NOKIA

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Nokia MetroHub Transmission Node Rel. C3

Optimising and Expanding Capacity in Nokia MetroHub

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Contents

1 Overview of optimising the transmission node

The following sections detail how to change settings in the transmission node, for node optimisation or network expansion.

- Set obligatory radio settings for *Nokia FlexiHopper (Plus)* or *Nokia MetroHopper*.
- *Adjust transmission node settings* (node identification, transmission unit identification, service interface, FXC E1/T1, FXC RR1, external alarm inputs and control output, and alarm property settings).
- *Adjust FXC STM-1 interface settings* (OS, RS, MS, VC-4, and VC-4 TUG interface settings).
- *Adjust FXC STM-1 SDH-PDH channel settings* (TTI, VC-12, 2M multiframe CRC4, performance, and alarm monitoring state settings).
- *Adjust management settings*.
- *Adjust SDH management channel settings*.
- *Adjust Q1 management settings*.
- *Adjust node synchronisation settings* (synchronisation, synchronisation loop bit, and SDH synchronisation settings).
- *Manage cross-connections* (add and modify cross-connections, manage cross-connection files and banks).

2 Setting obligatory radio settings

2.1 Setting Nokia FlexiHopper and Nokia FlexiHopper Plus settings

Before you start

Note

Familiarise yourself with the *Nokia FlexiHopper with FXC RRI User Manual*'s *Commissioning and Maintenance* document before setting Nokia FlexiHopper radio settings. Refer to the commissioning instructions in *Nokia FlexiHopper Plus Product Documentation* before setting FlexiHopper Plus radio settings.

Steps

1. **Click the FXC RRI unit corresponding to the Nokia FlexiHopper or FlexiHopper Plus radio in the Equipment View window.**

   A unit-specific menu appears.

2. **Select Settings → Operation Mode on the FXC RRI menu.**

   The **Operation Mode** dialogue box opens.

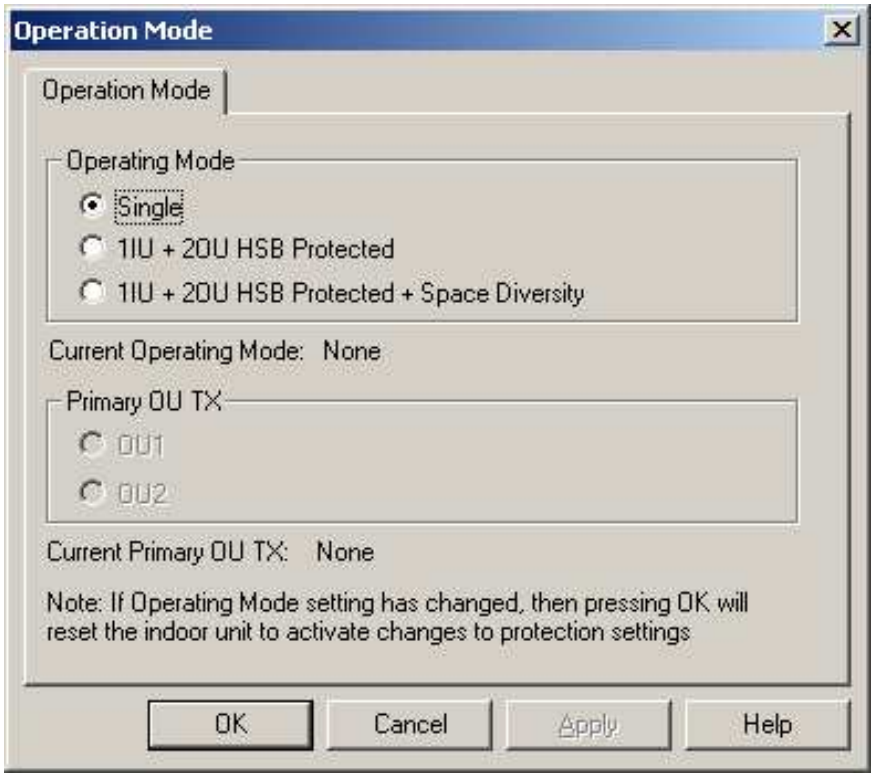

Figure 1. Operation Mode dialogue box

The operation mode of an FXC RRI unit can be single (no hot standby (HSB) protection) or 1 IU + 2 OU HSB Protected or 1 IU + 2 OU HSB Protected + Space Diversity. The **Operation Mode** dialogue box also allows the user to select which of the units should be the primary OU, which is the active protected OU when both OUs are operational.

3. **Select the operation mode, and in case of 1 IU + 2 OU HSB or 1 IU + 2 OU HSB + Space Diversity, also the primary OU Tx, and click OK.**

   When the operation mode of an FXC RRI unit is set to 1 IU + 2 OU HSB Protected, the protected radio hop is displayed in the **Equipment View** of the hub managers.

   The protected hop is only visible if the RRI unit has been selected in the **Equipment view**. If another unit was selected, the protected hop is not displayed.

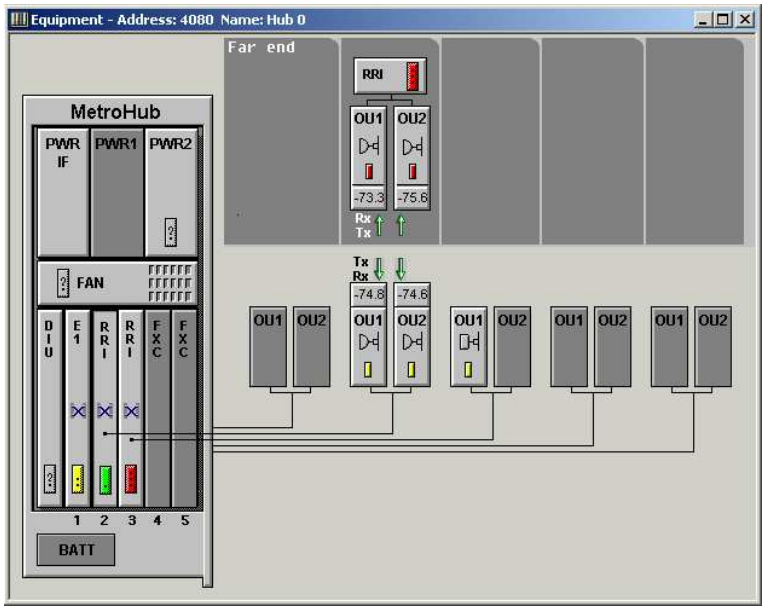

Figure 2. Protected radio hop in the Equipment View

The far-end outdoor units and indoor unit are shown for each protected hop together with information on the hop status. The status information includes:

- an arrow representing the receive status of each OU:
  - Green arrow = receiving at an acceptable level
  - Red cross over the arrow = not receiving
- numbers displaying the receive level of each OU in dBm, and
- text “Tx” and/or “Rx” beside each OU representing the currently active transmitter and receiver.

4. Select Settings → Outdoor Unit on the FXC RRI menu corresponding to the Nokia FlexiHopper or FlexiHopper Plus radio.

The settings dialogue box opens. The same dialogue box is used for Nokia FlexiHopper and FlexiHopper Plus, but the options vary.

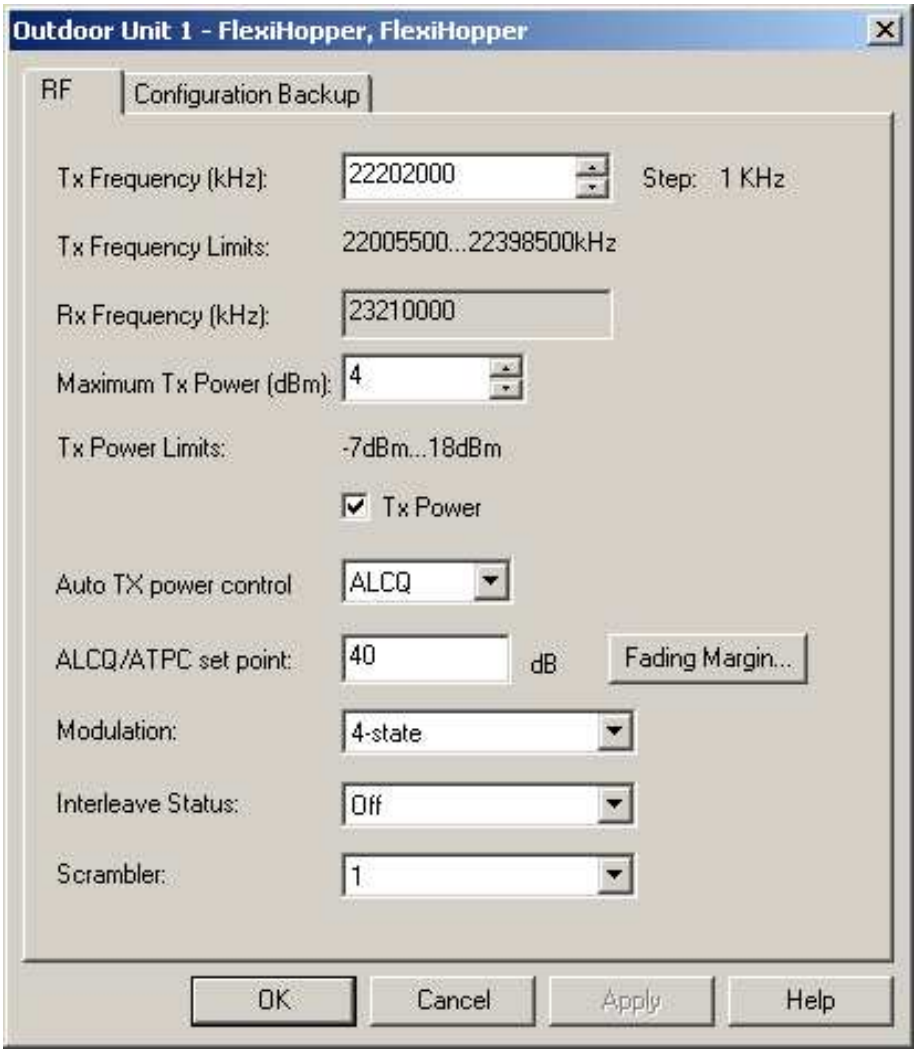

Figure 3. Nokia FlexiHopper or FlexiHopper Plus settings, single

In hot standby mode, the Flexbus capacity and OU settings are common for both radios, except for the Maximum Tx power and ALCQ / ATPC set point settings.

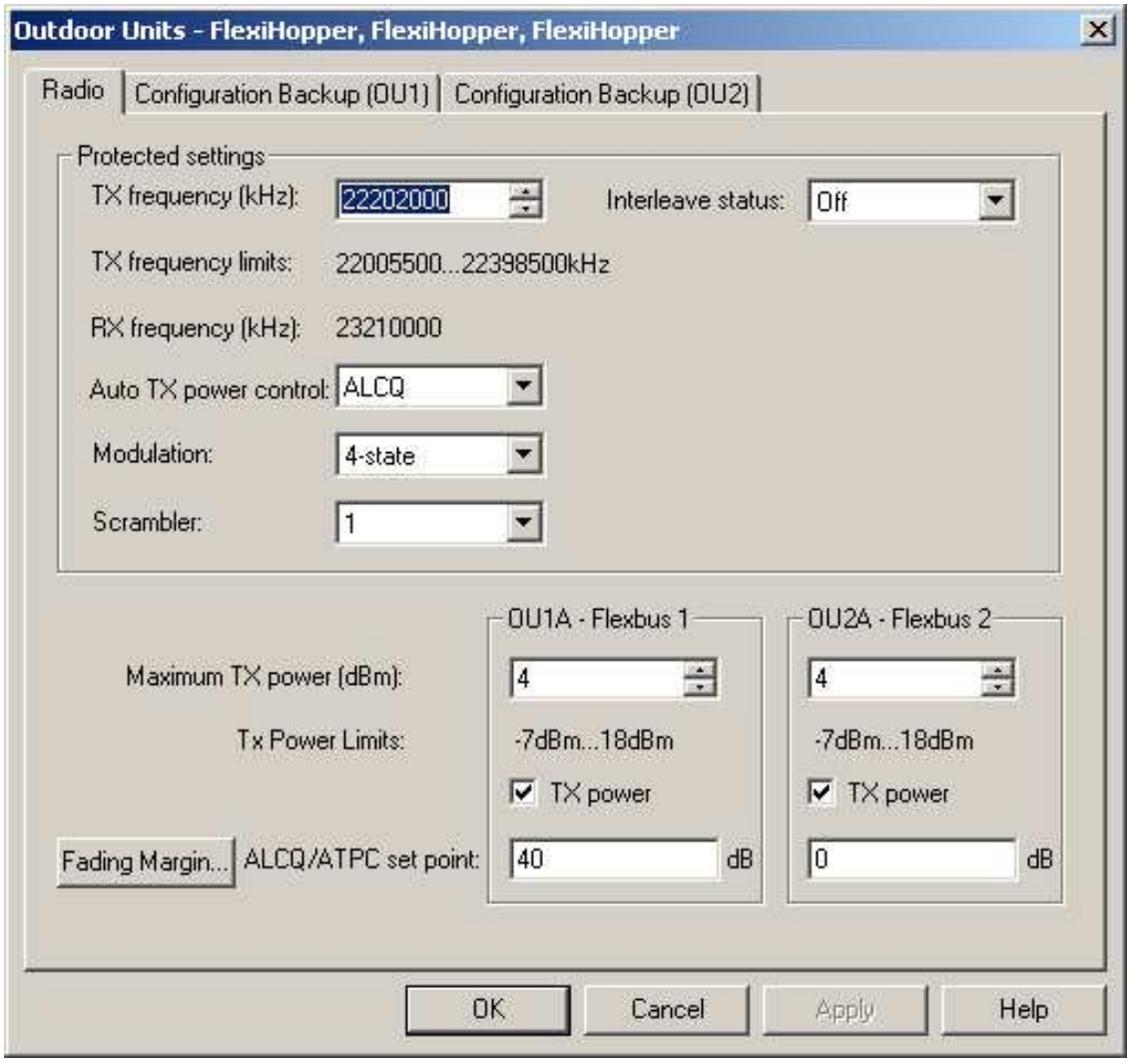

Figure 4. Nokia FlexiHopper or FlexiHopper Plus settings, HSB protected

5. Set the Tx frequency.

Use the Tx frequency provided by radio frequency planning.

6. Set the maximum Tx Power.

This value is also provided by radio frequency planning. The value is dependent on the frequency band. For example, for a 38 GHz frequency band radio, the maximum allowed value is 16 dBm.

7. **Set the Tx power ON.**

8. **Set the ALCQ (Adaptive Level Control with Quality Measure) or ATPC (Automatic Transmit Power Control).**

   If needed, ALCQ/ATPC can be switched on after the hop has been commissioned and the fine-alignment of the antenna has been performed. The Rx input level, determined by the radio frequency planning, must also be correct.

9. **For the ALCQ/ATPC to function, set the ALCQ/ATPC set point value (dB).**

   This value can be calculated by radio frequency planning.

10. *If* the installation includes a Nokia FlexiHopper Plus
    Then

    Set the Modulation.

    The 16-state mode is available for Nokia FlexiHopper Plus outdoor units with 8x2M and 16x2M capacities. Compared to using Nokia FlexiHopper, it is possible to achieve the same capacity using only half the bandwidth.

Note

16-state mode requires a software license. To use 16-state mode, license the feature via the **Licence Manager** dialogue box. For more information, see *Using the licence manager.*

Note

For a link to be established, the same modulation has to be used at both ends of the radio hop. Changing the modulation resets the radio and interrupts management traffic for one minute.

Further information

The Nokia FlexiHopper Plus supports higher modulation, which translates into higher density in terms of bandwidth for the existing channels. FlexiHopper Plus is fully compatible with FlexiHopper. However, to benefit from the increased capacity, it requires a FlexiHopper Plus at both ends of the radio link, that is, both radios have to support the 16-state setting.

In hot standby mode, the modulation selection is common for both radios. If one of the radios is a FlexiHopper, then both radios will have to use the 4-state setting, which is the only setting supported by FlexiHopper.

For more detailed information, refer to *Nokia FlexiHopper Plus documentation*.

11. Set Interleaver Status, if needed.

Possible values for the interleaver status are **Off**, **Depth 2** and **Depth 4** in 4-state modulation. In 16-state modulation, the interleaver status is fixed to Depth 4.

Change the setting accordingly at the other end of the hop (the status must be the same at both ends of the hop).

Note

The outdoor unit stops transmitting while the interleave status is being changed.

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12. Set the scrambler, if needed.

13. Measure the fading margin by clicking the Measure button.

The **Fading Margin Measurement** dialogue box opens.

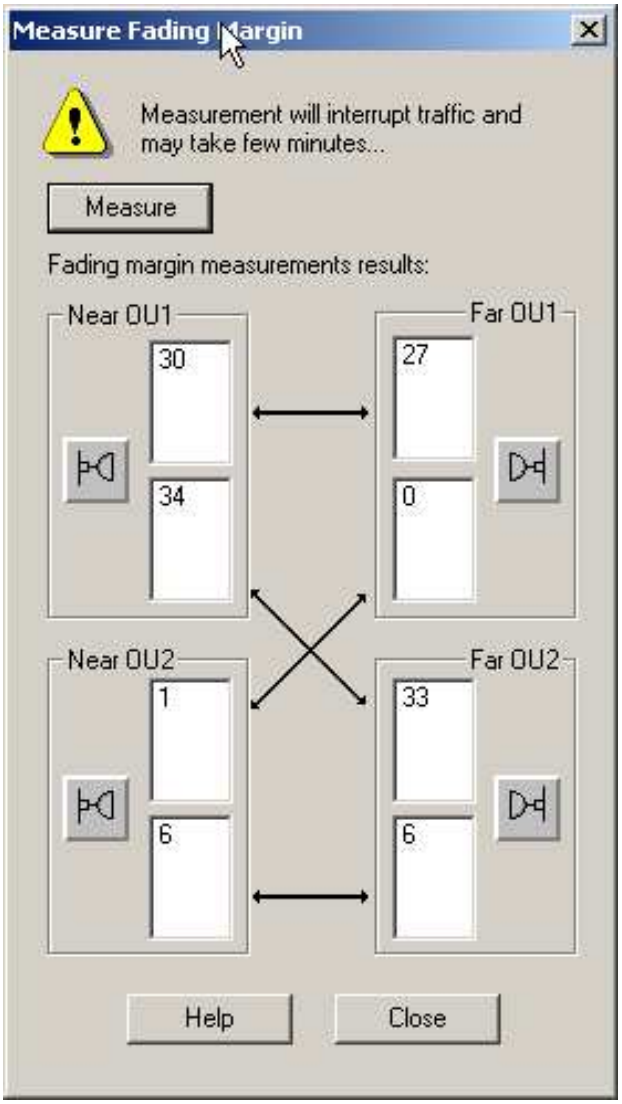

Figure 5. Fading margin measurement dialogue box

The *fading margin measurement (FMM)* is an optional part of the *radio hop (single or HSB protected) commissioning* process. FMM can also be executed manually for an already commissioned hop. If far-end indoor unit type is not supported, the measurement field is grey.

Note

The measurement interrupts the traffic.

Further information

For single hop, the fading margin is measured for one radio (outdoor unit) at a time: the measurement result fields for the selected outdoor unit are enabled (white) and the result fields for the other outdoor unit are disabled (greyed).

The fading marging measurement is also not supported (it is greyed) if the **HSB + Space Diversity** is selected.

The **Fading Margin Measurement** dialogue box result field can contain up to three measurement results at the same time from which the most sensible should be seen as a valid result. The uppermost value is the last measured.

When the measurement is started, the outdoor units at both ends of the hop stop transmitting, that is, they both switch to MUTE. Both outdoor units start their timers, which determine how long they stay in MUTE mode. The measurement stops automatically after the timers are elapsed.

14. Set the backup/restore settings.

Steps

a. In the Outdoor Unit dialogue box, select the Configuration Backup tab.

The **Configuration Backup** view is displayed:

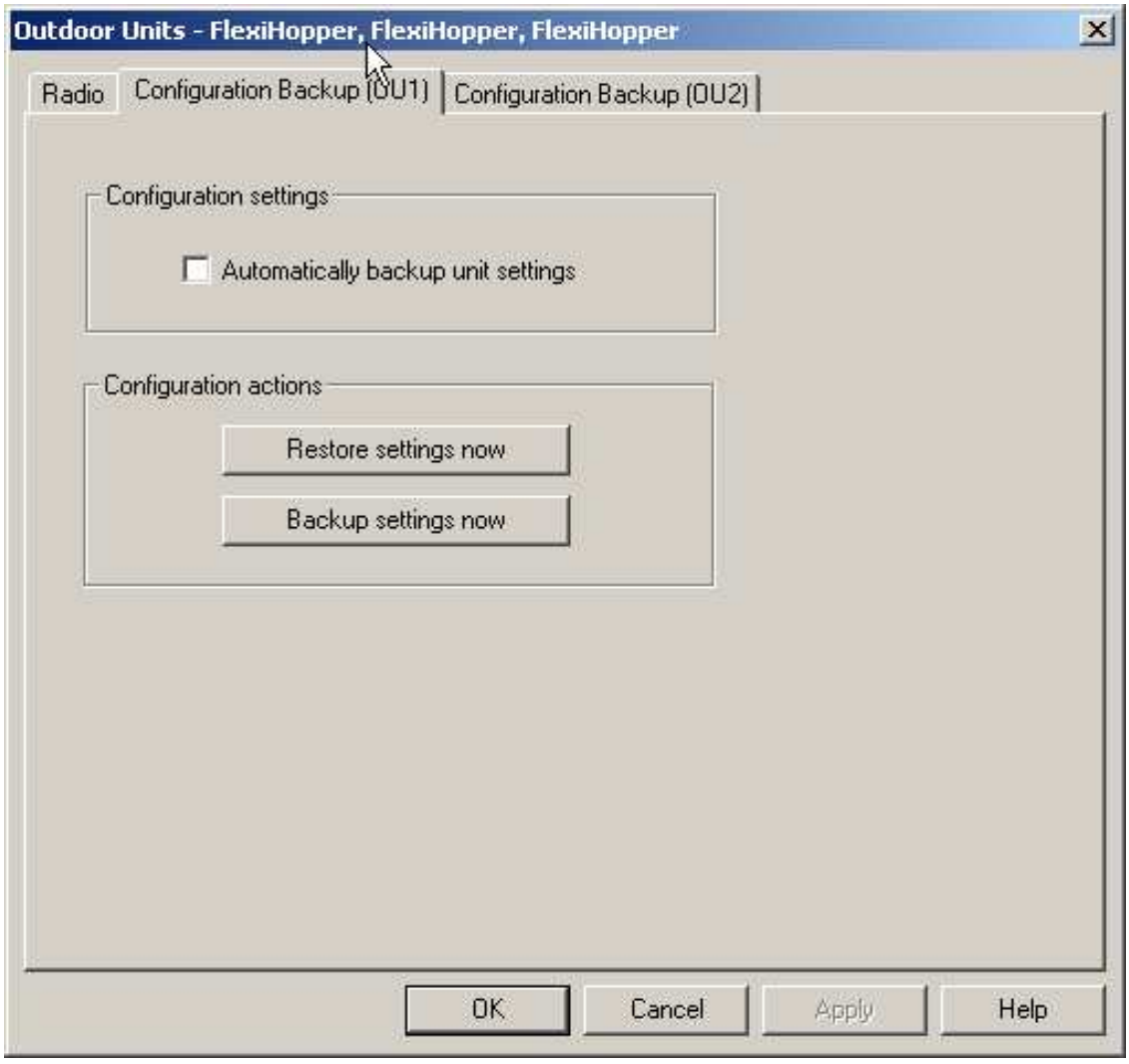

Figure 6. Configuration Backup tab

b. *If* you want to set the automatic backup on
Then

Check the Automatically backup unit settings check box.

If this check box is checked, the system saves the settings for the indoor unit each time they are changed.

c. To backup the settings immediately, click the Backup settings now button.

The current settings are saved for the indoor unit.

d. To restore the settings immediately, click the Restore settings now button.

Click the **Restore settings now** button when the settings have been changed and you want to revert to the previous settings.

Manually stored settings are restored.

15. Click the OK button.

2.2 Setting Nokia MetroHopper settings

Before you start

Note

Familiarise yourself with the *Commissioning and Maintenance* documents in *Nokia MetroHopper with FXC RRI User Manual* before setting Nokia MetroHopper radio settings.

Steps

1. Click the FXC RRI unit corresponding to the Nokia MetroHopper radio in the Equipment View window.

A unit-specific menu appears.

2. Select Settings → Outdoor Unit on the FXC RRI menu corresponding to the Nokia MetroHopper radio.

The settings dialogue box opens.

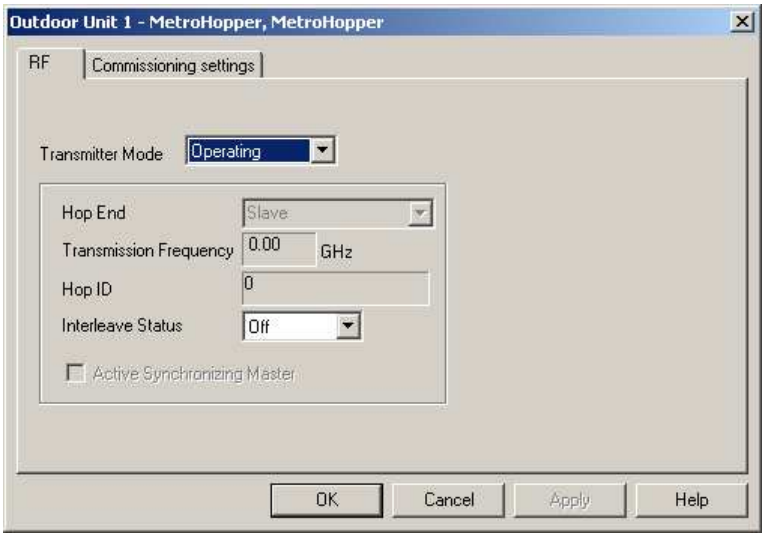

Figure 7. Nokia MetroHopper's RF settings for the outdoor unit in FXC RRI

3. Click the Commissioning settings tab.

The commissioning settings dialogue box opens. This tab is only visible in the offline mode.

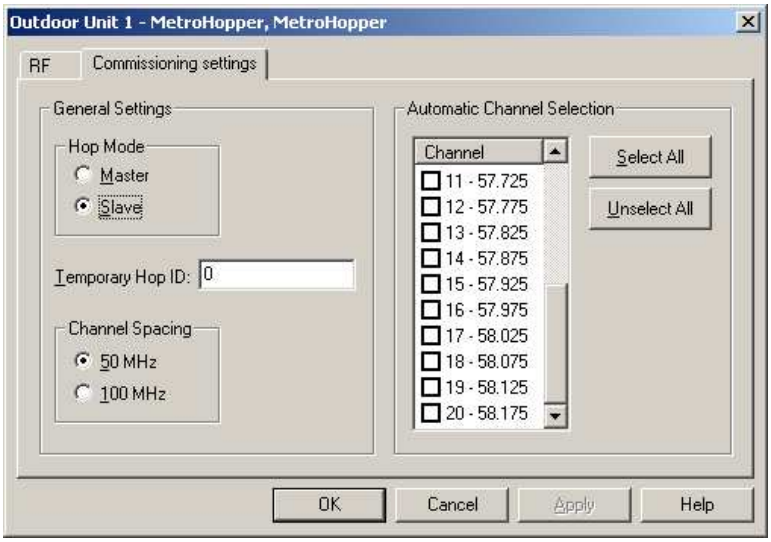

Figure 8. Nokia MetroHopper's commissioning settings for the outdoor unit in FXC RRI

4. **Set the Hop Mode.**

   One end of the hop must be set as the master and the other end as the slave.

5. **Set the Temporary Hop ID.**

   This value must be the same for both the master and the slave.

6. **Select channel spacing.**

   When the channel spacing is changed, the automatic channel selection list is updated accordingly. Changing the spacing mode online resets the MetroHopper OU.

   For more information on channel spacing, see *Nokia MetroHopper Radio with FIU 19/FIU 19E User Manual*.

7. **Use the Select All button to select all channels in the Automatic Channel Selection.**

8. **Click the Apply button.**

9. **Click the RF Settings tab to view the RF settings again.**

10. **Set the Interleave Status, if needed.**

    The status must be the same at both ends of the hop.

11. **Set the Forced Synchronising Master, if needed.**

    This check box is available only if you set the **Hop Mode** as the master in step *Set the Hop Mode*.

12. **Click the OK button.**

3 Adjusting transmission node settings

3.1 Overview of adjusting transmission node settings

Summary

It is possible to adjust the following settings using the manager:

- identification settings
- service interface settings
- synchronisation settings
- synchronisation loop bit settings
- alarm property settings
- Q1 management settings

Note

Circuit management settings are for Nokia internal use only. Trunet is a 2-bit control channel.

Steps

1. *If* you want to adjust identification settings
   Then

   See Adjusting identification settings

2. *If* you want to adjust service interface settings
   Then

   See Adjusting service interface settings

3. *If* you want to adjust synchronisation settings
   Then

   See Adjusting sychronisation settings

4. *If* you want to adjust synchronisation loop bit settings
   Then

   See Adjusting sychronisation loop bit settings

5. *If* you want to adjust alarm property settings
   Then

   See Adjusting alarm property settings

6. *If* you want to adjust Q1 management settings
   Then

   See Adjusting Q1 management settings

3.2 Adjusting node identification settings

Purpose

You can adjust the identification settings for the managed node using the **Hardware Identifications** dialogue box. The user can fill in the name, site name, group name and site location, and these are valid for the whole node.

Summary

Identification-related settings are not mandatory but it is strongly recommended to use them.

Note

If you change the master FXC unit of the node, User Notes, Node Identifications, and Node installation information is lost. The identification settings of remaining units do not disappear.

Steps

1. Connect to the node or open a file.

2. **Select Configuration → Identifications.**

The **Hardware Identifications** dialogue box opens.

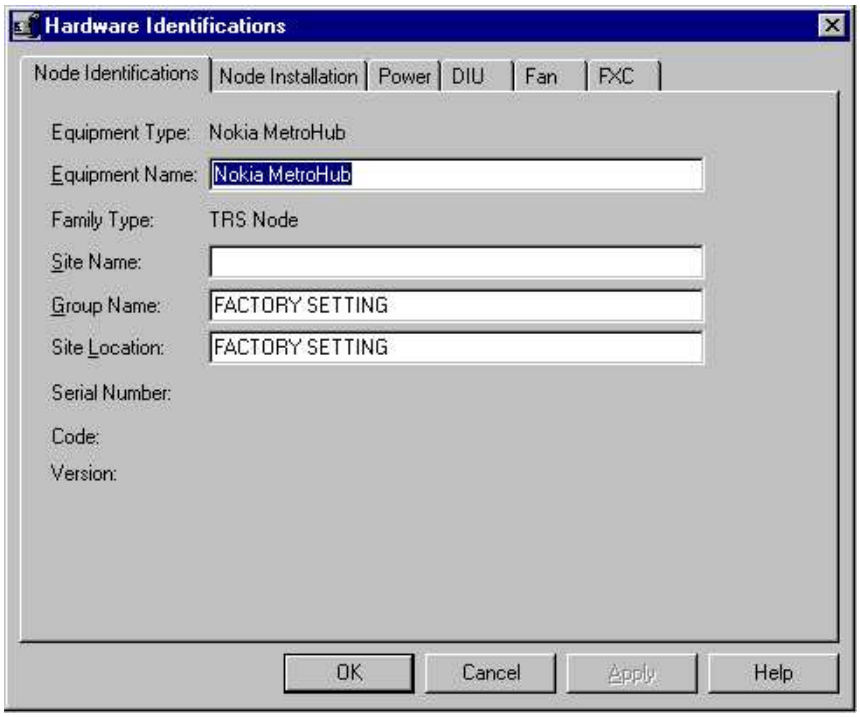

Figure 9. Hardware Identifications dialogue box (MetroHub)

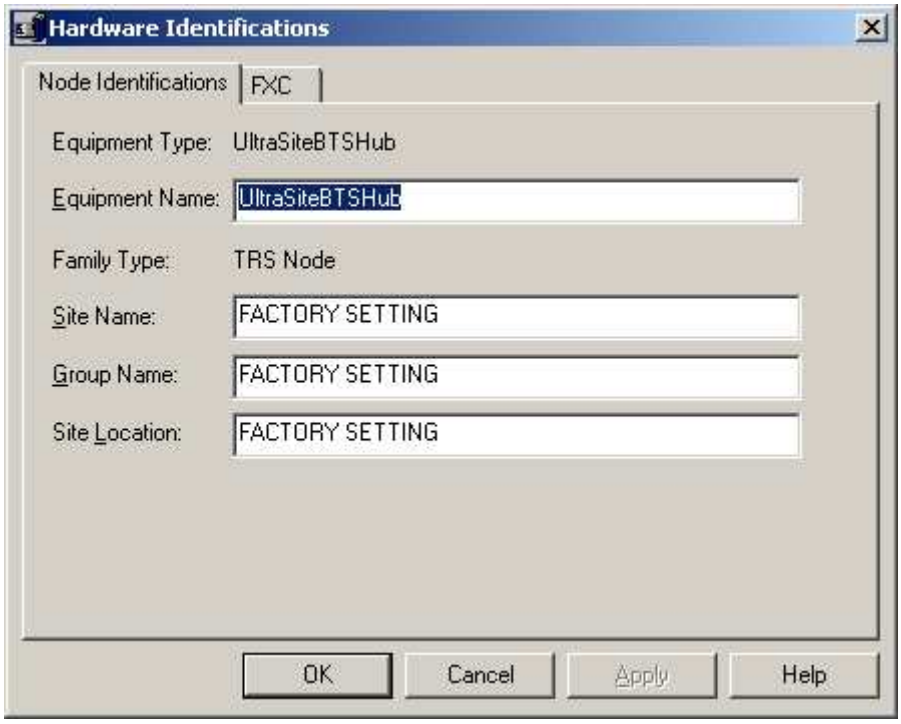

Figure 10. Hardware Identifications dialogue box (UltraSite BTS Hub)

3. Click the tabs to switch between the pages.

Click the tabs to switch between the pages. The tabbed **FXC** page allows you to view the codes, versions and serial numbers of the FXC units in the node.

Note

The **Outdoor Units** button opens an **Outdoor Units** dialogue box where available outdoor units are listed with the same information as shown in the **FXC Identifications** dialogue box.

The **Outdoor Units** button is disabled if no outdoor units are present.

The following pages are specific to Nokia MetroHub:

- The tabbed **Node Identifications** page, which allows you to view and modify the following ID information: Equipment Name, Site Name, Group Name and Site Location.
- The tabbed **Node Installation** page, which allows you to view installation information, including user notes from the node.
- The tabbed **Power** page, which allows you to view power identification information.
- The tabbed **DIU** page, which allows you to view DIU identification information.
- The tabbed **Fan** page, which allows you to view Fan identification information.

4. Select the identifications data you want to adjust, fill in the required information and click OK.

3.3 Adjusting transmission unit identification settings

Purpose

This chapter instructs you in configuring FXC transmission unit identification settings.

Summary

Identification-related settings are not mandatory but it is strongly recommended to use them. Through the 'Identifications' dialogue box for each transmission unit, unit names and installation dates can be specified.

Steps

1. Connect to the node or open a file.

2. Click the unit to be configured in the equipment view.

3. Click FXC (UNIT NAME) → Identifications to open the window (the following diagram shows the FXC STM-1 window).

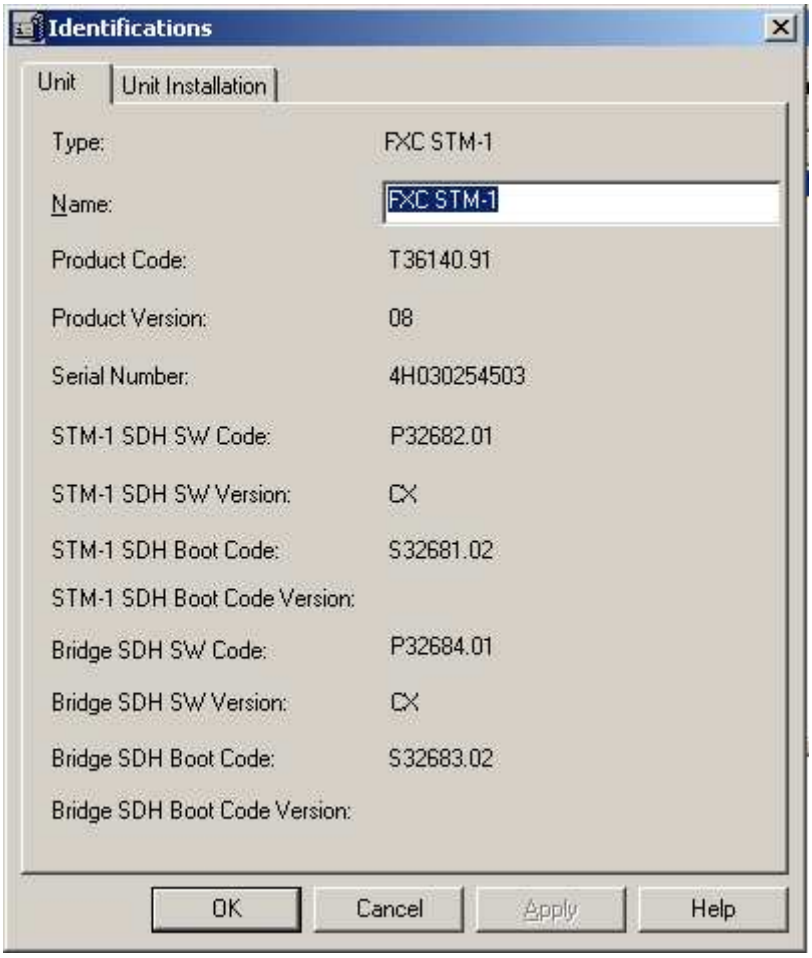

Figure 11. FXC STM-1 Identifications, Unit page

4. **Click the tabs (Unit / Unit Installation) to switch between the pages.**

5. **On the Unit page, type a Name for the unit.**

6. **On the Unit Installation page, insert installation Date and Time manually or click Now.**

7. **Type the name of the Person who installed the equipment in the field.**

8. **Type possible additional information in the User Notes field.**

The maximum length for the notes is 900 characters. The text field above the User Notes field shows the number of characters entered (for example 15/900).

9. **Click Apply to confirm settings.**

10. **Click OK to close the dialogue box.**

3.4 Adjusting service interface settings

Summary

You can adjust the settings of the LMP and the Q1 port. The settings are baud rate, Q1 address and Q1 group address. It is also possible to adjust time-outs under this menu.

The time-out settings concern the temporary settings of the whole node. These include, for example, interface loops and forced controls.

Steps

1. **Connect to the node or open a file.**

2. **Select Configuration → Service Interface.**

   The **Service Interface** dialogue box opens.

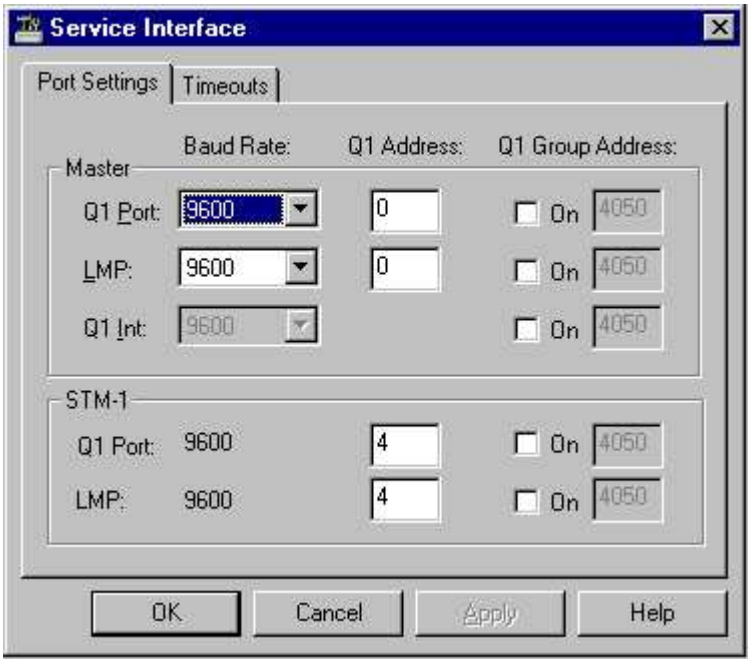

Figure 12. The Service Interface dialogue box

3. **Select either Port Settings or Timeouts.**

4. **Adjust the settings.**

   The supported baud rates for LMP are 9600–115 200 bit/s.

   Supported remote Q1 connection rates are 1200 - 115200 bit/s (recommended baud rate: 9600).

   When using a Q1 external management port and a FXC RRI unit as master unit, the maximum baud rate is 19200.

   The default baud rate is 2400 bit/s for Q1 and 9600 for LMP. The default address is 1 for the ports.

   The **Default** buttons in the **Timeouts** tab set the default values (600 seconds) stored in the node (range is 60 - 6000).

5. **Click Apply to apply the settings.**

6. **Click OK to close the window.**

3.5 Adjusting FXC E1/T1 and FXC E1 interface settings

Summary

Configuring the Line Interface (LIF) settings for a FXC E1/T1 or FXC E1 unit is, with one exception, common and as result this section describes the possible settings and options for both unit types.

Steps

1. **To open the LIF settings dialogue box, select FXC E1/T1 → LIF Settings, or FXC E1 → LIF Settings.**

   The LIF settings dialogue box opens.

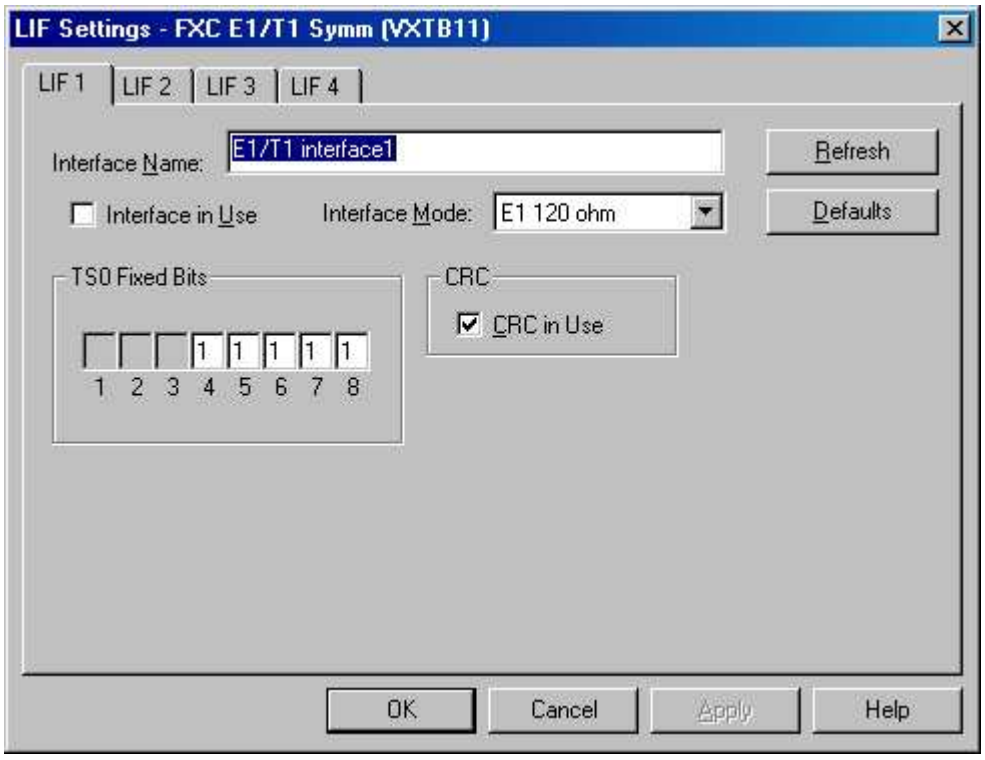

Figure 13. The LIF settings dialogue box

2. **Select the LIF1, LIF2, LIF3, or LIF4 tab.**

3. **Add a specific name for the LIF in the 'Interface Name' field.**

4. **Click the Interface In Use check box to mark the LIF for activation.**

   Check the 'Interface in Use' check box to mark the LIF for activation. If this check box is not checked, the interface will be not operational; it will supply an AIS signal, and all interface-related alarms will be suppressed.

5. *If* you are adjusting FXC E1/T1 interface settings

   Then

   Select the Interface Mode in the drop-down menu.

   Select the **Interface Mode** in the drop-down menu. The alternatives are E1 120 Ohm and T1 100 Ohm.

Note

An interface configured to the E1 mode operates as an ITU G.703/ITU G.704 Interface with 2048Kbit/s. An interface configured to the T1 mode operates as an ANSI T1.102/ANSI T1.403 Interface with 1544Kbit/s.

Note

For the FXC E1 unit, E1 75 Ohm is displayed. This value is fixed and cannot be changed.

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6. *If* the interface mode is T1 100 Ohm

   Then

   Adjust the settings for Framing Format, Line Code, and T1 Interface Type.

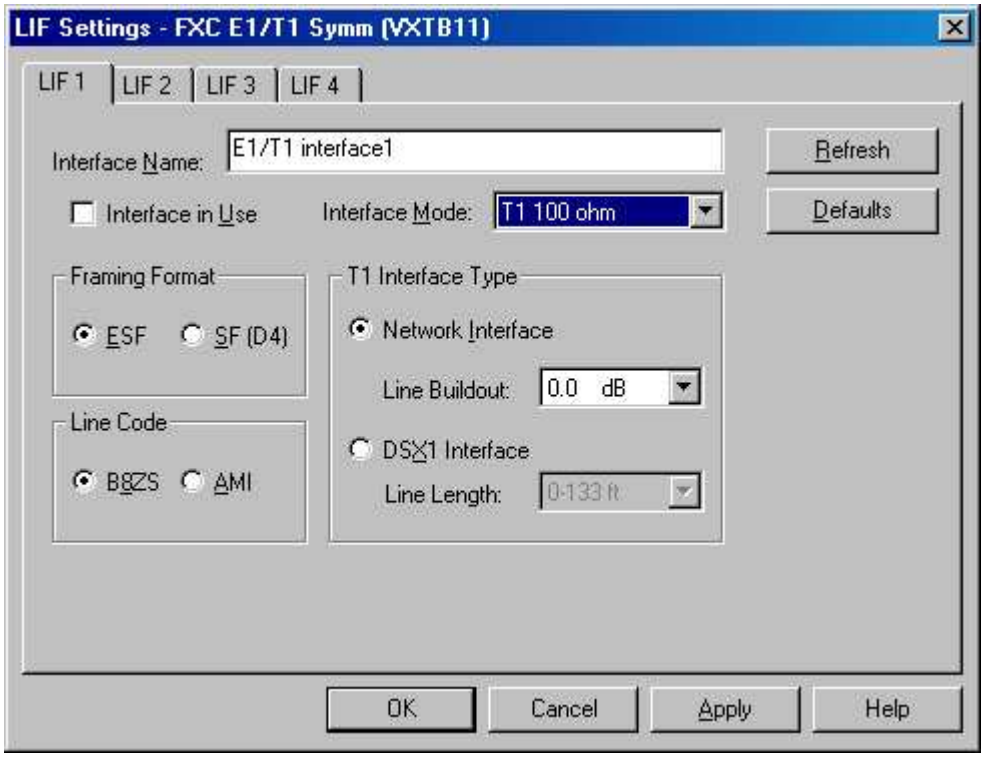

Figure 14. The LIF settings dialogue box, T1 Interface Mode

Adjust the settings for **Framing Format**, **Line Code**, and **T1 Interface Type**:

- Under **Framing Format**, select either **Extended Super Frame (ESF)** or **Super Frame (SF)**.
- Under **Line Code**, select **B8ZS** or **AMI**.
- Under **T1 Interface Type**, select and configure either **Network Interface** or **DX1 Interface**:
  - Select **Network Interface** to insert additional attenuation into the transmitter of the line interface, for standard T1 interface operation. Configure the line build (7.5, 15, 22.5,or 0.0 B).
  - Select **DX1 Interface** if the T1 line interface of the FXC E1/T1 unit is connected to a device whose interfaces operate as DSX1 interfaces. Configure the line length up to that device.

7. *If* the interface mode is E1 120 Ohm or E1 75 Ohm

   Then

Adjust the settings for TSO Fixed Bits and CRC.

Adjust the settings for TSO Fixed Bits and CRC:

- By checking the CRC in use check box, the transmitted and expected E1 frame is configured to be of CRC-4 multi-frame structure. If the check box is not checked, a E1 basic frame structure will be send and expected to be received.
- With the TS0 fixed bit settings it is possible to set the TS0 Sa bits either to one or zero or T (transparent), dependent on the policy or need within the network. If it is set to T then it represents the status of the loops set by the software (M: Master control bit, L: Loop control bit, E: EOC).

8. **Click OK or Apply to activate the interface settings.**

3.6 Adjusting FXC RRI interface settings

Purpose

The flexbus signal of the FXC RRI unit can multiplex up to 16 E1 signals. Each of these 16 E1 signals can be made operational, and the frame format can be selected (just as for the E1 line interface settings of a FXC E1/T1 or FXC E1 unit).

Steps

1. **Select FXC RRI → Settings → Unit.**

2. **Select the Flexbus 1 Interface tab or the Flexbus 2 Interface tab (depending on the interface to be configured).**

   The Flexbus (1/2) Interface tab is displayed.

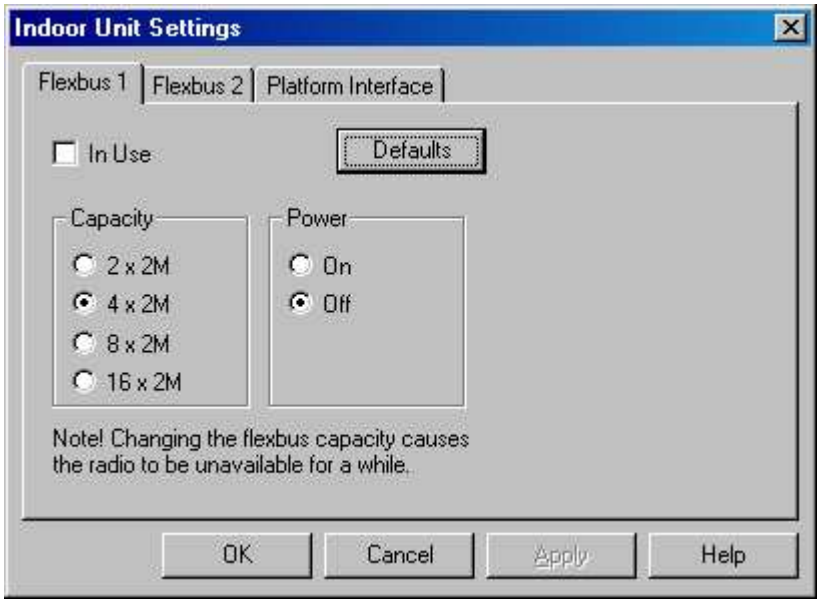

Figure 15. The Flexbus (1/2) interface tab

3. Click the In Use check box to mark the interface for activation.

If this check box is not marked, the interface will be not operational; it will supply an AIS signal, and all interface-related alarms will be suppressed.

4. Select the interface capacity (2 - 16 x 2M).

Select the interface capacity according to the capacity of the microwave radio link to be connected to it.

5. *If* the FXC RRI unit is directly connected to an outdoor unit (radio)
Then

select the Power On option.

Select the **Power On** option to switch on the power for the outdoor unit.

Note

Do not use the Power On setting when two FXC RRI units are connected with a flexbus cable, or when an FXC RRI and FIU 19(E) are connected with a flexbus cable. This could damage the units.

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6. Click OK or Apply to activate the Flexbus interface settings.

7. Select the Platform Interface tab.

The Platform Interface tab is displayed.

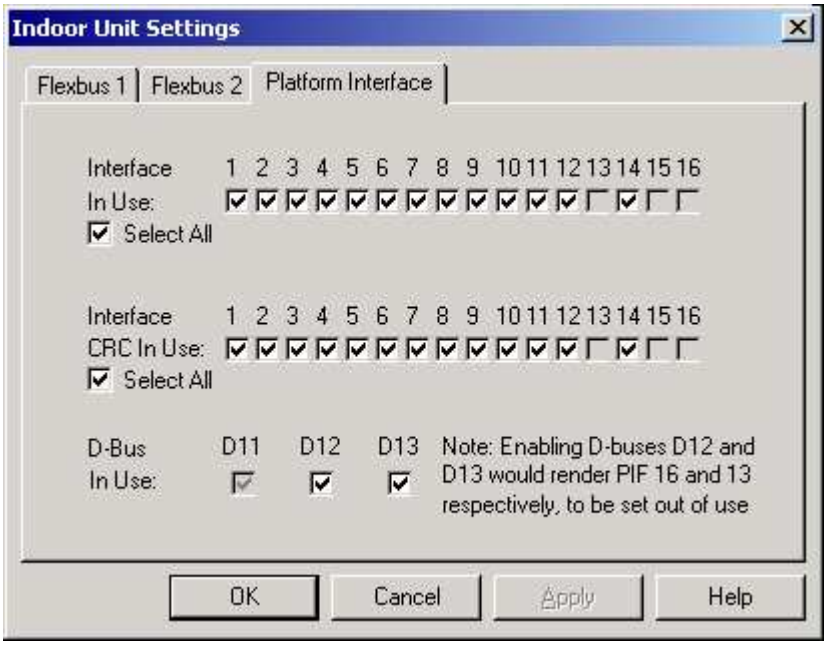

Figure 16. The Platform Interface tab

8. Click the Interface In Use check box for each interface to be activated.

If its check box is not marked, an interface will not be operational once the settings are activated. The interface will send AIS signals, and all interface-related alarms will be suppressed.

Note

Platform interfaces 13, 14, and 16 are disabled if D-bus D12 or D13 is enabled.

If a Nokia MetroHub is chained to a Nokia BTS, the platform interface 15 is always allocated to relay capacity to the BTS internal D-bus. The interface cannot be enabled.

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9. **Alternatively, click the Select All check box so that all the interfaces are activated.**

10. **Click the CRC In Use check box for each interface to use a CRC-4 multi-frame structure.**

    If its **CRC in use** check box is not marked, an interface will use E1 basic frame structure.

11. **Alternatively, click the Select All check box so that CRC In Use is activated for all the interfaces.**

12. **Click the D-Bus In Use check box for each D-bus to be activated.**

13. **Click OK or Apply to activate the platform interface settings.**

3.7 Adjusting external alarm inputs and control outputs

Purpose

In MetroHub, there are ten external alarm inputs that can be activated by connecting the input to GND. If an external alarm input is set in use, an active alarm can be seen in the node manager and remote management system. The polarity that generates the alarm can also be set (open or closed circuit).

There are also four open collector control outputs for external devices that are controlled by the node manager.

Steps

1. **Connect to the node or open a file.**

2. **Select Configuration → Programmable alarms.**

   The **Programmable Alarms** dialogue box opens.

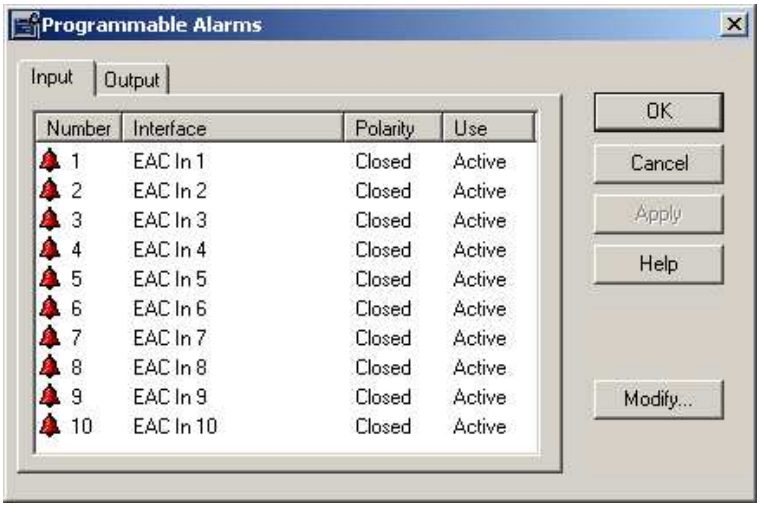

Figure 17. Programmable Alarms dialogue box

3. Select the Input or Output tab, depending on what you want to modify.

Note

To save the changes you have made, always click the **Apply** button before switching between the **Input** and **Output** tabs.

---

4. Select the alarm input or control output you want to modify.

5. Click Modify.

The **Modify Alarm** dialogue box opens.

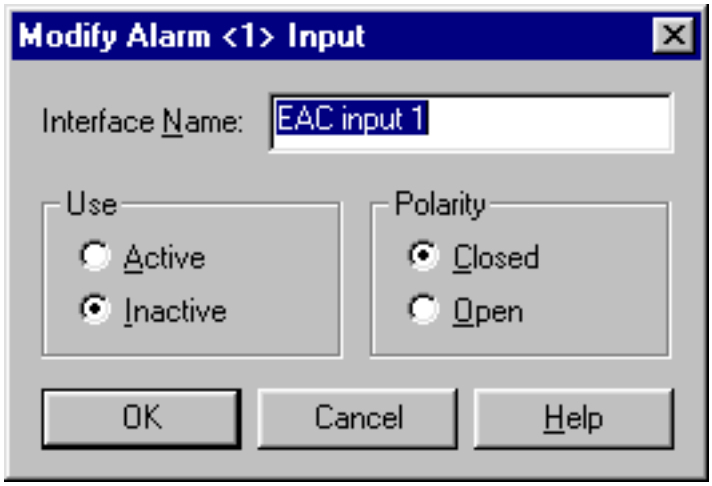

Figure 18. Modify Alarm dialogue box

6. Click the Active radio button to put the alarm into use.

7. Select the desired polarity (open or closed).

8. *If* you want to edit the name of the alarm
   Then

   Change the name of the alarm in the Interface Name field.

Note

The changed input alarm name is not transferred to the generated alarm when the alarm point is active.

---

9. Click OK.

10. *If* you want to modify more programmable alarms
    Then

    Repeat the procedure above as many times as needed.

11. Click OK after you have modified all the desired inputs and outputs.

3.8 Adjusting alarm property settings

Purpose

The **Alarm Properties** dialogue box allows you to view and modify the alarm properties of a node, FXC transmission unit, and outdoor unit.

Steps

1. **Select Configuration → Alarm Properties to view and/or modify node alarm properties.**

   Or

   Select **FXC (UNIT NAME) → Alarm Properties** to view and/or modify FXC transmission unit or outdoor unit alarm properties.

Expected outcome

The **Alarm Properties** dialogue box opens.

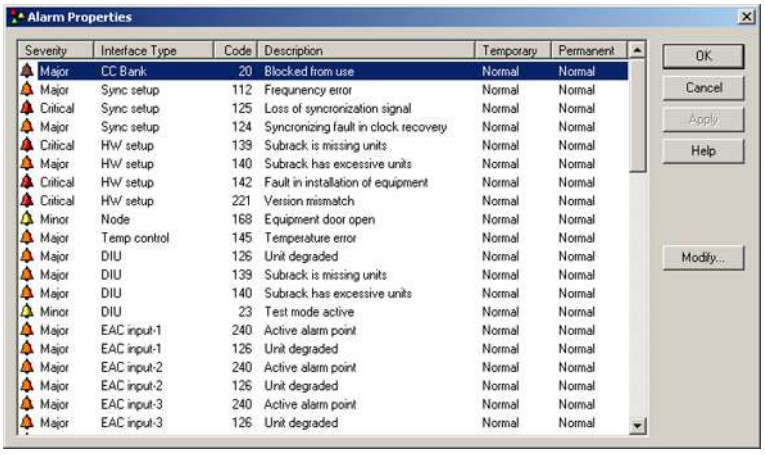

Figure 19. Alarm Properties dialogue box

Further information

The **Severity** column shows a coloured alarm bell and text explaining the severity of the alarm. The severity can be Critical, Major, Minor, or Warning.

The **Interface Type** (on FXC STM-1) column shows the interface the alarm relates to.

The **Code** column shows the fault code.

The **Description** column shows the name of the alarm.

The **Temporary** column (not on FXC STM-1) shows the temporary state of the alarm. The possible temporary states are normal, inhibited and forced ON. If the temporary state is inhibited or forced ON, the state is cancelled by the node's control timeout.

The **Permanent** column (not on FXC STM-1) shows the permanent state of the alarm, that is, the state that will remain even after a HW reset. The possible permanent states are normal, inhibited and forced ON.

The **Section** column is present for the FXC STM-1 only. It shows the name of the functional entity that was the source of the alarm.

Table 1. Sections and their descriptions

Section	Description
FXC STM	covers SDH node wide functions, such as synchronisation or real-time clock
FXC STM-1	covers functions specific to FXC STM-1, such as unit faults
FXC STM-1 IF 1	covers STM OS/RS/MS functions for STM interface 1
FXC STM-1 IF 2	covers STM OS/RS/MS functions for STM interface 2
FXC STM-1 S4 1	covers functions related to the S4 structure of STM signal 1
FXC STM-1 S4 2	covers functions related to the S4 structure of STM signal 2
FXC Bridge SDH	covers functions related to added/dropped S12 structures and PDH channels

2. Click the Modify button (not possible for warnings).

Or

Click the right mouse button over an alarm row and select **Modify** (not possible for warnings).

Expected outcome

The **Modify Alarm Properties** dialogue box for the node opens.

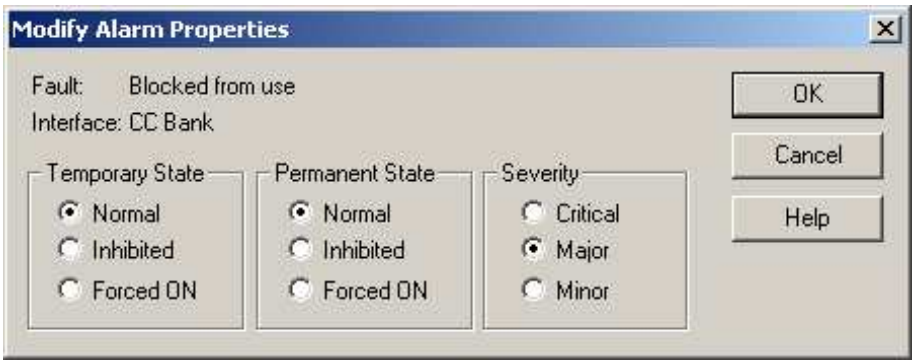

Figure 20. Modify Alarm Properties dialogue box

You can adjust temporary state, permanent state, and severity of the alarm.

Note

For an FXC STM-1 transmission unit, you can only adjust the severity of an alarm. When you click the **Modify** button, the **Modify Alarm Severities** dialogue box appears.

Note

Alarm severity can be modified in the **Modify Alarm Properties** dialogue box. The modified alarm severity is visible in the local manager alarm window. The alarm is reported to the NMS and BSC with an alarm code. Local alarm severity modification does not override global severity settings in the NMS or BSC.

---

3. Adjust the settings as desired and click OK.

Further information

Alarm property default settings can only be restored by *resetting the transmission node or units*.

4 Adjusting FXC STM-1 interface settings

4.1 Overview of adjusting FXC STM-1 interface settings

Steps

1. **Click FXC STM-1 → STM-1 Interfaces.**
2. **Select an interface (Interface 1 or Interface 2).**

   A window for the selected interface opens.

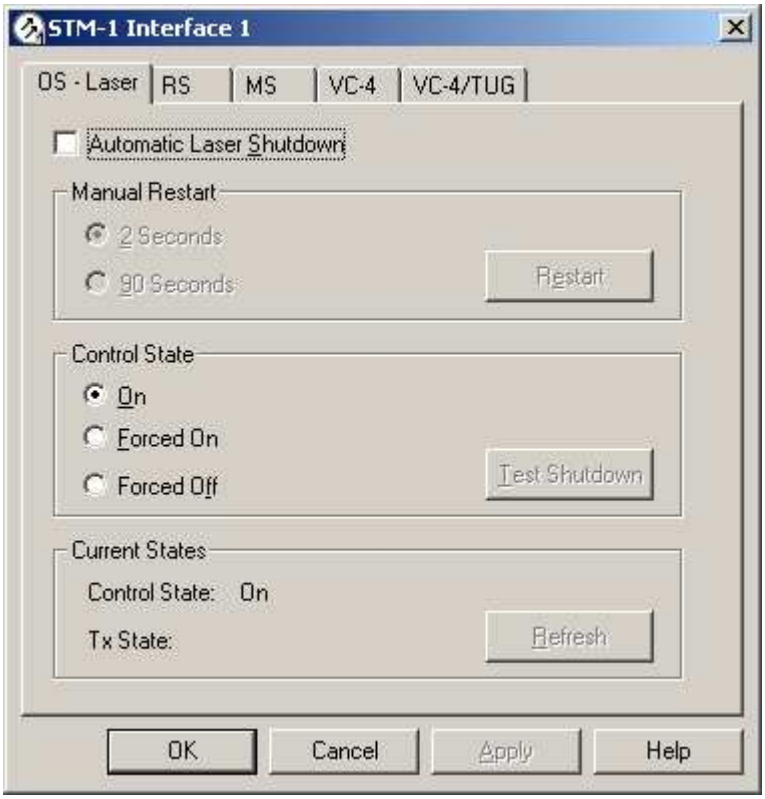

Figure 21. FXC STM-1 Interface 1, OS page

3. **Click the tabs (OS / RS / MS / VC-4 / VC-4/TUG) to switch between the pages.**

4.2 Adjusting the OS interface settings

Purpose

On the Optical Selection (OS) interface settings page for the FXC STM-1 transmission unit, you can:

- change the **Control State** of the laser. The default state is on, but the laser can be forced on or off for test and security reasons.
- see the latest fetched control state in the **Current States** selection. This information is read from the node when the dialogue box opens.

- switch on the **Automatic Laser Shutdown** (ALS) feature, which shuts down the laser transmitter if the incoming optical signal is missing (the laser then sends a two-second test pulse every 100 seconds, and restarts automatically if the incoming signal is received again).
- restart the laser manually in cases of laser shut-down.

Steps

1. Select the OS tab to access the OS settings page.

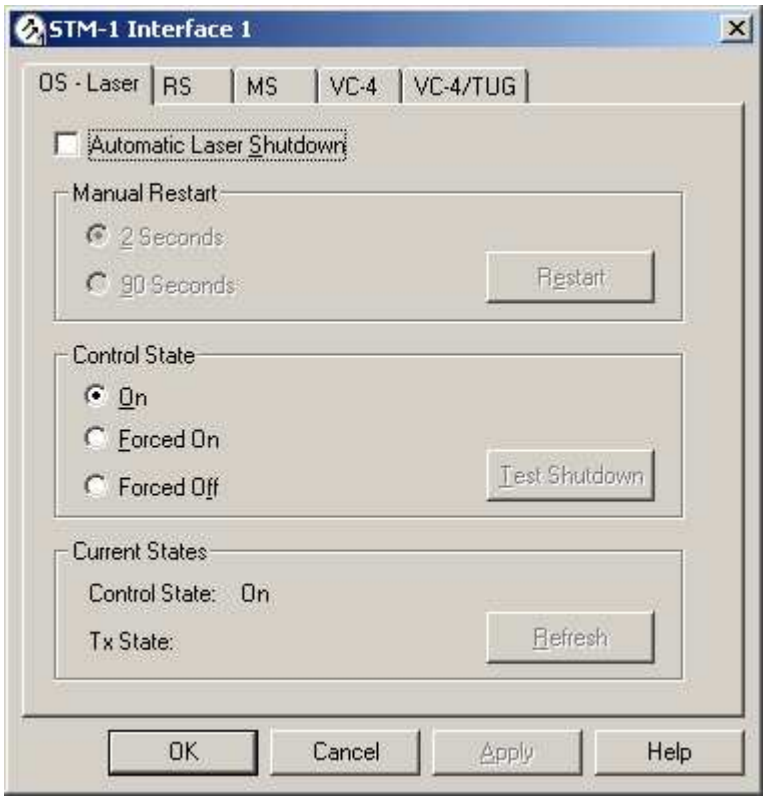

Figure 22. FXC STM-1 Interface 1, OS page

2. Activate ALS by clicking the Automatic Laser Shutdown check box.

It is recommended to activate ALS by clicking the **Automatic Laser Shutdown** check box. ALS is only available when the **Control State** of the laser is **On**.

Click **Apply**.

3. *If* you need to restart the laser manually after ALS

   Then

   Select the time you want the laser turned on, 2 seconds or 90 seconds, and click Restart.

   If the laser is shut down because of ALS, you do not have to wait for the next test pulse (that occurs after 100 seconds have passed); you can manually start the test pulse, which will turn on the laser for two or 90 seconds.

   Select the time you want the laser turned on.

   2 Seconds is used to check that the fibre is functional, and 90 Seconds is used for measurement purposes. Both the 2 and 90 second modes send a test pulse. If there is an input signal during the test pulse, the laser stays on. If there is not, the laser is switched off again.

   After selecting the time, click **Restart**.

4. **Select the Control State of the laser.**

   Select the **Control State** of the laser by clicking on the following check boxes/buttons:

   - **On** is the default setting.
   - With **Forced On**, the laser stays on even if there is no input signal (however, if the hardware fails, the laser is automatically shut down).
   - With **Forced Off**, the laser is forced off.

Note

You need a local management connection to switch the laser on after a **Forced Off** state.

Note

Forced settings do not persist if the unit is reset by power cycle or explicit unit reset. After a reset, the control state of the laser returns to **On**.

- With **Test Shutdown**, the laser is switched off for test purposes; it is switched on automatically (the old value is restored) after a control timeout. The control timeout is displayed in the **Service Interface** dialogue box.

If you changed the **Control State** of the laser, click **Apply**.

5. **If required, click Refresh in the Current States frame to read the new laser state.**

   Click **Refresh** in the **Current States** frame to read the new laser state after changes:

   - If the Tx State is **Off**, the laser is currently switched off.
   - If the Tx State is **On**, the laser is currently switched on.
   - A Tx State of **ALS Sending Pulses** means that the laser is currently switched off because of ALS, but is sending test pulses for starting up the link again (when the fibre connection is intact).

4.3 Adjusting the RS interface settings

Before you start

The Regenerator Section (RS) interface settings page for the FXC STM-1 transmission unit has two frames:

- **Performance Collection**
- **Trail Trace Identifier**

A Trail Trace Identifier (TTI) is a string of 15 definable characters that is used to make sure the trails are routed correctly. Two TTIs are defined for each termination point: **Transmitted** is sent to the remote end of the trail, and **Expected** is expected to be received from the remote end of the trail. Different TTIs are used in different directions to detect possible loopbacks.

The received TTI status field displays the current received TTI. It can be used to verify that the received TTI matches the expected TTI.

Use the **Refresh** button to update the Received TTI status (the Received TTI status is not automatically updated).

The use of TTIs is recommended, but not obligatory.

Steps

1. **Select the RS tab to access the RS settings page.**

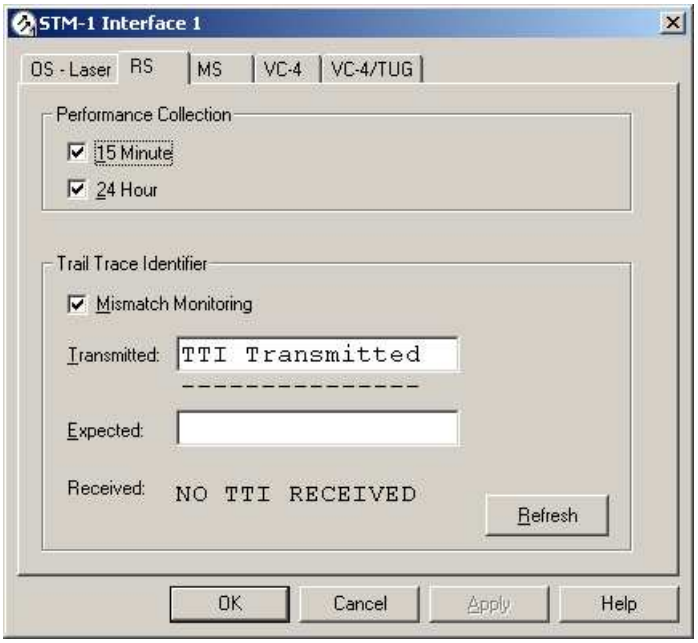

Figure 23. FXC STM-1 Interface 1, RS page

2. **Select 15 minute and/or 24 Hour performance collection for RS.**

   Select the required checkbox to enable 15 minute and/or 24 Hour performance collection for RS. Both functions can be employed separately.

3. **Click on the Mismatch Monitoring checkbox to turn switch Mismatch Monitoring on or off.**

Note

The expected TTI is only monitored against the received TTI if mismatch monitoring is switched on.

The expected TTI and the received TTI are compared only if the **Mismatch Monitoring** check box is checked.

---

4. **It is recommended that you fill in the Transmitted and Expected TTI fields.**

   It is recommended that you fill in the **Transmitted** and **Expected** TTI fields. All 15 characters must be used, for equipment compatibility reasons. An empty space is a valid character. The lines under the fields indicate the number of characters used.

Note

The values are not read from the node when the dialogue box opens, which means that earlier configured values are visible.

If a mismatch occurs between the expected and the received TTI, the *Trace identifier mismatch* alarm is displayed.

4.4 Adjusting MS interface settings

Purpose

On the Multiplex Section (MS) interface settings page for the FXC STM-1 transmission unit, you can enable **15 Minute** and/or **24 Hour** performance collection for MS. Both functions can be employed separately.

Steps

1. **Select the MS tab to access the MS settings page.**

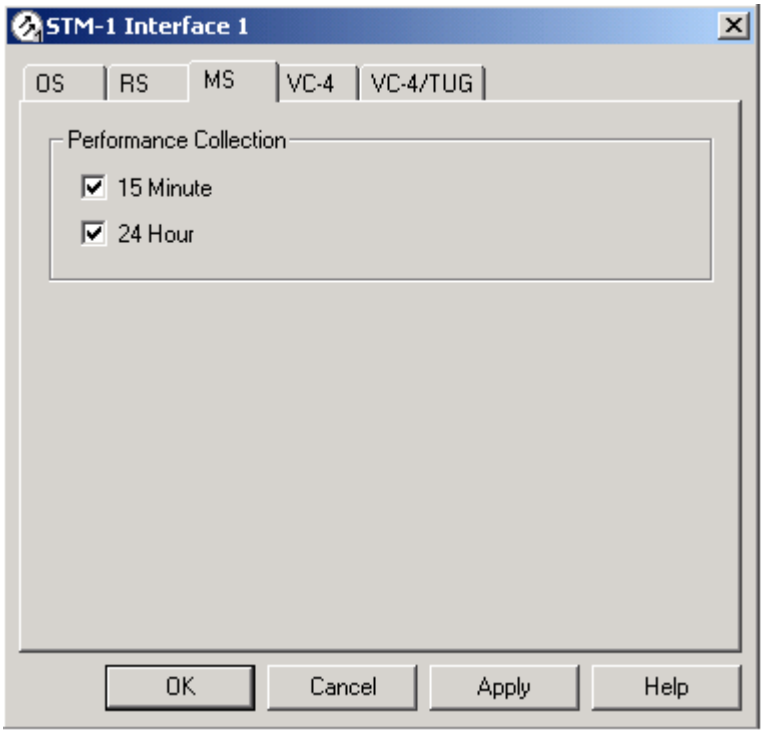

Figure 24. FXC STM-1 Interface 1, MS page

2. **Click on the 15 minute checkbox to enable 15 minute performance collection for MS.**

3. **Click on the 24 Hour checkbox to enable 15 minute performance collection for MS.**

4. **Click Apply.**

4.5 Adjusting the VC-4 interface settings

Purpose

The Virtual Container 4 (VC-4) interface settings page for the FXC STM-1 transmission unit has two frames:

- **Performance Collection**
- **Trail Trace Identifier**

A Trail Trace Identifier (TTI) is a string of 15 definable characters that is used to make sure the trails are routed correctly. Two TTIs are defined for each termination point: **Transmitted** is sent to the remote end of the trail, and **Expected** is expected to be received from the remote end of the trail if monitoring is on. Different TTIs are used in different directions to detect possible loopbacks.

Use the **Refresh** button to update the Received TTI status (the Received TTI status is not automatically updated).

The use of TTIs is recommended, but not obligatory.

Steps

1. Select the VC-4 tab to access the VC-4 settings page.

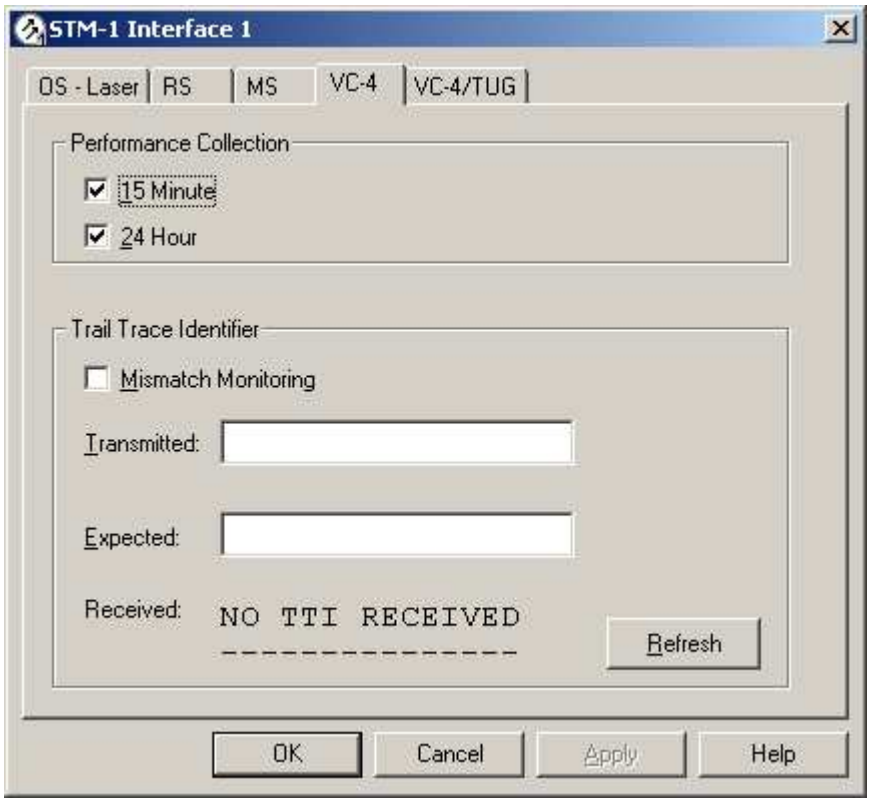

Figure 25. FXC STM-1 Interface 1, VC-4 page

2. Select 15 minute and/or 24 Hour performance collection for VC-4.

Select the required checkbox to enable 15 minute and/or 24 Hour performance collection for VC-4. Both functions can be employed separately.

3. **Click on the Mismatch Monitoring checkbox to turn switch Mismatch Monitoring on or off for VC-4.**

4. **It is recommended that you fill in the Transmitted and Expected TTI fields.**

   It is recommended that you fill in the **Transmitted** and **Expected** TTI fields for the VC-4 interface. All 15 characters must be used, for equipment compatibility reasons. An empty space is a valid character. The lines under the fields indicate the number of characters used.

Note

The values are not read from the node when the dialogue box opens, which means that earlier configured values are visible.

If a mismatch occurs between the expected and the received TTI, the *Trace identifier mismatch* alarm is displayed.

4.6 Adjusting VC-4/TUG interface settings

Purpose

The Virtual Container 4/Tributary Unit Group (VC-4/TUG) interface settings page for the FXC STM-1 transmission unit contains one frame, **VC-4 Path label**.

VC-4 Path label carries information about the payload type and indicates how the signal is constructed.

In this release, the only possible VC-4 Path Label is **TUG Structure**; you cannot modify the settings.

Steps

1. **Select the VC-4/TUG tab to access the VC-4/TUG settings page.**

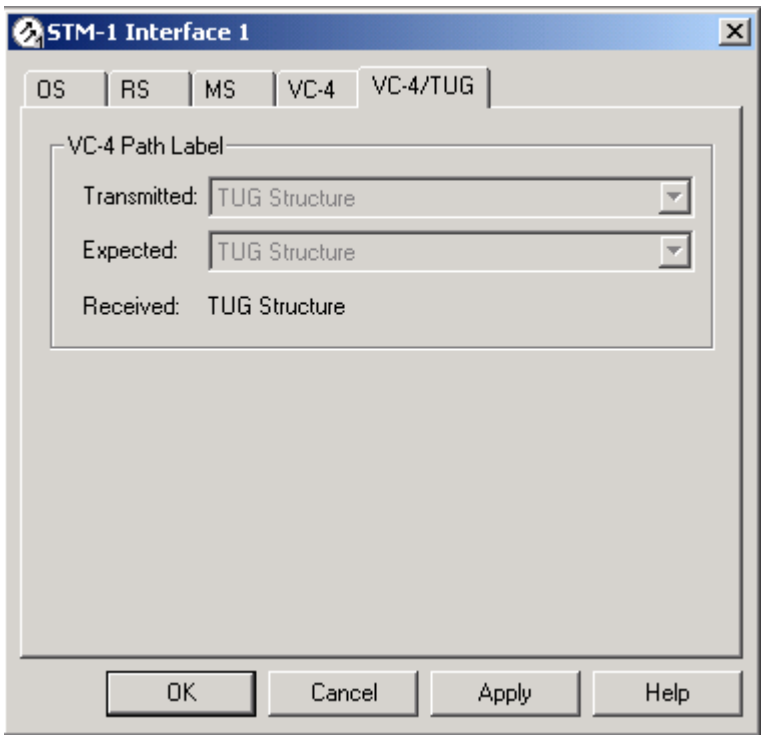

Figure 26. FXC STM-1 Interface 1, VC-4/TUG page

2. If required, use the pop-up Refresh to refresh the data.

5 Adjusting FXC STM SDH-PDH channel settings

5.1 Overview of adjusting FXC STM-1 SDH-PDH channels settings

Purpose

The FXC STM-1 unit supports adding/dropping 20 VC-12 (containing a 2M signal each).

Steps

1. **Click FXC STM-1 → SDH-PDH Channels to open the window.**

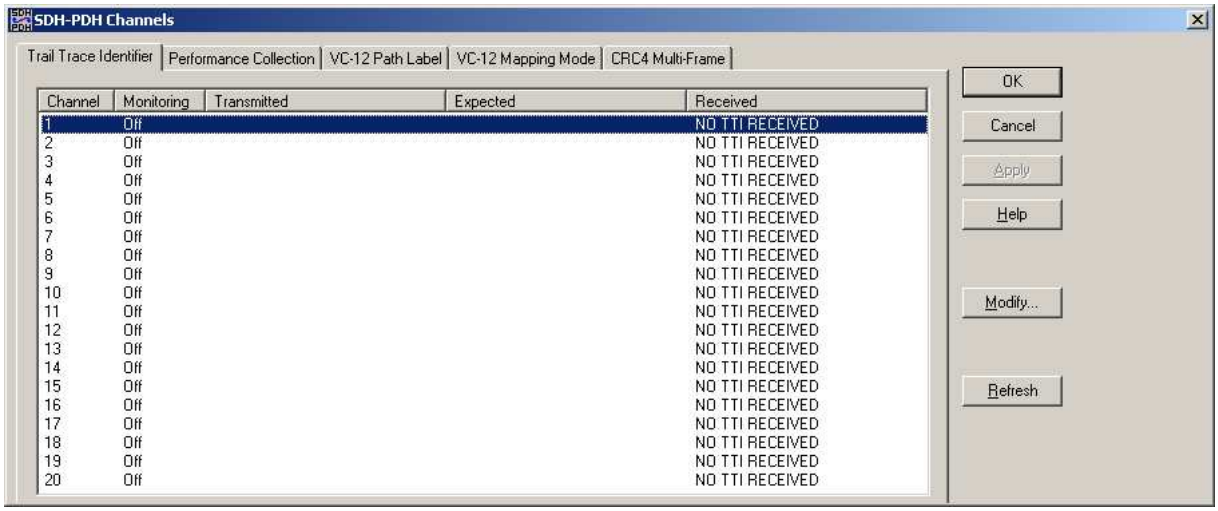

Figure 27. FXC STM-1 SDH-PDH Channels, Trail Trace Identifier page

2. **Click on a tab (Trail Trace Identifier / Performance Collection / VC-12 Path Label / VC-12 Mapping Mode) to view and modify the respective settings.**

5.2 Adjusting TTI settings

Purpose

On the **Trail Trace Identifier** (TTI) page, you can view and modify trail trace settings for the 20 SDH-PDH channels.

The **Channel** column shows the unique channel identification number, which determines the order of the items in the list. The **Monitoring** column shows whether mismatch monitoring is **Monitoring** or **Off**. The **Transmitted** column shows the transmitted trace identifier. The **Expected** column shows the expected trace identifier. The **Received** column shows the received trace identifier.

Use the **Refresh** button to update the Received TTI status (the Received TTI status is not automatically updated).

You can modify the settings for one or several channels at a time.

Steps

1. **Select FXC STM-1 → SDH-PDH channels.**

2. **Select the Trail Trace Identifier tab to access the TTI settings.**

   The Trace Trail Identifier settings are displayed.

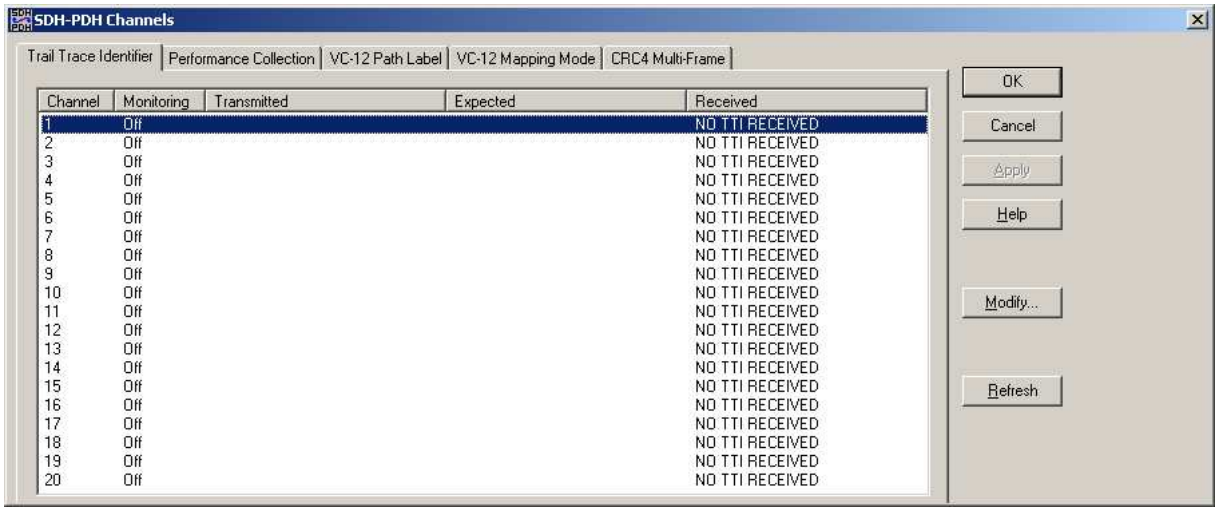

Figure 28. The Trace Trail Identifier settings

If a mismatch occurs between the expected and the received TTI, the *Trace identifier mismatch* alarm is displayed.

3. Select the channel/channels you want to modify.

Select the channel/channels you want to modify. To select multiple channels, hold down the Ctrl key or the SHIFT key on your pc keyboard while clicking.

4. Click Modify to open the Trail Trace Identifier dialogue box.

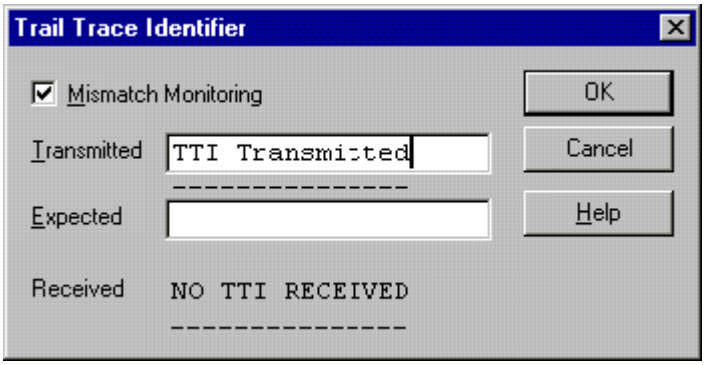

Figure 29. Modify Trail Trace Identifier dialogue box

5. Switch Mismatch Monitoring on/off by selecting/clearing the checkbox.

6. Fill in the Transmitted and Expected TTIs, using all 15 characters.

Fill in the Transmitted and Expected TTIs. The lines under the fields indicate the number of characters used.

Note

Fill in all 15 characters, for equipment compatibility reasons. Use empty spaces, for example.

---

7. Click OK to apply the settings to all selected channels.

8. Click Apply to send the changes to the node.

5.3 Modifying Performance Collection settings

Purpose

In the **Performance Collection** page, you can view and modify performance collection settings. The **Channel** column shows the unique channel identification number, which determines the order of the items in the list. The **15 minute** column shows whether 15 minute performance collection is On or Off. The **24 hour** column shows whether 24 hours performance collection is On or Off.

You can modify the settings for one or several channels at a time.

Steps

1. **Select FXC STM-1 → SDH-PDH channels.**
2. **Select the Performance Collection tab.**

   The Performance Collection settings are displayed.

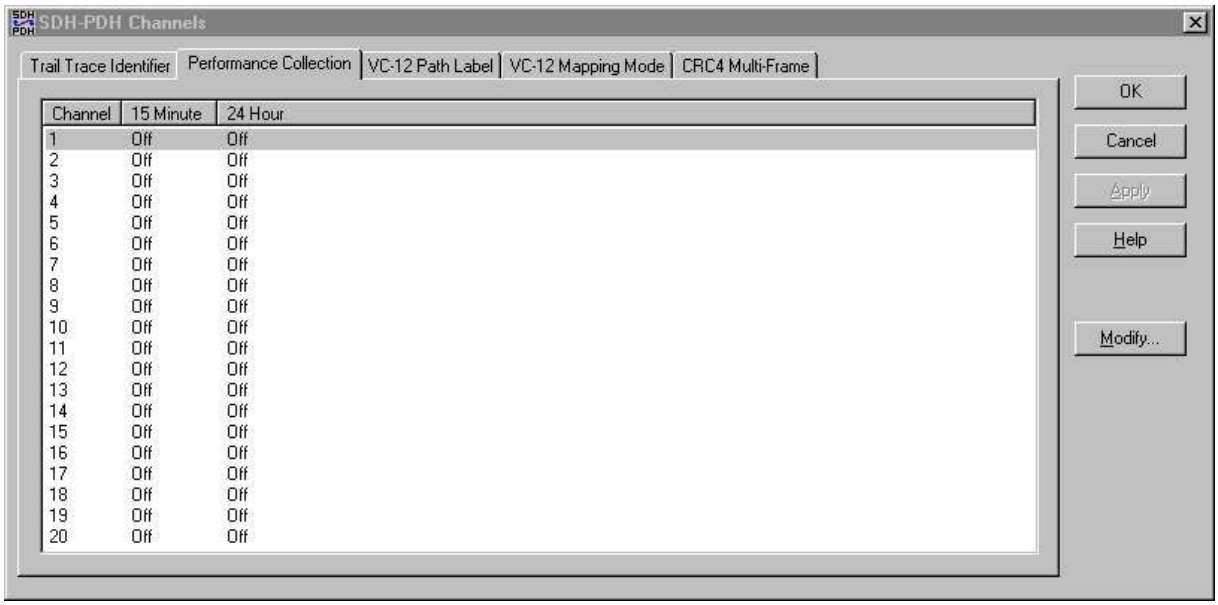

Figure 30. The Performance Collection settings

3. **Select the channel/channels you want to modify.**

Select the channel/channels you want to modify. To select multiple channels, hold down the Ctrl key or the SHIFT key on your pc keyboard while clicking.

4. **Click Modify to open the Performance Collection dialogue box.**

5. **By selecting/clearing the boxes, switch 15 minute and/or 24 hour performance collection on/off.**

6. **Click OK to apply the settings to all selected channels.**

7. **Click Apply to send the changes to the node.**

Further information

You can check the monitoring results in the Statistics History dialogue box.

5.4 Viewing the VC-12 Path Label

Purpose

In the **VC-12 Path Label** page, you can view VC-12 path labels for the SDH-PDH channels. The **Channel** column shows the unique channel identification number, which determines the order of the items in the list. The **Transmitted** column shows the path label transmitted. The **Expected** column shows the path label expected. The expected path is the same as the transmitted one. The **Received** column shows the path label received.

Note

You cannot modify the path labels in the current version of the software.

If a mismatch occurs between the expected and the received VC-12 Path Label, either alarm *Unequipped signal* or *Payload mismatch* occurs.

Steps

1. **Select FXC STM-1 → SDH-PDH channels.**

2. **Select the VC-12 Path Label tab.**

   The VC-12 Path Label settings are displayed.

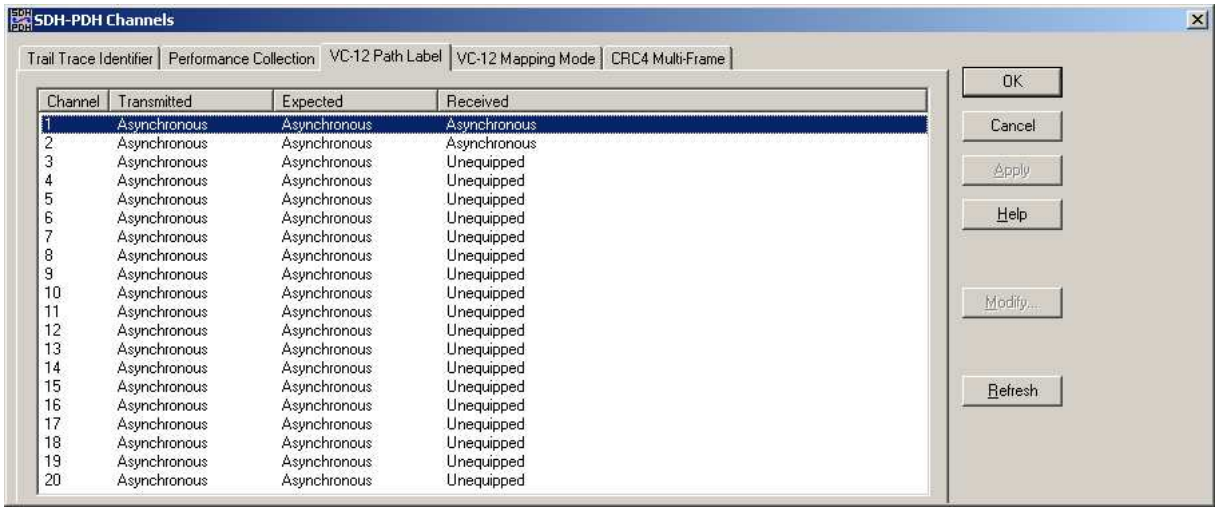

Figure 31. The VC-12 Path Label settings

3. Click on a channel to highlight it.

5.5 Viewing and adjusting the VC-12 Mapping Mode

Purpose

In the **VC-12 Mapping Mode** page, you can view and modify the mode of the transmitted mapping for each of the 20 SDH-PDH channels. The **Channel** column shows the unique channel identification number, which determines the order of the items in the list. The **Mapping Mode** column shows the mapping mode, which is **Asynchronous** or **Byte Synchronous** (2048 kbit/s).

The 31*64 kbit/s bytesynchronous mapping mode is not supported and cannot be configured.

You can modify the settings for one or several channels at a time.

Steps

1. Select FXC STM-1 → SDH-PDH channels.

2. Select the VC-12 Mapping Mode tab to access the VC-12 Mapping Mode settings.

The VC-12 Mapping Mode settings are displayed.

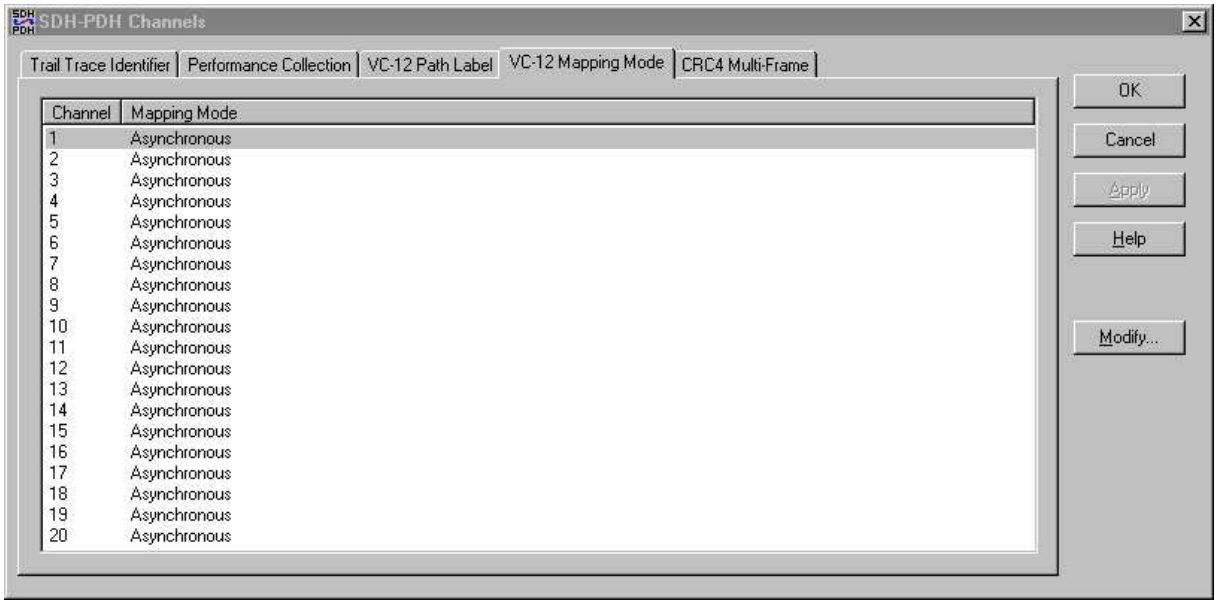

Figure 32. The VC-12 Mapping Mode settings

3. **Select the channel/channels you want to modify.**

   Select the channel/channels you want to modify. To select multiple channels, hold down the Ctrl key or the SHIFT key on your pc keyboard while clicking.

4. **Click Modify to open the VC-12 Mapping Mode dialogue box.**

5. **Select either Asynchronous or Byte Synchronous.**

6. **Click OK to apply the settings to all selected channels.**

7. **Click Apply to send the changes to the node.**

5.6 Configuring 2M multiframe CRC4 settings for FXC STM transmission units

Purpose

From the **CRC4 Multi-Frame** page, you can view and modify the CRC-4 Multi-Frame settings for each SDH-PDH channel. The **Channel** column shows the unique channel identification number, which determines the order of the items in the list. The **CRC4 Multi-Frame** column shows the CRC4 Multi-Frame setting, which is **Auto** (not supported by current release), **In Use**, or **Not in Use**. The default setting is In Use.

You can modify the settings for one or several channels at a time.

Steps

1. **Select FXC STM-1 → SDH-PDH channels.**
2. **Select the CRC4 Multi-Frametab.**

   The CRC4 multiframe settings are displayed.

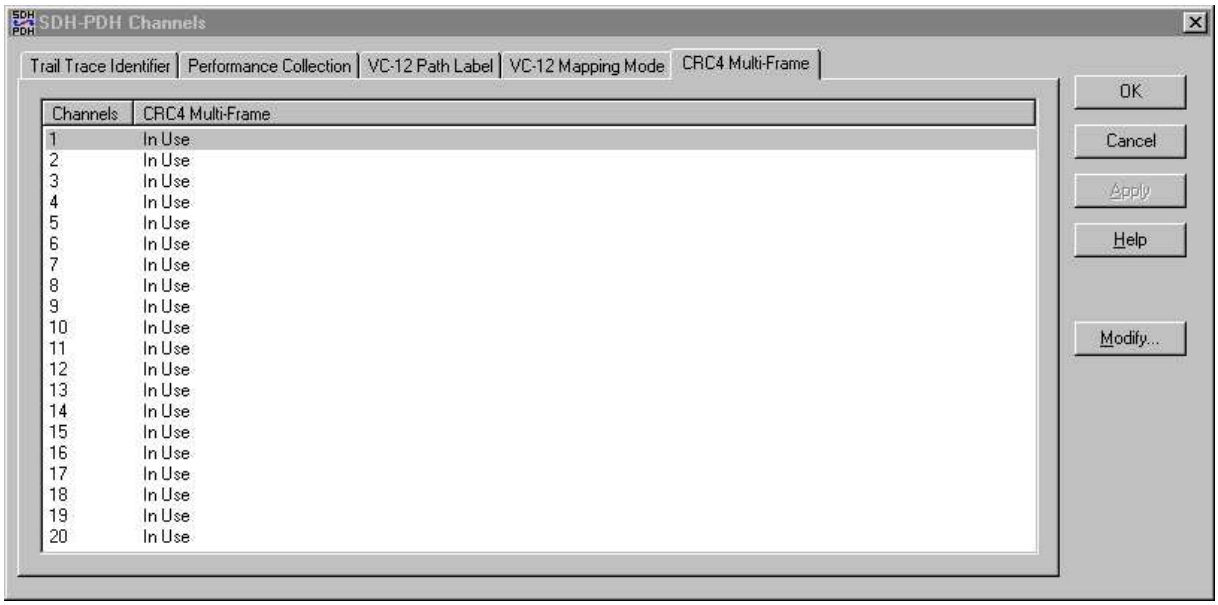

Figure 33. The CRC4 Multi-Frame settings

3. Select the channel/channels you want to modify.

Select the channel/channels you want to modify by clicking. To select multiple channels, hold down the Ctrl key or the SHIFT key on your pc keyboard while clicking.

4. Click Modify to open the CRC4 Multi-Frame dialogue box.

The CRC4 multiframe dialogue box opens.

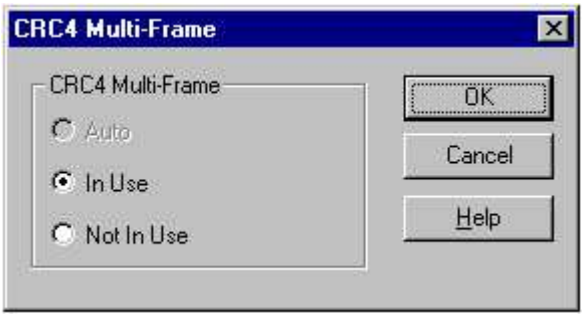

Figure 34. The CRC4 Multi-Frame dialogue box

5. Select either In Use or Not in Use.

6. Click OK to apply the changes to all selected channels.

7. Click Apply to send the changes to the node.

6 Adjusting management settings

6.1 Overview of adjusting management settings

Purpose

The following sections detail how to adjust the management settings of the transmission node.

Steps

1. **Adjust SDH management channel settings.**
2. **Adjust node synchronisation settings.**
3. **Manage cross-connections.**

Further information

For information on the Q1 settings, see *Technical description of Q1 management* and *Q1 management options for Nokia MetroHub*.

6.2 Adjusting SDH management channel settings

Purpose

In the **SDH Bus** page, you can:

- select **DCCm-DCCm (D4-D12)** to make a transparent connection between both STM-1 interfaces via the DCCm channel, which any management transmission data can pass through. DCCm is an STM-embedded management channel in the multiplex section.
- add, modify and delete SOH-SOH Embedded Operating Channel (EOC) settings. With these settings, you can establish transparent connections of SOH bytes between both STM-1 interfaces. This allows the bypass of any management data transmitted via an SOH byte.

There is no add/drop function for DCCm and for the SOH cross-connection.

Steps

1. **Click Configuration → Q1 Management to open the Q1 Management channel dialogue box.**

2. **Select the SDH Bus tab to access the SDH management channel settings.**

   The SDH management channel settings are displayed.

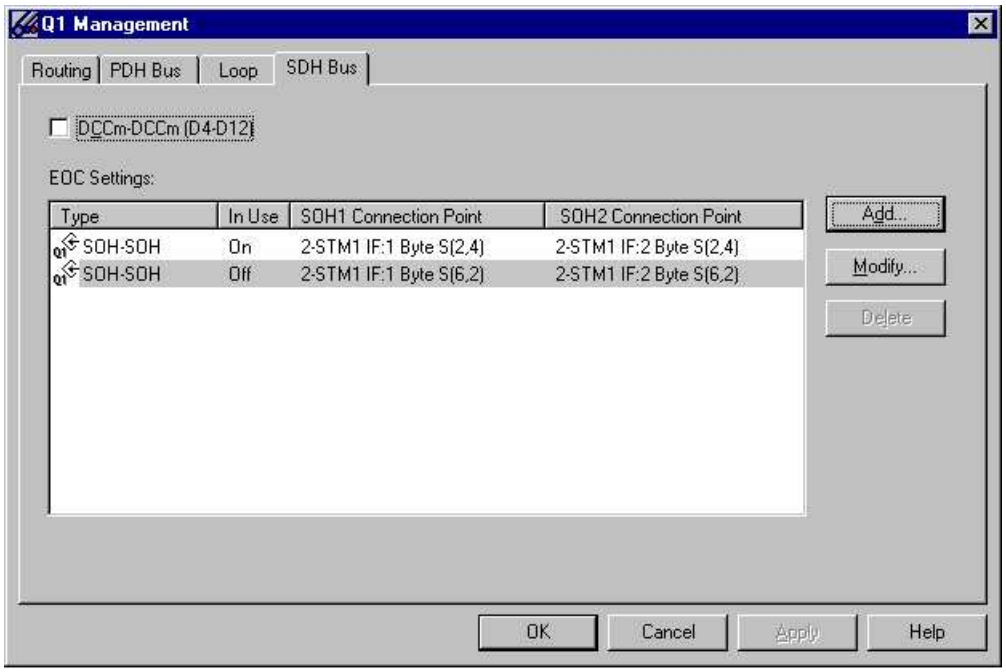

Figure 35. Q1 Management, SDH Bus page

3. **If necessary, activate the DCCm channel connection.**

If necessary, click the **DCCm-DCCm (D4-D12)** check box to activate the DCCm channel connection. Click **Apply**.

4. To add SOH-SOH channel connections

Steps

a. Click Add to open the Add SDH EOC dialogue box.

The **Add SDH EOC** dialogue box opens.

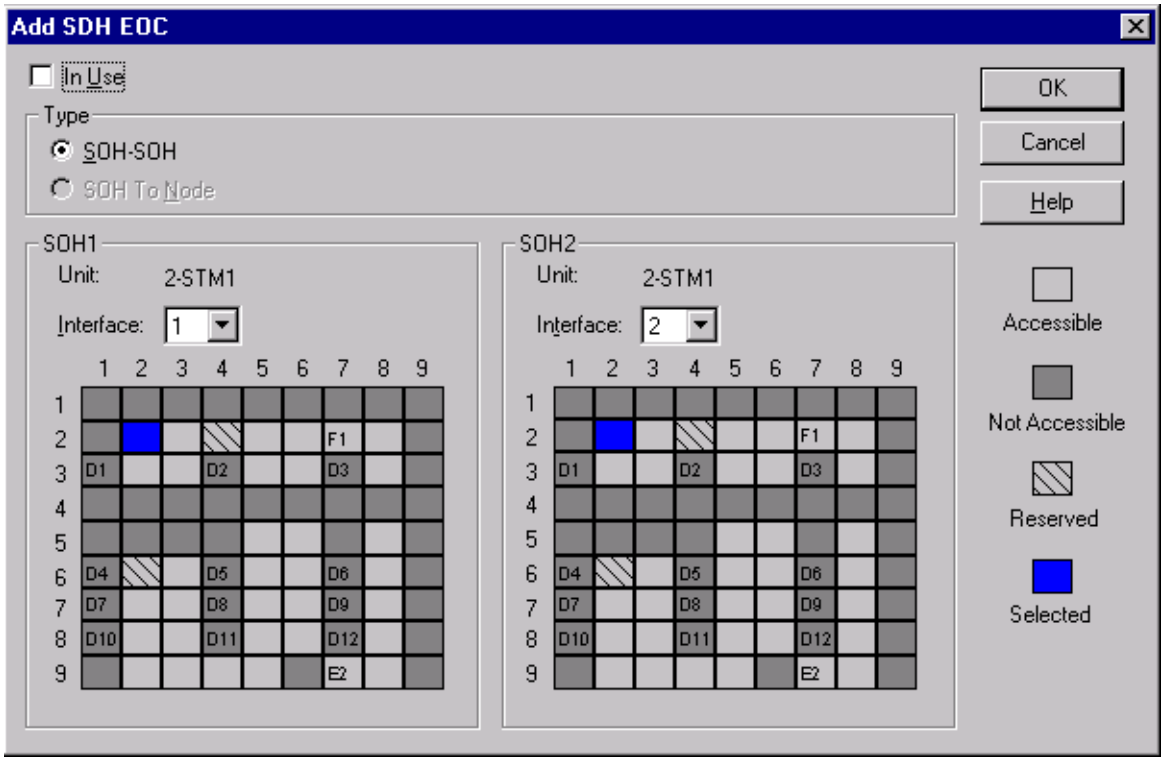

Figure 36. Add SDH EOC dialogue box

b. Assign the first connection point by select Interface 1 or 2 in the SOH1 frame.

c. Click to select an accessible (light-grey) SOH byte in the SOH1 selection graph.

d. Repeat steps 4-b and 4-c for the second connection point, in the SOH2 frame.

e. Click the In Use check box at the top of the window.

With the In Use check box, you can activate or deactivate SOH-SOH connections in the FXC STM unit, without deleting them from the node manager.

f. Click OK.

g. Repeat steps 4-a to 4-f as required, to add further SOH-SOH connections.

Note

Up to 16 SOH cross-connections can be configured.

---

h. Click Apply to create the SOH-SOH connections in the FXC STM unit.

Click Apply to create the SOH-SOH connections in the FXC STM unit. If **In Use** was selected for an SOH-SOH connection, it will be activated.

5. To modify an SOH-SOH channel connection

Steps

a. Click on an existing SOH-SOH connection in the EOC setting list.

b. Click Modify to open the Modify SDH EOC dialogue box.

The **Modify SDH EOC** dialogue box opens.

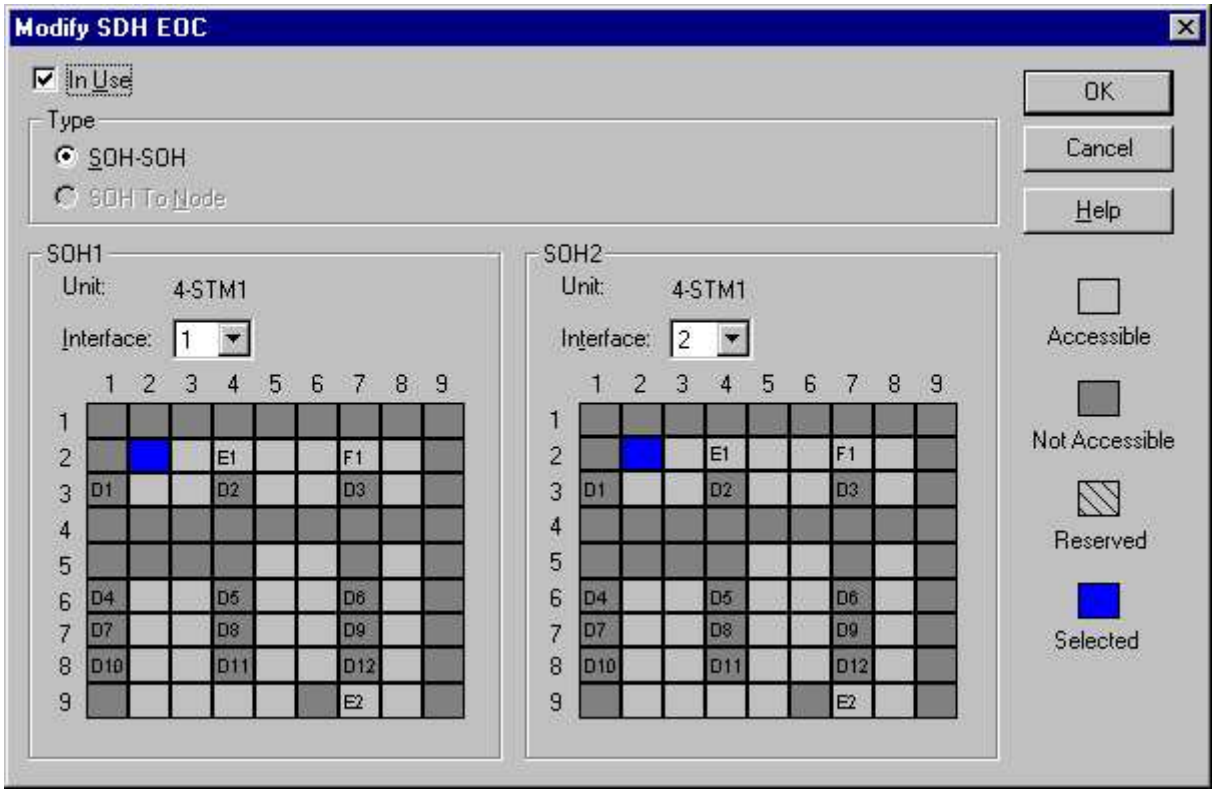

Figure 37. The Modify SDH EOC dialogue box

c. Modify the settings, then click OK.

d. Click Apply to set the changes in the FXC STM unit.

6. To delete SOH-SOH channel connections

Steps

a. Click on a existing SOH-SOH connection in the EOC setting list.

b. Click Delete.

c. Click Apply to delete the connection, and to set the changes in the FXC STM unit.

6.3 Adjusting Q1 management settings

Purpose

You can adjust the Q1 management settings of a node. These settings enable remote management when used.

Summary

To enable remote management, a transmission channel for Q1 has to be created. With UltraSite BTS Hub, Q1 is embedded in the OMUSIG channel. With MetroHub, a dedicated Q1 DCN channel has to be created.

To get MetroHub under Q1 management, you must further set up a Q1 hybrid.

For more information, see *Q1 management options for Nokia MetroHub* and *Technical description of Q1 management*.

Steps

1. **Connect to the node or open the node file.**

2. **Select Configuration → Q1 Management.**

   The **Q1 Management** dialogue box opens. The Q1 routing switches (Q1 hybrid) are displayed in the graphical form.

   The external and processor switches (see figure below) are closed by default in Nokia MetroHub.

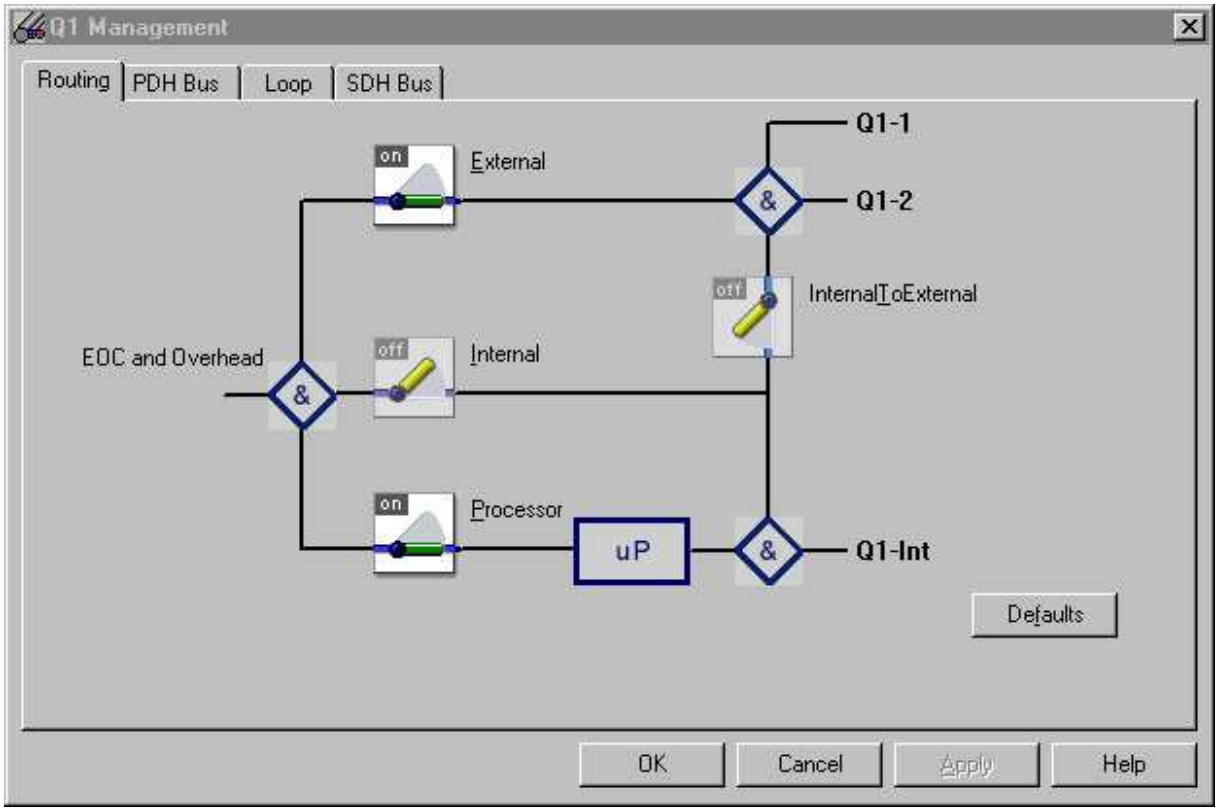

Figure 38. The Q1 management dialogue box

3. Select the PDH Bus tab.

The **PDH Bus** tab opens.

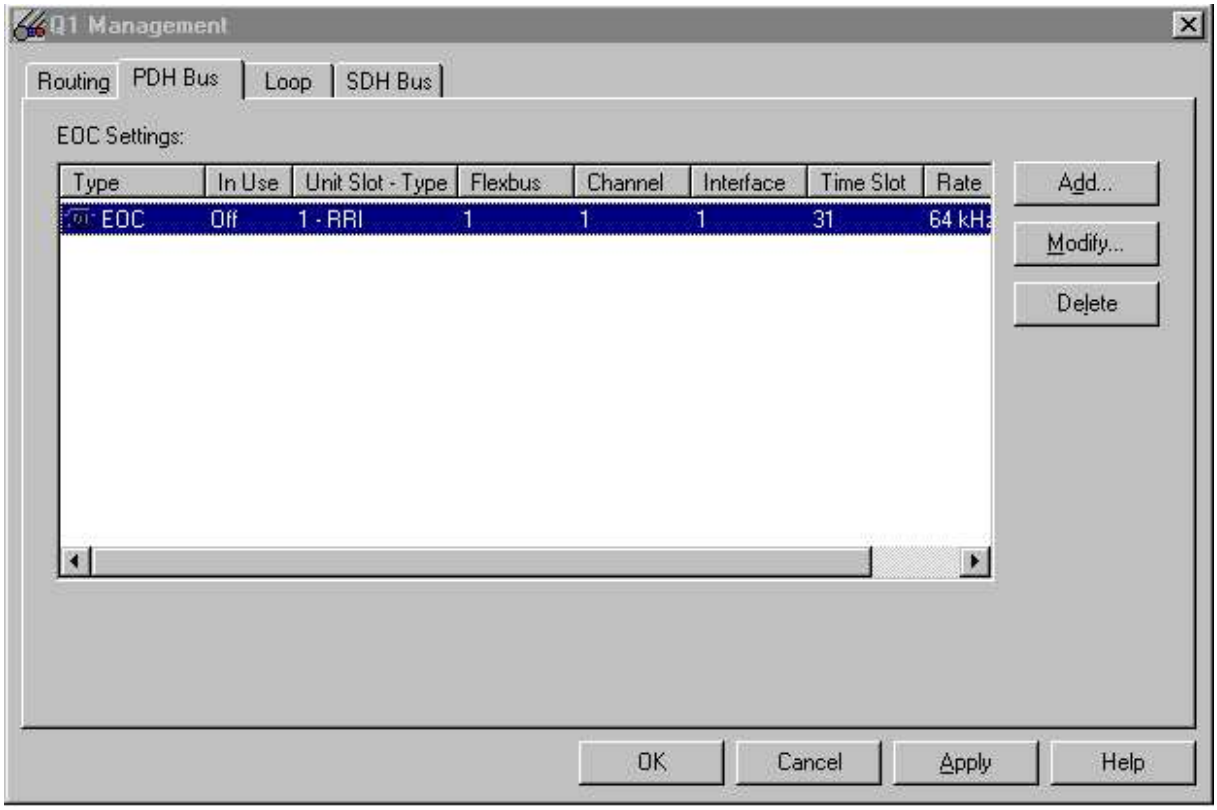

Figure 39. The PDH Bus tab

4. Click Add.

The **Add EOC** dialogue box opens.

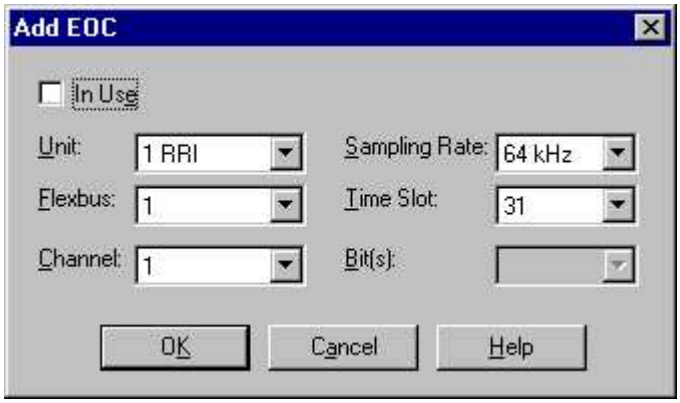

Figure 40. The Add EOC dialogue box

5. Select the unit to be configured.

6. Select the interface to be configured.

In FXC E1 and FXC E1/T1, there are four interfaces to choose from.

In FXC RRI, there are two Flexbuses and up to 16 channels available per Flexbus, depending on the Flexbus capacity setting. There are also two possibilities for Q1 channel, the EOC in the payload and the EOC in the radio overhead.

In FXC Bridge, there are 20 interfaces to choose from.

7. *If* you want to carry the Q1 management in the payload
Then

Select a timeslot and sampling rate on the selected interface or channel.

If 64 kbit/s sampling rate is selected, the whole timeslot is reserved for Q1 and no bit selection is required. If a lower sampling rate is selected, the bits inside the selected timeslot have to be selected. The sampling rate options are 64, 32, 16 and 8 kbit/s in timeslots 1−31 and 16, 8 and 4 kbit/s in timeslot 0. In case of timeslot 0, only the bits 5–8 are allowed for EOC usage.

Note

It is recommended that the sampling rate is at least four times higher than the baud rate used in the Q1 port.

8. *If* you want to carry the Q1 management in the radio overhead
   Then

   Select a Flexbus and overhead on the selected FXC RRI unit.

   Select either Overhead 1 or 2, depending on the selected Flexbus. Overhead 1 corresponds to Flexbus 1 and Overhead 2 corresponds to Flexbus 2. After this selection has been made, no further configurations for sampling rate are required because the sampling rate is fixed so that it is always at least 64 kbit/s.

   The advantage of using the overhead channel for Q1 is that it does not waste payload.

9. **Click OK to add Q1 information to the list of EOCs.**

10. **Click Apply or OK to apply the PDH Bus settings to the node.**

Further information

If the managed area is divided to different Q1 buses (see *Q1 management*) or the Q1 channel is otherwise forwarded over the transmission node, the EOC channel is just cross-connected as normal data towards other equipment.

7 Adjusting transmission node synchronisation settings

7.1 Overview of adjusting node synchronisation settings

Purpose

Node **Synchronisation** settings can be viewed and modified through the **Configuration** menu in the manager.

The following sections detail each possible step.

Steps

1. **Adjust synchronisation loop bit settings.**
2. **Adjust PDH synchronisation settings.**
3. **Adjust SDH synchronisation settings.**

7.2 Adjusting synchronisation loop bit settings

Steps

1. **Connect to the node or open a file.**
2. **Select Configuration → Synchronization...**

   The *Synchronization dialogue box* opens.
3. **Click the Loop Bits tab.**

   The **Loop Bits** tab opens.

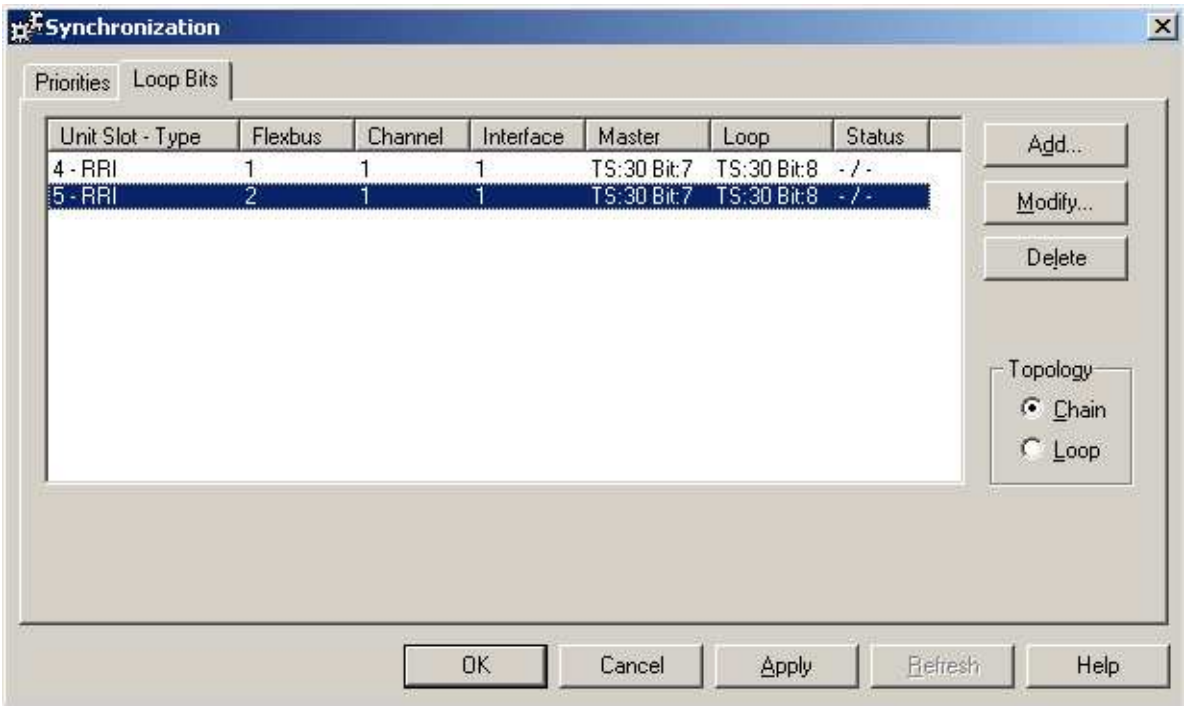

Figure 41. The Loop Bits tab in the Synchronization dialogue box

You can select between two topologies: **Chain** or **Loop**. It is recommended to use the *Chain* setting when the hub is used in a chain or tail configuration, and the *Loop* setting when the hub is a part of a loop configuration.

When configuring synchronisation loop bit settings and selecting *Loop*, a remote alarm indication in E1 (which is the active synchronation source) is interpreted as a synchronisation fail and the synchronation source switches to the protecting synchronation source. This way, undirectional faults are detected and protected in a loop network.

4. Click Add.

5. Select a transmission unit.

6. Select the interface.

7. *If* you selected FXC E1 or FXC E1/T1 unit
   Then

Select interface for the loop bits.

8. *If* you selected FXC RRI unit
   Then

   Select Flexbus and channel for the loop bits.

9. **Select the desired settings for MCB (master clock bit) in the master group and LCB (loop control bit) in the loop group.**

10. **Click OK.**

7.3 Adjusting PDH synchronisation settings

Purpose

On the **Priorities** page, you can view and modify synchronisation priorities. The **PDH Priorities** section contains the following columns: **Priority number**, **Timing**, **Unit**, **FB/IF** (Interface), **Channel**, and **Platform interface**.

You can also modify PDH settings. The **Modify Priority** dialogue box contains entries for the following:

- **Priority number**. The timing entry with the highest priority is selected as timing source. If it fails, the node uses the next active timing entry as source, until the higher entry becomes active again.
- **Timing** shows the timing source:
  - **RX Clock**. This should be selected if the timing source is a 2.048 Mbit/s E1 signal (or 1.544 Mbit/s with T1) at the FXC E1, FXC E1/T1, or FXC RRI.
  - **Sync Input**. The fourth interface of an E1 or T1 interface can be configured as an external synchronisation input interface. A 2.048 kHz synchronisation input signal can be used to connect to this interface and act as synchronisation source.
  - **Internal Timing**. If Internal Timing is the source for a priority, all subsequent priorities will be disabled.
- **Unit**, which shows the unit type and slot number of the FXC units installed. If the timing source is **RX Clock** or **Sync Input**, **Unit** refers to the unit where the interface of the timing source is located.

- **FB/Interface**, which specifies the interface to be used as timing source. This need only be configured for an **RX Clock** timing source: for FXC RRI, an**FB** interface, and for FXC E1, FXC E1/T1, an **E1** or **T1** interface.
- **Channel**, which allows the E1 channel to be used within a Flexbus interface. If an E1 within a Flexbus is used as timing source, the location of the E1 with the Flexbus signal must be specified.

If an E1 within a Flexubs interface is configured as timing source, the related platform interface is displayed as static text.

Steps

1. **Click Configuration → Synchronization to open the Synchronization dialogue box.**

   The Synchronization dialogue box opens.

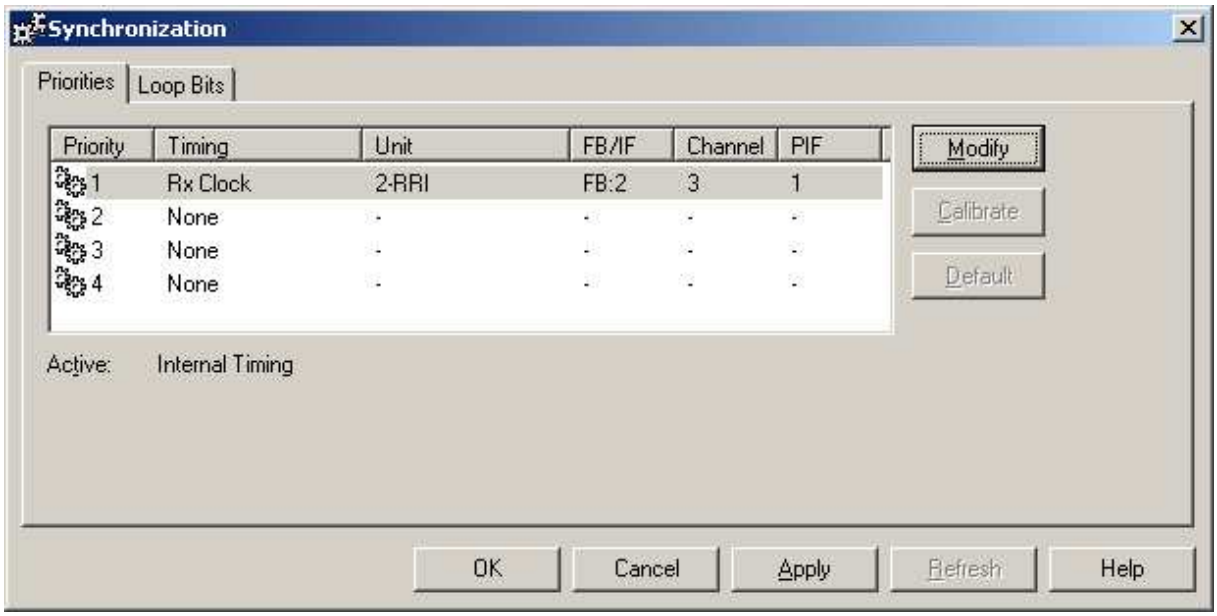

Figure 42. The Synchronization dialogue box

2. **Select the tab Priorities to switch to the synchronisation settings (see the following figure).**

3. **Select a priority by clicking on it.**

4. Click Modify to access the Modify Priority dialogue box for that priority.

The **Modify Priority** dialogue box opens.

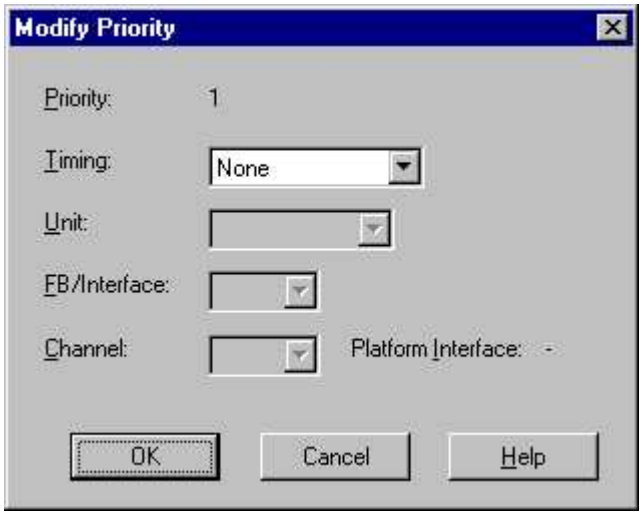

Figure 43. The Modify Priority dialogue box

5. Select the timing source from the Timing pull-down menu.

Select the timing source from the **Timing** pull-down menu. The alternatives are **RX Clock**, **Sync Input**, **Internal Timing**, or **None**.

Note

If Internal Timing is the source for a priority, all subsequent priorities will be disabled. The Unit and Interface boxes for the selected internal timing source will also be disabled.

The use of Internal Timing for a priority generates a minor 'frequency error' alarm.

Note

If all higher priority synchronisation sources have failed, the internal clock will be selected as the synchronisation source - even if internal timing is not the designated source. Instead of the minor 'frequency error' alarm, a critical 'loss of synchronisation signals' alarm will be raised.

Note

You can only select Sync Input for an FXC E1(/T1) unit, and the interface is always 4. Remember also to change the Interface Mode setting in the FXC / LIF Settings dialogue box to **Sync Input**.

6. Select the unit from the Unit pull-down menu.

Select the unit from the **Unit** pull-down menu. If you select Sync Input, the unit can only be FXC E1(/T1). The **Unit** menu is disabled if the **Timing** is **Internal Timing**.

7. Select the interface from the FB/Interface pull-down menu.

Select the interface from the **FB/Interface** pull-down menu. The selection depends on the unit in question. The **FB/Interface** menu is disabled if the **Timing** is **Internal Timing** or **Sync Input**.

8. Select the channel from the Channel pull-down menu.

Select the channel from the **Channel** pull-down menu. For FXC E1 or FXC E1(/T1), the **Channel** menu is disabled.

9. Click OK.

10. Click Apply to apply the settings to the node.

11. Repeat steps 3 to 10 as necessary for other priorities.

12. If necessary, click Calibrate to calibrate the internal clock to the current active synchronisation source.

If necessary, click **Calibrate** to calibrate the internal clock to the current active synchronisation source.

Note

Before calibrating, check that the accuracy of the timing source used for calibration is within a range of +-40 ppm. The accuracy of the calibration is within a range of +-10 ppm, which is well within the limits of +-50 ppm required for a PDH clock. However, if the timing source used for caliberation has a frequency higher than +40 ppm, the calibrated clock may be out of range.

Note

This button is not available in offline mode or when the active synchronisation source is Internal Timing.

7.4 Adjusting SDH synchronisation settings

Purpose

On the **Priorities** page, you can view and modify SDH synchronisation priorities if an FXC Bridge and FXC STM unit are installed.

By default, three synchronisation sources can be selected and prioritised: STM interface 1 (STM-1 IF:1), STM interface 2 (STM-1 IF:2), and Internal. If the FXC Bridge unit is installed in slot 1 (the slot for the node master), and a FXC E1 or FXC E1/T1 unit is installed, it is also possible to specify an E1 signal from the first E1 interface of an FXC E1 or FXC E1/T1 as the synchronisation source.

The SDH priority settings are presented in the following columns:

- **Priority number**. In **Use Priorities** mode, priority is of secondary importance: if two synchronisation sources have the same quality, priority decides which synchronisation source will be selected.
- **Source**, which can be modified (with the exception of **Internal)**.
- **Quality**. In **Use Priorities** mode, quality is the of primary importance: unless two synchronisation sources have have the same quality, quality decides which synchronisation source will be selected.

- **Determination**, which can be **SSM** (Synchronisation Status Message) or **Manual**. With **SSM** , the quality of the synchronisation source is indicated by a signal that can be used as the synchronisation source. With **Manual**, the quality of the synchronisation source is configured manually. For an E1 signal, only **Manual** determination is available.
- **Status**.

You can also modify the **SDH Synchronisation Mode**: the alternatives are **Use Priorities**, **Force On**, and **Hold Over**.

Before you start

The **Synchronize PDH to SDH** check box allows the PDH network to be synchronised to SDH.

If the FXC Bridge is installed in slot 1, the **Synchronize PDH to SDH** check box is checked and disabled in the view.

If the FXC bridge is installed in a slot other than 1, and a PDH unit is installed in slot 1, then the **Synchronize PDH to SDH** check box is empty, and enabled in the view. The PDH synchronisation list is also displayed below the SDH synchronisation list - this means that the PDH and SDH node are currently running on independent clocks, and that both priority lists can be altered. To synchronise the PDH node to the SDH, check the **Synchronize PDH to SDH** check box, then click **OK**; the next time you open the **Priorities** page, the PDH priority list will not be visible.

Steps

1. **Click Configuration → Synchronization to open the Synchronization dialogue box.**

   The **Synchronization** dialogue box opens.

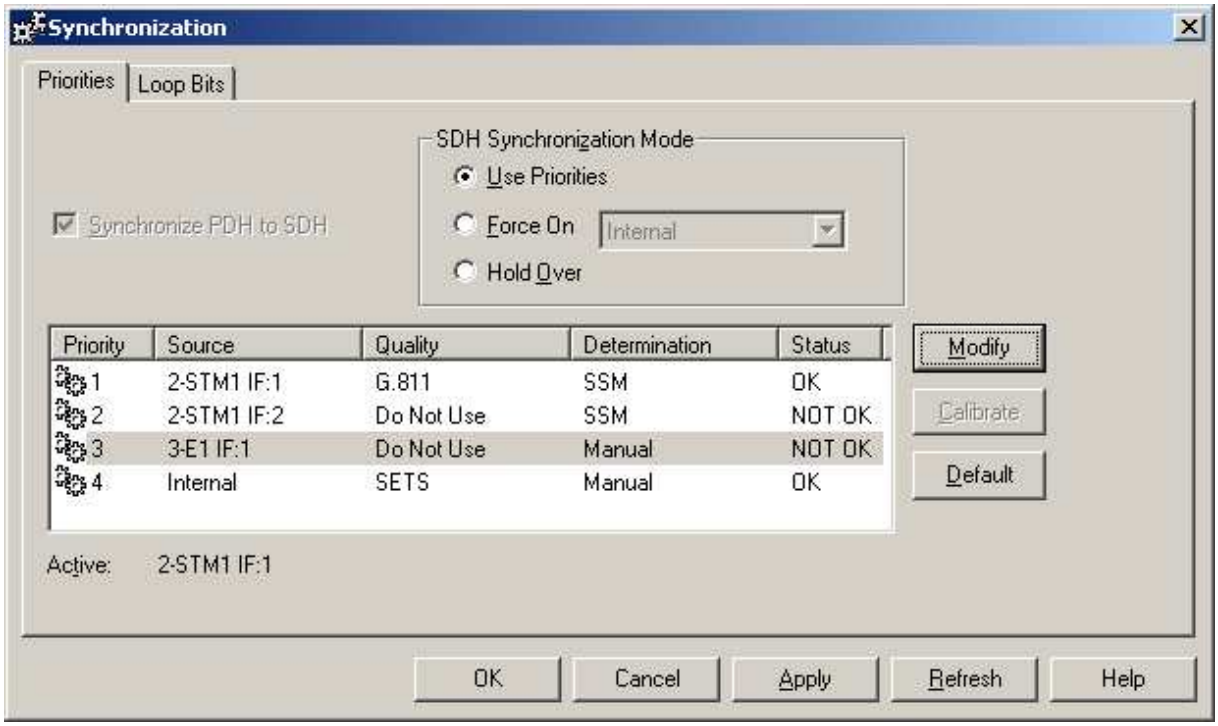

Figure 44. The Synchronization dialogue box

2. Select the Priorities tab.

3. Select the SDH Synchronisation Mode: the alternatives are Use Priorities, Force On, and Hold Over.

Select the **SDH Synchronization Mode**:

- With **Use Priorities,** the timing source is selected automatically, based on the priority and quality of the synchronisation sources.
- With **Force On**, you can force the use of a particular synchronisation source; select the source from the pull-down menu.
- **Holdover** switches the FXC STM to holdover mode (disabling the Calibrate button).

4. To modify a synchronisation source

Steps

a. Click on a synchronisation source in the SDH Priorities: frame.

b. Click Modify to access the Modify Source dialogue box.

The **Modify Source** dialogue box opens.

Figure 45. The Modify Source dialogue box

c. Select the Unit where the interface of the synchronisation source is located.

d. Select the Quality Determination: Use SSM or Manual.

Select the **Quality Determination** as follows:

- Select **Use SSM** if the Quality Determination of the synchronisation source should be automatically based on the SSM of the synchronisation source.
- Select **Manual** to allow the selection of a specific quality from the list. See the following table for details.

Table 2. Hierarchy of quality levels

Value	Description	Priority
G.811	Primary reference clock quality according to G.811	Highest
G.812 Transit	Transit slave clock according to G.812	|
G.812 Local	Local slave clock according to G.812	|
SETS	Synchronous Equipment Timing Source	|
Do not use	The signal should not be used for synchronisation	Lowest

Note

The quality selection is disabled when **Use SSM** is selected.

e. Select the Unit.

f. Select the Interface number; the alternatives are 1 or 2.

g. Click OK.

h. Click Apply to apply the settings.

5. To determine the current synchronisation source quality and status, click the Refresh button to read the priority list from the FXC STM node.

6. If necessary, view the Active source.

One synchronization source is **Active** at a time. The active source cannot be edited – it only shows the current situation.

Further information

If something went wrong and you want to start from a clean dialogue box, click **Default** to set the SDH priority settings back to their default status.

8 Managing cross-connections

8.1 Overview of managing cross-connections

Purpose

A cross-connection defines how the signals are routed between FXC units in a node.

If there is no cross-connection file available for commissioning the node, the cross-connections must be created manually with the MetroHub or UltraSite BTS Hub Manager.

Summary

Cross-connections are created into banks. The node contains two cross-connection banks. The state of a cross-connection bank can be active or inactive. Only the cross-connections that are in the active bank are in use in the node.

If you want to start using the cross-connections in the inactive bank, you must manually activate that bank.

Note

Adding new cross-connections or editing existing cross-connections is possible only in an inactive bank.

Note

Export the cross-connections from the inactive bank to a file before power reset, as the inactive bank is cleared from the node memory. Later, the same file can be imported to the inactive bank to restore the cross-connections.

You can edit cross-connections and banks only through the **Cross-connections** window.

Steps

1. To open the **Cross-connections** window

   Steps

   a. **Create an online access to the node or an offline access to the file.**

   b. **Select Configuration → Cross-connections...**

      The **Cross-connections** window is divided into two parts. The upper window includes a cross-connection list view and on the right-hand side of the window you can find, for example, the buttons for adding, removing and modifying connections. The lower window includes a cross-connections graphic view.

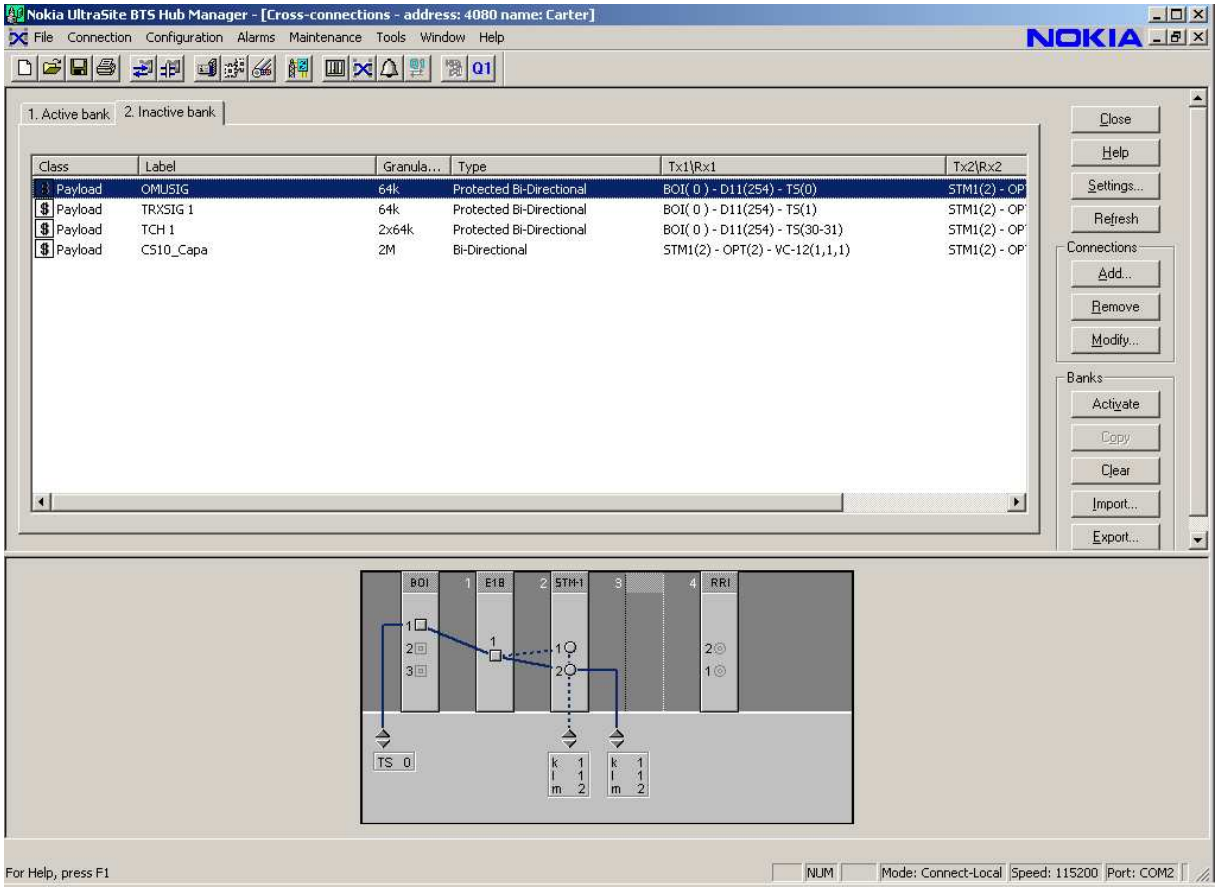

Figure 46. Cross-connections window

There is a list view for both the active bank and the inactive bank. The list view shows cross-connection related information in text format. A connection is always presented in one row. You can select several connections in the list. The view also provides a pop-up menu to carry out certain functionality for the selected cross-connection(s). It also provides buttons to carry out cross-connection-related or bank-related operations.

You can use the graphic view to create cross-connections and also to show how the selected connection in the cross-connections list view progresses from one FXC unit to another. The graphic view shows only one connection at a time.

Tip

The view also includes a **Refresh** button which you can use for refreshing the cross-connection data.

2. To open the **Cross-connection Properties** dialogue box

Steps

a. Select an active or inactive bank.

b. Right-click the desired cross-connection.

A pop-up menu opens.

c. Select Properties.

Complete details about the selected cross-connection are shown in the **Cross-connection Properties** dialogue box.

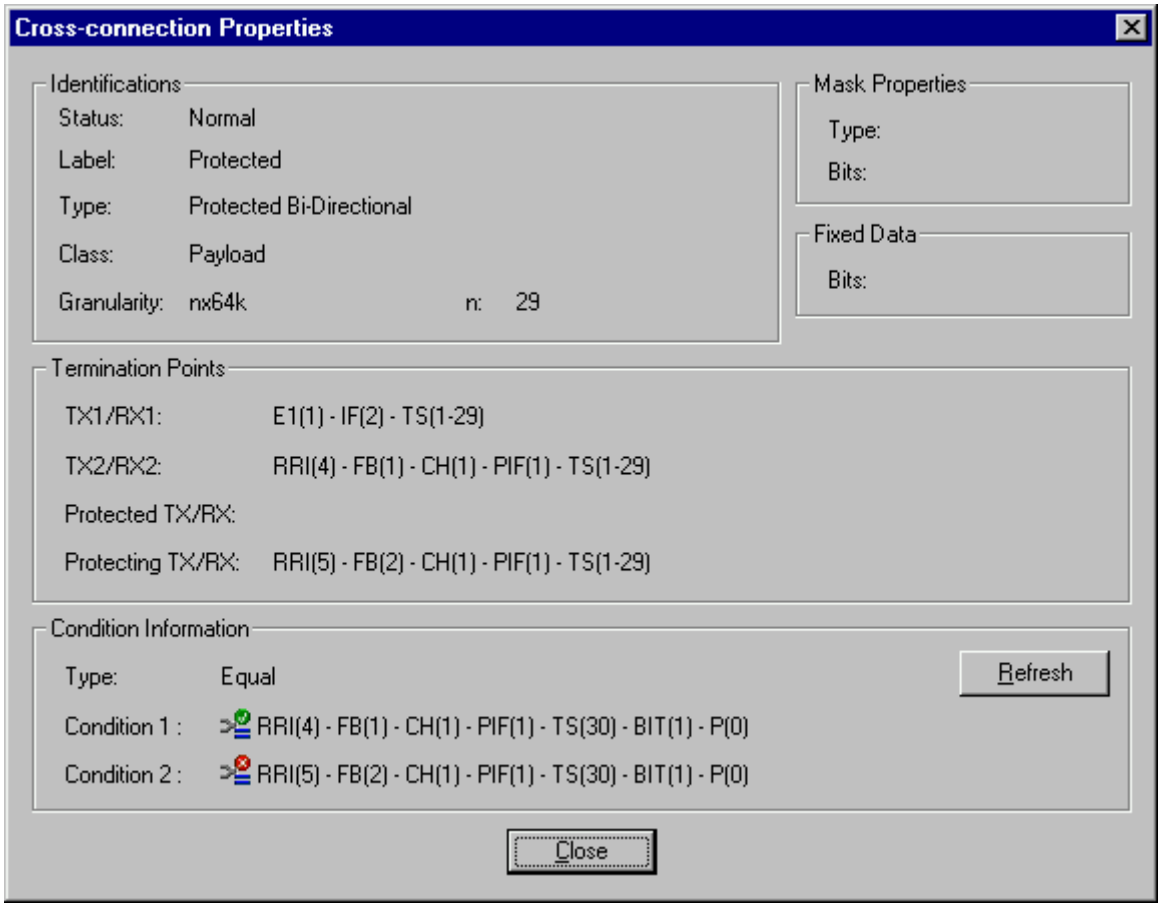

Figure 47. Cross-connection Properties dialogue box

While managing a node (NE) with a protected cross-connection in the active bank, the dialogue box also displays the condition bit status for Condition 1 and/or Condition 2. In such a case, the **Refresh** button is also available for refreshing the condition bit status. Once the condition bit status is read, the status is also displayed in the list view of the **Cross-connections** window for one or more cross-connections having the same condition(s).

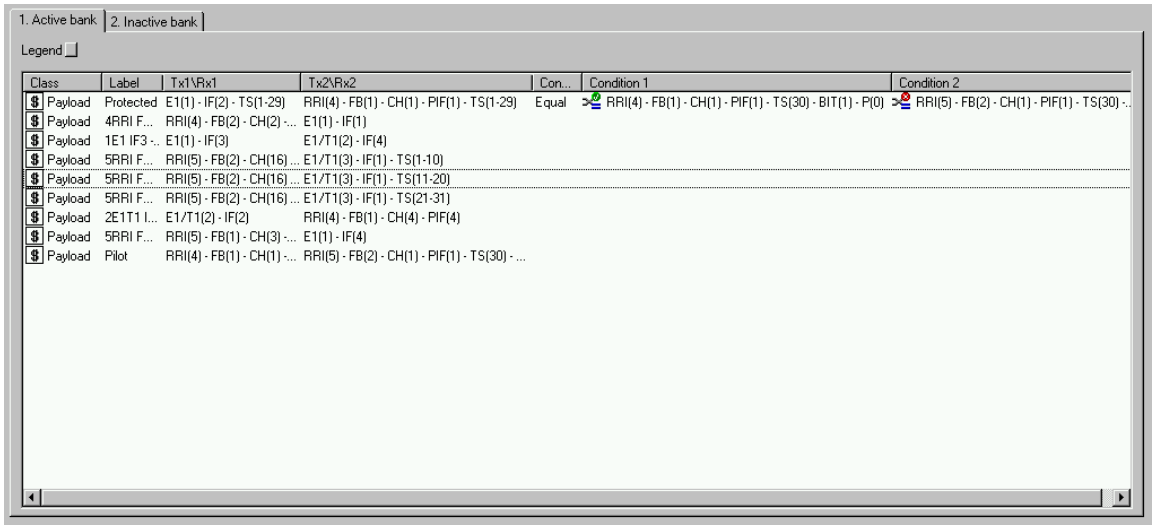

Figure 48. List view of the cross-connections window

Press the **Legend** button to see an explanation of the symbols.

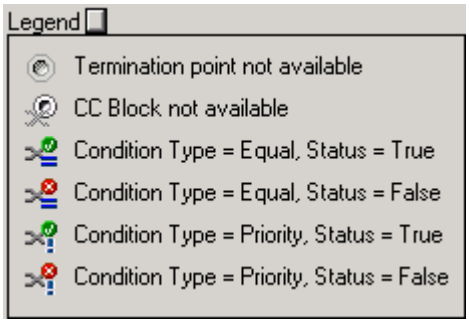

Figure 49. Symbols used in the cross-connections window

The condition bit status can also be read for selected cross-connections in the **Refresh bank** pop-up menu. The **Refresh bank** pop-up menu, which is available for the cross-connections active bank, refreshes the condition bit status for all the protected cross-connections in the bank.

3. *If* you want to add a cross-connection

   Then

See Adding cross-connections and Adding cross-connections in the graphic view.

Further information

Bypass connections are always bi-directional and the granularity is 2M. These connections are only available for FXC RRI units.

A fast and easy way to add bypass cross-connections is via the graphical view in the **Cross-connections** window. Refer to *Adding cross-connections in the graphic view* for more information.

4. *If* you want to modify a cross-connection
   Then

   See Modifying cross-connections.

5. *If* you want to remove a cross-connection
   Then

   See Removing cross-connections.

6. *If* you want to create a cross-connection file
   Then

   See Creating and exporting a cross-connection file.

7. *If* you want to import a cross-connection file
   Then

   See Importing a cross-connection file.

Further information

Usability tips for cross-connections:

- The easiest way to edit an active cross-connection bank is to take a copy of it to an empty inactive bank, edit the connections there and activate the edited bank.
- When clicking the **settings** button you can choose which cross-connection attribute is displayed in the **Cross-connections** window.
- Controls, for example, the Q1 EOC channel and MCB/LCB bits, are shown in the **Cross-connections** window as reserved capacity. These are also marked and seen as uni-directional connections, even though they are bi-directional by nature. It is only a way of marking.

It should be noted that control connections are just indicating the reservation of the cross-connection capacity, so they cannot be removed or edited in the **Cross-connections** window. They are reserving the capacity from both banks.

When the user chooses to create the EOCs/Sync loop bits, the contents of both active and inactive bank are validated for possible conflict.

If any conflict is detected, the manager displays a dialogue box with EOC/ Sync loop bits in conflict.

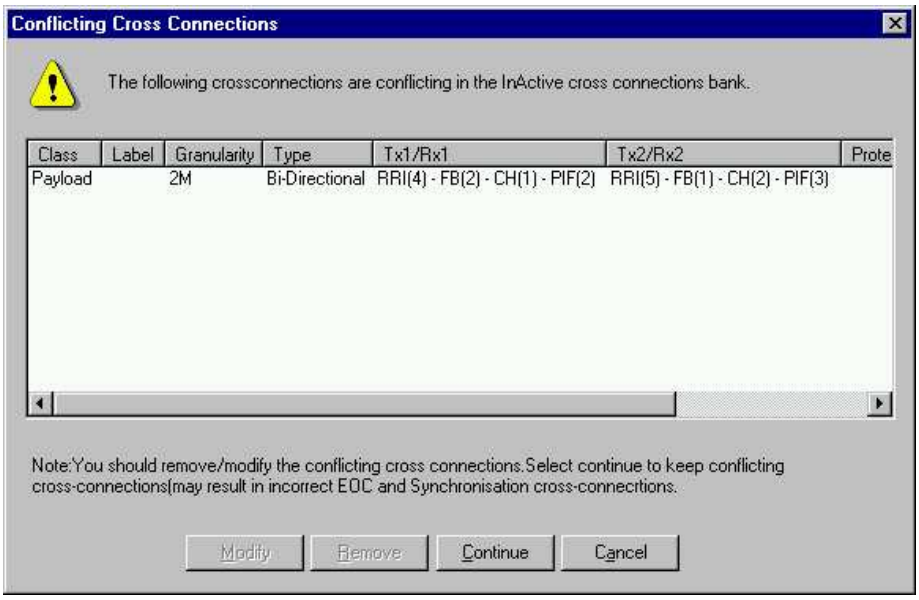

Figure 50. Conflicting cross-connections

The dialogue box provides an option for the user to clear or preserve the inactive bank contents and to cancel or continue with current selections. The manager creates the required 2M cross-connections in the active or inactive bank depending on the user's decision.

8.2 Adding cross-connections with the Add Cross-connection Wizard

Summary

Each type of cross-connections supported by the node can be created using the **Add Cross-connection Wizard**. The wizard guides you through the different steps of adding a new cross-connection into an inactive bank. Should you forget a setting when adding a new connection, the wizard informs you of the mistake.

The first dialogue box that opens is for the first termination point, TX1/RX1, and the second dialogue box is for the second termination point, TX2/RX2. If the cross-connection type is protected bi-directional, a third dialogue box opens allowing you to specify the parameters of the protecting termination point. All three dialogue boxes are similar in appearance and function.

The last dialogue box of the wizard is the **Overview** dialogue box, which shows you the configuration of the added cross-connection. Depending on the type of connection, you can enter protection information, mask properties or fixed data in this dialogue box.

Note

You can also *create cross-connections in the graphic view* of the **Cross-connections** window.

Steps

1. **Click Configuration → Cross-connections.**
2. **Select Inactive bank.**
3. **Select Add to open the Add Cross-connection Wizard dialogue box.**

   The **Add Cross-connection Wizard** dialogue box opens.

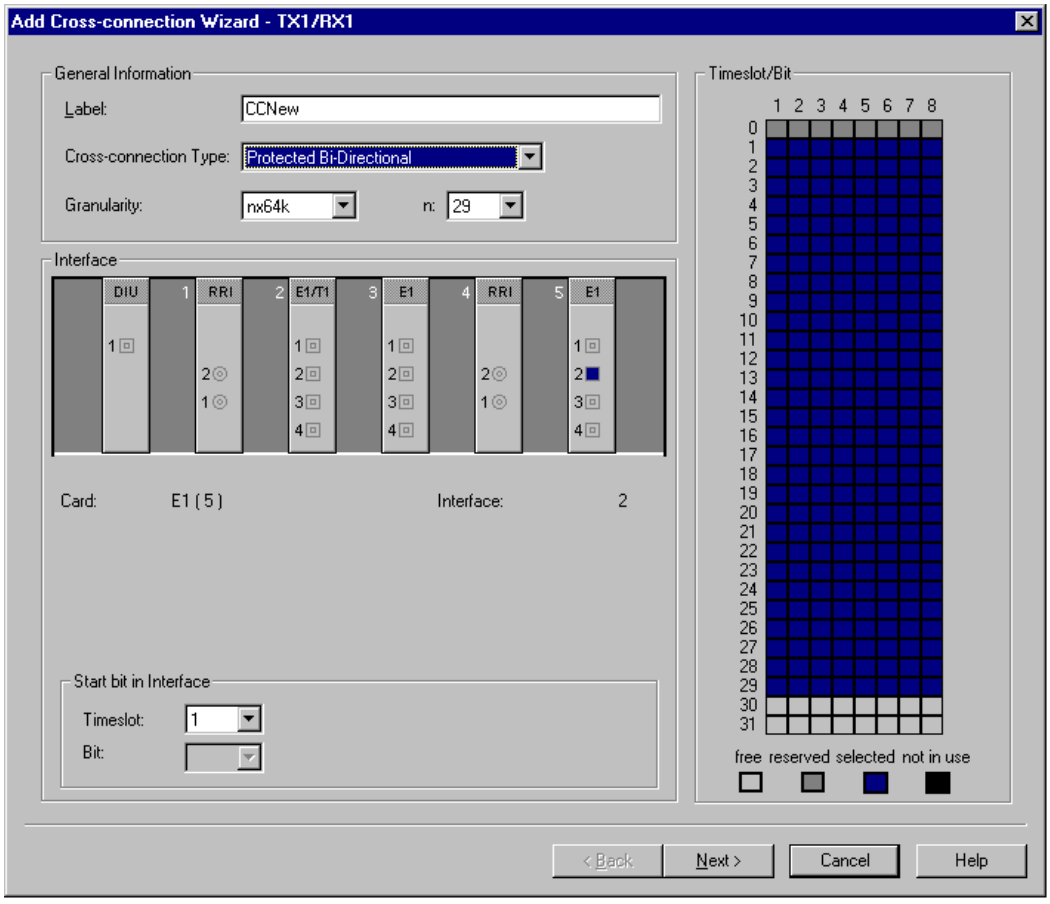

Figure 51. The Add cross-connection wizard TX1/RX1 dialogue box

4. Specify the parameters of Tx1/Rx1, the first termination point.

Steps

a. Label the new cross-connection (optional).

Label the new cross-connection by entering its name in the text field. The name may not exceed 80 characters.

b. Select the first termination point (TX1/RX1): click on the appropriate Interface symbol.

Select the first termination point by clicking on the appropriate **Interface** symbol in the **Interface** graphical field.

c. For an FXC RRI flexbus interface, select a channel from the Channels graphical field.

For an FXC RRI flexbus interface, select a channel from the **Channels** graphical field. The **Channels** graphical field shows the channels for the interface of the unit as a row of buttons.

Note

If a channel is selected from the free channels available, the appropriate button is painted in blue. The reserved channels are shown in grey, and cannot be selected.

---

d. For an FXC STM-1 optical interface, select the capacity in the VC-4 frame matrix.

Select the capacity of an FXC STM-1 optical interface in the VC-4 frame matrix. Changes in selection in the matrix are reflected in the Subsignal identification boxes (**K**,**L**,**M**) and vice-versa.

The **K** identification box specifies subsignal **TUG-3**, which can have a value of **1**, **2**, or **3**. The **L** identification box specifies subsignal **TUG-3**, which can have a value of **1** to **7**. The **M** identification box specifies subsignal **VC-12**, which can have a value of **1**, **2**, or **3**.

e. For the FXC Bridge interface, select one of the PDH/SDH channels from the Interface (PDH) graphical field, or the Interface (SDH) graphical field.

Note

If you are modifying cross-connections, perform this step. However, if you are adding cross-connections, you can ignore this step and move to the next step.

For the FXC Bridge interface, select one of the 20 PDH/SDH channels from the **Interface (PDH)** graphical field, or from the **Interface (SDH)** graphical field. Both graphical fields show the channels for the (PDH/SDH) interface of the unit as a row of buttons.

Note

If a channel is selected from the free channels available, the appropriate button is painted in blue. The reserved channels are shown in grey, and cannot be selected.

f. Select a Cross-connection Type from the drop-down menu.

Select a **Cross-connection Type** from the drop-down menu. The default is **Bi-Directional**. The cross-connection types are explained in *Transmission unit cross-connections*.

g. Select the Granularity.

Select the **Granularity**. The alternatives are **2M**, **nx64k**, **64k**, **32k**, **16k**, **8k**, and **nx8k**. The default value is **2M**.

Note

The granularity selection can disable/enable spin control n:. Spin control n: is enabled if granularity is n x 64k.

h. If the granularity is nx64k or nx8k, select n:.

n: is the coefficient of granularity when the granularity is nx64 k or nx8k. If the granularity is nx64k or nx8k, select n: (the alternatives are 1-31 for nx64k and 2-248 for nx8k; the default value is 1 for nx64k and 2 for nx8k).

i. Select the Timeslot/Bit (if the granularity is not the same as the interface size).

Click to select the Timeslot/Bit from the Timeslot/Bit matrix, or from the **Timeslot** and **Bit** boxes:

- The time-slot can be **0-31**, depending on the availability. The default value is the least available time-slot. The **Timeslot** box is disabled if the selected granularity is the same size as the interface or if an interface has not been selected.
- The bit can be **1-8**, depending on the granularity. For **8k** granularity, the alternatives are **1-8.** For **16k** granularity, the alternatives are **1**,**3**,**5**, and **7**. For **32k** granularity, the alternatives are **1** and **5**. The **Bit** box is disabled if the granularity is >= 64k.

Changes in selection are reflected in the **Timeslot** and **Bit** boxes, and vice-versa. The selected capacity is shown as painted in blue, and the reserved capacity is shown in grey and cannot be selected.

5. Click Next.

The **Add Cross-connection Wizard - TX2/DX2** dialogue box opens.

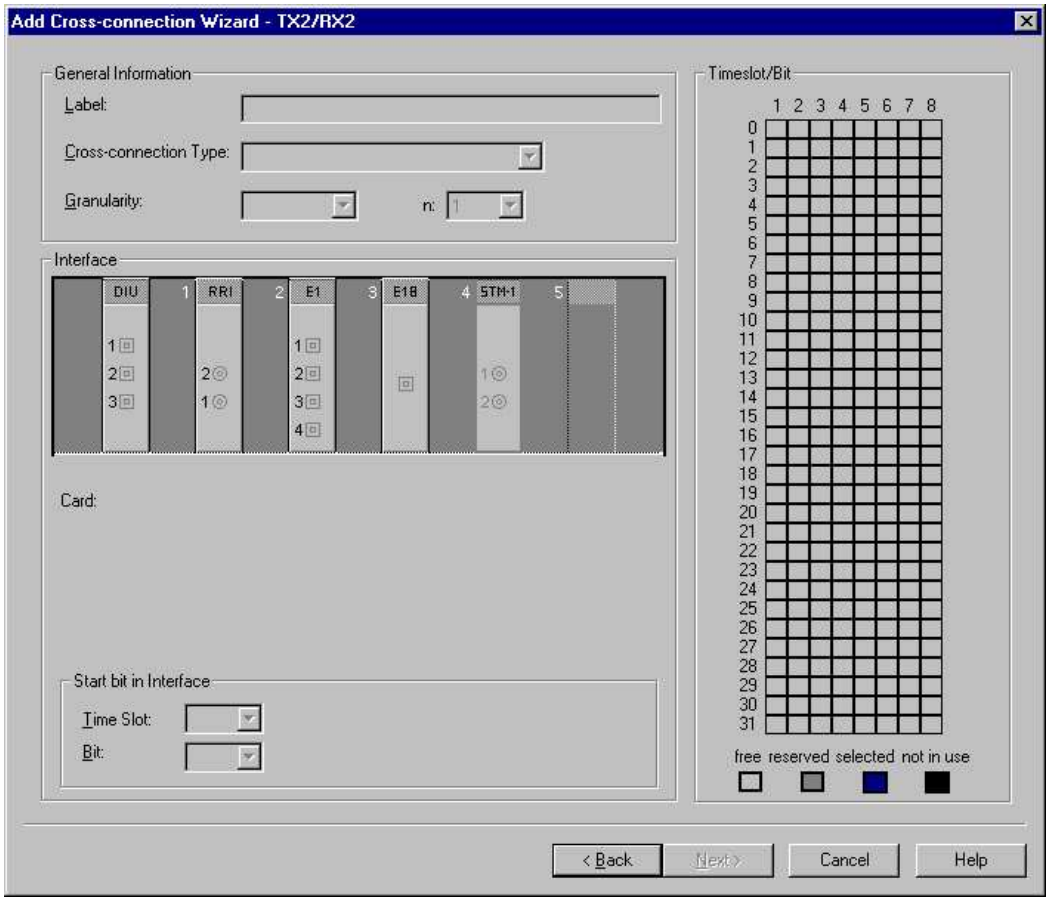

Figure 52. The Add Cross-connection Wizard - TX2/DX2 dialogue box

6. Specify the parameters for TX2/RX2, the second termination point.

Steps

a. Select the second termination point (TX1/RX2): click on the appropriate Interface symbol.

Select the second termination point by clicking on the appropriate **Interface** symbol in the **Interface** graphical field.

b. Configure any other available settings referring to the relevant instructions in steps 4-b to 4-i of this procedure.

Configure any other available settings; refer to steps 4-b to 4-i of this procedure. Depending on the cross-connection, some of the settings will not be available for TX2/RX2.

7. **Click Next.**

8. **Specify the parameters for the protecting termination point (only for Protected Bi-directional cross-connections).**

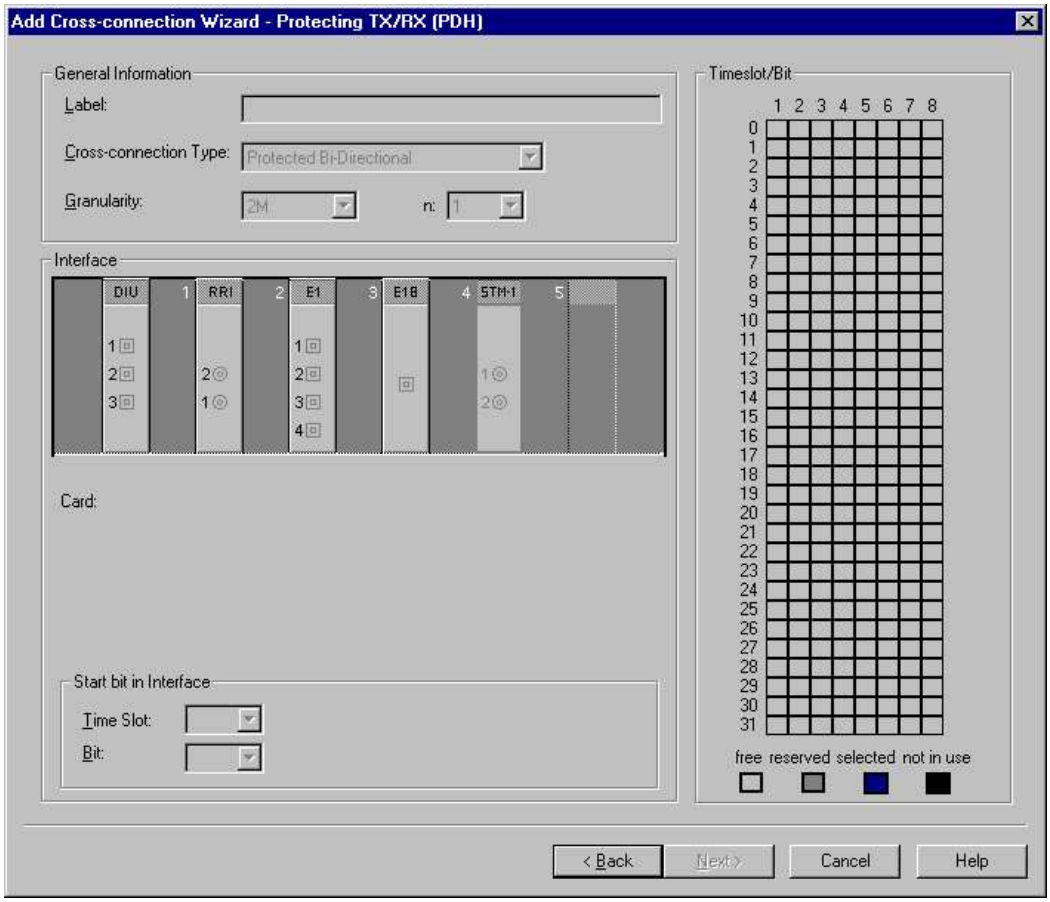

Figure 53. The Add cross-connection Wizard - Protecting TX/RX dialogue box

The **Add cross-connection Wizard - Protecting TX/RX** dialogue box will open if the cross-connection type is **Protected Bi-directional**. Specify the parameters for the protecting termination point, referring to the relevant instructions in steps 4-b to 4-i of this procedure.

Click **Next** to continue.

9. View the settings in the Overview dialogue box.

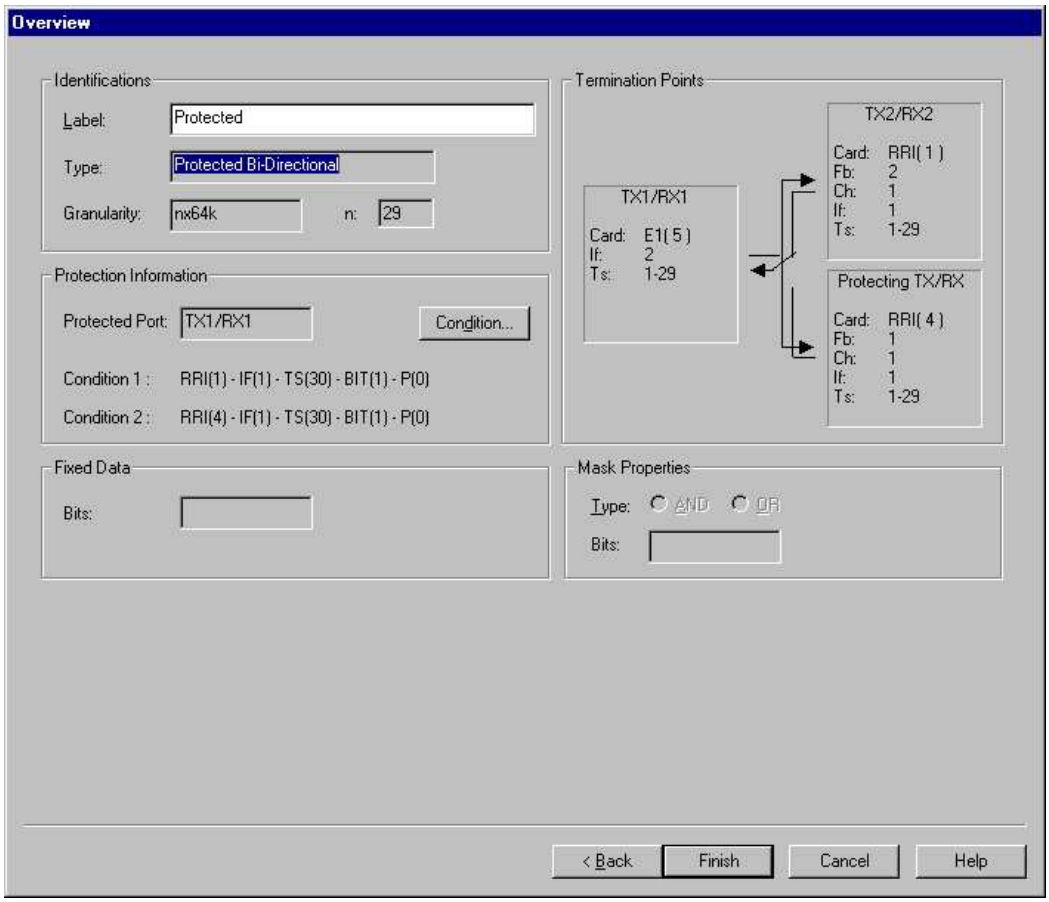

Figure 54. The Overview dialogue box

The **Overview** dialogue box shows the configuration of the added cross-connection. The arrows drawn in the space between termination point buttons indicate the direction of the cross-connection and its type.

10. Modify any required control settings in the **Overview** dialogue box.

Summary

According to the cross-connection type, the required control settings will be enabled in the **Overview** dialogue box.

Steps

a. Modify the Condition of the cross-connection (if the cross-connection type is Protected Bi-Directional).

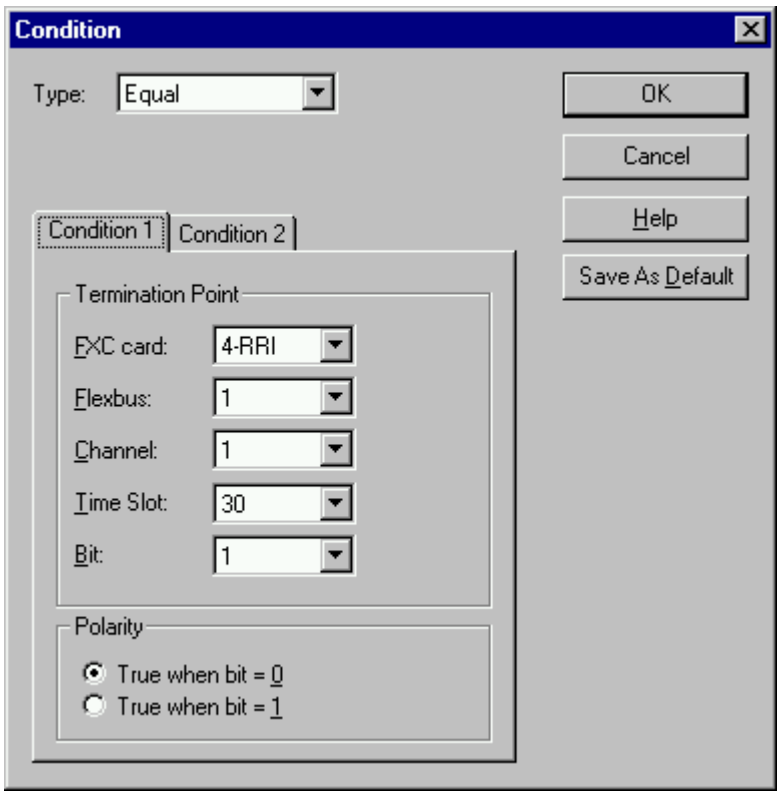

Figure 55. The Condition dialogue box (enabled only for protected cross-connections)

Modify the **Condition** of the cross-connection as follows:

i. Click the **Condition** button in the **Protection Information** frame to access the **Condition** dialogue box.

ii. Select the **Condition type** for the protected connection. The default value is **Priority**, which specifies a direct switch (revertive). **Equal** specifies a best signal source selection (non-revertive).

Note

An **Equal** condition type has two tabbed pages in the dialogue box. A **Priority** condition type has one tabbed page in the dialogue box.

iii. Modify the condition settings in the **Condition 1** and/or **Condition 2** tab.

i. Select an **FXC card**.
ii. If the unit is an FXC RRI, select a **Flexbus** (**1** or **2**) and **Channel1** to **4**).
iii. If the unit is not an FXC RRI, select an **Interface** (**1** to **4** for FXC E1(/T1), **1** to **20** for FXC Bridge).
iv. Select a **Timeslot** in the FXC unit (**1** to **31**; the default value is **1**).
v. Select a **Bit** in the FXC unit (**1** to **8**; the default value is **1**).
vi. Set the **Polarity** (**0** or **1**; the default value is **0**.)

Note

'Local' (valid inside the 2 Mbit/s signal) or 'Global' (valid inside the whole node) common conditions are not supported in MetroHub or UltraSite BTS Hub protected cross-connections.

Note

You can use the same condition bit for different protected cross-connections.

Note

If you need to create several protected connections with common condition data, you can store the condition data by clicking **Save As Default**. The data is saved for the duration of the session and it is always taken into use by default for new protected connections.

iv. Click **OK**.

b. Adjust the Mask Properties controls (if the cross-connection type is Bi-Directional Masked).

Adjust the **Mask Properties** controls as follows:

- Select the mask **Type**; the alternatives are **AND** or **OR**. The default choice is **AND**.
- Enter a bit pattern to use as a mask for the cross-connection in the **Bits** edit box. The number of bits depends on the granularity.

c. Adjust the Fixed Data control (if the cross-connection type is Uni-Directional Fixed Data).

Enter a bit pattern in the **Bits** edit box of the **Fixed Data** frame.

11. Click Finish.

Expected outcome

The cross-connection is successfully added.

8.3 Adding cross-connections in the graphic view

Summary

A fast and easy way to add cross-connections is via the graphic view in the **Cross-connections** window. You can select the unit, physical interface, and granularity, as shown in the figure below.

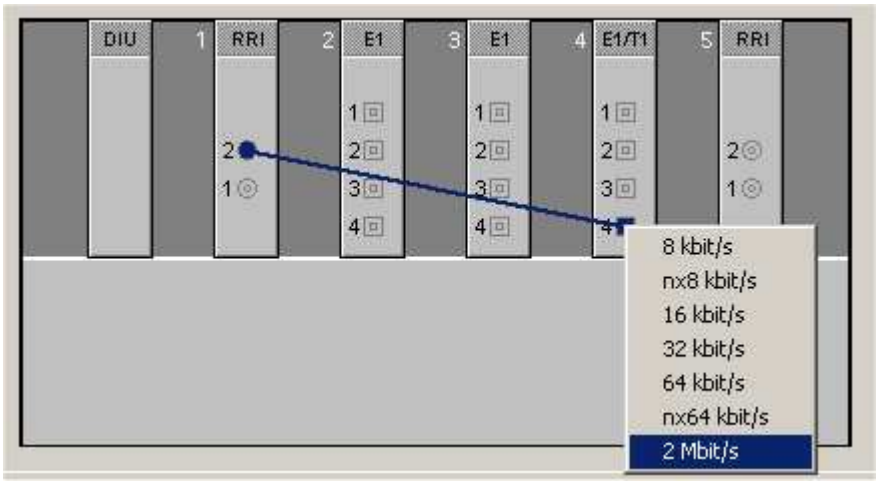

Figure 56. Selecting interface and granularity in the graphic view

Steps

1. **Press down the left mouse button to select an interface.**

2. **Drag the line to the second termination point and release the mouse button.**

   A pop-up menu is displayed.

3. **Select the granularity.**

   The Cross-connection wizard opens.

4. **On the first page of the wizard, select the cross-connection type and the parameters of Tx1/Rx1, the first termination point.**

   On the first page of the wizard, select the cross-connection type and the parameters of Tx1/Rx1, the first termination point. For information on individual settings, refer to *Adding cross-connections with the Add cross-connections wizard*.

5. **Click Next.**

6. **Select the parameters of Tx2/Rx2, the second termination point.**

Select the parameters of Tx2/Rx2, the second termination point. For information on individual settings, refer to *Adding cross-connections with the Add cross-connections wizard*.

7. **Click Next.**

8. **Click Finish.**

8.4 Modifying cross-connections

Purpose

You can modify existing cross-connections.

Steps

1. **Click Modify in the Cross-connections window.**

   The **Modify Cross-connection Wizard** opens. The layout of this wizard is exactly the same as in the **Add Cross-connection Wizard** (see *Adding cross-connections with the Add Cross-connection Wizard*).

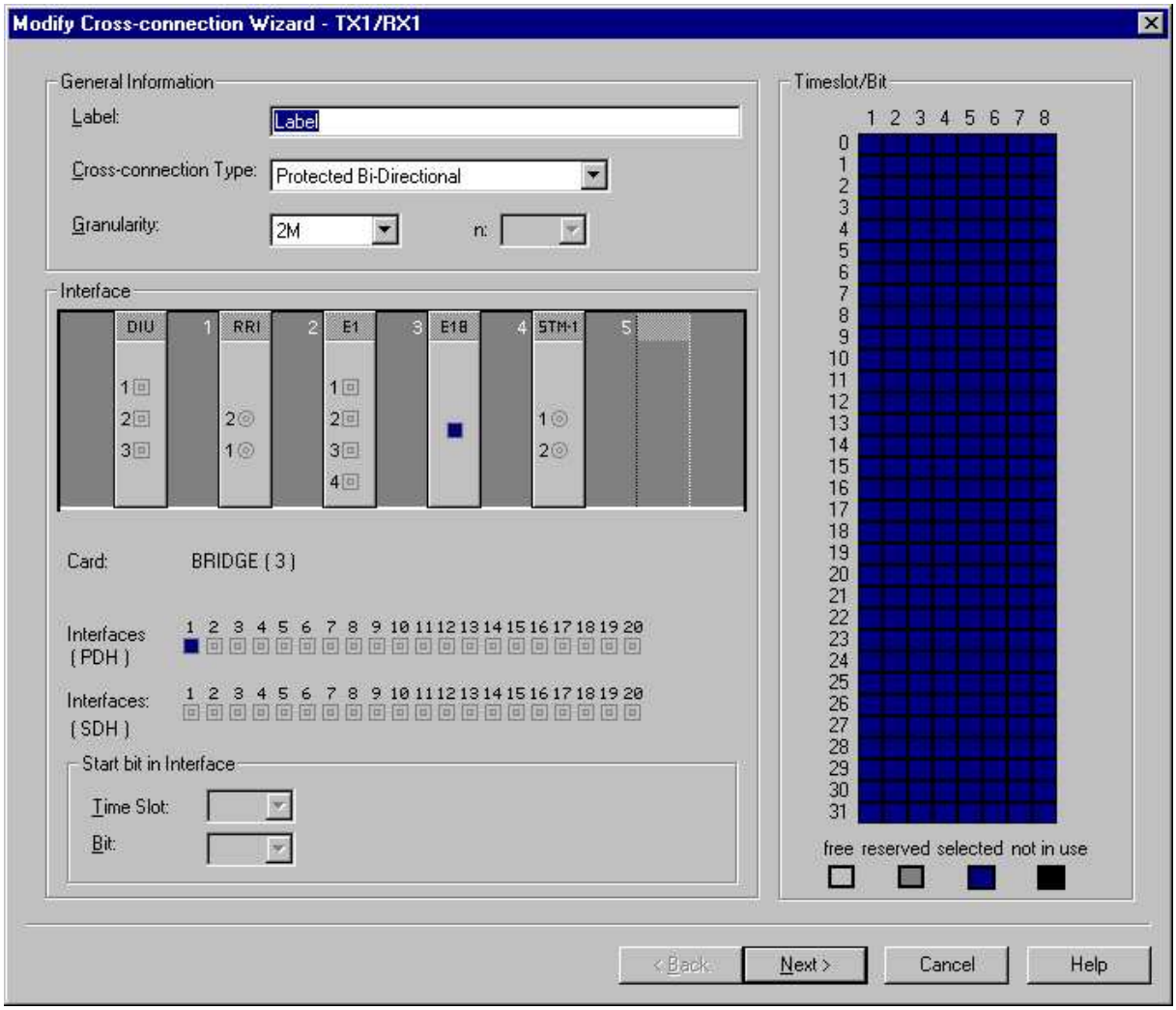

Figure 57. The Modify Cross-connection Wizard - TX1/RX1 window

Note

In the connection mode, only connections in the inactive bank can be edited.

In order for the modified cross-connections to take effect, you must activate the bank manually. For instructions, see *Managing cross-connection banks*.

2. **Modify the settings as desired.**

   Modify the settings as desired. For information on the settings, see *Adding cross-connections with the Add Cross-connection Wizard*.

Further information

You can also modify cross-connections via a pop-up menu. Right-click the selected cross-connection in the inactive bank.

8.5 Creating and exporting a cross-connection file

Steps

1. **Open the manager and start the file mode by selecting File → New.**

2. **Install the desired FXC units in the Equipment window.**

Note

To restore the settings stored in a previously exported node (or cross-connection 'xcs') file, the hardware configuration of the node/xcs file must match the hardware configuration of the node where it will be restored.

---

3. **Open the Cross-connections window by selecting Configuration → Cross-connections.**

   The **Cross-connections** window opens.

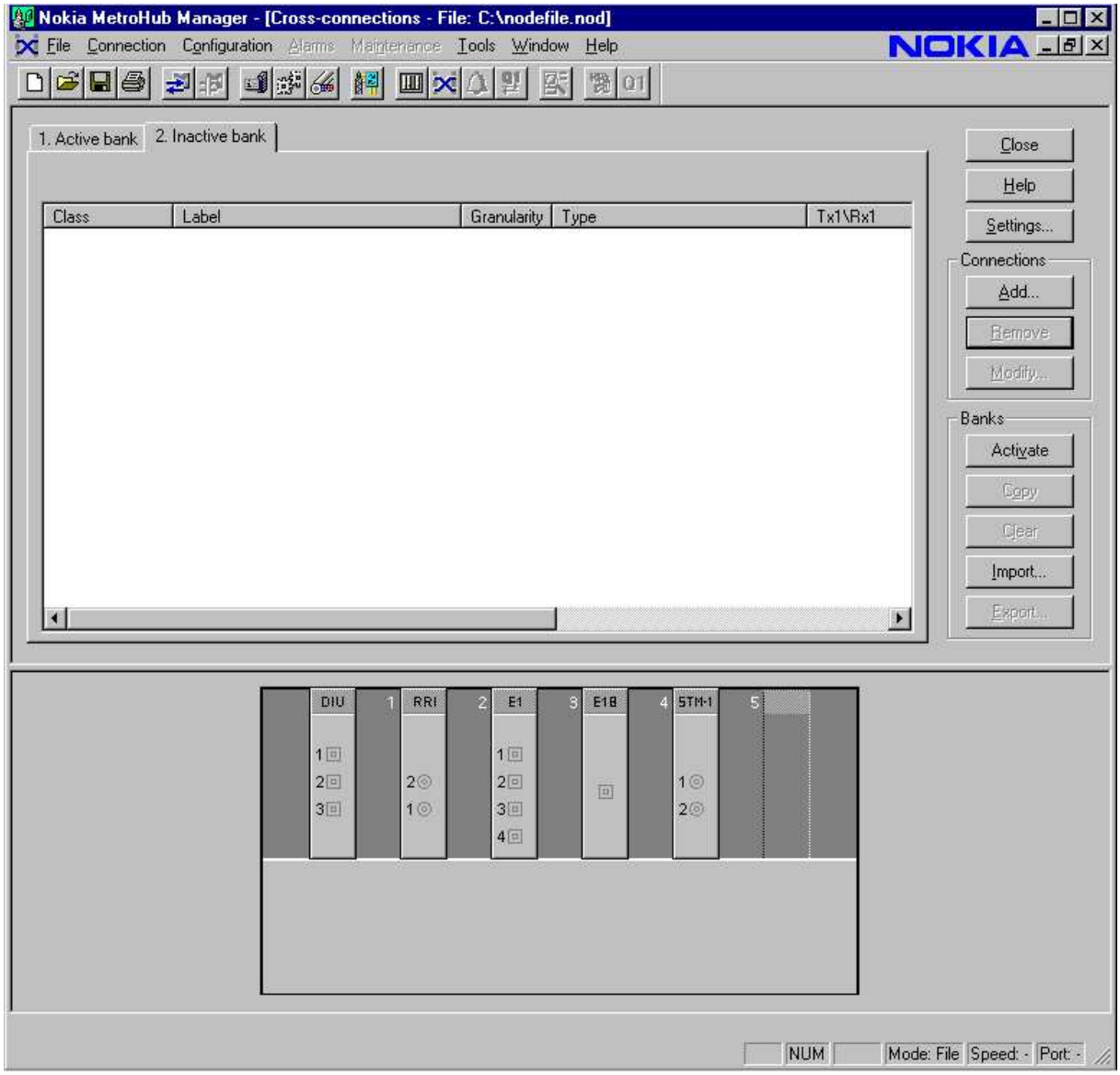

Figure 58. The Cross-connections window

4. Create all needed connections into an inactive bank.

See *Adding cross-connections with the Add Cross-connection Wizard*.

5. Click Activate to activate the inactive bank with the newly created cross-connections.

6. Click the Export button in the Cross-connections window.

The **Export** dialogue box opens.

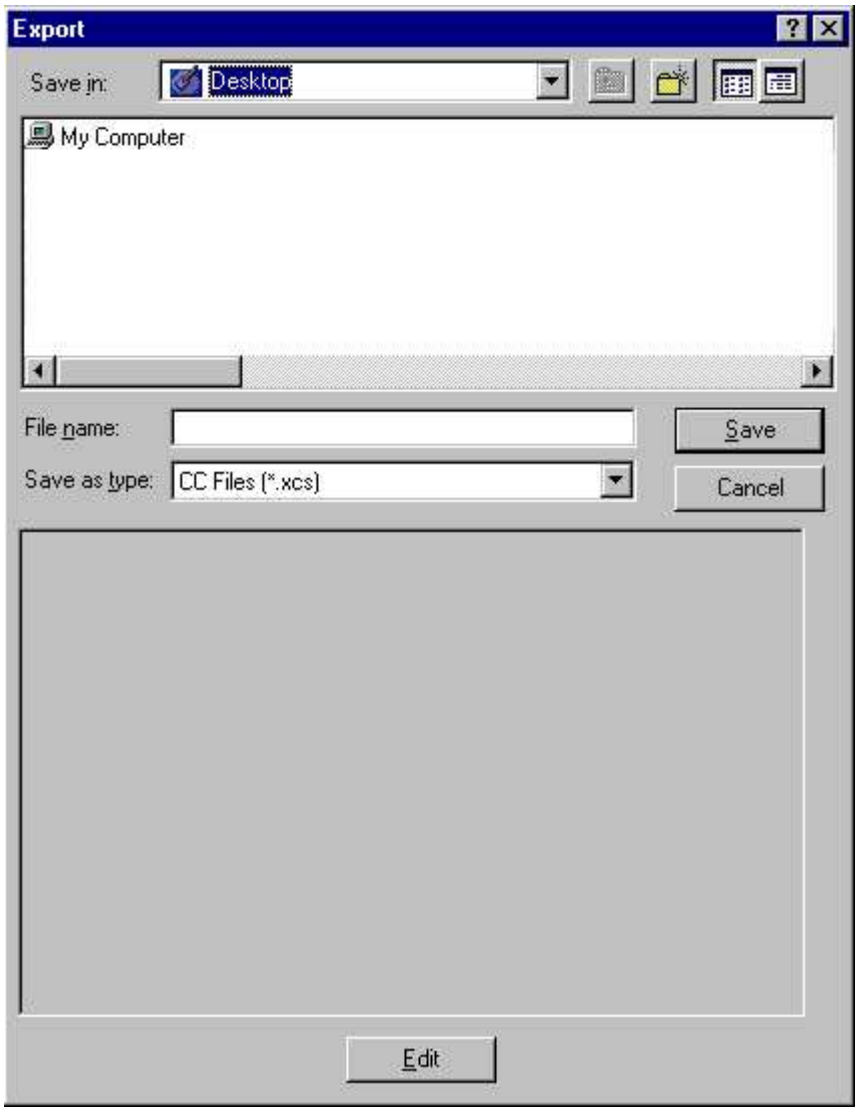

Figure 59. The Export dialogue box

7. Save the exported file in the desired location.

8.6 Importing a cross-connection file

Steps

1. **Connect to the node or open a file.**
2. **Select Configuration → Cross-connections.**

   The **Cross-connections** window opens.

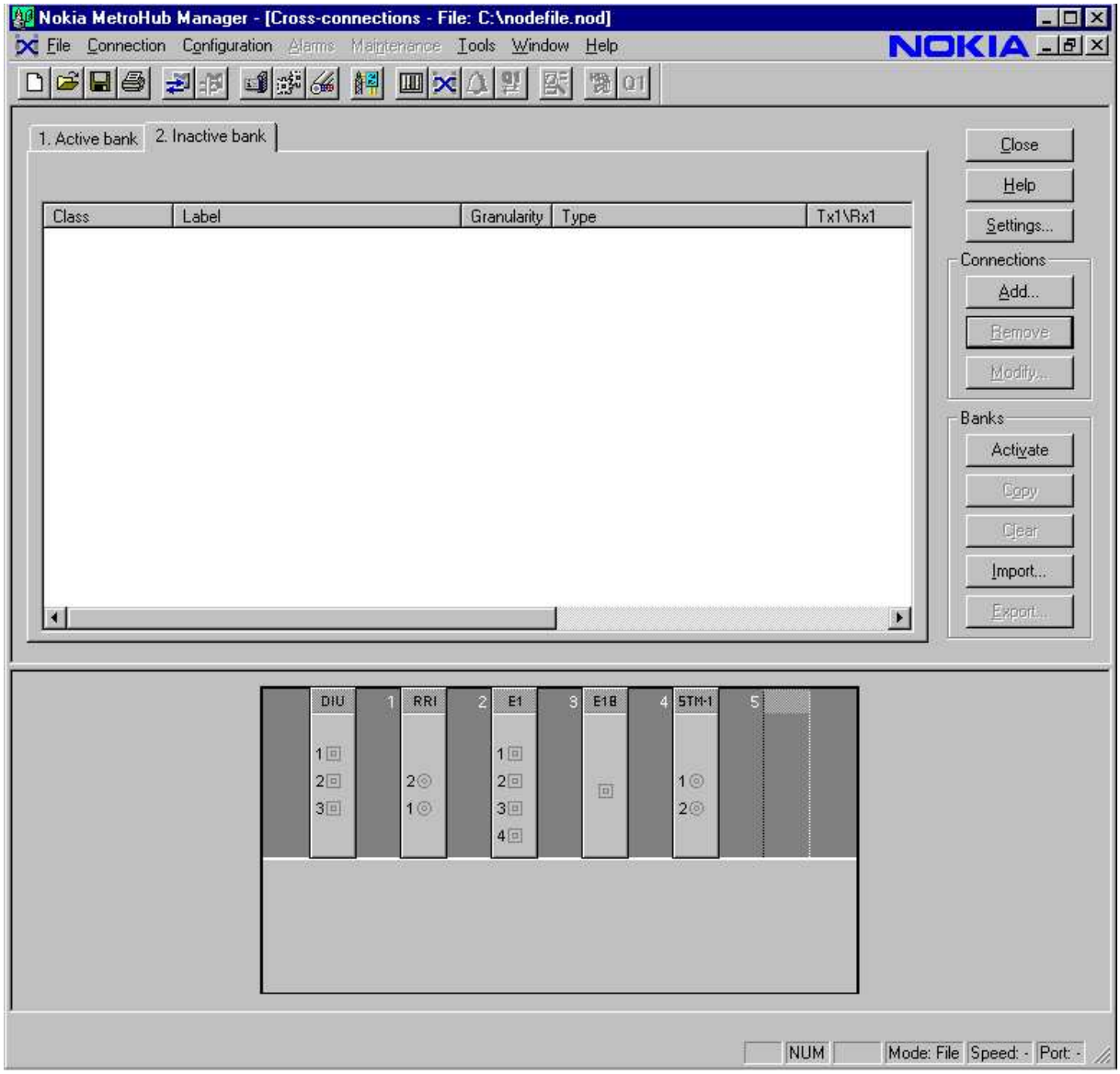

Figure 60. The Cross-connections window

3. Select the inactive bank.

4. Click the Import button in the Cross-connections window.

The **Import** dialogue box opens.

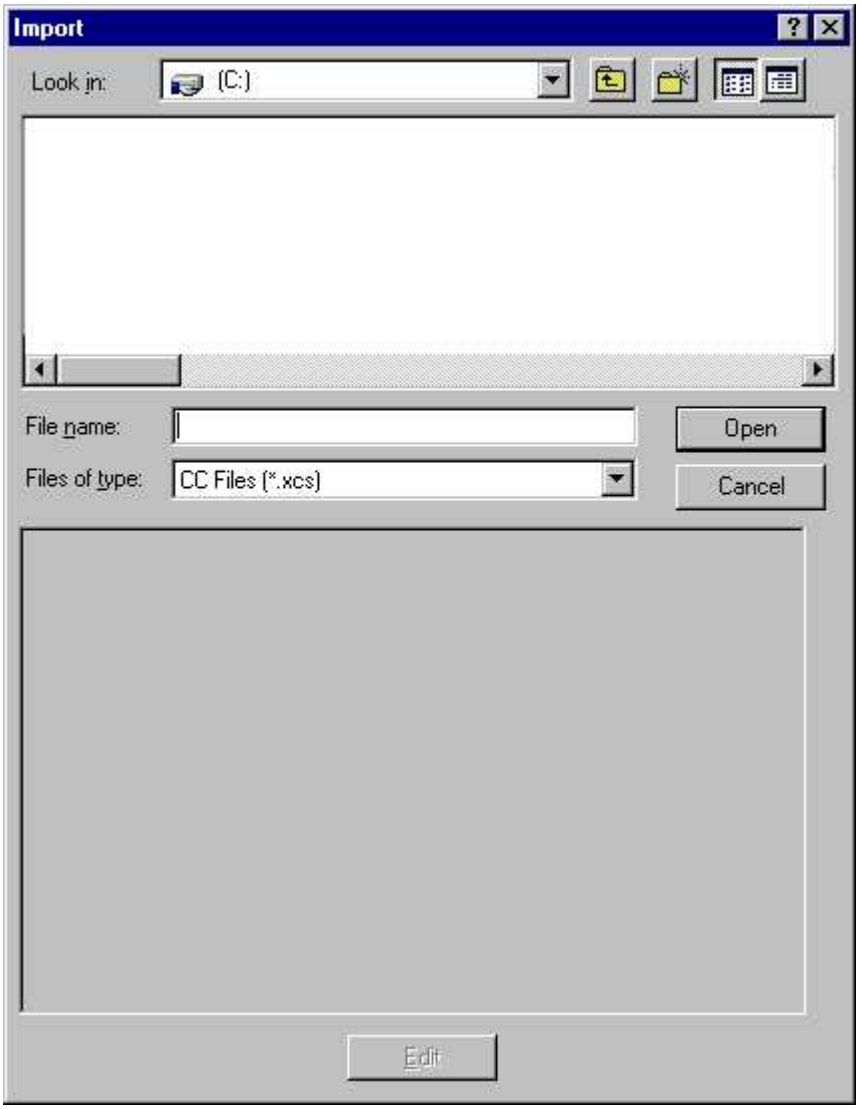

Figure 61. The Import dialogue box

5. Select the desired file.

6. Click the Open button.

Expected outcome

The file is imported to the inactive cross-connection bank.

Note

Cross-connections can only be imported to the inactive bank. For the imported settings to take effect, the bank has to be activated.

8.7 Managing cross-connection banks

Summary

Cross-connection banks can be activated, copied, and cleared.

Steps

1. *If* you want to activate an inactive bank
   Then

   Click Activate in the Cross-connection view.

2. *If* you want to copy an inactive bank
   Then

   Click Copy in the Cross-connection view.

   This creates a copy of the cross-connections from an active bank to inactive bank. This is useful if you want to create another cross-connection bank with only minor differences from the original.

3. *If* you want to clear an inactive bank
   Then

   Click Clear in the Cross-connection view, or select all cross-connections in the bank and click Remove.

   This removes all cross-connections from the inactive bank.

8.8 Removing cross-connections

Purpose

You can permanently remove a cross-connection from an inactive bank.

Steps

1. **Select the connection or connections you wish to delete.**

2. **Click Remove in the Cross-connections window.**

   Before removing the cross-connections, the manager asks you to confirm if you want to go ahead with the removal. After you have confirmed the removal, the manager removes the cross-connection(s) from the bank.

Further information

You can also remove cross-connections via a pop-up menu. Right-click the selected cross-connection in the inactive bank.

8.9 Forcing an SDH protection switch group

Purpose

With a protected cross connection (protection group) configured, you can force the working path to protecting or protected.

The force protection switch command will be active until an automatic protection switch mode is selected, or until the unit performs a reset and the protection switch mode returns to automatic by default.

The current working path can be determined by the green point displayed in front of the working path in the cross-connection list.

Summary

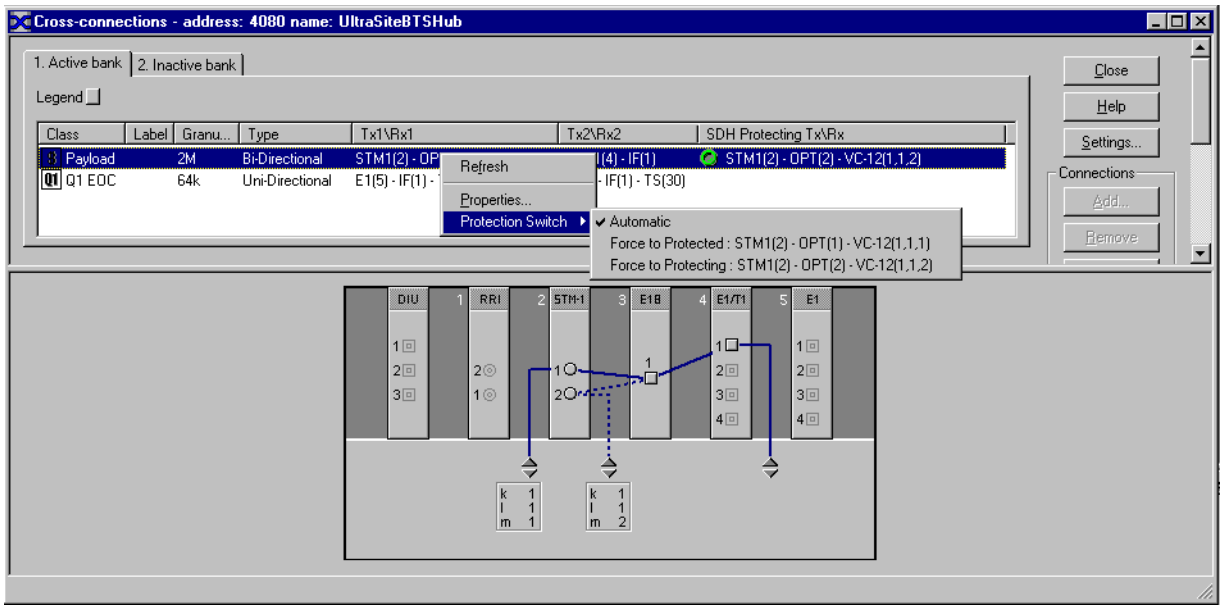

Figure 62. Forcing a protection switch group

Steps

1. **Select Configuration → Cross-connections.**
2. **Right-click at the SDH protection group, and select the Protection Switch menu.**
3. **Select either Automatic, Force to Protected, or Force to Protecting.**

   Select one of the following options:

- **Automatic**. In case of failure at the protected path, a switch will automatically occur, to the protecting path. The protecting path will now be used until a failure in this path occurs and a switch to the protected path takes place.
- **Force to Protected**. The working path is forced to be the protected path. Check that the protected path is working without any alarms shown. The protected path will continue as the working path, despite the failures.
- **Force to Protecting**. The working path is forced to be the protecting path. Check that the protecting path is working without any alarms shown. The protected path will continue as the working path, despite the failures.

Note

If you selected a **Force to Protected** or **Force to Protecting** path was selected, a "Forced Control On" alarm will be raised to notify that the transmission path is not longer protected. When switching back to automatic mode, the alarm will be cleared.

Expected outcome

A confirmation window is displayed to confirm that the selected action was successfully performed by the node.

8.10 Applying optical A-bis

8.10.1 Overview of applying optical A-bis

Purpose

When creating a cross-connection from, for example, an E1 interface to a VC-12 within a STM-1 signal, the SDH-PDH cross-connect consists of a PDH-PDH cross-connect from the E1 interface to an internal E1 interface at the Bridge unit, and an additional VC-12 layer cross-connect from the mapped E1 interface (E1 mapped to VC-12) to the target location within the STM-1 signal. The selection of the Bridge internal interface is done automatically, when the E1 interface and the STM-1 interface are selected as Termination Point 1 and Termination Point 2, respectively, for the cross-connection. This eases the configuration if no grooming is needed.

The process of applying optical A-bis is, however, more complex, and is explained below:

Steps

1. **Apply optical A-bis with Nokia STM-1 to groom capacity from D-bus, E1 and Flexbus sources.**

2. **Apply optical A-bis between two STM-1 VC-12 to groom capacity from a STM-1 VC-12 source.**

Example

The figure below shows an example for grooming traffic from three sources (D-bus, E1, STM-1 VC-12) to one destination STM-1 VC-12.

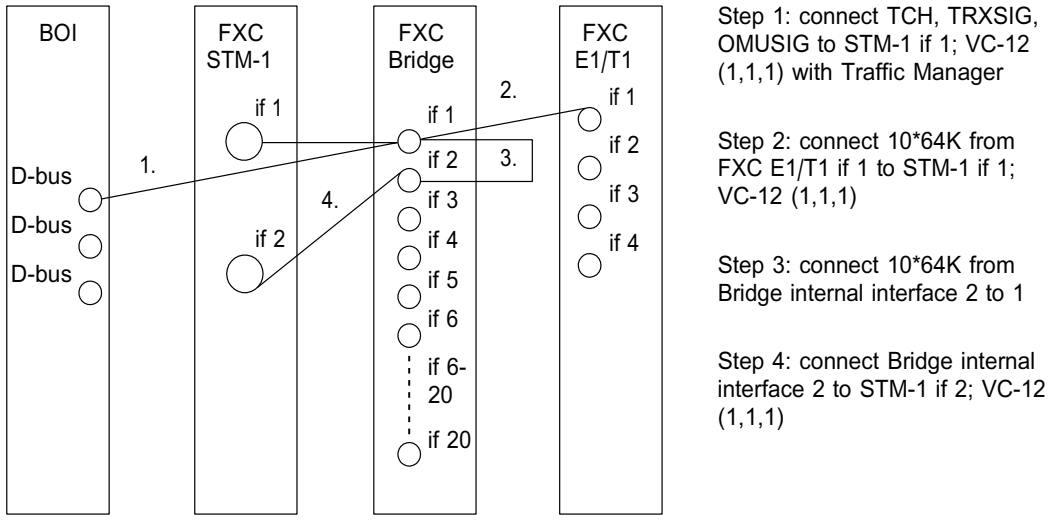

Figure 63. Grooming example for optical A-bis

8.10.2 Applying Optical A-bis with Nokia STM-1

Purpose

The instructions below explain the process of grooming with Nokia STM-1 optical A-bis.

Steps

1. **Configure A-bis allocation using Traffic Manager, as detailed in *Configuring D-bus allocation with the Traffic manager, with a Nokia BTS chained to a Nokia MetroHub* in *Commissioning Nokia MetroHub*.**

   For more information on configuring A-bis allocation using Traffic Manager, you can also refer to *Allocating F(X)C transmission capacity of UltraSite EDGE BTS* in *Commissioning UltraSite EDGE BTS* and *Allocating A-bis transmission capacity* in *Commissioning MetroSite EDGE BTS*.

Example

Configure the TCH, TRXSIG and OMUSIG to STM-1 interface 1, VC 12 (1,1,1) and Timeslots 1-10, for a 1+1+1 BTS site without EDGE.

2. **Open the cross-connection dialogue by clicking Configuration → Cross-connections …**

3. **If there are active cross-connections existing already, then copy them from the active bank to the inactive bank by clicking Copy.**

4. **Select the Inactive Bank tab to add or modify the cross-connections.**

Example

By using the Traffic Manager the necessary cross-connections for connecting the A-bis channels to STM-1 interface 1, VC 12 (1,1,1) were already created.

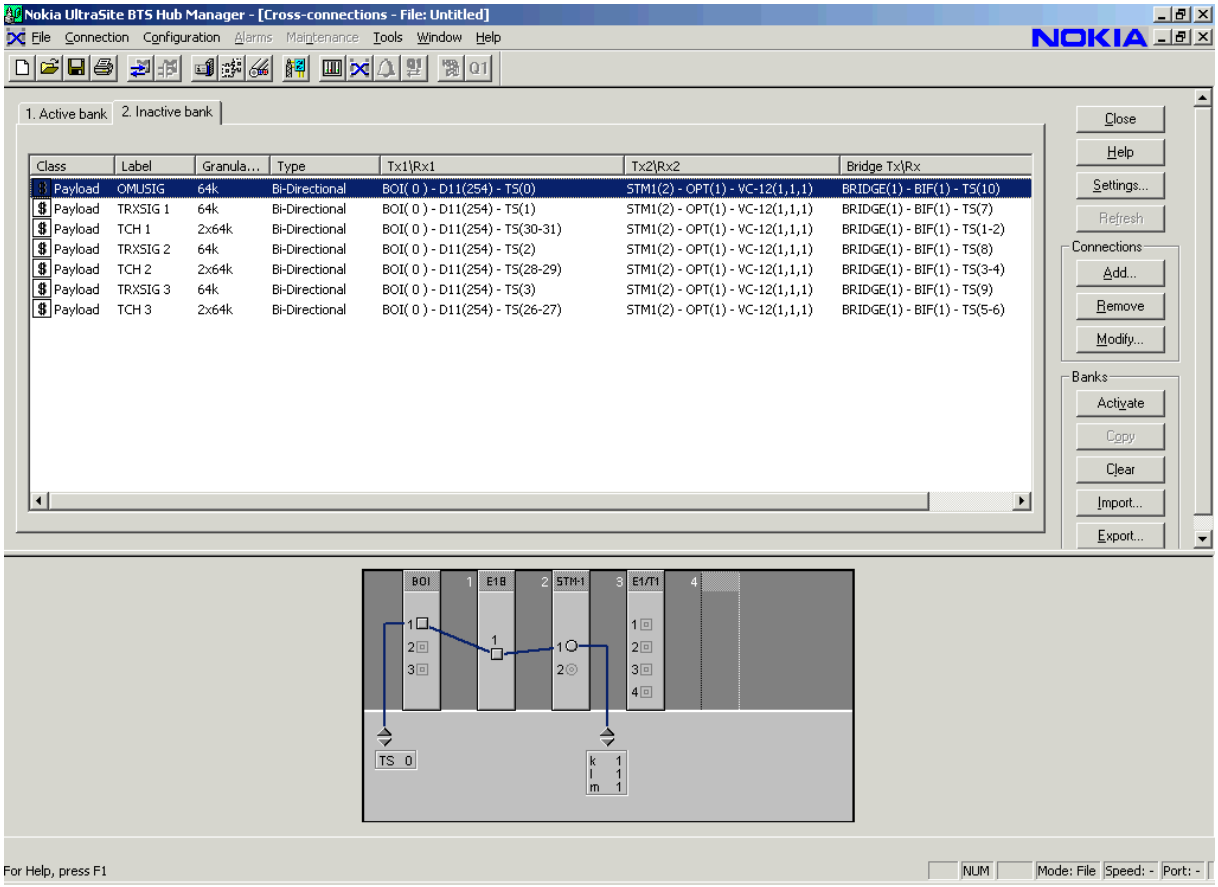

Figure 64. Cross-connection dialogue - Inactive bank

5. Click Add … for adding a new cross-connection.

The add cross-connection wizard appears. For grooming capacity from an external E1 or Flexbus interface, select the source interface and capacity as Termination Point 1 (TX1/RX1) to be groomed.

Example

First the partial filled E1/T1 interface is groomed towards STM-1 if 1, VC 12 (1,1,1). Select the E1/T1 if 1, Granularity n x 64k with n=10, Starting timeslot 1. Click **Next**.

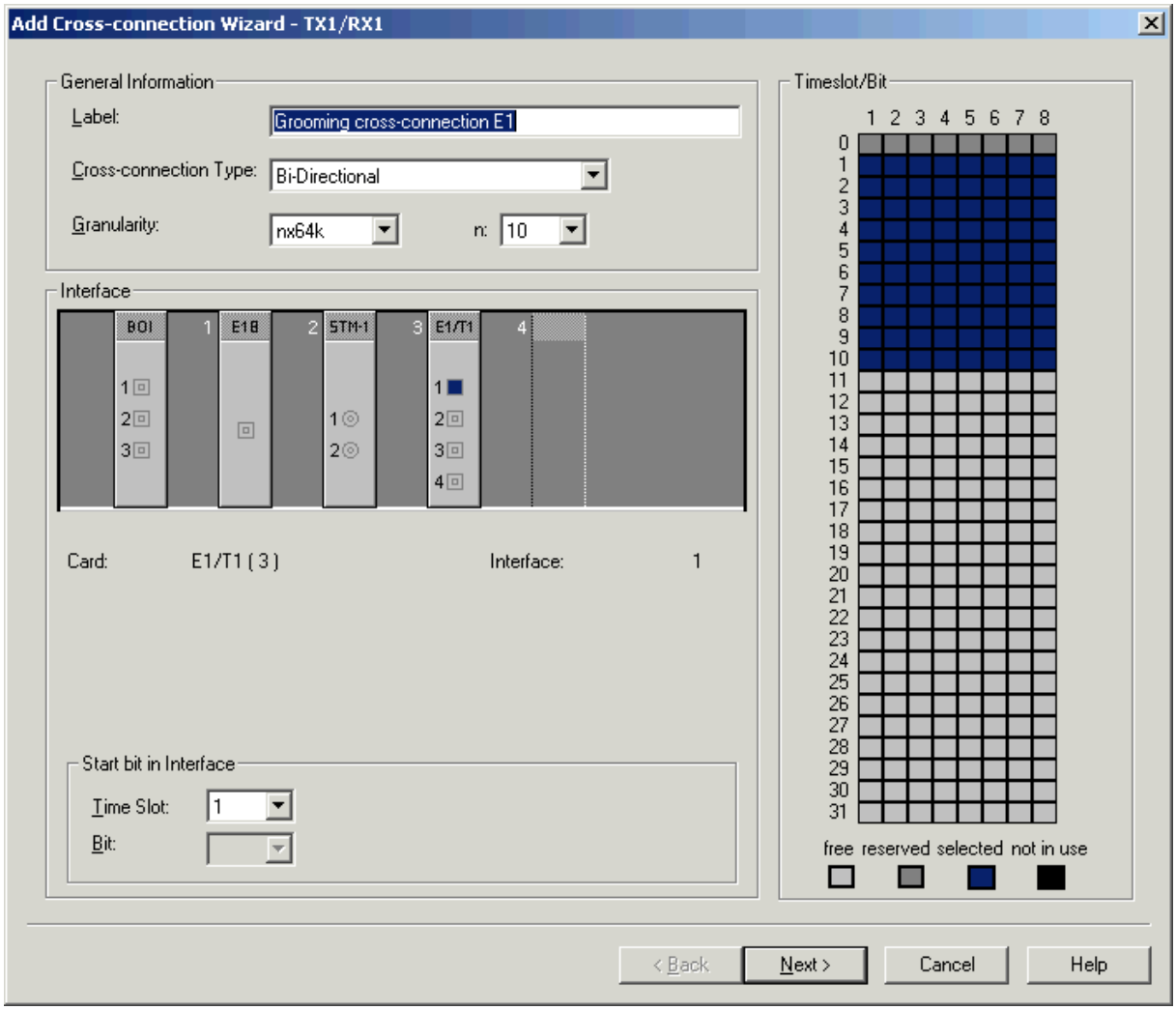

Figure 65. Add Cross-connection Wizard - TX1/RX1

6. At termination point 2 (TX2/RX2), select the destination STM-1 interface and VC-12 to which the source capacity should be groomed.

For setting up a SNC 1+1 protection group, the Cross-connection type *Protected Bi-Directional* has to be selected.

Example

Select STM-1 interface 1, VC-12 (1,1,1) and click **Next**.

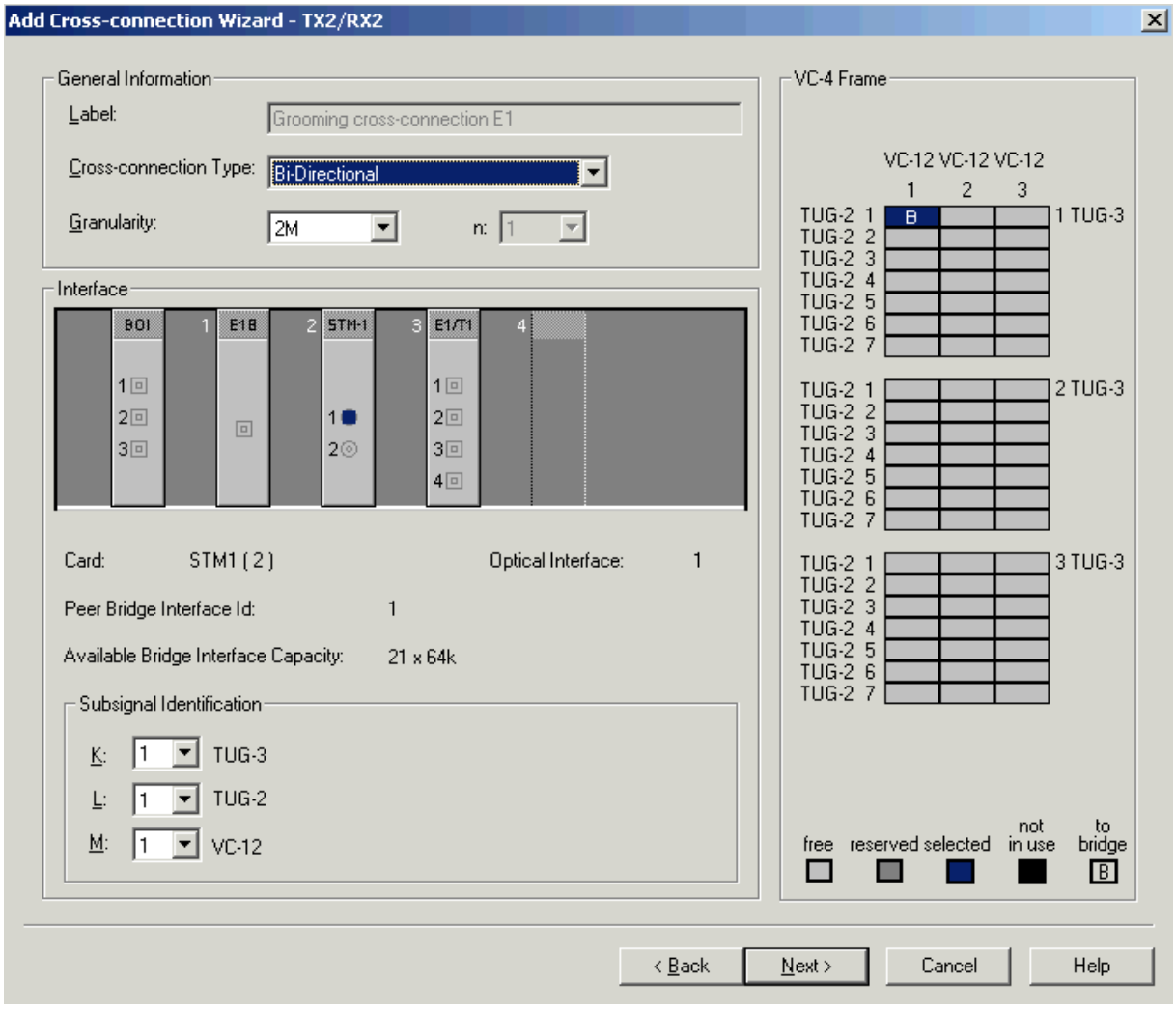

Figure 66. Add Cross-connection Wizard - TX2/RX2

7. When the timeslots of the E1 mapped to the VC-12 are allocated at the destination VC-12, you are warned that the SDH cross-connection cannot be created. Click OK.

A window opens where the timeslot allocation at the internal Bridge Interface, which is connected to the VC-12 selected as TX2/RX2, can be changed.

Example

Select Time Slot 11 as new Start bit at Bridge internal interface 1 and click **OK**.

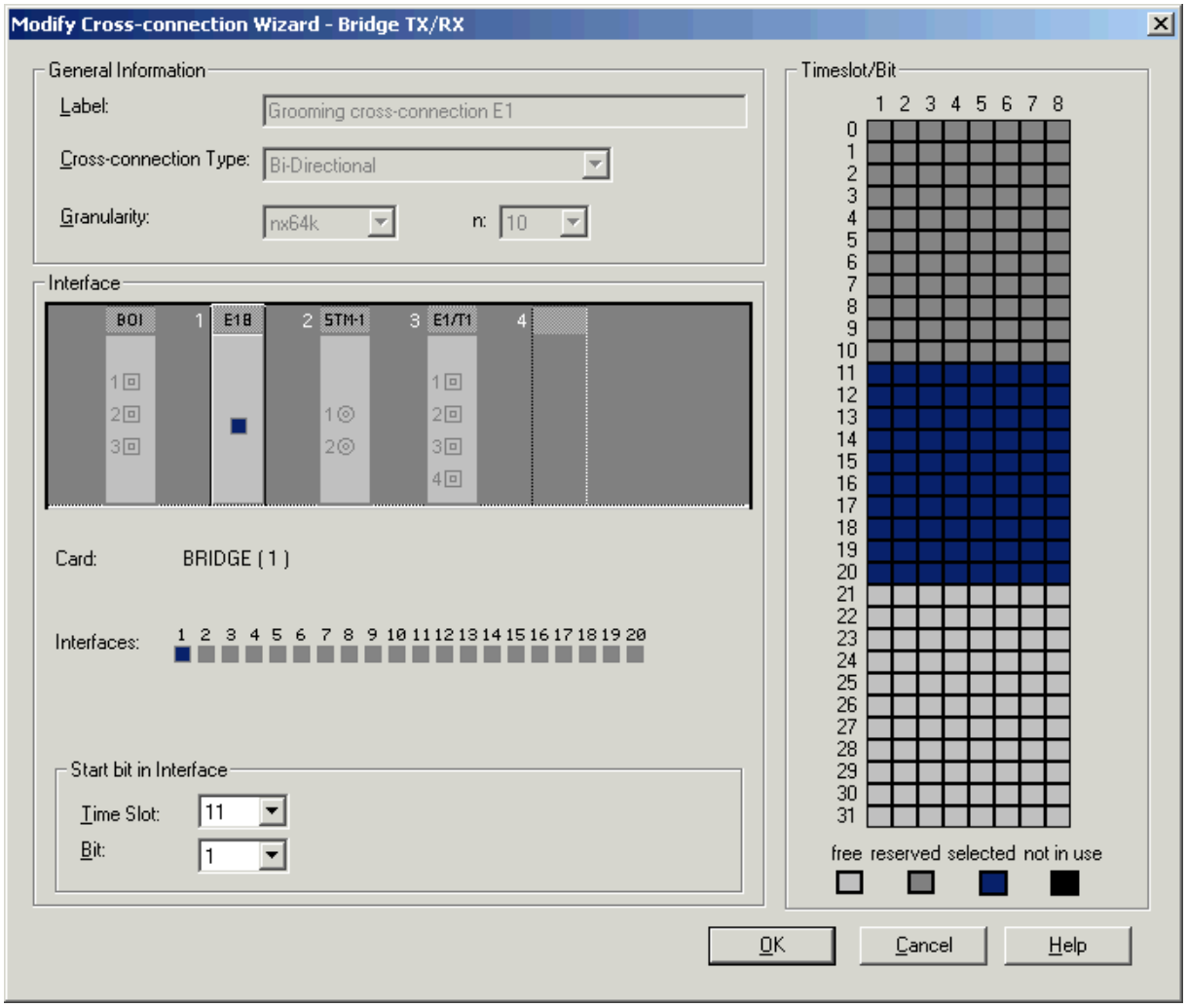

Figure 67. Modify Cross-connection Wizard - Bridge TX/RX

8. You can view an overview display of the cross-connection to be done. Click Finish.

The created cross-connection is now listed in the main cross-connection display.

Example

The A-bis capacity and the partial filled external E1 are groomed to STM-1 interface 1, VC-12 (1,1,1).

In case you need to groom further capacity, repeat steps 5 to 8.

8.10.3 Applying Optical A-bis between two STM-1 VC-12

Purpose

For grooming capacity from a partial filled STM-1 VC-12 to another STM-12 VC-12, you must create two separate cross-connects:

1. A cross-connection between two internal Bridge interfaces
2. A cross-connect between a STM-1, VC-12 and a Bridge interface

Steps

1. Click Add … to add a new cross-connection.

The add cross-connection wizard appears. For grooming capacity from an external STM-1, select the `E1B,` an unused internal Bridge interface, and the capacity to be groomed as `Termination Point 1 (TX1/RX1).`

Example

To groom the capacity from partial filled VC-12 (1,1,1), STM-1 interface 2, select Bridge internal interface 2, Granularity n x 64k with n=10 and Time Slot 21 as Start bit. Click **Next**.

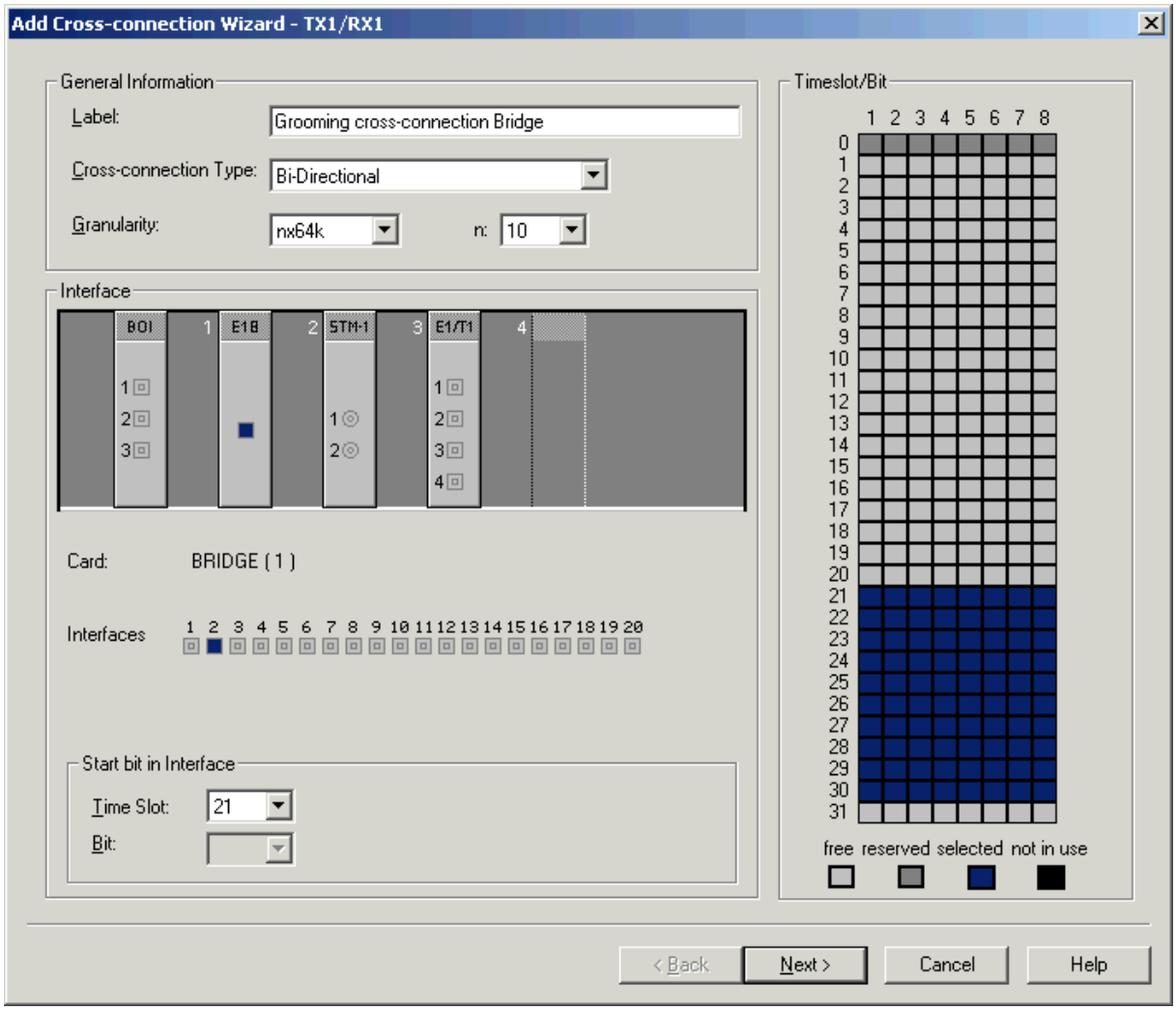

Figure 68. Add Cross-connection Wizard - TX1/RX1

2. Select the internal Bridge interface that is connected to the STM-1, VC-12, to which the capacity needs to be groomed.

You can determine this information from the Bridge TX/RX column at the main cross-connection dialogue, or by right-clicking a cross-connection that already uses part of the destination VC-12 capacity, and selecting *Property*.

Example

Select internal Bridge interface 1 and Time Slot 21 as Start Bit. Click **Next**.

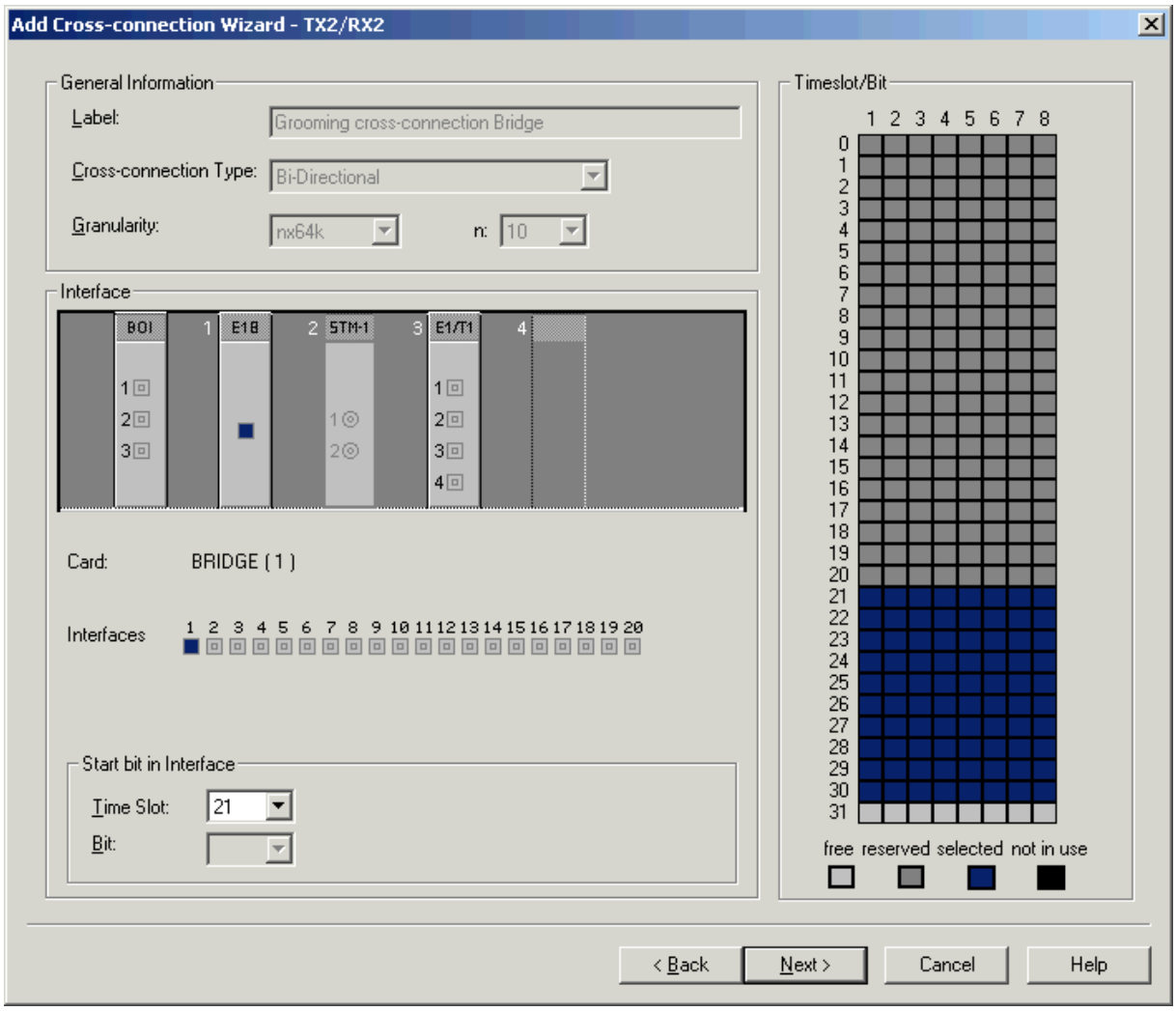

Figure 69. Add Cross-connection Wizard - TX2/RX2

3. You can view an overview display of the cross-connection to be done. Click Finish.

The created cross-connection is now listed in the main cross-connection display.

Example

A cross-connection with 10 x 64k is created from internal Bridge interface 2 to internal Bridge interface 1. The Bridge internal interface 1 appears connected to STM-1 interface 1, VC-12 (1,1,1) in the main cross-connection dialogue.

4. **You must now connect the internal SDH Bridge interface, which has groomed capacity to the destination VC-12, to the VC-12 which contains the source capacity. Click Add … for adding a new cross-connection.**

   The add cross-connection wizard appears. Select the internal SDH Bridge interface which was previously used for grooming capacity towards the destination VC-12.

Example

Select internal SDH Bridge interface 2 and click **Next**.

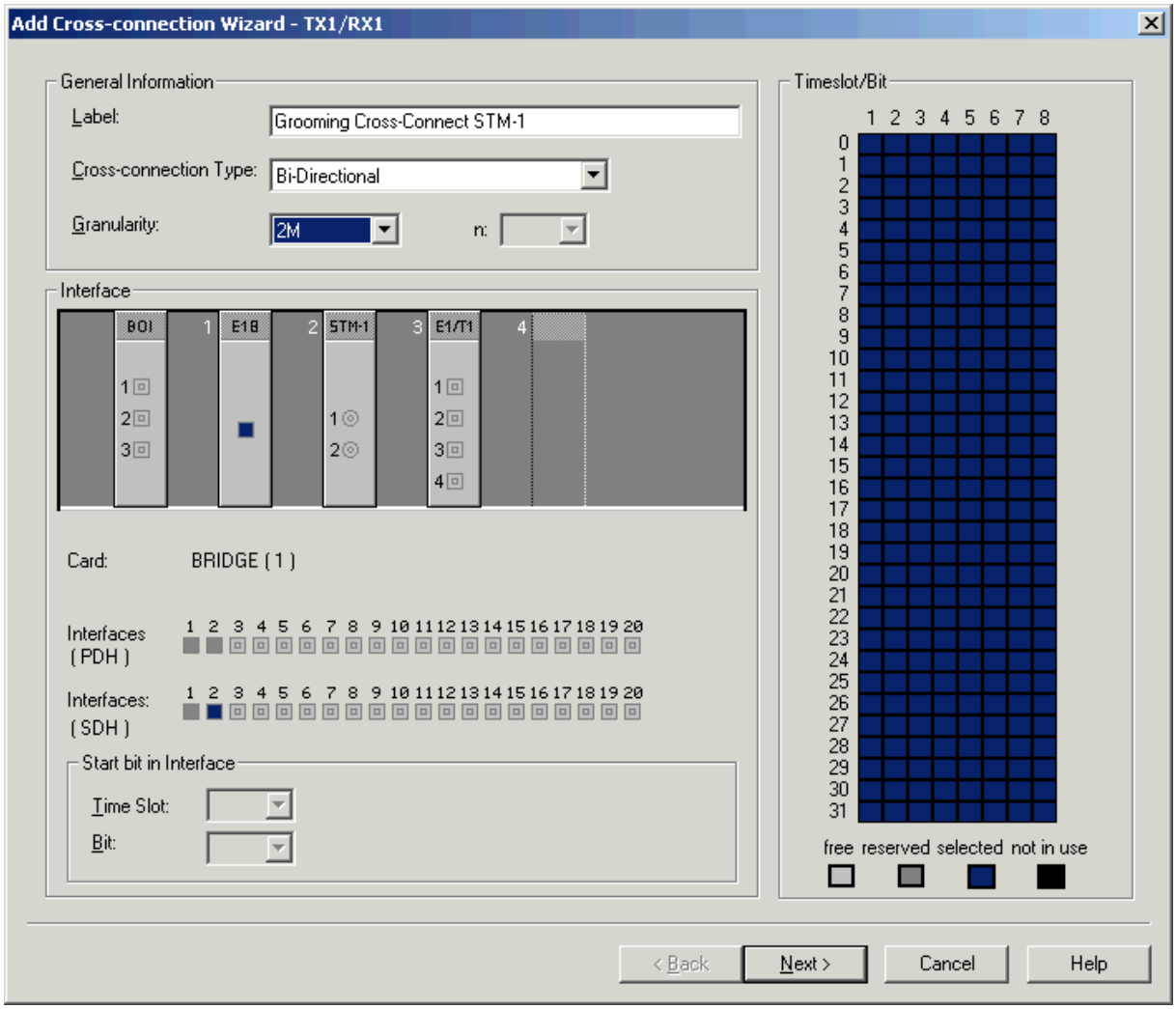

Figure 70. Add Cross-connection Wizard - TX1/RX1

The Add cross-connection Wizard window for TX2/RX2 appears.

5. Select the STM-1 interface and VC-12 which contains the source capacity to be groomed. Click Next. Click Finish at the overview dialogue if everything is OK.

At the main cross-connection dialogue the Bridge internal termination point 1 (TX1/RX1) of the previously created cross-connect between both internal Bridge interfaces will be replaced by the SDH termination point 1.

Example

The capacity from the partial filled VC-12 (1,1,1) at STM-1 interface 2 is groomed to the VC-12 (1,1,1) at STM-1 interface 1.

6. Activate the inactive bank by clicking Activate.

The inactive bank is activated and the grooming cross-connections are brought into use.

Note

When you have a cross-connection from one STM-1 to the other via internal Bridge interfaces for grooming purposes, then only one of the two SDH-PDH cross-connections are displayed at the property dialogue. Both the internal Bridge interfaces in use can be determined from the PDH cross-connection termination points.

Related Topics

Overview of optimising the transmission node

Instructions

Setting Nokia FlexiHopper and Nokia FlexiHopper Plus settings

Setting Nokia MetroHopper settings

Overview of adjusting transmission node settings

Overview of adjusting FXC STM-1 interface settings

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