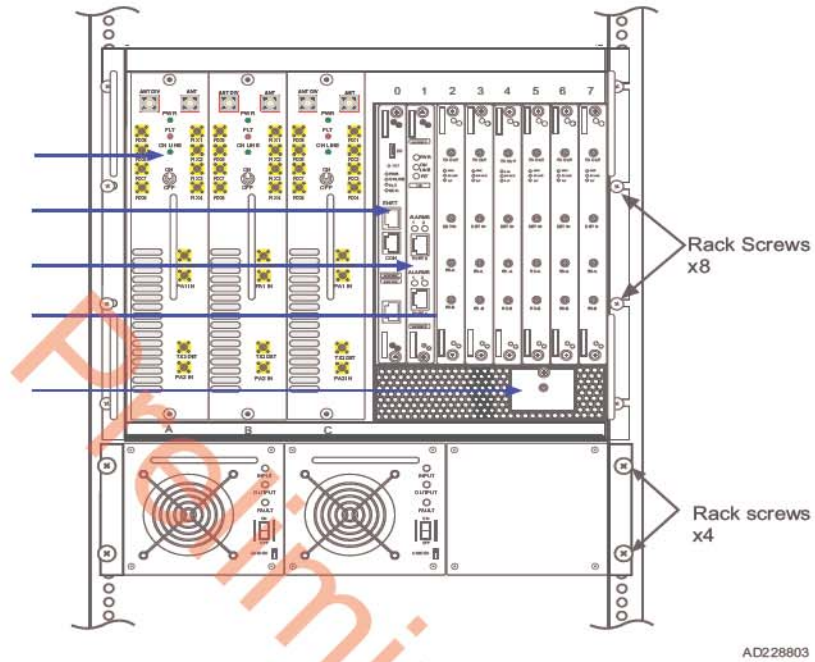


- 6 Align and mount the RF adapter plate, shown in Figure 2-5, above the chassis in the rack using customer-provided screws.



AD228803

Figure 2-5: Attaching the Subrack Assemblies

- 7 Connect the alarm cable between the power supply subrack assembly and the Micro subrack assembly. See Figure 2-6. Secure the cable by tightening the phillips screws.
- 8 There are two internal power cables between the power supply assembly and the chassis card cage. Power cable 1 (yellow labels) provides 27V and GND connections while power cable 2 (blue labels) provides 5V, 12V and GND connections.

Refer to Section 1.5 for more information on cabling and on verifying that cables are connected correctly.

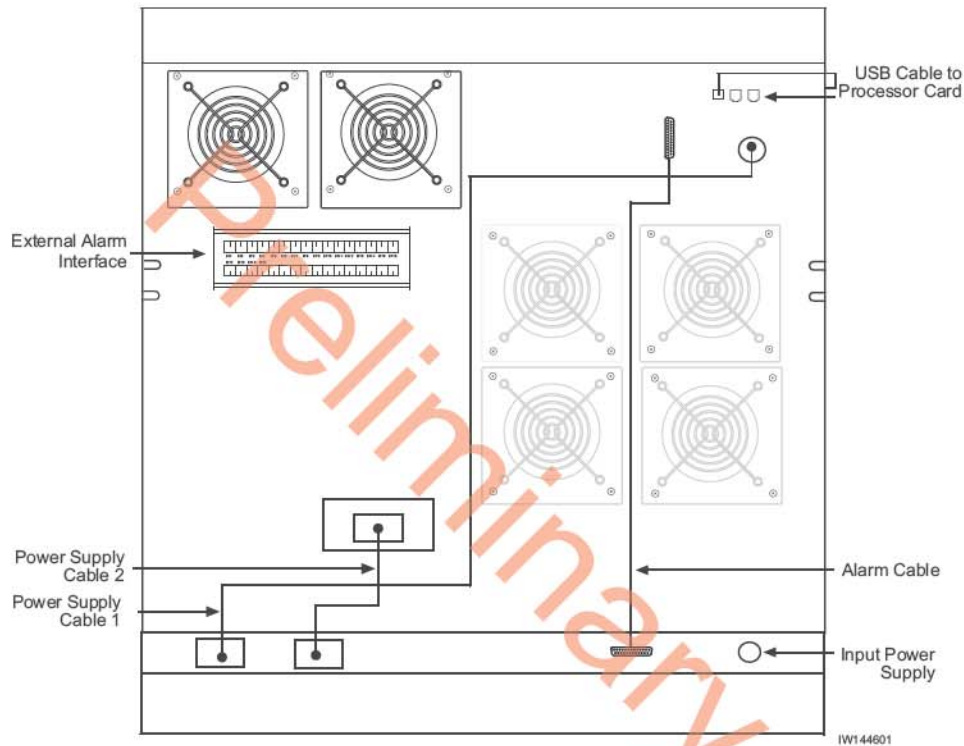


Figure 2-6: Power Cabling and Alarm Cabling

- 9 Connect the power supply cables between the power supply assembly and the card cage assembly, as shown in Figure 2-6 (check the main configuration label described in Figure 1-11 for power specifications).

First connect the blue connector to the card cage assembly which will snap into place, and then connect and tighten the round quick disconnect connector to the power supply connector by twisting the connector housing.

- 10 If you are using a rectifier assembly (necessary if using an AC power supply), connect the rectifier assembly DC output cable to the top rear of the power supply.

Then connect both of the rectifiers to the AC power strip using the supplied IEC standard power cables.

- 11 For the RF connections between the RF module(s) and the N-type adapter plate, you must refer to [Section 2.7](#) for configuration specific connection locations. Connect the rigid RF cables between the RF modules and adapter plate.
- 12 You have completed the hardware installation. Proceed to [Section 2.3](#) to continue the Micro BTS configuration.

2.2.2 ENCLOSURE INSTALLATION

The Micro BTS chassis should be mounted on a concrete pad of sufficient density to support the weight of the cabinet assembly. Alignment pins may be installed in the concrete pad at the locations provided in [Figure 2-7](#). The alignment pins should be 0.5 inches (1.27 cm) in diameter and protrude from 4.1 inches to 4.4 inches (10.41 cm to 11.18 cm) from the concrete pad.

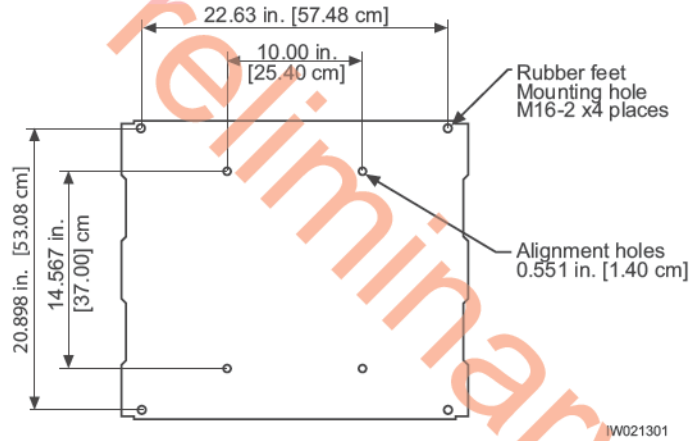


Figure 2-7: Cabinet Footprint

Enough clearance should be provided from the front and back of the cabinet to fully open the doors. This requires at least 24 inches (61 cm) from the front and rear doors. The minimum clearance required on either side of the cabinet is 4.5 inches (11.4 cm) and the minimum clearance required below the cabinet is 1.8 inches (4.59 cm). The mounting site should also have ample clearance for the trunk and antenna cables to be attached to the connectors at the top of the cabinet.

The required footprint for your cabinet installation must be at least 73.5 inches (186.7 cm) by 31.5 inches (80 cm). Be sure there is sufficient airflow around the unit.

The cabinet is mounted on casters and may be carefully moved from the unpacking site to its final mounting location. The cabinet has four rubber feet which will raise the cabinet off of the

casters. The dimensions for the engagement height of the rubber feet is shown in Figure 2-1. If you have alignment pins mounted in your concrete pad, use the procedure in this section.

If you do not have the alignment pins, Figure 2-8 illustrates the location of eight M10 tap holes which may be used for customer supplied mounting studs, eye hooks or angle brackets for securing the Micro BTS cabinet in its final location.

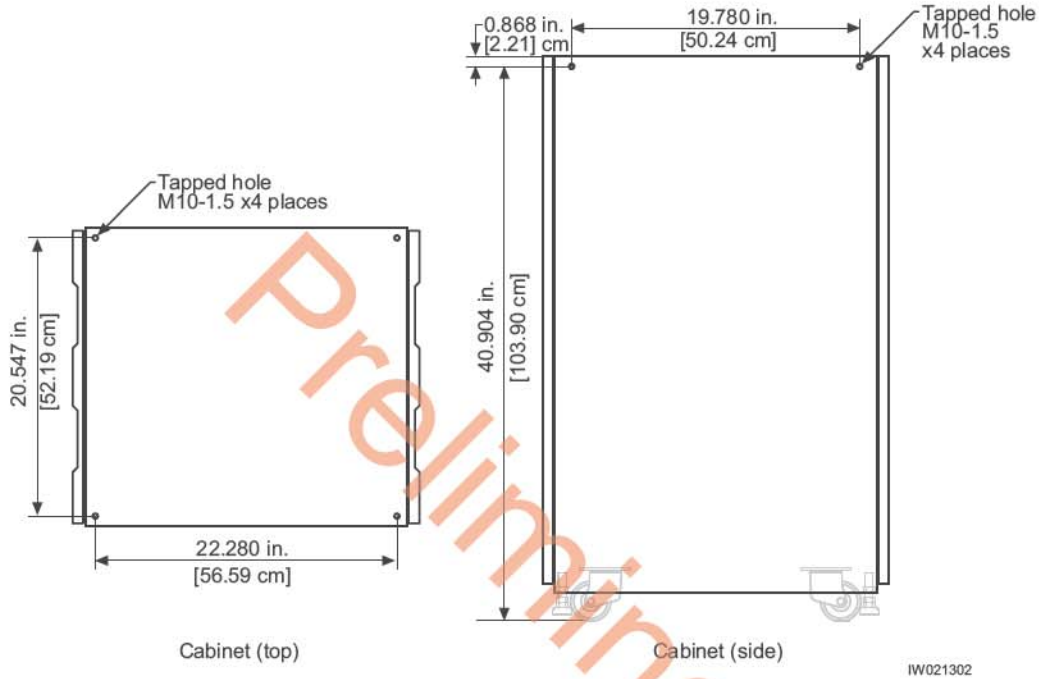


Figure 2-8: Cabinet Dimensions

Note:

- Make sure the ambient temperature around the unit (which may be higher than the room temperature) is within the specified limit.
- Make sure there is sufficient airflow around the unit.
- Make sure electrical circuits are not overloaded - consider the nameplate rating of all the connected equipment, and make sure you have over current protection.
- Make sure the equipment is properly grounded.
- Make sure no objects are placed on the top of the unit.

2.2.2.1 Required Materials

- Angle brackets (customer supplied)
- Four M10 machine screws and washers (customer supplied)

2.2.2.2 Required Tools

- 25 mm open end or adjustable wrench

2.2.2.3 Installation Instructions

- 1 Move the cabinet into its final location. If using alignment pins to prevent movement, move the cabinet into position over the pins.
- 2 Lower each of the rubber feet until each reaches the concrete pad.
- 3 Using the 25 mm open end or adjustable wrench, lower each foot until the casters are raised from the concrete floor, approximately 0.25 inches (0.65 cm).
- 4 Remove the casters from the bottom of the cabinet.
- 5 Lower the cabinet to within 4.1 inches to 4.4 inches (10.41 cm to 11.18 cm) of the concrete pad. If you are using alignment pins, lower the cabinet until the pins enter the alignment holes no more than 0.25 inches (0.6 cm). Do not lower the cabinet too far over alignment pins as they may puncture internal components.
- 6 Secure locking nuts on foot studs.
- 7 Secure the cabinet using customer-provided 10 mm screws.



Note: You may use the additional M10 tap holes to secure the cabinet as site-specific conditions allow.

2.2.2.4 Rack Mount Advisory

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



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

Attention: Pour éviter toute blessure corporelle pendant les opérations de montage ou de réparation de cette unité en casier, il convient de prendre des précautions spéciales afin de maintenir la stabilité du système. Les directives ci-dessous sont destinées à assurer la protection du personnel:



- Si cette unité constitue la seule unité montée en casier, elle doit être placée dans le bas.
- Si cette unité est montée dans un casier partiellement rempli, charger le casier de bas en haut en plaçant l'élément le plus lourd dans le bas.
- Si le casier est équipé de dispositifs stabilisateurs, installer les stabilisateurs avant de monter ou de réparer l'unité en casier.

Warnung: Zur Vermeidung von Körperverletzung beim Anbringen oder Warten dieser Einheit in einem Gestell müssen Sie besondere Vorkehrungen treffen, um sicherzustellen, daß das System stabil bleibt. Die folgenden Richtlinien sollen zur Gewährleistung Ihrer Sicherheit dienen:



- Wenn diese Einheit die einzige im Gestell ist, sollte sie unten im Gestell angebracht werden.
- Bei Anbringung dieser Einheit in einem zum Teil gefüllten Gestell ist das Gestell von unten nach oben zu laden, wobei das schwerste Bauteil unten im Gestell anzubringen ist.
- Wird das Gestell mit Stabilisierungszubehör geliefert, sind zuerst die Stabilisatoren zu installieren, bevor Sie die Einheit im Gestell anbringen oder sie warten.

2.3 CONFIGURING THE E1 OR T1 TRUNK CARD

This section describes how to configure E1 or T1 trunk cards.

These procedures are designed for E1 or T1 cards that are shipped pre-configured in a system. To configure E1 or T1 cards that are shipped as configured or unconfigured replacements, refer to the [GSM Field Maintenance Guide](#).

Your system is shipped from the manufacturer configured with the correct cards for your site-specific application. These can be 75 ohm E1, 120 ohm E1 or 100 ohm T1 cards. All cards are shipped with the appropriate connectors.



Note: Cable runs of greater than 600 meters (1968 feet) are not supported directly from the card. If you are attempting a longer cable run between UltraWAVE chassis please contact Customer Service to determine if you need a repeater for your application.

Table 2-10 lists the cards and the procedures that apply to each card type.

Table 2-10: Trunk Cards and Procedures

LABEL	DESCRIPTION	OPERATION
75 ohm	75 ohm E1 card	Set the ground to the Transmit or Receive side using the jumpers. Refer to Section 2.3.1 .
120 ohm	120 ohm E1 card	No configuration is required.
100 ohm	100 ohm T1 card	Configure the DIP switch based on cable length to the DSX-1 demarcation point. Refer to Section 2.3.2 . Note: No configuration is required unless connecting to a DSX-1 demarcation point greater than 133 feet.

2.3.1 CONFIGURING GROUND JUMPERS ON 75 OHM E1 CARDS

To configure the ground jumpers on a 75 ohm E1 card:

- 1 Ensure that anti-static precautions are taken. Refer to Section 1.2 for anti-static precautions.
- 2 Make note of the orientation of the cables and disconnect them from the selected card.
- 3 Using a Phillips screwdriver, fully loosen the two captive screws located at the top and bottom of the card.
- 4 Remove the card by firmly pulling the two white tabs located at the top and bottom of the card.
- 5 See Figure 2-9 to locate jumpers P8 through P11.
- 6 Set the signal grounding to the Transmit or Receive Side.

Jumpers P8, P9, P10 and P11 control the signal grounding. Placing the jumper across Pins 1 and 2 sets the corresponding ground; otherwise the jumper should be placed across Pins 2 and 3.

The following table shows the jumper assignments:

Table 2-11: Ground Jumpers

GROUND SELECTION	PORT	JUMPER POSITIONS	
Receive Side	Port 0	P8 = 1 to 2	P9 = 2 to 3
	Port 1	P10 = 2 and 3	P11 = 1 and 2
Transmit Side	Port 0	P8 = 2 to 3	P9 = 1 to 2
	Port 1	P10 = 1 and 2	P11 = 2 and 3

ADC recommends grounding the receive (RX) side on 75 ohm cards.



Note: Only one side of the transmission link should be grounded. To ensure that only the one side is grounded, you should check the settings at the far end of the E1 transmission link when possible. These settings should be identified by experienced personnel.

- 7 Place the card into the slot and slide in the card until it completely rests inside the slot. Push the card firmly into place.
- 8 Using a Phillips screwdriver, tighten the two captive screws.
- 9 Reconnect all disconnected cables to their proper ports on the E1 card.

Figure 2-9 shows the location of the grounding jumpers.



Figure 2-9: Ground Jumpers (P8 through P11)

2.3.2 CONFIGURING CABLE LENGTH DIP SWITCH SETTINGS ON T1 CARDS

To configure the DIP switch settings on a T1 card:

- 1 Ensure that anti-static precautions are taken. Refer to Section 1.2 for anti-static precautions.
- 2 Make note of the orientation of the cables and disconnect them from the selected card.
- 3 Using a Phillips screwdriver, fully loosen the two captive screws located at the top and bottom of the card.
- 4 Remove the T1 card by firmly pulling the two white tabs located at the top and bottom of the card.
- 5 See Figure 2-10 to locate the DIP switch.
- 6 On T1 cards, the DIP switch setting is determined by the cable distance from the card to the DSX-1 demarcation point. The following table provides the appropriate Port 0 and Port 1 DIP switch settings for DSX-1 demarcation points located within various cable distance ranges.



Note: In Table 2-12, the first setting (0-133 ft.) is the default and should be used for all T1 applications unless connecting to a DSX-1 demarcation point beyond 133 ft. When connecting two chassis you will always use the first setting regardless of distance (up to 600 m).

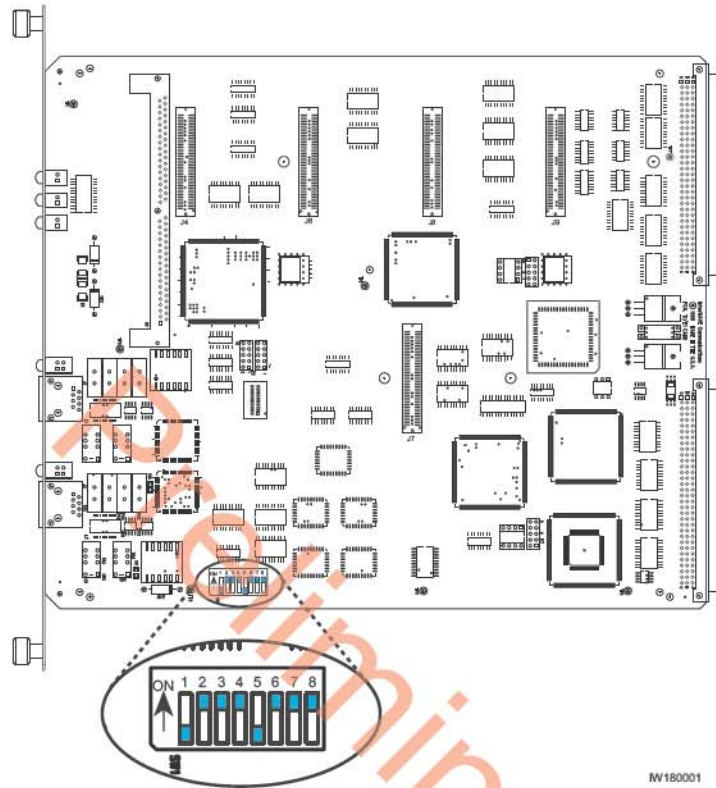
Table 2-12: T1 DIP Switch Settings

PORT 0 SWITCH SETTING 1-2-3-4	PORT 1 SWITCH SETTING 5-6-7-8	CABLE DISTANCE FROM T1 CARD TO DSX-1 DEMARCATION POINT FEET (METERS)
OFF-ON-ON-ON	OFF-ON-ON-ON	0-133 (0-40.57)
OFF-OFF-ON-ON	OFF-OFF-ON-ON	133-266 (40.57-81.13)
OFF-ON-OFF-ON	OFF-ON-OFF-ON	266-399 (81.13-121.7)
OFF-OFF-OFF-ON	OFF-OFF-OFF-ON	399-533 (121.7-162.57)
OFF-ON-ON-OFF	OFF-ON-ON-OFF	533-655 (162.57-199.78)

Note: ON refers to the DIP switch pin being in the “UP” position and OFF refers to the DIP switch pin being in the “DOWN” position. X = either ON or OFF.

- 7 Place the card into the slot and slide in the card until it completely rests inside the slot. Push the card firmly into place.
- 8 Using a Phillips screwdriver, tighten the two captive screws into the chassis through the trunk card.

Figure 2-10 shows the location of the DIP switch.



NV180001

Figure 2-10: Location of DIP Switch on a T1 Trunk Card

2.4 CONNECTING GROUND CABLES

Use this section to connect your earth ground and power cables to the Micro BTS cabinet.

2.4.1 CONNECTING THE GROUNDING CABLE

The rack unit in which the Micro BTS subracks are being mounted should be properly grounded to the site earth ground ring. You must attach a ground strap to each subrack and to the rack unit or directly to the site ground ring.

- 1 Locate the ground lugs on each subrack assembly. See Figure 2-11 for their location.



Figure 2-11: Micro Subrack, Power Supply, and Rectifier Ground Lugs

- 2 Remove the nut from each ground lug and connect a ground lead to each subrack. Secure the nut tightly on each subrack assembly.
- 3 Attach the ground cables to the properly grounded rack assembly or to the closest earth ground bus.

2.4.2 GROUNDING THE CABINET

The subrack assemblies are grounded to the cabinet by the manufacturer. The cabinet should be grounded to the site earth ground ring. Complete the following to connect an earth ground to the chassis.

- 1 Route a customer supplied 8 AWG (8.36 mm²) or larger copper wire terminated with a ground lug sized to accommodate an M5 stud through the access hole located on the top of the cabinet as shown in Figure 2-12.



Figure 2-12: Grounding the cabinet

- 2 Using a 8 mm socket wrench, connect the ground lug to the M5 grounding stud using the existing nut as shown in Figure 2-12.

Caution: Grounding circuit continuity is vital for safe operation of machine. Never operate machine with grounding conductor disconnected.



Attention: Un circuit de terre continu est essentiel en vue du fonctionnement sécuritaire de l'appareil. Ne jamais metre l'appareil en marche lorsque le cable de mise à la terre est débranche.

Warnung: Achtung, Hoher Ableitstrom! Schutzleiteranschluß vor dem Netzanschluß herstellen.

2.5 CONNECTING POWER SUPPLIES

In this section, you will connect the Micro BTS to your power source. Before beginning it is necessary to first:

- Identify your power configuration. This may be AC (220 V, 30 A 50-60 Hz) or DC (-40 V to -60 V, 40 A).
- Install your power supplies.

When you have completed these tasks, refer to the appropriate subsection to make either AC or DC power connections:

- Connecting AC power. See Section 2.5.1
- Connecting DC power. See Section 2.5.2

Warning: This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 110 VAC, 30 A; 220 VAC, 15 A; or -48 VDC, 40 A is used on the phase conductors (all current-carrying conductors).



Attention: Pour ce qui est de la protection contre les courts-circuits (surtension), ce produit dépend de l'installation électrique du local. Vérifier qu'un fusible ou qu'un disjoncteur de 110 VAC, 30 A alt., 220 VAC, 15 A alt., -48 VDC 40 A est utilisé sur les conducteurs de phase (conducteurs de charge).

Warnung: Dieses Produkt ist darauf angewiesen, daß im Gebäude ein Kurzschluß- bzw. Überstromschutz installiert ist. Stellen Sie sicher, daß eine Sicherung oder ein Unterbrecher von nicht mehr als 110 V Wechselstrom, 30 A; 220 V Wechselstrom, 15 A; oder -48 V Gleichstrom, 40 A an den Phasenleitern (allen stromführenden Leitern) verwendet wird.

2.5.0.1 Identifying Power Configurations

The Micro BTS uses a direct DC power input. AC input can only be supported using a rectifier.

You can determine the power requirements for your system by checking the main configuration label. This label is located on either the exterior of your shipping container or on the rear of the subrack as shown in Figure 1-11. Use Table 1-1 to identify your system power configuration.

Figure 2-12 displays the Micro BTS DC power supply modules.

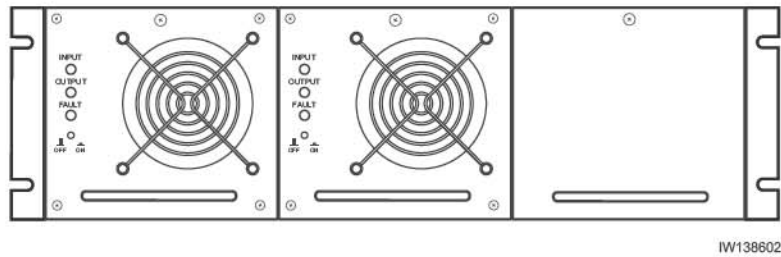


Figure 2-13: DC Power Supply Assembly

2.5.0.2 Installing DC Power Supply Modules

The customer ordered configuration determines the number of power supply modules included with the Micro BTS. The power supply modules must be installed according to the following procedure:

- 1 Remove the power supply module from the packaging.
- 2 Insert the power supply module in the first empty slot at the front left of the subrack assembly.
- 3 Slide the power supply module into the chassis.
- 4 Twist the captive screws clockwise to secure the power supply module into place.

2.5.1 CONNECTING AC POWER

AC power can ONLY be delivered to the Micro BTS power supply using a rectifier assembly.

The Micro BTS is shipped with the internal cabling routed from the rectifier assembly to the top rear of the DC power supply assembly. In a cabinet assembly, the rectifier receives AC power from the power cable connected to the roof of the cabinet at the rear. See Figure 2-13.

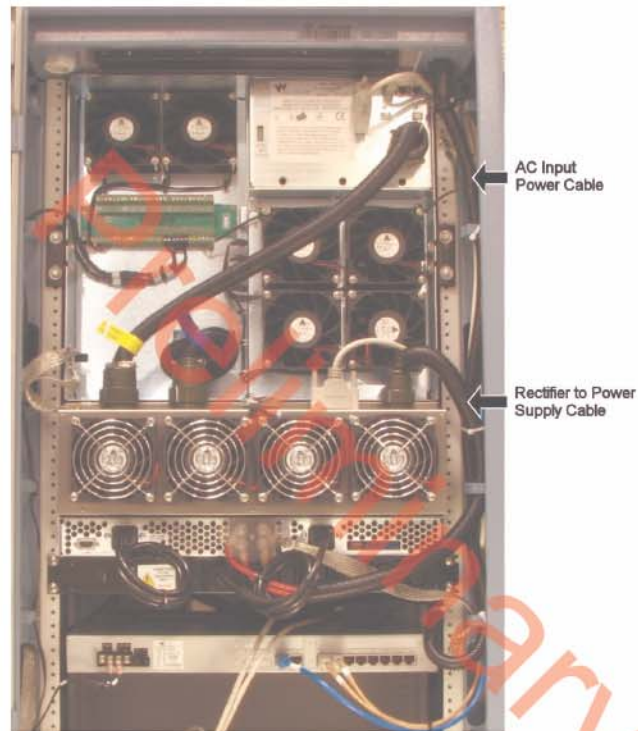


Figure 2-14: AC Power Input on the Cabinet Assembly Rear

2.5.1.1 Connecting the AC Power Supply to the Cabinet

- 1 Verify the ground connection you made in Section 2.4.1 is secure.
- 2 Make sure that the power switch located on all power supply modules is in the OFF position. See Figure 2-14 for the location of the power supply power switches.

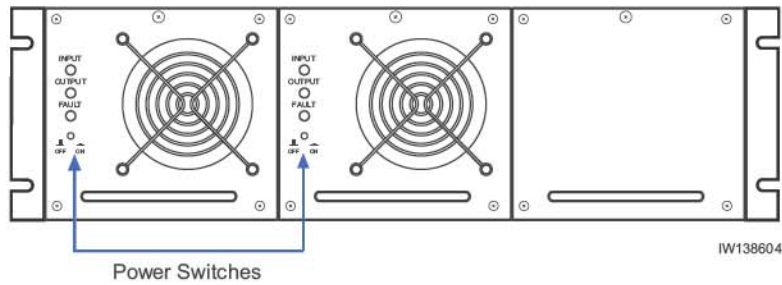


Figure 2-15: DC Power Supply Module ON/OFF Switches

- 3 Ensure the rectifier assembly is not receiving power from the power strip - the ON/OFF switch on the power strip should be in the OFF position.
- 4 Use the IEC standard power cables to connect the power strip to both rectifier power inputs at the rear of the rectifier assembly. The power strip should NOT be used for any purpose other than to power the rectifier.
- 5 To connect AC power to the power strip, connect the AC input power cable from the roof of the cabinet (See Figure 2-13) to the lone IEC standard socket at the front of the power strip.
- 6 If using a rack mounted system, use a local adapter to connect the external AC power source directly to the lone IEC standard socket at the front of the power strip. See Figure 2-15.



Figure 2-16: Power Supply Connection

- 7 Using the power cable provided in Figure 2-16, connect the external AC power source to the external AC connector on the roof of the cabinet shown in Figure 2-17.



Figure 2-17: AC Round Quick Disconnect Connector and Cable



Figure 2-18: AC Input Socket on Exterior of Cabinet Roof

- 8 **Do not apply power to the chassis at this time.** Wait until you are performing the off-line commissioning procedures in the next chapter.

Caution: The power supply cord is used as the main disconnect device, ensure that the socket-outlet is located/installed near the equipment and is easily accessible.



Attention: Le cordon d'alimentation est utilisé comme interrupteur général. La prise de courant doit être située ou installée à proximité du matériel et être facile d'accès.

Warnung: Das Netzkabel dient als Netzschalter. Stellen Sie sicher, dass die Steckdose einfach zugänglich ist.



Note: The power supplies' INPUT LEDs will illuminate and power supply fans will start when connected to the power source. Do not power on the cabinet at this time.

2.5.2 CONNECTING DC POWER

The Micro BTS is shipped from the factory with the internal cabling routed from the DC power supply subrack assembly to a round quick disconnect connector on the top rear of the cabinet. See Figure 2-18.

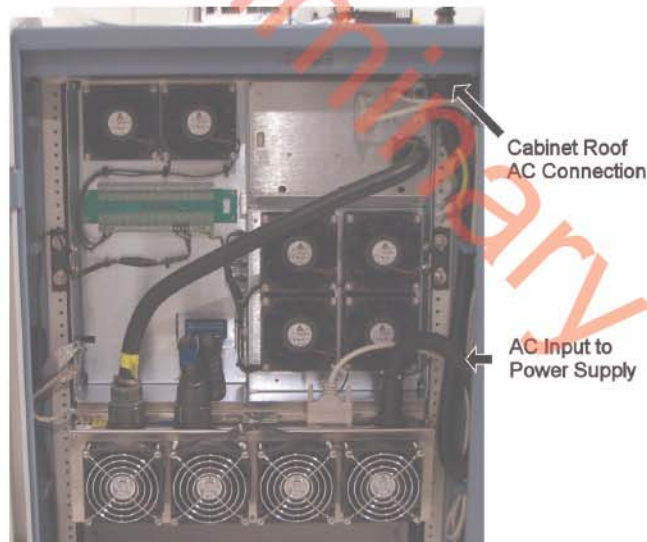


Figure 2-19: DC Power Connections

2.5.2.1 DC Input Power Connector Details

The input power connector cable is supplied with the cabinet assemblies (See Figure 2-19). This section explains how to assemble the input power connector and cable.

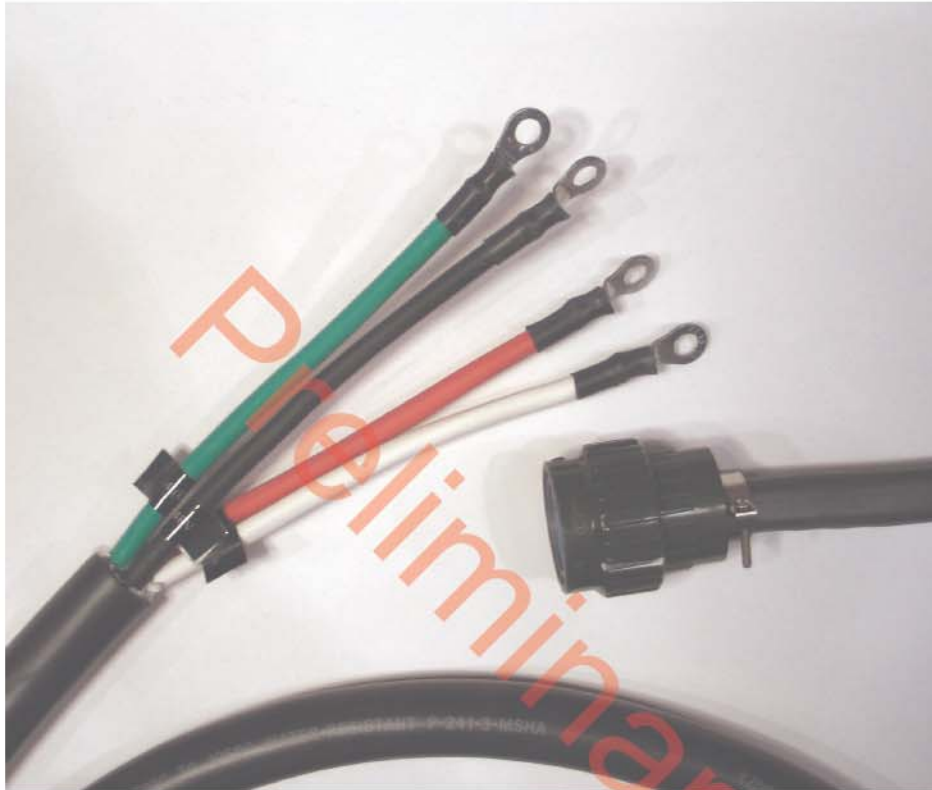


Figure 2-20: DC Round Quick Disconnect Connector and Cable

The cable wires are connected to the input power supply as follows:

- Black is connected to the -48 VDC supply.
- Red is connected to the -48 VDC supply.
- White is a return and typically connected to the cabinet ground.
- Green is a return and typically connected to the cabinet ground.



Note: Two wires carry -48 VDC and two wires must carry Return.

2.5.2.2 Connecting the DC Power Supply to the Cabinet

Use the following procedure:



Caution: The power main must be a Safe Extra-Low Voltage (SELV), -48 VDC supply as defined in IEC950 and EN60950.

- 1 Verify the ground connection you made in Section 2.4.1 is secure. The cabinet is grounded through this connection. It is critical that this connection is made properly.
- 2 Make sure that the power button located on all power supply modules is in the raised OFF position. See Figure 2-20 for the location of the power supply power buttons.

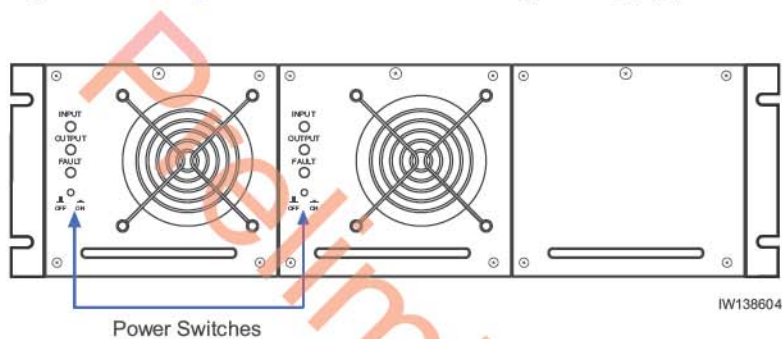


Figure 2-21: DC Power Supply Module ON/OFF Switches

- 3 Verify the -48 VDC power source is off.
- 4 The -48 VDC power cable has two wires for negative (-) connection and two wires for return (+) connection. This spreads the current draw across two pins of the round quick disconnect connector for each connection.
- 5 Attach the two return (+) cables (corresponding to pins 1 and 4 of the connector) to the positive side of your -48 VDC power source.
- 6 Attach the two negative (-) cables (corresponding to pins 2 and 3 of the connector) to the negative side of your -48 VDC power source.

- 7 Plug the round quick disconnect connector as illustrated in Figure 2-19 into the power connection on the top of the cabinet as illustrated in Figure 2-21. Secure the connector by twisting the connector sleeve until the lines on the cable connector and chassis connector align.



Figure 2-22: Cabinet External Power Supply Connection

If you have ordered the Micro BTS as separate subrack assemblies, you will connect the input power cable directly to the power supply subrack assembly.

- 8 Do not apply power to the chassis at this time. Wait until you are performing the off-line commissioning procedures in the next chapter. See Figure 2-22.



Note: The power supply INPUT LEDs will illuminate and power supply fans will start when connected to the power source. Do not power on the cabinet at this time.

Caution: The power supply cord is used as the main disconnect device, ensure that the socket-outlet is located/installed near the equipment and is easily accessible.



Attention: Le cordon d'alimentation est utilisé comme interrupteur général. La prise de courant doit être située ou installée à proximité du matériel et être facile d'accès.

Warnung: Das Netzkabel dient als Netzschalter. Stellen Sie sicher, das die Steckdose einfach zugänglich ist.

Figure 2-22 shows the DC input power connector location on the rear of the power supply.

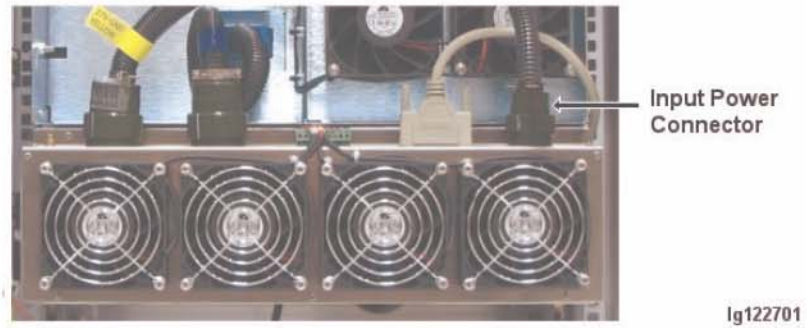


Figure 2-23: Power Supply Rear Showing DC Input

Preliminary

2.6 CONNECTING E1 OR T1 TRUNK CABLES

External trunk cabling depends on the configuration that the customer ordered and the site-specific requirements. These cables will be supplied by the customer. Failure to use electrically compliant T1 or E1 cables may cause transmission errors. Please refer to the appropriate subsections to determine your cable requirements.

The E1 or T1 trunk cables are routed directly to the E1 or T1 trunk card in the Micro subrack assembly. All three types of signaling (E1 75 ohm, E1 120 ohm and T1 100 ohm) are terminated at the cabinet with RJ-48C port connectors.

2.6.1 E1 CABLES

2.6.1.1 E1-75 ohm

This is coaxial cable with a nominal impedance of 75 ohm $\pm 5\%$ at 1 MHz. The maximum allowable cable distance depends directly on the insertion loss of the cable at 1 MHz. In this mode, the E1 trunk card can accommodate up to 6 dB of cable loss.

2.6.1.2 E1-120 ohm

This cable is individually shielded twisted pair with a nominal impedance of 120 ohm $\pm 5\%$ at 1 MHz. The maximum allowable cable distance depends directly on the insertion loss of the cable at 1 MHz. In this mode, the E1 trunk card can accommodate up to 9 dB of cable loss.

Table 2-13 provides a description of cables required for installation and connection to an E1 network, but not supplied with the Micro BTS.



Note: Before connecting E1 lines to the Micro BTS, it is assumed that the quality of the lines has been verified. It is recommended that Bit Error Ratio (BER) tests are completed to ensure that the BER is less than 10^{-8} .

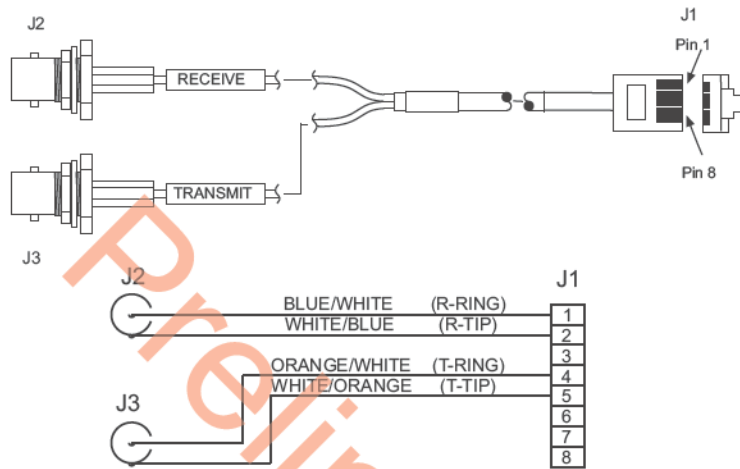
Table 2-13: Customer-Supplied E1 Cabling

CABLE IDENTITY	CABLE TYPE	CORRESPONDING CABLE PLUG
E1, 120 ohm	Shielded, Twisted, 2-Pair	RJ-48C Male
E1, 75 ohm	Coaxial	RJ-48C Male
Antenna (external)	Coaxial	N-Type, Female
Note: The number of cables required depends on the ordered configuration of the Micro BTS.		

2.6.1.3 Conversion Cables

If you are connecting into an existing E1 network with standard BNC or DSUB connectors, a conversion cable for either the 75 ohm or 120 ohm will be required. To purchase these cables from ADC, contact your local sales support representative.

Figure 2-23 illustrates the pinout for an RJ-48C to 75 ohm BNC conversion cable.



IW009302

Figure 2-24: 75 ohm BNC Conversion Cable