

APPLICATION NOTE

Metrodata's Line Performance and Monitoring and Testing

Application note



Background

All of Metrodata's managed products are endowed with a form of Metrodata Enhanced Line Performance Monitoring © (ELPM ©). This feature is used at the time of installation to monitor the performance of the unit and the attached line. All line performance functions are performed at the Physical Layer; in addition the Metrodata ATM Switching DSUs and ATM Circuit Emulation DSUs also function at the ATM layer, PLCP layer and at the circuit emulation layer (AAL1), where appropriate (see the attached table).

Metrodata ELPM and Testing

Metrodata Enhanced Line Performance Monitoring has three main functions:

1. **Error Rate Log**
Metrodata ELPM automatically keeps a 24-hour log (15-minute intervals) of line errors and performance as per G.821. This is a rolling report and oldest 15-minute interval is lost every time another 15-minutes of data is generated.
2. **Loop Backs**
Metrodata ELPM allows an operator to generate local and remote loop backs (not ATM DSU's, see table 1) both on the line and on the DTE interfaces. Test patterns (some DSUs, see table 1) are generated and used with these loop backs. This will enable engineers to find faults quickly and accurately.
3. **Management Link**
Metrodata Management Link can use a fast 64 Kbit/s time slot (E1 - Framed mode) or a slow data rate using a spare bit in time slot 0 (E2, E3 - framed mode, see table 1). To enable one Metrodata device attached to a leased line, to apply *ELPM* functions to a similar Metrodata device at the other end of the line. In effect the first device acts as a terminal to the second device for *ELPM* control functions. (see the table at the end of this article for information on which products have management link).

DTE Loop

When DTE LOOP is activated the signal received from the DTE is passed directly back to the DTE at the DTE interface. The signal from the E-1 port passes through the FM4000 and is looped adjacent to the DTE port. This therefore validates:

- The local DTE cable (without the effect of the FM4000) if the DTE recognises its own transmissions.
- The remote DTE cable, the E-1 link and both FM4000's if the remote DTE recognises its own transmissions.



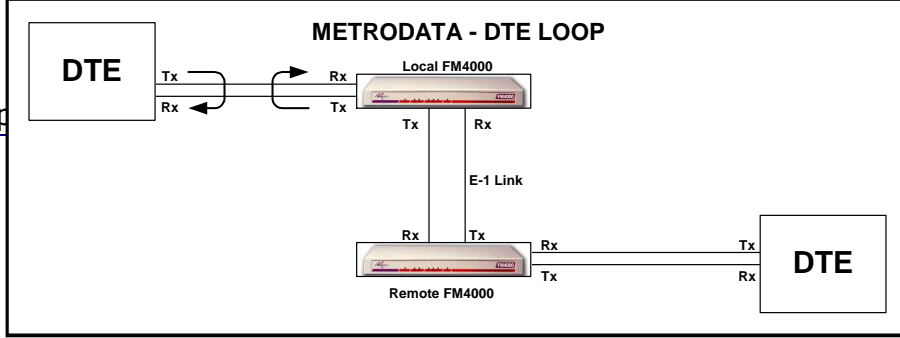


Diagram 1 – Metrodata FM4000 DTE Local Loop

Remote Loop

When the remote loop is activated, a loop-up code is transmitted to the remote FM4000, switching it into E-1 Loop. Therefore an E-1 loop may be performed at the remote end without any need for maintenance staff to attend the remote site.

Remote Loop-up is transmitted as repeated '10000' while Loop-down is transmitted as repeated '100'. The loop code is transmitted for 5.5 seconds with the response made in 4.5 seconds. The remote FM4000 stays in this mode until Loop-down is transmitted from the local unit.

The unit receiving the Remote Loop-up signals both the E-1 and DTE ports adjacent to those ports, therefore removing its own influence. This therefore validates:

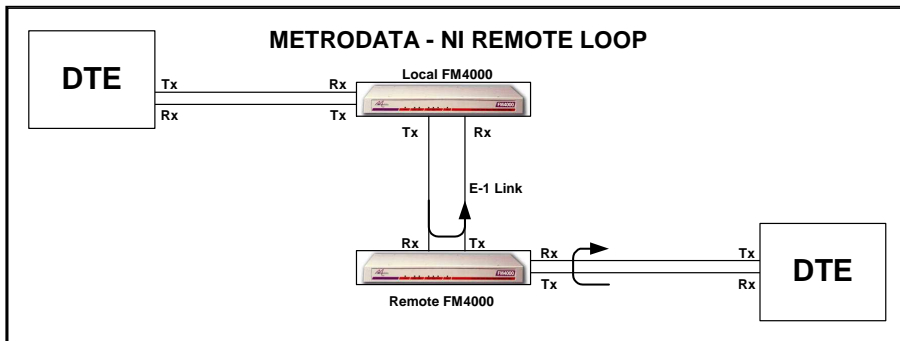


Diagram 2 – Metrodata FM4000 NI Remote Loop

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The remote DTE cable if the remote DTE recognises its own transmissions.
The local DTE cable, the local FM4000 and the E-1 link if the local DTE recognises its own transmissions.

Local Loop

When the Local Loop is activated the signal received from the local E-1 port is passed directly back to the local E-1 transmit port. The signal from the remote DTE passes through the remote FM4000 and is looped at the local E-1 port this therefore validates:

The local DTE cable and the local FM4000 if the local DTE recognises its own signals.
The remote DTE cable the remote FM4000 and the E-1 link if the remote DTE recognises its own signals.

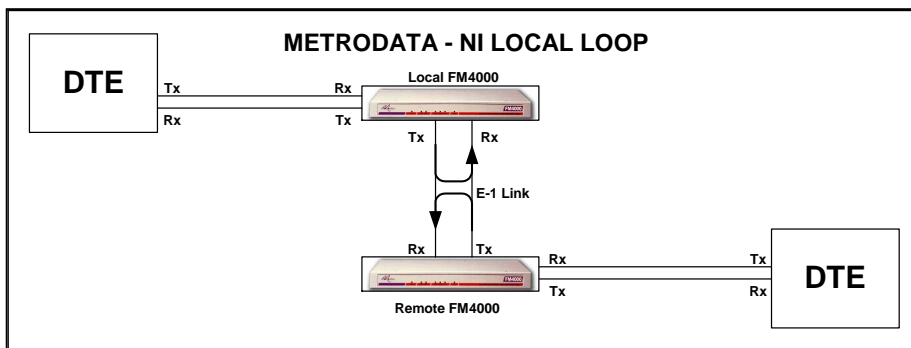


Diagram 3 – Metrodata FM4000 NI Local Loop

Management Link

Metrodata ManagementLink © can use a fast 64 Kbit/s time slot (E1 - Framed mode) or a slow data rate using a spare bit in time slot 0 (E2, E3 - framed mode, see table 1). To enable one Metrodata device attached to a leased line, to apply **ELPM** functions to a similar Metrodata device at the other end of the line. In effect the first device acts as a terminal to the second device for **ELPM** control functions.

Line Performance Monitoring & Network Management

Line Performance Monitoring is of great value when installing a device to run on the edge of and linking public and private network segments. Metrodata's ELPM allows the quality of the line to be monitored and tested; it can also check the DTE's Control lines (see table attached).

Once the Metrodata device is installed, it is a logical move to enable its SNMP Management option, so that the same facilities continue to be available to the network manager on an on-going basis. The Edge interface between a private LAN and a public wide-area network often presents a blind spot in management terms: Metrodata's Enhanced Level Performance Monitoring facilities and SNMP Management Modules allow



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Table 1 - Metrodata Enhanced Line Performance Monitoring and Diagnostics

Model	Performance Monitoring							Remote Management				Diagnostics				
	Current & Historic Stats, Errors, Alarms, Counts & G.821							SNMP	Telnet terminal	Telnet server	Management timeslot	Test Pattern	Local Loops			Remote Loops
	Front panel LEDs (Alarms only)	Physical Layer	PLCP Layer	ATM Layer	AAL1 Layer	DTE Control Signals	DTE						Primary Line Port	Secondary Line Port		
DC1X00	Y	no	N/A	N/A	N/A	no	no	no	no	no	no	Y	Y	N/A	no	
DC2000	Y	no	N/A	N/A	N/A	no	no	no	no	no	no	Y	Y	N/A	Y	
DC3X00	Y	no	N/A	N/A	N/A	no	no	no	no	no	no	Y	Y	N/A	no	
FM4000	Y	Y	N/A	N/A	N/A	Y	Y	Y	Y	Y #1	Y	Y	Y	N/A	Y	
FM4500	Y	Y	N/A	N/A	N/A	Y	Y	Y	Y	Y	no	Y	Y	N/A	Y	
FM4800	Y	Y	N/A	N/A	N/A	Y	Y	Y	Y	no	Y	Y	Y	N/A	Y	
FM4850	Y	Y	N/A	N/A	N/A	Y	Y	Y	Y	Y #1	Y	Y	Y	N/A	Y	
FM4900	Y	Y	N/A	N/A	N/A	Y	Y	Y	Y	Y #1	no	Y	Y	N/A	Y	
FM4950	Y	Y	N/A	N/A	N/A	Y	Y	Y	Y	Y #3	no	Y	Y	N/A	Y	
ATM DSUs	Y	see below				N/A	Y	Y	Y	no	no	N/A	Y	Y	no	
UNI Ports	E1	Y	Y #2	Y	N/A											
	E2	Y	N/A	Y	N/A											
	E3	Y	N/A	Y	N/A											
	DS3	Y	Y	Y	N/A											
	TAXI	N/A	N/A	Y	N/A											
	SDH	Y	N/A	Y	N/A											
Circuit Emulation		Y	N/A	N/A	Y											



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