

TTU Standalone/Rack

T1, Fractional T1 Single Port Access Unit

The **TTU** is a single port access unit for DS1, Fractional DS1 or Fractional cascade DS1 service.

The **TTU** data channels support user-selectable transmission rates, which are integral multiples of 56 or 64kbps, up to a maximum 1.536Mbps (64K x 24), 1544Mbps for unframed, for a line attenuation of up to 36 dB on two twisted pair.

The **TTU** packs the data channels into DS1 link time slots in user-selected time slots. The unused time slots can insert IDLE code (In frame mode) or insert the receive side time slots data (In cascade mode).

The **TTU** has a number of different user-replaceable data channel modules available, which provide the desired interface: V35, X.21, RS-530, RS-232, Ethernet Bridge or G.703 64k codirectional, to name a few.

The **TTU** fully meets all of the DS1 specifications including ITU-T G.703, G.704, G.706, G.824, and ANSI T1.403-1995.

The **TTU** features V.54 diagnostic capabilities for performing local loopback and remote digital loopback. The operator at either end of the line may test both the **TTU** and the line in the digital loopback mode. The loopback is controlled by either a manual switch or by the DTE interface for V.35 and RS-530. A front panel switch generates an internal 511 bit pseudo random test pattern, according to ITU, for direct end-to-end integrity testing. The Err indicator flashes for each bit error detected.

Multiple clock source selection provides maximum flexibility in connecting both the DS1 and user interface. The DS1 link may be clocked from the recovered receive clock, from user data port, or from the internal oscillator. The **TTU** operates from 90~250VAC, DC18~72V depending upon model. The unit is built in a compact case that can be placed on a desk top or shelf or installed, by means of an optional adapter, into a standard 19" rack.



TTU/AC
TTU/DC

Specifications

DS1(T1) Link

- **Framing** Unframed/Framed
SF (D4) / ESF
- **Bit Rate** 1.544Mbps
- **Line Code** AMI
B8ZS
- **Line Impedance** 100 Ohms (balanced)
Bridge (High Z)
- **Relative Receive Level** 0 to -36dB
- **Transmit Level**
 - **Pulse Amplitude** Nominal 3.0V $\pm 20\%$
 - **Zero Amplitude** $\pm 0.15V$
- **Transmit Frequency Tracking**
 - **Internal Timing** ± 30 ppm
 - **Loopback Timing** ± 50 ppm
 - **External Timing** ± 100 ppm
- **Jitter Performance** According to ITU G.824
- **Complies with** ANSI T1.403, AT&T TR-62411, ITU G.703, G.704, G.706 and G.733
- **Interface Connectors** 15 pin, D-type Female
BNC
Bantam

Specifications (cont.)

User Data Channels

- **Interface types**
 - V.35
 - X.21
 - RS-530
 - RS-449 (RS-530 module)
 - RS-232
 - 10Base-T (Bridge; Router)
 - G.703/64K
- **Interface connectors**
 - V.35 interface** 34 pin, MB, female
 - X.21 interface** 15 pin, D-type female
 - RS-530 interface** 25 pin, D-type female
 - RS-449 interface** 37 pin, D-type male (via adapter cable)
 - RS-232 interface** 25 pin, D-type female
 - ET10 interface** 8 pin, RJ-45
 - G703/64k interface** 15 pin, D-type female
- **Line code**
 - NRZ
 - 64 kbps Codirectional
- **Data rate**
 - Unframed: 1.544 Mbps
 - Framed: N x 56 or N x 64 kbps where N equals 1 to 24
- **Clock modes**
 - Clock mode 0 (DCE1)** Receive and transmit clock (recovered) to the synchronous DTE
 - Clock mode 1 (DCE2)** Receive and transmit clock (internal oscillator) to the synchronous DTE
 - Clock mode 2 (DTE1)** Receive clock to the synchronous, and transmit clock from the synchronous device
 - Clock mode 3 (DTE2)** Receive and transmit clock from the Synchronous DCE (from ETC and ERC pin)
 - Clock mode 4 (DTE3)** Receive and transmit clock from the Synchronous DCE (all from ETC pin)
- **Control signals**
 - CTS constantly ON
 - DSR constantly ON, except during test loops
 - DCD constantly ON or follows RTS, except during signal loss
- **Time slot allocation** User defined

LED Indicators

- **PWR** Green Power
- **TD** Yellow Transmit data
- **RD** Yellow Receive data
- **RTS** Yellow Request to sent
- **DCD** Yellow Data carrier detect
- **Tx CLK Loss** Red Transmit clock loss
- **Red Alarm** Red DS1 link signal loss
- **Sync Loss** Red DS1 link sync loss
- **Yel Alarm** Red DS1 link yellow alarm
- **Err** Red Bit errors
- **Test** Red Loopback and pattern test

Physical

- **Height:** 45mm
- **Width:** 195mm
- **Depth:** 255mm
- **Weight:** 1.5kg

Environment

- **Temperature** 0-50°C / 32-122°F
- **Humidity** 0 to 90% non-condensing

Diagnostics

- **Test switches/Diagnostics**
 - Digital local loopback
 - Analog local loopback
 - Digital remote loopback
 - Test pattern

Power Supply

- **Voltage** 90 ~ 250 VAC
18 ~ 72 VDC
- **Frequency** 47 to 63Hz (AC)
- **Consumption** 20 Watts
- **Fuse** 0.2A SB for AC
0.5A SB for DC

Ordering Information

- TTU/AC*** TTU & universal AC power supply
- TTU/DC*** TTU & universal DC power supply
- * No I/F Module installed

Optional Interface Modules

- ETU/TTU-V35** V.35 interface module
- ETU/TTU-X21** X.21 interface module
- ETU/TTU-530** RS-530 interface module
- ETU/TTU-449** RS-530 interface module plus RS-449 cable adapter
- ETU/TTU-G64** G.703 64k interface module
- ETU/TTU-ET10** 10Base-T Ethernet Bridge
- ETU/TTU-ET10R** 10/100Base-TX Ethernet Router
- ETU/TTU-232** RS-232 interface
- ETU/TTU-NRZ** NRZ/BNC 64K interface
- ETU/TTU-VOX** Voice

Order information examples

- TTU/V35-AC** TTU with V.35 I/F module & universal AC power supply
- TTU/449-DC** TTU with RS-449 I/F module & universal DC power supply
- TTU/ET10R-AC** TTU with ET10R I/F module & universal AC power supply



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* Specifications subject to change without notice.