Data Sheet

Megaplex-4

VS

Multiservice Module

- Broad variety of services: E1/T1, FXS, FXO or E&M toll-quality analog voice channels, input/output binary command ports, IEEE C37.94 dual optical link
- 6/12 serial sync/async data interfaces, configurable (per port) serial interface types and data rates of 2.4 kbps to 1984 kbps
- Bidirectional broadcast for easy interconnection of multiple control centers to remote RTUs/IEDs
- Pseudowire or Ethernet over PDH support

VS multiservice modules provide a variety of interfaces, including serial, binary command, C37.94, voice, E1/T1 and Fast Ethernet. The modules use an embedded pseudowire engine used for low-latency transmission of TDM services over packet-switched networks.

ARCHITECTURE

VS-12 modules consists of two identical submodules each featuring a serial interface with 6 sync/async channels and one Fast Ethernet port.

VS-6/BIN consists of the following submodules:

- Upper: serial interface submodule with 6 sync/async channels and one Fast Ethernet port
- Lower: binary command submodule with 8 inbound (cmd-in) and 8 outbound (cmd-out) ports.

VS-6/703 consists of the following submodules:

- Upper: serial interface submodule with 6 sync/async channels and one Fast Ethernet port
- Lower: G.703 submodule with 8 G.703 codirectional 64-kbps ports.

VS-6/C37 consists of the following submodules:

- Upper: serial interface submodule with 6 sync/async channels and one Fast Ethernet port
- Lower: C37.94 submodule with 2 IEEE C37.94 fiber optic ports.

VS-6/FXS, VS-6/FXO, VS-6/E&M modules consist of the following submodules:

- Upper: serial interface submodule with 6 sync/async channels and one Fast Ethernet port
- Lower: voice submodule with 8 FXS, 8 FXO or 4 E&M ports.

FXS/E&M module consists of the following submodules:

- Upper: voice submodule with 8 FXS ports.
- Lower: voice submodule with 4 E&M ports.

VS-6/E1T1 consists of the following submodules:

- Upper: serial interface submodule with 6 sync/async channels and 8 E1 or T1 ports
- Lower: E1/T1 submodule with 8 soft-selectable E1/T1 ports.

VS-16E1T1 consists of two identical E1/T1 submodules each featuring 8 soft-selectable E1/T1 ports.

SERIAL INTERFACE

The serial data rates in the VS modules are independently selectable for each channel and depend on the selected encapsulation mode.

The interface terminates in 68-pin SCSI-4 female connectors. Each submodule contains 2 connectors; each connector includes 3 channels. The module provides a simple and easy SW-configurable selection of serial interface (V.35, RS-422 or RS-232) according to the deployment needs.

Adapter cables, available upon order, are offered by RAD to split each module connector into three separate channel interfaces with standard connectors: V.35, RS-530, RS-232, X.21 or V.36/RS-449.

The VS serial interface is interoperable with HS-RN/V.110, HS-6N and HS-12N I/O modules.

Encapsulation Modes

VS modules behave like different types of modules on selection of the specific encapsulation mode:

- **None**: each channel operates at high speed rates of n×56 or n×64 kbps, where n = 1 to 31 (that is, maximum 1984 kbps).

- **V110**: each channel operates at low speed rates of 2.4, 4.8, 9.6, 19.2 or 38.4 kbps, performing rate adaptation in accordance with ITU-T Rec. V.110.
- **3-bit transitional**: the module provides transitional encoding to transmit asynchronous data at rates up to 19.2/38.4 kbps. It operates by encoding asynchronous data in a 3-bit transitional code, which is then transmitted over the Megaplex uplink at a rate of 64/128 kbps.
- **R111**: the module provides transitional encoding to transmit asynchronous data at the rates of up to 19.2 kbps. It operates by encoding data in a 3-bit transitional code, which is then transmitted over the Megaplex uplink at a rate of 64 kbps.
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HCM (High Capacity Multiplexing): the module transmits synchronous/asynchronous data over 64 kbps based on multiplexing with a DS0 timeslot. This Newbridge proprietary rate-adaption and sub-rate multiplexing scheme provides a bandwidth granularity of 800 bps throughout a network, by formatting low speed data into 10 bytes frame.

Interface Control Signals

Each channel has local support of interface control signals (CTS, RTS, DCD, DSR and DTR). Alternately, each channel can be configured to transmit control signals end-to-end.

E1/T1 INTERFACE

E1/T1 modules feature various combinations of E1/T1, serial and Fast Ethernet ports per module with optional PW or Ethernet over PDH support.

PW options can act as servers for other I/O modules, providing up to 16 protected PW connections). E1/T1 traffic is transported over CES/SAToP, including adapting timing support (ACR).

A special option provides ETHoPDH connectivity over E1/T1 links.

E1/T1 options are SW-selectable.

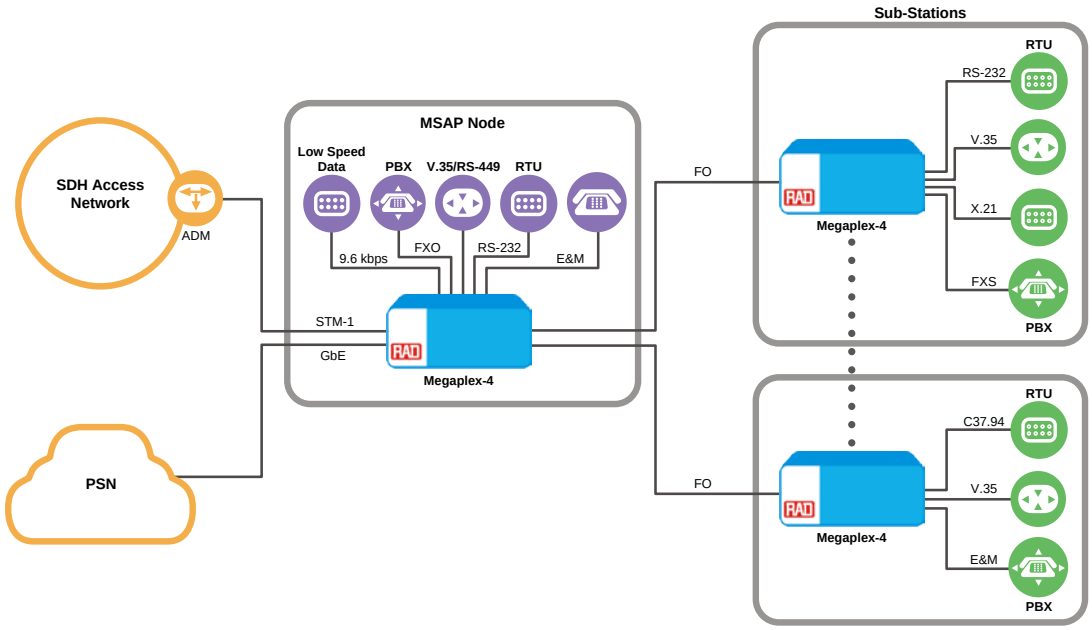

Figure 1. Substation Data Services Connectivity

BINARY COMMAND INTERFACE

The VS-6/BIN module provides the following functions:

- 8 binary input ports (cmd-in) – enable the management system to read inbound indications from external sources.
- 8 binary output ports (cmd-out) – provide outbound indications and control signals by means of dry relay contacts.
- Two cmd-channels (1,2) are used to transport binary information over the telecommunications network via end-to-end reporting: the input command is transferred to the remote location via a selected timeslot and affect the corresponding output.

The user can monitor the state of each inbound or outbound port by means of indicators located on the VS-6/BIN front panel or from the management system status display.

The binary commands can be locally output or be carried to a peer card/Megaplex over a TDM network or over a packet switched network. Up to 4 in/out commands can be carried over a single DS0.

Binary Inbound (CMD-IN) Ports

The VS-6/BIN module has 8 inbound ports, which enable it to report alarms external to the Megaplex-4 unit, and physical conditions in remote locations to a central management station.

The VS-6/BIN module is configured by the user to "interpret" the state of each input and report events to the CL module of the local Megaplex-4. For each event, the CL module will send the corresponding alarm message/SNMP trap, to the supervision terminal and network management stations. Each event can be associated with a user-selected message that describes the situation, or prompts the remote user to take a prescribed action.

Binary Outbound (CMD-OUT) Ports

The VS-6/BIN module has 8 outbound ports equipped with change-over dry relay contacts. The default state (the state of the relay contacts when Megaplex-4 is operating) can be selected by the user, individually for each outbound port.

The relay contacts report internal system alarms to outside indicators, and to control external devices or applications. Each relay can be controlled by a specific event in the network, in accordance with configuration.

G.703 INTERFACE

The VS-6/703 module provides Megaplex-4 with 8 64-kbps G.703 codirectional data channels (ports). Each channel can be independently enabled or disabled by software configuration.

C37.94 INTERFACE

The VS modules feature a dual-port fiber optic interface, operating at a nominal wavelength of 850 nm and nominal line rate of 2.048 Mbps. Each port is terminated in a pair of ST connectors for connection to standard multimode fiber.

The interface complies with IEEE C37.94 standard for distances of up to 2 km.

The interface can be used for both user and network ports – either for inter-substation communication or for transmitting distance Teleprotection information.

VOICE INTERFACE

The VS voice submodules provide 8 FXS, 8 FXO or 4 E&M toll-quality analog voice channels. Voice signals are digitized using PCM, in compliance with ITU-T G.711 and AT&T Pub. 43801 standards.

Encoding and decoding are in full compliance with ITU-T requirements G.711. Voice channel companding is selectable for A-law or μ-law.

The modules are available with E&M, FXO and FXS interface types.

VS-6/FXS, VS-6/FXO and VS-6/E&M modules are available in additional, advanced versions featuring enhanced PW capabilities –in particular, adaptive clock recovery (ACR).

The **E&M** interface operates with different types of E&M signaling: EIA RS-464 Types I, II, III and V (British Telecom SSDC5). Both 2-wire and 4-wire lines are supported (user-selectable).

The E&M modules provide EIA RS-464 Type I signaling without the need for an external DC power supply. For other signaling types, the internal -12 VDC provided by the chassis is sufficient for connection to most PBX systems.

However, for *full* support of EIA RS-464 Types II, III and V (BT SSDC5) standards, a -48 VDC power source is required.This voltage can be supplied via Megaplex PS AC or DC modules.

VS modules perform fault propagation.

The **FXS** interface employs both loop-start and wink-start signaling methods. FXS interfaces are typically used for direct connection to 2-wire telephones in the following loop-start applications:

- Off-Premises Extension (OPX), where a local telephone on the PBX can be connected to an off-premises telephone, by dialing only the extension number (see *Figure 3*);
- Private Line, Automatic Ringdown application (PLAR) (also referred to as Hot Line), where two telephones are connected directly via the E1/T1 link. When the telephone on one side goes off-hook, the other telephone rings;
- Direct connection to 2-wire telephones in PSTN applications.

When operating in PCM mode, battery polarity is reversed for wink-start signaling, used in direct inward dialing (DID) applications.

The **FXO** interface employs both loop-start and wink-start signaling methods. It can be used for connection to PBX extension lines in point-to-point, loop-start applications, with a corresponding FXS VS or VC module at the remote Megaplex connecting to the remote extension. The battery polarity is reversed for wink-start signaling.

The following signaling transfer modes are selectable in voice modules:

- Channel Associated Signaling (CAS) transmitted in Timeslot 16, compatible with ITU-T Rec. G.704 (available with E1 links only)
- Inband "Robbed Bit Multiframe" (RBMF) (available with T1 links only). This method is compatible with ITU-T Rec. G.704 and AT&T Pub. 43801, and is generally used with μ-law companding

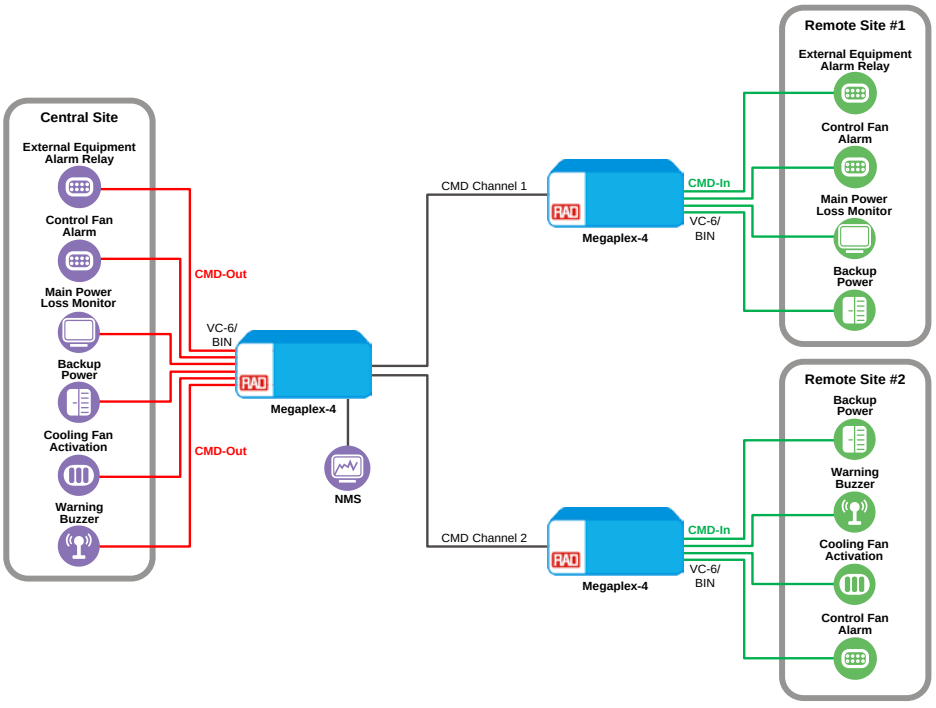

Figure 2. Input/Output Binary Relay Commands in a Point-to-Multipoint Deployment of a VS-6/BIN Module

- Inband "Robbed Bit Frame" (RBF). This method is useful for networks not supporting signaling switching
- No signaling – channel signaling is not transferred.

To provide feed and ringing signal generation voltages, FXS modules require a nominal -48 VDC (-37 to -75 VDC) source. This power can be provided either by an appropriate DC-powered chassis, or by an external standalone Ringer power supply unit or module for AC-powered chassis, in accordance with the number of ports.

Gain control is user-selectable for both the receive and transmit directions, enabling easy installation in all environments.

ETHERNET INTERFACE

The Ethernet services are provided by means of an internal Layer-2 Ethernet switch.

The external Ethernet ports can be ordered with two types of interfaces:

- 10/100BaseTx interface terminated in RJ-45 connectors.
- SFP Socket for Fast Ethernet transceivers. RAD offers a wide variety of SFPs, for meeting a wide range of operational requirements.

PSEUDOWIRE

A powerful pseudowire engine saves the need of two additional MPW-1 modules and can act as a server card to other I/O modules. Depending on the card type, the engine provides up to 12 or 16 protected PWs per module with up to 32 timeslots per each PW port.

The module features direct mapping of the local interfaces to PW port with reduced latency and built-in jitter buffer with configurable depth.

A series of PW-enhanced VS modules have independent adaptive clock recovery (ACR) mechanisms for each pseudowire, which recover the original timing (clock rate) of the far-end source of each pseudowire, according to ITU G.8261, G.823, G.824 and MEF 22 recommendations. The clock recovery mechanisms can provide recovered clock signals to serve as timing references for the Megaplex-4.

ETHERNET OVER PDH

VS modules transport Ethernet over PDH infrastructure via the following technologies:

- Generic Framing Procedure (GFP G.8040)
- Virtual Concatenation (VCAT G.7043)
- Link Capacity Adjustment Scheme (VCAT G.7042).

CROSS-CONNECT

The bidirectional broadcast mode enables a user at a central location to communicate with several users connected to remote Megaplex-4 units, using polled communications.

It is used mainly for SCADA applications in which a SCADA controller is polling multiple RTUs/IEDs at a central site (see *Figure 3*).

Each remote device is listening to the traffic sent by the central controller and responds when it is being polled.

At the central site all the traffic from the remote site is aggregated by the VS card.

MANAGEMENT

All module operating parameters are soft-selectable through the Megaplex management.

Specifications

SERIAL INTERFACE

Data Channels per Module
VS-12: 12
Other VS modules: 6

Interface (Electrical)
V.24/RS-232, V.35 or V.11/RS-422
RS-485 (4-wire only)

Interface (Physical)
V.24/RS-232, V.35, V.36/RS-449, RS-530, X.21 (via adaptor cables)

Connectors
Four/two 68-pin SCSI, female
(one per 3 data channels)

Encapsulation Modes
None
V110
R.111
3-bit-transitional
HCM

Interface Control Signals
Local support for all types of control signals

End-to-end transfer of local RTS and DTR lines

Signal Format
Asynchronous or synchronous, full duplex

Data Rates
Depend on encapsulation mode:

- None: n×56 or n×64 kbps (n = 1 to 31)
- V110: 2.4, 4.8, 9.6, 19.2, 38.4 kbps
- R.111: 2.4, 4.8, 9.6, 19.2 kbps
- 3-bit-transitional: 64 kbps, 128 kbps
- HCM: 2.4, 4.8, 9.6, 19.2, 38.4 kbps

Async Character Format
Length: 5,6,7,8
Parity bit: yes, no
Stop bits: 1,2

Clock Mode
DCE (VS channel provides both RX and TX clocks to the user DTE)

Diagnostics (per port)
Local digital loopback
Remote digital loopback

BINARY INTERFACE

Compliance
IEEE 1613 (USA standard for equipment in electrical switching stations)

Inbound Ports
Number: 8
Maximum Input Control voltage: ±60 VDC
Command trip point:

- Above – 24 VDC ON
- Below – 18 VDC OFF8B

Outbound Ports
Number 8
Relay type:

- Electro-mechanical relay (EMR)
- Solid-state relay (SSR)

Closed Contact Parameters:

- Max current 1A
- Impedance: < 0.1 Ohm
- Maximum current:
  - EMR: 1A
  - SSR: 0.12A
- Minimum current (SSR only) 0.1 mA

Maximum DC voltage across open contacts: 60 VDC

Isolation
All input and outputs are galvanically isolated

Connector
DB-44

LED Indicators
Name: CMD IN/OUT
Number: 8
Color: Green/Yellow
Green blinking: cmd-in port is active
Red blinking: cmd-out port is active
Green/Red blinking: cmd-in and cmd-out ports are both active
Off – port is not active or not connected

G.703 INTERFACE

Compliance
ITU-T Rec. G.703, Section 1.1.4.1

Number of Ports
8

Connectors
RJ-45 (one for each channel)

Nominal Data Rate
64 kbps

LED Indicators
ALM (red):

- Lights steadily – the corresponding port detects LOS
- Flashes – the corresponding port detects OOS pattern
- Off – the corresponding port is not connected.

C37.94 INTERFACE

Compliance
IEEE C37.94, optical part

Number of Ports
2

Connectors
Pair of ST connectors, female

Nominal Data Rate
2.048 Mbps

Wavelength
850nm ± 40nm

Fiber Type
62.5/125 µm multimode
50/125 µm multimode

Transmitter Type
LED

Power Coupled into Fiber
62.5/125 µm: -11 to -19 dBm
50/125 µm: -11 to -23 dBm

Minimum Receiver Sensitivity
-32 dBm

Maximum Receiver Input Power
-11 dBm

Receiver Dynamic Range
21 dB

Range (Typical)
2 km/1.25 miles

LED Indicators
SYNC (green/red):

- Lights steadily in green – the corresponding port is operating properly
- Flashes in green – the corresponding port is operating properly, but serves as the standby port when link protection is enabled
- Lights in red – the corresponding port detects loss of synchronization or loss of signal
- Flashes in red – the corresponding port serves as the standby port, and detects loss of synchronization

REM SYNC (yellow):

- On – the corresponding port detects loss of remote synchronization
- Off – the corresponding port is not connected.

Diagnostics (per port)
Local digital loopback
Remote digital loopback

E1/T1 INTERFACE

Ports
8 E1/T1 ports per submodule

E1 or T1 option soft-selectable, same for all module ports

Connectors (per submodule)
DB-44, female for each 8 ports (see *Ordering* for cables available from RAD)

Diagnostics
(per port and per timeslot)
Local digital loopback
Remote digital loopback
BER Test on E1 ports of selected VS modules

E1 INTERFACE

Compliance
ITU-T G.703, G.704, G.732 (Including CRC-4 and E bit)

Framing
2 frames (G732N), or 16 frames (G732S) per multiframe, with or without CRC-4

Unframed

Data Rate (per port)
2.048 Mbps

Line Code
HDB3

Jitter Performance
As per ITU-T G.823

Impedance
Balanced 4-wire: 120Ω
Unbalanced coax: 75Ω

Signal Level
Receive: 0 to -12 dBm
Transmit:
Balanced: ±3V (±10%)
Unbalanced: ±2.37V (±10%)

T1 INTERFACE

Compliance
ANSI T1.107 and T1.403

Framing
ESF

Data Rate (per port)
1.544 Mbps

Line Code
Bipolar AMI

Zero Suppression
Transparent, B7, B8ZS

Signal Level
Receive: 0 to -12 dBm
Transmit: 0.6, 1.2, 1.8, 2.4, 3.0 dBm user-adjustable, measured at 0 to 655 ft

Jitter Performance
As per AT&T TR-62411

Impedance
Balanced 4-wire: 100Ω

Compliance
E1: ITU-T G.703, G.704, G.732 (Including CRC-4 and E-bit)
T1: ANSI T1.107, T1.403

VOICE INTERFACE – GENERAL

Number of Voice Channels
FXS/FXO: 8 ports per submodule
E&M: 4 ports per submodule

Voice Encoding Technique
Per ITU-T G.711 and AT&T Pub. 43801, μ-law or A-law

Bandwidth Requirement
64 kbps (one timeslot) per enabled channel

Analog Interface
Line type:
E&M: 4-wire or 2-wire (soft-selectable)
FXS, FXO: 2-wire
ITU-T standard: G.712

Connectors:
E&M interface: 4xRJ-45
FXS/FXO interface: 4xRJ-12 (one per two channels)

Diagnostics
Local digital loopback for each channel, towards the local user equipment

Remote digital loopback for each channel, towards the remote user equipment

1 kHz, 0 dBm0 test tone injection for each channel, towards the remote user equipment

1 kHz, 0 dBm0 backward test tone injection for each channel, towards the local user equipment

Analog Parameters
Nominal level: 0 dBm
Nominal impedance: 600Ω
Return loss (ERL) at 300 to 3400 Hz:
better than 20 dB
Frequency response (Ref:1020 Hz):
±0.5 dB at 300 to 3000 Hz
±1.1 dB at 250 to 3400 Hz
Level adjustment (soft-selectable):
see *Table 1*.
Steps: 0.5 dB (±0.5 dB), nominal
Signal to total distortion (G.712):
-30 to 0 dBm0: better than 33 dB
-45 to +3 dBm0: better than 22 dB
Idle channel noise: better than -65 dBm0 (+25 dBrnc)
Far-end cross-talk (2W&4W):–65dBm0 max
Go-to-return cross-talk (4W): -60dBm0 max

E&M INTERFACE

Signaling Method (selectable)
EIA RS-464 Type I;

EIA RS-464 Types II, III, and V (British Telecom SSDC5) using -12 VDC in place of -48 VDC

Note: *For full support of Types II, III, and V (SSDC5) signaling standards, -48 VDC power supply is required.*

Pulse Dial Distortion
±2 msec max

Transformer isolation
1500 VRMS

Indicators
M On when the M line of the corresponding channel is off-hook (channel in use)
E On when the E line of the corresponding channel is off-hook (channel in use)

FXS INTERFACE

Signaling Methods
EIA RS-464 loop-start or wink-start

On-Hook/Off-Hook Threshold
Off-Hook Threshold: Loop current >11 mA
On-Hook Threshold: Loop current <8 mA

Indicators
Number: 8
Color: green/yellow
Name: LOC/REM
Lights steadily in green – Local "OFF-HOOK"
Lights steadily in yellow – Remote "OFF-HOOK"
Flashes in green/yellow – Local and Remote "OFF-HOOK"/conversation state
Off: port is not connected or both directions of signaling are "ON-HOOK"

Loop Resistance
Min: 300Ω
Max: 1600ΩΩ

Feed Current
20 mA (±10%) per active channel

Ringer
Overload protected, 1 sec ON, 3 sec OFF
54 VRMS with up to 1 REN load
45 VRMS with up to 5 REN load

Reverse Polarity Pulse Distortion
6 msec max

-48 VDC (nominal) Current Consumption
30 mA (±10%) per active channel

Number of Channels
Ringer-2100R: up to 40
Ringer-2000: up to 100
Ringer-2200N: up to 200

FXO INTERFACE

Signaling Methods
EIA RS-464 loop-start or wink-start

DC Impedance
Off-Hook:
160Ω at 50 mA feed
270Ω at 25 mA feed
On-Hook: 20 MΩ

Ring Detector
Ring Impedance: 20 MΩ
Detection: >16.5 VRMS, 13–68 Hz
No detection: <13.5 VRMS

Reverse Polarity Pulse Distortion
6 msec max

Indicators
Number: 8
Color: green/yellow
Name: RING/REM
Lights steadily in yellow – Remote "OFF-HOOK"
Lights steadily in green – Ringing is received on the corresponding channel
Off: Port is not connected or Remote "ON-HOOK" state with ringing not received on the corresponding channel

ETHERNET INTERFACE

Number of Ports
1 UTP copper (RJ-45 shielded) or 1 SFP socket

SFP Transceivers
For full details, see the SFP/XFP Transceivers data sheet on www.rad.com

Note. *It is strongly recommended to order this device with original RAD SFPs. RAD cannot guarantee full compliance to product specifications for units using non-RAD SFPs.*

Data Rate
UTP: 10/100 Mbps
SFP: 100 Mbps

Autonegotiation (copper only)

Frame Size
9140 bytes

LED Indicators
LINK On (green): Link is up
LINK Off: Link is down
ACT Flashes (yellow): Data is being transferred
ACT Off: No data transfer

PSEUDOWIRE

Standard Compliance
IETF: RFC 4553 (SAToP), RFC 5086 (CESoPSN)

MFA Forum: IA 8.0.0

MEF 8

Note. *Non-E1/T1 VS modules do not support SAToP.*

Number of PW Connections
32 per module (up to 640 per chassis)

Jitter Buffer Size

VS-16E1T1/PW and VS-6/E1T1 modules: 0.25–256 msec , in 1 µsec steps with 125 µsec granularity (the value entered by the user is rounded upward to the closest n*125 sec value)

Other VS modules: 0.25 –8 msec, in 1 µsec steps with 125 µsec granularity (the value entered by the user is rounded upward to the closest n*125 µsec value).

Diagnostics
Local and remote digital loopback per DS1 port timeslot: all VS modules
Local and remote digital loopback per entire DS1 port: VS-6/E1T1, VS-16E1T1/PW, VS-6/703, VS-6/FXS/PW, VS-6/FXO/PW, VS-6/E&M/PW

GENERAL

Power Consumption (max.)

VS-12
RS-422: 16.7W
RS-232: 13.5W
V.35: 15.9W

VS-6/BIN
RS-422: 14.7W
RS-232: 13.0W
V.35: 14.2W

VS-6/C37
RS-422: 12.9W
RS-232: 11.3W
V.35: 12.5W

VS-6/4E&M
RS-422: 17.0W
RS-232: 15.4W
V.35: 16.6W

VS-6/8FXO
RS-422: 13.9W
RS-232: 12.3W
V.35: 13.5W

VS-6/8FXS
RS-422: 14.7W
RS-232: 13.1W
V.35: 14.3W

VS-6/703

RS-422: 6.0W
RS-232: 4.4W
V.35: 15.6W

VS-8FXS/4E&M: 17.4W

VS-16E1T1-EoP: 14.5W
VS-16E1T1-PW: 14.5W

VS/8E1T1/UTP/PW

RS-422: 16.1W
RS-232: 14.5W
V.35: 15.7W

Configuration
Programmable via the Megaplex management system

Environment
Operating temperature: -10°C to +55°C (14°F to 131°F)
Storage temperature: -20°C to +70°C (-4°F to +160°F)
Humidity: up to 95%, non-condensing

Ordering

RECOMMENDED CONFIGURATIONS

MP-4100M-VS/12S/2UTP

MP-4100M-VS/12S/2SFP

Versatile module with 12 serial ports, 2 10/100 BaseT interfaces/empty SFP slots

MP-4100M-VS/6S/BIN/EMR/UTP

MP-4100M-VS/6S/BIN/EMR/SFP

Versatile module with 6 serial ports, 8 binary command ports with electromechanical relay output and Ethernet port, 10/100 BaseT interface/ empty SFP slot

MP-4100M-VS/6S/C37/UTP

Versatile module with 6 serial ports, 2 C37.94 ports and Ethernet port with 10/100 BaseT interface

MP-4100M-VS/6S/703/UTP/PW

Versatile module with 6 serial ports, 8 G.703 64-kbps codirectional ports and Ethernet port with 10/100 BaseT interface

MP-4100M-VS/6S/8FXS/UTP

MP-4100M-VS/6S/8FXS/UTP/PW

Versatile module with 6 serial ports, 8 FXS voice ports and Ethernet port with 10/100 BaseT interface, regular/PW-enhanced with ACR support

MP-4100M-VS/6S/8FXO/UTP

MP-4100M-VS/6S/8FXO/UTP/PW

Versatile module with 6 serial ports, 8 FXO voice ports and Ethernet port with 10/100 BaseT interface, regular/PW-enhanced with ACR support

MP-4100M-VS/6S/4E&M/UTP

MP-4100M-VS/6S/4E&M/UTP/PW

Versatile module with 6 serial ports, 8 E&M voice ports and Ethernet port with 10/100 BaseT interface, regular/PW-enhanced with ACR support

Table 1. Transmit and Receive Levels for Voice Interfaces

Interface	Transmit [dbm]		Receive [dbm]	
	min	max	min	max
E&M 2W	-8	+5	-17	+2
E&M 4W (when there is a mix* of 2W/4W ports)	-8	+5	-17	+3.5
E&M 4W**	-17	+5	-17	+9
FXS	-5	+5	-17	+1
FXO	-3.5	+5	-17	+1
*within groups 1-4,5-8 **all ports				

MP-4100M-VS/8FXS/4E&M

Versatile module with 4 E&M and 8 FXS voice ports

MP-4100M-VS/8E&M

Versatile module with 4 E&M and 8 FXS voice ports

MP-4100M-VS/6S/8E1T1/UTP/PW

MP-4100M-VS/6S/8E1T1/SFP/PW

Versatile module with 6 serial ports, 8 E1/T1 links, PW support and Ethernet port, 10/100 BaseT interface/empty SFP slot

MP-4100M-VS/16E1T1/PW

Versatile module with 16 E1/T1 links and PW support

MP-4100M-VS/16E1T1/EOP

Versatile module with 16 E1/T1 links and Ethernet over PDH support

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options.

OPTIONAL ACCESSORIES

CBL-SCS68/3/*/#/&
Cable for converting each of the VS 68-pin SCSI connectors into 3 separate channel connectors with the physical interface specified.

***Note**: A separate cable is required for each of the 2/4 channel connectors.*

Legend

* Interface:
- **232** V.24/RS-232, 25-pin
- **V35** V.35 interface, 34-pin
- **V36** V.36/RS-449, 37-pin
- **530** RS-530, 25-pin
- **X21** X.21, 15-pin

\# Length (Default=2m / 6.5 ft):
- **3M** for 3m (9.8 ft)
- **5M** for 5m (16.4 ft)

& Connector:
- **F** female
- **M** male

CBL-VS-VOICE

Cable for splitting each of the four RJ-12 connectors of FXS/FXO interface into two RJ-12 connectors intended for end-user equipment

CBL-G703-8/RJ45

Splitter cable for splitting each 44-pin VS E1/T1 module connector to 8 E1 or 8 T1 balanced RJ-45 connectors

CBL-G703-8/RJ45/X

Splitter cross-cable for splitting each 44-pin VS E1/T1 module connector to 8 E1 or 8 T1 balanced RJ-45 connectors

CBL-G703-8/COAX

Splitter cable for splitting each 44-pin VS E1 module connector to 8 pairs of unbalanced BNC connectors

CBL-G703-8/OPEN
Open-ended cable with DB-44 connector on the Megaplex side for balanced E1 or T1 applications

CBL-VS-BIN

Open-ended cable with DB-44 connector on the Megaplex side for binary (alarm control) applications

All VS cables listed in this section are 2m (6.6 ft) long. For additional cable lengths available, see RAD catalog.

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