

## Overview

The TM3100 is a compact access DCS-MUX that can combine various digital access interfaces into T1 or E1 lines for convenient transport and switching. The TM3100 provides access for a variety of interfaces, including Quad T1/E1, ATM/FR, 32 WAN Port Router, 64 WAN Port Router-A, Router-B, FOM, Terminal Server Card, G.703, U-Type, X.21/V.11, V.35/V36, RS232, 8xRS232, QE&M, QFXO, QFXS, 8xE&M, 12xFXS, 12xFXO, 24xFXS, 24xFXO and Magneto. These interfaces are compatible with other standard Telecom products. Using these interfaces, a DTE interface can be extended over copper wire pairs.

For many Quad T1/E1 plug-in cards, each card can have as many as 96 time slots for RS-232, X.21, V35 and V.36 interfaces are then multiplexed to fill 4 T1/E1 lines, with full flexibility of time slot interchange for all incoming lines. The TM3100 also supports optical fiber plug-in module, which can be used to aggregate up to 4 T1/E1 channels to single optical fiber interface to connect to other TM3100 or TM3000.

The TM3100 has capacity for 3 single slots and 4 mini plug-in slots. All interface cards and controller cards can be used in TM3000 and TM3100. It is a full cross-connect and can act as a mini DACS. It means that one or more of the WAN ports can be used as a Drop & Insert function with fractional T1/E1 lines, which can be multiplexed into a full T1/E1 line.

In addition, the TM3100 supports local control and diagnostics by using an external 2-line by 40-character LCD display and keypads, or by using a VT-100 terminal connected to the console port. The TM3100 supports Ethernet, SLIP, Telnet, and SNMP, so that it can be remotely controlled and monitored from remote locations. An in-band management channel with GUI is available. The TM3100 is ideal for implementing simple trunking systems for premise, metropolitan, and industrial environments. Applications for the TM3100 include PCS trunking, SCADA, ITS, railway networks, electrical utility networks, and cellular networks.



## Features

- *Support DSO DACS (Digital Access Cross Connected System)*
- *Dual Controller, Dual -48 VDC Power*
- *1 to 1 protection for T1, E1, FOM*
- *PDH ring Protection, QT1, QE1, FOM, Mini QE1*
- *Console, Telnet, SLPI, SNMP, and In-band Management Support*
- *Craft Interface Port for Connection to External Display*
- *GUI Network Management*

## Applications

- *Central Office Interconnects*
- *Local Exchange Digital Service*
- *PCS Trunking*
- *Metro Networks*
- *Campus Networks*
- *Traffic Networks*
- *Corporate and Enterprise Networks*

## Ordering Information

Model	Descriptions
TM3100-CH	2.5 RU Chassis with 56 Mb/s Cross-connect capacity, w/o CPU and Power
TM3100-CPU-T	CPU Card with T1 External Clock Module ( 2 cards for redundancy)
TM3100-T1	1 x T1 Interface w/ 120 Ohms, Mini Plug-in Module ( Up to 4 Cards per Chassis)
TM3100-4T1	4 x T1 Interface w/ 120 Ohms, Single Slot Plug-in Module (Max 28 T1)
TM3100-S5	100W -48 VDC Power Supply Module (2 Cards for Redundancy)

\*\*\* Please Consult Factory for Additional Model Numbers\*\*\*

### Specifications

<b>System:</b>	
Performance Store	The Last 24 hrs in 15 min Interval, Last 7 days in 24 hours Interval
Monitor Registers	12 MDSL ports, Network, User and Remote Site
Performance Reports	MDSL port unsync Date &Time, Errored Second, Unavailable Second, E1 Bursty Error Second, Severe Errored Second, Degraded Minutes, control Slip Second, Available in Statistics (%)
Alarm History	Contain 40 alarm records. Recorded latest alarm type, location, and date & time.
Diagnostics T1/E1 Interface MDSL Interface U Interface	Line, Local, Payload Loopbacks Local, Payload Loopbacks Local, Payload Loopbacks
Management Access	Console: VT100 Terminal Ethernet: RJ45
<b>Physical:</b>	
Dimensions	17.5" x 4.6" x 10.0"
DC Power	Single/ Dual -48 VDC @ 100 Watts
Operating	-10 <sup>0</sup> C to +65 <sup>0</sup> C
Storage	-40 <sup>0</sup> C to + 95 <sup>0</sup> C
Humidity	98% Non-Condensing

<b>Mini Slot:</b>	Up to 4 Cards
T1, E1 Interfaces	1-Ch T1, 1-CH E1, 4-CH E1
E1	1- Channel E1, 75 Ohms
Frame Relay	T1/E1 Frame Relay to ATM
Router, Bridge	32, 64 WAN Port Router, Bridge
Optical Interface	FO Card Links to other TM3100
Terminal Server	3-Ch Terminal Sever (RS-232)
FXO/FXS Interfaces	4-Ch FXO/FXS Voice Card
E&M Interface	2-Ch, 4-Ch 4-wire E&M Card
<b>Single Slot:</b>	Up to 3 Cards
T1, E1 Interfaces	4-Ch T1, 4-CH E1 Cards
E1 Interface	8-Ch G.703
MDSL	3-Ch MDSL w/o line power
G.SHDSL	2/4-Ch G.SHDSL w/o line power
RS-232 Interface	8-Ch RS-232 with x.50 subrate
LAN Port	8-LAN Port / 64 WAN port router
FXO/FXS Interfaces	12-Ch FXO/FXS Voice Card
E&M Interface	8-Ch 2/4-wire E&M Card
Relay Dry Contact	8-Ch Dry Contact I/O Card
Optical Interface	1 / 4-Ch Fiber Optic Cards
<b>Dual Slot:</b>	1 Card
MDSL	3-Ch MDSL w line power
G.SHDSL	2/4-Ch G.SHDSL w line power
RS-232 Interface	5-Ch RS-232 with x.50 subrate
RS-530 Interface	6-Ch RS530.RS449 Card
FXO/FXS Interfaces	24-Ch FXO/FXS Voice Card
X.21/V.11 Interface	6-Ch Data Card
V.35/V.36 Interface	6-Ch Data Card

Model:	TM3000	TM3100
Chassis	5RU	2.5RU
Number of Mini Slots	4	4
Number of Single Slots	12	3
Max T1/E1 Channels	64	28
Backplane Cross Connection	128 Mbps	56 Mbps

### Network Modules Specifications

<b>Network Line Interface – T1</b>	
Line Rate	1.544 Mbps +/- 50 bps
Line Code	AMI or B8ZS
Input Signal	ABAM Cable Length up to 655 F
Output Signal	DSX1
Framing	D4/ESF (Selectable)
Connector	RJ48C
<b>Network Line Interface – E1</b>	
Line Rate	2.048 Mbps +/- 50 bps
Line Code	AMI or HDB3
Input Signal	ITU G.703 to 10 dB
Output Signal	ITU G.703
Framing	ITU G.704
Connector	BNC/RJ48C
Electical	75 Ohms Coax / 120 Ohms TP
Jitter	ITU G.823
<b>Ethernet Router/Bridge Interface</b>	
Number of ports	2 LAN ports, Max 32 WAN ports
Physical Interface	10Base-T, 10/100M Base-T
Connector	RJ45
Routing Protocol	RIP-I, RIP-II
Data Rate	Channelized Nx64 Kbps up to T1/E1
Supporting	TCP/IP, PPP, HDLC
Management	VT-100, SNMP
<b>Router A Interface</b>	
Number of ports	2 LAN ports, Max 64 WAN ports
Physical Interface	10/100M Base-T
Connector	RJ45
Routing Protocol	RIP-I, RIP-II
Data Rate	Channelized Nx64Kbps upto 2 T1/E1
Supporting	PPP, HDLC, Frame Relay, Cisco
<b>Router B Interface</b>	
Number of ports	8 LAN ports, Max 64 WAN ports
Physical Interface	10/100M Base-T
Connector	RJ45
Routing Protocol	RIP-I, RIP-II, OSPF
Data Rate	Nx64Kbps up to 8 Mbps
Supporting	QoS Based on Rate Limit

<b>Terminal Server</b>	
Connectors	DB44 to DB9 and 2 DB25
Ports	1 Async and 2 Sync/Async RS-232
Data Rate	Async = 1.2 Kbps ~ 38.4 Kbps Sync = 64 Kbps
Router Function	RIP-I, RIP-II, Static Route
<b>2M MDSL Interface</b>	
Ports	Up to 3 3-port cards w/o line power Up to 2 3-port cards with line power
Data Rate	2M max per card
Line Rare	272, 400, 528, 784, 1168, 1552, 2064, 2320 for data rates n x 64 Kbps
Mode	Full Duplex MDSL Coding
Cable	19~26 AWG Twisted Pair
<b>6M MDSL Interface</b>	
Ports	Up to 3 3-port cards w/o line power Up to 2 3-port cards with line power
Data Rate	2M max per card
Line Rare	272, 400, 528, 784, 1168, 1552, 2064, 2320 for data rates n x 64 Kbps
Mode	Full Duplex MDSL Coding
Cable	19~26 AWG Twisted Pair
<b>G.SHDSL Line Interface</b>	
Ports	2 or 4 ports
Mode	Full Duplex 16-TCPAM
Line Rare	4-CH: n x 64 Kbps (n = 3~31) 2-CH: n x 64 Kbps (n = 3 ~15)
Clock Source	From System or Line
Cable	19~26 AWG Twisted Pair
Diagnostics	Loopback Test, To-bus BERT:QRSS
<b>U Interface</b>	
Ports	Up to 3 10-port cards or Up to 2 6-port DTU cards
Mode	Full Duplex with echo cancellation
Line Rare	56, 64, 112 or 128 Kbps
Line Code	2B1Q
Cable	19~26 AWG Twisted Pair
Connector	RJ48C

### Data Modules Specifications

<b>DTE RS-232 Interface (X.50 Mux)</b>	
Data Port	Up to 3 8-port cards
Mux	5 Sub-rate RS232 / 64 K
Asynchronous Mux Independent	0.6K, 1.2K, 2.4K, 4.8K, 9.6K 0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K
Synchronous Mux Independent	0.6K, 1.2K, 2.4K, 4.8K, 9.6K 0.6K, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 48K, 64K
Alarm	Remote Alarm, RTS Loss
Loopback	T0 DTE, To DS1 Line
Electrical	RS-232, DCE
Connector	DB44 (port 1~3), DB44 (port 4~6) RJ48 (port 7~8) RJ48 (port 1~8 are 8RJ48)
<b>DTE RS-530/RS449 Interface</b>	
Data Port	UP to 2 6-port EIA-530 cards
Data Rate	N x 64 Kbps, n = 1 to 32
Connector	DB25S
<b>DTE V.35/V.36 Interface</b>	
Data Port	UP to 2 6-port V.35/V.36 cards
Data Rate	N x 64 Kbps, n = 1 to 32
Connector	DB25S
<b>DTE X.21/V.11 Interface</b>	
Data Rate	56 / 64 Kbps (n = 1 ~24/31)
Mapping	Any sequential time slots
Connector	DB15S
<b>DTE RS-232 Interface</b>	
Data Port	UP to 2 5-port EIA-RS232 cards
Mux	5 independent or 5 sub-rate
Data Rate Sync	Independent port 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 48K, 64K
Async	1.2K, 2.4K, 4.8K, 9.6K, 19.2K
Data Rate Sync	Sub-rate mux card 1.2K, 2.4K, 4.8K, 9.6K, 19.2K
Async	1.2K, 2.4K, 4.8K, 9.6K, 19.2K
Connector	DB25S

<b>ATM Frame Relay Interface</b>	
Network Interface	T1/E1 = T1/E1 ATM UNIT
PR Channels	Up to 31 Logical Concentrated/De-concentrated FR/ATM service ports
T1/FT1 E1/FE1	N x 64 Kbps, n = 1 ~ 24 N x 64 Kbps, n = 1 ~ 31
Support	HDLC to FR, HDLC to ATM, FR to FR Multiplexing, AAL0, AAL5, VBR Service, PVC, ITU FR Management, Flash memory software download via RS485 Up to 128 DLCIs for total of 31 FR Up to 128 VCs Peak cell rate on DLCI basis Enable ATM scramble for testing

### Dry-Contact I/O Card

Input	
8-Channel	2-port per card, 4-pair per card
Connector	RJ45
Internal Resistance	1 K
Activation Current	3 mA
Deactivation Current	1.5 mA
Allowable Current	4 mA
Output	
8-Channel	8-pair per card
Connector	Screw Type
Insulation Resistance	Min 100 Ohms @ 500 VDC
Max Current	5 A
Max Voltage	100 VDC, 250 VAC
Short-circuit Current	5 A

### Optical Fiber Interface

Ports	Up to 4 ports
Transmitter	Laser
Receiver	PIN
Wavelength	1310/1550 nm
Data Rate	155 Mbps
Connector	SC/ST
Fiber	One or Two Fibers
Distances	10KM @ MM, 40KM @ SM

### Voice Modules Specifications

QFXS, QFXO Interface	
Connector	4 x RJ11
Alarm Conditioning	CGQ busy after 2.5 sec of LOS, LOF
Encoding	A-Law or u-Law selectable
AC Impedance	600/900 Ohms selectable
Longitudinal Rejection	55 dB
Loss Adjustment	0, 3, 6, 9 dB Transmit & Receive
Signal Distortion	>46 dB @ 1004 Hz, 0 dBm input
Frequency Response	-0.25 ~ - 1 dB from 300 ~ 3,400 Hz
FXS Loop Feed	-48 VDC @25 mA current limit
FXS Ringing	1 REN, 20 Hz @ 5,000 meters Optional Frequencies: 16.7 Hz, 25 Hz, 50 Hz @ 82 Vrms PLAR Function: 1/2 sec on 2/4 Sec off
FXO Ringing REN	
Ringing REN	0.5B (AC)
Detectable Ringing	25 Vrms
Loop Resistance	< 1800 Ohms
DC Impedence	
ON-HOOK	235 Ohms @ 25 mA Feed
OFF-HOOK	90 Ohms @ 100 mA feed
Metering Pulse	
Power	10 dBm
Sensitivity	-18 dBm to -45 dBm
Signaling	Loop Start, GND-Start, Metering Pulse (12/16 Khz), DTMF, PLAR, Dialing Pulse, Battery Reverse
In-band Signal Tones	Transparent

Voice 8E&M Interface	
Connector	8 x RJ11
Alarm Conditioning	
Encoding	A-Law or u-Law selectable
AC Impedance	600/900 Ohms selectable
Longitudinal Rejection	46 dB
Gain Adjustment	Tx: -10 to +7 dB @ 0.1 dB step (D/A) Rx: -10 to +17 dB @ 0.1 dB (A/D)
I/O Voice Power	Input: -66 dBm ~ +3 dBm (A/D) Output: -66 dBm ~ +7 dBm (D/A)
Signal Distortion	>25 dB @ 1004 Hz, 0 dBm
Frequency Response	-0.25 ~ - 1 dB from 300 ~ 3,400 Hz
Carrier Connection	Side A (Exchange)/Side B (Carrier)
Wire Mode	2/4 wires
Signaling Type	Type I, II, III, IV, V
OCUP Interface	
Ports	8 ports per card
Line Status Indicators	Red = Los, Green = Sync
Network Connector	RJ48
Electrical Connection	Tip/Ring
Transmit Impedance	135 Ohms +/- 20%
Receive Impedance	135 Ohms +/- 20%
Receiver Sensitivity	0 to 43 dB loop loss @ 72K & 56K 0 to 34 all other rates

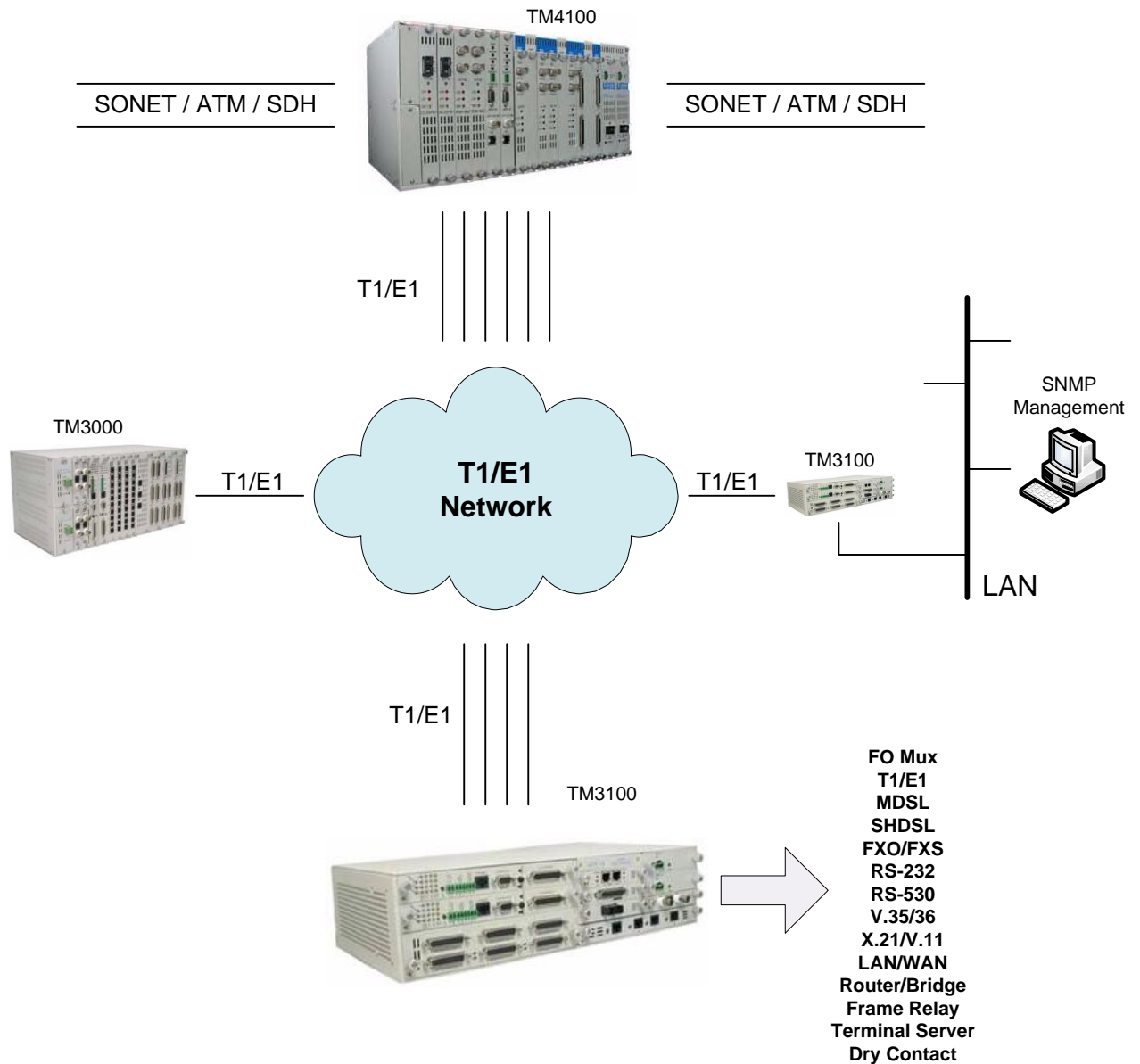
#### Certifications

EN55022 Class A, EN50024, FCC Part 15 Class A, FCC Part 68, IEC60950, UL60950

#### Compliance

ITU G.703, G.704, G.706, G.732, G.736, G.823, G.826, G.711, G.775, O.151, V.11, V.28, V.54

## Applications



**Typical TM3100 Application**