

APPLICATION NOTE

The Management Options available for Metrodata Interface Converters

Application note



Introduction

One of the features that differentiate Metrodata DSUs from other manufacturers' products is our sophisticated management facility. The table below shows the various ways of managing the Metrodata range of DSUs and ATM NTEs.

Option	Management path		Method
1	Local	Eng. on site	Laptop PC via the V.24 port on the DSU
2	Remote	End user LAN	External modem connected to the V.24 port
			Telnet and SNMP
3	Remote	End user LAN	LM1100 module, via customer Router
4	Remote	Carrier direct	LM1100 module, via remote access router (Cisco 761)
5	Remote	End user LAN	Aux. Console on customers Router to V.24 port
			Telnet/SNMP via SLIP in to the V.24 port (available Mar 1999)
6	Remote	Carrier direct	Via external Modem
7	Remote	End user LAN	Via Router Auxiliary port
8	Remote	Carrier direct	Internal Modem (available July 1999)

In-band management

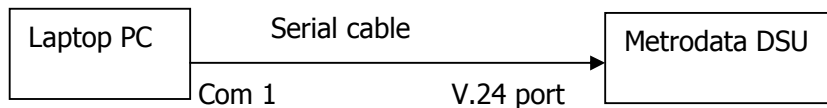
Several of the non-ATM DSUs manufactured by Metrodata (FM4000, FM4200, FM4500, FM4850, and FM4900) has the capability of in-band management of the far end DSU. You still need to use one of the methods above to communicate to the local DSU.

Management path

In the various options above there are two management routes to the Metrodata DSU (ignoring the engineer on site option). The first is via the end user's network, and the other is directly from the carrier or service provider. Which is selected depends upon such factors as the ownership and control of the DSU and the demarcation of the network. Does the DSU belong to the end-user who wishes to control it from his own network, or does it belong to the service provider who wants exclusive access to the unit without obtruding into the user's LAN.

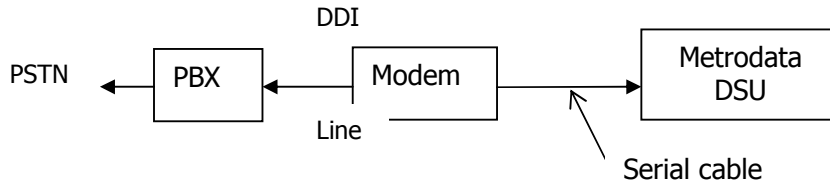
Option 1

A serial cable from a serial port on the laptop PC and the V.24 port on the DSU enables the PC via a VT100 emulator to control the DSU.



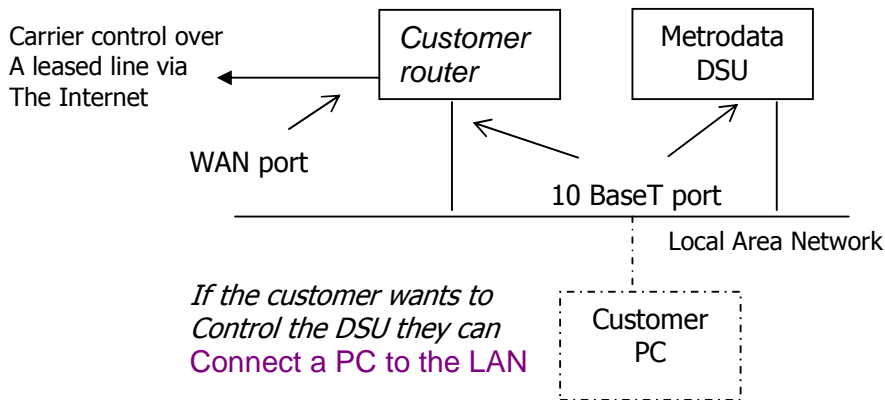
Option 2

An External modem is connected between the V.24 port and a DDI line off the customers PBX. A PC via a VT100 emulator will be able to dial in to the DSU and configure it. The Metrodata unit cannot dial out on this line, the user must dial in.



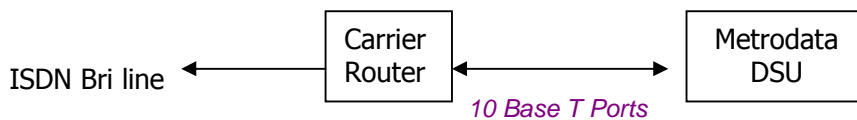
Option 3

The LM1100 module is an internal unit that has a 10 BaseT (RJ45) port on it. After the LM1100 module is fitted to the DSU it must be given an IP number via the V.24 port. Then all other commands can be entered via the customer Local Area Network using SNMP or Telnet software.



Option 4

This is the same as option 3 but has a dedicated router (Cisco 761 is a good example) connected to an ISDN line. This method can be used if the end user does not want to give access to his LAN.

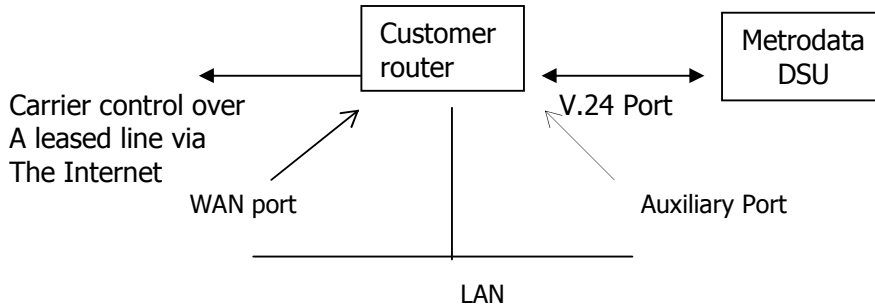


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Option 5

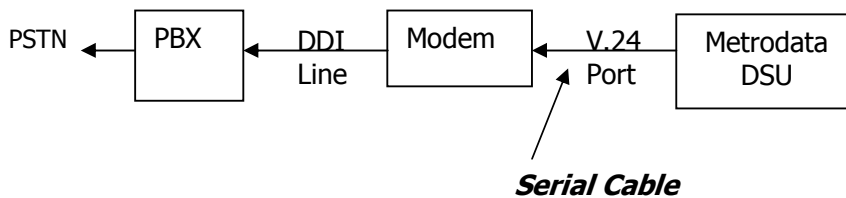
The Auxiliary port on the customers router is connected to the V.24 port on the DSU. Access via the customers LAN must be given to the carrier.



The next three options (6-8) all use Telnet and SNMP encapsulated in SLIP.

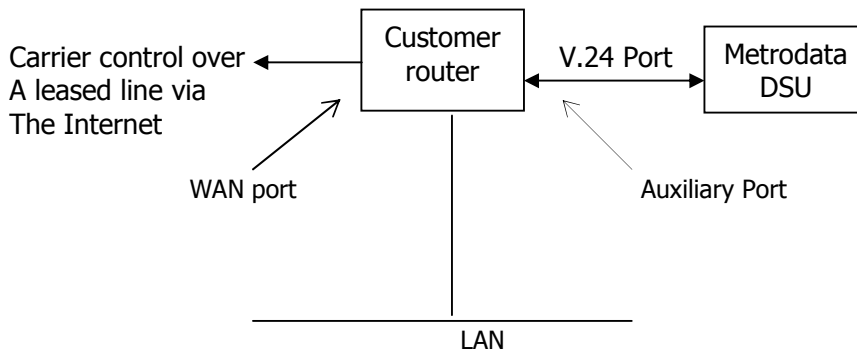
Option 6

An External modem is connected between the V.24 port and a DDI line off the customers PBX, and access is via a direct dial number



Option 7

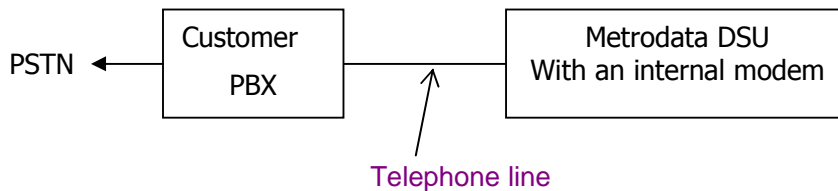
The Auxiliary port on the customers router is connected to the V.24 port on the DSU. Access via the customers LAN must be given to the carrier.



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Option 8

An internal modem replaces the **LM1100** module, this is connected to the customers PBX and is given a DDI number.



Metrodata and SNMP

SNMP enables rapid detection and rectification of faults in wide area networks. The combination of Metrodata's Enhanced Line Performance Monitoring and implementation of SNMP allows network managers to both manage the DSUs/NTEs and to monitor the quality of the attached lines. These tools allow network managers to detect and rectify WAN errors before they have time to impact perceptibly on users' applications. Any network manager aspires to get as close to 100% uptime of expensive wide-area networks as possible: such networks act as an organisation's global central nervous system. An indispensable ingredient in the provision of this requirement is the availability of line performance monitoring, and the constant monitoring and management facilities provided by the vigilance of an SNMP-based system.

SNMP is widely accepted as a *de facto* standard for LAN network management. SNMP is used to monitor IP gateways (and other equipment) and their network. It defines a set of variables that the gateway must keep and specifies that all operations on the gateway are a side effect of fetching or storing to the data variables.

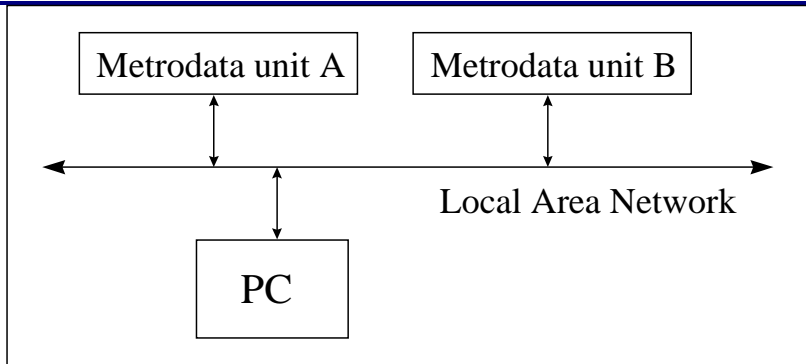
SNMP consists of three parts:

- Structure of the Management Information (SMI).
- Management Information Base (MIB).
- The Protocol itself.

The SMI and MIB define and store the set of managed entities; SNMP itself conveys information to and from these entities.

The method of connection is the same as any Ethernet device on a Local area network.

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Managing the DSU/NTE

There are two ways of managing a Metrodata DSU/NTE via an IP network:

Directly by means of a Telnet terminal session into the unit. This facility is part of the Enhanced Line Performance Monitoring function that is an integral part of every Metrodata product.

As an integral part of an SNMP management system using a graphical management system like:

- HP OpenView
- SunNet manager
- Castlerock SNMPc

The facilities offered by a direct terminal connection via the V.24 port are also offered over a Network using the SNMP facility.

The strength of a graphical system like HP OpenView is the ability to manage a system of Metrodata units, as well as other SNMP compatible devices on a network.

The DSU is able to send information (traps) to the server controlling the network; these can be interpreted by HP OpenView and alarms raised indicating a problem.

Examples of Telnet (ELPM) and SNMP Software

Telnet

Looking at the Telnet method, below is a screen shot from "NetTerm" a typical software package.



Having just logged into a Metrodata FM4900, all that is required is to enter the password and the same functions found on the terminal connected to the V.24 port will now be duplicated.

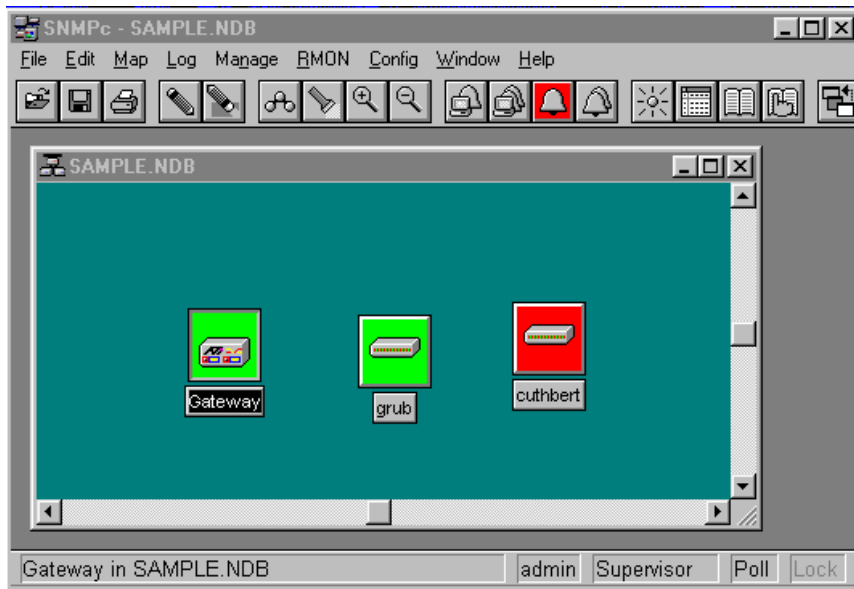
The internal software of Metrodata units enables both a Telnet session (via a LM1100) and a terminal on the V.24 port to run simultaneously.

SNMP

Metrodata uses Castlerock SNMPc, and below is a sample of the main screen on a PC running this package.

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The Icon called "gateway" is the gateway out of Metrodata, whilst "grub" and "cuthbert" are two units. Green icon (gateway and grub) indicates we are able to poll the unit, whilst red indicates "cuthbert" is not on the network, power turned off or is faulty.

HP OpenView and SunNet manager are more sophisticated network management systems, with the ability to monitor major networks on a global scale.

The displays on computer screens can be organised to show how the network is connected together, this aids the engineers when they are fault-finding the network. Highlighting individual units enables precise data on that unit to be displayed such as:

- Port details
- Event logs
- Fault logs.

Also commands can be sent to these units to place them in a diagnostic mode to assist faultfinding.

All this can be done without sending an engineer to the site, thus enabling significant cost and time savings to be achieved.

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Roles of ELPM and SNMP

Enhanced Line Performance Monitoring is an invaluable testing tool when installing a DSU/NTU. It allows the operator to test both the attached line and the connection to the local device (router, switch etc.). It also allows the operator to perform diagnostics on the DSUs/NTUs and to configure them as appropriate. At any given time the operator can log into the units to check the current state of play of these devices and their connections.

Metrodata's SNMP management facilities allow a network manager to perform all the tasks associated with ELPM, and in addition to have the system keep a watching brief in the knowledge that any critical problems will be brought to the manager's urgent attention by a system of traps and alerts.

These facilities also allow the network manager to compile useful statistics on the Quality of Service offered by the attached leased lines. Routers and switches are not normally suitable for this task, as they tend to compensate for errors (even if this is done at the upper layers) as opposed to recording them. Metrodata ATM NTEs also provide valuable statistics on cell transmission and error rates. These ATM statistics can also be used as the input of a traffic-based billing system.

Benefits of ELPM and SNMP

Metrodata's Enhanced Line Performance Monitoring and SNMP Management Modules light up the dark holes of a wide area network. They enable the monitoring and management of network termination devices (NTUs, NTEs and DSUs). They also allow thorough monitoring of attached wide area connections.

When installing a network, Metrodata's ELPM allows the operator to ensure that:

- the DSUs/NTUs are functioning correctly
- the connection to any local device is functioning correctly
- the attached wide-area connection is performing satisfactorily.

Once the network is installed Metrodata's ELPM and SNMP Management Modules offer the network manager the following features:

- Monitoring of wide area links
- Monitoring of QoS of leased lines
- Monitoring, management and configuration of DSUs/NTUs
- Measurement of ATM traffic
- Monitoring of ATM cell error rate.



This brings the network manager the following benefits:

- Detection of faults in otherwise dark areas of network
- Integration of network management
- Pre-emptive rectification of network errors
- Less network downtime
- Better value-for-money on leased line services
- Happier users
- More efficient centralised management of entire network
- Reduced network management costs

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