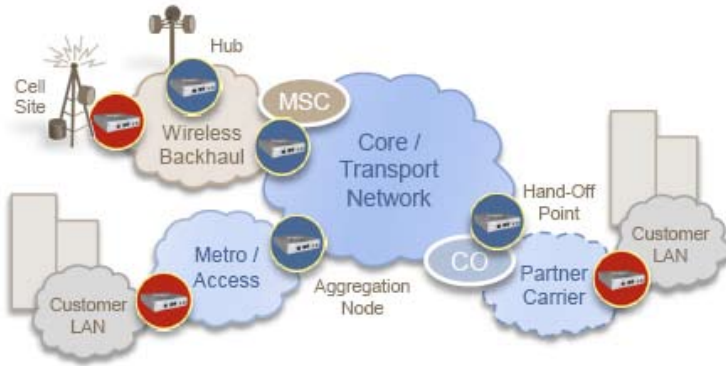




Packet Assurance Demarcation Units

Network interface devices for Ethernet & IP networks



Key features

- Proprietary Hardware Design
 - 1 μ s measurement resolution
 - Ultra-low pass-through jitter & latency
 - Ideal for assuring real-time services
- Service Assurance & Creation Features
 - Establish SLA-backed Ethernet services, point-to-point & multi-point
 - Monitor in-service: no effect on traffic
 - 1-way delay & jitter, throughput, packet loss, continuity and usage statistics
- Test Set & Monitoring System Support

Typical Demarcation Points:  MetroNIDs  EtherNIDs



Packet Performance Assurance™

Define the boundaries of your network, establish assured, end-to-end SLAs and standards-based management to deliver carrier-grade Ethernet & IP services.

Defining Intelligent Demarcation

Powered by the advanced functionality of JDSU's ESAP™ Ethernet Service Assurance Platform, EtherNID™ and MetroNID™ demarcation units define the boundaries of your network, enabling end-to-end service provisioning and assurance with carrier-grade performance.

The EtherNID and MetroNID units are built on the patent-pending Fast-Thru™ architecture, a unique hardware-based design that provides advanced performance testing and service creation capabilities in a compact, cost efficient, carrier-grade in-line element.

Unlike store-and-forward architectures, Fast-Thru's proprietary silicon design provides wire-speed pass-through performance without adding jitter or delay, while at the same time providing micro-second measurement resolution and real-time processing for every packet flowing through the unit.

With MEF 9+14 & NEBS Level 3 certification, no moving parts, 3-way redundant power, 1+1 protection and failover-bypass circuitry, EtherNID and MetroNID units are truly carrier-grade. A variety of mounting options ease installation at customer premises, cell sites, central offices and aggregation nodes.

EtherNID™ Units

Designed to demarc the edge of your network, EtherNIDs offer advanced Packet Performance Assurance™ and service creation directly from customer premises and cell-sites. With a full range of Ethernet rates and interfaces, the comprehensive EtherNID family fits your network from end-to-end.

MetroNID™ Units

High-performance MetroNID units provide carrier-grade demarcation within metro and access networks. Designed for cellular hubs, aggregation nodes, and carrier hand-offs, MetroNIDs segment, monitor and bridge diverse networks, delivering pervasive OAM and performance monitoring visibility.





Product Family Feature Matrix

JDSU has developed a wide range of packet assurance demarcation units, each adapted and optimized for popular demarcation, service assurance and creation applications. All units are interoperable where common functionality is supported. Our technical specialists can help you determine the right combination of units to provide complete Packet Performance Assurance™ for your network and services.

	Model	EtherNID™ EE	EtherNID™ GE	MetroNID™ TE	MetroNID™ TE-R	MetroNID™ TE-S
Interfaces	EE: Electrical-Electrical		•	•	•	•
	OE: Electrical-Optical					•
	OO: Optical-Optical		•	•	•	•
	10/100 Mbps	•	•	•	•	•
	1000 Mbps – Wirespeed GbE		•	•	•	•
	Electrical interfaces (including monitoring part)	5	3	3	3	1
	SFP interfaces		2	2	2	4
Service Assurance	PAA™ & SLA-Meter™ Performance Monitoring	•	•	•	•	•
	Multicast PAA (L2 & 3)	•	•	•	•	•
	Layer 2 & 3 Test Traffic Generator		•	•	•	•
	Layer 2 & 3 In-Service Throughput Testing		•	•	•	•
	RFC-2544 Automated Test Suite & Reports			•	•	•
	Intelligent Layer 1-4 Loopbacks	•	•	•	•	•
	Per-Flow Traffic Statistics	•	•	•	••	•
	802.1ag, 802.3ah, Y.1731 OAM Functionality	•	•	•	•	•
	Wirespeed Tapping & Monitoring	•	•	•	•	•
Service Creation	Ethernet Service Mapping (MEF certified)	•	•	•	•	•
	Zero-Latency Traffic Shaping			•	•	•
	Bandwidth Policing	•	•	•	••	•
	Traffic Filtering	•	•	•	•	•
	4FE x 1 & 2GbE x 1 Switch-Free Aggregation			•		•
General & Management	SNMP v1 & v2c	•	•	•	•	•
	Plug & Go™ Instant Provisioning	•	•	•	•	•
	RADIUS Authentication & Security Support	•	•	•	•	•
	Jumbo Frames Support	•	•	•	•	•
	3-Way Redundant Power	•	•	•	•	•
	MEF 9+14 & NEBS Level 3 Certified	•	•	•	•	•
	Temperature Hardened Option	•	•	•	•	•
	Dual-Protected Links (1+1) with LACP / LAG			•	•	•
	Copper Failover Bypass Circuit	•			•	

• = with electrical SFP •• = high capacity



Feature Highlights

Please refer to the ESAP™ solution overview brochure for complete functionality details

Service Assurance Functionality

PAA™ & SLA-Meter™

High-precision, hardware assisted, latency + jitter-free demarcation, monitoring and measurement of latency, jitter, frame loss and continuity, including 1-way performance validation with microsecond resolution. Multi-flow, multi-service, multi-site performance assurance enables real-time SLA assurance over any network. Supports point-to-point, multipoint & mesh topologies, unicast & multicast testing.

In-Service Throughput Testing

Verify the throughput of EVCs in-service, without affecting customer traffic. EtherNID™ & MetroNID™ units generate & analyze traffic flows up to full wire-speed at both layer 2 & 3.

RFC-2544 Automated Test Suite & Reports

Advanced tool based on the RFC-2544 standard that can be used to measure and diagnose throughput, delay, jitter (delay variation), frame loss, and back to back efficiency.

Intelligent Loopbacks

In-service layer 1-2-3-4 loopbacks per-flow, defined by VLAN, Service-Level, MAC / IP addresses or any combination of layer 2-4 header criteria. Units respond to in-band loop-up commands from most third-party Ethernet test sets and monitoring systems, as well as via Y.1731 standards.

Per-Flow Statistics

Real-time statistics of live traffic at layer 1-2-3-4 (perVLAN, Ethertype, ToS, CoS, MAC, IP, etc.).

Tapping & Monitoring

Single or dual monitor ports providing filtered, real-time access to unidirectional or bidirectional traffic.

Service Creation & Traffic Conditioning

Service Mapping

Create E-Line, E-LAN & E-Tree services directly at the demarc point -service mapping applies C/V-LAN tags (selective push) and/or configurable service class to traffic meeting detailed layer 2,3 & 4 criteria.

Bandwidth Policing

Limit upstream and downstream CIR/EIR by filtering criteria or for all traffic. Facilitates Carrier Ethernet service provisioning and on-demand/incremental service upgrades.

Zero-Latency Traffic Shaping

Pre-conditioning of traffic to accelerate services and optimize access link bandwidth use. Passes highest-priority traffic Fast-Thru™ without added delay or jitter while other traffic is buffered until capacity is available.

Wire-speed Filtering

Filter wirespeed traffic at layer 1-2-3-4 (L2CP, BDPU, perVLAN, Ethertype, Protocol type, MAC, IP, user defined).

Switch-Free Aggregation

Latency-free, multi-port aggregation from 4 fast Ethernet ports to a single GbE, or from 2 GbE's to a single GbE or protected pair (total traffic < 1 GbE). De-aggregate by VLAN, or any combination of Layer 2 - 4 frame criteria.



4

Specifications

General Functionality

Jumbo Frames Support: All functions support jumbo frames up to 10,240 bytes at all rates (10/100/1000 Mbps).

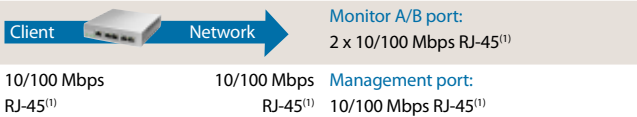
3-Way Redundant Power: Units can be powered using 5 VDC, or dual -48V feeds, all mutually redundant.

Plug & Go™: Full automated customer-level install, auto-configuration & inventory tracking capabilities.

SNMP v1 & v2c: Support SNMP v1 and v2c for monitoring, alarms, OSS integration and unit configuration.

Interfaces

EtherNID™ EE



EtherNID GE, MetroNID™ TE & MetroNID TE-R



MetroNID TE-S



Notes

- (1) 10/100 Mbps (10/100 Base TX) RJ-45 connectors: supports auto-negotiation and auto MDIX
- (2) 100 Mbps (100 Base FX/LX/SX/ZX/BX) SFP connector: supports a wide range of SFPs
- (3) 10/100/1000 Mbps (10/100/1000 Base TX) RJ-45 connectors: supports auto-negotiation and Auto MDIX
- (4) 10/100/1000 Mbps (10/100/1000 Base TX/FX/LX/SX) SFP connectors: supports a wide range of SFPs including copper SFPs

Service Assurance Features

- Loopback functionality

Layer 1, Layer 2 (MAC Swap), Layer 3 (IP Swap), Layer 4 (TCP/UDP Port Swap)

Automatically reacts to in-band loopback requests sent from popular 3rd party Ethernet test-sets, as well as 802.3ah / Y.1731 OAM loopback commands.

Loopback on specific VLANs, source/destination MAC/IP address(es), Ethertype, protocol type, service class, or any logical combination.

Loopback on specific MAC/IP source and/or destination address

- Thru-traffic per-flow statistics

Stats per VLAN, per Ethertype, per ToS, per CoS, per MAC, per IP, etc.

Stores up to 7 days of local and remote historical packet statistics in user configurable history buckets (typically set from 1-15 minutes).

Monitor up to 60 concurrent flows on MetroNID TE-R, 16 flows on other units

- Dual monitor access ports providing individual access to both signal directions, combined access to both directions and intelligent filtering.

Up to 100 Mbps of traffic can be monitored from each port

- Fast fault propagation, <50 ms on all interfaces, client & network ports
- Transparent fail-over bypass on electrical-to-electrical models
- Dual protected uplink option for network side optical connection⁽⁵⁾

Standard 1+1 protection (<20ms) or LACP/LAG active / standby modes (< 50ms)

- Link Loss Return

- OAM functionality

IEEE 802.3ah Ethernet OAM

IEEE 802.1ag service layer OAM (Connectivity Fault Management)

ITU-T Recommendation Y.1731

- Dying Gasp (via 802.3ah or SNMP traps)
- VLAN tagging/de-tagging and VLAN stacking (.1Q in .1Q)
- Integrated copper TDR cable integrity testing
- Optical digital diagnostics (SFF-8472) with threshold crossing alerts via SNMP traps
- Jumbo frames support for all features (up to 10,240 bytes)

Performance Assurance Agent (PAA™)

- Continuous in-service monitoring of Layer 2 & 3 SLA parameters, unicast or multicast

One-way and round-trip latency (delay)

One-way and round-trip jitter (delay variation)

One-way packet loss

Continuous end-to-end path continuity check, availability (SES)

IGMP group join / leave delays

- High precision measurements: 1 μs resolution
- Exclusive remote synchronization allows highly accurate one-way measurements over large geographical areas.
- Large-scale performance assurance works in multiple topologies:
 - Point-to-Point
 - Multipoint-to-Multipoint
 - Mesh
- Assures SLAs per VLAN/per CoS/per ToS/per EVC
- Multi-SLA™ monitoring –up to 100 simultaneous instances
- User settable SLA threshold crossing alerts using SNMP traps



5

Specifications

RFC-2544 Testing & Traffic Generation

- Wirespeed traffic generator and analyzer

Layer 2 or Layer 3 (IP)

- In-service traffic generator and analyzer⁽²⁾

Layer 2 or Layer 3 (IP); unidirectional or bidirectional

Seamless operation, does not affect customer traffic

Up to full service or wire-speed; 1 or 2 test streams

- RFC-2544 automated test suite with reports⁽¹⁾

Throughput

Delay (latency)

Delay variation (jitter)

Frame loss

Back-to-Back

Supports all packet sizes including jumbo frames

Automatic report generation

Service Creation & Traffic Conditioning

Service Mapping⁽²⁾

- Create E-line, E-LAN & E-tree Ethernet virtual circuits
- Identify traffic flows based on frame characteristics

Source or destination MAC or IP addresses, masks

Ethertype, port(s), DSCP, IP precedence or PCP

Customer & providers VLAN ID (C-VLAN, S-VLAN)

- Applies one or more actions

S-VLAN tagging (selective push)

CoS mapping (set C/S-VLAN tag priority based on DSCP, IP precedence or PCP, drop eligibility)

Bandwidth policing (based on DSCP, IP precedence or PCP values)

Bandwidth Policing

- Limit upstream and downstream CIR/EIR by filtering criteria or for all traffic. Allows enforcement of MEF-compliant services.
- Regulate up to 64 flows (MetroNID TE-R), 15 on other models

Zero-Latency Traffic Shaping⁽³⁾

- Pre-conditioning of traffic by using buffer queues to delay and prioritize packets to smooth insertion into lower speed transport tunnels. No delay added to highest-priority traffic.

Traffic Filtering & Per-Flow Statistics

- Through traffic wire-speed filtering (L2CP, BPDU, per-VLAN, Ethertype, Protocol type, MAC, IP, user defined)
- Define policies for up to 60 flows (TE-R), 16 on other models

Switch-Free Aggregation

- Latency-free, multi-port aggregation from 4 fast ethernet ports to a single GbE, or from 2 GbE to a single or protected GbE port (total traffic rate limited to 1 GbE). De-aggregate by VLAN, or any combination of Layer 2 - 4 frame criteria. Client-side MTU limited to 1522 bytes.

(1) Available on MetroNID™ TE and MetroNID TE-R only

(2) Available on EtherNID™ GE, MetroNID TE and MetroNID TE-R only

(3) Available on MetroNID TE and TE-S models only

(4) MTBF > 53 yrs at 25°C, > 15 yrs at 40°C per Telcordia SR-332 method

Hardware & Performance

Pure Hardware Data-Path (Fast-Thru™ architecture)

- Inline transparent performance (all packet sizes):

Throughput: wire-speed (1000 Mbps at 100% utilization)

Intrinsic pass-through traffic latency < 3.3 μs

Intrinsic pass-through traffic jitter < 0.1 μs

Intrinsic latency for intelligent loopback < 0.8 μs

Intrinsic jitter for intelligent loopback < 0.1 μs

- High-accuracy, hardware-assisted performance measurements with 1μs resolution.

Integrated Management

- SNMP v1, v2c Sets & Gets
- Secure web GUI via SSL
- Management VLAN
- Configuration import/export
- NTP client (or source)
- DNS client
- Radius authentication
- Secure CLI via SSH
- 802.3ah EFM OAM
- FTP, TFTP, HTTP, HTTPS
- Remote and local syslog
- DHCP client

- Plug & Go™ Instant Provisioning
- In-band remote management over the Ethernet customer line via network & client-side interface
- Local management craft port: 10/100 BaseT RJ-45 connector
- Serial RS-232 management port: RJ-45 connector
- Zero-Touch provisioning to OSS systems & EchoVault™ SLA EMS

Redundant Power, Connectivity & Timing

- External AC/DC adapter (120-240 Vac auto-sensing, 50-60 Hz), 5 VDC input to unit
- Dual (A/B) -48 VDC or 24 VDC Central Office Supply inputs
- Power consumption: 5-8 watts
- Cooling: convection cooled (no fans)
- Transparent fail-over bypass on electrical-to-electrical models
- Dual protected uplink allows two redundant connections on the network side for increased reliability⁽¹⁾

Physical Specifications

- 1.60" H x 5.34" W x 5.80" D
- 625 g or 1.37 lb
- MTBF 52-66 years (at 25° C ambient)
- Mounting options:

Desktop, Wall-mount

Rack-mount: 1 or 2 units side-by-side in 1U

EtherSHELF™: High density, 12-unit, 19" central office shelf in 4U (23" adapter available)

Regulatory and Certification

- IEC 60950
- FCC part 15 class A
- Industry Canada CS-03
- CE mark
- MTBF > 53 yrs⁽⁴⁾
- NEBS Level 3
- MEF9 service certification
- MEF14 traffic management

Environmental

- Standard operating temperature -5 to +65°C
- Hardened operating temperature (-H) -40 to +65°C
- Storage temperature -40 to +70°C
- Operating/storage humidity 5-95 % RH non-condensing



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Ordering information

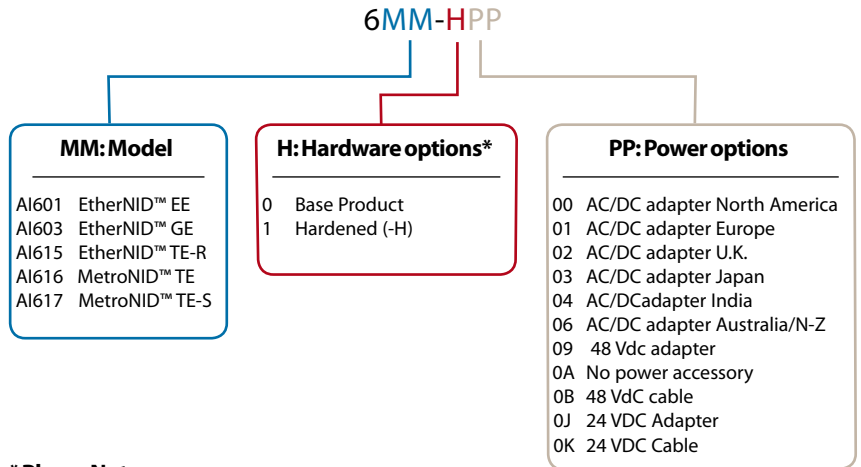
EtherNID™ & MetroNID™ Packet Assurance Demarcation Units

Models

Part No.	Model	Description
AI601-XXX	EtherNID™ EE	EtherNID™ EE : 10/100 Mb/s Ethernet demarcation device
AI603-XXX	EtherNID™ GE	EtherNID™ GE : 10/100/1000 Mb/s Ethernet demarcation device
AI615-XXX	MetroNID™ TE-R	MetroNID™ TE-R : 10/100/1000 Mb/s unit enhanced multi-flow processing & statistics
AI616-XXX	MetroNID™ TE	MetroNID™ TE : 10/100/1000 Mb/s unit with advanced traffic shaping & packet processing functionality
AI617-XXX	MetroNID™ TE-S	MetroNID™ TE -S: 4 SFP port version of the MetroNID TE

Options

Example: AI615-109 is MetroNID™ TE-R with 48 Vdc Adapter



*** Please Note:**

- Hardware option 2 and 3 are only available on MetroNID™ models
- AC/DC adapters do not support hardened applications: only 24 & 48 VDC power options are supported



Ordering information

SFP modules

PartNo.	Model		Description
100 Mb/s SFPs			
Standard	Hardened*	Add "-H" for hardened	Description
AI7SA-000	AI7SA-100	SFP-100-SM-16DB-1310 (-H)	100 Mb/s SFP, SM, 1310 nm, 16 dB budget, 30 km, LC
AI7SB-000	AI7SB-100	SFP-100-SM-30DB-1310 (-H)	100 Mb/s SFP, SM, 1310 nm, 30 dB budget, 60 km, LC
AI7SE-000	AI7SE-100	SFP-100-SM-30DB-1550 (-H)	100 Mb/s SFP, SM, 1550 nm, 30 dB budget, 100 km, LC
AI7SF-000	AI7SF-100	SFP-100-BIDIR-18DB-1310 (-H)	100 Mb/s SFP, Bi-Dir, 1310-1550 nm, 18 dB budget, 20 km, LC
AI7SG-000	AI7SG-100	SFP-100-BIDIR-18DB-1550 (-H)	100 Mb/s SFP, Bi-Dir, 1550-1310 nm, 18 dB budget, 20 km, LC
AI7SH-000	AI7SH-100	SFP-100-BIDIR-26DB-1310 (-H)	100 Mb/s SFP, Bi-Dir, 1310-1550 nm, 26 dB budget, 40 km, LC
AI7SJ-000	AI7SJ-100	SFP-100-BIDIR-26DB-1550 (-H)	100Mb/s SFP, Bi-Dir, 1550-1310 nm, 26 dB budget, 40 km, LC
AI7SK-000	AI7SK-100	SFP-100-MM-850 (-H)	100 Mb/s SFP, MM, 850 nm, VCSEL, 2 km, LC
1000 Mb/s Gigabit SFPs			
AI7SM-000	AI7SM-100	SFP-1000-MM-850 (-H)	GigE SFP, MM, 850 nm, VCSEL, 550 m, LC
AI7SN-000	AI7SN-100	SFP-1000-SM-10KM-1310 (-H)	GigE SFP, SM, 1310 nm, FP, 12 dB, 10 km, LC
AI7SO-000	AI7SO-100	SFP-1000-SM-30KM-1310 (-H)	GigE SFP, SM, 1310 nm, DFB, 20 dB, 30 km, LC
AI7SP-000	AI7SP-100	SFP-1000-SM-50KM-1550 (-H)	GigE SFP, SM, 1550 nm, DFB, 20 dB, 50 km, LC
AI7SR-000	AI7SR-100	SFP-1000-SM-70KM-1550 (-H)	GigE SFP, SM, 1550 nm, DFB, 24 dB, 70 km, LC
AI7SS-000	AI7SS-100	SFP-1000-SM-110KM-1550 (-H)	GigE SFP, SM, 1550 nm, DFB, 30 dB, 110 km, LC
AI7ST-000	AI7ST-100	SFP-1000-BIDIR-10KM-1310 (-H)	GigE SFP, Bi-Dir, 1310-1490 nm, FP, 10 km, LC
AI7SU-000	AI7SU-100	SFP-1000-BIDIR-10KM-1490 (-H)	GigE SFP, Bi-Dir, 1490-1310 nm, DFB, 10 km, LC
AI7ST-002	AI7ST-102	SFP-1000-BIDIR-60KM-1310 (-H)	GigE SFP, Bi-Dir, 1310-1490nm, 60 km, LC
AI7SU-002	AI7SU-102	SFP-1000-BIDIR-60KM-1490 (-H)	GigE SFP, Bi-Dir, 1490-1310nm, 60 km, LC
AI7SW-000	n/a	SFP-1000-CWDM-1470	GigESFP, CWDM, 1470 nm, DFB, 27 dB, LC
AI7SX-000	n/a	SFP-1000-CWDM-1490	GigESFP, CWDM, 1490 nm, DFB, 27 dB, LC
AI7SX-001	n/a	SFP-1000-CWDM-1510	GigESFP, CWDM, 1510 nm, DFB, 27 dB, LC
AI7SX-002	n/a	SFP-1000-CWDM-1530	GigESFP, CWDM, 1530 nm, DFB, 27 dB, LC
Copper SFPs			
AI7SV-000	n/a	SFP-1000-COPPER	10/100/1000 Copper SFP, RJ-48

*Hardened Temperature Range: -40 to +65°C

Mounting Options

Part No.	Description
AI705-000	Rackmount 1U horizontal mounting bracket, fits 1 demarc unit
AI706-000	Rackmount 1U horizontal mounting bracket, fits 2 demarc units
AI704-000	EtherSHELF™ rackmount 4U vertical mounting shelf, fits 12 demarc units, individually fused, -48 Vdc power feeds
AI707-000	Adapter: Rackmount 1U horizontal, 19" to 23"
AI708-000	Adapter: Rackmount 4U vertical, 19" to 23"
AI709-000	Adapter: Wallmount kit



Wallmount



Twin 1U Rack-mount



12 unit 4U Rack-mount

**Test & Measurement Regional Sales**

NORTH AMERICA TEL: 1 866 228 3762 FAX: +1 301 353 9216	LATIN AMERICA TEL:+1 954 688-5660 FAX:+1 954 3454668	ASIA PACIFIC TEL:+852 2892 0990 FAX:+852 2892 0770	EMEA TEL:+49 7121 86 2222 FAX:+49 7121 86 1222	WEBSITE: www.jdsu.com/test
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