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## Ethernet Link-layer OAM Loopback

How to configure OAM loopback on Anritsu Network Master Pro/Flex with third-party network device

Network Master Pro MT1000A / Network Master Flex MT1100A

Link-layer OAM (802.3ah) is an OAM protocol operating purely at the Ethernet layer without the requirement for setting IP addresses. 802.3ah operates only on point-to-point links and messages are sent in untagged slow protocol frames called OAM Protocol Data Units (OAMPDUs). OAMPDUs are multicast to a specific multicast address that is link-constrained, meaning OAMPDUs only traverse a single link, and are never forwarded by bridges or switches, even if these do not implement OAM.

The capabilities of the link-layer OAM protocol itself are limited to placing the remote device into loopback mode, setting flags indicating critical events, and querying the configuration of the remote device. Two modes are defined for OAM entities: active or passive. The active-mode device can control the passive-mode device. For example, the active-mode device can send commands (Loopback Control OAMPDU) forcing the passive-mode device into or out of loopback mode.

This note describes how to configure the Network Master Pro/Flex to act as an active OAM device capable of remotely setting a connected passive-mode OAM device into loopback mode. Configuration of the third-party Accedian NID network device is described as well.

### **Network Master Pro/Flex OAM Setup**

Follow the below steps to enable the remote OAM loopback function in the Network Master Pro/Flex.

1. At the **SETUP** page, go to the **OAM 803.3ah** tab and select the **802.3ah** function. At the **Discovery** tab set **State** to *On* and set **Link mode** to *Active*.



2. Go to the **OAM** status page and verify the **Remote Device** is discovered correctly. The Network Master is now ready to start remote loopback.

Application Selector R Port 1 IEEE 1588v2 Settings Answer: Non WAN SyncE Off OAM 802.3ah Filter Off Port Stream O Link Speed Devices Variables P 1 Gbps Duplex FDX Remote Device Ethernet • Traffic • MPLS frame Mode Passive Parser Unsupported Muxer Unsupported O MPLS-TP frame O VLAN frame OUI 123456 ĕ VSI 63 Unidirectional Supported Í Link events Supported Loopback Supported • Var. ret OAM 22:09:44 Discovered 00:80:16:8A:5F:2F X rame capture Transceiver 🕑 SETUP TEST RESULT 🔐 🖬 🖘 🛛 V 🍱 🗫 🖳 📫 22:09 ETH-BERT

Application Selector

SyncE Off

Settings Answer: Nor

WAN Off

Devices Variables

Remote Device

Unidirectional

Mode

Parser

Muxer OUI

VSI

Stream

Passive Supported

63 Supported

Supported 123456

Port

IEEE 1588v2

OAM 802.3ah

> Link Speed:

Duplex:

Ethernet • Traffic

• MPLS frame • MPLS-TP frame

O VLAN frame

1 Gbp

FDX

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?

Filter Off

3. Press the **Loop** button to start OAM remote loopback. The status window shows the result of the remote loop-up request.

4. Press the **Loop** button again to take the remote device out of loopback mode. The status window shows the result of the remote loop-down request.



### Accedian NID - OAM Remote Loopback

Follow the steps below to enable the remote OAM loopback function in Accedian NIDs<sup>1</sup>.

1. Select the **OAM -> Configuration** page, and select the OAM instance for the port at which to configure the loopback function.

In this example, this is the **client** port.



2. Make sure the **Enable OAM protocol** checkbox is checked and select **Passive mode**.



3. Select the **OAM** -> **Loopback** page, and select the OAM instance at which to configure the loopback function. In this example, this is the **client** instance (port).



<sup>&</sup>lt;sup>1</sup> The configuration examples in this document are made via the web interface of the ACCEDIAN NETWORKS EtherNID AEN-1000-GE, running firmware version 4.9.2.1. Similar functions may be found in other NIDs from ACCEDIAN NETWORKS, but with slightly different configuration menus.

4. Make sure the **Remote loopback enable OAM 802.3ah** checkbox is checked.

The Accedian NID is now ready to accept remote loopback requests from the Network Master.



5. After receiving and accepting the command to set the interface to loopback mode, the loopback status is reflected at the **OAM -> Loopback** screen...

...and the **client** instance detailed page.



KET PERFORMANCE A	SSURANCE™					
admin : G171-0368						
Port	Traffic	System	OAM	SOAM		
ontiguration	Loopback		Events	Status		
	WARNING: Loopback configuration can disrupt the service!					
	OAM loopback			î		
	Name:	client				
	State:		Enable (OAM 802.3ah)			
	Loopback enable		802.3ah 🛩 Type			
	Persistent					
	✓ Drop opposite traffic	0	Loopback timeout (in mins)			
	Remote loopback enable					
	□ JDSU/Actema <sup>™</sup>					
	Enable discovery loop comma	inds				
	Sunrise <sup>TM</sup>					
	VeEX <sup>1M</sup>					
	OAM 802.3ah					
	ET PERFORMANCE A admin : G171-0368 onfiguration	Port Traitlic   andmin : G171-0368 Loopback   andiguration WARNING: Loopback   WARNING: Loopback Name:   State: Value   Vocation Loopback configuration   Value Loopback configuration   Value Drop opposite traffic   Persuitest Drop opposite traffic   Enable discovery loop comma Suntrie <sup>104</sup> Velocity O QAM 802 Jah	VET PERFORMANCE ASSURANCE <sup>Max</sup> admin : G171-0368   Port Traillic System   undiguration WARNING: Loopback System   WARNING: Loopback Manne: State:   VIC Loopback enable Persister Viceopback enable   Drop opposite traffic 0   Remote loopback enable IDSU/Acterna <sup>TM</sup> Enable discovery loop commands Suntrie <sup>TM</sup> ViceXT <sup>MAK</sup> ViceXT <sup>MAK</sup>	VET PERFORMANCE ASSURANCE**   admin : C171.0583   antiguration   Post Totalic   Loopback Events   OAM   OAM loopback   Name: Cleast   State: Enable (OAM 802 3ai)   Persustent B02 3ain Type   Persustent B02 3ain Type   Persustent B02 3ain Type   Open poposite traffic Loopback timeout (in mins)   Remote loop back cable DDSU/Actema**   DSU/Actema** Exable discovery loop commands   Surgis:*** YeeX**   O AM 802 3ah YeeX**		

### Accedian NID - Loopback using Custom Filters

As described earlier, 802.3ah OAM operates only on point-to-point links. When test equipment and the Accedian NID are at different test points in a routed network, it is impossible to remotely start the loopback function from the Network Master Pro/Flex. However, using the Accedian NID filters and the built-in Custom Loopback function, it is possible configure the Accedian NID to loopback test traffic originating from Network Master Pro/Flex while passing other traffic streams.

Follow the steps below to configure the Accedian NID Custom Loopback function. The first step is to configure a filter to address traffic to loopback. The second step is to configure the loopback function to use this filter.

The following example describes how to configure a filter to loopback streams originating from any Anritsu test set (the MAC address of an Anritsu source). In this example, only Layer 2 is filtered. Depending on the network configuration, more advanced filters are available for specifying VLAN/IPv4/UDP/TCP properties of the looped-back traffic.

1. We want to set a filter to address all traffic originating from an Anritsu test set, i.e. with an Anritsu source MAC address of 00:00:91:xx:xx:xx (Anritsu Corporation registered and default instrument addresses).

Select the **Traffic -> Filters -> L2 filters** page, and select the filter instance to configure.

In this example we are setting up the **AnritsuMac** filter.

2. Enable **MAC source/mask** and set a source MAC address of 00:00:91:xx:xx:xx. Set 24 bit mask to look only at the first 3 bytes and ignore the last 3 bytes.

Port Policies	Traffic Filters L2 filters	System Regulate	OAM IS	SOAM Mapping Pv4 filters	RFC-2544
L2 Filters					
Filter name	MAC destination	MAC source	Ethertype	VLAN1	VLAN2
*default					
PAA-Discovery	FF FF FF FF FF FF		0x88FC		
tupe 0000			0s:0800		
AnritsuMAC		00:00:91:00:00:00			
Cuttinin					
ieeeBPDU	01:80:C2:00.00:00				
ciscoBPDU	01:00:0C:CC:CC:CD				
mecDst	00:15:AD:01:01:01				
macSrc		00:15:AD:01:01:01			
frameType			0x9000		
firstVlanId				100	
firstVlanPrior					
firstVlanCfi					
secondVlanId					200
secondVlanPrior					
secondVlanCfi				***	
[1-16] of 16				< )	234>



3. Select the **OAM** -> **Loopback** page, and select the port at which the loopback function is to be configured. In this example, the **client** instance (port) is set.



4. Put a checkmark in the **Loopback** enable checkbox and select **Custom** at **Type**. Select **L2 filter** at **Filter type** and select **AnritsuMAC** from the list of available L2 filters.

If applicable, also enable swapping of MAC/IP addresses, and TCP/UDP ports.

The Client port of the Accedian NID will now loopback all traffic originating from an Anritsu test set with source MAC address of 00:00:91:xx:xx:xx.

5. After enabling custom loopback, the loopback status is reflected at the **OAM -> Loopback** screen.



Local

#### Note:

As mentioned previously, many more filter properties can be used to uniquely identify the traffic to loop-back. This is the configuration page for an IPv4-type filter which, in addition to VLAN parameters, includes parameters for IPv4 source and destination addresses, DSCP/IP precedence and other IP header fields, UDP/TCP source and destination ports.

ipDst configuration ?				
IPv4 filter name	ipDst			
IPv4 header settings				
IPv4 source / mask	0.0.0.0 / 32			
IPv4 destination / mask	192.168.1.1 / 32			
TTL	0			
ECN ECN	0			
Header length	5			
Protocol	UDP 17			
UDP/TCP ports settings				
Source port	0			
Destination port	0			
VLAN settings				
Ethertype	Both 🗸			
CFI/DEI	0			
Priority	Equal to 🕑 0 0			
VLAN ID	Equal to 🗸 0			
VLAN in VLAN settings				
Ethertype	Both			
CFI/DEI	0			
Priority	Equal to 🕑 0 0			
VLAN ID	Equal to 💽 0 0			
DSCP/IP precedence				
DSCP 💌	Equal to v default(0) v default(0) v			
Apply Delete				

### Conclusion

Controlling and creating a loopback via OAM 802.3ah across a non-rerouted network or implementing custom filters on devices such as the Accedian NID simplifies testing for telecom engineers. Combining these functions with the flexibility and powerful Ethernet testing capabilities of the Network Master Pro/Flex, allows engineers to troubleshoot any issues quickly.

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#### United States

Anritsu Company 1155 East Collins Blvd., Suite 100, Richardson, TX 75081, U.S.A. Toll Free: 1-800-267-4878 Phone: +1-972-644-1777 Fax: +1-972-671-1877

Canada Anritsu Electronics Ltd. 700 Silver Seven Road, Suite 120, Kanata, Ontario K2V 1C3 Canada Phone: +1-613-591-2003 Fax: +1-613-591-1006

#### • Brazil Anritsu Eletrônica Ltda. Praça Amadeu Amaral, 27 - 1 Andar 01327-010 - Bela Vista - São Paulo - SP - Brazil Phone: +55-11-3283-2511 Fax: +55-11-3288-6940

 Mexico Anritsu Company, S.A. de C.V. Av. Ejército Nacional No. 579 Piso 9, Col. Granada 11520 México, D.F., México Phone: +52-55-1101-2370

Fax: +52-55-5254-3147 United Kingdom Anritsu EMEA Ltd. 200 Capability Green, Luton, Bedfordshire, LU1 3LU, U.K. Phone: +44-1582-433200 Fax: +44-1582-731303

• France Anritsu S.A. 12 avenue du Ouébec, Bâtiment Iris 1- Silic 612. 91140 VILLEBON SUR YVETTE, France Phone: +33-1-60-92-15-50 Fax: +33-1-64-46-10-65

 Germany Anritsu GmbH Nemetschek Haus, Konrad-Zuse-Platz 1 81829 München, Germany Phone: +49-89-442308-0 Fax: +49-89-442308-55

Italy

Anritsu S.r.l. Via Elio Vittorini 129, 00144 Roma, Italy Phone: +39-6-509-9711 Fax: +39-6-502-2425

Sweden Anritsu AB Kistagången 20B, 164 40 KISTA, Sweden Phone: +46-8-534-707-00 Fax: +46-8-534-707-30

• Finland Anritsu AB Teknobulevardi 3-5, FI-01530 VANTAA, Finland Phone: +358-20-741-8100 Fax: +358-20-741-8111

 Denmark Anritsu A/S Kay Fiskers Plads 9, 2300 Copenhagen S, Denmark Phone: +45-7211-2200 Fax: +45-7211-2210

• Russia Anritsu EMEA Ltd. **Representation Office in Russia** Tverskaya str. 16/2, bld. 1, 7th floor. Moscow, 125009, Russia Phone: +7-495-363-1694 Fax: +7-495-935-8962

• Spain Anritsu EMEA Ltd. Representation Office in Spain Edificio Cuzco IV, Po. de la Castellana, 141, Pta. 8 28046, Madrid, Spain Phone: +34-915-726-761 Fax: +34-915-726-621

 United Arab Emirates Anritsu EMEA Ltd. Dubai Liaison Office P O Box 500413 - Dubai Internet City Al Thuraya Building, Tower 1, Suit 701, 7th Floor Dubai. United Arab Emirates Phone: +971-4-3670352 Fax: +971-4-3688460

Specifications are subject to change without notice.

India Anritsu India Private Limited 2nd & 3rd Floor, #837/1, Binnamangla 1st Stage, Indiranagar, 100ft Road, Bangalore - 560038, India Phone: +91-80-4058-1300 Fax: +91-80-4058-1301

Singapore Anritsu Pte. Ltd. 11 Chang Charn Road, #04-01, Shriro House Singapore 159640 Phone: +65-6282-2400 Fax: +65-6282-2533

• P.R. China (Shanghai) Anritsu (China) Co., Ltd. Nom 2701-2705, Tower A, New Caohejing International Business Center No. 391 Gui Ping Road Shanghai, 200233, P.R. China Phone: +86-21-6237-0898 Fax: +86-21-6237-089

• P.R. China (Hong Kong) Anritsu Company Ltd. Unit 1006-7, 10/F., Greenfield Tower, Concordia Plaza, No. 1 Science Museum Road, Tsim Sha Tsui East, Kowloon, Hong Kong, P.R. China Phone: +852-2301-4980 Fax: +852-2301-3545

• Japan Anritsu Corporation 8-5, Tamura-cho, Atsugi-shi, Kanagawa, 243-0016 Japan Phone: +81-46-296-6509 Fax: +81-46-225-8359

Korea Anritsu Corporation, Ltd. 5FL, 235 Pangyoyeok-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400 Korea Phone: +82-31-696-7750 Fax: +82-31-696-7751

• Australia Anritsu Pty. Ltd. Unit 21/270 Ferntree Gully Road, Notting Hill, Victoria 3168, Australia Phone: +61-3-9558-8177 Fax: +61-3-9558-8255

• Taiwan Anritsu Company Inc. 7F, No. 316, Sec. 1, NeiHu Rd., Taipei 114, Taiwan Phone: +886-2-8751-1816 Fax: +886-2-8751-1817

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