* Available the first quater 2001

Can be terminated with 75 Ω load for 4 NT assembly.

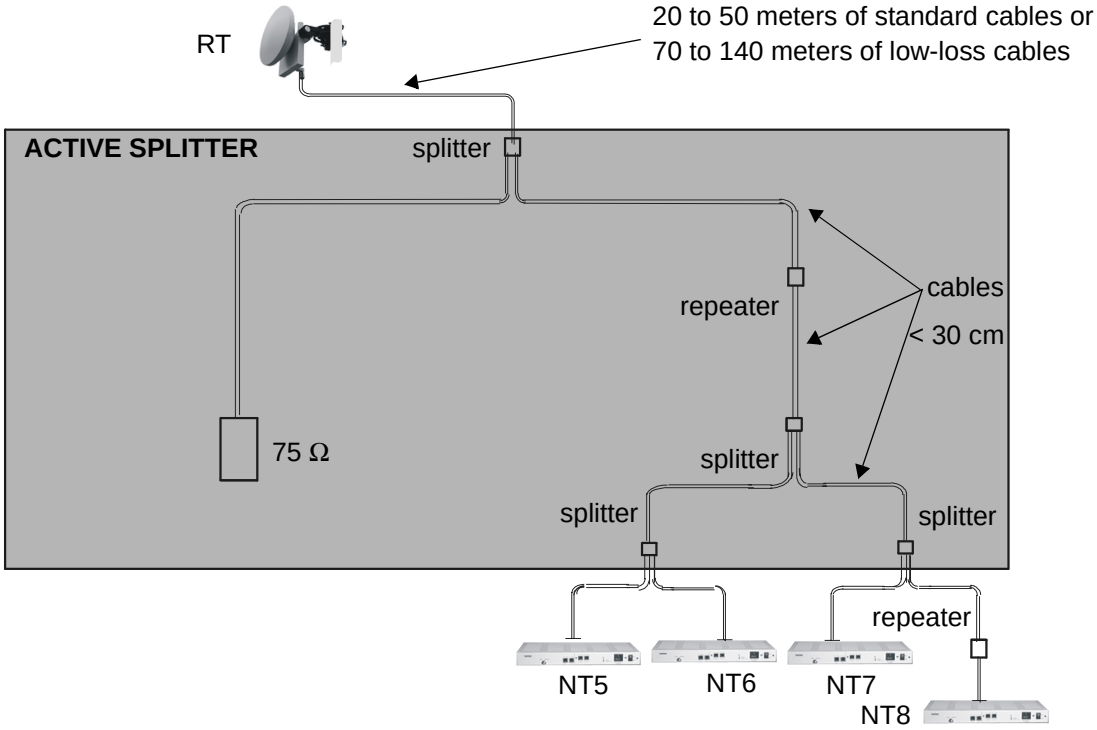

Figure 38 – "4 NT" assembly with active splitter

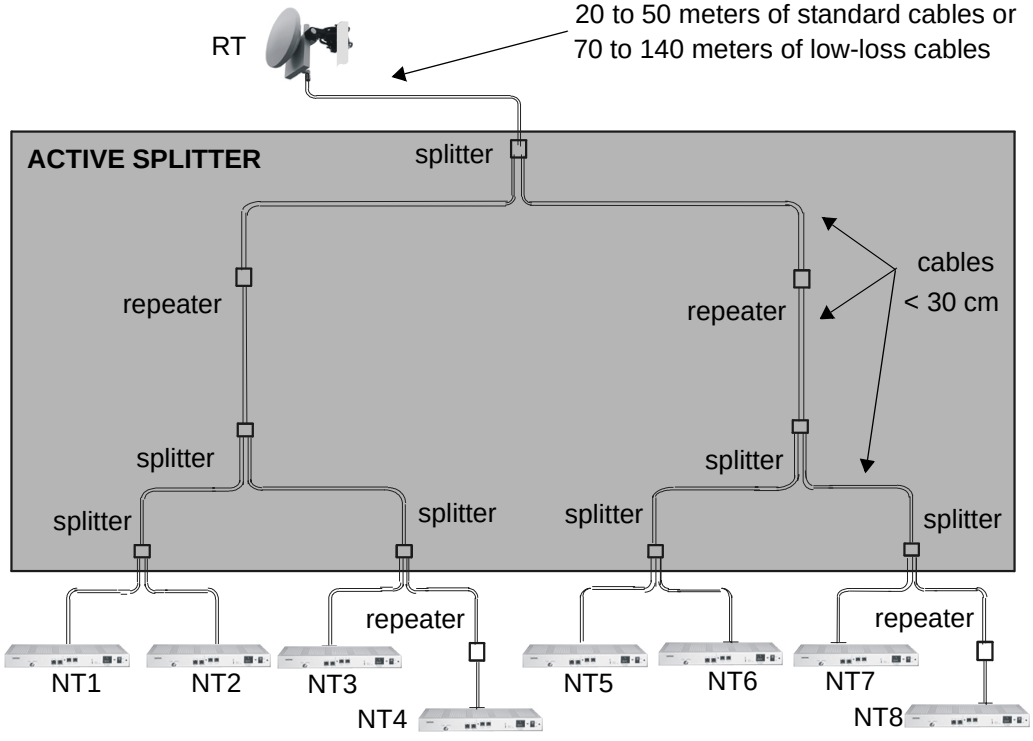

Figure 39 – "8 NT" assembly with active splitter

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4 Commissioning the 7390 TS Terminal Station

4.1 Purpose

The purpose of this task is to carry out:

- **site adjustment** of the RT unit (also called RT or RT radio),
- **initialization** and **configuration** of the RT unit and NT unit parameters,
- **checking** and **validation** of the installed parameters before rendering the equipment operational.

4.2 Commissioning the RT unit

4.2.1 Equipment required

To configure the parameters and carry out site adjustment of the RT unit, the following equipment is required:

- the **RT unit**,
- the E-RIT tool (Radio Installation Tool) cf. *§ 4.2.2 E-RIT Tool*;
  RIT software installation (Ref. : 3CC11826 Axxx):
  - DLL software, Driver I2C Win95/98 NT,
  - Installation kit RT 7390WW (3CC10786Axxx 02),
  - Setup.
- one tool **cable set** (see *Figure 41 – RT «N» connector configuration setup diagram* and *Figure 43 – RT antenna fine alignment assembly diagram*),
- one **audio-head** set (see *Figure 43 – RT antenna fine alignment assembly diagram*),
- one No.5 **Allen key** for M6 screw for an integrated antenna
- one No. 8 **Allen key** for M10 screw and one 16/17 flat wrench for non integrated antenna,
- the RT installation and programming **software** pre-installed on a portable PC,
- CD-ROM containing the data pre-recorded by the network operator,
- a **PC** fitted with the RT unit initialization and programming software; the PC should have the following minimum characteristics:
  - Microprocessor: 500 MHz Pentium III,
  - RAM Memory 64 MB,
  - Hard disk: 4 GB,
  - Monitor SVGA (800 x 600),
  - Windows 9x /NT4. (Service pack 3 or above).

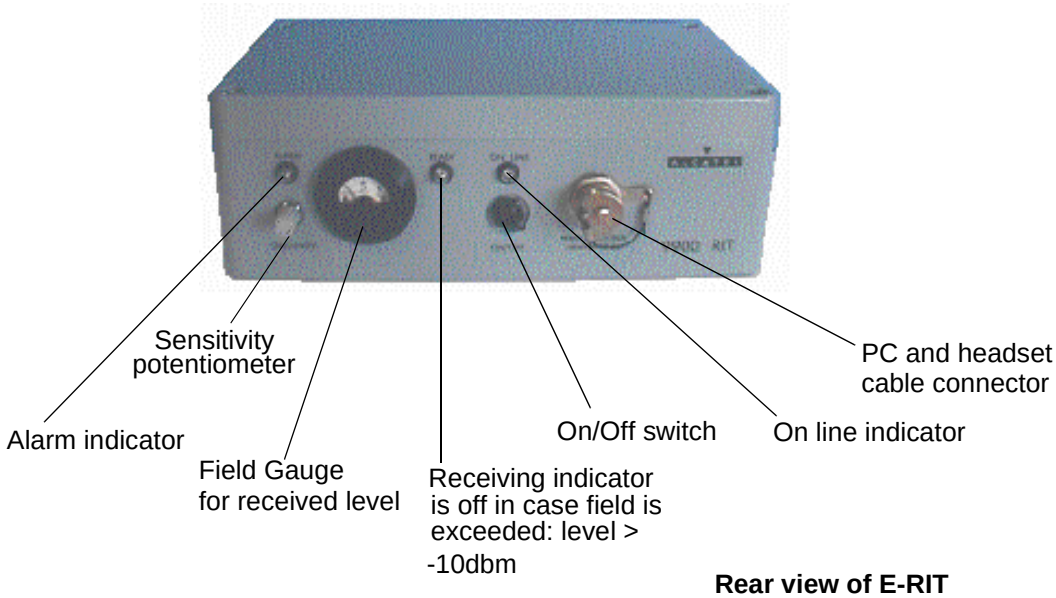
4.2.2 E-RIT Tool

The **E-RIT** is used (only if RT «N»):

- as an **interface** between the PC and the RT unit: it receives the information necessary to the initialization and programming of the RT from the PC and transmits it to the RT unit;
- to implement **optimal alignment** of the antenna facing the Base Station. This function is provided by the Received Signal Level control system (visual and/or audible) of the E-RIT.

The E-RIT tool is equipped with a sheath to protect it from impacts and allowing the operator hands-free operation.

Front view of E-RIT



Rear view of E-RIT

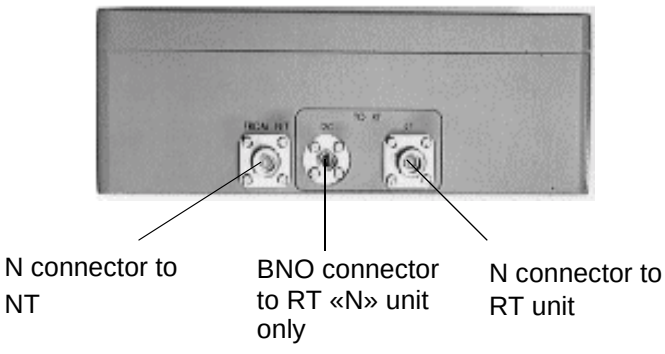


Figure 40 – RIT tool

Note: Let the E-RIT warm up (-10/+55 °C range) after it storage in extreme temperatures (-40/+70 °C).

4.2.3 Site configuration and adjustment procedures

	**FOR THE ASSEMBLIES DESCRIBED IN THE FOLLOWING PARAGRAPHS, CONNECT THE NT TO THE MAINS SUPPLY LAST OF ALL, ONCE ALL THE OTHER CONNECTIONS HAVE BEEN MADE BEFORE.**

4.2.3.1 Configuration setting of the 7390RT parameters

To carry out RT radio programming, implement FIRST the assembly shown in *Figure 41 – RT «N» connector configuration setup diagram*.

Note: *The radio configuration requires the information featuring in the installation instructions (see Appendix 1 – 7390 TS installation sheet), duly completed in advance. This will be used to define the parameters required by the configuration application.*

Note: *It is recommended that this task be carried out indoors. The use of the portable PC in inclement weather conditions (rain, snow, etc.) is not advisable.*

Note: *Safety recommendations listed in section 1.3 being followed, it is not necessary to establish special grounding connection for the NT casing. Therefore, it is performed via the 3-wire mains cord.*

A) RT «N» connector

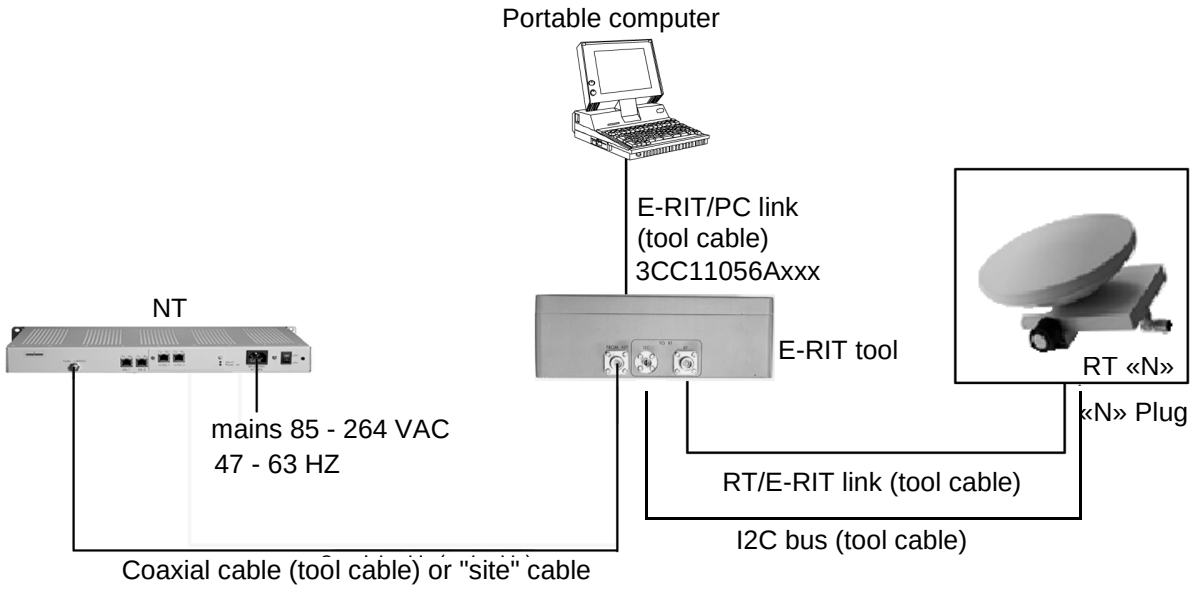


Figure 41 – RT «N» connector configuration setup diagram

Stages

1. Connect the cables of the configuration tools (cables and tools delivered with the equipment):
   - between the RT unit and the E-RIT tool: the RT/E-RIT link coaxial cable ("N" type connectors at both ends (75Ω),
   - between the RT unit and the E-RIT tool: the data transfer bus («N» type connectors at both ends),
   - between the portable PC and the E-RIT tool,
   - between the E-RIT tool and the NT: coaxial cable ("N" type connector at the E-RIT (75Ω) and "F" type connector at the NT),
   - between the NT and the mains power supply: mains connection cable (**to connect last**).

2. Power-up the assembly:
   - power-up the NT,
   - power-up the PC,
   - power-up the E-RIT tool.

3. Run the radio configuration application by clicking on its "kit-install.exe" icon on the PC Windows desktop.

To run the kit_install.exe application from the Windows desktop, double-click on the icon shown opposite. The first configuration screen then appears.

Note: *The user of the installation software must be familiar with the operation of software in the Windows 95, 98 or NT environments.*

B) RT «F» connector

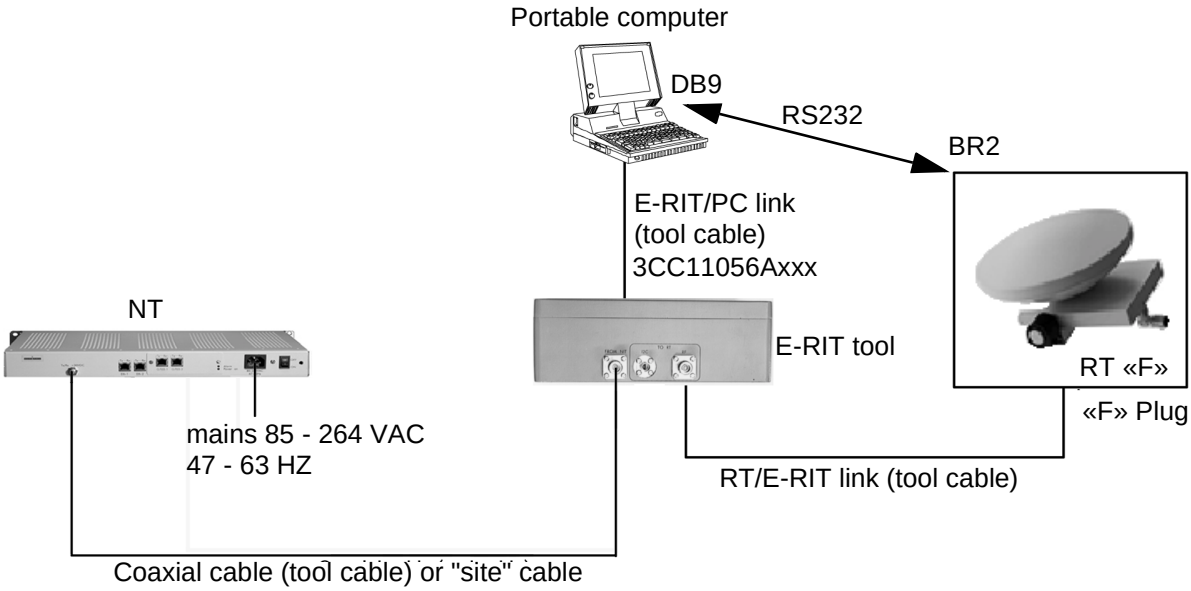


Figure 42 – RT «F» connector configuration setup diagram

Stages

1. Connect the cables of the configuration tools (cables and tools delivered with the equipment):
   - between the RT unit and the E-RIT tool: the RT/RIT link coaxial cable ("F" type connectors at both ends (75Ω),
   - between the portable PC and the E-RIT tool,
   - between the E-RIT tool and the NT: coaxial cable ("N" type connector at the E-RIT (75Ω) and "F" type connector at the NT),
   - between the NT and the mains power supply: mains connection cable (**to connect last**),
   - between the E-RIT/PC link and RT «F» connector the data transfer bus (RS232) with BR2 / DB9 cable.
2. Power-up the assembly:
   - power-up the NT,
   - power-up the PC,
   - power-up the E-RIT tool.
3. Run the radio configuration application by clicking on its "kit-install.exe" icon on the PC Windows desktop.

To run the kit_install.exe application from the Windows desktop, double-click on the icon shown opposite. The first configuration screen then appears.

Note: *The user of the installation software must be familiar with the operation of software in the Windows 95, 98 or NT environments.*

4.2.3.2 RT configuration (maximum distance according to a NT-RBS)

The steps of RT configuration are:

- geographic area,
- RF gain correctio calculation,
- cable gain correction for,
  - mono NT software ref.:1.1.2d,
  - two NT software ref.:1.0.9a,
  - 4/8 NT software ref.:1.1.2d.

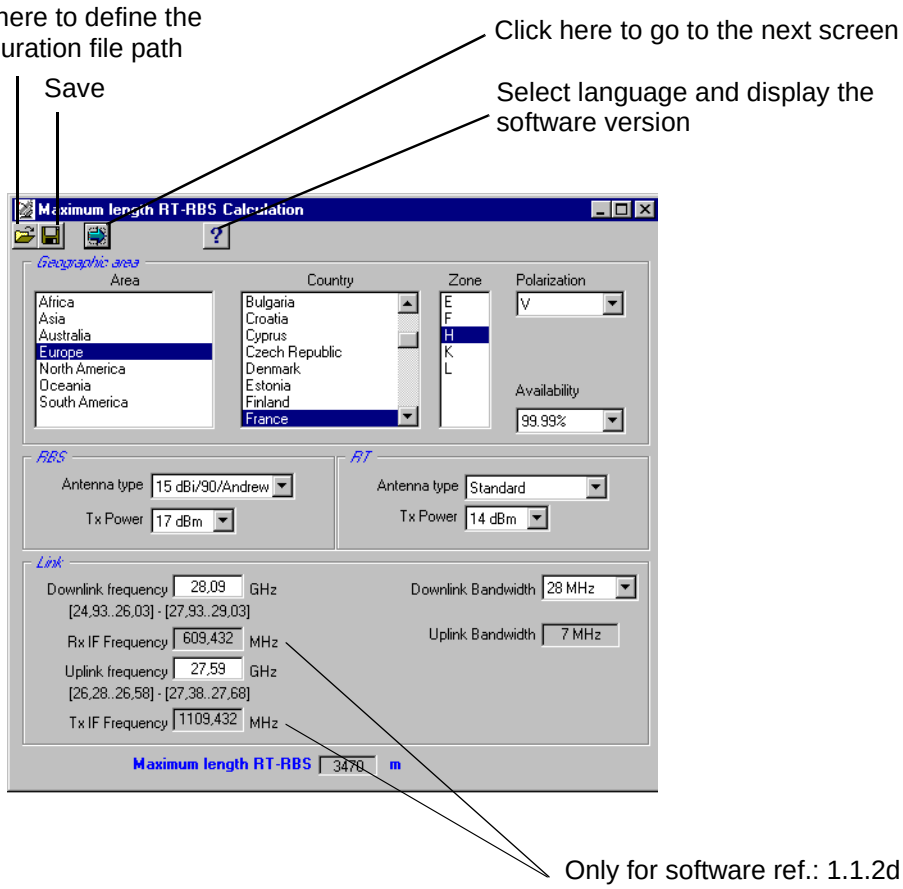
Geographic area

Once the configuration application has been run, the radio parameters must be supplied.

The radio configuration parameters can be supplied to the software in two different ways:

- in the form of a configuration file stored on an IT medium (floppy disk, CD-ROM or other); the parameters obtained like this may, if necessary, be subsequently modified,
- by direct input of parameters via configuration screens.

In the case of data saved in a file, insert the IT medium in the PC and transfer the contents of the file to the installation software.



In the case of the parameters being directly entered, follow the RT radio programming stages described below:

- Calculate the maximum RT-RBS distance (cf. A),
- Calculate the gain corrections (cf. B),

Once the parameters have been entered, the configuration must be sent to the RT radio unit.

Note: *To ensure optimum radio link quality, define with care the parameter values in compliance with the real environmental characteristics.*

RF gain correction calculation

Note: *does not depend on RT / NT topology*

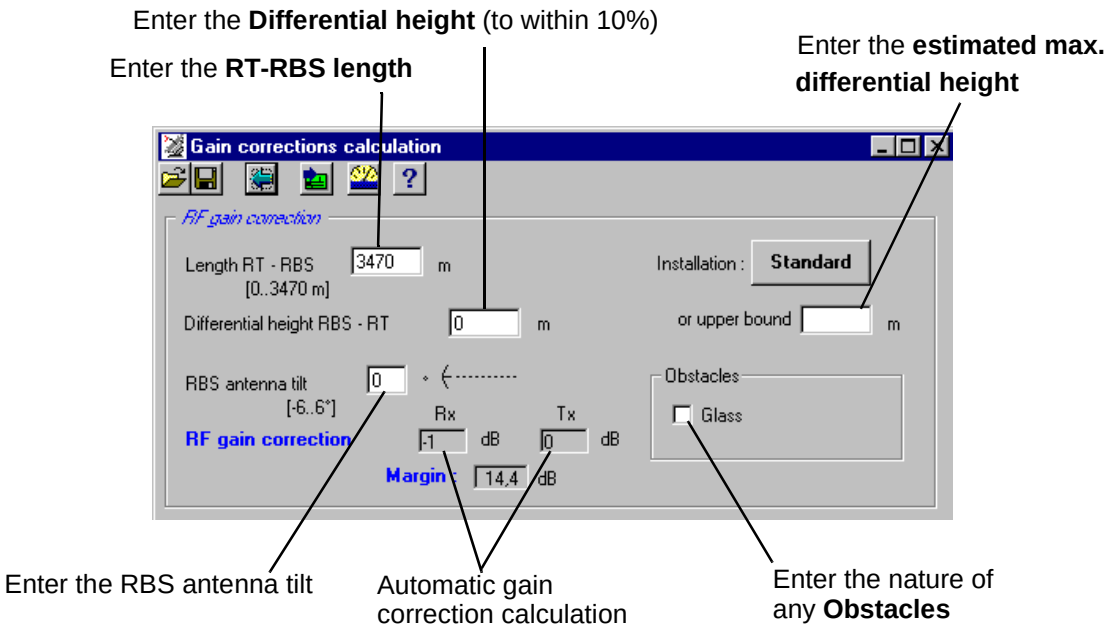
To define the value of the parameters to be entered in the "Gain corrections calculation" screen, use the installation sheet (see *Appendix 1 – 7390 TS installation sheet*), complemented by the Radio Planning. The RT-RBS distance must be compatible with the value defined in the previous screen.

As the software parameters are entered, the software carries out the gain correction calculations.

If the parameters cannot be accepted, the background colors of the Rx and Tx gain connection windows change to red. If the values are beyond the system capabilities, all the windows are emptied of their contents and are grayed-out; it is then necessary to recommence the input starting with the first RT-RBS distance parameter.

For the RT-RBS distance, it must be to within the following margins:

– 100 m < D < 200 m, 20 m max. error
– 200 m < D < 400 m, 40 m max. error
– 400 m < D < 800 m, 80 m max. error
– D > 800 m 100 m max. error

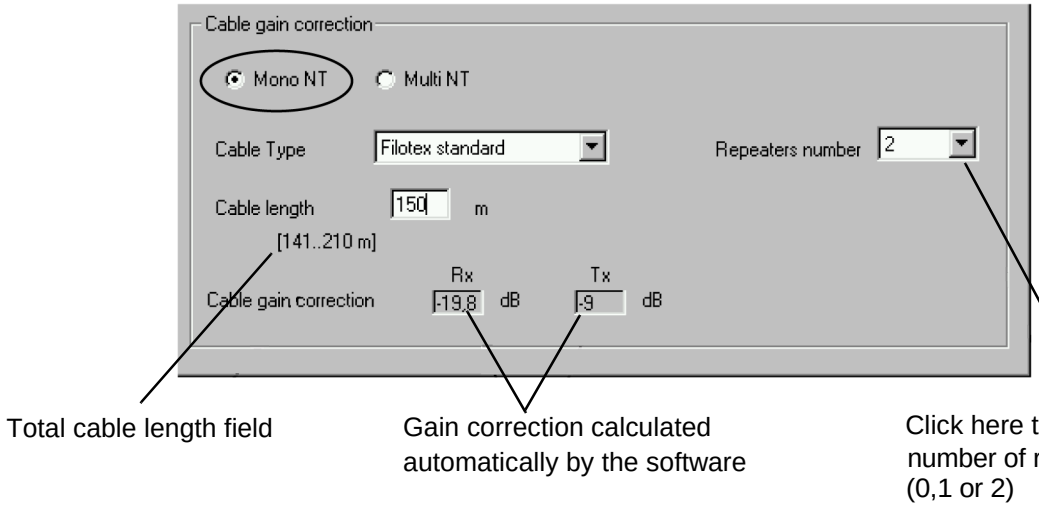


Cable gain correction

For the cable gain correction calculation, there are three possible scenarios depending on the installation topology: **Mono NT**, **two NT**s or **Multi NTs**.

1. Mono NT software ref.: 1.1.2d

Cable gain correction in the case of Mono NT, the screen appears as follows, once Mono NT has been selected:



The cable length indicated is the total length including the free part and the part imposed by the topology.

The field in brackets on the screen is defined as follows:

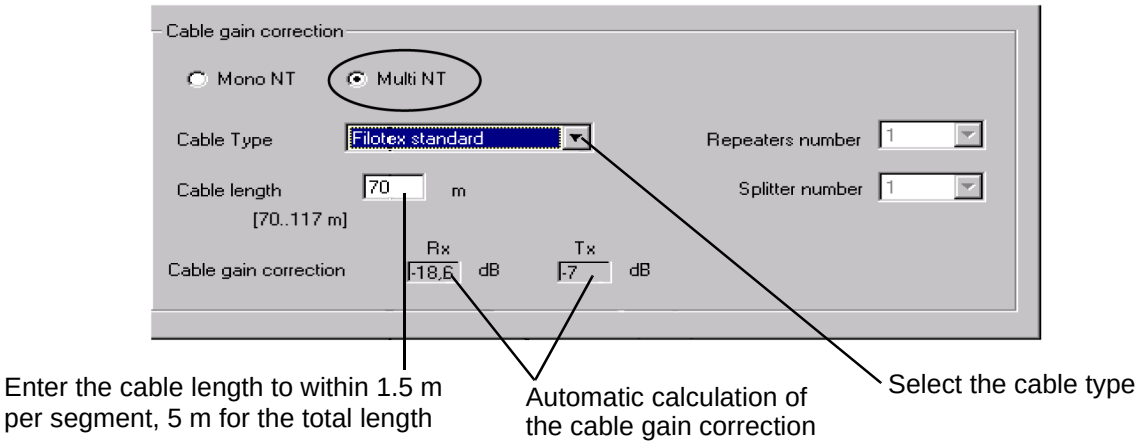
minimum value = N x 70 m (N number of repeater),
maximum value = N+1 x 70 m (N number of repeater),

The length adjustment is between 1 m and the maximum length of the first segment with respect to the cable selected (70 or 210 m).

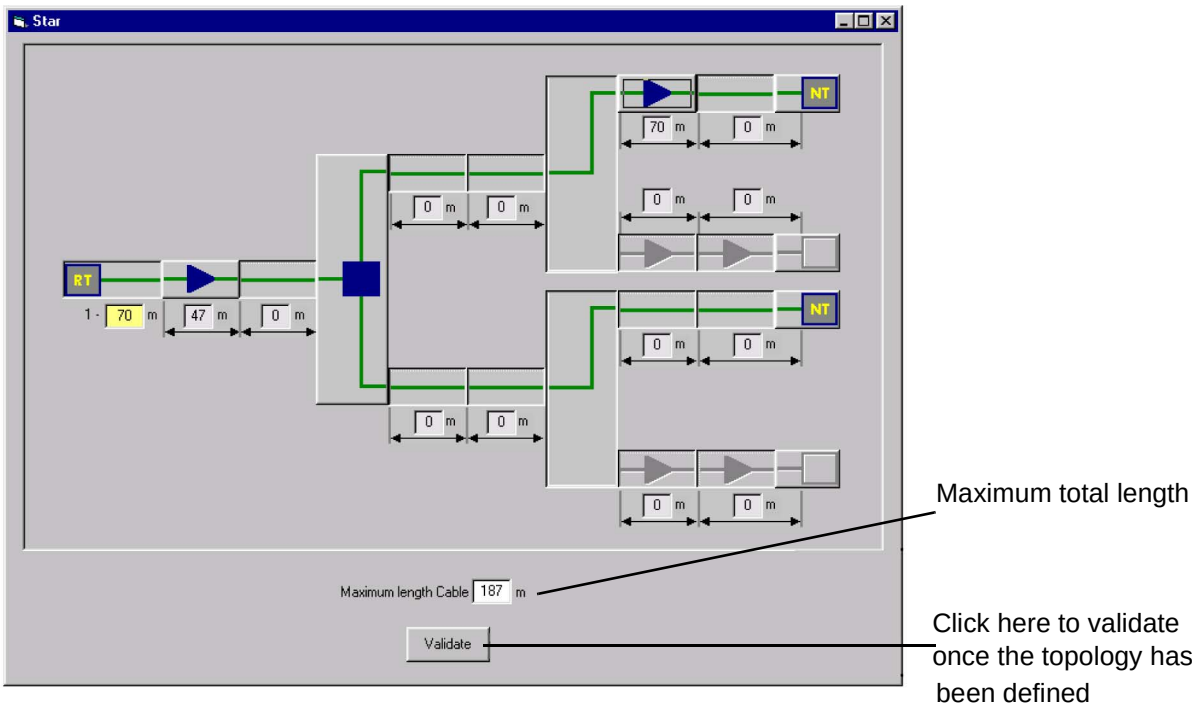
The software will calculate automatically with respect to the entire set of parameters the corrections to be made.

2. Two NT software ref.: 1.0.9a

Cable gain correction in the case of two NT: once the data presented in the ***Star*** screen is validated, the following screen appears:



In the case of two-NT configuration, the following screen appears, once two-NT has been selected:



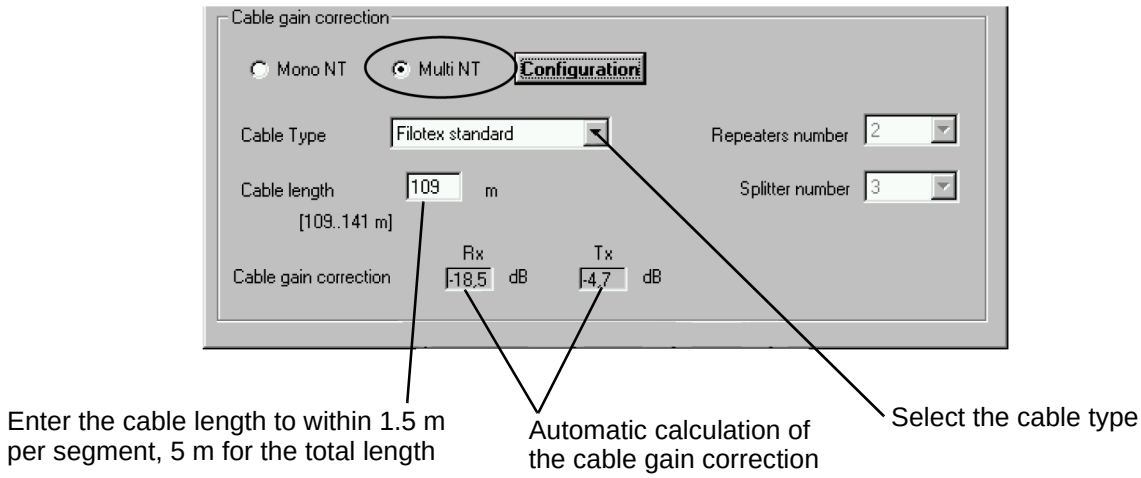
This screen is used to define the installation topology. Depending on the topology, the total maximum length (incorporating the imposed part and the free part) is displayed.

Sending the configuration to the RT radio unit

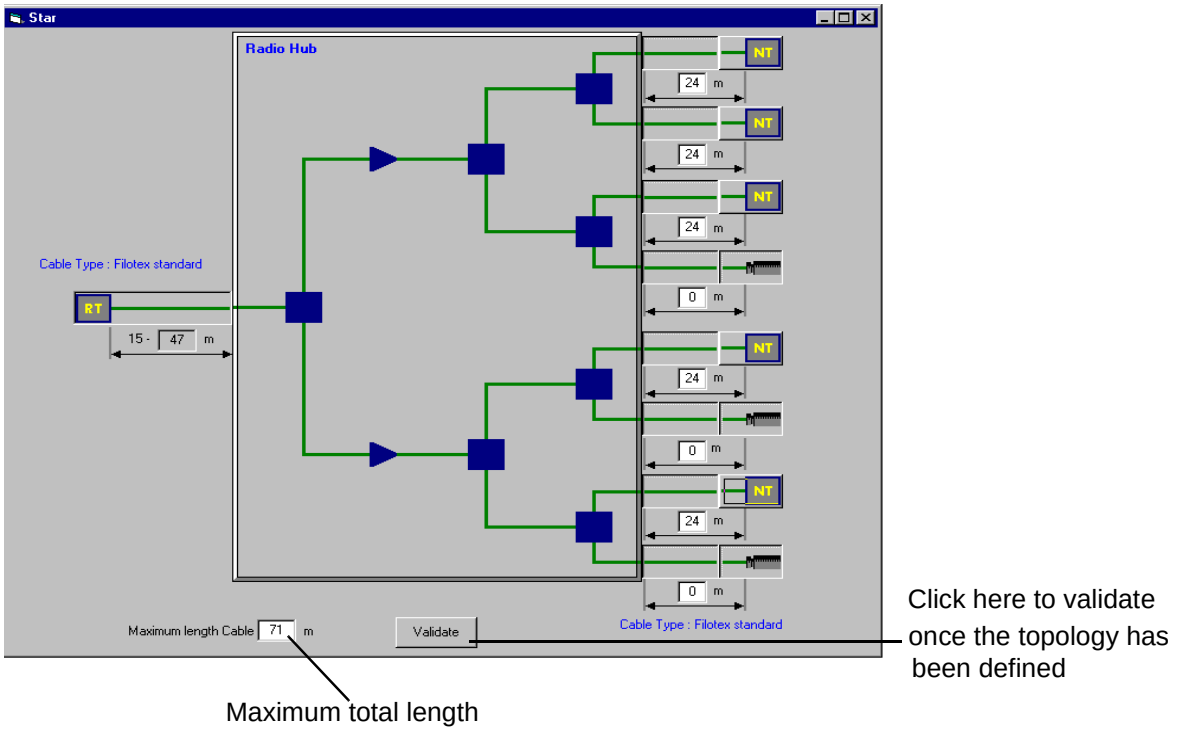
Once the calculations have been made, click on the icon "data send" shown here, that is at the top of the ***Gain corrections calculation*** screen, for the values to be acknowledged by the RT.

3. 4/8 NT software ref.: 1.1.2d

Cable gain correction in the case of multi NT: once the data presented in the ***Star*** screen is validated, the following screen appears:



In the case of multi-NT configuration, the following screen appears, once multi-NT has been selected:



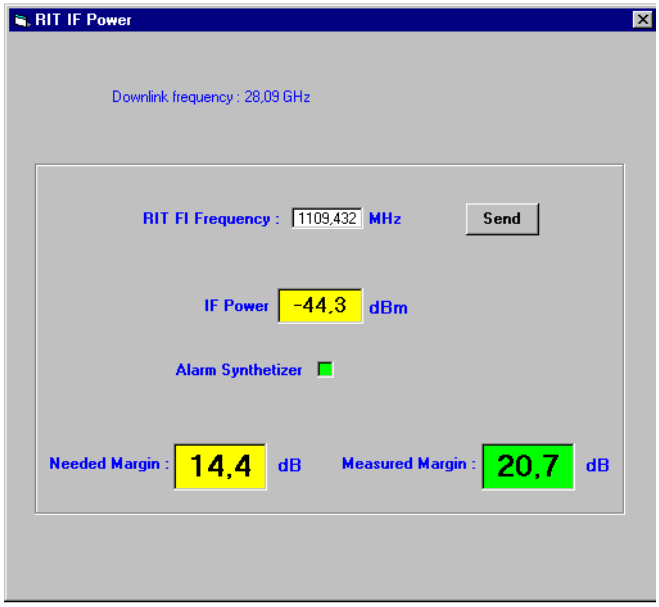
This screen is used to define the installation topology. Depending on the topology, the total maximum length (incorporating the imposed part and the free part) is displayed.

Sending the configuration to the RT radio unit

Once the calculations have been made, click on the icon "data send" shown here, that is at the top of the ***Gain corrections calculation*** screen, for the values to be acknowledged by the RT.

4.2.3.3 Margin measurement (software réf. 1.1.2d)

Click on this icon to display the ***RIT IF Power*** screen.



- Check that the «*RIT IF Frequency*» in the field is correct or adjust the frequency
- In case of modification, click on the «*Send*» button to validate the modification
- Check that the «*Needed Margin*» = Margin x, so that x is:
  - Distance (RT - RBS) / Distance max. (RT - RBS)
- Check that the «*Measured Margin*» > «*Needed Margin*» field value in **RIT IF Power** screen (+/- 3 dB)
- Check that Measured Margin is such that:
  - (-65 dBm) (standard) IF Power,
  - (-67 dBm) (specific) IF Power.

Nota: E-Rit IF Power access is +/- 3 dB.

4.2.3.4 Aligning the RT unit antenna

1. **Preparation**

	**IMPORTANT NOTE FOR INTEGRATED ANTENNA: NEVER HANDLE THE RT UNIT BY ITS ANTENNA BUT BY THE BODY OF THE RT RADIO OR THE SUPPORT ARM**

Note: *To carry out the following phases of the Terminal Station commissioning, the link Base Station must be operational and its antenna correctly oriented.*

- Montage

  The following equipment is required for carrying out RT antenna alignment:

  - the **RT unit**,

- the **E-RIT** (Radio Installation Tool),
- a **NT**,
- an audio headset,
- a No. 5 Allen key for M6 screw for integrated antenna,
- a No. 8 Allen key for M10 screw and a 16/17 flat wrench for non integrated antenna,
- the **service cable** kit.

	**WARNING: DO NOT PERFORM SUCH ASSEMBLY IN STORMY CONDITIONS; THE EQUIPMENT METAL STRUCTURES MAY BE A TARGET FOR LIGHTNING**

To carry out RT unit antenna alignment, implement the assembly shown in *Figure 43 – RT antenna fine alignment assembly diagram*.

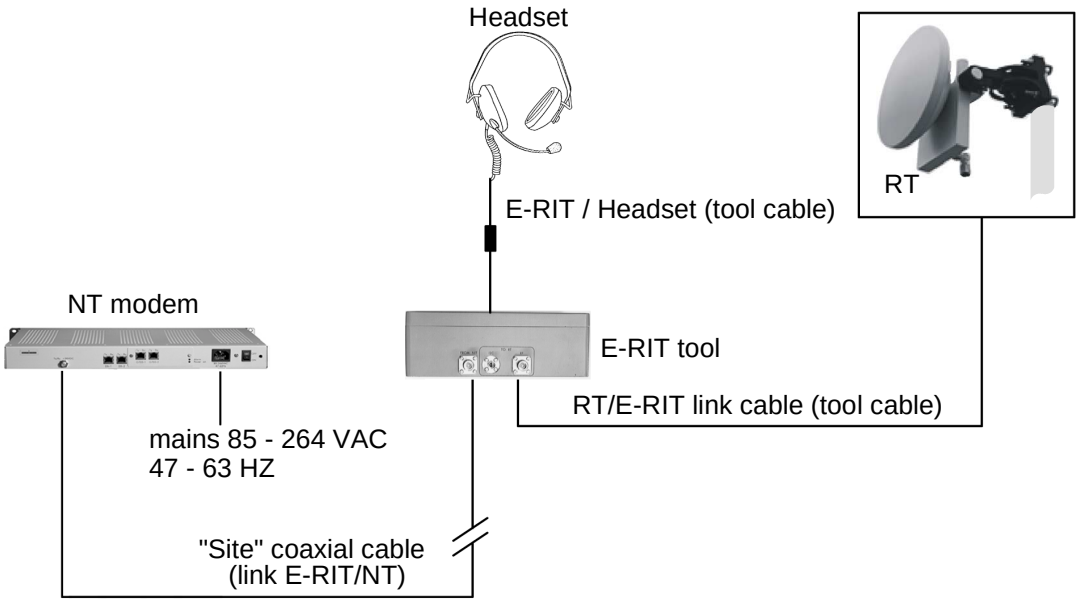


Figure 43 – RT antenna fine alignment assembly diagram

– Help for using the E-RIT

  • **E-RIT tool received field indicator** (represented in *Figure 44 – Adjustment procedure using the E-RIT tool potentiometer*): to the maximum received field corresponds a maximum vumeter pointer deviation; as soon as the pointer reaches its maximum stop, adjust the **potentiometer** to set the pointer back to its center position (these adjustments may be renewed).

Figure 44 – Adjustment procedure using the E-RIT tool potentiometer

  • audio headset connected to the "service kit" cable: to the minimum received field corresponds a low frequency audio signal (headset's LF tone); to the maximum received field corresponds a high frequency audio signal.

The received signal follows the curve below which comprises several maximum points called "lobes":

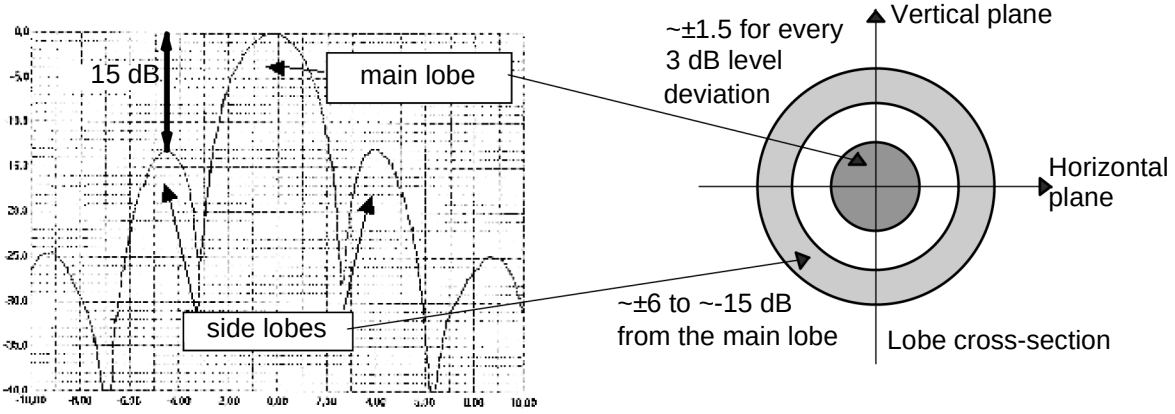


Figure 45 – Main lobe and side lobes of the received signal

Note: *As the side lobes are rather close (4° to 5°) from the main lobe at a rather high level (-15 dB), searching the maximum received signal must be carried out carefully to make sure that pointing is effectively carried out considering the main lobe (see § Horizontal and vertical pointings).*

2. Pointing an integrated antenna

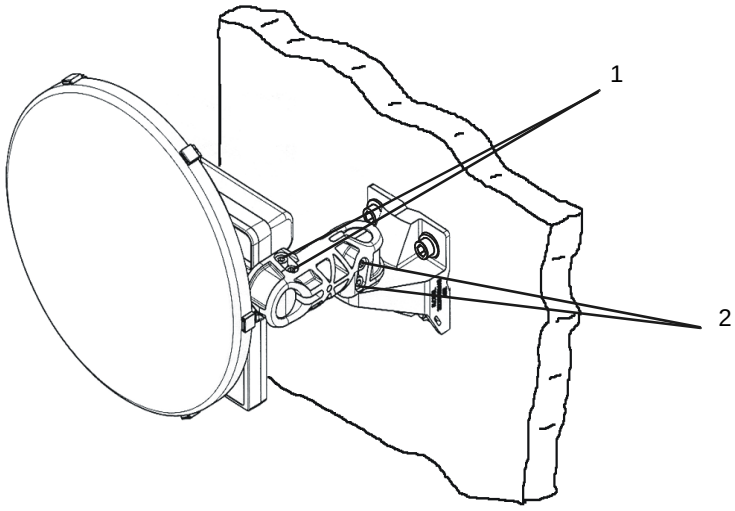


Figure 46 – "azimuth" and "elevation" adjustment screw

– Presets:

- Using the Allen key, **slightly untighten** the "azimuth" and "elevation" screws so that the RT **can move easily** (marks 1 and 2, *Figure 46 – "azimuth" and "elevation" adjustment screw*).
- **Horizontally** direct the RT to the Base Station using a compass if necessary.

– Horizontal and vertical pointings:

Using the E-RIT tool and/or the audio headset (see section Help for using the E-RIT *§ 4.2.3.4 Aligning the RT unit antenna*), perform the following adjustments:

- Move the RT radio by performing **horizontal** scanning, until you find a **maximum** reception level.

Note: *If no level is detected, check with the compass that the RT correctly points to the base station. In case of failure check the installation (polarization, connections).*

- Carry out alignment with respect to the **strongest signal.** To do this, either:
  - observe the maximum field level on the **E-RIT tool indicator** shown in *Figure 44 – Adjustment procedure using the E-RIT tool potentiometer*,
  - or, evaluate the maximum field level using the **audio headset** connected to the service kit cable,
- Using the Allen key, slightly tighten the "azimuth" screws (mark 1, *Figure 46 – "azimuth" and "elevation" adjustment screw*) before performing the vertical pointing, in order to maintain a maximum azimuth reception and make the two adjustments independent (H and V).
- Provided that a maximum has effectively been detected during the previous pointing, several cases are possible depending on the maximum position in the reception curve (see *Figure 45 – Main lobe and side lobes of the received signal*).

3. Pointing a non integrated antenna

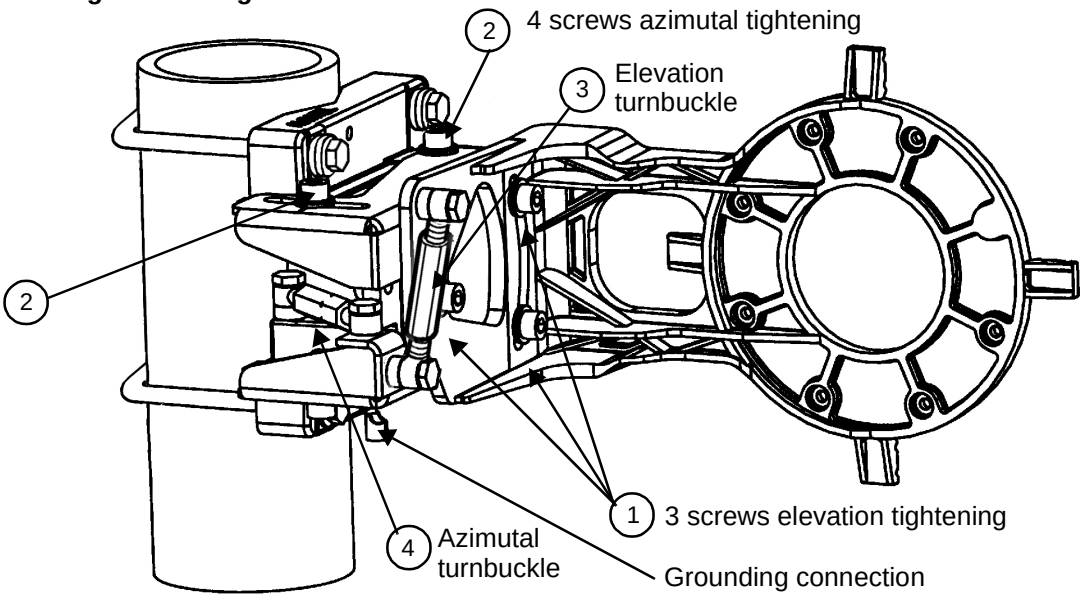


Figure 47 – Pole mounting 1+0 9900UXI102

– Presets:

  • Be sure that the three screws ① and the four screws ② are a bit slackened, just enough to allow movement of the different parts of the pole mounting. These screws must not be too much slackened, otherwise, the fine-tuning of alignment will be imperfect. Use the 10 mm Allen key.

  • **Horizontally** direct the RT to the Base Station using a compass if necessary.

– Horizontal and vertical pointings:

  Using the E-RIT tool and/or the audio headset (see section Help for using the E-RIT *§ 4.2.3.4 Aligning the RT unit antenna*) , perform the following adjustments:

  • Move the RT radio by performing **horizontal** scanning, until you find a **maximum** reception level.

Note: *If no level is detected, check with the compass that the RT correctly points to the base station. In case of failure check the installation (polarization, connections).*

  • Carry out alignment with respect to the **strongest signal**. To do this, either:

    • observe the maximum field level on the **E-RIT tool indicator** shown in *Figure 44 – Adjustment procedure using the E-RIT tool potentiometer*,

    • or, evaluate the maximum field level using the **audio headset** connected to the service kit cable,

    • with the azimutal turnbuckle ④ and the 16 mm flat wrench, fine tune the azimutal setting, before performing the vertical pointing, in order to maintain a maximum azimut reception and make the two adjustments independent (H and V),

    • with the vertical turnbuckle ③ and the 16 mm flat wrench, fine tune the elevation setting until you find a maximum reception level. Be aware that if the elevation angle is higher than +5º or lower than -5º, it is necessary to remove completely one of the 2 screws fixing the antenna support on the azimut support and insert it in the third hole accessible. See *Appendix 6 – Installation of the Terminal Station RT unit with a non integrated antenna*.

  • Provided that a maximum has effectively been detected during the previous pointing, several cases are possible depending on the maximum position in the reception curve (see *Figure 45 – Main lobe and side lobes of the received signal*):

Note: *The following cases are treated for the vertical scanning (site), they are also valid for the horizontal scanning (azimuth).*

Case 1 (*Figure 48 – Vertical scanning: case 1*): **only one wide maximum** is found throughout the vertical scanning. Thus the RT is aligned within the ± 6° deviation range corresponding to the side lobe.

Then slightly move the RT horizontally (by less than 6°) to the BS.

Perform again **vertical** scanning.

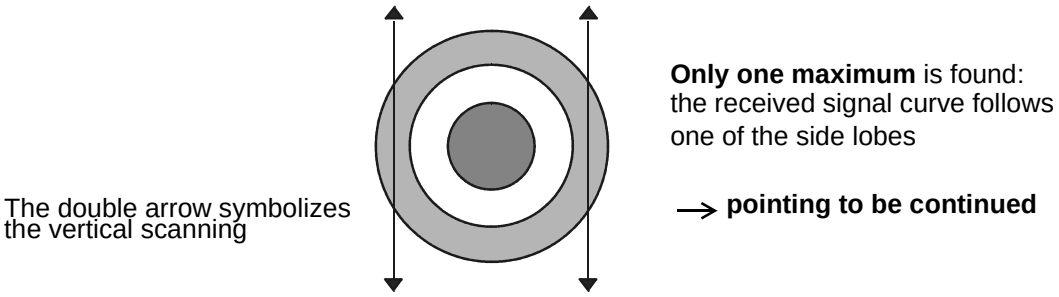


Figure 48 – Vertical scanning: case 1

Case 2 (*Figure 49 – Vertical scanning: case 2*): only **two remote maxima** have been found throughout vertical scanning.

Then adjust the **vertical position** so that the reception level is at the **minimum** between both maxima.

Horizontally move the RT until the main lobe is found, as shown in *Figure 49 – Vertical scanning: case 2*.

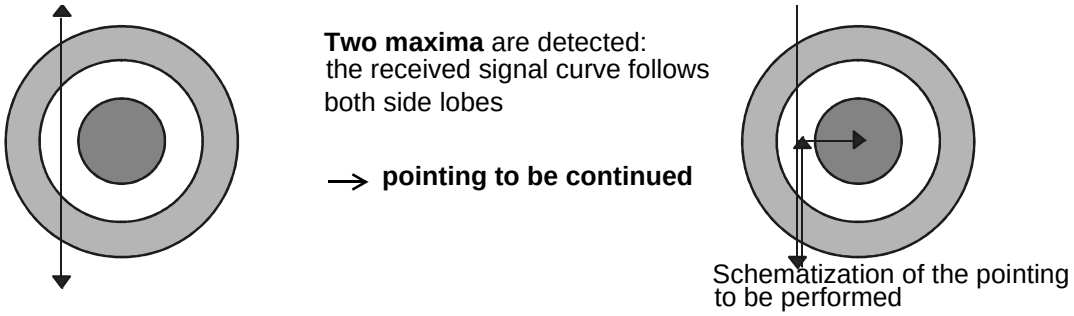


Figure 49 – Vertical scanning: case 2

Case 3 (*Figure 50 – Vertical scanning: case 3*): **three maxima** have been found throughout vertical scanning, including one maximum of higher level (main lobe).

Then move the RT so that it matches the **central** maximum.

Use the potentiometer to distinguish both maximum types by varying the received signal sensitivity and thus confirm that the pointing effectively corresponds to the main lobe (maximum of higher level).

Slightly adjust the **vertical and horizontal** positions until the **maximum main lobe level** is reached.

RT alignment with the base station is then correct.

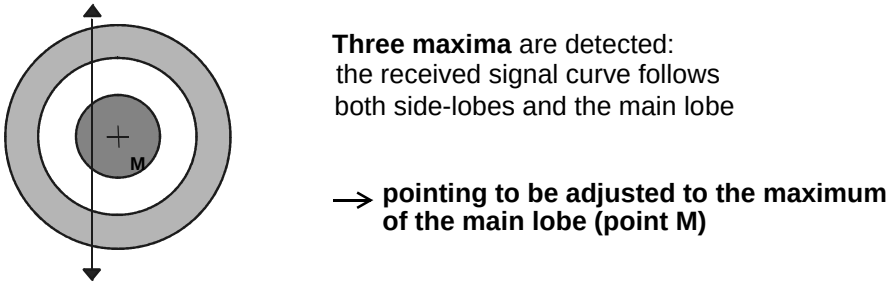


Figure 50 – Vertical scanning: case 3

Note: *If no maximum is detected throughout vertical scanning, it means that the horizontal reception maximum is lost, the horizontal position is not located within the ± 6° deviation range.*
*Then **horizontally** move the RT to the BS so that a maximum is found and **vertically** scan again to find one of the 3 previously described cases.*

	**Make sure you observe the conditions of case 3 before performing the following step to complete the pointing**

– End of pointing

Once alignment is completed:

- For an integrated antenna, tighten the "azimuth" screws using the Allen key, then the "elevation" screws (marks 1 and 2, *Figure 46 – "azimuth" and "elevation" adjustment screw*).

	**TORQUE VALUE MUST BE 9 TO 10 m.N. USE A TORQUE WRENCH**

- For a non integrated antenna, tighten the three screws ① and the four screws ② (*Figure 47 – Pole mounting 1+0 9900UXI102*).

	**TORQUE VALUE MUST BE 30 m.N. ± 10 %. USE A TORQUE WRENCH**

- Make sure the maximum reception signal is always found.
- Completely lock the mechanical assembly preventing the RT radio assembly from misaligning

4. Cabling according to standards

– Remove the tools and cables used for the RT commissioning and adjustment.

– On the Radio side, connect the RT/NT connection cable in accordance with the requirements indicated in *§ 3.6 Installation of the RT/NT link*.

– Screw up the stopper of catch BNO on the radio to allow the sealing of the radio.

	**IMPORTANT NOTE: IT IT MANDATORY TO OBSERVE THE REQUIREMENTS IN PARAGRAPH (3.6) ENSURING RT/NT CABLE WATERTIGHTNESS (THERMOSHRINKABLE SLEEVE) AND ATTACHMENT (CLIPS)**

4.3 Commissioning the NT

Note: *To carry out the following phases of the Terminal Station commissioning, the link Base Station must be operational and its antenna correctly orientated.*

Considerations

- Before commissioning the NT unit, complete the RT unit adjustment procedures.
- No adjustment is required for commissioning the NT.
- To check the voltage at the mains connector terminals, use a measuring instrument (voltmeter).
- For the mains connection, use only the connection cable supplied with the equipment.
- Never use an extension cable for connecting the NT unit to the power source.

Stages (*Figure 51 – The NT unit 220V*)

1. Connect the RT/NT connection cable. Use ref. 1 connector.
2. To ground the NT unit in this way, carry out the procedures described in *Chapter 3 Installation of the 7390TS Terminal Station*. Use the lug and screw hardware supplied with the equipment, ref. 7.
3. Check that the mains socket to which the NT is to be connected supplies voltage compliant with the equipment characteristics and that it is fitted with an earth.
4. (ref. 5)
   - For NCAxxx: connect the NT connection cable to the NT connector and then to the mains.
   - For NGAxxx: connect the 48V cable to the HE15-3 connector, then to the 48V arrival.
5. Power-up the NT unit using the On/Off switch (ref. 6); the **green** "Power on" LED (ref. 3) **lights up**. The **red** "Alarm" LED (ref. 4) **lights up** (searching for the carrier frequency) then flashes at different rates according to the current phase:
   - **slow** flashing: automatic scanning over the frequencies,
   - **fast** flashing: frame recovery (authentication by the serial number) once the frequency is found.

Malfunctions to the installation:

The A7390 is a reliable and easy-to-install system. By following the procedures described in the documentation, no problems should occur. However, if these procedures have been poorly applied, here is a list of the possible problems that may arise.

Manifestation of the problem	Possible causes	Solution
The red NT LED is flas-hing slowly.	1 Errored NT declaration. 2 Poor connector contact. 3 Cable damaged or severed. 4 Alignment problem. 5 Incorrect RT settings. 6 RT breakdown. 7 NT breakdown.	1 Check NT declaration. 2 Check connectors. Secure loo-sely cabled connectors. 3 Check installation wiring. Change damaged cables. 4 and 5 Reconfigure and check antenna alignn-ment (cf. *§ 4.2.3 Site configuration and adjust-ment procedures*). 6 Replace RT.
The red NT LED is flas-hing quickly.	1 Bad transmission. 2 Incorrect NT settings.	1 Delete and recreate the managed NT using the 7390LT. Check the allocation of the correct NT serial number. 2 and 3 Reconfigure and check antenna alignn-ment (cf. *§ 4.2.3 Site configuration and adjust-ment procedures*). 4 Replace RT.
The red NT LED rest lit uninterrup-ted	1 Check the NT supply voltage 2 NT breakdown.	Try a swith off/switch on, and if the LED remains red, replace NT.

6. Wait for this automatical initialization time of the NT. As soon as the **red** LED (ref. 4) **goes out**, the system **can be managed by the BS** (calibration of the radio link (output, frequency, time) has been performed).

	**NEVER DISCONNECT THE NT/RT LINK UNLESS REQUIRED FOR MAINTENANCE OR INSTALLATION PURPOSES. SUCH INTERVENTION MUST BE CARRIED OUT IN ACCORDANCE WITH THE PROCEDURE INDICATED IN CHAPTER 5**

Note: *The maximum initialization time is in the order of 5 minutes (otherwise see § 5.4 Changing a faulty NT unit).*

Client terminals are connected to the ref. 2 connectors (see *§ 4.4 Client terminal connections (NT unit) or § 4.5 Client terminal connections (NT Lite unit)*

.

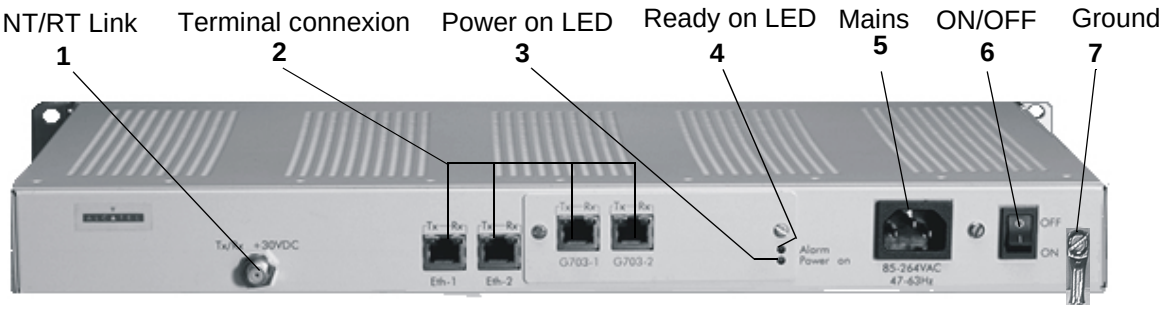


Figure 51 – The NT unit 220V

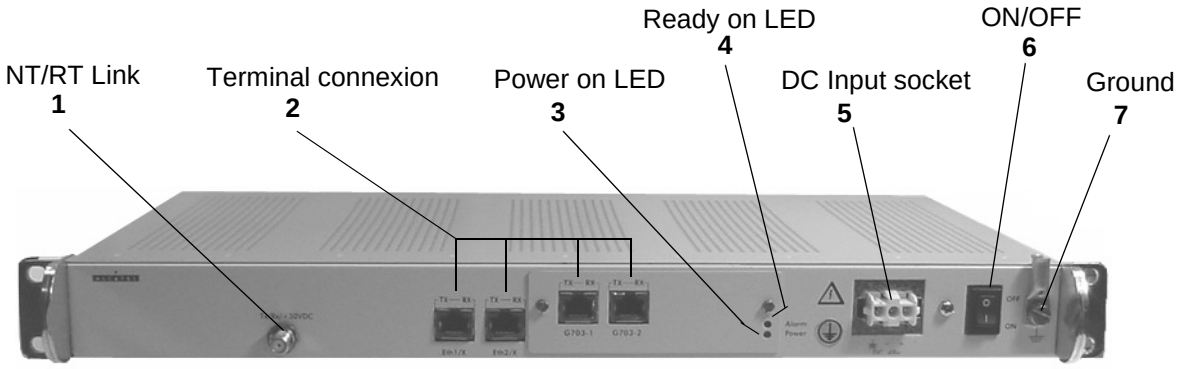


Figure 52 – The NT unit 48 Vcc

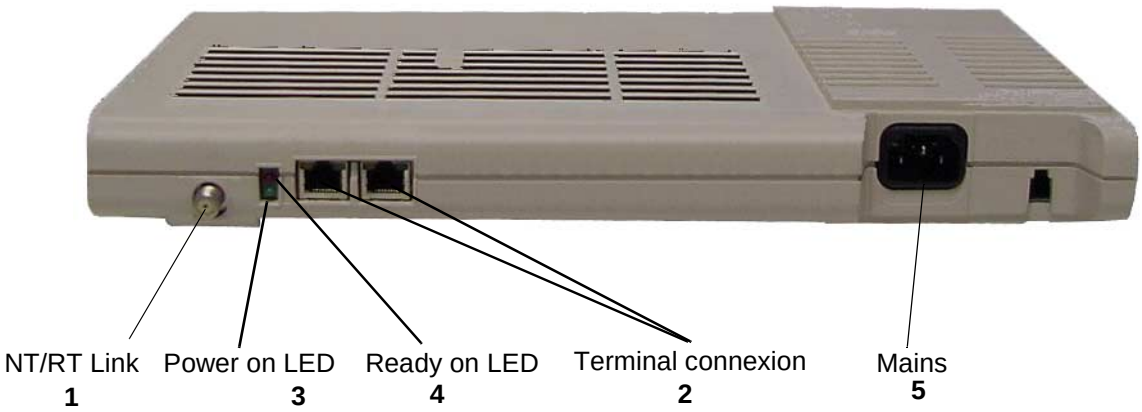
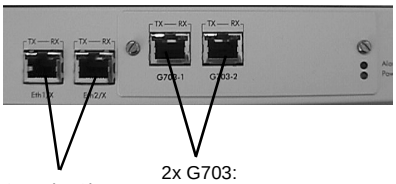
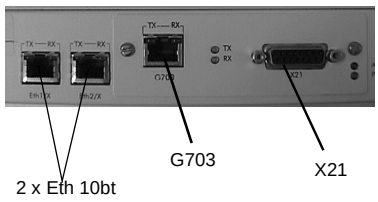
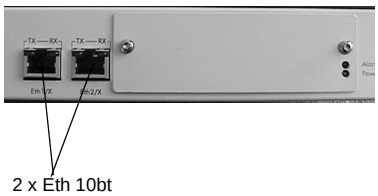
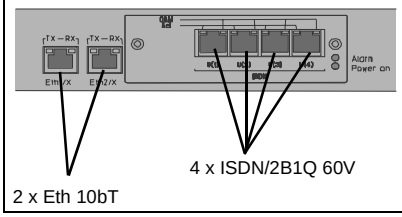
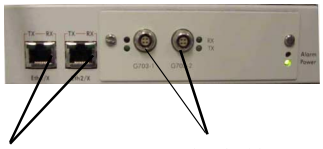
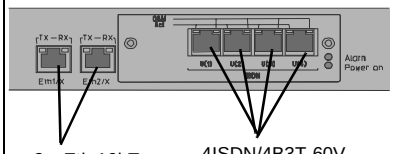


Figure 53 – The NT Lite unit 220 Vcc

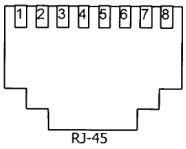
4.4 Client terminal connections (NT unit)

There are ten types of NT units:

9900 NCA 001, 9900 NGA 001 and 9900 NCE 001	9900 NCA 002	9900 NCD 001
		

9900 NCB 001, 9900 NGB 001	9900 NGA 004	9900 NCB 002, 9900 NGB 002
		

4.4.1 Ethernet connector



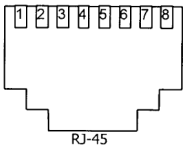
Front view soket

Pin 1:	Tx_diff_plus	**Pin 5:**	Not connected
Pin 2:	Tx_diff_Moins	**Pin 6:**	Rx_diff_Moins
Pin 3:	Tx_diff_plus	**Pin 7:**	Not connected
Pin 4:	Not connected	**Pin 8:**	Not connected

Figure 54 – Affectation of Ethernet access points at NT back

	**SHIELDED CABLES MANDATORY**

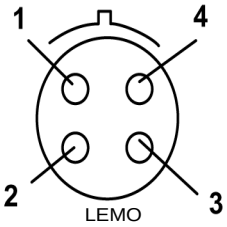
4.4.2 G703 connector (120 ohm E1 and 100 ohm T1 standards)



Front view soket

Pin 1:	Rx_Ring	**Pin 5:**	Tx_Tip
Pin 2:	Rx_Tip	**Pin 6:**	Not connected or equiment ground
Pin 3:	Not connected or equipment ground	**Pin 7:**	Not connected
Pin 4:	Tx_Ring	**Pin 8:**	Not connected

OR



Pin 1: Rx_Ring
Pin 2: Tx_Tip
Pin 3: Rx_Ring
Pin 4: Rx_Tip

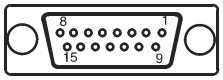
Figure 55 – Affectation of G703 access points at NT back

	SHIELDED CABLES MANDATORY

4.4.3 X21 connector

If the distance between DCE (NT) and DTE is too long, according to V11 norms, you can exchange pin 6 and pin 13 in order to get a phase inversion

.



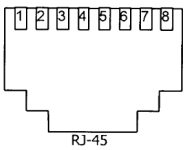
Female connector

Pin 1:	Screw	**Pin 6:**	S_neg	**Pin 11:**	R_pos
Pin 2:	T_neg	**Pin 7:**	B_neg	**Pin 12:**	I_pos
Pin 3:	C_neg	**Pin 8:**	Ground	**Pin 13:**	S_pos
Pin 4:	R_neg	**Pin 9:**	T_pos	**Pin 14:**	B_pos
Pin 5:	I_neg	**Pin 10:**	C_pos	**Pin 15:**	Not connected

Figure 56 – Affectation of X21 connector access points

	SHIELDED CABLES MANDATORY

4.4.4 ISDN connector (Norm TS 102 - 080)



Front view soket

Pin 4: TIP
Pin 5: RING

Figure 57 – Affectation of ISDN access points at NT back

	SHIELDED CABLES MANDATORY

4.4.5 48V connector (HE 15)

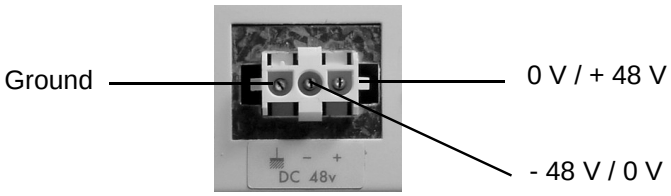
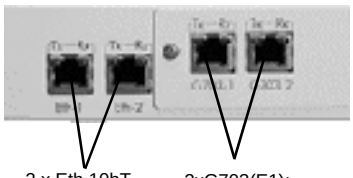


Figure 58 – Affectation of 48 V points

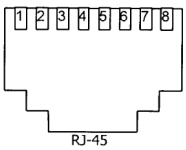
4.5 Client terminal connections (NT Lite unit)

There are two types of NT units:

9900 NCF 001, 9900 NCG 001(*)



4.5.1 Ethernet connector



Front view soket

Pin 1:	Tx_diff_plus	**Pin 5:**	Not connected
Pin 2:	Tx_diff_Moins	**Pin 6:**	Rx_diff_Moins
Pin 3:	Tx_diff_plus	**Pin 7:**	Not connected
Pin 4:	Not connected	**Pin 8:**	Not connected

Figure 59 – Affectation of Ethernet access points at NT back

	SHIELDED CABLES MANDATORY