000 MAC Addresses - Flow control in Back Pressure Mode Compliant

SLT Adapter

Constant Current Circuit: Current fixed at 47 mA

Signal Method

On-Hook Condition: 48VDC

Ringer Signal: 180 Vp-p, 16Hz

SLIU PCB / SLIDB

Signal Method

On-Hook Condition: -50VDC

Message Waiting Signal: -112VDC +/- 3VDC

Ringer Signal: 75Vrms +/-1Vrms (no load condition), 20Hz +/-1%

Cabling Requirements

1. Do not run station cable in parallel with the AC source, telex or computer, etc. If the cables are near cable runs to those devices, use shielded cable with grounded shields or install the cable in conduit.
2. When cables must be run on the floor, use cable protectors.
3. Cable runs for key telephones, single line telephones, Door Boxes, CTA or CTU adapters, and 2PGDAD Modules must be a dedicated, isolated cable pair.
4. The Telco RJ21X and cross-connect blocks should install to the right of the Main Cabinet. Extension blocks and cross-connect blocks should be installed to the left of the Main Cabinet.

Cable Requirements

Device	Cable Type	Cable Run Length (Metres)	Notes
Key Telephone, DSS Console:	2-wire 26 AWG 2-wire 24 AWG 2-wire 22 AWG	400 600 800	
Single Line Telephone, Analogue Terminals (20mA):	2-wire 26 AWG 2-wire 24 AWG 2-wire 22 AWG	4000 6400 10600	
20mA Setting: 35mA Setting:	1,140 ohm loop resistance 540 ohm loop resistance	6400M with 24AWG 3000M with 24AWG	
SLT Adapter: SLTAD to SLT:	2-wire 26 AWG 2-wire 24 AWG 2-wire 22 AWG	400 600 800 15	
2PGDAD Adapter:	2-wire 26 AWG 2-wire 24 AWG 2-wire 22 AWG	600 600 800	
Door Box to 2PGDAD:	2-wire 26 AWG 2-wire 24 AWG 2-wire 22 AWG	60 100 170	
Using Under Carpet Cable: The cable is not twisted, but flat parallel wire. Good impedance balance cannot be expected and reduces the cable length to no more than 300m when using flat cable.			

Cable Requirements (Cont'd)

Device	Cable Type	Cable Run Length (Metres)	Notes
NTCPU to PC:	Serial cross cable Ethernet cross cable USB cable (USB1.1)	15 metres 100 metres 5 metres	
NTCPU to Hub:	Ethernet straight cable	100 metres	
NTCPU to Printer:	Serial cross cable	15 metres	
IP Telephone	LAN (UTP) cable with category 3 or more for 10Base-T, and category 5 or more for 100 Base-TX	15	
PC to CTA	Serial Straight Thru Cable	1.5	
16VOIPU PCB to IP Telephone and Router	Standard Ethernet Cable	100	
DID Trunks:		DTMF = 1,500 ohm DP = 3,000 ohm	Includes SLT or exchange
2/4/8BRIU to ISDN Terminals:	4-wire 24 AWG	100m with Point-Multi-point short connection 300m with Point-Multi-point long connection 500m with Point-Point connection	
PRIU to ISDN Terminals:	4-wire 24 AWG	50	
APSU to LAN Terminals:	Ethernet cable	100 metres	

7

PARTS LIST

Station Equipment

Description	Part Number
2-Button Telephone - Black	0890047
2-Button Telephone - White	0890048
12-Button Handsfree Non-Display Telephone - Black	0890041
12-Button Handsfree Non-Display Telephone - White	0890042
12-Button Handsfree Display Telephone - Black	0890043
12-Button Handsfree Display Telephone - White	0890044
24-Button Handsfree Display Telephone - Black	0890045
24-Button Handsfree Display Telephone - White	0890046
24-Button Super Display Telephone - Black	0890049
24-Button Super Display Telephone - White	0890050
24-Button Aspila EX IP Telephone - Black	0890065
Full Duplex Speakerphone - Black	0890062
Full Duplex Speakerphone - White	0890063
24-Button DLS Console - Black	0890053
24-Button DLS Console - White	0890054
110-Button DSS Console - Black	0890051
110-Button DSS Console - White	0890052

Peripheral Station Equipment

Description	Part Number
AC Adapter (AC-R)	780109
Analogue Interface with Ringing Adapter (APR)	0890056
Analogue Interface without Ringing Adapter (APA)	0890057
Call Recording Adapter (ADA)	0890055
Door Box	92245
IP Adapter (IP)	0890060
Power Failure Adapter for IP Telephone	0890067
Recording Adapter for IP Telephone	0890066
RS-232C Adapter (CTA)	0890058
USB Adapter (CTU)	0890059

Common Equipment

Description	Part Number
Aspila EX 8 Slot KSU	0890000
Power Supply IP1WW-PSU-C1	
19” Rack Mount Bracket	0891300
KSU Expansion Set	0891001

PCBs

Description	Part Number
Common Cards/Parts	
KSU Expansion Set	0891001
72 Port CPU (NTCPU-A0)	
128 Port CPU (NTCPU-A1)	
712 Port CPU (NTCPU-B1)	
Port increase for NTCPU-A0	
Feature Upgrade for NTCPU-A1	
DSP Resource Daughter Board	
Trunk Interfaces	
4 CO Loop Start Trunk PCB	0891005
8 CO Loop Start Trunk PCB	0891004
4 CO Loop Start/Ground Start Trunk PCB	0891029
8 CO Loop Start/Ground Start Trunk PCB	0891028
8 DID/OPX PCB	0891012
4 DID/OPX PCB	0891013
4 E&M Tie Line PCB	0891011
2 BRI PCB	0891006
4 BRI PCB	0891007
8 BRI PCB	0891008
PRI PCB	0891009
Station Interfaces	
8 Aspila EX Digital Station PCB	0891015
16 Aspila EX Digital Station PCB	0891014
16 i-Series Digital Station PCB (Not available)	0891016
8 Analogue Station PCB	0891017
8 Analogue Station Expansion Daughter Board	0891018
2 Port Aspila EXmail PCB	0891032
4 Port Aspila EXmail PCB	0891037
4 Port Aspila EXmail Plus PCB	0891033
4 Port Aspila EXmail Expansion Daughter Board	0891034
4 Port Aspila EXmail UMS PCB	0891035
8 PACS PCB	0891019
10/100Base-T 8-Port Switching Hub PCB	0891021
16 Channel VoIP Media Gateway PCB	0891022
16 Channel VoIP Media Gateway Expansion Daughter Board	0891023
In-Skin Server Without OS	0891025
SLT Adapter	0891026
2 Door Box/Page/ACI Module	0891027

Numerics

A

B

C

D

Index

Index

V

W

Index

NEC

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Aspila EX Hardware Manual

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