

VB-652

2/4-wire SHDSL Modem/Multiplexer



Features

- SHDSL modem for effective provisioning of TDM and Ethernet data services at the rates of up to 4.6 Mbps
- Ethernet and E1 or serial data services multiplexed over SHDSL
- Operating range of up to 10 km (6.2 miles) on 24 AWG
- Data rates between 64 kbps and 4608 kbps

Description

- VB-652 is an SHDSL modem/multiplexer for data and voice that operates in full-duplex mode over 2-wire and 4-wire lines.
- Multiple data rates in the range of 64 to 4608 kbps are supported. The data rates depend on the line interface, DTE interface types, and operating clock modes.
- VB-652 employs standard SHDSL TC-PAM technology to extend the transmission range (see Table 1), thus enabling carriers to reach more customers at lower costs.
- The following DTE interfaces are available: X.21, V.35, RS-530, and G.703/G.704 E1 or T1. For LAN to-LAN connectivity using SHDSL technology, the modem features a built-in 10/100BaseT bridge Ethernet port with VLAN functionality.
- When equipped with two interfaces, the VB-652 units combine and multiplex user traffic over the SHDSL link. The following DTE combinations are available:
 - Serial Port (V.35, X.21, RS-530) + LAN
 - E1 + LAN

- E1 + serial port (V.35, X.21, RS-530).

Note: T1 multiplexer units are not available.

- 4-wire line interface modems can be configured to operate over 2-wire lines.
- The modem uses an Embedded Operation Channel (EOC) for controlling and monitoring the remote unit. The management channel uses SHDSL overhead bits in compliance with ITU-T G.991.2 requirements, without interfering with the data transmission.
- User-configurable low-speed mode is available for units with serial and LAN interfaces. In this mode VB-652 operates at 64/128 kbps (2-wire) and 128/256 kbps (4-wire) data rates when working opposite devices with E1 DTE interface. The maximum data rate in low-speed mode is 2048 kbps.

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- QoS is enhanced by prioritizing the LAN packets to the DSL line according to four levels of VLAN priorities. The user can enable or disable the VLAN priority, and each VLAN priority (0–7) tag can be configured to one of four classes of priority level.

MANAGEMENT

- Supervision and configuration activities are performed using an ASCII terminal, IP hosts using the Telnet protocol, or SNMP management systems.

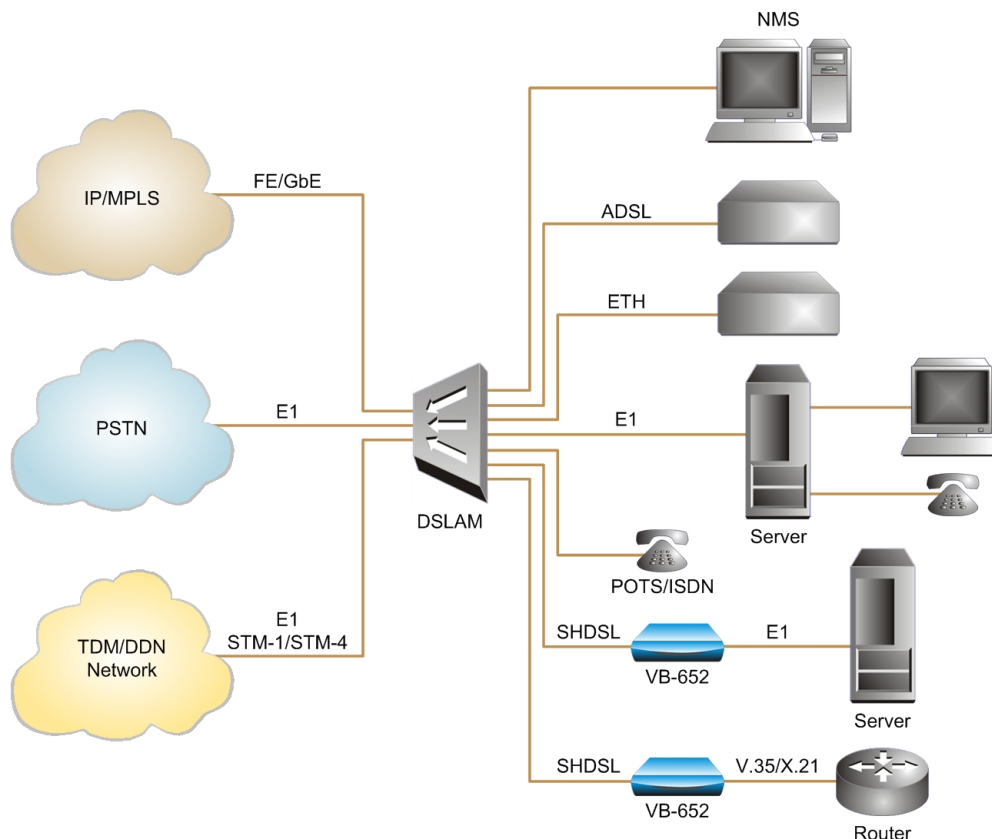
- The terminal port supports a dial-up modem connection for remote management of VB-652 over telephone lines.
- SNMP management can be performed via a 10/100BaseT port or a dedicated E1/T1 timeslot.

Note: When VB-652 is ordered only with the 10/100BaseT port, it is used to transfer the user and management data.

DIAGNOSTICS

- Comprehensive diagnostic capabilities include:
 - Real-time alarms to alert the user on fault conditions
 - V.54 local analog and remote digital loopbacks
 - SHDSL and E1/T1 statistics collection for 15-minute and 24-hour intervals.
- BER test can be performed by multiplexer units on each serial interface.
- The BERT generates and receives four different test patterns.

Application



Specifications

LINE INTERFACE

- Type
2/4-wire unconditioned dedicated line (twisted pair)
- Line Coding
TC-PAM
- Range
See *Table 1*
- Impedance
135 Ω
- Standards
ITU-T 991.2, ETSI 101 524.
- Connectors
RJ-45

DTE INTERFACE

- Data Rate
Depends on the DTE/line interface type and clock mode:
2-wire: 64 to 2304 kbps (ext. clock)
64 to 2048, 2304 kbps (int. clock)
64 to 1536 kbps (T1)
4-wire: 128 to 4608 kbps (ext. clock)
128 to 4096, 4608 kbps (int. clock)
64 to 1536 kbps (T1)

Note: The multiplexer option operates at up to 2048 kbps only.

- Connectors
X.21: 15-pin, D-type, female
V.35: 34-pin, female
RS-530: 25-pin, D-type, female
G.703/G.704 E1: RJ-45
T1: RJ-45
ETH (10/100BT bridge with VLAN support): RJ-45

E1/T1 INTERFACE

- Data Rate
E1: 2048 kbps
T1: 1544 kbps

- Coding
E1: HDB3
T1: B8ZS or AMI
- Line Impedance
Balanced E1: 120 Ω
Unbalanced E1: 75 Ω (via adapter cable)
Balanced T1: 100 Ω
- Connector
8-pin RJ-45

Note: An adapter cable can be ordered for converting the main link RJ-45 connector into a pair of BNC connectors for unbalanced E1 coax interface.

- E1 Jitter Performance
As per ITU G.823

MANAGEMENT PORTS

- V.24/RS-232 CONTROL Port
Interface: V.24/RS-232 DTE
Connector: 9-pin D-type, female
Format: asynchronous
Baud rate: 9.6 to 115.2 kbps
- Ethernet Port
Interface: 10/100BaseT
Connector: RJ-45 shielded

ALARM PORT

- Type
Dry relay contacts for major and minor alarms
- Connector
9-pin D-type female

GENERAL

- Timing
Internal, from internal oscillator
External, from attached DTE
Receive, from received signal (CPE only)
- Diagnostics
Local analog loopback in compliance with ITU V.54
Remote digital loopback in compliance with ITU V.54
BER test on and multiplexer units

- Performance Monitoring
SHDSL statistics collection
E1 with CRC-4 or T1 with ESF framing (per ITU G.706)
E1 without CRC-4 or T1 with SF framing (BPV)
Compliance with G.826
- Indicators
PWR (green) – Power on
DATA (yellow) – Transmit data (except E1 or T1 interface)
SYNC A/B (green/red) – Sync status of DSL line
E1 or T1 SYNC (red) – Loss of E1 or T1 sync (E1 or T1 interface only)
AIS (yellow) – “All 1s” string is received (E1 or T1 interface only)
ALM (red) – Alarm enters the buffer
TST (red) – Test in progress
- Power
100–240 VAC, 50/60 Hz or 48/60 VDC nominal (40 to 72 VDC)
24 VDC nominal (18 to 36 VDC)
- Power Consumption
4-wire: 7W max
2-wire: 6W max
- Physical
Height: 4.37 cm (1.7 in)
Width: 21.7 cm (8.5 in)
Depth: 17.0 cm (6.7 in)
Weight: 0.5 kg (1.1 lb)
- Environment
Operating temperature: 0°–50°C (32°–122°F)
Humidity: Up to 90%, non-condensing

Ordering

VB-652/@/*/#/%/\$/?/+
2/4-wire SHDSL standalone modem

Legend

@ Power supply (Default= wide-range AC/DC power supply):

24V 24 VDC

* DTE interface:

X21 X.21

V35 V.35

E1 E1

Note: For E1 unbalanced interface, order cable CBL-RJ45/2BNC/E1/X.

RS530 RS-530

ETH 10/100BaseT

T1 T1

Line interface:

2W 2-wire

4W 4-wire

% Second interface (Default= single DTE interface):

ETH 10/100BaseT (only for models with 1st E1, T1 or serial DTE interfaces)

Note: In the T1 interface units, this port is for management only.

V.35 V.35 (only for models with 1st E1 or serial DTE interfaces)

SUPPLIED ACCESSORIES

Power cord

AC/DC adapter plug (when -48 VDC is ordered)

PLUG-DC/TB-S

DC adapter plug (when 24 VDC is ordered)

OPTIONAL ACCESSORIES

CBL-RJ45/2BNC/E1/X

Interface adapter for converting a balanced E1 RJ-45 connector into a pair of BNC unbalanced coaxial connectors

CBL-DB9F-DB9M-STR

Control port cable

RM-33-2

Hardware kit for mounting one or two plastic VB-652 units in a 19-inch rack

Table 1. Typical Ranges (26 AWG)

Data Rate [kbps]	2-wire		4-wire	
	[km]	[mi]	[km]	[mi]
64	7.5	4.6	—	—
128	7.0	4.3	7.1	4.4
256	6.7	4.1	6.8	4.2
384	6.5	4.0	6.7	4.1
512	6.3	3.9	6.6	4.1
1024	5.3	3.3	6.0	3.7
1536	5.0	3.1	5.6	3.5
2048	4.5	2.8	4.7	2.9
2304	4.2	2.6	4.5	2.8
4096	—	—	3.7	2.3
4608	—	—	3.0	1.8

Note: The typical ranges are based on error-free lab tests without noise



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