

MiNID

Miniature Programmable Network Interface Device



- Field programmable Network Interface Device (NID) for service providers, wholesalers, and mobile operators
- Part of RAD's Distributed Network Functions Virtualization (D-NFV) portfolio
- Patent-protected design for seamless integration and enhancement of any existing network device
- Service demarcation, SLA assurance and diagnostic tools at Layer 2, 3, and 4
- Low OpEx due to decreased power consumption, space and installation costs

RAD's patent-protected MiNID® is a field-programmable miniature L2/L3 network interface device (NID), available in an SFP form factor, SFP sleeve form factor with integrated optics, or in a standalone enclosure. As part of RAD's Distributed Network Functions Virtualization (D-NFV) offering, MiNID enriches the Service Assured Access portfolio with software-defined network functionalities, including enhanced demarcation, remote monitoring, and fault isolation. MiNID programmability is based on a powerful FPGA that enables field updates to the product software and application.

The SFP sleeve is a revolutionary platform for service providers seeking to upgrade their networks to deliver reliable bandwidth with end-to-end SLA assurance. MiNID's innovative patent-based design breaks through the barriers of cost and complexity to make Carrier Ethernet available to everyone, everywhere. The SFP sleeve patent-protected design is easily pluggable into standard SFP ports, eliminating the use of external power, and reducing space, and cabling expenses.

MiNID provides instant Carrier Ethernet functionality for switches, routers, DSLAMs, and mobile base stations. It offers comprehensive tools for service activation, performance monitoring, and fault diagnostics, providing ongoing SLA reports while reducing costs associated with fault isolation.

MiNID transparently envelops a large variety of SFPs, enabling full reuse of customer equipment and seamless deployment over multiple access infrastructure types, such as short-haul and long-haul fiber connections, bidirectional single-fiber links, and copper lines.

MiNID is also available as an SFP with integrated optical module.

In its standalone version, MiNID offers a compact, low power, low-cost two-port solution. When equipped with combo interfaces, it allows seamless installation in any field scenario;

when equipped with copper interfaces, it also offers bypass relays that bypass the device in the event of critical failure.

MiNID is a true plug-and-play solution. Its zero-touch provisioning capabilities enable easy installation by anyone.

MARKET SEGMENTS AND APPLICATIONS

As an important part of the toolkit offered by RAD's Service Assured Access portfolio, MiNID is the perfect solution for service assurance in residential and mobile backhauling networks, small cells, business services, and wholesale services.

As a service demarcation device, MiNID ensures proper service handling throughout the service provider's network by policing customer traffic, attaching service VLANs, and adding priority marking to multiple services at the customer premises.

Simultaneously, MiNID offers multi-layer performance monitoring tools for every service. At Layer-2, it offers OAM and PM tools that actively measure key performance indicators including delay, jitter, and packet loss rate. At Layer-3, its integrated TWAMP Light controller/responder and UDP echo responder allow seamless monitoring across any packet network and in multi-vendor environments.

For the mobile backhauling, MiNID can offer Sync-E support including transparent ESSM message forwarding.

ETHERNET

MiNID can be ordered as an FE or FE/GbE device. The GbE option features auto-negotiation and supports both rates.



For service demarcation, MiNID provides:

- Port-based and flow-based classification of multiple services
- Flow classification per VLAN, 2 VLANs, VLAN range, P-bits, DSCP, EtherType or source/destination MAC address
- Per flow, MEF 10.3 policing
- VLAN or 2 VLAN addition, VLAN replacement per flow with priority marking per P-bits and DSCP
- Layer-2 control protocol tunneling with optional MAC change (L2PT)

MONITORING AND DIAGNOSTICS

OAM

MiNID provides the following OAM tools per EVC.COS or untagged traffic:

- IEEE-802.1ag (CFM) for continuity check, loopback, and link trace
- ITU-T Y.1731 for loss (synthetic and real traffic), delay, and delay variation measurements, as well as fault propagation (AIS/RDI)
- MEF 36-based MIBS for PM reports
- IEEE 802.3-2005 link OAM and dying gasp trap

- RFC-5357 TWAMP Light controller and responder with multiple session reflectors offering hardware-based time stamping.

Loopback Tests

MiNID can perform on-demand intrusive and non-intrusive Layer-2/3/4 loopbacks at wire speed, with optional MAC, IP and UDP port swap per flow. MiNID also offers UDP echo responder functionality.

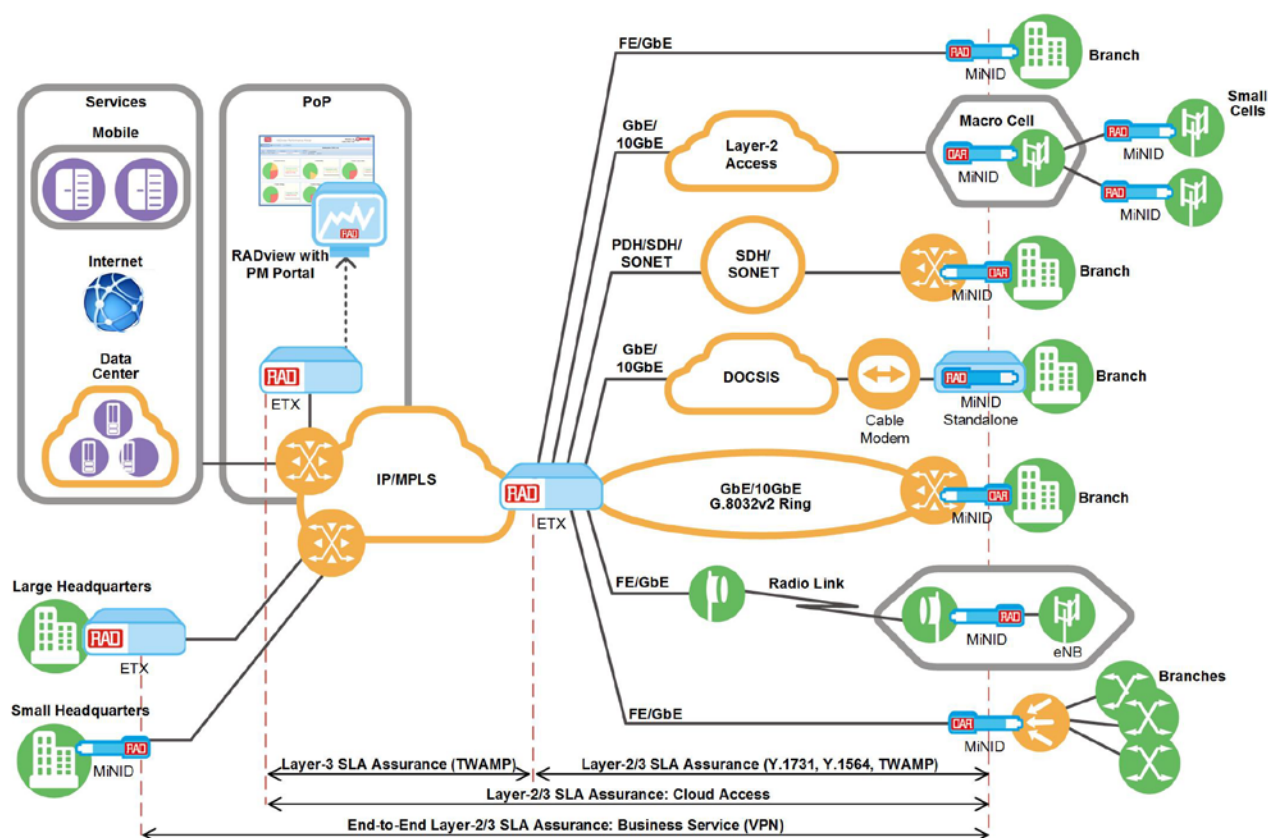
Service Activation Tests

MiNID responds to RFC-2544 and Y.1564 service activation tests at wire speed. It can also initiate Layer-3 SAT with its own generator.

Within the Platinum package, MiNID enables smart packet capturing remotely. It can transport classified traffic to any standard Wireshark station for further analysis. For best efficiency, MiNID can send truncated packets.

Digital Diagnostic Monitoring

Digital Diagnostics Monitoring (DDM) information read from an SFP plugged into a MiNID is stored on the MiNID. This information can be forwarded to the host and retrieved directly from the device via a remote management system.



Microburst Monitoring

Within the Platinum package, MiNID offers the ability to monitor network traffic, on a per-flow or multiple-flows basis, and detect unexpected bursts of data in very short time intervals measured in microseconds. It provides clear indication of traffic and bursts passed, dropped, or exceeding thresholds based on CIR/CBS and EIR/EBS. In addition, it helps facilitate bandwidth on demand.

Auto Responder

MiNID can automatically detect and respond to L2, L3, L4 loopbacks and OAM traffic with minimal installation effort and no configuration. The auto-responder mode is transparent to user traffic and provides a smooth introduction of service visibility into the network.

MANAGEMENT AND SECURITY

Management Options

MiNID can be managed via the following interfaces:

- Web-based and menu-driven interface in English and Chinese
- Command Line Interface (CLI) via secured Telnet (SSH)
- SNMPv2
- Inband management (VLAN-based)
- Out-of-band management and software configuration from any Ethernet port in the host device

MiNID supports secure management using TACACS+ (client authentication, authorization, and accounting).

MiNID is equipped with two MAC addresses; one for management and one for services. This enables the device to work and be managed in a Layer-2 untagged environment, as well as VLAN and double VLAN-tagged.

MiNID acquires Time of Day through NTP.

Access Control List (ACL)

The ACL enables permission/denial of management access to specified IP addresses for increased security.

Application software can be downloaded to MiNID via the following:

- SFTP or TFTP for remote software download
- SFP-CA.2 unit, using YMODEM protocol for the SFP sleeve option
- Serial interface for the standalone option

Zero Touch Provisioning

Host IP address and configuration files can be automatically obtained using standard DHCP client functionality.

Loaned IP

MiNID can be managed without a dedicated IP address, by loaning the IP address of the hosting device.

Network Management with RADview

RADview manages MiNID, and the RADview PM portal provides SLA reports based on PM counters and utilization measurements.

Specifications

CAPACITY

Max. Frame Size	12,000 bytes
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ETHERNET INTERFACES

SFP Sleeve	SFP-based, MSA-compliant edge connectors, 100BASE-FX/1000BASE-FX
SFP Transceivers for MiNID SFP	Electrical: 100BASE-T/1000BASE-T Optical: Dual/single, multi-mode/single mode fiber: FE: 100BASE-FX/LX/BX GbE: 1000BASE-SX/LX/ZX/BX and CWDM
Standalone	Two SFPs/Copper/Combo ports: 100/1000BASE-T, 100BASE-FX, or 1000BASE-FX

DIAGNOSTICS

Syslog	
Loopback Tests	Intrusive and non-intrusive L2/L3/L4 loopbacks, with optional MAC, IP, and UDP port swap per flow
Service Activation Tests	RFC-2544 responder ITU-T Y.1564 responder L3 SAT generator

GENERAL

Compliance	IEEE 802.3, MEF CE 2.0
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Power Consumption

SFP Sleeve	1.2W without SFP 1.65W (including standard 10km SFP)
Standalone	max 3.75W

Physical

	SFP sleeve	MiNID SFP	Standalone
Height	12.7 mm (0.50 in)	12.7 mm (0.50 in)	30 mm (1.18 in)
Width	14.3 mm (0.56 in)	14.3 mm (0.56 in)	113 mm (4.45 in)
Depth	81.1 mm (3.19 in)	81.1 mm (3.19 in)	113 mm (4.45 in)
Weight	30.0 g (1.0 oz)	40.0 g (1.4 oz)	0.3 kg (0.66 lb)

Environment

Case/Ambient Temperature	SFP sleeve, MiNID SFP: -40 to 85°C (-40 to 185°F) Standalone: 0 to 50°C (32 to 122°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Humidity	Up to 90%, non-condensing

Note: Reaching the operating temperature of -20/-40 to 65°C (-4/-40 to 149°F) requires the use of industrial SFPs.

Ordering

The information below represents examples of supported configurations. For additional configuration options, please contact your local RAD partner.

Hardware:

MiNID/SLV/GE

MiNID/SFP/5DH/GE

MiNID/SFP/6DH/GE

MiNID/STU/GE/ACEX/CMB

MiNID/STU/GE/ACEX/BPS/UTP

MiNID/STU/GE/ACEX/CMB/SYE

MiNID/STU/GE/ACEX/BPS/CMB

Software:

MiNID-SW/DEMARC

MiNID-SW/PLATINUM

Note: Order a hardware and a software option.

ORDERING OPTIONS

Some options are not supported by all models. Some option combinations are invalid or may require a minimum order. To determine the BOM for your application, please contact your local RAD partner.

Bypass Relay	Default	No bypass relay
	BPS	Bypass relay
Enclosure	SLV	SFP sleeve enclosure
	SFP	SFP enclosure
	STU	Standalone enclosure
Ethernet Ports	CMB	2 combo Ethernet ports
	UTP	2 RJ-45 Ethernet ports
Fiber Type	5DH	850 nm, 300m (984ft) 62.5/125 multimode, 550m (1804ft) 50/125 multimode
	6DH	1310 nm, 10km (6.2mi) 62.5/125 single mode
Power Supply	ACEX	External 100-240 VAC power supply (mandatory for standalone versions)

Sync-E	Default	No Sync-E
	SYE	Sync-E

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Software:

MiNID-SW/DEMARC

Service demarcation application software

MiNID-SW/PLATINUM

Platinum application software, includes demarcation application software and additional features

Note: Order a hardware and a software option.

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for configuration options.

SUPPLIED ACCESSORIES

P/S-AC/5/2000/UNIVERSAL-W/LOCK

External AC power supply for MiNID standalone AC ordering options

OPTIONAL ACCESSORIES

CBL-MUSB-DB9F

Mini-USB cable to connect MiNID standalone to a serial port

SFP-CA.2

Adapter to connect MiNID to a PC (when ordered, comes with the PS and cable listed below)

PS-AC/5/1200/GND

Power Supply for SFP-CA.2 (can be also ordered separately)

CBL-USB-A-B

Communication cable for SFP-CA.2

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