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**Title:** Configuration of the SNMP LAN Adapter (LANA)
 

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**Synopsis:** Many Paradyne products are designed to provide SNMP Manager access via a PPP session through local COM or AUX ports. However, many configurations require management from a centralized, LAN attached SNMP Manager. In configurations of this type, the managed unit must be attached to a LAN segment or to an AUX port on a router. Since router AUX ports are few, LAN attachment is generally desired.

LAN attachment is provided through a Lan Adapter (LANA) which attaches between a LAN and the COM (or AUX) port of the CDU/DSU/T1 product. This document will describe the methods which may be used to configure the optional LANA.

Paradyne products which can utilize the LAN Adapter include:

|  |  |
|--|--|
| • 3150, 3151 - Standalone/Nest Mount T1 CSU                | • 7610 - Single Port 56K/64K CSU/DSU                   |
| • 316x, 3161 - Standalone/Nest Mount Multi-Port T1 CSU/DSU | • 7110 - Single Port T1/FT1 Mux                        |
| • 3162 - Single-height 2-port T1 DSU/CSU                   | • 9121 - T1 Frame Relay Access Unit                    |
| • 317x - E1 CSU/DSU  | • 9162 - T1 CSU/DSU Access Unit/Access Mux (Two Slot)  |
| • 3350 - Zero Port (G703 only) E1 HDLC NTU                 | • 9165 - T1 CSU/DSU Access Unit/Access Mux (Five Slot) |
| • 3360, 3364, 3365 - E1 HDLC NTU with G703 Drop & Insert   | • 9621 - 56k/64k Frame Relay Access Unit               |

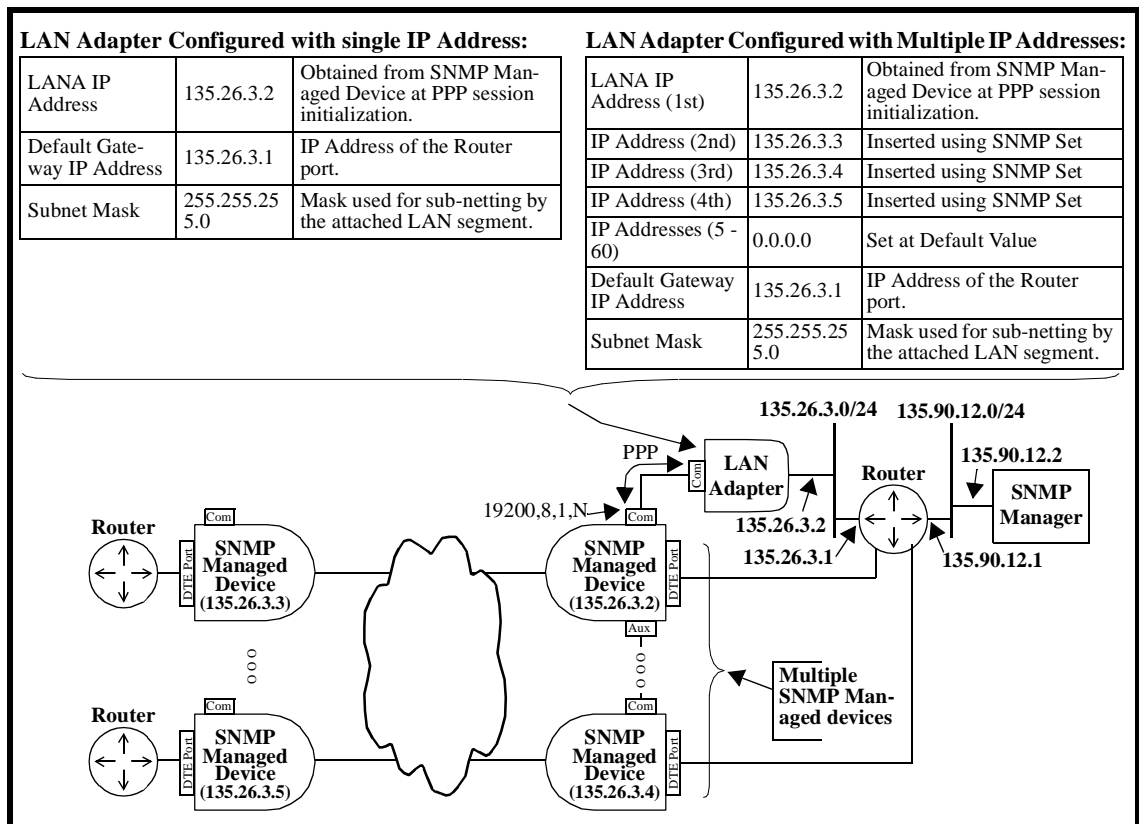
This document refers to each of these products as an “SNMP managed device”.

**Note:** Although the following discussion features Ethernet attached configurations, it is equally valid for Token Ring.

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**Typical Configurations**

The typical configuration consists of the LAN Adapter connected between a local area network and the COM (or AUX) port of a chain of SNMP Managed Devices. If standalone units are used, the chaining is accomplished with AUX to COM port cables. With the Nest version, the chaining occurs in the 3000 carrier backplane.



When multiple SNMP managed devices are supported by a single LAN Adapter, the end user must select from one of two possible configuration strategies:

- A. **(Recommended method)** All SNMP managed device IP addresses are configured to be on the same subnet and each is included in the LAN Adapter Proxy table; or
- B. The SNMP Manager and intervening routers are configured to route IP Packets for every SNMP Managed Device to one single LAN Adapter IP Address. This is the address provided to the LAN Adapter by the directly attached SNMP managed device.

Although either method will work, as usual there are consequences:

Strategy A: - requires that each SNMP managed device Address be on the subnet of the LAN Adapter (135.26.3.0/24<sup>[1]</sup> in the above example). As devices are added, the IP Address Table in the LANA must have an entry added. Up to 60 IP

1. The /24 shown after the IP address is a short hand method used to indicate the subnet mask. The number, 24 in this instance, is the number of contiguous 1's in the mask, counting from the most significant end of the address. Therefore, /24 translates to 255.255.255.0 since there are 24 1's in the mask starting at the left side of the number.

Addresses may be added either through a MIB browser or using an unsupported standalone configuration utility.

**NOTE: The Windows PC Version of the HP OpenView Network Management System will currently not allow the addition of new rows to the IP Address Table. Only the existing IP address may be changed. However, if null table entries (i.e. 0.0.0.0) are entered between IP addresses, then the null entries may be changed to active IP addresses with Windows HP OpenView. For Example:**

Suppose IP address 135.26.3.3 must be added to the following IP Address Table:



Entry number 2 could be changed to 135.26.3.3. However additions past Entry 4 (e.g. 5 - 60) can't be done using the Windows HP OpenView Manager

| Entry | Contents   |
|-------|------------|
| 1     | 135.26.3.1 |
| 2     | 0.0.0.0    |
| 3     | 0.0.0.0    |
| 4     | 135.26.3.2 |
| 5     | 0.0.0.0    |
| ⋮     | ⋮          |
| 60    | 0.0.0.0    |

| Entry | Contents   |
|-------|------------|
| 1     | 135.26.3.1 |
| 2     | 135.26.3.3 |
| 3     | 0.0.0.0    |
| 4     | 135.26.3.2 |
| 5     | 0.0.0.0    |
| ⋮     | ⋮          |
| 60    | 0.0.0.0    |

Once additions or changes have been made to the IP Address Table of the LAN Adapter, the unit must be reset to make the changes permanent. This is done by resetting the LANA through the MIB Browser or by using the unsupported LAN Adapter configuration utility (See below).

**NOTE: When the LAN Adapter is reset, it will be inactive for approximately 30 seconds. During this time no IP packets are forwarded.**

Strategy B - allows greater flexibility in assignment of IP addresses and requires the LAN Adapter to have only a single IP address. This means that as devices are added, it is not necessary to change the configuration of the LAN Adapter. However, static routes must be put in all routers between the SNMP manager and the LAN adapter. In addition, if the SNMP Manager is on the same subnet as the LANA then static routes must be put in the SNMP Manager Host for each of the supported SNMP Managed Devices. Since Hosts are sometimes limited in the number of static routes allowed, large configurations may not be possible.

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**LANA  
Operation**

The basic operation of the LAN Adapter is as follows:

At power up, the LANA attempts to create a PPP session with the SNMP Managed device connected to its Uniport connector. (Note: The factory default settings for the Uniport are 19200, 8,N,1.) When the session is established, the LANA acquires the IP address of the SNMP managed device via PPP and enters it into its internal IP Address Table. With this complete, the LANA enables the LAN interface and issues BOOTP requests for approximately one minute. If a BOOTP server receives the command and finds a match in its internal network files, it will return a BOOTP response containing the Ethernet Address, IP Address, Subnet Mask, and Default Gateway IP Address, required to configure the LANA. If the IP Address matches the LANA value, the Subnet Mask and Default Gateway replace the existing values. If either the Subnet Mask or Default Gateway are changed, the LANA will pause momentarily while the LAN stack is rebuilt. In the event that the BOOTP fails, the LANA will continue operation using the existing values for Subnet Mask and Default Gateway.

If after 30 seconds the LANA has failed to establish the PPP session, it will configure itself with the default IP address of 199.92.187.36 and then enable the network interface. The network interface is also enabled to receive SNMP broadcasts on the local subnet. This allows a SNMP manager to access the LANA enterprise MIB variables by using the broadcast address of the subnet on which the LANA resides. The required community name is the MAC address, in lower case hexadecimal (e.g. 00:40:af:20:f5:90). The MAC address may be found on a label on the underside of the LANA.

Once the LANA has been configured with at least one IP address and has activated its network interface, it will proceed to accept Packets addressed to any of the IP addresses stored in its internal IP Address Table. Accepted packets will be examined and routed, either out the COM port or to the LANA's SNMP agent if they are SNMP commands directed to the LANA Enterprise MIB. The LANA will also provide a proxy ARP Service for all IP addresses in its IP Address Table.

Packets incoming to the LANA COM port will be routed to the LAN if the IP Address of the packet is on the attached subnet. Otherwise the packet will be routed to the Default Gateway.

The LANA enterprise MIB can be used to add Additional IP addresses to the IP Address Table in support of multiple SNMP Managed Devices, or to configure other LANA variables (e.g. Subnet Mask, Default Gateway, COM port settings, etc.).

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**Configuration Items** In order to operate properly, the following items must be programmed into the LAN Adapter:

| Item                               | Factory Default  | Comments   |
|------------------------------------|--|--|
| Default Gateway IP Address         | 0.0.0.0  | If the Default Gateway IP address is misconfigured or unconfigured, the SNMP manager may not receive responses to get/set commands. However, set commands will still modify MIB objects.                               |
| Subnet Mask                        | 0.0.0.0  |  |
| IP Address Table (1 to 60 entries) | Initially has zero entries and disables forwarding of broadcast datagrams. value of 199.92.187.36 is set after failure to acquire IP address for 30 sec. | LANA will provide a Proxy ARP service for all IP addresses found in this table. At least one entry must exist. The initial IP address is normally obtained through initiation of a PPP session across the serial port. |
| Serial Port Speed                  | 19,200 bps   | Values allowed: 1200, 2400, 4800, 9600, 19200, 38400. Note: Some devices support a maximum rate of 19200.  |
| Async Port Bits                    | 8  | Values allowed: 5, 6, 7, 8   |
| Async Port Parity                  | None   | Values allowed: None, Odd, Even  |
| Async Port Stop Bits               | 1  | Values allowed: 1, 2, 1&1/2.   |

All IP addresses placed in the IP Address Table must be on the subnet of the LAN to which the LAN Adapter is attached. The user may also access the LANA Enterprise MIB using the broadcast address of the attached LAN. The LANA will accept IP packets addressed to the adapter's physical MAC address, including the Broadcast MAC address.

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**Methods:** There are three methods available to configure the LANA:

- A. BOOTP - BOOTP is the method specified in the LAN Adapter manual (Reference [1]). This method is generally not desired since it requires a BOOTP server to be resident on the LAN segment containing the LAN Adapter.
- B. LANA MIB access - The LAN Adapter contains an Enterprise MIB which may be used to configure the unit from an SNMP manager.
- C. Win95 Application - An "As Is" unsupported (use at your own risk) Windows 95 program exists which may be used to directly configure the LANA.

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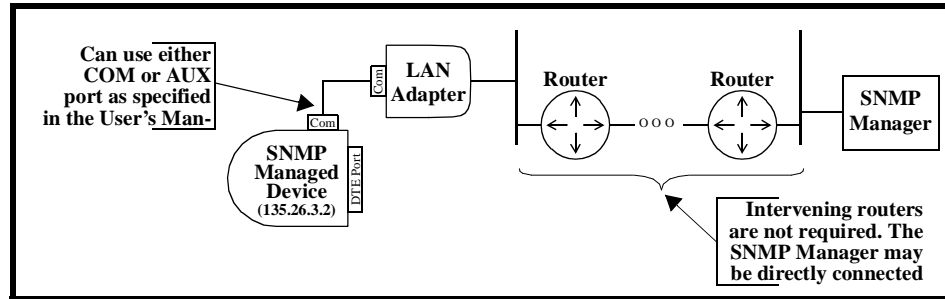
**BOOTP Method:** The BOOTP method is fully described in the owner's manual (see Reference [1]).

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**MIB Method:** The following procedure assumes that the LAN Adapter is in its factory default configuration consisting of an empty IP Address Table, zero Subnet Mask (0.0.0.0), zero Default Gateway IP Address (0.0.0.0), and Com port con-

figured for 19,200, 8, N, 1. Previously configured units may be restored to factory defaults either by writing a “1” to MIB object lanaFactoryDefault or by using Jumper JP10(Ethernet)/JP2(Tolken Ring). Refer to the owner’s manual (see Reference [1]).

1. With the LAN adapter powered down, cable it as shown in the following diagram:



2. Configure the SNMP Managed Device with the following:
  - IP address equal to an unused address on the subnet where the LAN Adapter is attached. (e.g. if subnet is 135.26.3.0/24 any unused address in the range 135.26.3.1 thru 135.26.3.254 could be used)
  - Configure port which will be attached to the LAN Adapter for the following:
    - Port Rate = 19200
    - Number of Data Bits = 8
    - No Parity
    - Number of Stop Bits = 1
    - Support for Asynchronous PPP
    - Support for PPP negotiation of IP address
3. Power up the LAN Adapter. After initialization, the LANA will use PPP to acquire the IP Address of the SNMP Managed Device and put it in its IP Address Table.
4. Obtain the MAC address of the LAN Adapter from the label on the underside of the case (e.g. 00:40:af:20:f5:90).
5. Using the SNMP MIB Browser access and change the following OIDs using the “Community Name” equal to the MAC address, and the IP Address equal to the Subnet Broadcast IP Address (e.g. 135.26.3.255 for a subnet of 135.26.3.0/24):
  - lanaSubnetMask = subnet mask of the subnet to which the LANA is attached (e.g. 255.255.255.0 for a subnet of 135.26.3.0/24).
  - lanaDefGatewayIpAddr = IP address of the default gateway to

be used to return SNMP responses (e.g. 135.26.3.1). This will be either the IP address of the closest router to the SNMP Manager, or the SNMP Manager IP address if the SNMP Manager is on the same subnet as the LAN Adapter.

Note: Responses from these SNMP commands will not be returned if the SNMP Manager is not on the same subnet as the LAN Adapter. However, the variables will be changed as long as the correct command is sent with the proper Community Name.

6. Reset the Lan Adapter by accessing the following OID using the same process as in step 5.
  - lanaReset = 1

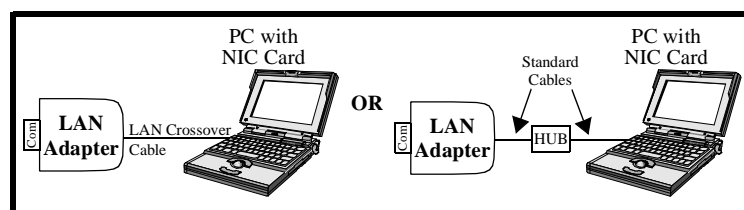
This will cause the LAN Adapter to reset.

**NOTE: When the LAN Adapter is reset, it will be inactive for approximately 30 seconds. During this time no IP packets are forwarded.**

7. The SNMP Manager should now be able to access the MIBs in either the LAN Adapter or the SNMP Managed Devices. If other SNMP Managed Devices are daisy chained to the head end unit, their addresses may be added to LAN Adapter IP Address Table. Once additional IP Addresses have been added, repeat step 6 to reset the LAN Adapter.

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**Win 95 Application:** A unreleased Paradyne Windows 95 application exists which was created to ease the configuration of LAN Adapters. Use of the program requires a Windows 95 PC with a Ethernet NIC card (See figure below).



The PC may either be directly attached to the LAN adapter with a special point-to-point crossover cable (see diagram below), or attached through a hub with standard Ethernet cables. The LAN Adapter Configurator program may be obtained from the Paradyne Web site (See Reference [2]). The Menu provided by the LAN Adapter configurator is shown in the following diagram along with the steps required to use it. Further help is provided in the program Help file.

① Configure the SNMP Managed Device IP Address and then after connecting it to the (powered down) LAN Adapter, power up the LAN Adapter. The LANA will solicit the PPP Address from the SNMP Managed Device via a PPP session, and configure itself with the IP Address of the SNMP Managed Device.

② Enter the IP address of the SNMP Managed Device connected to the COM port of the LAN Adapter.

③ Enter the MAC Address of the LAN Adapter (used for the SNMP community name). It is printed on the back side of the LAN.

④ Press "Get All". The Version number will appear in the Version window if the IP and MAC address are

⑤ Enter the Network Mask for the SubNet to which the LAN Adapter is attached.

⑥ If the SNMP Manager is on a different LAN segment than the SNMP Manager, enter the IP address of the Gateway which will be used to Route Packets to the SNMP Manager

⑦ Press "Set" to configure the LAN Adapter with the Network Mask and Gateway IP Address.

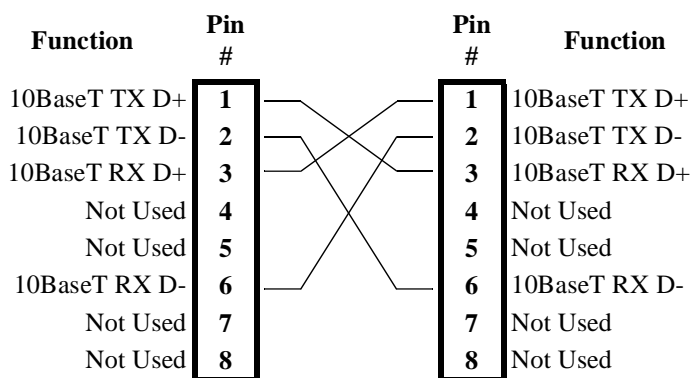
⑧ Enter the IP addresses of the downstream devices connected to the Lan Adapter. If this is not done, then they will not be accessible. DO NOT put the

⑨ Press "Add" to enter the IP Address in the LANA Address Table.

⑩ Press "Make Permanent" when all IP Addresses have been entered. The LAN Adapter will reset itself and come back on-line in a few seconds

The following diagram lists the pinout for the LAN Adapter Crossover Cable if a hub is not to be used.

LAN Adapter Cross-Over Cable.



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**References:**

|     | <b>Name</b>                                   | <b>Location</b>   |
|-----|---|---|
| [1] | SNMP LAN Adapter Hardware Owner's Manual.     | Delivered as part of the product.   |
| [2] | LAN Adapter Configurator (Win 95 Application) | <a href="http://www.eng.paradyne.com/">http://www.eng.paradyne.com/</a> in Download Zone under "LANADAPT" |