

# vAccess

## VNF-Based Ethernet to TDM Conversion

RAD's vAccess is a set of software components (VNFs) that operates along with RAD pluggable devices and complements support RAD vCPE toolbox deployments. vAccess is incorporated in RAD expertise VNF form factor. It is comprised of a hardware component (RAD's MiRIC-ML) and a Virtual Network Function (vAccess-VNF) that runs on any white box platform.

vAccess covers three major areas:

- Adds data-plane functionalities
- Controls and manages RAD pluggable devices
- Introduces Service Assurance capabilities

### MARKET SEGMENTS AND APPLICATIONS

Attached to a user packet network from one side and to multiple TDM interfaces (E1/T1 or E3/T3) on the WAN side, vAccess provides a protocol stack translation from packet-over-Ethernet to packet-over-TDM and vice versa.

### TDM

The TDM port connects to any standard E1 or T1 device. E1 and T1 interfaces feature:

- G.703, G.704, framed and unframed modes
- SF and ESF framing (T1)

vAccess is transparent to all signaling protocols.

### RESILIENCY

E1/E3/T1/T3 loss of signal is propagated by sending an electrical LOS signal to the 100/1000BaseFx port, and is visually indicated by the LOS LED (red) turning on. This in turn can automatically turn off the LAN link. Turning on/off the packet link is user-configurable (enabled or disabled).

### TIMING AND SYNCHRONIZATION

Synchronization between TDM devices is maintained by deploying advanced clock distribution mechanisms. The clocking options are:

- Internal – the master clock source for the TDM circuit is the internal oscillator
- Loopback – the transmit clock for the TDM is derived from the E1/E3/T1/T3 port receive clock
- Adaptive – the clock for the TDM is recovered from the PSN. Clock recovery conforms to G.823 using G.8261-defined scenarios.
- Sync-E – Synchronous Ethernet timing is received via PSN and used to create a locked TDM clock. This ensures both sides of the network work with the same clock source.
- Jitter and wander of the recovered clock are maintained at levels that conform to G.823/G.824 traffic. For adaptive clock recovery, the recovered clock performance depends on the packet network characteristics.

### MANAGEMENT AND SECURITY

vAccess offers a comprehensive management suite including CLI, Syslog, and alarms.

Security features include SNMPv3, SSH, SFTP, Access Control, RADIUS (client authentication), and TACACS+.

MiRIC-ML can be managed using vAccess-VNF CLI.

To facilitate integration of a new device into an IP network, if no IP address has been manually configured, MiRIC-ML automatically requests one from the DHCP server upon booting.

Management traffic can run over a dedicated VLAN.

Application software can be downloaded to vAccess-VNF using:

- Activation of the SFTP server application
- Downloading the image file from the PC to the white box hypervisor
- Installing the image as the active software

Application software can be downloaded to MiRIC-ML via:

- SFP-CA.2 unit, using YMODEM protocol
- VNF terminal

### ARCHITECTURE

vAccess consists of a white box running vAccess-VNF and MiRIC-ML SFPs plugged into the white box. The MiRIC-ML SFPs implement the physical E1/T1/E3/T3 interfaces.

### Specifications

#### WHITE BOX REQUIREMENTS

The white box should have the following resources necessary to run the vAccess-VNF:

- 1 GB RAM
- 6 virtual network interface cards (vNIC)
- 2 GB hard disk space
- 1 virtual CPU (vCPU)

#### CAPACITY

Maximum four PPP sessions when MLPPP is supported

#### E1 INTERFACE

##### Number of Ports

1

##### Compliance

G.703, G.704, G.823, G.775

##### Data Rate

2.048 Mbps

##### Line Code

HDB3, AMI

##### Jitter and Wander Performance

Per ITU-T G.823

##### Framing

Framed, unframed

##### Line Impedance

120Ω, balanced

##### Cable Type

UTP CAT-5

##### Cable Length

Up to 2500m (8202 ft) max, over 22 AWG wire

##### Connector

RJ-45

#### T1 INTERFACE

##### Number of Ports

1

##### Compliance

G.824, T1.403, G.703, G.823, T1-231, AT&T TR-62411, G.775

##### Data Rate

1.544 Mbps

##### Line Code

B8ZS, AMI

##### Jitter and Wander Performance

Per AT&T TR-62411, ITU-T G.823, ITU-T G.824

##### Framing

Framed (ESF, D4), unframed

##### Line Impedance

100Ω, balanced

##### Cable Type

UTP CAT-5

##### Cable Length

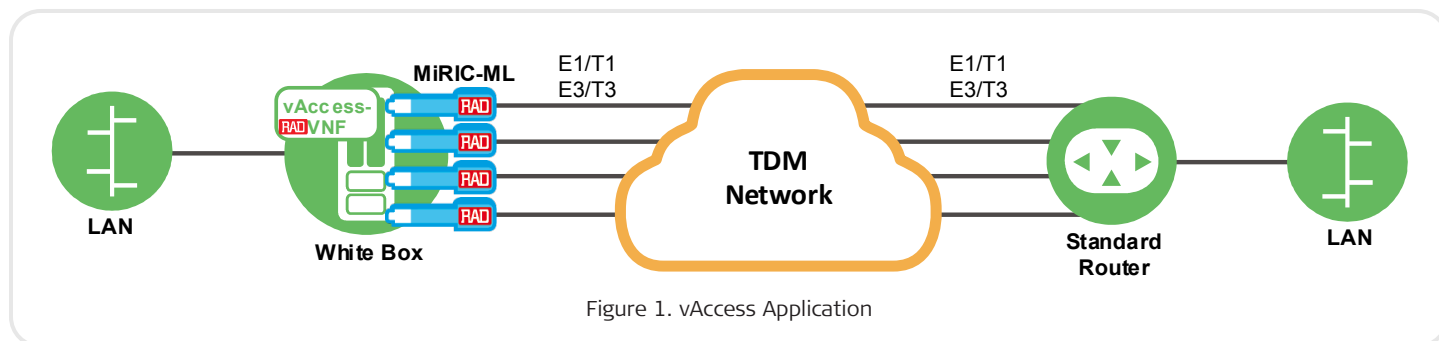
Up to 1829m (6000 ft) max, over 22 AWG wire

##### Connector

RJ-45

### Applications

Based on the generic vAccess-VNF, this converter is suitable for any Ethernet to TDM conversion scenario.



## E3 INTERFACE

### Number of Ports

1

### Compliance

ITU-T Rec. G.703, G.751, G. 775, G.823, G.832

### Data Rate

34,368 Mbps

### Line Code

HDB3

### Framing

Framed (G.832, G.751), unframed

### Line Impedance

75Ω, unbalanced

### Transmit Clock

Receive, internal, adaptive

### Jitter and Wander Performance

Per ITU-T G.823

### Cable Length

Up to 275m (900 ft)

### Connector

DIN 1.0/2.3

## T3 INTERFACE

### Number of Ports

1

### Compliance

GR-499-CORE, T1.107, T1.404, G.703, G.704, G.775, G.824

### Framing

C-bit, M23, unframed

### Data Rate

44.736 Mbps

### Line Code

B3ZS, AMI

### Line Impedance

75Ω, unbalanced

### Transmit Clock

Receive, internal, adaptive

### Jitter and Wander Performance

Per ITU-T G.823, G.824

### Cable Length

Up to 275m (900 ft)

### Connector

DIN 1.0/2.3

## ETHERNET INTERFACE

### Type

100/1000BaseFx

### Compliance

IEEE 802.3

### Edge Connector

SFP-based, MSA-compliant

## MANAGEMENT

### Management Capabilities

SSH over MGT interface

PAP and CHAP authentication to peer

TACACS+ authentication, authorization and accounting

## DIAGNOSTICS

Ping (send and reply) on both LAN and TDM interfaces

Diagnostic loops to the TDM interface(s)

Syslog

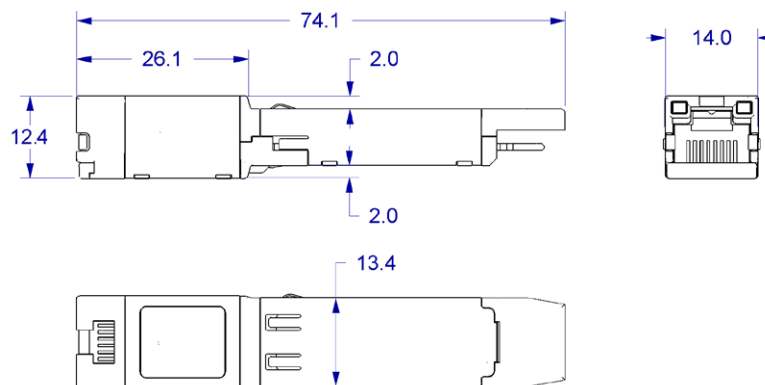


Figure 2. MiRIC-ML E1/T1 Physical Dimensions

## vAccess

## VNF-Based Ethernet to TDM Conversion

## GENERAL

## Indicators

LINK (green) – Ethernet link status

LOS (red) – E1/T1 signal status

## Physical

*MiRIC-ML E1/T1*

Height: 12.4 mm (0.49 in)

Width: 14.0 mm (0.55 in)

Depth: 74.1 mm (2.91 in)

Weight: 30.0 g (1.0 oz)

*MiRIC-ML E3/T3*

Height: 12.4 mm (0.48 in)

Width: 14.0 mm (0.55 in)

Depth: 79 mm (3.1 in)

Weight: 30.0g (1.0 oz)

## Power Supply

*MiRIC-ML E1/T1*

3.3V, up to 410 mA

*MiRIC-ML E3/T3*

3.3V, up to 400 mA

## Power Consumption

MiRIC-ML E1/T1 - 1.35W

MiRIC-ML E3/T3 - 1.55W

## Environment

Temperature:

Ambient: -40 to 60°C (-40 to 140°F)

Case: -40 to 75°C (-40 to 167°F)

Humidity: Up to 90%, non-condensing

## Ordering

## RECOMMENDED CONFIGURATIONS

## Hardware:

MiRIC-ML/E1

MiRIC-ML/T1

MiRIC-ML/E3

MiRIC-ML/T3

## Software:

vAccess-VNF

Carrier-grade PPP and MLPPP driver for MiRIC-ML

## SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options

## OPTIONAL ACCESSORIES

## SFP-CA.2

Configuration adapter for connecting MiRIC-ML to a PC

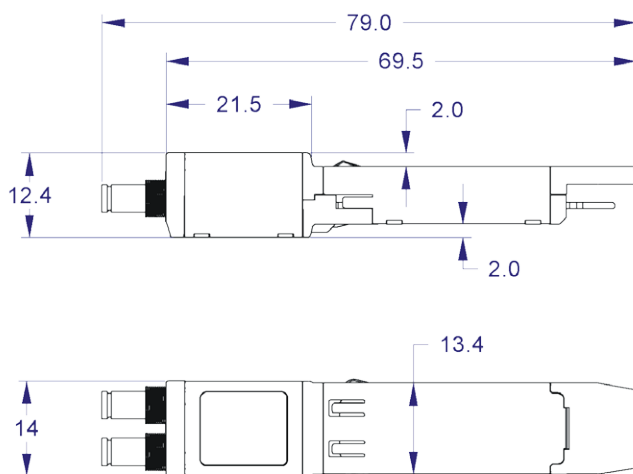


Figure 3. MiRIC-ML E3/T3 Physical Dimensions

## Pulse Supply

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