Null Modem Cables for Connecting to DTE

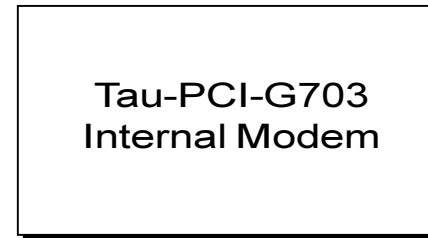| Delta HDB-26 male	V.35 M-34 female	RS-232 DB-25 female	RS-530 DB-25 female	RS-449 DB-37 female
12	—	3	3	6
14	—	2	2	4
1	R	—	13	27
3	P	—	19	25
2	T	—	16	24
24	S	—	14	22
10	D	5	5	9
21	C	4	4	7
19	E,F	6,8	6,8	11,13
16,25	H	20	20	12
7	V,Y	—	10,22	29,31
5,22	U	—	23	30
9	AA,X	—	9,12	23,26
15,23	W	—	11	35
20	—	15,17	15,17	5,8
17,26	—	24	24	17
11	A	1	1	1
18	B	7	7	19

For V.35 cable you should link pin 6 to pin 4 in HDB-26 connector.

Loopback Connector for Testing Channels

Pin	V.35	RS-530	RS-232	G703

Tau-PCI-G703 Adapter
User Manual

CRONYX Engineering

Tau-PCI-G703 Internal Modem

Contents

Specifications

- Distance up to 2.5 km
- Two G.703 interfaces 2.048 Mbps
- Full duplex synchronous mode
- Two additional digital interfaces V.35/RS-232 or RS530/X.21
- PCI bus, Master mode
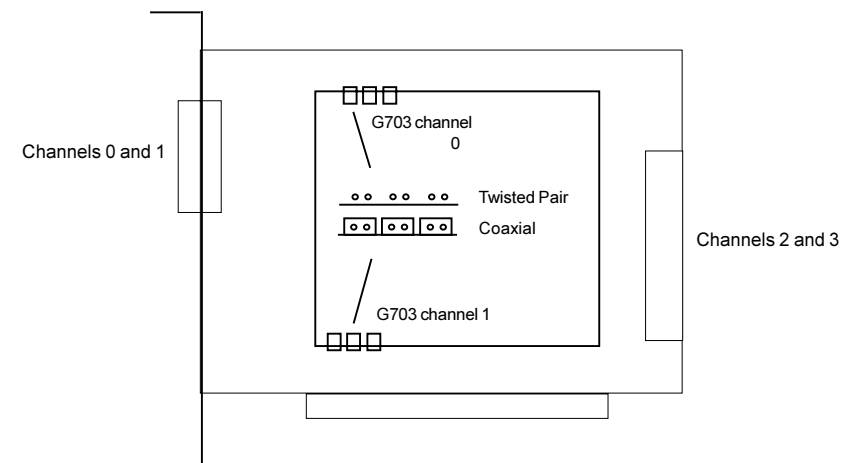
Technical Specifications

Bus type...PCI 33 MHz / 32-bit

Synchronous protocol ....HDLC

Protocols supported ....PPP, Cisco/HDLC, Frame Relay

Operating systems ....Linux, FreeBSD

Card dimensions...105 mm height, 140 mm width

G703 interface

Data rate ....64, 128, 256, 512, 1024, or 2048 kbps
programmable for each channel

Line code..HDB3

Line impedance ....120 Ohm (twisted pair) or 75 Ohm (coaxial),
selectable by jumpers for each channel

Input level ....0 to -43 dB, programmable
(up to 2.5 km over a twisted-pair cable of 0.6
mm gage)

Signal level control ....4 levels: 0 dB, -9.5 dB, -19.5 dB, -28.5 dB

Suppression of jitter ....In the receiving path, 32-bit depth

Error check ....Code violation

Serial channels (Delta expansion card)

Interface Type ....Tau-PCI4-G703/V – RS-232 / V.35
Tau-PCI4-G703/R – RS-530 / X.21

Maximum data rate ....10 Mbps for each channel simultaneous
operation

Synchronization modes ....TXCIN, RXCIN, TXCOUT, or DPLL
programmable for each channel

Modem signals ....DTR, DSR, CTS, RTS, CD

RS-530 and RS-449 Cables for Connecting to DCE

Signal	Delta HDB26 male		RS-530 DB-25 male	RS-449 DB-37 male
TXD-a	12	→	2	4
TXD-b	2	→	14	22
RXD-a	14	←	3	6
RXD-b	24	←	16	24
TXCOUT-a	20	→	24	17
TXCOUT-b	9	→	11	35
TXCIN-a	17	←	15	5
TXCIN-b	23	←	12	23
RXCIN-a	26	←	17	8
RXCIN-b	15	←	9	26
RTS-a	10	→	4	7
RTS-b	1	→	19	25
DTR-a	19	→	20	12
DTR-b	7	→	23	30
DSR-a	25	←	6	11
DSR-b	5	←	22	29
CTS-a	21	←	5	9
CTS-b	3	←	13	27
CD-a	16	←	8	13
CD-b	22	←	10	31
GND	11	↔	1	1
GND	18	↔	7	19

X.21 Cable for Connecting to DCE

Signal	Delta HDB26 male		X.21 DB-15 male	Signal
TXD-a	12	→	2	Transmit (A)
TXD-b	2	→	9	Transmit (B)
RXD-a	14	←	4	Receive (A)
RXD-b	24	←	11	Receive (B)
TXCOUT-a	20	→	7	ETC (A)
TXCOUT-b	9	→	14	ETC (B)
RXCIN-a	26	←	6	Sig Timing (A)
RXCIN-b	15	←	13	Sig Timing (B)
RTS-a	10	→	3	Control (A)
RTS-b	1	→	10	Control (B)
CD-a	16	←	5	Indication (A)
CD-b	22	←	12	Indication (B)
DTR-a	19	⌐		
DSR-a	25			
CTS-a	21	⌐		
DTR-b	7	⌐		
DSR-b	5			
CTS-b	3	⌐		
GND	11	↔	1	Shield
GND	18	↔	8	GND
Select	6			

connect to GND 4

14	—	RXD-a	RXD	In
15	RXCIN-b	RXCIN-b	—	In
16	CD	CD-a	CD	In
17	—	TXCIN-a	TXCIN	In
19	DTR	DTR-a	DTR	Out
20	—	TXCOUT-a	TXCOUT	Out
21	CTS	CTS-a	CTS	In
22	TXCIN-a	CD-b	—	In
23	TXCIN-b	TXCIN-b	—	In
24	RXD-b	RXD-b	—	In
25	DSR	DSR-a	DSR	In
26	—	RXCIN-a	RXCIN	In

Cable Diagrams of Delta Expansion Card

V.35 cable for connecting to DCE

Signal	HDB26 male		M34 male
TXD-a	1	⟶	P
TXD-b	2	⟶	S
RXD-a	3	⟵	R
RXD-b	24	⟵	T
TXCOUT-a	7	⟶	U
TXCOUT-b	9	⟶	W
TXCIN-a	22	⟵	Y
TXCIN-b	23	⟵	AA
RXCIN-a	5	⟵	V

RXCIN-b	15	⟵	X
RTS	10	⟶	C
DTR	19	⟶	H
DSR	25	⟵	E
CTS	21	⟵	D
CD	16	⟵	F
GND	11	⟷	A
GND	18	⟷	B
Select	6		
		connect to GND 4	

RS-232 Cable for Connecting to DCE

Signal	HDB26 male		DB-25 male
TXD	12	⟶	2
RXD	14	⟵	3
TXCOUT	20	⟶	24
TXCIN	17	⟵	15
RXCIN	26	⟵	17
RTS	10	⟶	4
DTR	19	⟶	20
DSR	25	⟵	6
CTS	21	⟵	5
CD	16	⟵	8
GND	11	⟷	1
GND	18	⟷	7

Description

Adapters of Tau-PCI-G703 family are designed for use in Intel-compatible computerss with PCI bus for directly connecting computers to G.703 communication links. An expansion card allows you to add two extra links for connecting communication and terminal equipment with RS-232, V.35, RS-530, or X.21 interfaces.

Tau-PCI-G703 multiplexer implements HDLC synchronous protocol. Data are transmitted over a direct memory access channel in master mode that ensures an effective usage of computer input/output bus.

Tau-PCI-G703 multiplexer has two data transmission channels. Tau-PCI4-G703/V multiplexer has four channels and consists of two cards: main adapter card (Tau-PCI-G703) and expansion card (Delta).

Each serial channel of Delta expansion card provides two interfaces: V.35 and RS-232. Switching between the interfaces is performed automatically depending on the cable connected. Multiplexers with additional channels having RS-530 / X.21 interfaces are available on special request.

The adapter is supplied with Linux and FreeBSD drivers. There is a Driver Development Kit available for developers of special-purpose software. You can download the latest software versions from www.cronyx.ru.

Models

There are several models of the multiplexer:

- Tau-PCI-G703 - two channels with G703 interface.
- Tau-PCI4-G703/V - two channels with G703 interface and two extra channels with V.35/RS-232 interfaces.
- Tau-PCI4-G703/R - two channels with G703 interface and two extra channels with RS-530/X.21 interfaces.

You can also order an expansion card separately:

- Delta – two channels with V.35/RS-232 interfaces.
- Delta/R - two channels with RS-530/X.21 interfaces.

Check List

The package should contain the following items:

- Tau-PCI-G703 adapter card
- expansion card with connector (for Tau-PCI4 models)
- loopback connector for G703 interface
- loopback connector for V.35, RS-530, and RS-232 interfaces (for Tau-PCI4 models)
- extra HDB-26 connector for making customer-specific cable
- two floppy disks with the software
- user manual

Note: interface cables are not included and should be purchased separately.

Adapter Installation

Warning! V.35, RS-232, RS-530, and X.21 interfaces have no galvanic decoupling. To avoid damage of your multiplexer and communication equipment ***make sure*** that the ***housings*** of the communication equipment and your PC are ***securely connected*** to each other through grounded outlets or with a separate wire, and there is no significant potential drop between them.

Also, check if the power source of your PC has enough power reserve for installing an additional card.

- Make sure that your PC is turned off!
- Remove the cover from your system unit, locate an empty PCI slot, and demount the related stub on the backside of the chassis.
- Before inserting the multiplexer into your PC set jumpers of G703 line type selection for each channel as required (see page 1).
- Insert the multiplexer into the slot up to the stop and secure it to the backside of the chassis with a screw.
- For Tau-PCI4 model: locate another empty slot, demount its stub, and insert an expansion card into the slot. Make sure the card does not touch any other parts within your PC and secure it with a screw. Connect the main card to the expander with a cable.
- Replace the cover of your system unit.
- Solder G703 lines to HDB-26 connector supplied with the multiplexer. See Appendix for a list of signals assigned to the connector pins. Use dry flux when soldering for not to soil pins.
- Connect your communication equipment using appropriate cables (not supplied).

G703 Line Protection

Communication lines can be subject to pulse interference from electrostatic and lightning discharges, or other sources. If you are utilizing long lines extending beyond a single building it is advisable to use special safety devices (Communication Line Surge Suppressors) which should be located in close vicinity to your PC.

Devices with rated break-down voltage of about 7.5V and allowable pulse current of 200A having small self-capacitance will fit to protect G703 lines. Examples of such devices are D10B2 (for coaxial cable) and D10BT (for twisted-pair cable) models by TRIPP LITE company (U.S.A.).

Adapter Testing

- Boot your PC from the floppy disk labelled "Diag (Boot)". After the boot DIAG utility will start automatically to search for installed adapters.
- Choose "General Test" from "Test" menu. This will check main communication circuits of the adapter (bus test) and then start an internal test of all channels. The test should find no errors (several CRC errors are only allowable in the beginning of the test because of the sync adjustment).
- To check external signal circuits go to "Channel" menu, select the necessary channel number ("Select Channel..." row), connect an external contactor (supplied with the adapter) to the connector of the channel so selected, and launch an external loopback ("External Loopback" row). When testing digital channels of Delta expander make sure "Internal clock" sync method is set. For X.21 interface, you should use "RS-530" contactor.
- If the connected communication equipment supports the loopback mode you can use the latter for cable testing as well as for synchronization instead of the contactor. To do that switch the external equipment to the loopback mode and start an external loopback of the channel ("Channel" menu, "External Loopback" row).
- "Setup" menu is used to change sync mode, speed, test data type, etc. "Channel", "Adapter", and "Test" menus are used to test single channels, all channels of the same adapter, or all adapters simultaneously.

Software Installation

The first (bootable) floppy disk supplied with the adapter is intended to test the adapter. The second floppy disk contains drivers for Linux and FreeBSD.

Installing Drivers in FreeBSD and Linux OS

Drivers for Linux and FreeBSD are on the second floppy disk. File `readme.txt` contains the full list of the drivers. You can read files on the floppy disk using "mread" utility (mtools package). Use "tar" utility to unpack files. For example:

```
mread a:linx30.tgz .
tar xvzf linx30.rgz
```

After unpacking the necessary driver, follow the installation instructions provided in readme.txt file (or install.txt).

Configuring Channels in FreeBSD OS

Use sconfig utility to set channel modes. Modes are normally set at the start of the operational system (e.g. from /etc/rc file) and do not need to be changed afterwards. The full description of sconfig utility is included in software package supplied, see "man sconfig".

Configuring Channels in Linux OS

Use sconfig utility to set channel modes of Tau-PCI adapter in Linux OS. Create a batch file that sets channel modes at the start of the operational system using examples provided in the distributive package. For help on sconfig utility use the following command:

```
sconfig help
```

List of Signals

G703 Connector

Pin	G.703	Dir
1	XMT0-a	Out
2	XMT0-b	Out
3	RCV0-a	In
4,8,11,13,18	GND	—
5	RCV1-a	In
7	XMT1-a	Out
9	XMT1-b	Out
15	RCV1-b	In
24	RCV0-b	In

V.35/RS-530/RS-232 Connector of Delta Expansion Card

Pin	V.35	RS-530	RS-232	Dir
1	TXD-a	RTS-b	—	Out
2	TXD-b	TXD-b	—	Out
3	RXD-a	CTS-b	—	In
4,8,11,13,18 GND	GND	GND	GND	—
5	RXCIN-a	DSR-b	—	In
6	Select	Select	Select	—
7	TXCOUT-a	DTR-b	—	Out
9	TXCOUT-b	TXCOUT-b	—	Out
10	RTS	RTS-a	RTS	Out
12	—	TXD-a	TXD	Out