Centauri

Audio Gateway

Interface Reference Manual

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1.1 General view

Figure 1: Centauri backplane ISDN / E1

1.2 Audio in/out analog

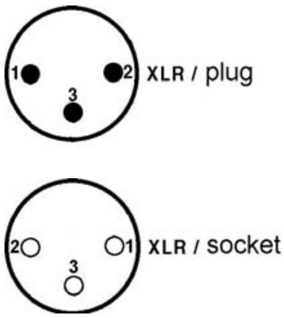


Figure 2: Audio In/Out analog

Pin	Pin Description (out)		Pin	Pin Description (in)
1	Ground		1	Ground
2	plus (+)		2	plus (+)
3	minus (-)		3	minus (-)

Table 1: Pin description XLR analogue in/out

1.3 Digital Audio card

With all Centauris 300X and 200x, in association with the CIMDIG option.

1.3.1 Position and labeling of the card

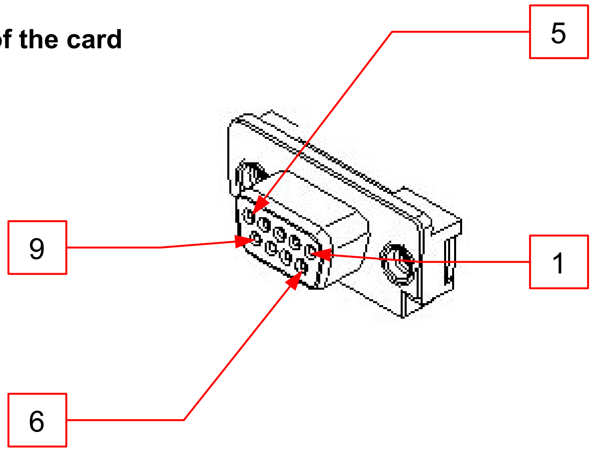


Figure 3: Digital in/output

1.3.2 AES cable adapter Sub D - XLR

Connector configuration for AES-XLR-SYNC-IN (female)

1	GND
2	AES Sync In +
3	AES Sync In -

Table 2: Connector configuration AES-XLR-SYNC-IN

Connector configuration for AES-XLR-IN (female)

1	GND
2	AES In +
3	AES In -

Table 3: Connector configuration AES-XLR-IN

Connector configuration for AES-XLR-OUT (male)

1	GND
2	AES Out +
3	AES Out -

Table 4: Connector configuration AES-XLR-OUT

Connector configuration for AES-Sub D (male)

1	GND
2	n.c.
3	AES Sync In +
4	AES Out +
5	AES In +
6	n. c.
7	AES Sync In -
8	AES Out -
9	AES In -

Table 5: Connector configuration AES-Sub D

MAYAH COMMUNICATIONS

1.4 TTL I/O

1.4.1 Position and labeling of the port

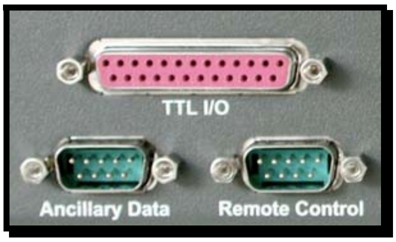
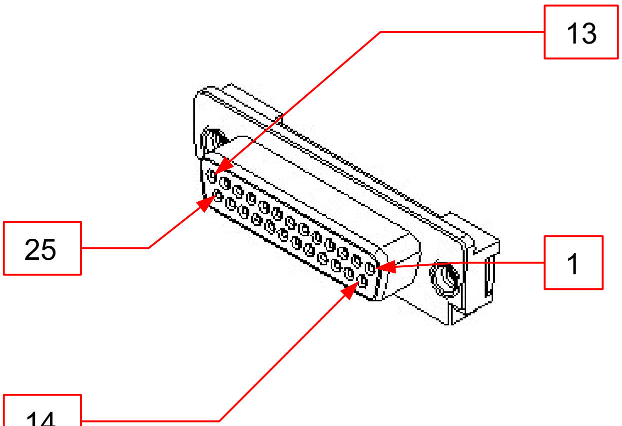


Figure 4: TTL I/O



Pin No.	Pin Description
2	Alarm
3	Framed
4	Connected
5	Output A
6	Output B
7	Output C
8	Output D
9	Output E
10	Input D
11	Input E
12	Input C
13	Input B
15	Input A
18-25	Ground

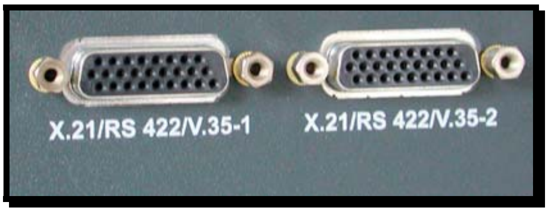
Table 6: Pin description TTL I/O

As default, Input A to Input D are set to high level while Input E is set to low level.

While the Centauri is booting, the pins 2-9 (outputs, alarm, framed, connected) can run through different states.

1.5 X.21 card

1.5.1 Position and labeling of the connectors



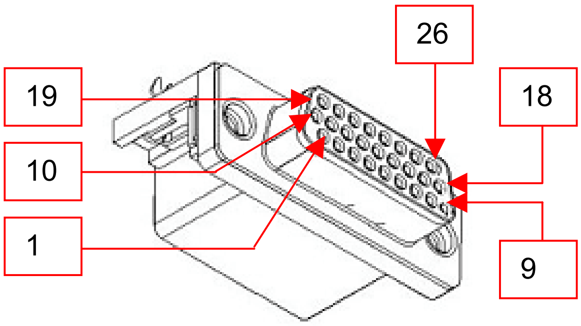


Figure 5: X.21

Available bit rates:

16000, 32000, 48000, 64000, 80000, 96000, 112000, 128000, 144000, 160000, 176000, 192000, 208000, 224000, 240000, 256000, 272000, 288000, 304000, 320000, 336000, 352000, 368000, 384000, 512000, 768000, 1024000, 2048000

Pin configuration for the X.21 interface in the X.21/RS422 mode

DSUB26HD Female	DTE Mode		DCE Mode	
Pin No.	**Signal**	**DIR**	**Signal**	**DIR**
1	Frame GND	UNDEF	Frame GND	UNDEF
2	T(A)	OUT	R(A)	OUT
3	R(A)	IN	T(A)	IN
4	C(A)	OUT	I(A)	OUT
5	I(A)	IN	C(A)	IN
6	NC		NC	
7	Signal GND	UNDEF	Signal GND	UNDEF
8	NC		NC	
9	S(B) T4, RXC	IN	X(B) T1, TXCE	IN
10	NC		NC	
11	X(B) T1,TXCE	OUT	S(B) T4, RXC	OUT
12	B(B) T2, TXC	IN	B(B) T2, TXC	OUT

DSUB26HD Female	DTE Mode		DCE Mode	
13	I(B) CTS	IN	C(B)	IN
14	T(B)	OUT	R(B)	OUT
15	B(A) T2, TXC	IN	B(A) T2, TXC	OUT
16	R(B)	IN	T(B)	IN
17	S(A) T4, RXC	IN	X(A) T1, TXCE	IN
18	LL	OUT	TM	IN
19	C(B)	OUT	I(B)	IN
20	NC		NC	
21	NC		NC	
22	NC		NC	
23	NC		NC	
24	X(A) T1; TXCE	OUT	S(A) T4, RXC	OUT
25	NC		NC	
26	NC		NC	

Table 7: Pin configuration X.21/RS422, DSUB26HD, DTE/DCE

Pin configuration for the X.21 interface in the V.35 mode

DSUB26HD Female	DTE Mode		DCE Mode	
Pin-No.	**Signal**	**DIR**	**Signal**	**DIR**
1	Frame GND	UNDEF	Frame GND	UNDEF
2	TD(A)103	OUT	RD(A)104	OUT
3	RD(A)104	IN	TD(A)104	IN
4	RTS105	OUT	CTS106	OUT
5	CTS106	IN	RTS105	IN

DSUB26HD Female	DTE Mode		DCE Mode	
6	DSR107	IN	DTR108	IN
7	Signal GND	UNDEF	Signal GND	UNDEF
8	DCD109	IN	DCD109	OUT
9	RET(B)115,T4	IN	XCE(B)113, T1	IN
10	NC		NC	
11	XCE(B)113,T1	OUT	RET(B)115, T4	OUT
12	TET(B)114, T2	IN	TET(B)114, T2	OUT
13	NC		NC	
14	TD(B) 103	OUT	RD(B) 104	OUT
15	TET(A)114, T2	IN	TET(A)114, T2	OUT
16	RD(B) 104	IN	TD(B) 104	IN
17	RET(A) 115, T4	IN	XCE(A) 113, T1	IN
18	LL	OUT	TM	IN
19	NC		NC	
20	DTR 108	OUT	DSR 107	OUT
21	NC		NC	
22	NC		NC	
23	NC		NC	
24	XCE(A) 113, T1	OUT	RET(A) 115, T4	OUT
25	NC		NC	
26	NC		NC	

Table 8: Pin configuration X.21/V.35, DSUB26HD, DTE/DCE

X.21 connector cable for the Centauri (referring to protocol V.11 (X.21))

Centauri (DCE) to Centauri (DTE) (referring to protocol V.11 (X.21))

Pin No. on DCE Centauri (DB 26 male)	Pin Description on DCE Centauri	Pin No. on DTE Centauri (DB 26 male)	Pin Description on DTE Centauri
1	Frame GND	1	Frame GND
2	Receive (A)	3	Receive (A)
14	Receive (B)	16	Receive (B)
3	Transmit (A)	2	Transmit (A)
16	Transmit (B)	14	Transmit (B)
24	Signal Timing T4(A)	15	Signal Timing T2(A)
11	Signal Timing T4(B)	12	Signal Timing T2(B)
15	Signal Timing T2(A)	17	Signal Timing T4(A)
12	Signal Timing T2(B)	9	Signal Timing T4(B)
7	Signal GND	7	Signal GND

Table 9: Pin description Centauri (DCE) to Centauri (DTE)

Centauri (DCE) to 15pin-SubD connector (referring to protocol V.11 (X.21))

PIN NO. ON CENTAURI (DB 26 MALE)	PIN DESCRIPTION ON CENTAURI	PIN NO. (DB 15 MALE)	PIN DESCRIPTION
2	Receive (A)	4	Receive (A)
14	Receive (B)	11	Receive (B)
3	Transmit (A)	2	Transmit (A)
16	Transmit (B)	9	Transmit (B)
15	Signal Timing T2(A)	6	Signal Timing T4(A)
12	Signal Timing T2(B)	13	Signal Timing T4(B)
7	Signal GND	8	Signal GND

Table 10: Pin description Centauri (DCE) to 15pin-SubD connector

Centauri (DTE) to 15pin-SubD connector (referring to protocol V.11 (X.21))

Pin No. on Centauri (DB 26 male)	Pin Description on Centauri	Pin No. (DB 15 male)	Pin Description
2	Transmit (A)	2	Transmit (A)
14	Transmit (B)	9	Transmit (B)
3	Receive (A)	4	Receive (A)
16	Receive (B)	11	Receive (B)
17	Signal Timing T4(A)	6	Signal Timing T4(A)
9	Signal Timing T4(B)	13	Signal Timing T4(B)
7	Signal GND	8	Signal GND

Table 11: Pin description Centauri (DTE) to 15pin-SubD connector

X.21 connector cable for the Centauri (referring to protocol V.35)

Centauri (DTE) to Other (DTE) (referring to protocol V.35)

PIN NO. ON DTE CENTAURI (DB 26 MALE)	PIN DESCRIPTION	PIN NO. ON DTE OTHER UNIT (DB 25 MALE)	PIN DESCRIPTION
1	Frame GND	1	Frame GND
2	TD(A)	2	TD(A)
3	RD(A)	3	RD(A)
4	RTS	4	RTS
5	CTS	5	CTS
7	Signal GND	7	Signal GND
8	DCD / RLSD	8	DCD / RLSD
9	RET(B)	12	RET(B)
12	TET(B)	14	TET(B)
14	TD(B)	13	TD(B)
15	TET(A)	15	TET(A)
16	RD(B)	16	RD(B)
17	RET(A)	17	RET(A)
20	DTR	20	DTR

Table 12: Pin description Centauri (DTE, DB 26 MALE) to Other (DTE, DB 25 MALE)

Centauri (DTE) to Other (DTE) (referring to protocol V.35)

PIN NO. ON DTE CENTAURI (DB 26 MALE)	PIN DESCRIPTION	PIN NO. ON DTE OTHER UNIT (DB 15 MALE)	PIN DESCRIPTION
3	RD(A)	4	RD(A)
16	RD(B)	11	RD(B)
17	RET(A)	6	RET(A)
9	RET(B)	13	RET(B)
15	TET(A)	7	TET(A)
12	TET(B)	14	TET(B)
2	TD(A)	2	TD(A)
14	TD(B)	9	TD(B)
4	RTS	3	RTS
1	Frame GND	1	Frame GND
7	Signal GND	8	Signal GND
20	DTR	10	DTR
8	DCD / RLSD	12	DCD / RLSD
5	CTS(A)	15	CTS

Table 13: Pin description Centauri (DTE, DB 26 MALE) to Other (DTE, DB 15 MALE)

Centauri (DCE) to Other (DTE) (referring to protocol V.35)

PIN NO. ON DCE CENTAURI (DB 26 MALE)	PIN DESCRIPTION	PIN NO. ON DTE OTHER UNIT (DB 15 MALE)	PIN DESCRIPTION
2	RD(A)	4	RD(A)
14	RD(B)	11	RD(B)
24	XCE(A)	6	RET(A)
11	XCE(B)	13	RET(B)
15	TET(A)	7	TET(A)
12	TET(B)	14	TET(B)
3	TD(A)	2	TD(A)
16	TD(B)	9	TD(B)
5	CTS(A)	3	RTS
1	Frame GND	1	Frame GND
7	Signal GND	8	Signal GND
6	DSR	10	DTR
8	DCD	12	DCD / RLSD
4	RTS(A)	15	CTS

Table 14: Pin description Centauri (DCE, DB 26 MALE) to Other (DTE, DB 15 MALE)

Centauri (DCE) to Other (DTE) (referring to protocol V.35)

PIN NO. ON DCE CENTAURI (DB 26 MALE)	PIN DESCRIPTION	PIN NO. ON DTE OTHER UNIT (DB 25 MALE)	PIN DESCRIPTION
2	RD(A)	3	RD(A)
14	RD(B)	16	RD(B)
24	RET(A)	17	RET(A)
11	RET(B)	12	RET(B)
15	TET(A)	15	TET(A)
12	TET(B)	14	TET(B)
3	TD(A)	2	TD(A)
16	TD(B)	13	TD(B)
5	RTS(A)	4	RTS
1	Frame GND	1	Frame GND
7	Signal GND	7	Signal GND
6	DTR	20	DTR
8	DCD	8	DCD / RLSD
4	CTS(A)	5	CTS

Table 15: Pin description Centauri (DCE, DB 26 MALE) to Other (DTE, DB 25 MALE)

Centauri (DCE) to Centauri (DTE) (referring to protocol V.35)

Pin No. on DCE Centauri (DB 26 MALE)	Pin Description on DCE Centauri	Pin No. on DTE Centauri (DB 26 MALE)	Pin Description on DTE Centauri
1	Frame GND	1	Frame GND
2	RD (A)	3	RD (A)
14	RD (B)	16	RD (B)
3	TD (A)	2	TD (A)
16	TD (B)	14	TD (B)
24	RET (A)	17	RET (A)
11	RET (B)	9	RET (B)
15	TET (A)	15	TET (A)
12	TET (B)	12	RET (B)
7	Signal GND	7	Signal GND

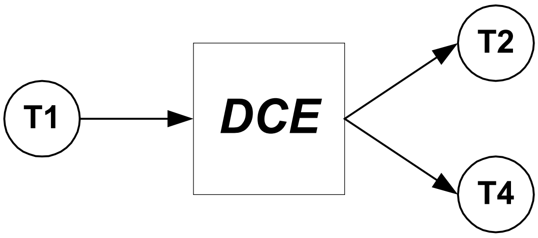
Table 16: Centauri (DCE, DB 26 MALE) to Centauri (DTE, DB 26 MALE)

1.5.2 Clock signal routing

There are two different operating modes of clocksignal routing,

- DCE (Data Carrier Equipment)
- DTE (Data Terminal Equipment)

DCE is fed by T1 (ancillary clock) and supplies T2 (sending clock) and T4 (receiving



clock).

Figure 6: Clock signal routing DCE

DTE is fed by T2 and T4 and supplies T1.

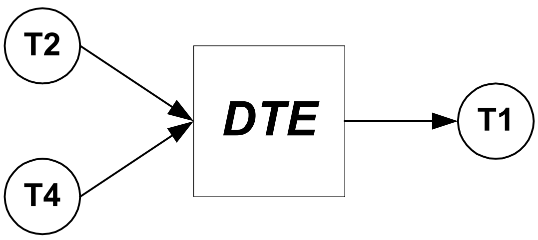
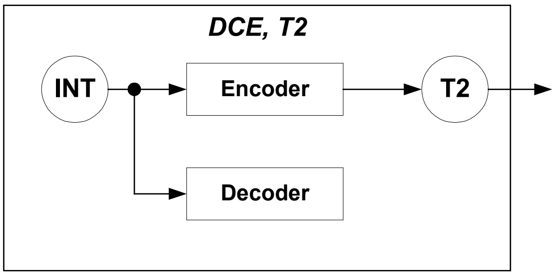


Figure 7: Clock signal routing DTE

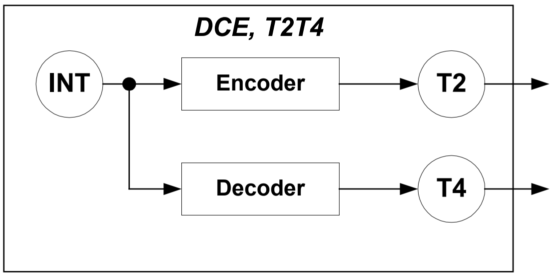
This way of implementing the clocksignal routing leads to the fact that the DCE of one Centauri can supply the DTE of another and vice versa, which is unique in the world of codecs.

The various different possibilities of using the routing are described below.

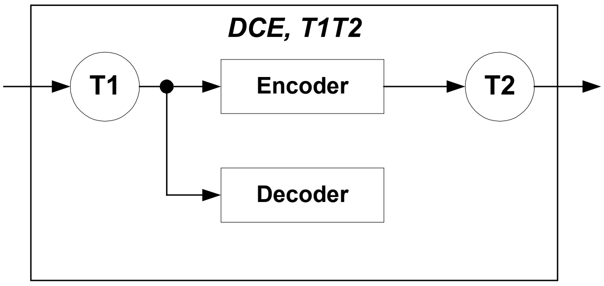
1.5.3 DCE



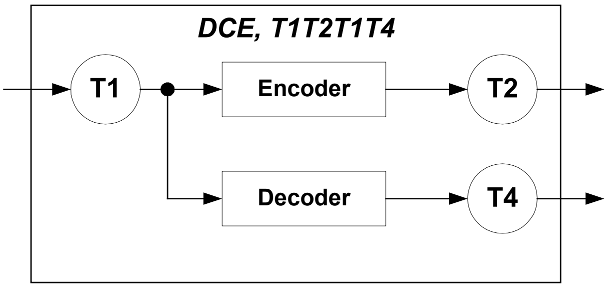
Encoder, Decoder and T2 are supplied by an internal clock.



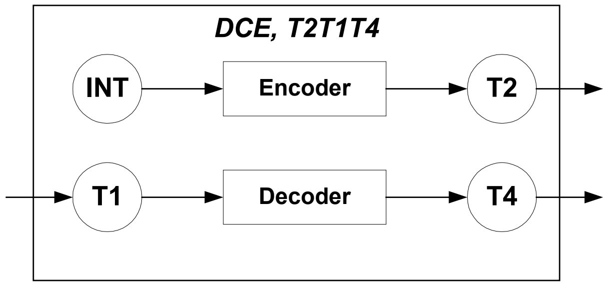
Encoder, Decoder, T2 and T4 are supplied by an internal clock.



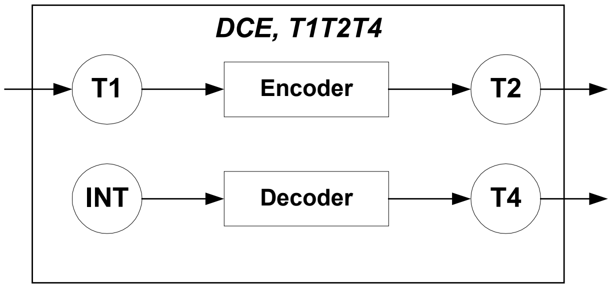
Encoder, Decoder and T2 are supplied by T1.



Encoder, Decoder, T2 and T4 are supplied by T1.



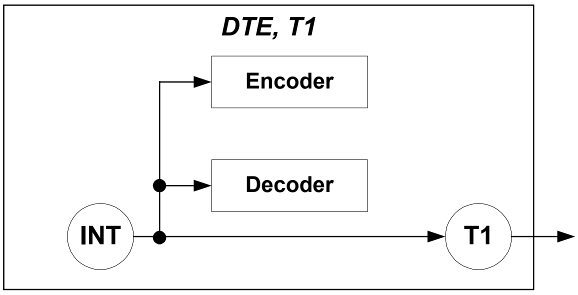
Encoder and T2 are supplied by an internal clock. Decoder and T4 are supplied by T1.



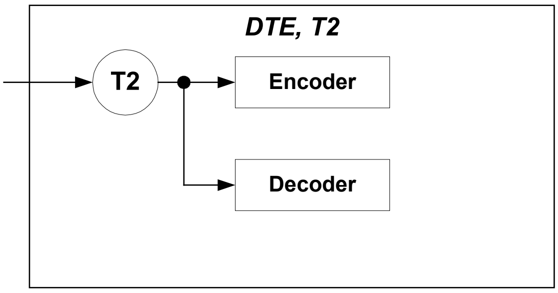
Encoder and T2 are supplied by T1. Decoder and T4 are supplied by an internal clock.

Figure 8: DCE

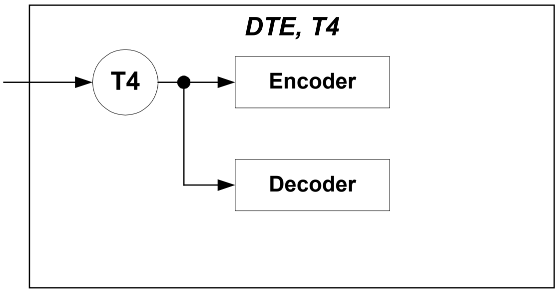
1.5.4 DTE



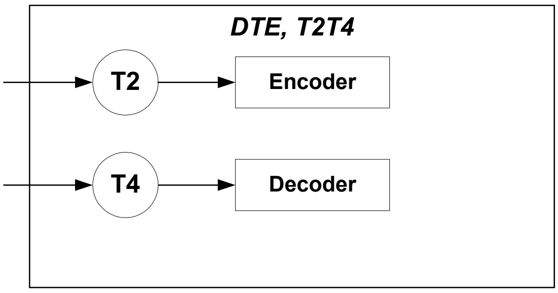
Encoder, Decoder and T1 are supplied by internal clock.



Encoder and Decoder are supplied by T2

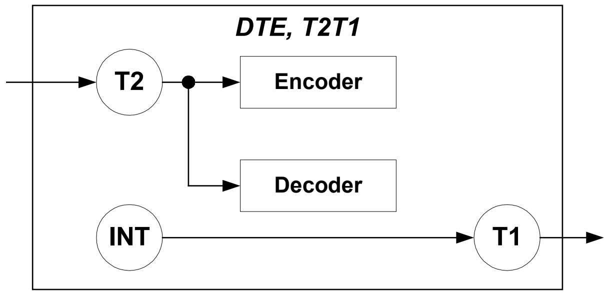


Encoder and Decoder are supplied by T4

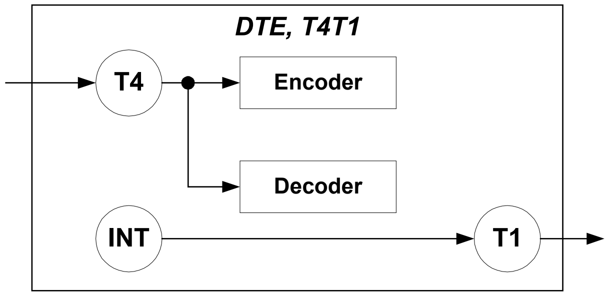


Encoder is supplied by T2. Decoder is supplied by T4.

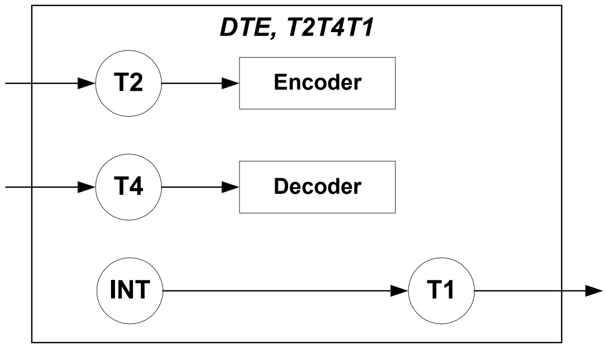
Figure 9: DTE



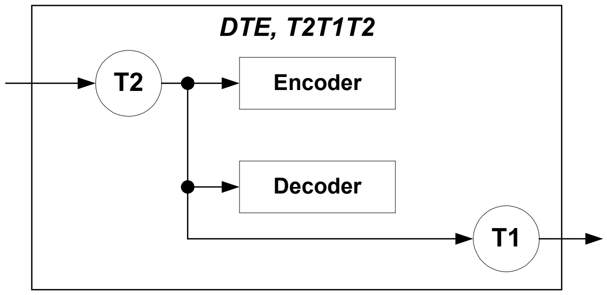
Encoder and Decoder are supplied by T2. T1 is supplied by an internal clock.



Encoder and Decoder are supplied by T4. T1 is supplied by an internal clock.

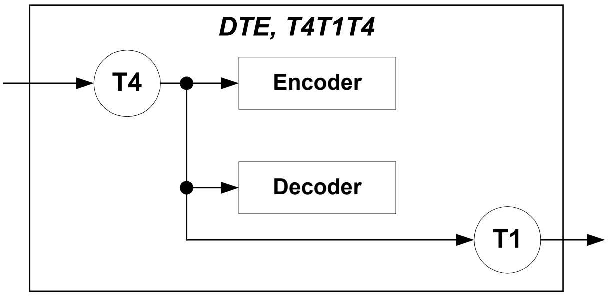


Encoder is supplied by T2. Decoder is supplied by T4. T1 is supplied by an internal clock.

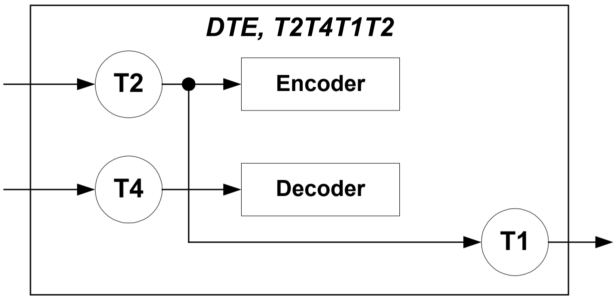


Encoder, Decoder and T1 are supplied by T2.

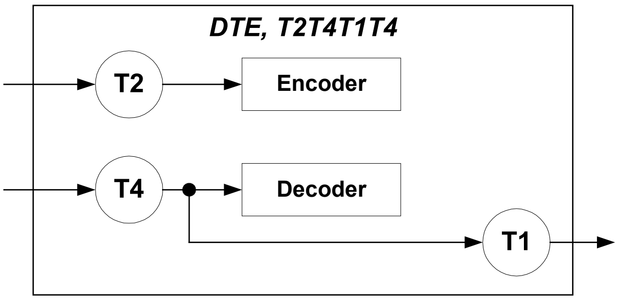
Figure 10: DTE



Encoder, Decoder and T1 are supplied by T4.



Encoder and T1 are supplied by T2. Decoder is supplied by T4.



Encoder is supplied by T2. Decoder and T1 are supplied by T4.

Figure 11: DTE

1.5.5 Overview clocksignal routing

Summarized information is given within the following tables. The first two show which of encoder, decoder, T1, T2 or T4 is supplied by which clock, depending on the mode DCE or DTE. The third table describes the case of connecting two Centauris, one with mode DCE and the other with mode DTE, and the possible combinations of clockings.

DCE	***Encoder***	***Decoder***	***T2***	***T4***
T2	INT	INT	INT	-
T2T4	INT	INT	INT	INT
T1T2	T1	T1	T1	-
T1T2T1T4	T1	T1	T1	T1
T2T1T4	INT	T1	INT	T1
T1T2T4	T1	INT	T1	INT

Table 17: Overview clocksignal routing DCE

DTE	***Encoder***	***Decoder***	***T1***
T1	INT	INT	INT
T2	T2	T2	-
T4	T4	T4	-
T2T4	T2	T4	-
T2T1	T2	T2	INT
T4T1	T4	T4	INT
T2T4T1	T2	T4	INT
T2T1T2	T2	T2	T2
T4T1T4	T4	T4	T4
T2T4T1T2	T2	T4	T2
T2T4T1T4	T2	T4	T4

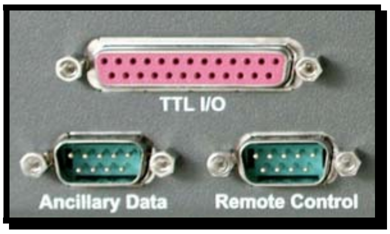
Table 18: Overview clocksignal routing DTE

DCE / DTE	***T2***	***T2T4***	***T1T2***	***T1T2T1T4***	***T2T1T4***	***T1T2T4***
T1	No	No	Yes	Yes	No	No
T2	No	Yes	No	No	No	No
T4	Yes	Yes	No	No	No	No
T2T4	No	Yes	No	No	No	No
T2T1	No	Yes	No	Yes	No	No
T4T1	Yes	Yes	Yes	Yes	No	No
T2T4T1	No	Yes	No	Yes	Yes	Yes
T2T1T2	No	Yes	No	No	No	Yes
T4T1T4	Yes	Yes	No	No	Yes	No
T2T4T1T2	No	Yes	No	No	No	Yes
T2T4T1T4	No	Yes	No	No	Yes	No

Table 19: Overview clocksignal routing between two Centauris

1.6 Ancillary Data

1.6.1 Position and labeling of the port



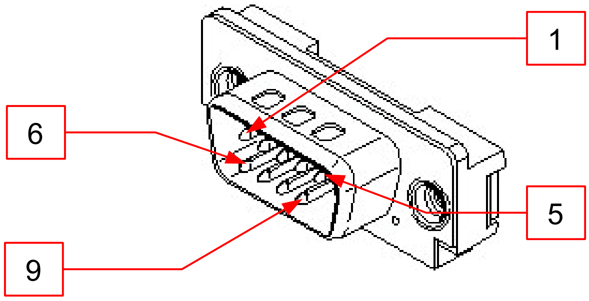


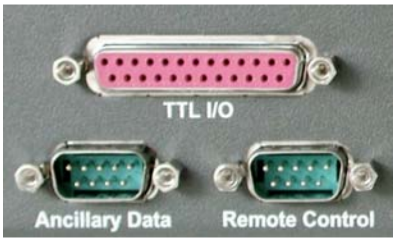
Figure 12: Ancillary Data

Pin	Description
1	Data Carrier Detector (DCD) Source: DCE
2	Received Data (RD) Source: DCE
3	Transmitted Data (TD) Source: DTE
4	Date Terminal Ready (DTR) Source: DTE
5	Ground
6	Data Set Ready (DSR) Source: DCE
7	Request to Send (RTS) Source: DTE
8	Clear to Send (CTS) Source: DCE
9	Ring Indicator (RI) Source: DCE

Table 20: Pin description ancillary data

1.7 Remote Control

1.7.1 Position and labeling of the port



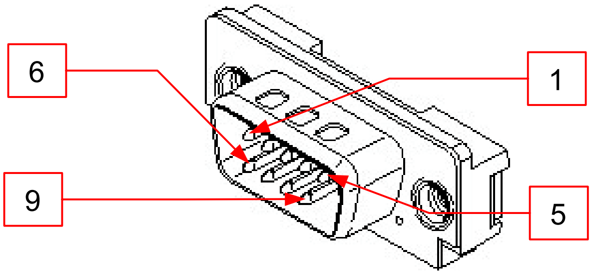


Figure 13: Remote Control

Pin	Description
1	Data Carrier Detector (DCD) Source: DCE
2	Received Data (RD) Source: DCE
3	Transmitted Data (TD) Source: DTE
4	Date Terminal Ready (DTR) Source: DTE
5	Ground
6	Data Set Ready (DSR) Source: DCE
7	Request to Send(RTS) Source: DTE
8	Clear to Send (CTS) Source: DCE
9	Ring Indicator (RI) Source: DCE

Table 21: Pin description remote control

1.8 USB Ports

1.8.1 Position and labeling of the port

Figure 14: USB

General

The abbreviation USB stands for "Universal Serial Bus". This refers to the serial bus system that is gaining enormous importance in the area of computer periphery.

The most important features of USB are explained below:

Free Standard:

USB is a free standard. All specifications are freely available.

Relatively fast, scalable:

With transmission rates of 1.5 and 12 Mbps, USB is approx. 10 times faster than the standard parallel port and approx. 100 times faster than the conventional serial interface. During the development of the specification one decided on one low and one high-speed mode. Devices with different speeds can be used together on one bus without any problems arising.

Purely digital:

The USB interface is a purely digital interface. An analog/digital conversion that could negatively influence the integrity of the transferred data, is not necessary.

Two-directional:

With USB data transmission is possible both "upstream" to the host as well as "downstream" to the periphery.

Space-saving, universal, inexpensive:

USB plugs are extremely compact compared to the very wide parallel port connections and thus well suited for small peripheral devices. Due to the different transfer modes and the bandwidths that are sufficient for virtually all standard peripheries, USB is able to replace many of the previous standard interfaces on PC's.

Self-powered:

USB cables (see "Technical Data") are current-carrying and provide connected devices with up to 500 mA.

Hot-plugging:

Devices can be connected or disconnected when the bus is active. New devices are recognized, addressed, and are immediately ready for operation.

Various transfer modes:

USB supports four different data transfer modes: control, interrupt, bulk and isochronous.

USB bus topology:

The USB bus topology is uncomplicated, and a maximum number of 127 devices per host is considerable.

Technical data

USB cables carry current and can supply connected appliances with 5 volts up to 500 mA. To guarantee this, you also receive one cable each for voltage and ground as well as two data lines. There is no separate clock lead. The bus clock is generated out of the data current medium sync-signal.

As unit of measurement for the current strength USB uses so-called loads, whereby 1 load is exactly 100 mA. Depending on their current consumption, all devices can be divided into three classes: the first two draw their current via the bus (bus-powered) and consume wither one (low-power) or up to 5 loads (high-power). The third class includes all devices with their own power supply (self-powered). They always need one load, in other words 100 mA.

According to USB specification the cable length must be limited to 3-5 m. The 5 m limit applies for high-speed (12 Mbps), and 3 m for low-speed devices (1.5 Mbps), since the latter uses untwisted and unshielded cable as a rule. USB extension cables are not recommended because this could lead to installation problems or signal loss.

1.9 Network connection (100Base/TX)

1.9.1 Location and description of the connection

Figure 15: LAN

General

Twisted-pair, 10BaseT, 100BaseTX

Twisted-pair is a four-wire copper cable twisted in pairs, where two copper wires are used for each transmission direction between transmitter and receiver. The typical thickness of the wires is 0.5 or 0.6 mm. The maximum transmission length varies with the damping and depends on whether the wires are shielded or not. The twisted-pair cable is suitable for different transmission methods such as token ring and Ethernet. With a data rate of 10 - 100 MBit/s a twisted-pair cable can have a length of up to 100 m. The minimum length of the cable is 0.6 m. The cable connects exactly two stations with one another.

To connect several stations it is necessary to use so-called hubs, and it is then possible to couple up to 1024 stations with each other. RJ-45 plugs and sockets are usually used as connectors. Differential drivers and receiving amplifiers are also used here. The level alternates between -2,5 V and +2,5 V.

Unshielded cables (UTP, unshielded twisted pair) or cables with shielding (STP, shielded twisted pair) are used, depending on the environment and possible interference. UTP is available with different specifications. The individual levels differ from each other in the form of better fault intervals and lower damping:

- UTP-1 for alarm systems and analog speech transmission
- UTP-2 for speech and RS232 interfaces
- UTP-3 data transfer up to 16 MHz
- UTP-4 data transfer up to 20 MHz (IBM token ring 16 MHz)
- UTP-5 data transfer up to 100 MHz

Only four of the eight lines of the RJ45 plug are used:

Pin	Signal
1	Transmit signal +
2	Transmit signal -
3	Receive signal +
6	Receive signal -

Table 22: Pin description RJ45, LAN

Between computer and hub the cable connects the two plugs 1:1. With special cables for connecting two computers directly or for cascading hubs the lines have to be crossed. The connection is then:

1	(TX+)	-	3	(RX+)
2	(TX-)	-	6	(RX-)
3	(RX+)	-	1	(TX+)
6	(RX-)	-	2	(TX-)

Table 23: Pin description RJ45, LAN

1.10 Network connection (100Base/FX(SC))

1.10.1 Position and description of the connectors

Figure 16: Network connection

Glass fiber - LWL

Glass fiber cables have the advantage that one can achieve enormous ranges with them. Distances of up to 1000 meters are possible without amplification. There are multiple mode cables and single mode cables, whereby in the case of single mode cables a greater range is possible but a lower speed.

Multiple mode fiber (LwL) (MMF)

The light beams are often reflected off the boundary layer between the core and the sheath and also in different ways, and this necessitates different running times of the beams. The multiple mode fiber is either a step index profile fiber with a typical core diameter of 100, 120 or 400 µm, with a band width length product of less than 100 MHz x km and a damping of approx. 6 dB /km or a gradient index profile fiber with typical core diameters of 50 µm, 62,5 µm, 85 µm or 100 µm and sheath diameters of 125 µm or 140 µm. The damping values are 3 dB/km (LED 850 nm) which means that a transmission of up to 10 km is possible without a repeater. The band width length product is between 200 MHz x km at 850 nm and 500 MHz x km at 1.300 nm due to the better suppression of the mode dispersion.

Mono mode fiber

The mono-mode fiber is an optical fiber with step index profile, where due to its very small core diameter which is around 8 to 10 µm, the light is in effect only transmitted in one mode which lies more or less parallel to the axis.

Structure/alignment and beam course of the mono mode fiber

Characteristic of the mono mode fiber is that it displays virtually no running time differences (mode dispersion 0.1 ns/km), since the light only runs through the optical fiber in one direction of propagation, the pulse behavior thus keeps to the shape and that it has the lowest damping values of all optical fibers. This expresses itself in a damping of 0.1 dB /km (LED 1300 nm), a bandwidth length product of >10 GHz x km and a bit rate length product of 250 GHz x km. Distances of up to 50 km can be bridged without repeaters. The sheath diameter of the mono mode fiber is typically 125 µm, the core diameter typically 10 µm.

The shunting cable and the cable for the terminals are very flexible and thin. This is why the cables must under no circumstances be bent or laid out in tight circles.

WARNING...

IF YOU LOOK AT THE END OF A CONNECTED CABLE, A SMALL RED LIGHT THAT REPRESENTS THE SIGNAL CAN BE DISCOVERED NEXT TO ONE OF THE TWO PLUGS. TO PROTECT YOUR EYES, DO NOT LOOK DIRECTLY INTO THE LIGHT

1.11 ISDN (1BRI)

1.11.1 Position and description of the connectors

Figure 17: ISDN (1 BRI)

General technology of the ISDN cabling

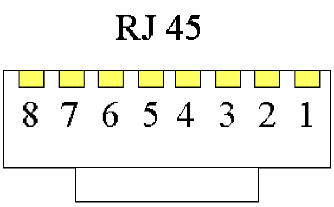
Plug configuration

Today **RJ45 plugs** (8 pole) are used for ISDN connections. However, only 4 pins are used in effect. The RJ45 plug is a coded plastic plug – it can only be slotted into the socket in one position. It is crimped at the end of the cable using special pliers.

The following illustration shows the front view of such a plug:

The ISDN configuration of this plug is as follows:

Figure 18: RJ 45



Pin	Signal	Wire
1	NC	unused
2	NC	unused
3	RX+	2a
4	TX+	1a
5	TX-	1b
6	RX-	2b
7	NC	unused
8	NC	unused

Table 24: Pin description RJ45, ISDN

CAUTION...

The number printed on the device is always valid for the numbering of the pins. Even when these seem to be ‘mixed up’. Different manufacturers do not arrange the wires internally in accordance with the number series.

General principles for cable installation

In general one should observe the following tips when installing cables and connecting sockets:

- Remove as short a piece of insulation from the cable as possible
- Only unwind as much of the wires as is necessary. Otherwise maintain the twisted structure.
- Contacts must be secure and safe; otherwise this could lead to feedback on the whole bus.
- Never lay lighting network (230 V) and low voltage lines in the same conduits. Not only because this is bound to lead to cross-voltage, but because a non-insulated point could have fatal consequences.

1.12 ISDN (4BRI)

1.12.1 Position and description of the connectors

Figure 19: ISDN (4 BRI)

General configuration technology, see chapter 1.11.1 General Technology

1.13 E1 PCI

Only valid with option CIM35E1.

Figure 20: E1 PCI

1.13.1 General

The E1PCI-Module connects the Centauri with E1-based nets (32 timeslots, 2,048Mbit/s). There are two interfaces, **DS2** and **D_I,** which can be used for connecting both as well to a network as to a ring-topology (add/drop). Therefore E1PCI can act as a talkmaster or can be synchronized with one of the E1-interfaces or the TS2-port.

The Centauri E1 Concept regards all hardware interfaces, as well as the codec, as data streams which can be interconnected in each form. The hardware interfaces are: DS2(E1), D_I(E1), X.21/A(V.11), X.21/B(V.11)

Rules for interconnecting:

1) Each interface is considered as timeslot based.

2) Each data stream timeslot can only be fed by one other data stream timeslot (see chap. 1.13.3, source-target-connections).

1.13.2 E1 interfaces DS2, D_I

The S2-interfaces are to be connected optional with 8-pinned **RJ45**-sockets **DS2**, **D_I**, or with small **BNC**-sockets.

Cables have to be *120R symmetrical* according to **G.703**, **I.431**.

Reserving of the **RJ45**-Sockets has to be according to **ISO/IEC 10173** for **TE**-configuration.

Shields over SMD0805 soldering-bridges **R26**, **R25**, **R67**, **R66** to frontpanelground

PIN	SIGNALNAME	DIRECTION
1	Rx+	In
2	Rx-	In
3	GND	(Shield)
4	Tx+	Out
5	Tx-	Out
6	GND	(Shield)
7		
8		

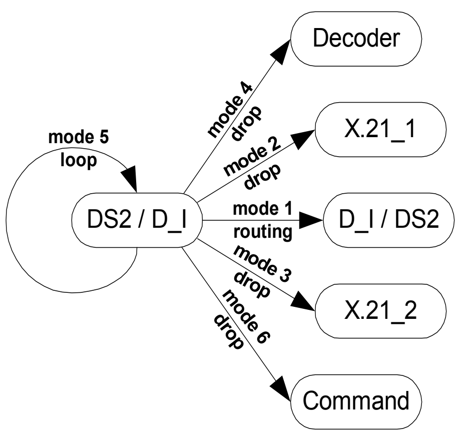
Table 25: Pin description RJ45, E1

1.13.3 E1 Timeslots

There are six sending/receiving-modes available for the 32 different timeslots (except timeslot 0 and 16) of the Centauri 3500. For sending data, it is possible to run different modes simultaneously. For receiving, only one mode at the same time is possible.

MODE	DESCRIPTION
Mode 1	Timeslot is routed directly from DS2 (D_I) to D_I (DS2).
Mode 2 drop	Timeslot is routed to X.21.1. The opposite device has to be synchronized with a corresponding bitrate (timeslot * 64000 bit/s).
Mode 2 insert	Timeslot is filled from X.21.1.
Mode 3	Same as mode 2 (X.21.2)
Mode 4 drop	Timeslot is routed to Decoder. Decoder and bitrate have to be adjusted.
Mode 4 insert	Timeslot is filled from Encoder. Encoder and bitrate have to be adjusted.
Mode 5 loop	Timeslot is routed directly back. Using this mode, the opposite device and the cable can be tested.
Mode 6 drop/insert	Timeslots can be handled by an external command. This mode is not implemented yet.

Table 26: E1 sending/receiving modes



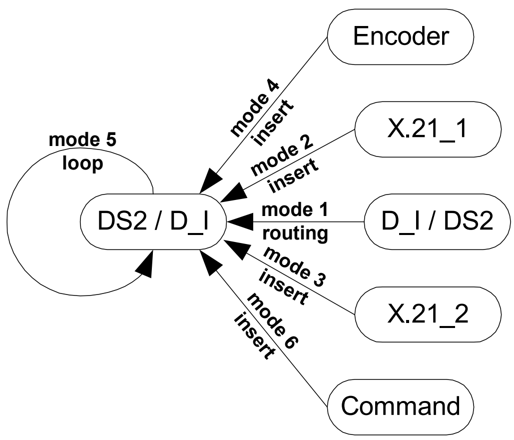


Figure 21: Sending/receiving modes for E1

Source-Target Connections - Summary -

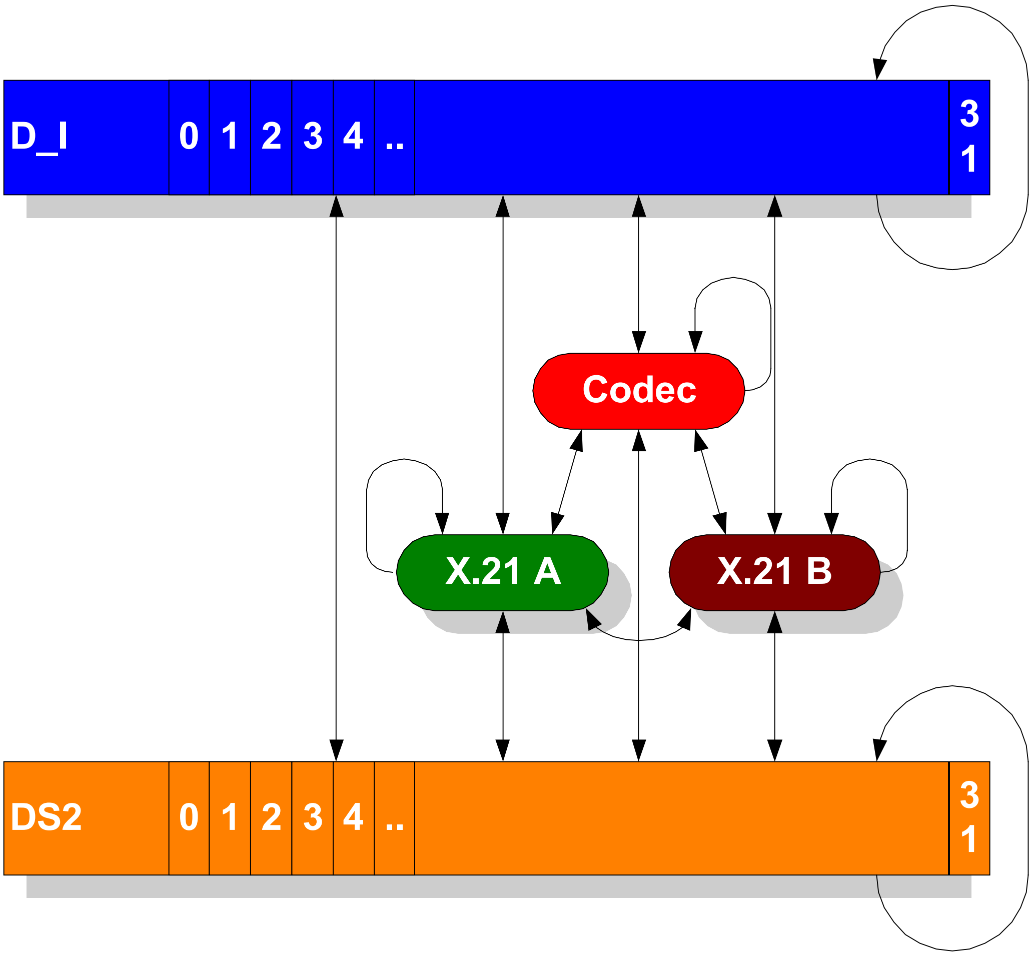


Table 27: E1 source-target-connections

The colors used in this figure for the different interfaces correspond to the colors used within the Centauri Control Center, the remote software for the Centauri 3500.

1.13.4 Clock Interface TS2

Connection with 8-pinned **RJ45**-Sockets **TS2**.

Cables have to be *120R symmetrical* according to **G.703**, **I.431**

adjustable for **120R**(standard) or >1k

Shields over SMD0805 soldering-bridges **R26**, **R25**, **R67**, **R66** to frontpanelground

PIN	SIGNALNAME	DIRECTION
1	Rx+	In
2	Rx-	In
3	GND	(Shield)
4		
5		
6		
7		
8		

Table 28: Pin description RJ45, TS2

1.13.5 Monitor Interface MON

Connection with 8-pinned **RJ45**-Sockets **MON**.

Cables have to be *120R symmetrical*

(Just short cables for connecting a local G.703-test-device)

PIN	SIGNALNAME	DIRECTION
1	DS2: RX+	Out
2	DS2: RX-	Out
3	DS2: TX+	Out
4	DS2: TX-	Out
5	D_I: RX+	Out
6	D_I: RX-	Out
7	D_I: TX+	Out
8	D_I: TX-	Out

Table 29: Pin description RJ45, MON

1.13.6 Additional interfaces X.21/A, X.21/B

For each of the two additional interfaces, **X.21/A**, **X.21/B,** which type is **DCE**, there is intended to be an extern 26-pinned HD-SUBD-socket.

PIN	SIGNAL	DIRECTION	AN HD SUBD	PIN	SIGNAL	DIRECTION	AN HD SUBD
1	RB	Out	14	2	RA	Out	2
3	IB	Out	19	4	IA	Out	4
5	SB	Out	11	6	SA	Out	24
7	BB	Out	12	8	BA	Out	15
9	TB	In	16	10	TA	In	3
11	CB	In	13	12	CA	In	5
13	GND	-	7	14	RXD	Out	26
15	DCD	Out	8	16	CTS	Out	22
17	DSR	Out	20	18	TXD	In	25
19	DTR	In	6	20	RTS	In	21

Table 30: Pin description additional interfaces X.21/A, X.21/B

1.13.7 E1-X.21 for X.21/A, X.21/B

- X.21/A, X.21/B (pin: RB, IB, SD, BB, TB, CB, RA, IA, SA, BA, TA, CA, see table above pin 1 - 12)
- Just DCE
- Bitrate n * 64000 bit/s
- X.21/A and X.21/B can have different bitrates

1.13.8 E1-CAS for X.21/A, X.21/B

E1-CAS (Channel Associated Signaling) provides six different modes to handle own and incoming data.

- X.21/A, X.21/B (pin: DCD, DSR, DTR, RXD, CTS, TXD, RTS, see table above pin 14 - 20)
- asynchronous
- baudrate : 4800 guaranteed (9600 possible)
- X.21/A and X.21/B are multiplexed to DS2 or D_I, timeslot 16
- For modes see following table and graphics

E1-CAS modes

MODE	DESCRIPTION
Mode 0	Inactive
Mode 1	Send only
Mode 2	Send and receive
Mode 3	Receive and pass received data
Mode 4	Receive and send ‘1’s
Mode 5	Loop, for testing the connected terminal (e.g. Windows HyperTerminal)

Table 31: *E1 CAS modes*

E1-CAS

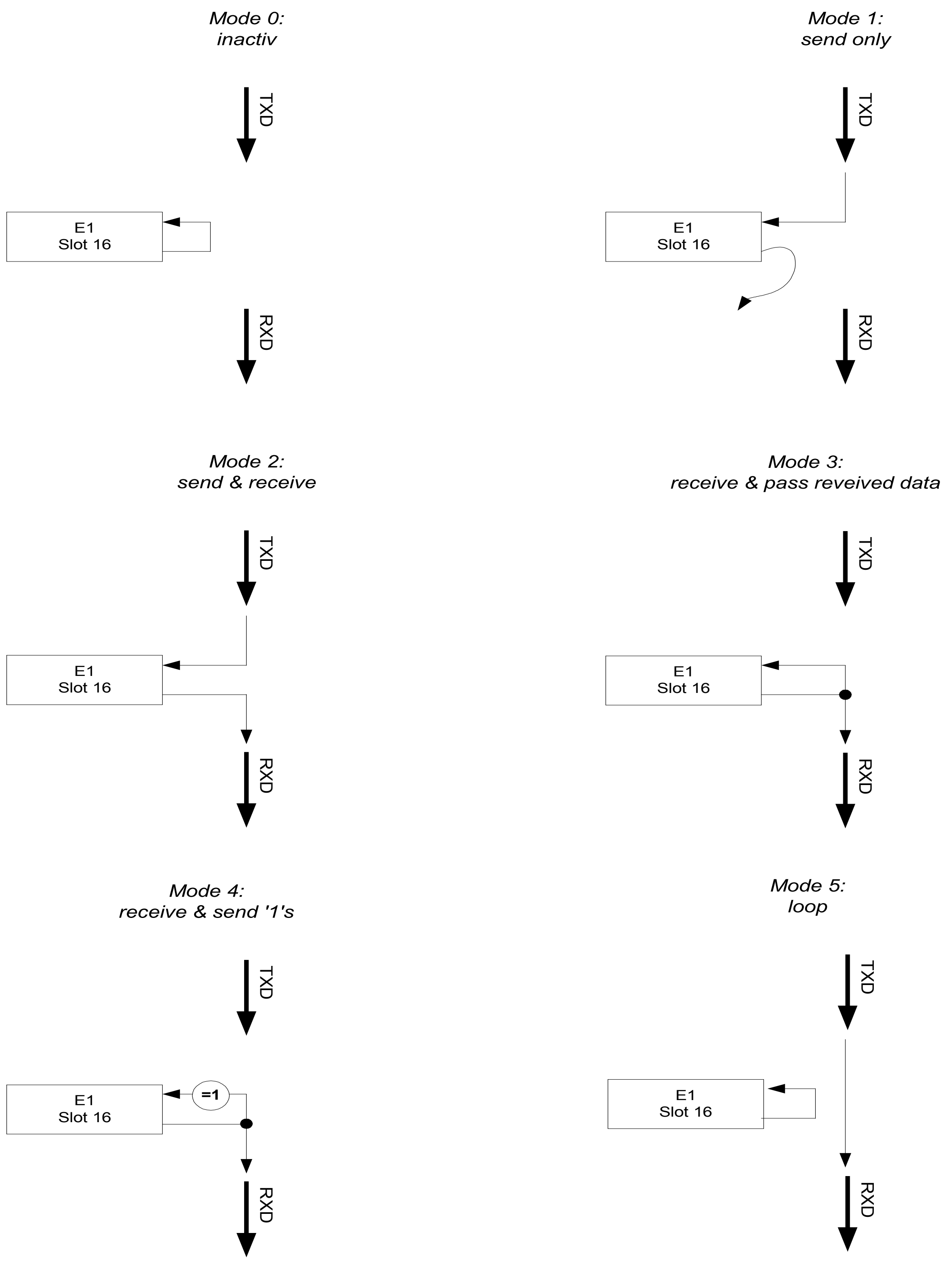


Figure 22: E1-CAS

1.14 CAT cable categories for Ethernet, ISDN etc.

Category	Area of use	Speed	Characteristic impedance in ohms
CAT1	Telephone lines, telecommunication cables, untwisted cable	< 1MBit/s	
CAT2	Improved telecommunication cable	<= 4MBit/s	
CAT3	Simple LAN up to 100Meter	<= 10MBit/s,	100
CAT4	LAN	<= 20MBit/s	100
CAT5	LAN up to 100 Meter at 100MBit/s	20-100MBit/s	100
CAT6	Draft Gigabit Ethernet	ATM 622 MBit/s <= 600 MHz	

Table 32: CAT cable categories

1.14.1 CAT color codes

Color code	**Pair no.1**		**Pair no.2**		**Pair no.3**		**Pair no.4**	
Norm	**Terminal**		**Terminal**		**Terminal**		**Terminal**	
Pin	4	5	3	6	1	2	7	8
EIA/TIA 568 A	bl	ws/bl	ws/or	or	ws/gn	gn	ws/bn	bn
IEC 708, IEC 189.2	bl	ws	ws	or	ws	gn	ws	bn
ICEA S80-576	or	gr	sw	rt	gn	gb	bl	bn

Color code	Pair no.1		Pair no.2		Pair no.3		Pair no.4	
Norm	Terminal		Terminal		Terminal		Terminal	
Pin	4	5	3	6	1	2	7	8
EIA/TIA 568 B	bl	ws/bl	ws/gn	gn	ws/or	or	ws/bn	bn
IEC 708, IEC 189.3	bl	ws	tk	vl	(bl)	(ws)	(tk)	(vl)

Table 33: CAT color codes

Color abbreviations

Color	White	Blue	Orange	Green	Brown	Grey	Red	Yellow	Slate grey	Turquoise	Violet	Pink
Abbreviation	ws	bl	or	gn	br bn	gr	rt	gb ge	sf	tk	vl	rs

Table 34: Color abbreviations

1.14.2 Transmission directions

Transmission according to Ethernet Standard in network 10BaseT and 100BaseTX

transmit ->	Pin1	Wire pair (orange)	Pin 1	**-> receive**
	Pin2		Pin 2	
receive <-	Pin3	Wire pair (green)	Pin 3	**<- transmit**
	Pin6		Pin 6	

Table 35: Transmission directions

1.14.3 Pin configuration of services

Application	Pin configuration
Telephone analog	4-5
ISDN	4-5, 3-6
10Base-T, 100BaseTX	1-2, 3-6
10Base-T, 100BaseTX crossed cable	1-3,2-6,3-1,6-2 (Rest, must not result: 4-8,5-7,7-5,8-4)
TP-PMD (FDDI), ATM	1-2, 7-8
100Base-VG, 100BaseT4	1-2, 3-6, 4-5, 7-8

Table 36: Pin configurations of services