

Vmux-400

GSM Abis/Ater Optimization Gateway



DESCRIPTION

- Vmux-400 optimizes the GSM Abis/Ater traffic and transports it over either an E1, serial or a 10/100BaseT Ethernet link.
- With Vmux-400 cellular operators are able to achieve better bandwidth utilization and improve the infrastructure utilization of their backhaul section, such as satellite or microwave links.
- The Vmux-400 Abis/Ater optimization gateway complements RAD's Vmux family, which helps network operators reduce OPEX costs while expanding their network.
- Vmux-400 completes RAD's cellular offering by optimizing the Abis (BTS to BSC) interface and Ater (BSC to MSC) interface, while the A (BSC to MSC) interface and the E (MSC to PSTN) interface can be optimized and compressed by RAD's Vmux-2100 voice trunking gateway.
- Vmux-400 has one or two E1 interfaces towards the BTS side and one E1 uplink interface towards the BSC side. Alternatively, it features a built-in 10/100BaseT Ethernet port or a serial port as an uplink.
- A second 10/100BaseT port is provided for management.
- Vmux-400 supports transparent signaling with HDLC flag suppression.
- Enhanced diagnostics include user-activated local and remote loopbacks, and ping test for IP connectivity.
- Vmux-400 conforms to all relevant industry standards and supports interoperability with equipment from Siemens, Ericsson, Nokia, Huawei, Alcatel and Motorola. Optimization is performed for Alcatel Qmux signaling.
- All Vmux-400 operating parameters are configured using a simple menu-based software. For upgrades or backup, software download can be performed via TFTP.

FEATURES

- Abis/Ater interface optimization of voice and data via E1, serial or Ethernet port (MAC or IP)
- Connects two E1 digital GSM ports over a single E1, serial, or Ethernet 10/100BaseT uplink
- Up to 3:1 average bandwidth optimization
- GSM FR/EFR/AMR/dynamic HR Codecs support
- HDLC flags suppression for signaling timeslots
- SS7 FISU and LSSU suppression (for Ater)
- Idle frames (speech and data) suppression
- Data/Extended data, GPRS/EDGE support over any number of timeslots
- Dynamic GPRS/Speech detection
- Dynamic jitter mechanism based on network delay
- Clock recovery over any transmission network
- Silence suppression when DTx is enabled
- Inband management
- TSO remote alarm indication transfer
- Enhanced local and remote diagnostic tools
- Management via ASCII terminal, Telnet host, or Web client
- Second Ethernet port for user management
- Interoperability with Siemens, Ericsson, Nokia, Huawei, Motorola and Alcatel
- Automatic detection of timeslot types for Ericsson BSS
- Alcatel Qmux supported
- Automatic detection of signaling timeslot for any vendor
- Optional redundant power supply modules

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- Vmux-400 can be configured and monitored via a local ASCII terminal, Telnet, or Web client. An RS-232 control port is provided for local terminal connection for monitoring and control.
- Vmux-400 sends SNMP alarm traps for predefined management stations.
- SS7 FISU and LSSU suppression eliminates redundant silence and idle frames, thereby enabling optimum use of available bandwidth (for Ater).
- Data, EDGE and GPRS transparent support over multiple timeslots, provides flexibility and enables meeting demand for data and image services over GSM networks.
- Vmux-400 supports dynamic HR, which enables switching between FR/EFR/AMR codecs and HR (Half Rate) mode, and vice versa.
- Clock recovery over any transmission network. This enables the BTS to synchronize timing with the BSC, even though IP networks do not provide timing mechanisms.
- Automatic detection of timeslot types for Ericsson BSS is required since Ericsson RBS selects its timeslots assignment dynamically upon startup, thus the timeslot assignment (and their types) must be dynamically detected by the Vmux-400 according to the Rx payload.
- Automatic detection of GPRS packets which enables switching between speech and GPRS, and vice versa.

SPECIFICATIONS

UPLINK (NETWORK) PORTS

Vmux-400 features one uplink E1 port, one 10/100BaseT Ethernet port and one n x 64 kbps serial link.

E1 Port (LINK)

- **Compliance**
ITU G.703, G.706, G.732
- **Framing**
G.732N, with or without CRC-4
- **Bit Rate**
2.048 Mbps
- **Line Code**
HDB3
- **Impedance**
120Ω, balanced
75Ω, unbalanced
- **Signal Level**
Receive:
0 to -36 dB with LTU
0 to -10 dB without LTU
Transmit:
±3V (±10%), balanced
±2.37V (±10%), unbalanced

APPLICATIONS

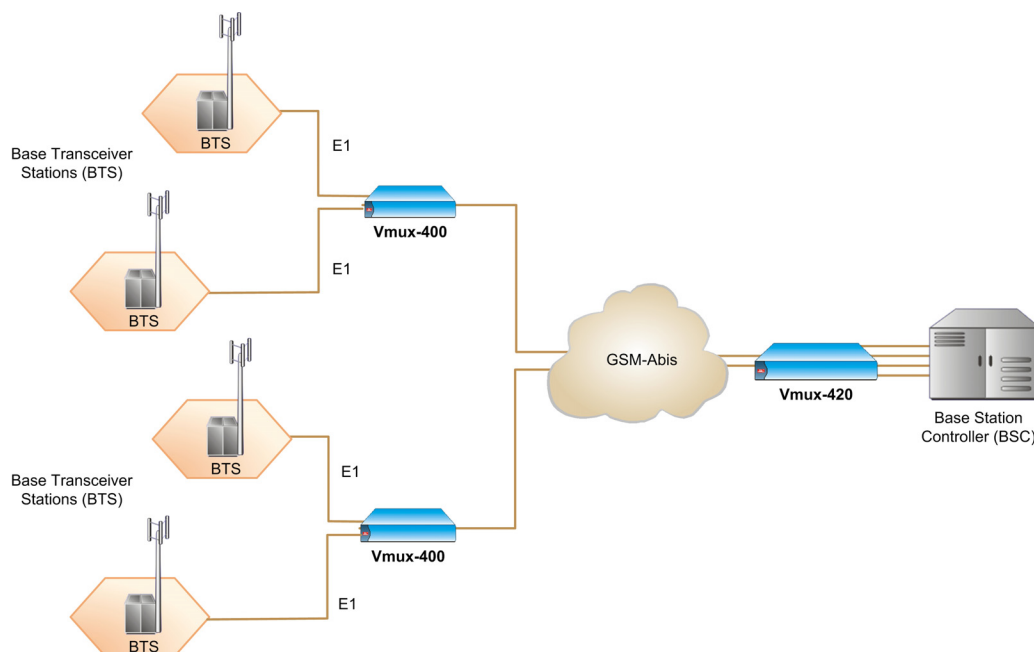


Figure 1. GSM Abis Optimization over E1, Serial or Ethernet Uplink

GSM Abis/Ater Optimization Gateway

- **Connectors**

RJ-45, 8-pin, balanced

Note: Vmux-400 is delivered with balanced E1 interface. To convert it to an unbalanced interface, use the CBL-RJ45/2BNC/E1 converter cable, supplied by RAD.

- **Timing**

- Internal
- Recovered from the receive clock of the E1 uplink or E1 user port. Clock regeneration over ETH uplink.

Ethernet Port (NET)

- **Standards**

IEEE 802.3, 802.3u

- **Data Rate**

10 or 100 Mbps, half-duplex or full-duplex, auto-negotiation

- **Statistics**

According to RFC 3638, or RFC 3635:

- Received frames:
Correct Frames, Correct Octets, Alignment Errors, and FCS Errors.

- **Transmitted frames:**

Correct Frames, Correct Octets, Single Collision, Multiple Collision, Deferred Transmission, Late Collision, Carrier Sense Error

- **Range**

Up to 100m on UTP Cat.5 cable

- **Connector**

RJ-45

Serial Link (SERIAL LINK)

- **Data Rate**

n x 64 kbps, up to 2048 kbps

- **Interface**

Selectable for RS-530, V.35 or X.21 via adaptor cables – see *Ordering*

- **Connector**

DB-25, female

(For V.35 or X.21 interface, an adaptor cable is required – see *Ordering*)

- **Clock Modes**

- DCE: Vmux-400 provides clock to connected equipment
- DTE: Vmux-400 accepts clock from connected equipment (requires adaptor cable– see *Ordering*)

USER PORTS (E1)

- **Number of Ports**

1 or 2

- **Compliance**

ITU G.703, G.706, G.732, ETSI GSM08.60

- **Framing**

G.732N, with or without CRC-4

- **Bit Rate**

2.048 Mbps

- **Line Code**

HDB3

- **Impedance**

120Ω, balanced
75Ω, unbalanced

- **Signal Level**

Receive:

0 to -36 dB with LTU

0 to -10 dB without LTU

Transmit:

±3V (±10%), balanced

±2.37V (±10%), unbalanced

- **Connectors**

RJ-45, 8-pin, balanced

Note: VMUX-400 is delivered with balanced E1 interface. To convert it to an unbalanced interface, use the CBL-RJ45/2BNC/E1 converter cable, supplied by RAD.

MANAGEMENT PORT (MNG)

The specifications are identical to those of the LAN uplink port.

CONTROL PORT

- **Standards**

RS-232/V.24 (DCE)

- **Data Rate**

9.6, 19.2, 38.4, 57.6 or 115.2 kbps

- **Connector**

DB-9, female

INDICATORS

- **General**

PWR (green) – On when power is on

TST (green) – On when test is performed

ALM (red) – On when alarm is present in the system

- **Ethernet Uplink and Management Ports**

LINK (green) – Lights when the link is active

ACT (yellow) – Blinks during LAN traffic activity

- **E1 Uplink and User Ports**

LOC (red) – Local loss of synchronization

REM (red) – Remote loss of synchronization

GENERAL

- **Performance Monitoring**

- TRAU Frame Statistics:

Total RX/TX frames, Total RX/TX bytes, RX/TX counters per frame type (FR, EFR, AMR, data etc.)

- Signaling Statistics: Total RX/TX frames, Total RX/TX bytes, HDLC RX errors

- Ethernet Port: monitoring and statistics according to RFC 3638

- **Diagnostics**

- Ethernet Ports:

Ping

- E1 and Serial Ports:

Local and remote loops

- **Physical**

Height: 4.3 cm (1.7 in)

Width: 21.5 cm (8.5 in)

Depth: 30.0 cm (11.8 in)

Weight: 2.0 kg (4.4 lb)

- **Power Input**

(According to order)

AC: 100 to 240 VAC, 50/60 Hz

48: -36 to -72 VDC

- **Power Consumption**

AC: 15VA

DC: 9W

- **Environment**

Operating temperature:

0 to 50°C (32 to 122°F)

Storage temperature:

-20 to 80°C (-4 to 176°F)

Humidity: Up to 90%, non-condensing

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ORDERING

VMUX-400*/&/\$/%
GSM Abis/Ater Optimization Gateway

* Specify power supply:
AC for 100 to 240 VAC
48 for -48 (-36 to -72) VDC

& Specify R for redundant power supply (of same type)

\$ Specify adaptor cable for the serial link:

NULL for RS-530, DCE or non-serial uplinks

V35DCE for V.35, DCE

V35DTE for V.35, DTE

X21DCE for X.21, DCE

X21DTE for X.21, DTE

530DTE for RS-530, DTE

% Specify number of E1 user ports:

1E1 for one E1 user port

2E1 for two E1 user ports

SUPPLIED ACCESSORIES

CBL-SP-9

Control port cable

CBL-RJ45/2BNC/E1

Interface adaptor cable for converting the balanced E1 port RJ-45 connector into a pair of BNC connectors for unbalanced coax interface.

OPTIONAL ACCESSORIES

RM-35/@

Hardware for mounting one or two Vmux-400 units in a 19-inch rack

@ Specify rack mounting kit type:

P1 for mounting one unit

P2 for mounting two units

WM-35

Hardware for mounting one Vmux-400 unit on a wall.

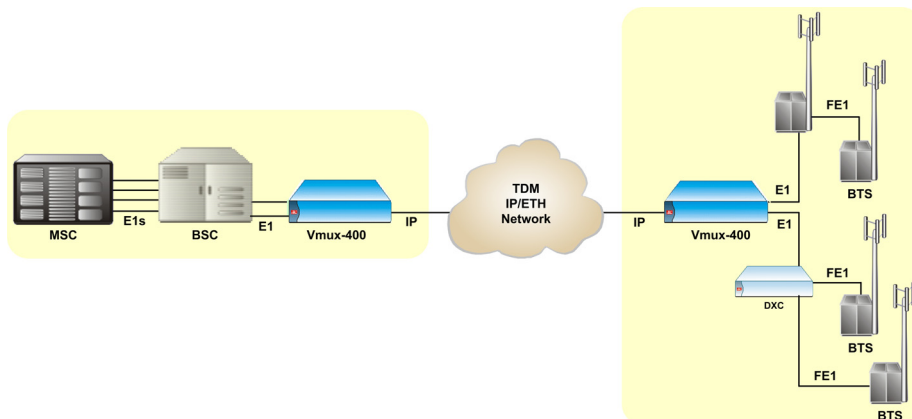


Figure 2. Terrestrial Daisy-Chain BTS Application

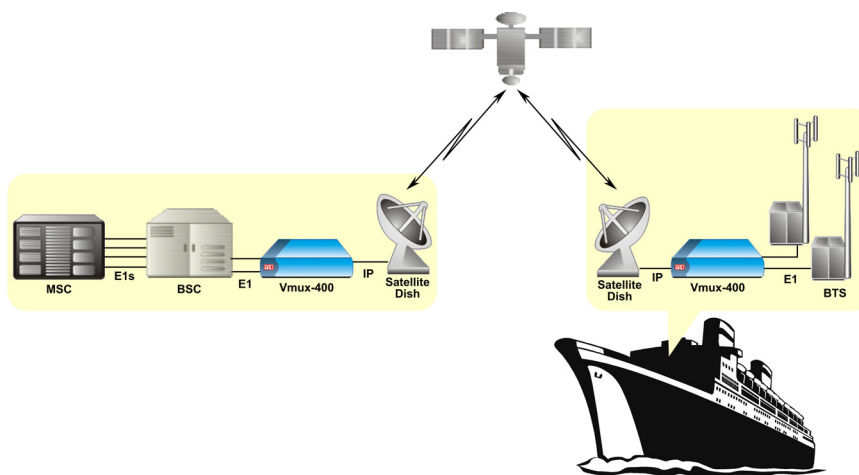


Figure 3. Mobile Platforms Application



data communications

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