NOKIA

FIU 19 (E) Indoor Unit Installation

C33513.85--H0

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Contents

Summary of changes

Document	Date	Comment
C33513007SE_00	09 Mar 1999	
C33513007SE_A0	11 Jun 1999	Instructions updated
C33513007SE_B0	21 Oct 1999	Aux data plug-in unit, 1 + 1 protection, slim rack installation, appendix on cabling added
DN99589183 Issue 2-0 en	05 Jan 2000	Plug-in unit instructions updated, new document numbering scheme adopted
DN99589183 Issue 5-0 en	07 Jul 2000	ETSI rack installation added, updated
DN99589183 Issue 6-0 en	31 May 2001	RJ-45 added; paragraph added in section 5.2 (Install plug-in units in the following order...) + minor corrections, cable lengths added in Appendix; FIU power connections & grounding figure added
DN99589183 Issue 7-0 en	30 Apr 2002	FIU 19E and FIU 19RJ added
DN99589183 Issue 8-0 en	04 Feb 2003	FIU 19RJ removed Added Appendix B: information about UltraSite BTS cabling

1 About this document

This document describes the installation of the FIU 19 (E) radio indoor unit. FIU 19 (E) can be installed in Nokia Site Support System cabinet or in any standard 19-inch rack. FIU 19 (E) can also be installed in a 600 x 300 mm ETSI rack or a slim rack (Nokia TM4) using mounting adapters.

Note

This document is valid for the FIU 19 and FIU 19E indoor units, unless otherwise stated.

The document covers the following topics:

- precautions when installing FIU 19 (E)
- tools and work order of the installation
- installing FIU 19 (E)
- installing plug-in units
- connecting interfaces.

FIU 19 (E) indoor unit can be used with Nokia FlexiHopper and Nokia MetroHopper outdoor units. The instructions in this document apply irrespective of the outdoor unit used. Note, however, that Nokia MetroHopper does not support 1+1 protection.

Refer to the *Installation Overview* part of this manual for general work order and precautions when installing Nokia radios. Refer to the *Outdoor Unit Installation* part when installing the radio outdoor units.

2 Precautions

This chapter describes the issues that must be taken into account when installing the FIU 19 (E) indoor unit. Familiarise yourself thoroughly with the installation instructions before starting the installation.

2.1 Warnings and cautions

Electrical safety

Caution

Never connect or disconnect the Flexbus cable when the power is on. Damage to the equipment may result. Ensure that the Flexbus LED is not on or blinking. Power can be switched off using the manager software.

2.2 Precautions

Before starting the installation, verify that you have the correct equipment and that the equipment has not been damaged during transport.

2.3 Installation restrictions

2.3.1 19-inch units

Consider the following restrictions before installing the indoor unit:

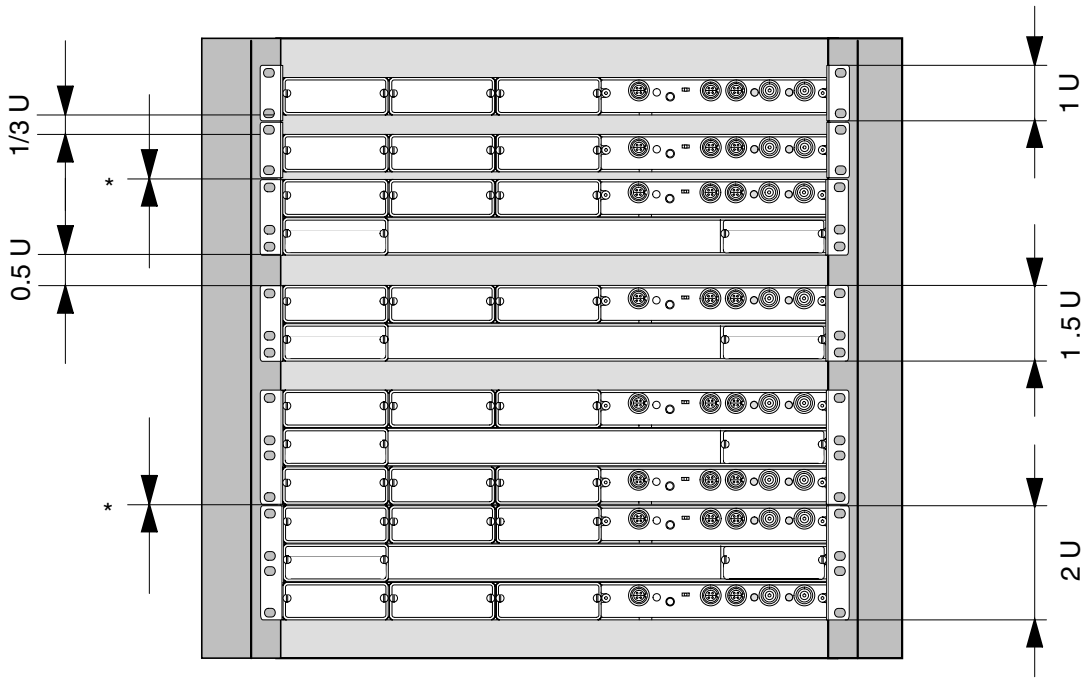
- If FIU 19 (E) is installed in a cabinet, leave adequate space for cables between the front panel and the cabinet door.
- The ambient temperature of the installation location must be within the range given in technical specifications.

  When FIU 19 (E) with 4 - 12 x 2M capacity is installed in a standard 19-inch rack, an air gap of at least 1/3 U is left between the units (1 U = 44.45 mm).

  When FIU 19 (E) with 16 x 2M capacity and no protection is installed in a standard 19-inch rack, an air gap of 0.5 U is left between the unit assemblies.

  When FIU 19 (E) with 16 x 2M capacity and 1+1 protection is installed in a standard 19-inch rack, consider the cooling (Figure 1):

  - In equipment cabinets equipped with a fan improving air circulation, the unit assemblies can be mounted onto each other.
  - In racks with no enhancement of air circulation, a 1 U air gap must be left between the indoor unit assemblies.



*) In a rack not equipped with a fan, an air gap of 1 U must be left here.

Figure 1. Installation of FIU 19 units in a 19-inch rack

2.3.2 Plug-in units

Consider the following restrictions before installing plug-in units in the FIU 19 plug-in unit slots:

- The power cable of the Flexbus plug-in unit must always be disconnected when installing or removing the plug-in unit.
- Negative input voltage is grounded in the Flexbus plug-in unit. The plug-in unit requires an external power supply, if positive grounding is used at the equipment station.
- Install plug-in units only in slots defined for the specific plug-in unit. See Section 5.1 for applicable unit slots.
- If the 16 x 2M expansion unit is installed, remove any 4 x 2M plug-in units in the main unit plug-in slots. Interfaces in them will not work.
- In 1+1 protection, when installing or removing the 16 x 2M IC plug-in unit, the corresponding FIU 19 (E) must be turned off.
- Although the installation and removal of the FIU 19 plug-in units has been designed to work without flaws even with the power on, we recommend that you switch the FIU 19 (E) power off before installing or removing plug-in units. Note that switching the power off cuts the traffic and resets any equipment statistics.

3 Work order

This chapter lists the required parts and tools and gives the suggested work order for the installation of the FIU 19 (E) indoor unit.

3.1 Parts

The required installation parts depend on the configuration. Chapter 4 lists the parts needed in each configuration.

Mounting brackets for the 19-inch rack are included in the unit packages. Mounting adapter kit for the ETSI rack and the TM4 slim rack must be purchased separately.

3.2 Tools

The following tools are required in the installation of the FIU 19 (E) indoor unit:

- 5 mm Allen key; for 19-inch rack screws
- T10 Torx driver; needed when changing the mounting brackets.

In addition the following tool is required when installing the TM4 slim rack mounting kit:

- Phillips screwdriver.

3.3 Task list

Plan the work in advance.

The following order is recommended for the installation of FIU 19 (E):

1. Install the indoor unit (Chapter 4).
2. Connect the Q1 cables and 2 Mbit/s main interface cables (Chapter 6).
3. Connect the Flexbus cables (Chapter 6).
4. Connect the power cable (Chapter 6).

4 Installing FIU 19 (E)

This chapter describes the installation of the FIU 19 (E) indoor unit. The chapter covers:

- installation of FIU 19 (E) in a 19-inch rack
- installation of FIU 19 (E) in an ETSI rack
- installation of FIU 19 (E) in a slim rack
- removal of the FIU 19 (E) units.

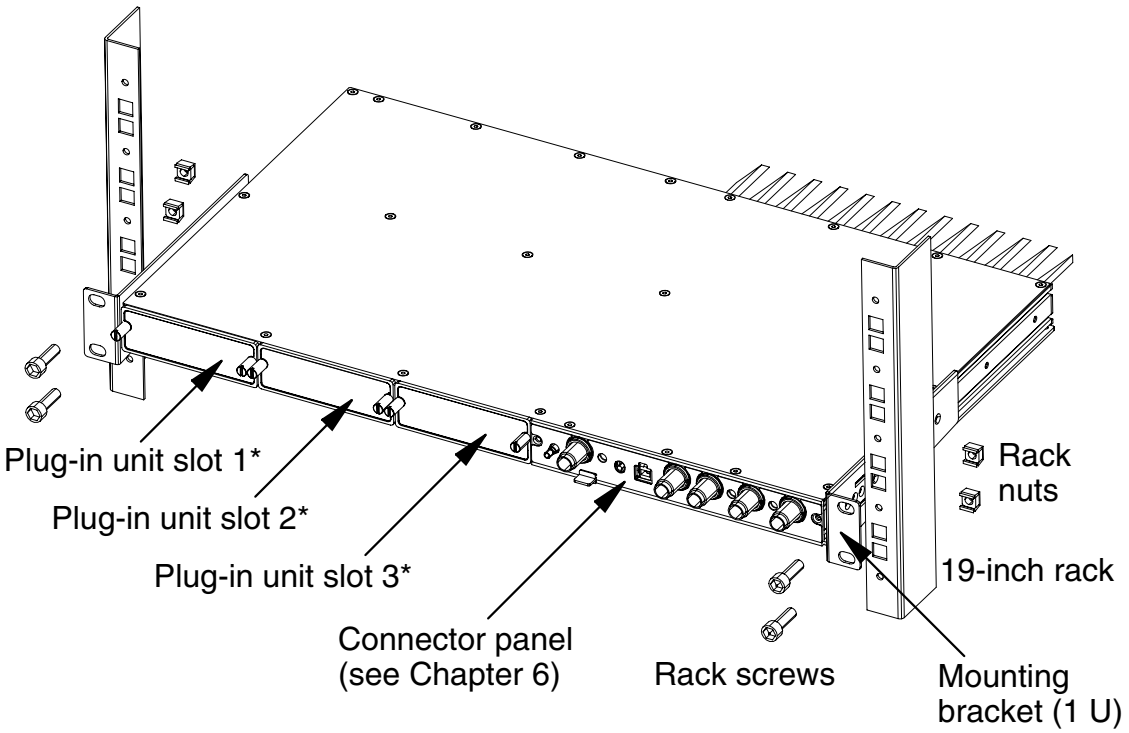
4.1 Installing FIU 19 (E) in a 19-inch rack

FIU 19 (E) is installed in a 19-inch rack using its own mounting brackets. The brackets are included in the FIU 19 (E) packages.

4.1.1 FIU 19 (E) with 4 - 12 x 2M capacity

The following parts are needed in the installation:

- FIU 19 (E) main unit with mounting brackets (1 U)
- four rack nuts and four rack screws (M6x16, Allen-head).



*) Plug-in unit slots are filled at the factory, according to the configuration ordered

Figure 2. Installing FIU 19 4 - 12 x 2M in a 19-inch rack

To install FIU 19 (E) with 4 - 12 x 2M capacity in a 19-inch rack, put the rack mounting nuts (4 pcs) to the rack and fix the main unit to the rack with four screws. Tighten the screws with a 5 mm Allen key.

4.1.2 FIU 19 (E) with 16 x 2M capacity (1+0)

The following parts are needed in the installation:

- FIU 19 (E) main unit
- FIU 19 EXU 16 x 2M expansion unit
- slim mounting brackets for the main unit (*preinstalled in some cases*)
- mounting brackets for the 16 x 2M 1+0 assembly
- backplane 1+0 (for one main unit and expansion unit) and backplane guide pin

- eight M3x10 Torx screws
- six rack nuts and six rack screws (M6x16, Allen-head).

Installing FIU 19 (E) with 16 x 2M capacity (1+0) in a 19-inch rack

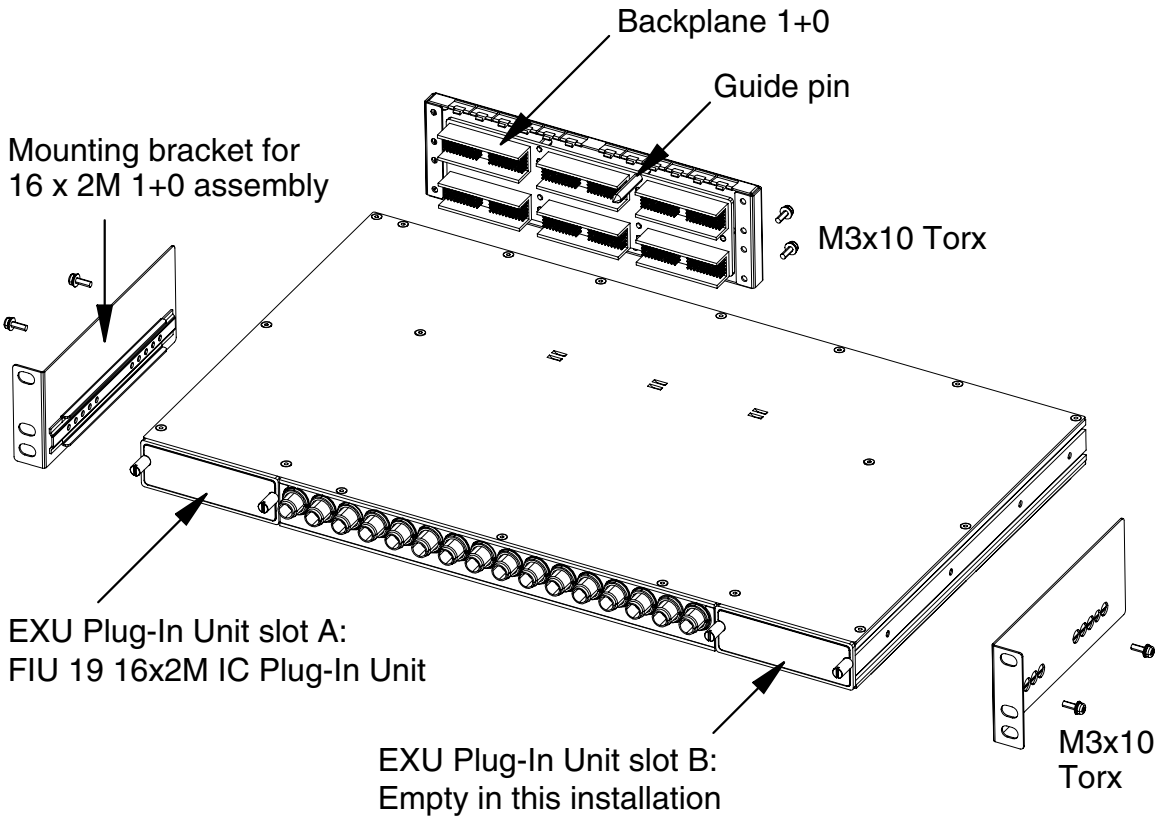


Figure 3. Installing FIU 19 16 x 2M 1+0 in a 19-inch rack, phases 1 - 2

To install FIU 19 (E) with 16 x 2M capacity (1+0) in a 19-inch rack:

1. Screw the left and right side mounting brackets to the wanted depth with two M3x10 Torx screws each.

2. Screw the backplane guide pin to its place (Figure 3). Fix the backplane to the expansion unit with four Torx screws.

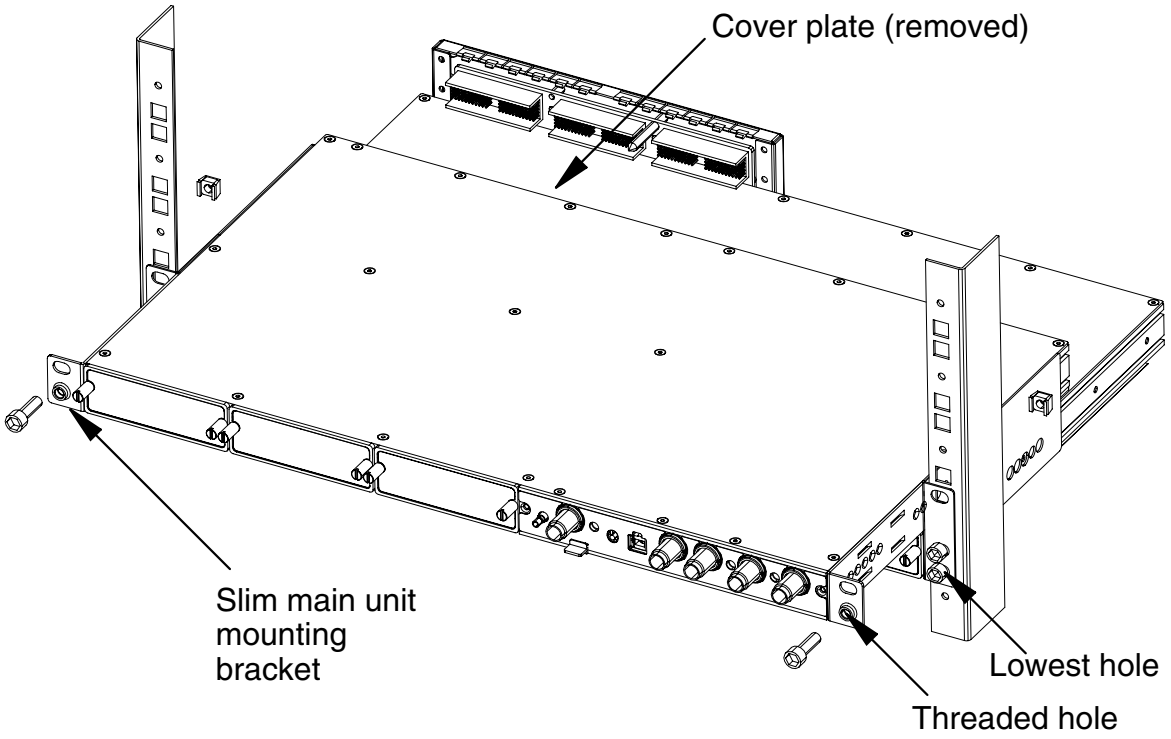


Figure 4. Installing FIU 19 16 x 2M 1+0 in a 19-inch rack, phases 3 - 6

3. (*When applicable*) Replace the normal 1U mounting brackets of the main unit with slim brackets. Use the same Torx screws that were used with the 1U brackets. The brackets should be as shown in Figure 4, free hole up, threaded hole down.

4. Remove the cover plate from the back of the main unit.

5. Put the rack mounting nuts (6 pcs) to the rack and fix the assembly to the rack with four screws, first through the lowest bracket holes (Figure 4). Tighten the screws with a 5 mm Allen key.

6. Slide the main unit gently to its place above the expansion unit. Fix it to the rack with the two remaining screws.

4.1.3 FIU 19 (E) with 16 x 2M capacity and 1+1 protection

The following parts are needed in the installation:

- two FIU 19 (E) main units
- FIU 19 EXU 16 x 2M expansion unit
- mounting brackets for the 16 x 2M 1+1 assembly
- two sets of slim mounting brackets for the main units (*preinstalled in some cases*)
- backplane 1+1 (for two main units and expansion unit) and two backplane guide pins
- eight M3x10 Torx screws
- eight rack nuts and eight rack screws (M6x16, Allen-head).

Installing FIU 19 (E) with 16 x 2M capacity and 1+1 protection in a 19-inch rack

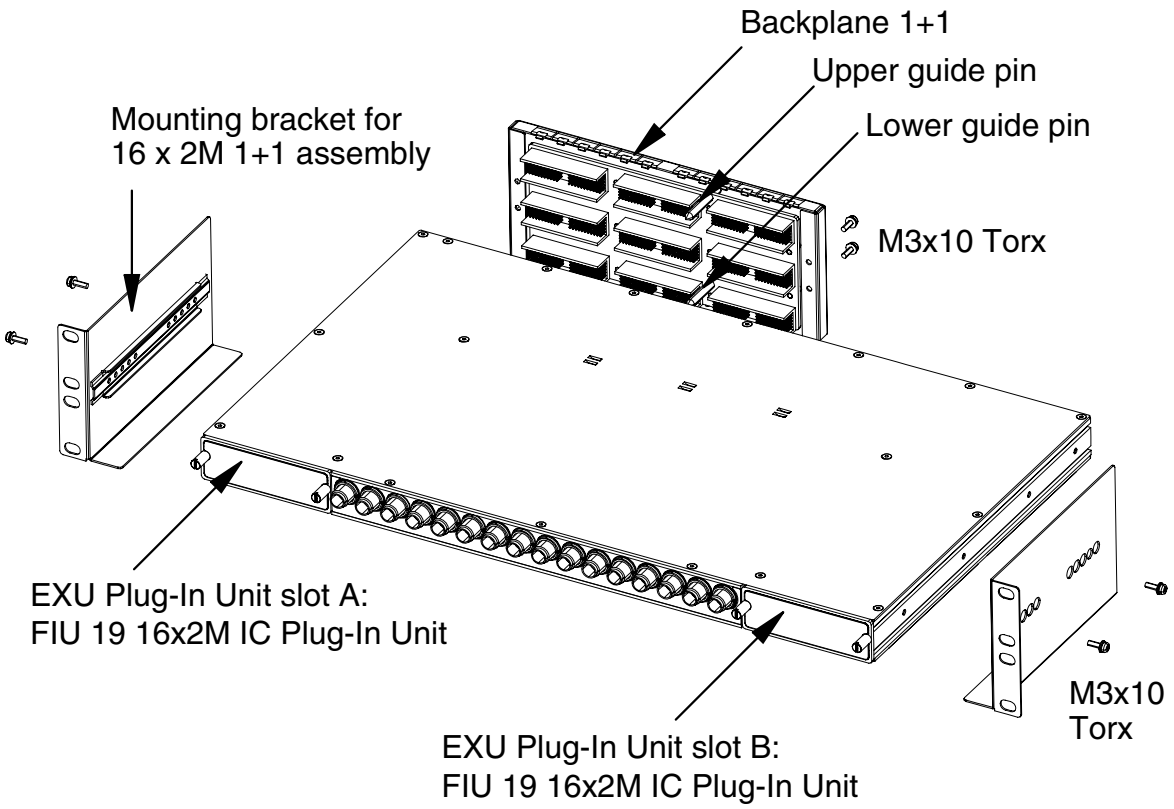


Figure 5. Installing FIU 19 16 x 2M 1+1 in a 19-inch rack, phases 1 – 2

Note

If the node will have access to an IP-based DCN via 10baseT Ethernet, the Ethernet interfaces of both indoor units have to be connected to the LAN. It is recommended to use a Hub for setting up these cable connections.

To install FIU 19 (E) with 16 x 2M capacity and 1+1 protection in a 19-inch rack:

1. Screw the left and right side mounting bracket to the wanted depth with two M3x10 Torx screws each.

2. Screw the backplane guide pins to their places (Figure 5). Screw the backplane to the expansion unit with four Torx screws.

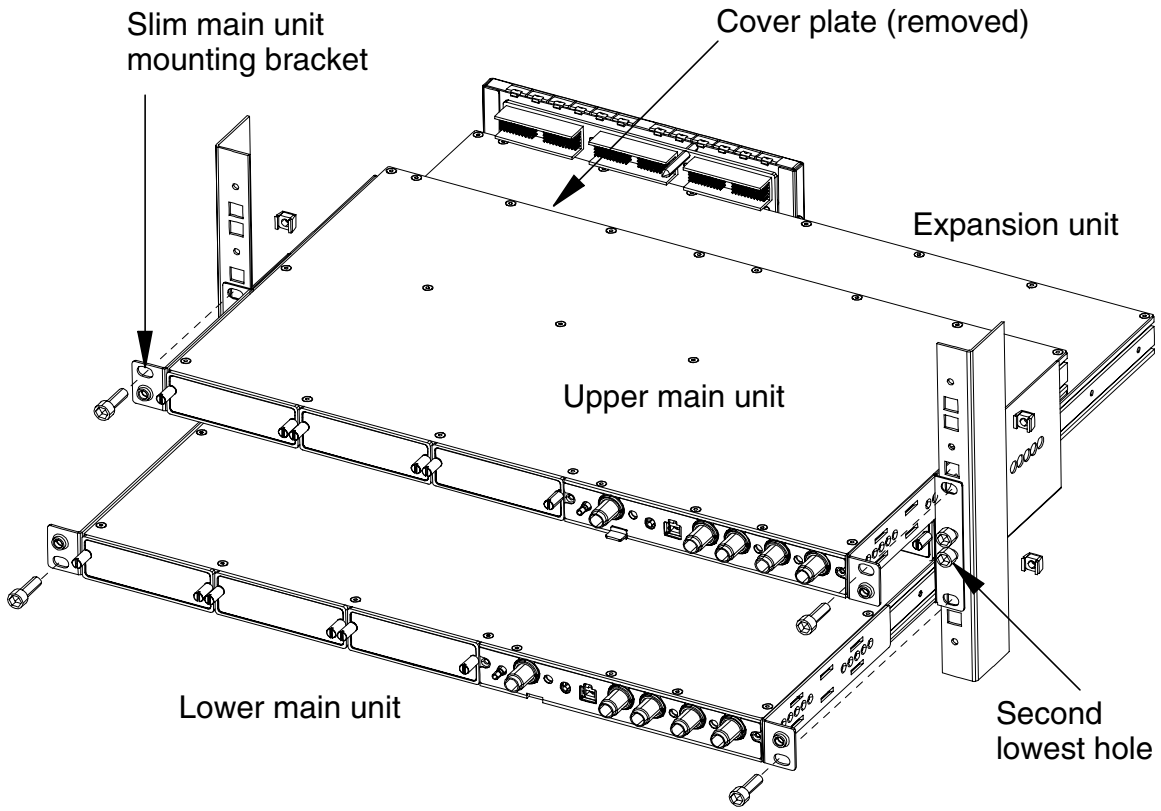


Figure 6. Installing FIU 19 16 x 2M 1+1 in a 19-inch rack, phases 3 – 6

3. (*When applicable*) Replace the normal 1U mounting brackets of the main units with slim brackets. Use the same Torx screws that were used with the 1U brackets. The brackets should be as shown in Figure 6, free hole up (upper unit) or down (lower unit).

4. Remove the cover plates from the back of the main units.

5. Put the rack mounting nuts (8 pcs) to the rack and fix the assembly to the rack with four screws, first through the *second lowest* bracket holes. Tighten the screws with a 5 mm Allen key.

6. Slide the main units gently to their places. Fix them to the rack with the remaining screws (two each).

4.2 Installing FIU 19 (E) in an ETSI rack

FIU 19 (E) is installed in a 600 x 300 mm ETSI rack using mounting adapter brackets. The adapter brackets are installed first, and the units are installed in the rack in a diagonal position. Otherwise the installation procedure in the ETSI rack is similar with the installation in 19-inch rack.

The space taken by the FIU 19 (E) units in the rack is shown in Figure 7. Two FIU 19 (E) units with 4 - 12 x 2M capacity or one FIU 19 (E) with 16 x 2M capacity can be installed per a set of adapter brackets.

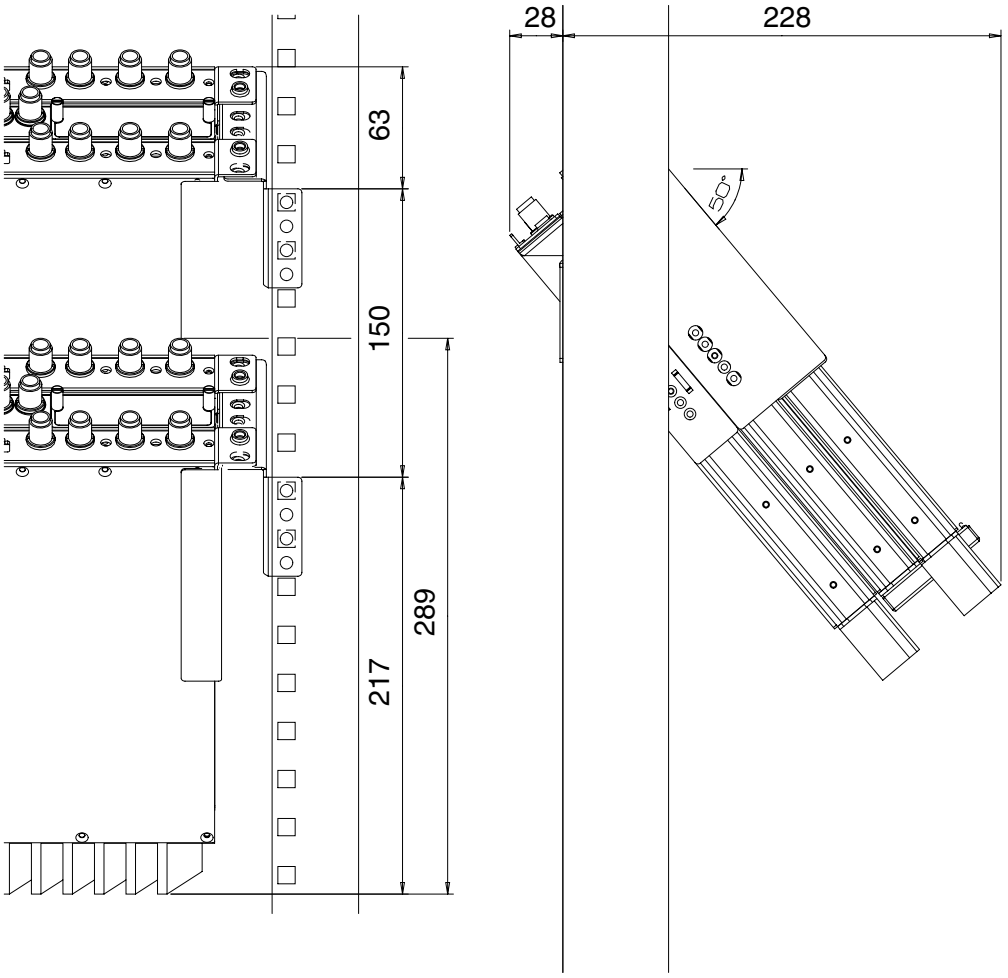


Figure 7. FIU 19 in a 600 x 300 mm ETSI rack

The following parts are needed in the installation:

- mounting adapter brackets
- four rack nuts and four rack screws (M6x16, Allen-head).

To install the ETSI mounting brackets, put the rack mounting nuts (4 pcs) to the rack. Fix the brackets to the rack with two screws each (see Figure 8). Tighten the screws with a 5 mm Allen key.

4.2.1 FIU 19 (E) with 4 - 12 x 2M capacity (1+0)

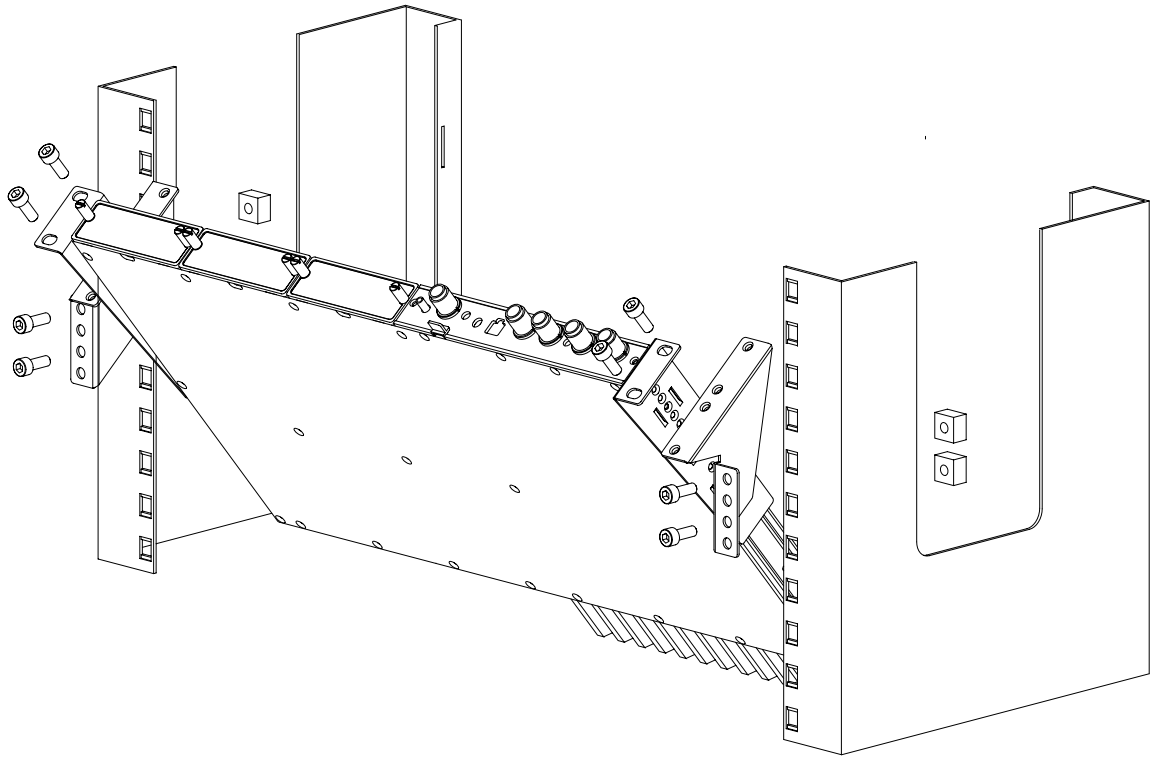


Figure 8. Installing FIU 19 4 - 12 x 2M in an ETSI rack

To install FIU 19 (E) with 4 - 12 x 2M capacity in an ETSI rack, follow the instructions in Section 4.1.1. Ignore the use of rack mounting nuts. They are not needed in this installation. Fix the unit to the rack as shown in Figure 8.

4.2.2 FIU 19 (E) with 16 x 2M capacity (1+0)

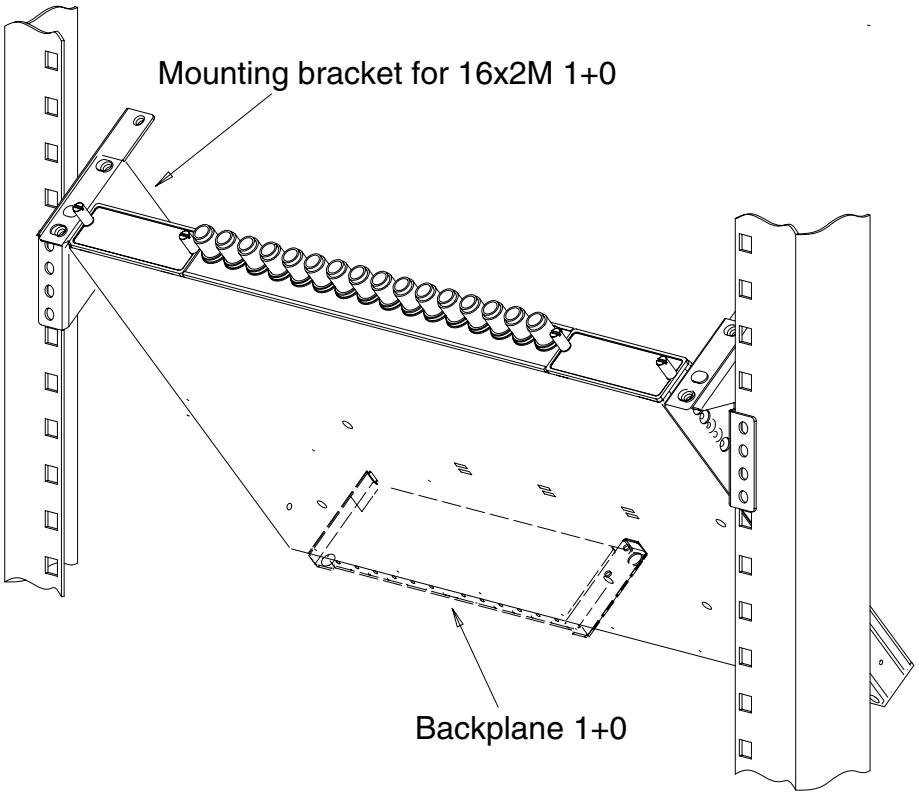


Figure 9. Installing FIU 19 16 x 2M 1+0 in an ETSI rack

To install FIU 19 (E) with 16 x 2M capacity (1+0) in an ETSI rack, follow the instructions in Section 4.1.2. Ignore the use of rack mounting nuts. They are not needed in this installation. Put the expansion unit to the rack as shown in Figure 9 and the main unit above the expansion unit (see Figure 4).

4.2.3 FIU 19 (E) with 16 x 2M capacity and 1+1 protection

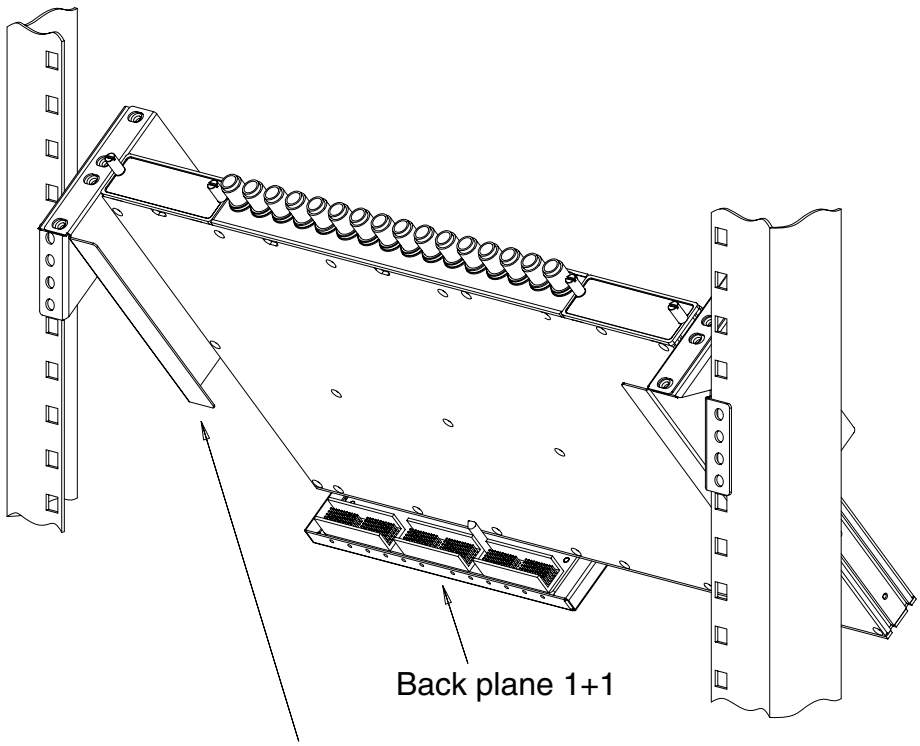


Figure 10. Installing FIU 19 16 x 2M 1+1 in an ETSI rack

To install FIU 19 (E) with 16 x 2M capacity and 1+1 protection in an ETSI rack, follow the instructions in Section 4.1.3. Ignore the use of rack mounting nuts. They are not needed in this installation. Put the expansion unit to the rack as shown in Figure 10 and the main units above and below the expansion unit (see Figure 6).

4.3 Installing FIU 19 (E) in a slim rack

FIU 19 (E) is installed in Nokia TM4 (CEPT A type) slim rack using a mounting adapter kit. The mounting kit is installed first, and the units are installed in the rack in vertical position. Otherwise the installation procedure in TM4 rack is similar with the installation in 19-inch rack.

The mounting adapter kit takes 11 U of space in the rack (Figure 11). Two FIU 19 (E) units with 4 - 12 x 2M capacity or one FIU 19 (E) with 16 x 2M capacity can be installed in the adapter kit.

The following parts are needed in the installation:

- two mounting supports
- eight M4x10 Phillips screws.

Installing the TM4 mounting adapter

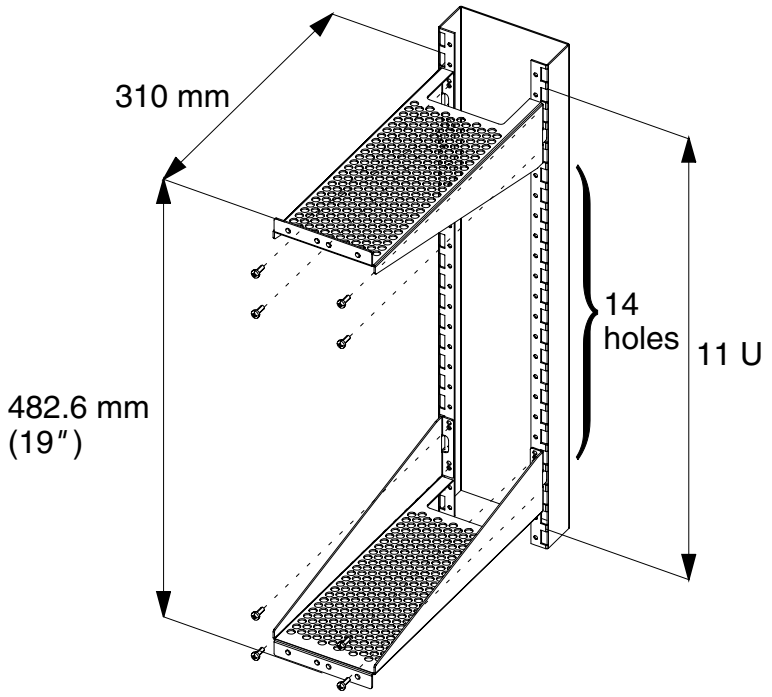


Figure 11. Installing the TM4 mounting adapter

To install the adapter:

1. Place the upper and lower supports as shown in Figure 11. 14 holes are left between the supports.

2. Fix the upper and lower supports to the rack using four M4x10 Phillips screws each.

4.3.1 FIU 19 (E) with 4 - 12 x 2M capacity (1+0)

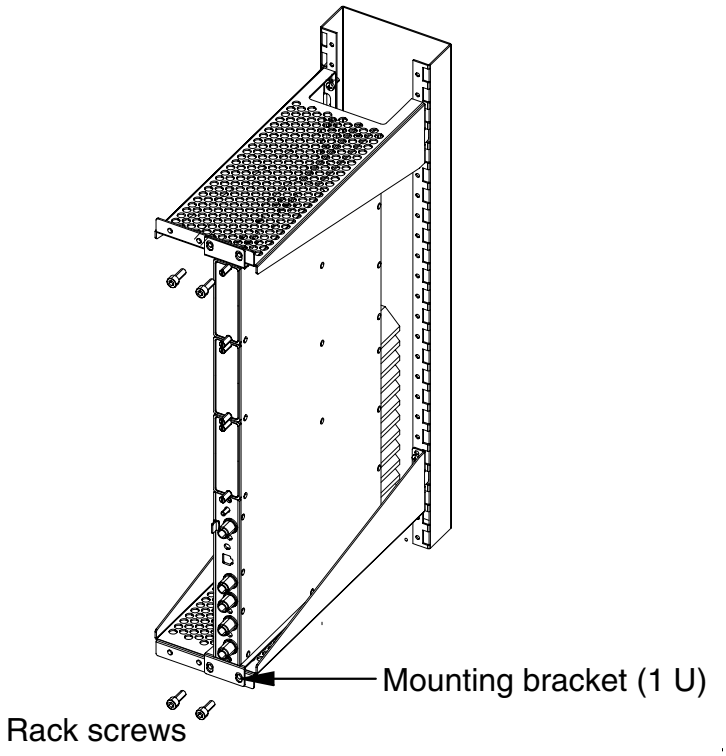


Figure 12. Installing FIU 19 4 - 12 x 2M in a TM4 slim rack

To install FIU 19 (E) with 4 - 12 x 2M capacity in a slim rack, follow the instructions in Section 4.1.1. Ignore the use of rack mounting nuts. They are not needed in this installation. Fix the unit to the rack as shown in Figure 12.

4.3.2 FIU 19 (E) with 16 x 2M capacity (1+0)

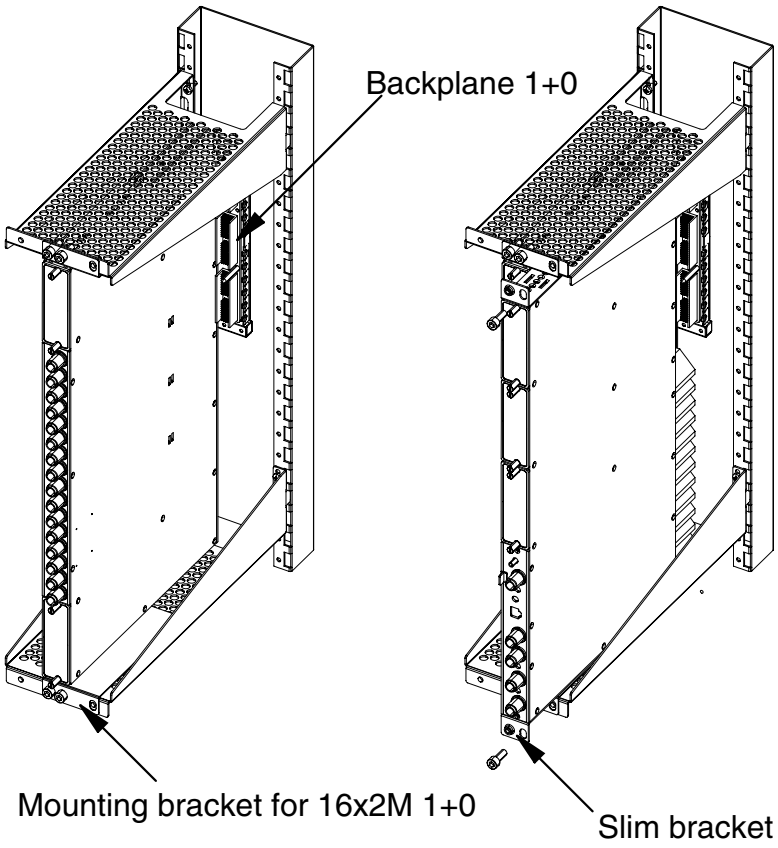


Figure 13. Installing FIU 19 16 x 2M 1+0 in a TM4 slim rack

To install FIU 19 (E) with 16 x 2M capacity (1+0) in a slim rack, follow the instructions in Section 4.1.2. Ignore the use of rack mounting nuts. They are not needed in this installation. Fix the units to the rack as shown in Figure 13.

4.3.3 FIU 19 (E) with 16 x 2M capacity and 1+1 protection

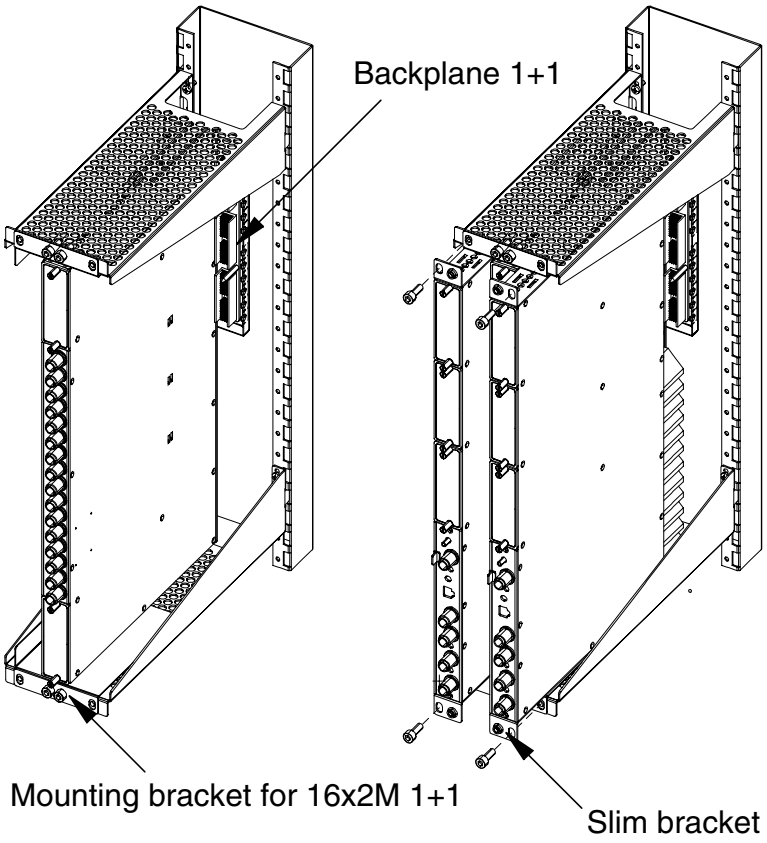


Figure 14. Installing FIU 19 16 x 2M 1+1 in a TM4 slim rack

To install FIU 19 (E) with 16 x 2M capacity and 1+1 protection in a slim rack, follow the instructions in Section 4.1.3. Ignore the use of rack mounting nuts. They are not needed in this installation. Fix the units to the rack as shown in Figure 14.

4.4 Removing 19-inch units

Caution

Switch the power off and disconnect the IU power supply before removing FIU 19 (E) units.

When removing units, follow installation steps in reverse order.

When a main unit is removed from EXU assembly, the two threaded holes in the slim main unit brackets can be used as ejectors. First remove the screws and drive the same screws into these threaded holes. Tightening these screws pushes the main unit free from the backplane.

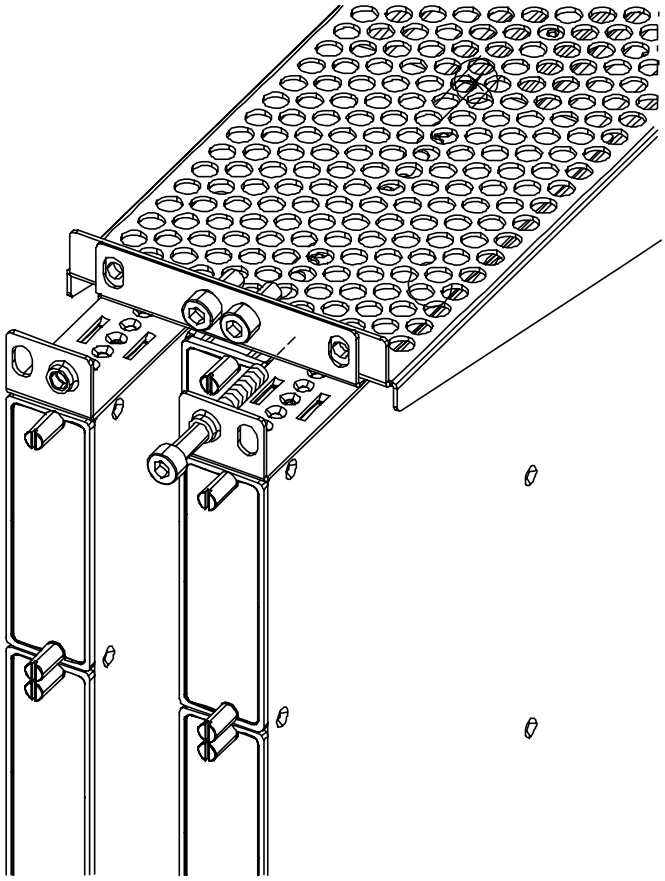
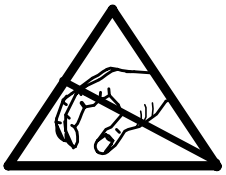


Figure 15. Removing 19-inch units

5 Installing plug-in units

This chapter describes how to install and remove plug-in units of FIU 19 (E). Depending on the configuration ordered, some plug-in units have already been installed at the factory.

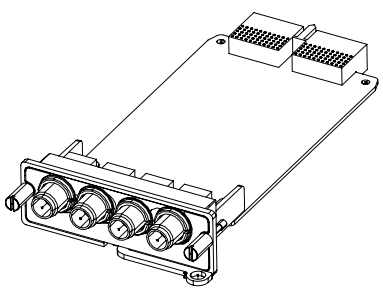


CAUTION:
Always use a wrist grounding device or equivalent antistatic protection when handling plug-in units removed from their antistatic packaging.

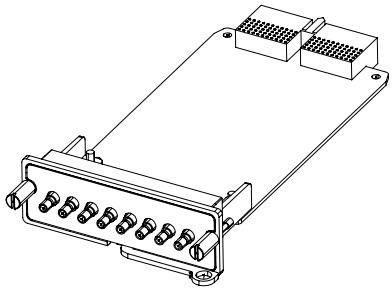
5.1 Identifying plug-in units

The following plug-in units are available for FIU 19 (E):

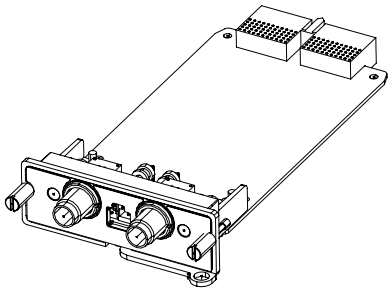
16 x 2M IC (interface circuit)	(expansion unit, EXU slots A - B)
4 x 2M 75 Ω SMB	(main unit, slots 1 - 3)
4 x 2M 120 Ω TQ	(main unit, slots 1 - 3)
4 x 2M 120 Ω RJ-45	(main unit, slots 1 - 3)
Aux data	(main unit, slots 1 - 3)
Flexbus	(main unit, slot 3)



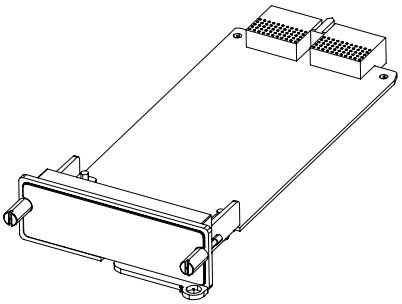
FIU 19 4 x 2 M 120 Ω
Plug-In Unit
(T55220.01)



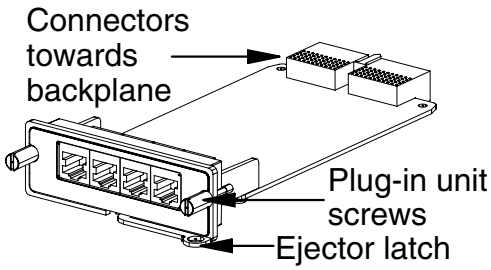
FIU 19 4 x 2 M 75 Ω
Plug-In Unit
(T55220.02)



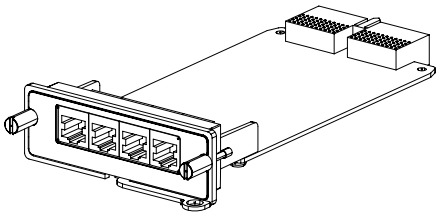
FIU 19 Flexbus Plug-In Unit
(T55221.01)



FIU 19 16 x 2 M IC Plug-In Unit
(T55212.01)



FIU 19 Aux Data Plug-In Unit
(T55223.01)



FIU 19 4 x 2 M 120 Ω Plug-In Unit
(T55220.03)

Figure 16. FIU 19 plug-in units

Plug-in units can be installed only in specified slots according to the plug-in unit type (Figures 17 and 19).

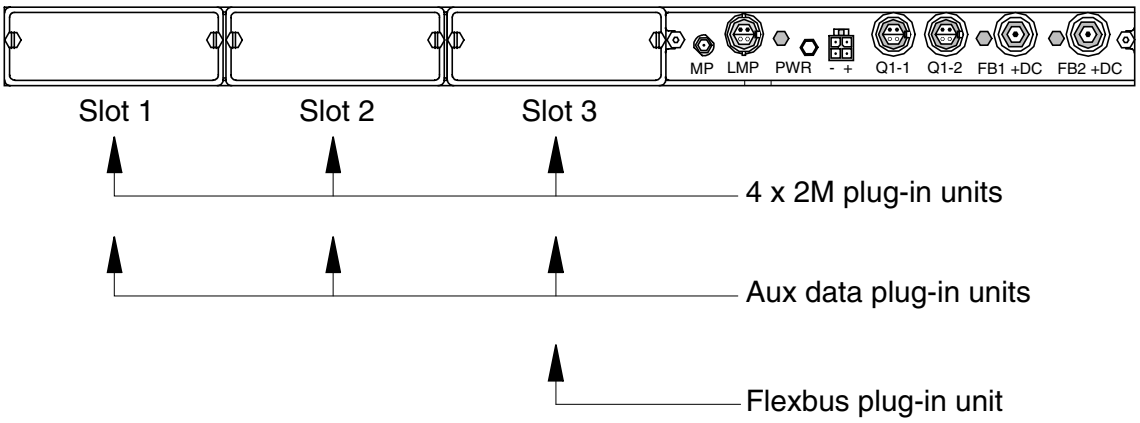


Figure 17. Plug-in unit slots of the FIU main unit

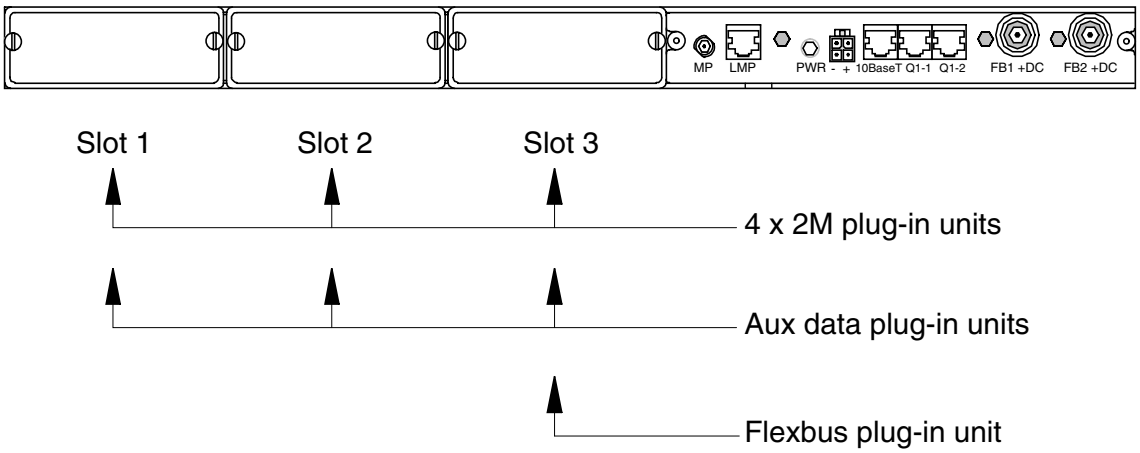


Figure 18. Plug-in unit slots of the FIU 19E main unit

When using the FIU 19 EXU expansion unit, at least one FIU 19 16x2M IC Plug-In Unit is installed. If the plug-in unit is installed only in EXU slot A, the expansion unit functions as single use 16 x 2 Mbit/s interface unit. If two plug-in units are installed (also in EXU slot B), the expansion unit provides 1+1 protection.

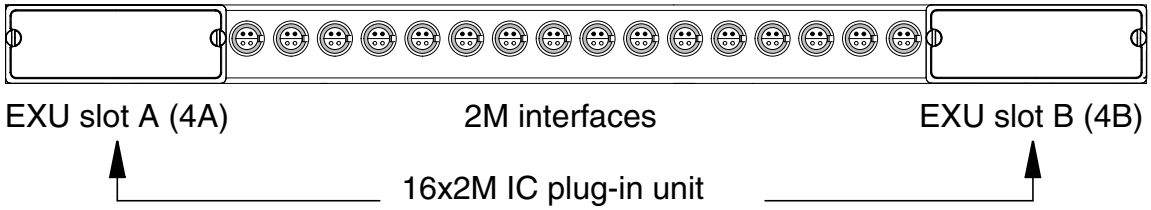


Figure 19. Plug-in unit slots of the expansion unit

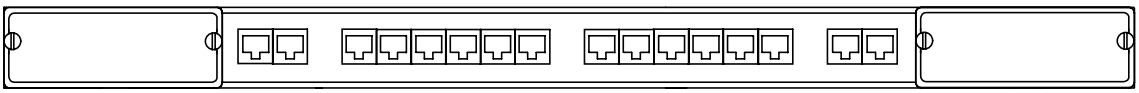


Figure 20. 16x2M IC plug-in unit (RJ-45 version)

5.2 Installing a plug-in unit

Choose the slot you wish to install the plug-in unit in (see Section 5.1 for possible plug-in unit slots).

Note

Although the installation and removal of the plug-in units has been designed to work without flaws even with the power on, we recommend that you switch the FIU 19 (E) power off before installing or removing plug-in units. Note that switching the power off cuts the traffic and resets any equipment statistics.

Note

The power cable of the Flexbus plug-in unit must always be disconnected when installing the plug-in unit.

Note

In 1+1 protection, when installing the 16 x 2M IC plug-in unit, turn off the corresponding FIU 19 (E) unit.

Install plug-in units in the following order

1. Install the Flexbus unit in slot 3.
2. Continue filling the slots beginning from slot 1.
3. Install 4 x 2M units.
4. Install Aux data plug-in units.

In 2 IU protection, two Aux data plug-in units are needed. Install the Aux data plug-in units in the corresponding slots of both the protective FIU 19 (E) units. When FIU 19 (E) is used in 1+1 protection mode, connect the auxiliary interfaces together with an RJ45-RJ45 branch wire. The use of Aux data plug-in units in 2 IU protected mode provides protection for channels over protected radio path and device faults of FIU 19 (E) unit and FlexiHopper outdoor unit, but not for an Aux data plug-in unit itself.

Signals of AUX connectors are introduced in Section 6.4, Table . Cables used within Aux data plug-in unit are specified in Appendix A.

To install a FIU 19 plug-in unit:

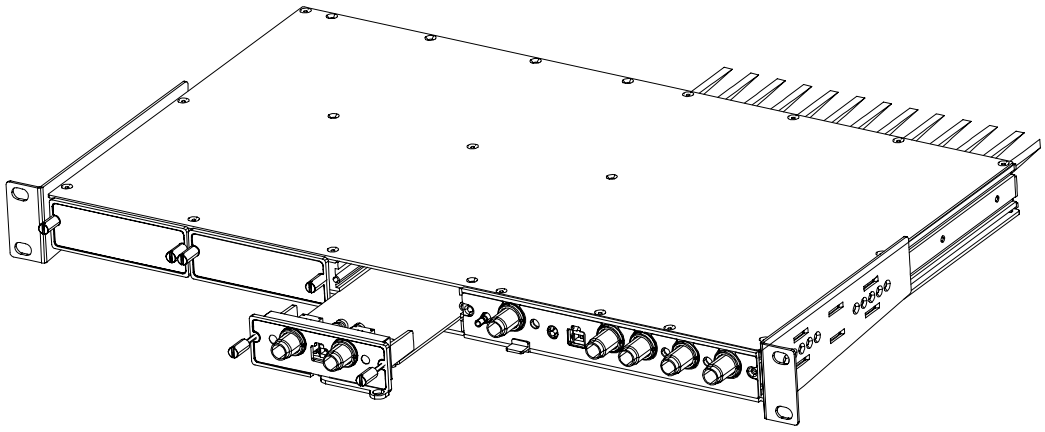


Figure 21. Installing a plug-in unit

1. Unscrew the filler plate screws and remove the filler plate from the place.

2. Push the plug-in unit gently to its place

3. Tighten the plug-in unit screws.

Note

In addition to the physical installation, the plug-in unit has to be installed logically with Nokia Hopper Manager (see *Commissioning and Maintenance*).

5.3 Removing a plug-in unit

Note

The power cable of the Flexbus plug-in unit must always be disconnected when removing the unit.

Note

In 1+1 protection, when removing the 16 x 2M IC plug-in unit, the corresponding FIU 19 (E) unit must be turned off.

To remove a FIU 19 plug-in unit:

1. Unscrew the plug-in unit screws.

2. Pull the ejector latch on the plug-in unit to free it from the backplane.

3. Draw the plug-in unit gently out of its place.

4. Replace the filler plate. / Install a new plug-in unit.

Note

In addition to the physical removal, the plug-in unit has to be uninstalled logically with Nokia Hopper Manager (see *Commissioning and Maintenance*).

6 Connecting interfaces

This chapter describes how to connect interfaces of FIU 19 (E). The chapter does not contain instructions on making cables and connectors.

Refer to Appendix A for the description of standard cables used when FIU 19 (E) is installed in Nokia Extratalk Site Support System cabinet.

6.1 Main unit

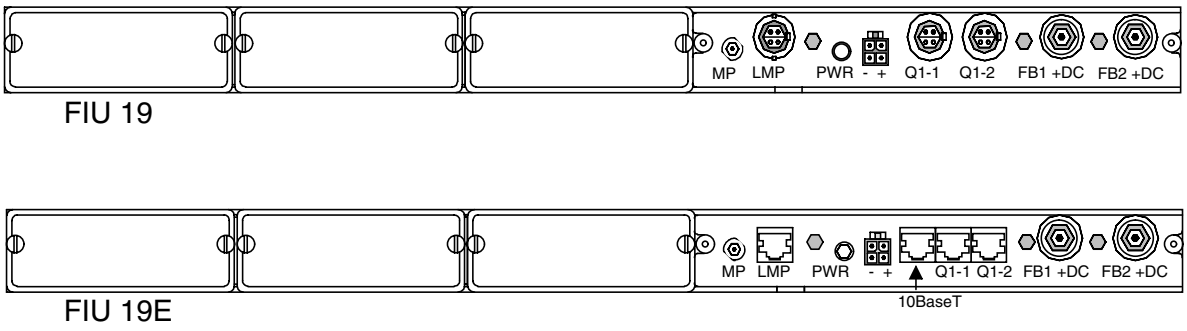


Figure 22. Interfaces of the main units

FIU 19 (E) has the following items marked on the front panel (Figure 22):

MP:	Measurement point interface (SMB connector)
LMP:	Local management port (BQ connector)
PWR:	Power switch
– + :	Power supply connector
Q1-1:	Q1 network management interface (TQ connector or RJ-45 with FIU 19E)
Q1-2:	Q1 network management interface (TQ connector or RJ-45 with FIU 19E)
FB1 +DC:	Flexbus interface 1, with power feed to the outdoor unit (TNC connector)

FB2 +DC: Flexbus interface 2, with power feed to the outdoor unit (TNC connector).

In addition, the front panel has three indicator LEDs: two green ones beside the Flexbus interfaces, and one tricolour beside the power switch.

6.1.1 Flexbus (TNC connector)

If the power cable is already connected, verify that the Flexbus OU power supply is off (Flexbus LEDs are off). If this is not the case, turn the power supply off with Nokia Hopper Manager (see *Commissioning and Maintenance*) or turn the power off at FIU 19 (E) power switch.

Connect the coaxial Flexbus cables to the Flexbus interfaces (50 Ω TNC female).

6.1.2 Q1 (TQ connector or RJ-45 connector)

Connect the Q1 cables to the Q1 interfaces Q1-1 and Q1-2 (TQ connector). Two interfaces allow chaining the Q1 bus to other equipment at the equipment station. See *Product Description* for details.

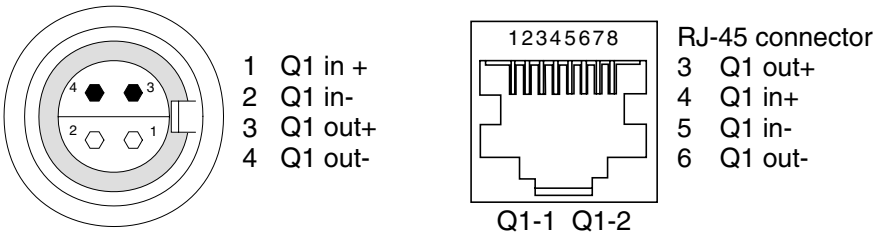


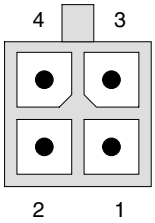
Figure 23. Q1 interfaces Q1-1 and Q1-2

FIU 19 (E) contains a shunt switch which ensures that when the Q1 signal is chained, the chain does not break even if the power supply to a FIU 19 (E) unit is lost or switched off.

When FIU 19 (E) is used in 1+1 protection mode and the Q1 bus is chained, connect the Q1 cables to the Q1-1 port of the indoor unit A and Q1-2 port of the indoor unit B.

6.1.3 Power (Molex Micro-Fit 3.0 connector)

Connect positive battery voltage (VPB) and negative battery voltage (VNB) to the power supply connector (Figure 24). The power input is of a floating type. The power can be drawn from enhanced power supply adapter (EPSA), for example.



1	VPB (+)
2	VNB (-)
3	not connected
4	not connected

Figure 24. Main unit power supply interface

Power cable (2.5 m) with Molex connector is included in the FIU 19 (E) package. The other end of the cable is open.

When FIU 19 (E) is used in 1+1 protection mode, connect the power supply to both units.

6.1.4 Local management port (BQ connector or RJ-45 connector with FIU 19E)

When managing the node locally with Nokia Hopper Manager, connect the communication cable to the local management port (BQ connector). See *Commissioning and Maintenance* for details.

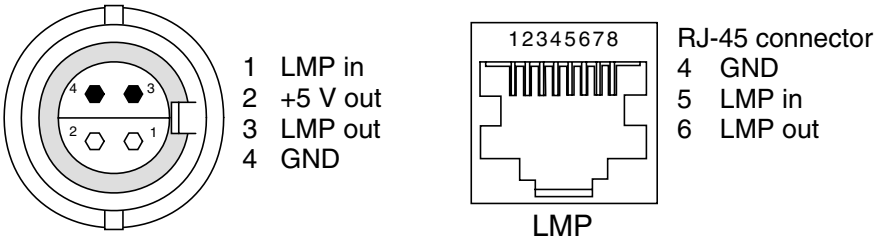


Figure 25. Local management port

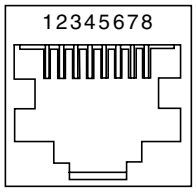
When FIU 19 (E) is used in 1+1 protection mode, the communication cable can be connected to either unit (unless a fault has occurred).

6.1.5 MP (SMB connector)

Measurement point (SMB connector) output can be used for monitoring different signals from the FIU 19 (E) indoor unit. The signals can be selected with Nokia Hopper Manager. See *Commissioning and Maintenance* for details.

6.1.6 LAN interface (RJ-45 connector)

A 10 BaseT Ethernet connection is used when Network Element Management information (SNMP) is transported towards the network management centre via a standardised Ethernet connection (10Mbit/s).



RJ-45 connector
1 Data out+
2 Data out-
3 Data in+
6 Data in-

10BaseT Ethernet

Figure 26. LAN interface

6.2 4 x 2M plug-in units and 16 x 2M expansion unit

2 Mbit/s interfaces are located in the 4 x 2M plug-in units or in the 16 x 2M expansion unit.

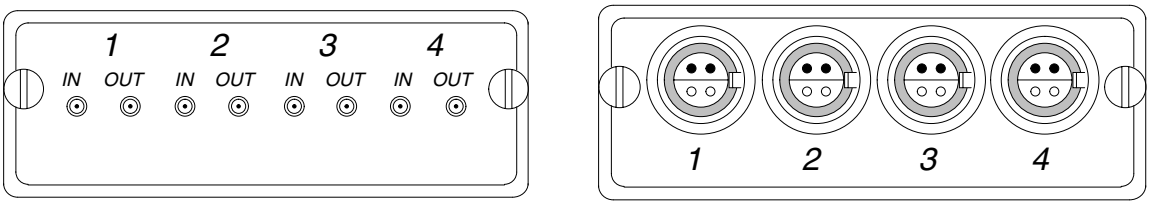


Figure 27. Interfaces in the 4 x 2M plug-in units

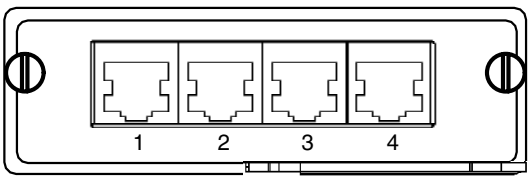


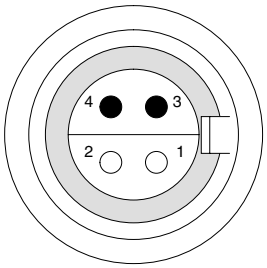
Figure 28. Interfaces in the RJ-45 plug-in unit

6.2.1 2 Mbit/s unbalanced 75 Ω interfaces (SMB connector)

Connect the 2 Mbit/s unbalanced cables to the unbalanced interfaces (two cables per 2 Mbit/s channel).

6.2.2 2 Mbit/s balanced 120 Ω interfaces (TQ connector)

Connect the 2 Mbit/s balanced cables to the balanced interfaces (one cable per 2 Mbit/s channel).



1	In -
2	In +
3	Out -
4	Out +

Figure 29. 2M balanced interface TQ

6.2.3 2Mbit/s balanced 120 Ω interfaces (RJ-45 connector)

Connect the 2 Mbit/s balanced cables to the balanced interfaces (one cable per 2 Mbit/s channel).

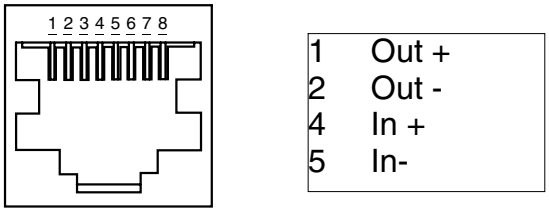


Figure 30. 2M balanced interface of RJ-45 connector

6.3 Flexbus plug-in unit

Flexbus plug-in unit has two Flexbus interfaces and a power supply interface. Power supply must be connected if the Flexbus cables are connected to outdoor units. The power supply is not necessary if the Flexbus cables are connected to other indoor units.

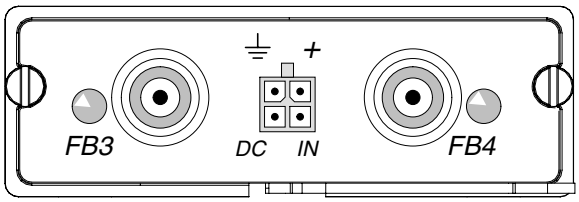


Figure 31. Interfaces in the Flexbus plug-in unit

In the case that one of two fuses protecting Flexbus Plug-in unit against wrong polarity of power supply blows, there is one spare fuse (surface mounted component) mounted on the printed circuit board. The following figure shows the location of the spare fuse (surface-mounted component) in the plug-in unit.

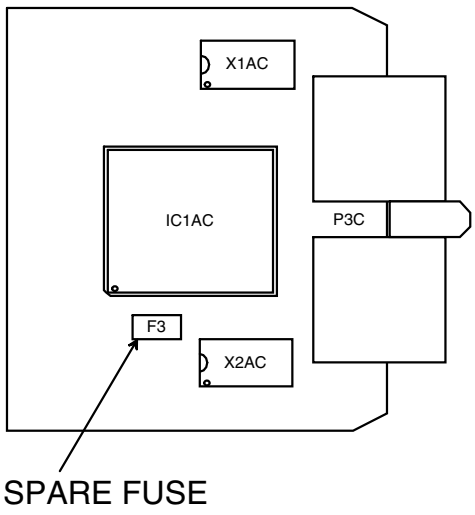


Figure 32. Spare fuse

6.3.1 Flexbus (TNC connector)

If the power cable is already connected, verify that the Flexbus OU power supply is off (Flexbus LEDs are off). If this is not the case, turn the power supply off with Nokia Hopper Manager (see *Commissioning and Maintenance*) or disconnect the power cable.

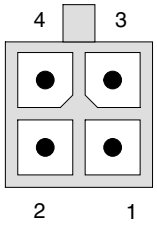
Connect the coaxial Flexbus cables to the Flexbus interfaces (50 Ω TNC female).

6.3.2 Additional power supply (Molex Micro-Fit 3.0 connector)

Caution

Negative input voltage is grounded in the plug-in unit. The plug-in unit requires an external power supply, if positive grounding is used at the equipment station.

Connect positive input voltage (P55V) and negative input voltage (N55V) to the power supply connector.



1	not connected
2	not connected
3	P55V
4	N55V = GND

Figure 33. Additional power supply interface

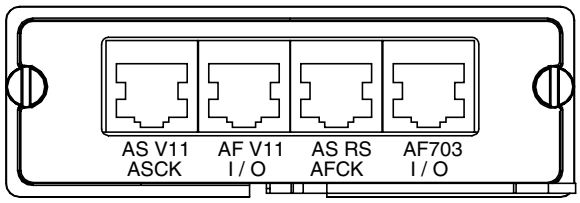
Power cable is included in the plug-in unit package. Note that this is not the same cable that is used with the main unit.

T30839.01 Power AC/DC 1*100W 19"/ETSI 1.5 U and **T30839.02 Power AC/DC 2*100W 19"/ETSI 1.5 U** can be used to supply power to the Flexbus plug-in unit. These power supplies can also be used to supply power to the FIU 19 main unit, when only AC power is available at the site.

T30839.03 Power DC/DC 1*100W 19"/ETSI 1.5 U and **T30839.04 Power DC/DC 2*100W 19"/ETSI 1.5 U** can be used to supply power to the Flexbus plug-in unit. These power supplies can also be used to supply power to the FIU 19 main unit, when only DC power is available at the site. DC input voltage range is 20 – 75 V.

6.4 Aux data plug-in unit

Aux data plug-in unit has four auxiliary interfaces (RJ-45 connector). Input and output of these interfaces can be selected with Nokia Hopper Manager. See *Commissioning and Maintenance* for details.



Interface	Pin	Pin name	Signal / direction
AS V11 ASCK	1	Ground	
	2	ASOUTP	V.11 (Aux slow RX +) / out
	3	ASOUTN	V.11 (Aux slow RX -) / out
	4	ASINP	V.11 (Aux slow TX +) / in
	5	ASINN	V.11 (Aux slow TX -) / out
	6	ASRXCKP	V.11 (Aux slow clock RX direction) / out
	7	ASTXCKP	V.11 (Aux slow clock TX direction) / out
	8	DOUT0	+/- Relay control / out
AF V11 I/0	1	Ground	
	2	AFOUTP	V.11 (Aux fast RX +) / out
	3	AFOUTN	V.11 (Aux fast RX -) / out
	4	AFINP	V.11 (Aux fast TX +) / in
	5	AFINN	V.11 (Aux fast TX -) / in
	6	DIO0	Digital I/O (TTL) /in/out
	7	DIO1	Digital I/O (TTL) /in/out
	8	DOUT1	+/- Relay control / out
AS RS AFCK	1	Ground	
	2	AFTXCKP	V.11 (Aux fast TX direction +) / in/ out
	3	AFTXCKN	V.11 (Aux fast TX direction -) / in/out
	4	AFRXCKP	V.11 (Aux fast RX direction +) / out
	5	AFRXCKN	V.11 (Aux fast RX direction -) / out
	6	RXD232	RS-232 (aux slow RX) / out
	7	TXD232	RS-232 (aux slow TX) / in
	8	DOUT2	+/- Relay control / out
AF703 I/0	1	Ground	
	2	703RXP	G.703 RX 64 kbit/s, coding HDB3 / out
	3	703RXN	G.703 RX 64 kbit/s, coding HDB3 / out
	4	703TXP	G.703 TX 64 kbit/s, coding HDB3 / in
	5	703TXN	G.703 TX 64 kbit/s, coding HDB3 / in
	6	DIO2	Digital I/O (TTL) / in/out
	7	DIO3	Digital I/O (TTL) / in/out
	8	DOUT3	+/- Relay control / out

Figure 34. Interfaces in the Aux data plug-in unit

When FIU 19 (E) is used in 1+1 protection mode, you need to install 2 Aux plug-in units to the same slot of both protected FIU 19 (E) units. Connect the auxiliary interfaces together with an RJ45-RJ45 branch wire.

Appendix A. Cabling in Nokia Extratalk cabinets

This appendix describes the cabling when FIU 19 (E) is installed in Nokia Extratalk Site Support System (SSS) cabinets. The appendix considers also configurations in which FIU 19 (E) is installed in the same cabinet with DMR 18-38 / DynaHopper C and CE and DMR 8-15 indoor units.

A.1 Cabling of Flexbus

Flexbus cabling in a SSS cabinet is pictured in Figure 35.

The following standard connector kits are available for the Flexbus connections:

- **T55255.01 Flexbus TNC-TNC (RG-223) Connector Kit**
- **T55255.02 Flexbus TNC-TNC (RG-214) Connector Kit**.

These kits contain a straight TNC connector (male, to be connected to the outdoor unit) and an angle TNC connector (male, to be connected to the indoor unit or to the connector plate of *T55257.01 Jumper Cable*). Cables can be purchased separately and cut to suitable length.

The following standard cables are available for the Flexbus connections:

- **T55257.01 Flexbus TNC-TNC Jumper Cable** contains one Flexbus cable (TNC male – TNC female) and a connector plate to be installed on the top of the base station cabinet. The connector plate will fit a total of four TNC female connectors.
- **T55257.02 Flexbus TNC-TNC Cable (0.5 m)** is used for Flexbus connections between indoor units at the site. Connectors are TNC male.

In case **T38094.01 Jumper Cables DMR 18-38CE BBU1** already exist in the cabinet, it is possible to connect these cables to FIU 19 with the aid of **T55271.01 TNC-N Adapter for Jumper Cable** (TNC male - N female). Then the following connector kits are used for the IU-OU Flexbus cable:

- **T55255.11 Flexbus N-TNC (RG-223) Connector Kit**
- **T55255.12 Flexbus N-TNC (RG-214) Connector Kit.**

These kits contain a straight TNC connector (male, to be connected to the outdoor unit) and an angle N-connector (male, to be connected to the connector plate of *T38094.01 Jumper Cables*). Cables can be purchased separately and cut to suitable length.

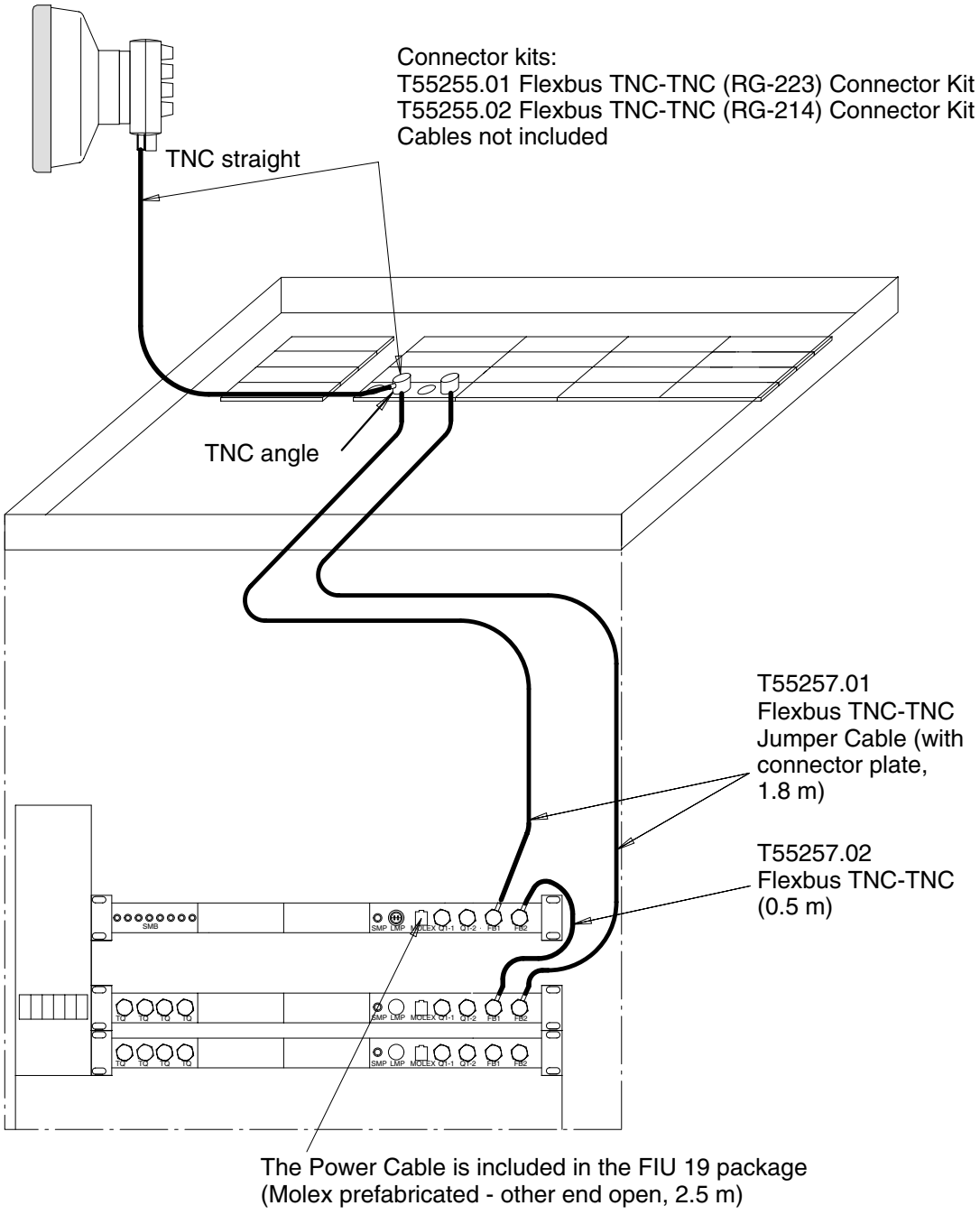


Figure 35. Flexbus cabling in Nokia Extratalk cabinet

A.2 Cabling of the 2 Mbit/s channels

Cabling of the 2 Mbit/s channels in a SSS cabinet is pictured in Figure 36.

The following standard cables and connector kits are available for the 2 Mbit/s balanced 120Ω (TQ) connections:

- **T55250.03 FIU 19 D9F-TQ 2x2M Jumper Cables** (1.8 m) contains cables for two 2 Mbit/s balanced interfaces and a connector plate to be installed on the top of the SSS cabinet.
- **T55250.20 FIU 19 TQ-TQ Q1 or 2M Cable (0.5 m)** is used for the cross-connections between 2 Mbit/s interfaces.
- **T55250.21 FIU 19 TQ-TQ 2M Cable (30 m)** is used if longer distances are required. The cable can be cut to suitable length.
- **T55250.31 FIU 19 4xTQ Cable 5 m open**
- **T2550.32 FIU 19 4xTQ Cable 15 m open**
- **T55251.01 FIU 19 4xTQ 2M Connector Kit** contains four TQ connectors.
- **T38128.01 Interconnection Cable, 2M, 120, C/CE (SSS/BTS)** can be used for connecting the balanced A-bis interface of the BTS cabinet to the jumper cable of the SSS cabinet. The cable has D9 (male) connectors on both ends. This cable can also be used for cross-connection between two radios via the connectors of the jumper cables on the top of the cabinet.

The following standard cables and connector kits are available for the 2Mbit/s balanced 120Ω (RJ-45) connections:

- **T55252.01 FIU 19 4xRJ-45 2M Connector Kit** contains four RJ-45 connectors.
- **T55249.01 FIU 19 4xRJ-45 Cable 15 m open** contains four RJ-45 cables.

The following cable is available for Aux data plug-in unit:

- **T55249.20 FIU 19 4xRJ-45 Aux Card Cable 15m** contains four RJ-45 15 m cables with open end (8 pins connected, see Figure 32 for specifications).

The following standard cables are available for the 2 Mbit/s unbalanced 75Ω connections:

- **T38127.01 Interconnection Cable, 2M, 75, C/CE (SSS/BTS)** (1.5 m) can be used for connecting the unbalanced (75Ω) A-bis interface of the BTS cabinet to the jumper cable of the Extratalk cabinet (the output of the A-bis interface is connected to the input of the jumper cable and vice versa). The product code contains two cables (BNC-BNC) for one 2 Mbit/s channel. This cable can also be used for cross-connection between two radios via the connectors of the jumper cables on the top of the cabinet.
- **T38127.02 Jumper Cables, 2x2M, 75, C/CE (SSS)** (1.4 m) contains cables for two 2 Mbit/s unbalanced interfaces and a connector plate to be installed on the top of the SSS cabinet. The connector plate is equipped with four BNC female connectors. The other end of the cables is equipped with four SMB connectors (2 cables per 2 Mbit/s channel).
- **T38127.04 Cross-Connection Cable, 2M, 75, CE (SSS)** is used for the cross-connections between 2 Mbit/s interfaces. The product code includes two SMB-SMB cables (for one 2 Mbit/s channel).

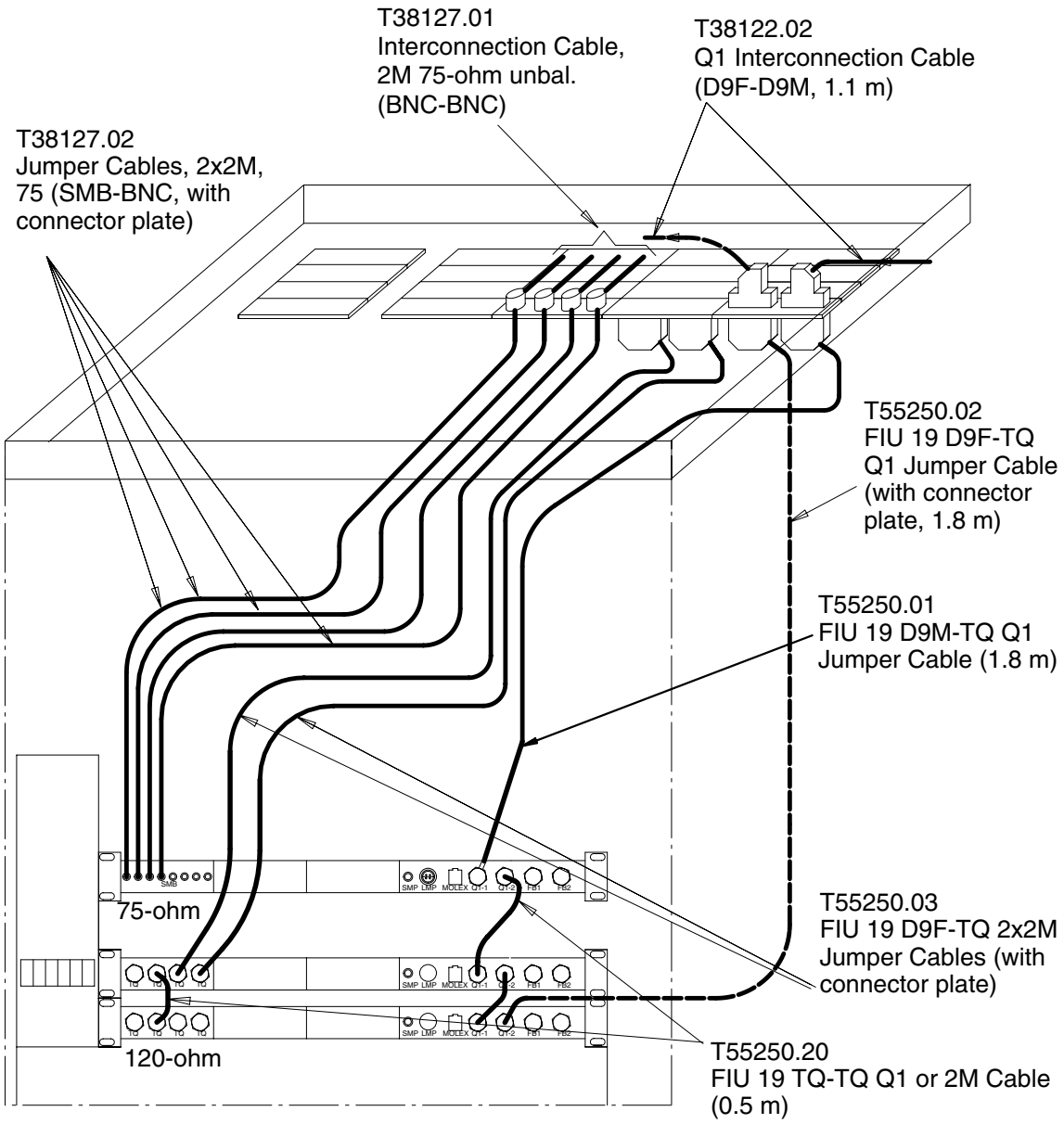


Figure 36. Cabling of the 2 Mbit/s channels and the Q1 bus in Nokia Extratalk cabinet

A.3 Cabling of the Q1 bus

Cabling of the 2 Mbit/s channels in a SSS cabinet is pictured in Figures 36 and 37.

The following standard cables are available for the Q1 bus cabling:

- **T55250.01 FIU 19 D9M-TQ Q1 Jumper Cable** is routed from the FIU 19 Q1 port to the cabinet roof. The cable is 1.8 m long.
- **T55250.02 FIU 19 D9F-TQ Q1 Jumper Cable** is routed from the FIU 19 Q1 port to the cabinet roof. The cable is 1.8 m long and includes a connector plate to be installed on the top of the cabinet.
- **T55250.20 FIU 19 TQ-TQ Q1 or 2M Cable (0.5 m)** is used for chaining the Q1 bus between FIU 19 units.
- **T38122.02 Q1 Interconnection Cable** is used in connecting cabinets at a site together. The cable is 1.1 m long and has D9 female connector on other end and D9 male on the other.
- **T38122.04 Q1 Chaining Cable 2, CE (6xIU/BBU)** (total length 3.2 m) is used in chaining DMR 18-38CE and DMR 8-15 indoor units together. Six indoor units can be chained with one cable. FIU19 can be connected to the chain with **T55260.01 FIU 19 2xTQ-D9 Q1 Adapter**.
- **T38122.10 Q1 Coupling connector, CE** is connected to the vacant connectors of the *Q1 Chaining Cable 2, CE*. The coupling connector must also be used when performing service, for example, when replacing an indoor unit. This prevents the Q1 bus connection to the next equipment in chain from breaking.

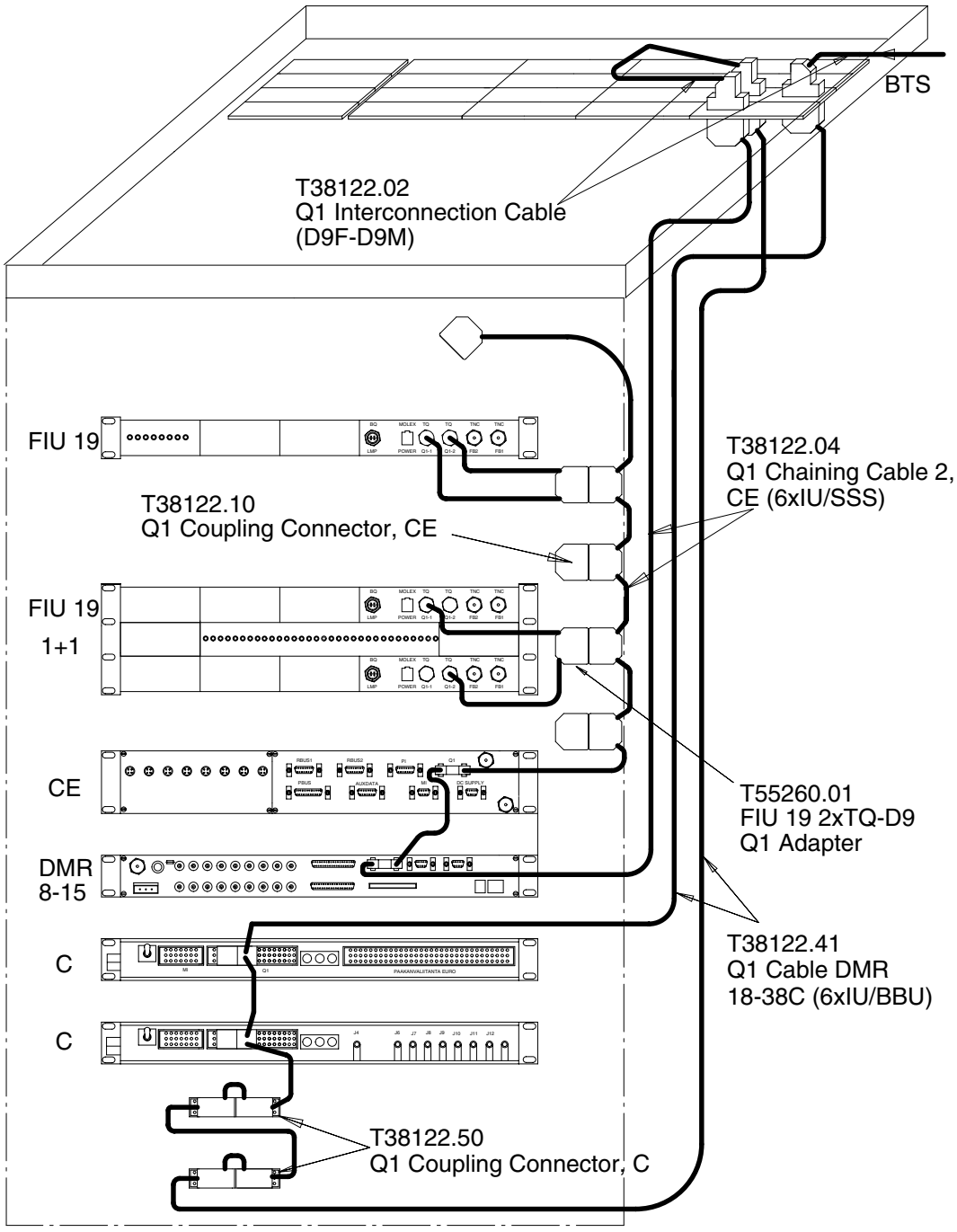


Figure 37. Cabling of the Q1 bus; FIU 19, DMR 8-15, and DMR 18-38 / DynaHopper C and CE installed in the same cabinet

Appendix B. Cabling in Nokia UltraSite BTS cabinets

This appendix describes the Flexbus cabling with some of the new cables and accessories.

B.1 Flexbus cables, connectors, accessories

- **T36625.01 Cable TNC-M/0-TNC-M/0 1.5 m** This cable can be used as a Flexbus cable between FIUs and FXC RRIs. The cable is provided with TNC (male, straight) connectors at both ends.
- **T36625.02 Cable TNC-M/0-TNC-M/0 4 m** This cable can be used as a Flexbus cable between FIUs and FXC RRIs. The cable is provided with TNC (male, straight) connectors at both ends.
- **T36625.03 Cable TNC-M/0-TNC-M/0 8 m** This cable can be used as a Flexbus cable between FIUs and FXC RRIs. The cable is provided with TNC (male, straight) connectors at both ends.
- **T36625.04 Cable TNC-M/0-TNC-M/0 15 m** This cable can be used as a Flexbus cable between FIUs and FXC RRIs. The cable is provided with TNC (male, straight) connectors at both ends.
- **T36626.01 Cable Reel Flexbus RG223 500 m** The connector sets T36627.01, T36627.02, T55255.01 and T55255.11 can be connected to this cable.
- **T36627.01 Connector Set 2XTNC-M/0** This connector set includes 2 TNC connectors (male, straight) that can be used with RG223 cable (eg. T36626.01).
- **T36627.02 Connector Set 2XTNC-M/90** This connector set includes 2 TNC connectors (male, angle) that can be used with RG223 cable (eg. T36626.01).
- **T36628.01 Cable TNC-F/O-TNC-M/O 2.5M** This cable is provided with TNC female straight and TNC male straight connectors.
- **T36629.01 Cable Reel Flexbus RG214 300m** The connector Sets T36630.01, T36631.02 and T55255.12 can be connected to this cable.
- **T36630.01 Connector Set 2XTNC-M/O RG214** This connector set includes 2 TNC connectors (male, straight) that can be used with RG214 cable (eg. T36629.01).
- **T36631.01 Connector Set 2XTNC-M/90 RG214** This connector set includes 2 TNC connectors (male, angle) that can be used with RG214 cable (eg. T36629.01).

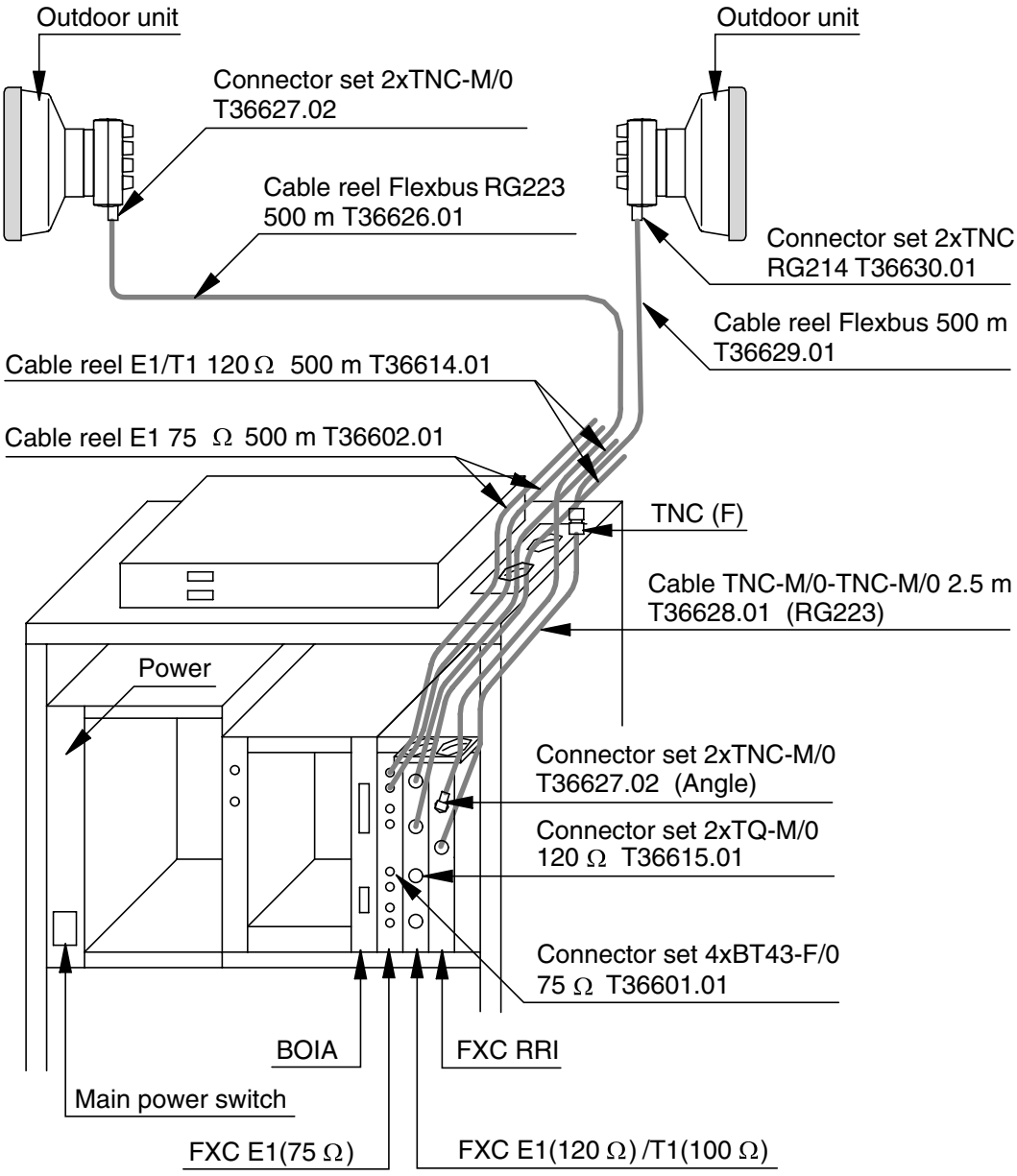


Figure 38. Flexbus and 2Mbit/s cabling

B.2 FIU 19 2M and Q1 cables and connectors

- **T36602.01 Cable Reel E1 75 Ω 500 m** This cable can be used with following connector sets: T36601.01, T36605.01, T36606.01, T36607.02 and T36608.01.
- **T36606.01 Connector Set 2X(BT43-F/0+SMB-F/90) 75 Ω** This connector set includes connectors for making one bi-directional E1 75 Ω cable. It is designed for connecting E1 BT43 and SMB interfaces. A typical usage is to connect UltraSite or MetroSite basestations to FIU 19. Connectors for two cables are included for implementation of one bi-directional connection.
- **T36607.02 Connector Set 2X(SMB-F/90+BNC-M/0) 75 Ω** This connector set includes connectors for connecting E1 SMB and BNC interfaces. A typical usage is to connect TALK family BTS and FIU 19. Connectors for two cables are included for one bi-directional connection. Connectors are suitable for T36602.01 cable.
- **T36608.01 Connector Set 4xSMB-F/90** This cable is designed for connecting E1 SMB interfaces. A typical usage is to connect FIU 19 to a SDH ADM. Four connectors are included for one bi-directional connection. The connectors are suitable for T36602.01 cable.
- **T36612.01 Cable TQ-M/0-TQ-M/0 120 Ω 3 m** This cable is designed for connecting E1 TQ interfaces. A typical usage is to connect MetroSite basestation to MetroHub. The twisted pair cable includes both directions.
- **T36612.02 Cable TQ-M/O-TQ-M/0 120 Ω 7 m** This cable is designed for connecting E1 TQ interfaces. A typical usage is to connect MetroSite basestation to MetroHub. The twisted pair cable includes both directions.
- **T36612.03 Cable TQ-M/O-TQ-M/0 120 Ω 30 m** This cable is designed for connecting E1 TQ interfaces. A typical usage is to connect MetroSite basestation to MetroHub. The twisted pair cable includes both directions.
- **T36612.04 Cable TQ-M/O-TQ-M/0 120 Ω 50 m** This cable is designed for connecting E1 TQ interfaces. A typical usage is to connect MetroSite basestation to MetroHub. The twisted pair cable includes both directions.
- **T36612.05 Cable TQ-M/O-TQ-M/0 120 Ω 15 m** This cable is designed for connecting E1 TQ interfaces. A typical usage is to connect MetroSite basestation to MetroHub. The twisted pair cable includes both directions.
- **T36613.01 Cable TQ-M/0 120 Ω 30 m** This cable is designed for connecting E1 TQ interfaces to an undefined E1 120 Ω interface. A typical usage is to connect UltraSite basestation to customer transmission equipment. The twisted pair cable includes both directions.
- **T36614.01 Cable Reel E1/T1 120 Ω 500 m** This cable is used when making E1 120 Ω connections. The twisted pair cable includes both directions. The cable is suitable for T55251.01 and T55252.01 connectors.

- **T36615.01 Connector Set 2XTQ-M/0 120 Ω** The TQ connectors are used when making E1 120 Ω cables. TQ connectors are used in Nokia UltraSite, MetroSite, MetroHub and FIU 19 applications.
- **T36617.01 Cable TQ-M/0-D9-M/45 120 Ω 2.5 m** This cable is designed for co-siting UltraSite and TALK family BTS's when using 120 Ω cables. The TQ end can of course also connect to MetroSite BTS, MetroHub or FIU 19. The cable includes both directions.
- **T36617.02 Cable TQ-M/0-D9-M/45 120 Ω 12.5 m** This cable is designed for co-siting UltraSite and TALK family BTS's when using 120 Ω cables. The TQ end can of course also connect to MetroSite BTS, MetroHub or FIU 19. The cable includes both directions.
- **T36617.03 Cable TQ-M/0-D9-M/45 120 Ω 25 m** This cable is designed for co-siting UltraSite and TALK family BTS's when using 120 Ω cables. The TQ end can of course also connect to MetroSite BTS, MetroHub or FIU 19. The cable includes both directions.
- **T36618.01 Connector Set TQ-M/0+EURO-F/45 120 Ω** This connector set contains one TQ female, straight connector and one 3 x 7 pin EURO female connector. The suitable cables are T36614.01 and T55253.01.
- **T36623.01 Cable TQ-M/0-RJ-45 0.5 m E1-T1 Adapter** This cable is especially designed for adapting TQ connector to standard T1 RJ-45 connector. A typical usage is ANSI UltraSite basestation. The twisted pair cable includes both directions.
- **T36632.01 Cable BT43-F/0-SMB-F/90 75 Ω 3 m** This cable is designed for connecting E1 BT43 and SMB interfaces. A typical usage is to connect UltraSite BTS to FIU 19. Two cables are included for one bi-directional connection.
- **T36632.02 Cable BT43-F/0-SMB-F/90 75 Ω 7 m** This cable is designed for connecting E1 BT43 and SMB interfaces. A typical usage is to connect UltraSite BTS to FIU 19. Two cables are included for one bi-directional connection.

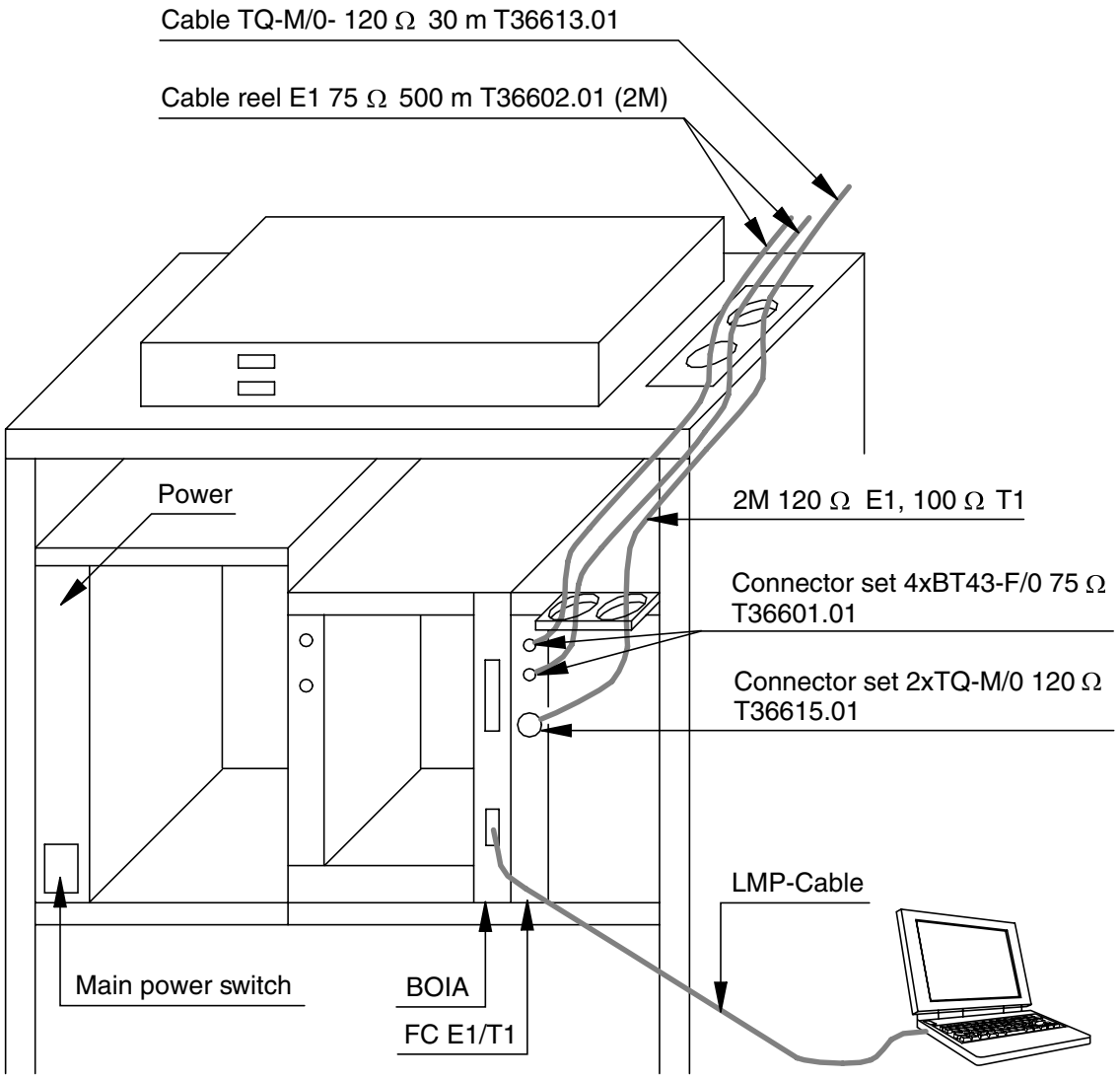
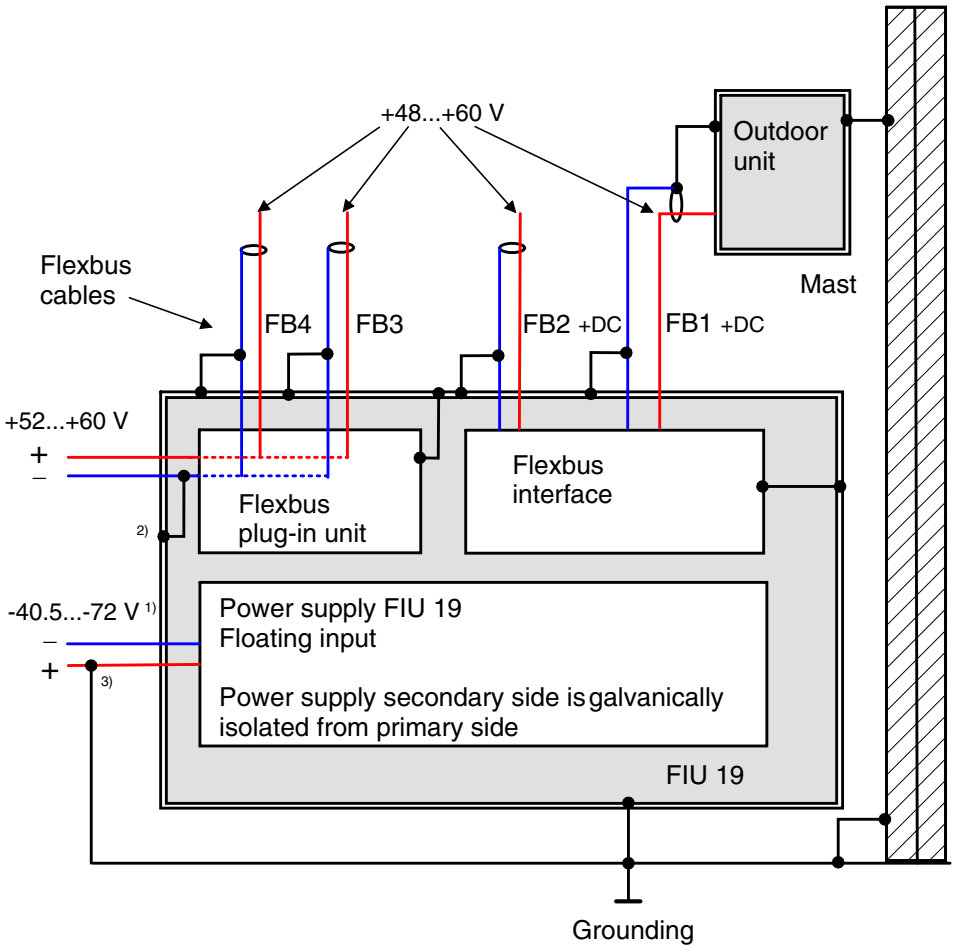


Figure 39. 2Mbit/s cabling in Ultrasite cabinet

Appendix C. FIU 19 power connections and grounding



1) Power requirement
90W - 2 x OU+1 x FIU19
60W - 1 x OU+1 x FIU19

2) In Flexbus plug-in unit, negative supply voltage is always grounded

3) In this site, positive supply voltage is grounded. Negative voltage could be grounded as well.

Figure 40. FIU 19 indoor unit power connections

Caution

If the positive voltage is grounded on the site, the Flexbus plug-in supply voltage has to be galvanically isolated.

Refer to 6.3.2 for optional power supply units.