NOKIA

468962A.505_NOLSD
Nokia MetroSite EDGE BTS, Release 5

FXC E1 and FXC E1/T1 Transmission Unit Description

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Contents

1 About this document

This document gives an overview of the main functions and features of the FXC E1 and FXC E1/T1 transmission units. It also describes the functional blocks and the external interfaces of the units.

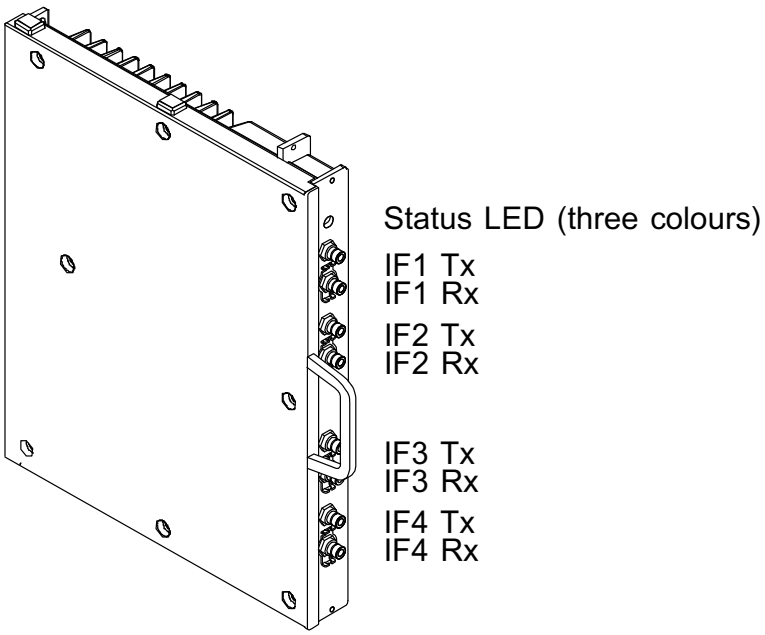

Figure 1. FXC E1

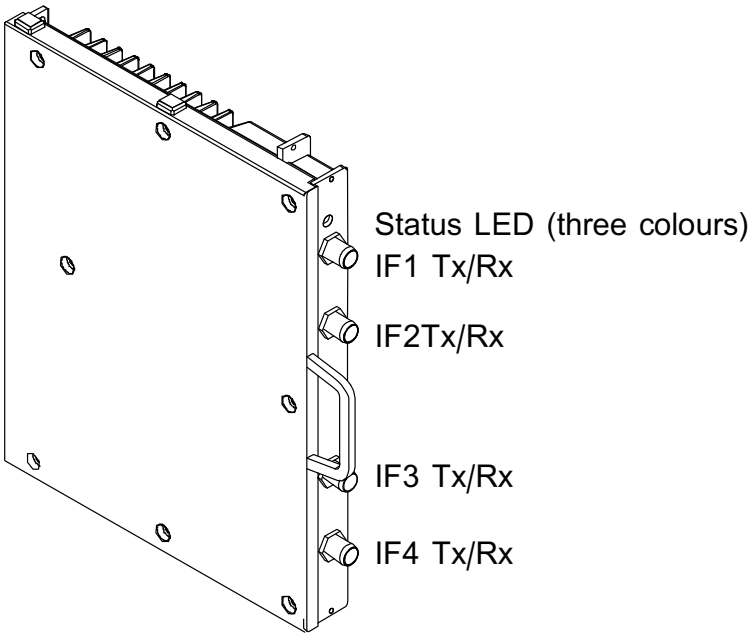

Figure 2. FXC E1/T1

2 General description

In mobile networks, many different ways are needed for routing the traffic. The traffic routes via the network elements are defined by using the cross-connection functions available in the network elements, and the traffic routing is basically the management of the cross-connections in the network elements.

FXC E1 and FXC E1/T1 transmission units provide the transmission functionality, including cross-connections, for various Nokia transmission solutions. The units can be applied as a single-unit transmission equipment or a multi-unit cross-connect node.

2.1 Features

The main features of the FXC E1 and FXC E1/T1 transmission units are

- four 2 Mbit/s (E1) A-bis interfaces to the multidrop 2 Mbit/s transmission line
- four 1.5 Mbit/s (T1) A-bis interfaces to the multidrop 1.5 Mbit/s transmission line (only in FXC E1/T1)
- in FXC E1/T1, each interface can be independently configured to E1 or T1 mode
- cross-connections with the following granularities: 8k, 16k, 32k, 64k, n x 64k and 2M
- support for several cross-connection types
- grooming, branching and loop protection support
- ability to operate as a loop network master or slave
- interface statistics gathered in compliance with ITU-T G.826 and ANSI T1.403 Recommendations
- handling of timeslot 0 at 2 Mbit/s interfaces. The 2 Mbit/s E1 frame/multiframe structure complies with ITU-T G.704/706 Recommendations

- transmitting and receiving functions at the 2 Mbit/s interfaces (HDB3 line coding, clock recovery, AIS detection etc.) and at the 1.5 Mbit/s interfaces (B8ZS line coding, clock recovery, AIS detection etc.)
- the Rx-connector of line interface 4 can be used as a synchronisation interface for externally provided 2048 kHz or 1544 kHz clock signals
- easy management of settings and transmission configurations both remotely and locally, using the Nokia Q1 management protocol. The management is carried out using a Nokia NMS-compatible node manager software.
- multiple Q1 management connections can be active simultaneously
- advanced testing features: the transmission unit's internal tests can be started through the node manager.
- applies the Nokia Q1 End-to-End traffic routing model which allows easy transmission network planning. Nokia Autoconfiguration is also supported for this purpose.
- support for Nokia Autoconfiguration which eases and speeds up the setup and commissioning of the BTS and the whole base station system (BSS) network

2.2 Main blocks

FXC E1 and FXC E1/T1 units are encased plug-in units constructed on a printed circuit board. The unit connects to other units in its environment via its backplane connectors, so it does not require any additional cabling except the line interface cables.

In the functional block diagram the unit is divided into the platform and the application part. The former takes care of the cross-connections and the interfacing to other transmission units. The latter part interfaces to other network elements.

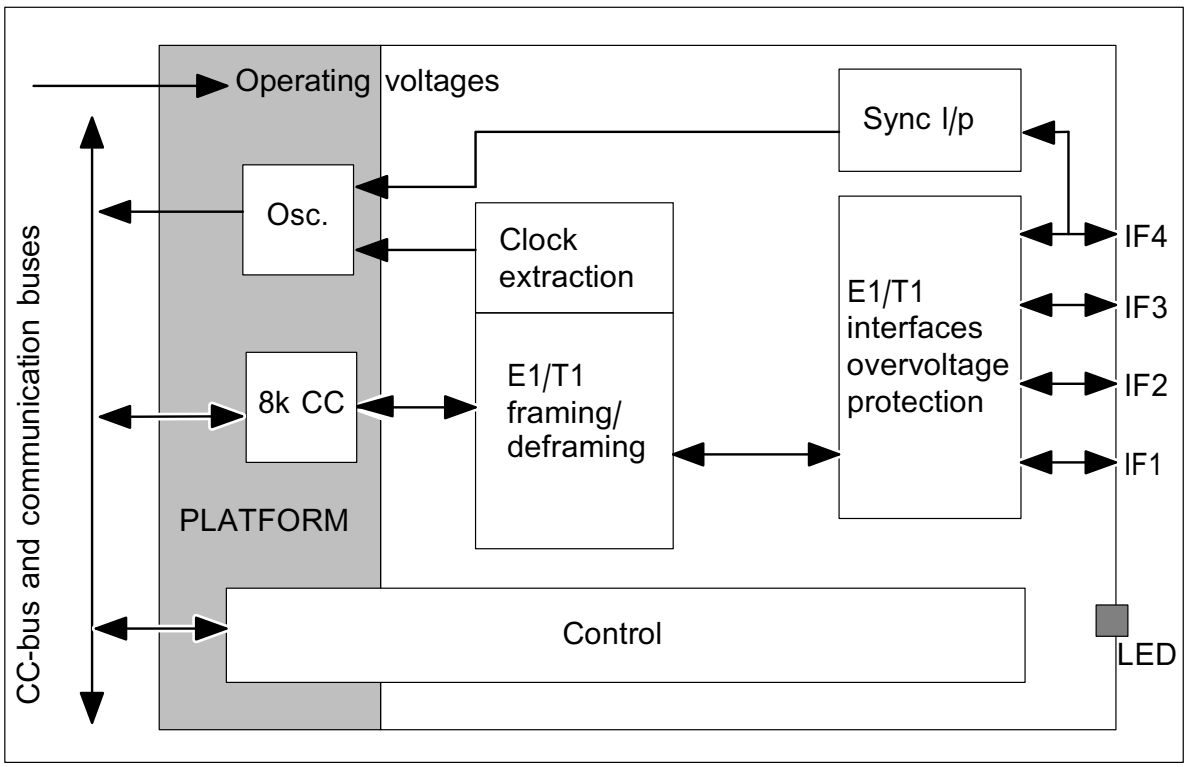

Figure 3. Functional block diagram

3 Interface description

FXC E1 has four pairs of unbalanced 75 Ω connectors (type BT-43). Each pair forms a transmission interface (IF). The upper connector is always the Tx connector of any given transmission interface. The lower connector is always the Rx connector.

The 75 Ω Tx and Rx connectors are connected to each other with a grounding bridge. If the grounding bridge is removed, the grounding of the Rx connector's outer conductor changes from direct grounding to capacitive grounding.

FXC E1/T1 has four balanced TQ connectors (Tx and Rx in the same connector). Each line interface can be independently configured to be a 120 Ω E1 interface or 100 Ω T1 interface which also makes it possible to use it as an E1/T1 converter.

3.1 Connectors

Table 1. FXC E1 and FXC E1/T1 connectors

E1 interface in FXC E1 and FXC E1/T1 units (G.703, G.704)	BT43 75 Ω, female, in FXC E1 TQ 120 Ω in FXC E1/T1
T1 interface in FXC E1/T1 unit (T1.403, T1.102)	TQ 100 Ω in FXC E1/T1

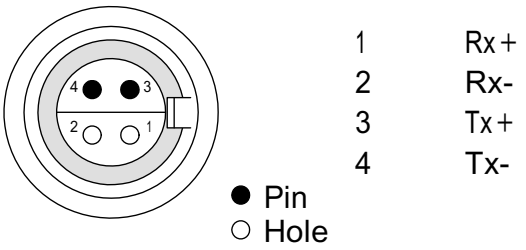

Figure 4. TQ connector

3.1.1 Synchronisation interface

There is no specific synchronisation interface in any FXC unit.

Any free interface input can be used as a synchronisation interface by connecting the synchronisation signal in proper format (E1 or T1) to it and configuring the unit correspondingly.

The Rx-connector of line interface 4 can be used as a synchronisation interface for externally provided 2048 kHz or 1544 kHz (in FXC E1/T1 only) clock signals. The usage of this connector is selected by software.

3.2 Front panel LED

There is a tri-colour status LED on the front panel of the units. The following table shows the meaning of the different colours.

Table 2. FXC E1 and FXC E1/T1 status LED

Indicator	Static	Slow flashing	Fast flashing
GREEN	Operation	Upon master"s command[1] ; no alarms active	Software is downloading
YELLOW	Major or minor alarm active	Upon master"s command; major or minor alarm(s) active	Software is downloading

[1] When the Q1 master unit sends the functional entity indication command

Table 2. FXC E1 and FXC E1/T1 status LED (cont.)

Indicator	Static	Slow flashing	Fast flashing
RED	Critical alarm active	Upon master"s command; critical alarms active	Software is downloading

4 Technical specifications

This chapter lists the technical specifications of the FXC E1 and FXC E1/T1 transmission units.

Table 3. FXC E1 and FXC E1/T1 dimensions and weight

Height	254 mm
Width	28 mm
Depth	187 mm
Weight	1.35 kg

4.1 FXC E1

Table 4. E1 equipment interface

E1 equipment interface	
Bit rate	2048 kbit/s ±50 ppm
Line code	HDB3
Transmitter characteristics	75 Ω
Receiver parameters	
Attenuation at 1 MHz	< 20 dB
Impedance	75 Ω
Jitter and wander	ITU-T G.823
E1 equipment synchronisation input (IF4 Rx)	

Table 4. E1 equipment interface (cont.)

Frequency	2048 kHz ±50 ppm
Receiver parameters	
Attenuation at 1 MHz	< 6 dB
Impedance	75 Ω
Amplitude	1.5 - 3.0 Vpp

Table 5. Power supply and power consumption

DC supply voltage	Centralised power arrangement via the backplane of BTS or transmission node
Power consumption	6 W

Table 6. International recommendations

2048 kbit/s E1 interface	
ITU-T G.703 (1991)	Physical/electrical characteristics of hierarchical digital interfaces
ITU-T G.704 (10/94)	Synchronous frame structures used at primary and secondary hierarchical levels
ITU-T G.706 (1991)	Frame alignment and cyclic redundancy check (CRC) procedures relating to basic frame structures defined in Recommendation G.704
ITU-T G.823 (03/93)	The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy
ITU-T G.826 (08/96)	Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate

4.2 FXC E1/T1

Table 7. E1 interface

E1 equipment interface	
Bit rate	2048 kbit/s ±50 ppm
Line code	HDB3
Transmitter characteristics	120 Ω
Receiver parameters	
Attenuation at 772 kHz	< 20 dB
Impedance	120 Ω
Jitter and wander	ITU-T G.823
E1 equipment synchronisation input (IF4 Rx)	
Frequency	2048 kHz ±50 ppm
Receiver parameters	
Attenuation at 1 MHz	< 6 dB
Impedance	120 Ω
Amplitude	2 - 3.8 Vpp

Table 8. T1 interface

T1 equipment interface	
Bit rate	1544 kbit/s ±32 ppm
Line code	AMI or B8ZS
Transmitter characteristics	ANSI T1.403 (DS-1) or ANSI T1.102 (DSX-1)
Receiver parameters	
Attenuation at 772 kHz	< 26 dB

Table 8. T1 interface (cont.)

Impedance	100 Ω
Jitter and wander	ITU-T G.824, AT&T TR 62411

Table 9. Power supply and power consumption

DC supply voltage	Centralised power arrangement via the backplane of BTS or transmission node
Power consumption	6 W

Table 10. International recommendations

2048 kbit/s E1 interface	
ITU-T G.703 (1991)	Physical/electrical characteristics of hierarchical digital interfaces
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ITU-T G.826 (08/96)	Error performance parameters and objectives for international, constant bit rate digital paths at or above the primary rate
1544 kbit/s T1 interface	
ITU-T G.824 (03/93)	The control of jitter and wander within digital networks which are based on the 1544 kbit/s hierarchy
ANSI T1.403 (1995) and T1.102 (1993)	Digital interface characteristics Functional Interface Characteristics PCM Coding Law Primary PCM Multiplexer Performance parameters

Table 10. International recommendations (cont.)

AT&T TR 62411 (12/90)	Jitter and Wander Multiplexing, Rate Adaptation