



***MC12000 Chassis
V8.20
User Manual***

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1 INTRODUCTION



The Metrodata MetroConnect is a modular chassis based product which offers increased card density and thereby more efficient use of data centre equipment rack space. The MetroConnect is a 19" Rack based chassis occupying 4U. MetroConnect offers 12 slots into which a wide range of IO Modules may be inserted. To ease maintenance, and provisioning of new services, all modules and power supplies are "hot swap" compliant.

The IO Modules for MetroConnect support both basic standalone operation with simple bit switch configuration and with the Management Module, fully managed operation including SNMP.

Management of the MetroConnect will be either via the console port, or via the management Ethernet port using SNMP or Telnet. SNMP version 1 will be supported, including MIB-2 and Traps. SNMP traps will be generated based on configurable alarms generated for any of the IO Modules. TFTP download of software and configuration will be supported. To further future proof the MetroConnect system, remote hardware upgrade of CPLD firmware is included. A password will be required for management access whether via the console or Telnet. Performance statistics will be available for all ports with statistics collected in 15 minute segments for a 24 hour period

The MetroConnect offers a pair of change over relays to indicate alarm conditions. The Major Alarm relay is energized for normal operation to ensure a fault is signaled in the event of a power failure.

The MetroConnect is a compact unit requiring 4U in a 19" rack. A single Power Supply supports a full rack of cards, however for increased reliability the AC PSU is load sharing when used in the optional 1+1 redundant configuration. For critical applications -48V DC PSU modules may be used.

2 MODULES

2.1 Management Module

The MC12000 Management module adds a management function. The Manager is inserted in slot 0 of the chassis.

The manager may be accessed using either the local VT100 terminal port or remotely using Telnet or SNMP via the LAN port.

The Manager has numerous LED's to indicate system status.

- OK - Manager Status, Green = Normal
- T - Test Mode, Yellow = Test Running
- Maj - Major Alarm, Red = Major Alarm
- Min - Minor Alarm, Yellow = Minor Alarm
- 1-12 - IO Module Status

Green = Card Present, and OK

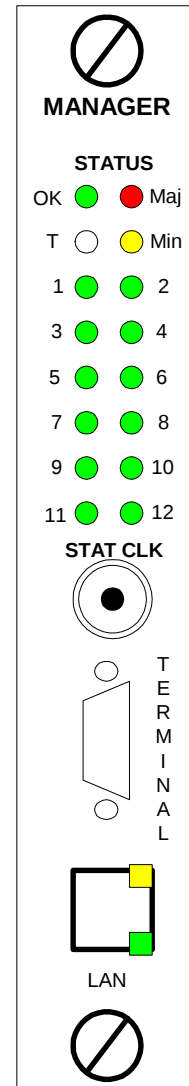
Red = Card Present and Alarmed

Off = Card not fitted.

The LAN port RJ-45 has two integrated LEDs as below

Green = Link Up

Yellow = Tx/Rx Activity



2.2 FC1x00 Module

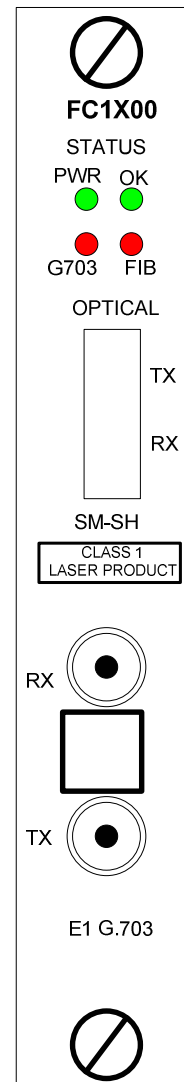
The MetroConnect FC1x00 module provides an extension of an E1 G703 circuit over a fibre optic connection. Several models are available supporting different fibre specifications:

80-15-9xx	FC1000 (Multi-Mode)
80-15-9xx	FC1100 (Single Mode / Short Haul)
80-15-9xx	FC1200 (Single Mode / Long Haul)

The FC1x00 can operate in either stand alone, or fully managed mode. In stand-alone mode the operating parameters are configured using bit switches. In managed mode the manager card will configure the module via the backplane.

The FC1x00 has four status LED's to indicate the operating status of the module.

The FC1x00 module is fully "hot swappable" and may be inserted / removed from the chassis without affecting other modules.



2.2.1 FC1x00 Bit switch Settings

The FC1x00 has an 8 position DIP switch on the PCB. This switch is used to configure the module for stand alone operation, and to select the default settings for the Managed Mode of operation.

The bit switches configure the unit as follows:

Bit Switch	ON	OFF
1	75Ohm BNC Port	120Ohm RJ45 Port
2	Normal Operation	Loopback Enable
3	Alarm Extension Disabled	Alarm Extension Enabled
4	Short Haul	Long Haul
5	X ³ +1 Scrambler	Scrambler Disabled
6	Unused	
7	Unused	
8	Unused	

The default settings for the FC1x00, as shipped from the factory, is for all the switches to be in the ON position.

2.2.2 FC1x000 LEDs

The FC1x00 has four LEDs to indicate status. The LEDs have the following significance

2.2.2.1 PWR LED

The Green PWR LED indicates that the FC1x00 card is correctly inserted into a “powered up” rack chassis.

Green On	Module Powered Up
Off	Module not plugged in, Rack not powered up

2.2.2.2 OK LED

The bi-colour OK LED has different significance in managed and unmanaged mode.

Unmanaged Mode

Green ON	Module Powered Up
Off	Module not plugged in, Rack not powered up

Managed Mode

Green ON	Module Operating Correctly, No Alarms
Red ON	Module has at least one port in Alarmed state
Off	Module not plugged in, Rack Not powered up.

2.2.2.3 G703 LED

The bi-colour G703 LED indicates the status of the G703, E1 port on the FC1x00 as follows:

Green On	G703 port operating normally
Red On	G703 port in LOS or AIS condition
Off	Module not plugged in, Rack Not powered up.

2.2.2.4 FIB LED

The bi-colour FIB LED indicates the status of the fibre optic port on the FC1x00 as follows:

Green On	Fibre port operating normally
Red On	Fibre port in LOS condition
Off	Module not plugged in, Rack Not powered up.

2.3 FC3x000 Module

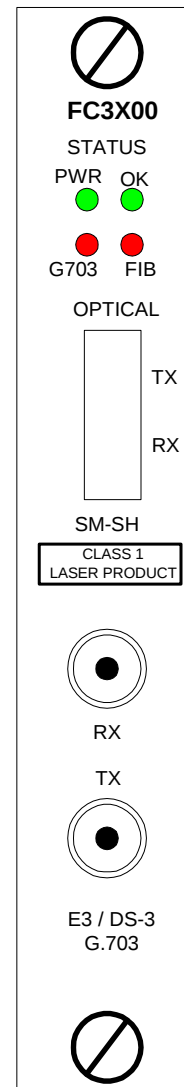
The MetroConnect FC3x00 module provides an extension of a selectable E3 or DS-3 G703 circuit over a fibre optic connection. Several models are available supporting different fibre specifications:

80-15-920	FC3000 (Multi-Mode)
80-15-921	FC3100 (Single Mode / Short Haul)
80-15-922	FC3200 (Single Mode / Long Haul)

The FC3x00 can operate in either stand alone, or fully managed mode. In stand-alone mode the operating parameters are configured using bit switches. In managed mode the manager card will configure the module via the backplane.

The FC3x00 has four status LED's to indicate the operating status of the module.

The FC3x00 module is fully "hot swappable" and may be inserted / removed from the chassis without affecting other modules.



2.3.1 FC3x00 Bit switch Settings

The FC3x00 has an 8 position DIP switch on the PCB. This switch is used to configure the module for stand alone operation, and to select the default settings for the Managed Mode of operation.

The bit switches configure the unit as follows:

Bit Switch	ON	OFF
1	E3 Mode	DS-3 Mode
2	Normal Mode	Loopback Test Mode
3	Alarm Extension Disabled	Alarm Extension Enabled
4	E3 or DS-3 Cable <225'	DS-3 Cable >225'
5	X ³ +1 Scrambler	Scrambler Disabled
6	Unused	
7	Unused	
8	Unused	

The default settings for the FC3x00, as shipped from the factory, is for all the switches to be in the ON position.

2.3.2 FC3x000 LEDs

The FC3x00 has four LEDs to indicate status. The LEDs have the following significance

2.3.2.1 PWR LED

The Green PWR LED indicates that the FC3x00 card is correctly inserted into a "powered up" rack chassis.

Green On Module Powered Up

Off Module not plugged in, Rack not powered up

2.3.2.2 OK LED

The bi-colour OK LED has different significance in managed and unmanaged mode.

Unmanaged Mode

Green ON	Module Powered Up
Off	Module not plugged in, Rack not powered up

Managed Mode

Green ON	Module Operating Correctly, No Alarms
Red ON	Module has at least one port in Alarmed state
Off	Module not plugged in, Rack Not powered up.

2.3.2.3 G703 LED

The bi-colour G703 LED indicates the status of the G703, E3 or DS-3 port on the FC3x00 as follows:

Green On	G703 port operating normally
Red On	G703 port in LOS or AIS condition
Off	Module not plugged in, Rack Not powered up.

2.3.2.4 FIB LED

The bi-colour FIB LED indicates the status of the fibre optic. port on the FC3x00 as follows:

Green On	Fibre port operating normally
Red On	Fibre port in LOS condition
Off	Module not plugged in, Rack Not powered up.

2.4 FC4x000 Module

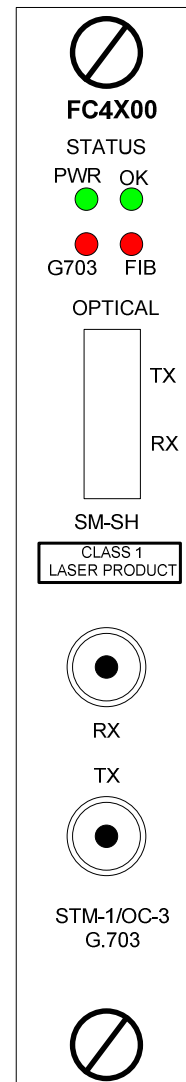
The MetroConnect FC4x00 module provides a conversion between optical and electrical STM-1/OC-3 interfaces. Several models are available supporting different fibre specifications:

80-15-915	FC4000 (Multi-Mode)
80-15-916	FC4100 (Single Mode / Short Haul)
80-15-917	FC4200 (Single Mode / Long Haul)

The FC4x00 can operate in either stand alone, or fully managed mode. In stand-alone mode the operating parameters are configured using bit switches. In managed mode the manager card will configure the module via the backplane.

The FC4x00 has four status LED's to indicate the operating status of the module.

The FC4x00 module is fully "hot swappable" and may be inserted / removed from the chassis without affecting other modules.



2.4.1 FC4x00 Bit switch Settings

The FC4x00 has an 8 position DIP switch on the PCB. This switch is used to configure the module for stand alone operation, and to select the default settings for the Managed Mode of operation.

The bit switches configure the unit as follows:

Bit Switch	ON	OFF
1	Normal Operation	Fibre Loopback
2	Normal Operation	G703 Loopback
3	Alarm Extension Disabled	Alarm Extension Enabled
4	Normal Operation	Trim Enabled
5	Trim0	
6	Trim1	
7	Trim2	
8	Trim3	

The default settings for the FC4x00, as shipped from the factory, is for all the switches to be in the ON position.

2.4.2 FC4x000 LEDs

The FC4x00 has four LEDs to indicate status. The LEDs have the following significance

2.4.2.1 PWR LED

The Green PWR LED indicates that the FC4x00 card is correctly inserted into a “powered up” rack chassis.

Green On	Module Powered Up
Off	Module not plugged in, Rack not powered up

2.4.2.2 OK LED

The bi-colour OK LED has different significance in managed and unmanaged mode.

Unmanaged Mode

Green ON	Module Powered Up
Off	Module not plugged in, Rack not powered up

Managed Mode

Green ON	Module Operating Correctly, No Alarms
Red ON	Module has at least one port in Alarmed state
Off	Module not plugged in, Rack Not powered up.

2.4.2.3 G703 LED

The bi-colour G703 LED indicates the status of the G703, port on the FC4x00 as follows:

Green On	G703 port operating normally
Red On	G703 port in LOS or AIS condition
Off	Module not plugged in, Rack Not powered up.

2.4.2.4 FIB LED

The bi-colour FIB LED indicates the status of the fibre optic. port on the FC4x00 as follows:

Green On	Fibre port operating normally
Red On	Fibre port in LOS condition
Off	Module not plugged in, Rack Not powered up.

2.5 WC1000 Module

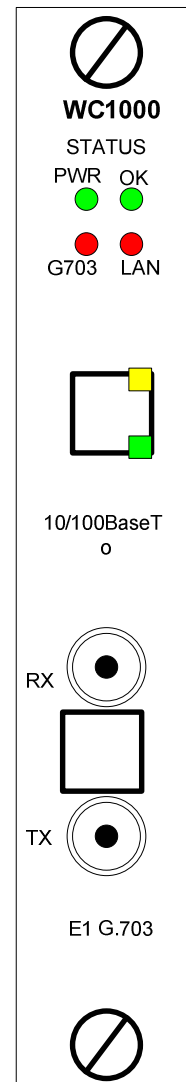
The MetroConnect WC1000 module provides an extension of a 10/100BaseT Ethernet connection over an E1 G.703 circuit.

80-15-541 WC1000 Lan to E1 converter

The WC1000 can operate in either stand alone, or fully managed mode. In stand-alone mode the operating parameters are configured using bit switches. In managed mode the manager card will configure the module via the backplane.

The WC1000 has four status LED's to indicate the operating status of the module.

The WC1000 module is fully "hot swappable" and may be inserted / removed from the chassis without affecting other modules.



2.5.1 WC1000 Bit switch Settings

The WC1000 has an 8 position DIP switch on the PCB. This switch is used to configure the module for stand alone operation, and to select the default settings for the Managed Mode of operation.

The bit switches configure the unit as follows:

Bit Switch	ON	OFF
1	Loop Timing	Internal Timing
2	E1 BNC Port	E1 RJ45 Port
3	Alarm Extension Disabled	Alarm Extension Enabled
4	Normal Mode	Loopback Enabled
5	Flow Control Disabled	Flow Control Enabled
6	10M	100M
7	Half Duplex	Full Duplex
8	Auto Negotiate	Manual

The default settings for the WC1000, as shipped from the factory, is for all the switches to be in the ON position.

2.5.2 WC1000 LEDs

The WC1000 has four LEDs to indicate status. The LEDs have the following significance

2.5.2.1 PWR LED

The Green PWR LED indicates that the WC1000 card is correctly inserted into a “powered up” rack chassis.

Green On	Module Powered Up
Off	Module not plugged in, Rack not powered up

2.5.2.2 OK LED

The bi-colour OK LED has different significance in managed and unmanaged mode.

Unmanaged Mode

Green ON	Module Powered Up
Off	Module not plugged in, Rack not powered up

Managed Mode

Green ON	Module Operating Correctly, No Alarms
Red ON	Module has at least one port in Alarmed state
Off	Module not plugged in, Rack Not powered up.

2.5.2.3 G703 LED

The bi-colour G703 LED indicates the status of the G703, E1 port on the WC1000 as follows:

Green On	G703 port operating normally
Red On	G703 port in LOS or AIS condition
Off	Module not plugged in, Rack Not powered up.

2.5.2.4 LAN LED

The bi-colour LAN LED indicates the status of the LAN port on the WC1000 as follows:

Green On	LAN port operating normally
Red On	LAN port in Link Down condition
Off	Module not plugged in, Rack Not powered up.

2.6 FCC9000 Dual Media Converter

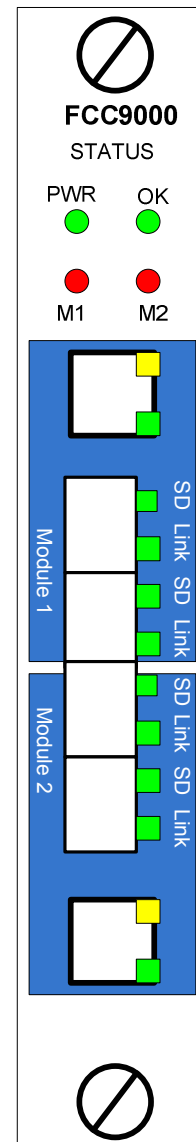
The MetroConnect FCC9000 module provides a media conversion function between copper (10/100/1000BaseT) and fibre (1000Base-X). The FCC9000 card offers two independent media converter modules.

The FCC9000 can operate in either stand alone, or fully managed mode. In stand-alone mode the operating parameters are configured using bit switches.

In managed mode the manager card will configure the module via the backplane and the card supports a much greater range of functionality.

The FCC9000 has four status LED's to indicate the operating status of the module.

The FCC9000 module is fully "hot swappable" and may be inserted / removed from the chassis without affecting other modules.



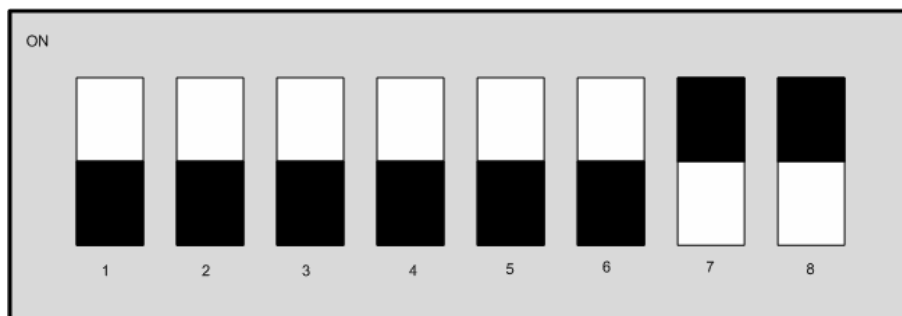
2.6.1 FCC9000 Bit switch Settings

The FCC9000 has an 8 position DIP switch on the PCB. This switch is used to configure the module for stand alone operation, and to select the default settings for the Managed Mode of operation.

The bit switches configure the unit as follows:

Bit Switch	ON	OFF
1	Managed Mode	Stand Alone Mode
2	Copper to Fibre	Fibre to Fibre
3	Alarm Extension Disabled	Alarm Extension Enabled
4	MTU 2048	MTU 10K
5	Copper Port Mode	
6		
7	100Base-FX SFP	1000Base-X SFP
8	LSF Enabled	LSF Disabled

The default settings for the FCC9000, as shipped from the factory, is for the switches to be set as shown, 1-6 ON, 7+8 OFF.



2.6.1.1 Bit Switch 1, Operating Mode

This switch controls the operating mode of the module.

ON	Managed Mode (default)
OFF	Unmanaged / Standalone Mode

When Managed mode is selected the FCC9000 is fully under the control of the MC12000 Manager and offers a full suite of functions.

When unmanaged / standalone mode is selected the FCC9000 is controlled by the local cpu, and has a limited functionality with configuration controlled using the bit switches.

2.6.1.2 Bit Switch 2, Media Conversion Mode

This switch configures the operating mode of the media converter.

ON	Copper to Fibre (default)
OFF	Fibre to Fibre

2.6.1.3 Bit Switch 3, Alarm Relay Drive

This switch enables the module to drive the back plane alarm relay independent of the manager. This switch should only be set when the card is used in an unmanaged, or standalone mode.

ON	Disable Alarm Driver (default)
OFF	Enable the Alarm Driver

2.6.1.4 Bit Switch 4, Maximum Frame Size

This switch selects the maximum frame size supported.

ON	2048 bytes Maximum (default)
OFF	10K bytes

The default setting of 2048 bytes will support most network protocols such as QinQ, MPLS for example.

2.6.1.5 Bit Switch 5+6, Copper Port Mode

These switches select the speed and duplex for the copper port.

Sw5	Sw6	Configuration
ON	ON	Auto Negotiation, 10/100/1000BaseT (default)
ON	OFF	10M, Full Duplex
OFF	ON	100M, Full Duplex
OFF	OFF	1000M, Full Duplex

It is often required to force the operating mode of the copper port, rather than relying on auto negotiation, to give maximum interoperability with other vendor switch and router ports.

2.6.1.6 Bit Switch 7, SFP Mode

This switch defines the operating mode of the SFP.

ON	100Base-FX, 100M, Full Duplex
OFF	1000Base-X, Auto Negotiating (default)

2.6.1.7 Bit Switch 8, Link State Forwarding

This switch defines the LSF operating mode.

ON	LSF Enabled
OFF	LSF Disabled (default)

Link State Forwarding is a method of mirroring the port states such that a failure on one side is visible on the other. LSF should only be used in unmanaged configurations as it is undesirable where remote management is used.

2.6.2 FCC9000 LEDs

The FCC9000 has four LEDs to indicate status. The LEDs have the following significance

2.6.2.1 PWR LED

The Green PWR LED indicates that the FCC9000 card is correctly inserted into a “powered up” rack chassis.

Green On	Module Powered Up
Off	Module not plugged in, Rack not powered up

2.6.2.2 OK LED

The bi-colour OK LED has different significance in managed and unmanaged mode.

Unmanaged Mode

Green ON	Module Powered Up
Off	Module not plugged in, Rack not powered up

Managed Mode

Green ON	Module Operating Correctly, No Alarms
Red ON	Module has at least one port in Alarmed state
Off	Module not plugged in, Rack Not powered up.

2.6.2.3 M1 LED

The bi-colour M1 LED indicates the status of the Media Converter Module 1 as follows:

Green On	Module 1 operating normally
Red On	Module 1 port Alarmed
Off	Module not plugged in, Rack Not powered up.

2.6.2.4 M21 LED

The bi-colour M1 LED indicates the status of the Media Converter Module 2 as follows:

Green On	Module 1 operating normally
Red On	Module 1 port Alarmed
Off	Module not plugged in, Rack Not powered up..

2.7 WCC-Serial, Ethernet over Serial Module

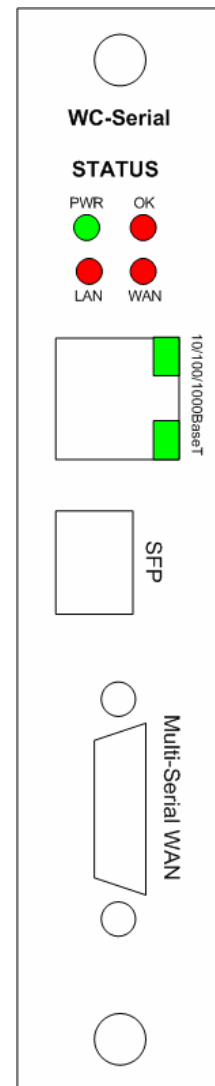
The MetroConnect WCC-Serial module enables the extension of LAN segments over a serial connection. The WCC-Serial presents a 'Cisco' compatible HD60 connector to support V.11, EIA-530, V.36, V.35 and RS-232 in both DTE or DCE modes

The WCC-Serial can operate in either stand alone, or fully managed mode. In stand-alone mode the operating parameters are configured using bit switches.

In managed mode the manager card will configure the module via the backplane and the card supports a much greater range of functionality.

The WCC-Serial has four status LED's to indicate the operating status of the module.

The WCC-Serial module is fully "hot swappable" and may be inserted / removed from the chassis without affecting other modules.



2.7.1 WCC-Serial Bit Switch Settings

The WCC-Serial has an 8 position DIP switch on the PCB. This switch is used to configure the module for stand alone operation, and to select the default settings in managed mode.

The bit switch settings are as below:

Bit Switch	ON	OFF
1	Managed Mode	Stand Alone Mode
2	Enable QOS	Enable Flow Control
3	Alarm Driver Disabled	Alarm Driver Enabled
4	MTU 1522	MTU 2048
5	Copper Port Mode	
6		
7	1000BaseX	100BaseFX
8	DSCP QOS	802.1p QOS

The default setting for the WCC-Serial is for all switches in the ON position.

2.7.1.1 Bit Switch 1, Operating Mode

This switch controls the operating mode of the WCC-Serial.

ON Managed Mode (Default)

OFF Unmanaged / Standalone Mode

When Managed Mode is selected, the WCC-Serial is fully under the control of the MC12000 Manager and offers the full suite of configuration options

When Unmanaged / Standalone mode is selected, the WCC-Serial will operate in a limited range of configurations, controlled by the setting of the bit switches.

2.7.1.2 Bit Switch 2, QOS Enable

This switch enables the priority queuing mode.

- | | |
|-----|---|
| ON | Priority Based QOS processing Enabled |
| OFF | IEEE802.3X pause frame based Flow Control Enabled |

In order to ensure that high priority traffic gets passed in preference to lower priority traffic the QOS function should be enabled. The module supports 4 levels of priority queueing, with the priority scheme being defined by switch 8.

Flow control will ensure traffic is not lost due to buffer overflow, but will not prioritise traffic.

2.7.1.3 Bit Switch 3, Alarm Relay Driver

This switch enables the module to drive the backplane alarm relay independent of the manager. This switch should only be enabled in stand alone mode.

- | | |
|-----|-----------------------|
| ON | Relay Driver Disabled |
| OFF | Relay Driver Enabled |

2.7.1.4 Bit Switch 4, Maximum Frame Size

This bit switch controls the maximum frame size that may be used,

- | | |
|-----|------------------|
| ON | MTU = 1518 Bytes |
| OFF | MTU = 2048 Bytes |

For standard LAN frames, the maximum frame size should be set to 1518, however if VLAN or QinQ encapsulations are enabled the MTU should be raised to 2048.

2.7.1.5 Bit Switch 6/5, Copper Port Operating Mode

These two switches define the operating mode for the copper port

SW6	SW5	Operating Mode
ON	ON	Auto Negotiate, 10/100/1000BaseT
ON	OFF	10M, Full Duplex
OFF	ON	100M, Full Duplex
OFF	OFF	1000M, Full Duplex

In some cases it may be desirable to fix the operating parameters of the copper port, rather than having the port auto negotiate for speed and duplex.

2.7.1.6 Bit Switch 7, SFP Mode

This switch determines the speed of the fibre port

ON	SFP Mode, 1000Base-X, Auto Negotiate
OFF	SFP Mode, 100Base-FX, Full Duplex

The switch controls the mode of the fibre port and must be set to match the type of SFP fitted.

2.7.1.7 Bit Switch 8, Prioritisation Mode

When switch 2 is in the ON position, selecting QOS mode, then this switch selects the priority scheme to use

ON	IP DSCP
OFF	IEEE 802.1p

With QOS enables, all packets are examined and based on the incoming priority are placed in one of the four priority queues. Unmarked packets are assumed to be low priority.

2.7.2 LED Indications

The WCC-Serial has a bank of four LED indicators to display the status of the module. The LEDs operate as below:

PWR	GREEN	Module Inserted, and Powered Up
OK	GREEN	Normal Operation
	RED	Alarm Condition
LAN	GREEN	LAN / SFP Link Up
	RED	LAN or SFP Link Down
WAN	GREEN	WAN Link Up
	RED	WAN Link Down

Note, that in standalone mode, the LAN port will show Link Down unless both the LAN and SFP ports are operational and have link up. In managed mode, unused ports may be disabled.

2.7.3 Multi Serial Interface

The serial interface is presented on a high density, 60 way connector. The interface supports the following standards, EIA-530, X.21, V.35, V.36/RS-422 at speeds of upto 20Mbps.

The port uses the cable identifier to determine the type of the interface used, and uses CISCO compatible cables as shown below:

EIA-530 DTE	CAB-530-MT
-------------	------------

X.21 DTE	CAB-X21-MT
----------	------------

X.21 DCE	CAB-X21-FC
----------	------------

V.35 DTE	CAB-V35-MT
----------	------------

V.35 DCE	CAB-V35-FC
----------	------------

V.36/RS-422 DTE	CAB-V36-MT
-----------------	------------

V.36/RS-422 DCE	CAB-V36-FC
-----------------	------------

2.8 WCC1100, Ethernet over E1 Module

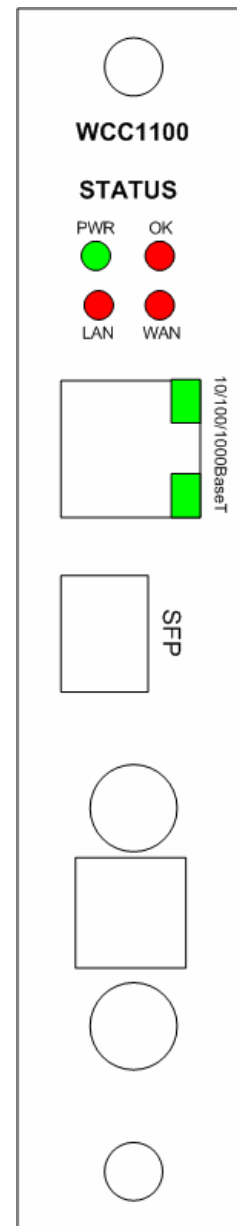
The MetroConnect WCC1100 module enables the extension of LAN segments over an E1 connection.

The WCC1100 can operate in either stand alone, or fully managed mode. In stand-alone mode the operating parameters are configured using bit switches.

In managed mode the manager card will configure the module via the backplane and the card supports a much greater range of functionality.

The WCC1100 has four status LED's to indicate the operating status of the module.

The WCC1100 module is fully "hot swappable" and may be inserted / removed from the chassis without affecting other modules.



2.8.1 WCC1100 Bit Switch Settings

The WCC1100 has an 8 position DIP switch on the PCB. This switch is used to configure the module for stand alone operation, and to select the default settings in managed mode.

The bit switch settings are as below:

Bit Switch	ON	OFF
1	Managed Mode	Stand Alone Mode
2	Enable QOS	Enable Flow Control
3	Alarm Driver Disabled	Alarm Driver Enabled
4	MTU 1522	MTU 2048
5	Copper Port Mode	
6		
7	1000BaseX	100BaseFX
8	DSCP QOS	802.1p QOS

The default setting for the WCC1100 is for all switches in the ON position.

2.8.1.1 Bit Switch 1, Operating Mode

This switch controls the operating mode of the WCC1100.

ON Managed Mode (Default)

OFF Unmanaged / Standalone Mode

When Managed Mode is selected, the WCC1100 is fully under the control of the MC12000 Manager and offers the full suite of configuration options

When Unmanaged / Standalone mode is selected, the WCC1100 will operate in a limited range of configurations, controlled by the setting of the bit switches.

2.8.1.2 Bit Switch 2, QOS Enable

This switch enables the priority queuing mode.

- | | |
|-----|---|
| ON | Priority Based QOS processing Enabled |
| OFF | IEEE802.3X pause frame based Flow Control Enabled |

In order to ensure that high priority traffic gets passed in preference to lower priority traffic the QOS function should be enabled. The module supports 4 levels of priority queueing, with the priority scheme being defined by switch 8.

Flow control will ensure traffic is not lost due to buffer overflow, but will not prioritise traffic.

2.8.1.3 Bit Switch 3, Alarm Relay Driver

This switch enables the module to drive the backplane alarm relay independent of the manager. This switch should only be enabled in stand alone mode.

- | | |
|-----|-----------------------|
| ON | Relay Driver Disabled |
| OFF | Relay Driver Enabled |

2.8.1.4 Bit Switch 4, Maximum Frame Size

This bit switch controls the maximum frame size that may be used,

- | | |
|-----|------------------|
| ON | MTU = 1518 Bytes |
| OFF | MTU = 2048 Bytes |

For standard LAN frames, the maximum frame size should be set to 1518, however if VLAN or QinQ encapsulations are enabled the MTU should be raised to 2048.

2.8.1.5 Bit Switch 6/5, Copper Port Operating Mode

These two switches define the operating mode for the copper port

SW6	SW5	Operating Mode
ON	ON	Auto Negotiate, 10/100/1000BaseT
ON	OFF	10M, Full Duplex
OFF	ON	100M, Full Duplex
OFF	OFF	1000M, Full Duplex

In some cases it may be desirable to fix the operating parameters of the copper port, rather than having the port auto negotiate for speed and duplex.

2.8.1.6 Bit Switch 7, SFP Mode

This switch determines the speed of the fibre port

ON	SFP Mode, 1000Base-X, Auto Negotiate
OFF	SFP Mode, 100Base-FX, Full Duplex

The switch controls the mode of the fibre port and must be set to match the type of SFP fitted.

2.8.1.7 Bit Switch 8, Prioritisation Mode

When switch 2 is in the ON position, selecting QOS mode, then this switch selects the priority scheme to use

ON	IP DSCP
OFF	IEEE 802.1p

With QOS enables, all packets are examined and based on the incoming priority are placed in one of the four priority queues. Unmarked packets are assumed to be low priority.

2.8.2 LED Indications

The WCC1100 has a bank of four LED indicators to display the status of the module. The LEDs operate as below:

PWR	GREEN	Module Inserted, and Powered Up
OK	GREEN	Normal Operation
	RED	Alarm Condition
LAN	GREEN	LAN / SFP Link Up
	RED	LAN or SFP Link Down
WAN	GREEN	WAN Link Up
	RED	WAN Link Down

Note, that in standalone mode, the LAN port will show Link Down unless both the LAN and SFP ports are operational and have link up. In managed mode, unused ports may be disabled.

2.8.3 E1 Interface

The E1 interface is presented as either unbalanced 75ohm on a pair of BNC co-ax connectors, or as a balanced, 120ohm on an RJ45 connector.

The presentation pinout of the RJ45 is controlled by a slide switch on the PCB. The default position is TE (Terminal Equipment) which will allow direct connection to a network port on an NTU. Changing the switch allows the card to present an NT interface.

2.9 WCC1800, WCC1400 Ethernet over Octal/Quad E1 Module

The MetroConnect WCC1800 and WCC1400 modules enable the extension of LAN segments over multiple bonded E1 connections.

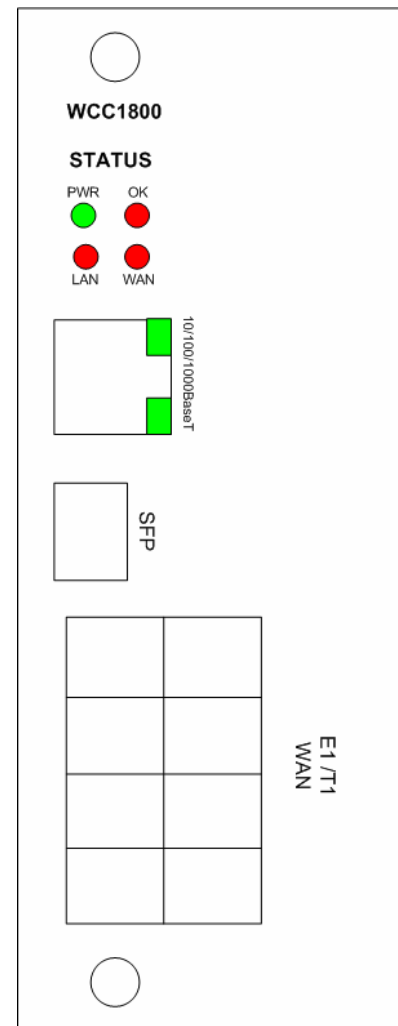
The WCC1800 is a 2" wide module occupying 2 slot positions in the rack and offers 8 E1 interfaces on RJ45. The WCC1400 is a standard 1" module offering 4 E1 interfaces.

The WCC1800/1400 modules can only operate fully managed mode.

In managed mode the manager card will configure the module via the backplane and the card supports a much greater range of functionality.

The WCC1800/1400 has four status LED's to indicate the operating status of the module.

The WCC1800/1400 module is fully "hot swappable" and may be inserted / removed from the chassis without affecting other modules.



2.9.1 WCC180/1400 Bit Switch Settings

The WCC1100 has an 8 position DIP switch on the PCB. This switch is used to configure the module for stand alone operation, and to select the default settings in managed mode.

The bit switch settings are as below:

Bit Switch	ON	OFF
1	Managed Mode	Stand Alone Mode
2	Enable QOS	Enable Flow Control
3	Alarm Driver Disabled	Alarm Driver Enabled
4	MTU 1522	MTU 2048
5	Copper Port Mode	
6		
7	1000BaseX	100BaseFX
8	DSCP QOS	802.1p QOS

The default setting for the WCC1100 is for all switches in the ON position.

2.9.1.1 Bit Switch 1, Operating Mode

This switch controls the operating mode of the WCC1800/1400.

ON Managed Mode (Default)

OFF Unmanaged / Standalone Mode

Due to the complexity of the configuration required for the WCC1800/1400 modules standalone operation is not supported..

2.9.1.2 Bit Switch 2, QOS Enable

This switch enables the priority queuing mode.

- | | |
|-----|---|
| ON | Priority Based QOS processing Enabled |
| OFF | IEEE802.3X pause frame based Flow Control Enabled |

In order to ensure that high priority traffic gets passed in preference to lower priority traffic the QOS function should be enabled. The module supports 4 levels of priority queueing, with the priority scheme being defined by switch 8.

Flow control will ensure traffic is not lost due to buffer overflow, but will not prioritise traffic.

2.9.1.3 Bit Switch 3, Alarm Relay Driver

This switch enables the module to drive the backplane alarm relay independent of the manager. This switch should only be enabled in stand alone mode.

- | | |
|-----|-----------------------|
| ON | Relay Driver Disabled |
| OFF | Relay Driver Enabled |

2.9.1.4 Bit Switch 4, Maximum Frame Size

This bit switch controls the maximum frame size that may be used,

- | | |
|-----|------------------|
| ON | MTU = 1518 Bytes |
| OFF | MTU = 2048 Bytes |

For standard LAN frames, the maximum frame size should be set to 1518, however if VLAN or QinQ encapsulations are enabled the MTU should be raised to 2048.

2.9.1.5 Bit Switch 6/5, Copper Port Operating Mode

These two switches define the operating mode for the copper port

SW6	SW5	Operating Mode
ON	ON	Auto Negotiate, 10/100/1000BaseT
ON	OFF	10M, Full Duplex
OFF	ON	100M, Full Duplex
OFF	OFF	1000M, Full Duplex

In some cases it may be desirable to fix the operating parameters of the copper port, rather than having the port auto negotiate for speed and duplex.

2.9.1.6 Bit Switch 7, SFP Mode

This switch determines the speed of the fibre port

ON	SFP Mode, 1000Base-X, Auto Negotiate
OFF	SFP Mode, 100Base-FX, Full Duplex

The switch controls the mode of the fibre port and must be set to match the type of SFP fitted.

2.9.1.7 Bit Switch 8, Prioritisation Mode

When switch 2 is in the ON position, selecting QOS mode, then this switch selects the priority scheme to use

ON	IP DSCP
OFF	IEEE 802.1p

With QOS enables, all packets are examined and based on the incoming priority are placed in one of the four priority queues. Unmarked packets are assumed to be low priority.

2.9.2 LED Indications

The WCC1800/1400 has a bank of four LED indicators to display the status of the module. The LEDs operate as below:

PWR	GREEN	Module Inserted, and Powered Up
OK	GREEN	Normal Operation
	RED	Alarm Condition
LAN	GREEN	LAN / SFP Link Up
	RED	LAN or SFP Link Down
WAN	GREEN	WAN Link Up
	RED	WAN Link Down

Note, that in standalone mode, the LAN port will show Link Down unless both the LAN and SFP ports are operational and have link up. In managed mode, unused ports may be disabled.

2.9.3 E1 Interfaces

The E1 interfaces are presented as balanced, 120ohm on either a dual stacked Octal RJ45 connector or harmonica quad RJ45 connector

The presentation pin out of the RJ45 is TE (Terminal Equipment) which will allow direct connection to a network port on an NTU.

2.10 WCC3200, Ethernet over Dual E3/DS3 Module

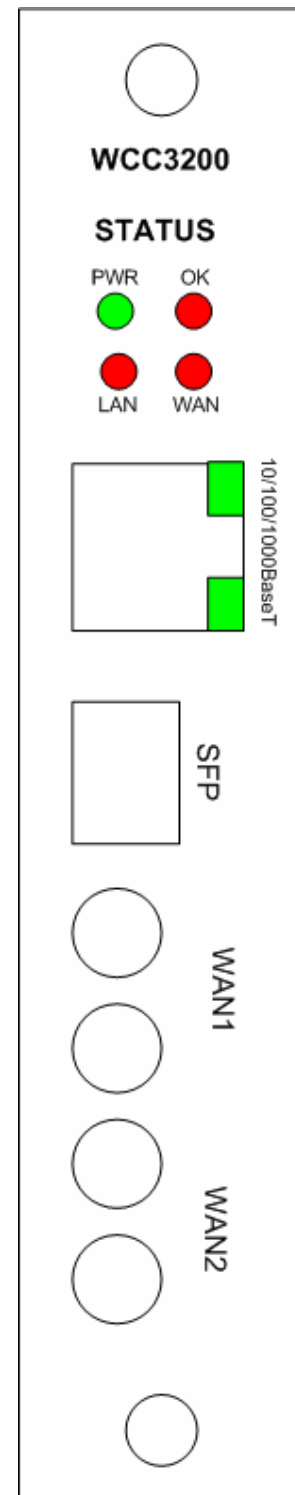
The MetroConnect WCC3200 module enables the extension of LAN segments over a pair E3/DS-3 connections.

The WCC3200 can only operate in fully managed mode.

In managed mode the manager card will configure the module via the backplane and the card supports a much greater range of functionality.

The WCC3200 has four status LED's to indicate the operating status of the module.

The WCC3200 module is fully “hot swappable” and may be inserted / removed from the chassis without affecting other modules.



2.10.1 WCC3200 Bit Switch Settings

The WCC3200 has an 8 position DIP switch on the PCB. This switch is used to configure the module for stand alone operation, and to select the default settings in managed mode.

The bit switch settings are as below:

Bit Switch	ON	OFF
1	Managed Mode	Stand Alone Mode
2	Enable QOS	Enable Flow Control
3	Alarm Driver Disabled	Alarm Driver Enabled
4	MTU 1522	MTU 2048
5	Copper Port Mode	
6		
7	1000BaseX	100BaseFX
8	DSCP QOS	802.1p QOS

The default setting for the WCC3200 is for all switches in the ON position.

2.10.1.1 Bit Switch 1, Operating Mode

This switch controls the operating mode of the WCC3200.

ON Managed Mode (Default)

OFF Unmanaged / Standalone Mode

When Managed Mode is selected, the WCC1100 is fully under the control of the MC12000 Manager and offers the full suite of configuration options

2.10.1.2 Bit Switch 2, QOS Enable

This switch enables the priority queuing mode.

- | | |
|-----|---|
| ON | Priority Based QOS processing Enabled |
| OFF | IEEE802.3X pause frame based Flow Control Enabled |

In order to ensure that high priority traffic gets passed in preference to lower priority traffic the QOS function should be enabled. The module supports 4 levels of priority queueing, with the priority scheme being defined by switch 8.

Flow control will ensure traffic is not lost due to buffer overflow, but will not prioritise traffic.

2.10.1.3 Bit Switch 3, Alarm Relay Driver

This switch enables the module to drive the backplane alarm relay independent of the manager. This switch should only be enabled in stand alone mode.

- | | |
|-----|-----------------------|
| ON | Relay Driver Disabled |
| OFF | Relay Driver Enabled |

2.10.1.4 Bit Switch 4, Maximum Frame Size

This bit switch controls the maximum frame size that may be used,

- | | |
|-----|------------------|
| ON | MTU = 1518 Bytes |
| OFF | MTU = 2048 Bytes |

For standard LAN frames, the maximum frame size should be set to 1518, however if VLAN or QinQ encapsulations are enabled the MTU should be raised to 2048.

2.10.1.5 Bit Switch 6/5, Copper Port Operating Mode

These two switches define the operating mode for the copper port

SW6	SW5	Operating Mode
ON	ON	Auto Negotiate, 10/100/1000BaseT
ON	OFF	10M, Full Duplex
OFF	ON	100M, Full Duplex
OFF	OFF	1000M, Full Duplex

In some cases it may be desirable to fix the operating parameters of the copper port, rather than having the port auto negotiate for speed and duplex.

2.10.1.6 Bit Switch 7, SFP Mode

This switch determines the speed of the fibre port

ON	SFP Mode, 1000Base-X, Auto Negotiate
OFF	SFP Mode, 100Base-FX, Full Duplex

The switch controls the mode of the fibre port and must be set to match the type of SFP fitted.

2.10.1.7 Bit Switch 8, Prioritisation Mode

When switch 2 is in the ON position, selecting QOS mode, then this switch selects the priority scheme to use

ON	IP DSCP
OFF	IEEE 802.1p

With QOS enables, all packets are examined and based on the incoming priority are placed in one of the four priority queues. Unmarked packets are assumed to be low priority.

2.10.2 LED Indications

The WCC3200 has a bank of four LED indicators to display the status of the module. The LEDs operate as below:

PWR	GREEN	Module Inserted, and Powered Up
OK	GREEN	Normal Operation
	RED	Alarm Condition
LAN	GREEN	LAN / SFP Link Up
	RED	LAN or SFP Link Down
WAN	GREEN	WAN Link Up
	RED	WAN Link Down

Note, that in standalone mode, the LAN port will show Link Down unless both the LAN and SFP ports are operational and have link up. In managed mode, unused ports may be disabled.

2.10.3 E3/DS-3 Interface

The E3/DS-3 interface is presented as unbalanced 75ohm on a pair of mini BNC co-ax connectors.

3 UNIT CONFIGURATION

The purpose of this document is to give users new to the MC12000 chassis, a simple overview on how to configure the various options for a basic level of operation. This document should be used in conjunction with the User Manual.

3.1 Logging onto the MC12000 Manager

The initial access to the MetroConnect MC12000 Manager must use a local terminal connected to the terminal port. The default terminal settings are:

19200 baud, 8 bits, No Parity, 1 Stop bit.

The MC12000 has a password protected, menu driven user interface. When a terminal session is connected to the MC12000, the welcome banner will be displayed as shown:

**Metrodata MC12000: Local connection to “”
Password (‘view’ to view only) :**

At the prompt, enter the password to gain access to the user interface. The default password is “mc12000”. For security, the password is obscured with an asterisk (*) being displayed for each character typed. An incorrect password will lead to the welcome banner being redisplayed. A correct password will lead onto the main set up menu as shown below:

Metrodata MC12000 ""

Alarms: Major

MAIN SET-UP

Global status	<display>
alarm eXtension	<menu>

Operational Modes	<menu>
Port set-up	<menu>
V.24 set-up	<menu>
Management Entity	<menu>
System	<menu>
Update EEPROM	

circuit/flow Tests	<menu>
--------------------	--------

performance Data	<menu>
------------------	--------

First CAPITAL - select item
<escape> - exit menu

3.1.1 User Interface Navigation

The MetroConnect user interface is a simple, menu based interface. Each selectable item may be selected by typing the first capital of the option, e.g. for "Data port set-up" type <D>¹ or <d>. Sometimes, where multiple items have the same starting letter the selection capital will not be the first letter, e.g. "alarm eXtension" which is selected with <X> or <x>.

On the right side of the display is a list of what is below each item. This could be:

<menu>	This indicates a sub-menu will be entered
<display>	This indicates an information screen will be displayed. This may be status or statistics.

Additional keys may be used to navigate the menu system:

<ESC>	This will exit the current menu, or log out from the main set up menu.
<SPACE>	This will toggle through a list of selectable options
<ENTER>	This will select an item

¹ Encapsulating an item within < > indicates a key press is required, for example <D> means type D.

3.1.2 Setting the Unit IP Address

From the Main Setup Menu, select the Management Menu.

```
Metrodata MC12000 ""
```

Alarms: Major

```
MANAGEMENT ENTITY
```

```
proXying      <menu>
intErface     <menu>
IP             <menu>
UDP           <menu>
tCp           <menu>
sNmp          <menu>
Telnet/SSH    <menu>
tFtp          <menu>
Ping          <display>
```

```
First CAPITAL - select item
<escape> - exit menu
```

then select the interface menu:

```
Metrodata MC12000 ""
```

Alarms: Major

```
INTERFACE
```

```
State          Up
Phys. address  0:c0:81:0:12:44
DHCP           Off
IP addr        192.168.0.1
Net mask       255.255.255.0
AT table       <display>
sTats.         <display>

c-VLAN         None
```

```
First CAPITAL - select item
<escape> - exit menu
```

The interface menu allows access to the Management Interface setup.

To change the IP settings for installation:

dHcp	For operation in a DHCP enabled network and automatic IP address allocation leave this parameter enabled.
IP Address	Assign the required IP address for correct installation into the network.
Net mask	Assign the required network mask for correct installation into the network.

Where Management Traffic is VLAN tagged, the VLAN ID must also be configured.

3.1.3 Setting a default Route

From the Main Setup Menu, select the Management Menu, IP Menu:

```
Metrodata MC12000 ""                               Alarms: Major
IP
default TTL                32
DSCP priority              0
Routing table              <display>
Forwarding                 Disabled
Stats.                     <display>
```

```
First CAPITAL - select item
<escape> - exit menu
```

then select the Routing Table and add the default route using 0.0.0.0 as destination and mask and enter the required next hop router address. For management traffic the default route should be assigned to the Mgr-LAN interface.

```
Metrodata MC12000 ""                               Alarms: Major
Destination      Next Hop      I/f  Type      Prot.  Age      Mask
-----
192.168.0.0      0.0.0.0      mgmt direct  local   973      255.255.255.0
0.0.0.0          192.168.0.254 mgmt indirect local   973      0.0.0.0
```

```
A - add entry
D - delete entry
any other key to exit:
```

3.2 System Configuration

The system menu provides the basic administrative configuration items for the MC12000 and should be configured first. The System Menu is shown below:

Metrodata MC12000 ""

Alarms: Major

SYSTEM

Time & date	<menu>
Node name	
pRovider id	
Access Control	<menu>
weLcome screen	<menu>
Software version	Main 8.20 / Boot 5.5
Output config	<display>
Input config	
Warm start	
Cold start	
Event logs	<menu>

First CAPITAL - select item
<escape> - exit menu

3.2.1 *Setting the Time and Date*

The MC12000 does not provide a non volatile Real Time Clock, instead it uses NTP to set the date and time following power up. In applications where NTP is not available, the MC12000 defaults to providing a simple uptime display.

To configure the NTP parameters, select the "Time and date" menu from the "System" menu. The menu is as below:

Metrodata MC12000 "MC12000"

Alarms: Major

TIME & DATE

local Time	16:46:59
local Date	Tue 23/7/2013
system up time	0d1h27m27s
time Zone	GMT+1
NTP server	192.168.0.100
last sync	15:19:39 Tue 23/7/2013
Sync now	

First CAPITAL - select item
<escape> - exit menu

If NTP is available, then the following parameters need to be set,

Time Zone +/-12	Since NTP uses GMT, time zone adjustment allows the correct time to be configured wherever the units are deployed globally.
-----------------	---

NTP Server	Enter the IP address of the network NTP server.
------------	---

According to the NTP protocol, the MC12000 will wait for a random period of between 1 and 5 minutes before requesting an NTP update.

If NTP is not available, then the user can manually enter the time and date. The MC12000 uses a SuperCap to provide backup over a power cycle, and will maintain the time and date for around an hour powered down.

3.2.2 *Setting the Node Name*

To enable identification of the MC12000, it is useful to enter a meaningful name for the unit. The node name is entered as a string of up to 32 alpha numeric characters, including spaces.

Metrodata MC12000 "MC12000"

Alarms: Major

SYSTEM

Time & date	<menu>
Node name	MC12000
pProvider id	
Access Control	<menu>
weLcome screen	<menu>
Software version	Main 8.20 / Boot 5.5
Output config	<display>
Input config	
Warm start	
Cold start	
Event logs	<menu>

First CAPITAL - select item
<escape> - exit menu

Once a node name has been defined, in this case "MC12000" it is displayed at the top of each user menu to assist the user identify which device is currently connected.

3.2.3 Access Control

The access control menu defines the security policy for management access to the MC12000 unit.

The Access Control menu is shown below:

Metrodata MC12000 "" Alarms: Major

ACCESS CONTROL

Password	*****
'View' user	Enabled
Super Me	No
TACACS+	<menu>

First CAPITAL - select item
<escape> - exit menu

3.2.3.1 Password

The local password for the MC12000 may be changed from the access control menu. The default password is the product name, ie "MC12000", however for deployment a more secure password may be required.

To change the unit password, select "Password" from the system menu. The MC12000 will display the following:

Enter new password

Password >

Enter the new password, up to 16 alphanumeric characters. For security, each character is shown on the screen as an asterisk "*". Once the new password is entered, the display changes to

Enter new password

Password > *****
Verify>

Re-enter the new password. If the password is correctly verified the unit will assume the new password for the next logon.

For security, passwords are stored in encrypted form within the unit configuration files that may be uploaded using TFTP.

3.2.3.1.1 Password Recovery

If for any reason, the password for access to the MC12000 is lost, the unit may be cold started by using bit switch 8 which will return the unit to the default factory configuration. The default factory password is the product name, "MC12000".

Note, that returning the unit to factory default will erase the configuration memory and all configuration items including IP address will be lost.

3.2.3.2 'View' User

The MC12000 supports two levels of access: admin and view. An Admin user has full access rights over the MC12000 configuration. A view user has read only access to the configuration.

In some cases it may be desirable to prevent the "view" user access.

To disable the view user access, select the View User menu item and toggle the option to disabled. It will now not be possible to log in with the "view" password.

3.2.3.3 Super Me

The super me option will raise the user level to super user which will enable some extra diagnostic and debug screens.

3.2.3.4 TACACS+

Where greater access control and security is required, the MC12000 units support TACACS+ for central password authentication.

Metrodata MC12000 ""

Alarms: Major

TACACS+

Authentication	TACACS+, Local
Timeout	3
Retries	3
Server	192.168.100.45
Encryption key	*****

First CAPITAL - select item
<escape> - exit menu

3.2.3.4.1 Authentication

The MC12000 supports three modes of password access control and authentication. The options are:

Local	(Default) The password access control is handled locally by the MC12000 unit and the unit password should be used to log in.
TACACS+, Local	In this mode, the MC12000 unit will attempt to contact the TACACS+ server for authentication, however if the server cannot be accessed, it will fall back to local password administration.
TACACS+	Use TACACS+ for password authentication. If the server is unavailable, access to the unit will not be allowed.

3.2.3.4.2 Timeout

The timeout defines how long the MC12000 unit will wait for a response from the TACACS+ server. The timeout is specified in seconds in the range 1 to 90 seconds.

3.2.3.4.3 Retries

This defines the number of attempts the MC12000 unit will make when trying to access the TACACS+ server. The valid range is 1 to 10.

3.2.3.4.4 Server

This defines the IP address of the TACACS+ Authentication server. When a login attempt is made, this server will be accessed.

3.2.3.4.5 Encryption Key

This key is used by both the MC12000 and the TACACS+ server to provide a secure, encrypted password exchange and authentication. This must be set the same on both MC12000 and Server.

3.2.3.5 Welcome Screen

By default, the initial access to the MC12000 will display the welcome banner as shown below:

Metrodata MC12000: Local connection to "MC12000"
Password ('view' to view only) :

However, it is possible to customize the welcome banner to give further information about the unit, or to inform the user of access restrictions.

To configure the welcome screen select the "welcome screen" menu item which will lead to the menu:

```
Metrodata MC12000 "MC12000"                Alarms: Major
WELCOME SCREEN
Welcome screen          Disabled
```

```
First CAPITAL - select item
<escape> - exit menu
```

If a customized welcome is required, change to enabled and the menu will change as shown below:

```
Metrodata MC12000  "MC12000"                Alarms: Major
WELCOME SCREEN
Welcome screen          Enabled
1st line
2nd line
3rd line
4th line
5th line
6th line
7th line
8th line
Clear all text
Display screen          <display>
```

```
First CAPITAL - select item
<escape> - exit menu
```

To configure the Welcome Screen enter each line using alpha numeric characters with each line supporting upto 80 characters as in the example below:

```
Metrodata MC12000    "MC12000"                                Alarms: Major
```

```
WELCOME SCREEN
```

```
Welcome screen      Enabled
1st line            This is an example
2nd line            of a Welcome Banner
3rd line
4th line            Welcome to the MC12000
5th line
6th line
7th line            Please enter the password>
8th line
Clear all text
Display screen      <display>
```

```
First CAPITAL - select item
```

```
<escape> - exit menu
```

Once the welcome message has been defined, it may be displayed using the display screen option, and for this example, the Display Screen shows:

```
Metrodata MC12000    "MC12000"                                Alarms: Major
```

```
WELCOME SCREEN
-----
```

```
This is an example
of a Welcome Banner
```

```
Welcome to the MC12000
```

```
Please enter the password>
```

```
<Escape> - exit, other key - refresh
```

which leads to a welcome banner displayed as follows when a management session is started up:

```
This is an example  
of a Welcome Banner
```

```
Welcome to the MC12000
```

```
Please enter the password>
```

```
password ('view' to view only):
```

3.2.4 Software Version

This display only item shows the software version that is running on the unit. This will usually be required when requesting technical support on the products.

The software version shows the version of both application and boot software that is running on the MC12000

3.2.5 Output Config

Normally TFTP is used to upload/download the system configuration files, however a text file may be output to the screen.

To output the configuration file, you will need a terminal emulator such as Tera Term or Hyper Term which have the capability of capturing the screen output.

When output config is selected, the following prompt is displayed

```
Metrodata MC12000 "MC12000"                               Alarms: Major  
Start capture then press a key.  
After transfer, stop capture then press another key.
```

At this point, start the screen capture and then press a key to output the configuration file to the screen. Once the complete file has been displayed, stop the capture and then press a key to continue.

3.2.6 Input Config

The input configuration menu item allows a configuration file to be loaded onto the MC12000 unit using the serial port. The configuration file for use may have been generated using either the serial output configuration option, or have been saved via TFTP.

To load the configuration file, the terminal emulator application must be capable of sending a text file to the serial port.

Selecting the Input Config menu item leads to the following prompt

```
Send file. Esc to End
```

At this point, send the text file and once it is complete type <ESC> to terminate the transfer. At this point, the MC12000 will validate the configuration and then reboot using the new configuration.

Please note, that with some terminal emulation packages, if error messages are encountered, it may be necessary to set the character delay to 1mS

3.2.7 Warm Start

A warm Start will force the MC12000 to restart and reload the configuration from the EEPROM. Note, any changes to configuration that have not been saved to the EEPROM will be lost.

When a user issues a warm start request, the MC12000 will indicate that a warm start is in progress and then close the connection.

3.2.8 Cold Start

Cold Start will return the MC12000 to the factory default condition, as defined by the bit switch settings.

Note, that a cold start will erase IP addresses and Routing Table entries and it is therefore highly likely that remote access will be lost following a cold start.

For this reason a cold start request must be confirmed before it is actioned, and the user must type Y at the prompt

```
Returns all settings to defaults!  
Are you sure?
```

Once confirmed the unit will restart, and default the internal non volatile configuration memory returning the unit to the factory default state.

3.2.9 Event Logs

The event logging system on the MC12000 units provide a diagnostic capability to assist problem diagnosis when errors or faults occur in the network.

The event log menu is as shown below:

```
Metrodata MC12000    "MC12000"                                Alarms: Major

EVENT LOGS

System event log      <display>
Alarm event log       <display>
Config. event log     <display>
Full event log        <display>

First CAPITAL - select item
<escape> - exit menu
```

The event log is split into 3 separate sections grouped by event type, or alternatively the complete event log may be displayed to give full time relationship between events.

3.2.9.1 System Event Log

The system event log stores events that are related to the operation of the system as shown below:

```
Metrodata MC12000    "MC12000"                                Alarms: Major

--- System Event Log ---
1/1/2000    00:00:00  performance log cleared
1/1/2000    00:00:00  rtc needs to be set
1/1/2000    00:00:00  config restored
1/1/2000    00:00:00  event logs cleared
press any key to continue
```

3.2.9.2 Alarm Event Log

The alarm event log stores the set and clear times for all alarm conditions as shown below:

```
Metrodata MC12000    "MC12000"                      Alarms: Major

--- Alarm Event Log ---
1/1/2000    00:00:02  Major ON VCG
1/1/2000    00:00:01  Major ON WAN
1/1/2000    00:00:01  Major ON SFP
1/1/2000    00:00:01  Major ON LAN2
1/1/2000    00:00:01  Major ON LAN1
press any key to continue
```

3.2.9.3 Config Event Log

The config event log stores all changes that are made to the unit configuration as shown below:

```
Metrodata MC12000    "MC12000"                      Alarms: Major

--- Config. Event Log ---
5/1/2000    17:59:07  Config. updated
1/1/2000    23:00:21  Default config. set
1/1/2000    22:58:28  Default config. set
1/1/2000    22:37:12  Config. updated
1/1/2000    21:58:00  Config. updated
1/1/2000    00:00:00  Default config. set
press any key to continue
```

3.3 Configuration of the IO Modules (Port Setup Menu)

This section deals with the configuration of each of the IO Modules. Up to 12 IO modules are supported in a MC12000 chassis. A simple configuration will be shown for each type of port.

The port configuration is accessed from the main setup menu by selecting the port setup menu. The port setup menu gives the following options

Metrodata MC12000 "MC12000"

Alarms: Major

PORT SET-UP

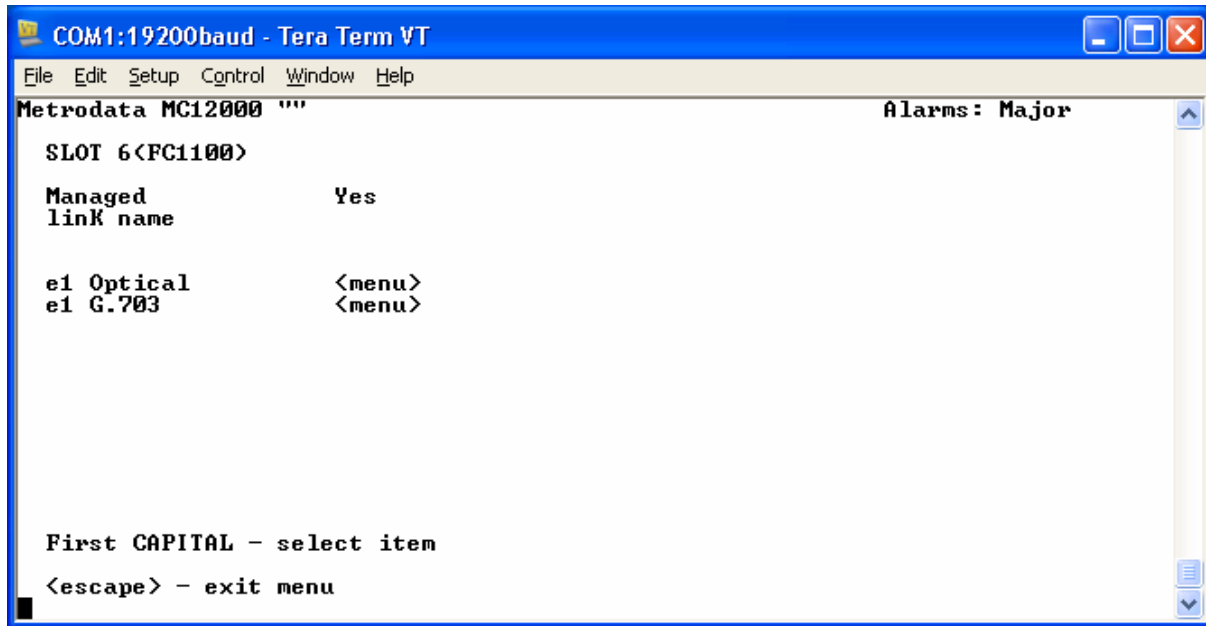
```
1 - 1(FCC9000)    <menu>
2 - 2(WCC-Serial) <menu>
3 - 3(WCC3200)    <menu>
4 - 4(WCC1800)    <menu>
6 - 6(WCC1800)    <menu>
8 - 8(FCC9000)    <menu>
```

First CAPITAL - select item
<escape> - exit menu

Note, the slots are selected using "hex" notation, ie 1 to 9, then A=10, B=11, C=12

3.3.1 FC1x00

Selecting an FC1x00 IO module will lead to the following menu



The FC1x00 module may operate in stand alone mode, where the manager simply monitors the status of the FC1x00, or it may be operated in fully managed mode where the configuration is controlled from the user interface.

3.3.1.1 Link Name

In order to assist identification of the link being configured a label may be applied. The label may be up to 32 characters.

3.3.1.2 Managed

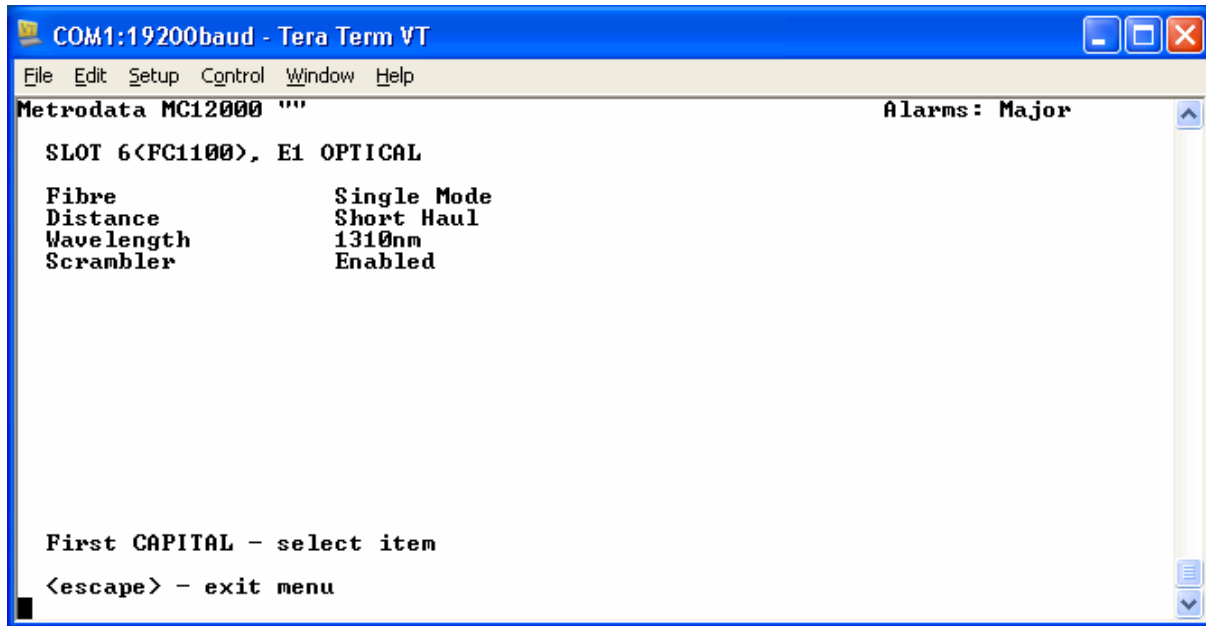
The Managed menu item is used to select the operating mode of the FC1x00.

- | | |
|-----|--|
| NO | The FC1000 is configured using the PCB mounted bit switches and the manager simply monitors the status of the FC1000 Module. |
| YES | The FC1x00 is configured according to the user configuration. |

In unmanaged mode, the following menu items are all for information only and cannot be changed, however if managed mode is enabled, some items may be configured.

3.3.1.3 E1 Optical Port Configuration

Selecting the E1 optical configuration gives the following options:



3.3.1.3.1 Fibre

This parameter, non configurable, displays the fibre type supported by the transceiver fitted to the FC1x00 module:

Options:

Multi-Mode	50/125 or 62.5/125 Multi Mode Fibers Supported
Single Mode	9/125 Single Mode Fibre Supported

3.3.1.3.2 Distance

This display item displays the drive capability of the fibre transceiver.

Options:

Short Haul	Multi-Mode	2km approx
Short Haul	Single Mode	25km approx
Long Haul	Single Mode	70km approx

3.3.1.3.3 Type

This display item details the type of transceiver fitted and also the transmit wavelength.

Options:

Duplex,	1300nm
Duplex,	1550nm
Bidir,	Tx 1310nm
Bidir,	Tx 1550nm

The bidirectional transceivers support transport over a single fibre by utilizing CWDM and transmitting and receiving on different wavelengths. For single fibre operation, a matched pair of transceivers must be used.

3.3.1.3.4 Scrambler

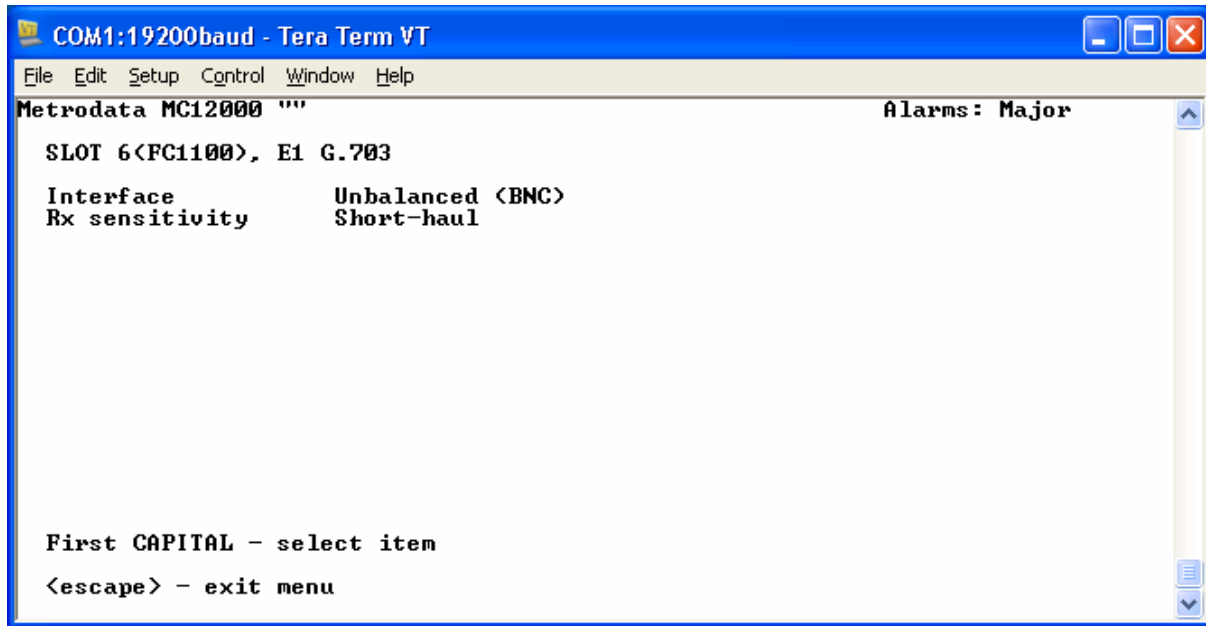
This item is configurable in managed mode. In normal operation it should be enabled to ensure a balanced 1's density is maintained.

Options

Enabled	X^3-1 Self synchronizing Scrambler Enabled
Disabled	Scrambler Disabled.

3.3.1.4 E1 G.703 Port Configuration

Selecting the E1 G703 option leads to the following configuration menu



3.3.1.4.1 Interface

The interface selection enables selection of the physical E1 port presentation.

Options:

Unbalanced (BNC)	75Ohm, Co-ax, BNC
Balanced (RJ45)	120Ohm, twisted pair, RJ45,

3.3.1.4.2 Rx Sensitivity

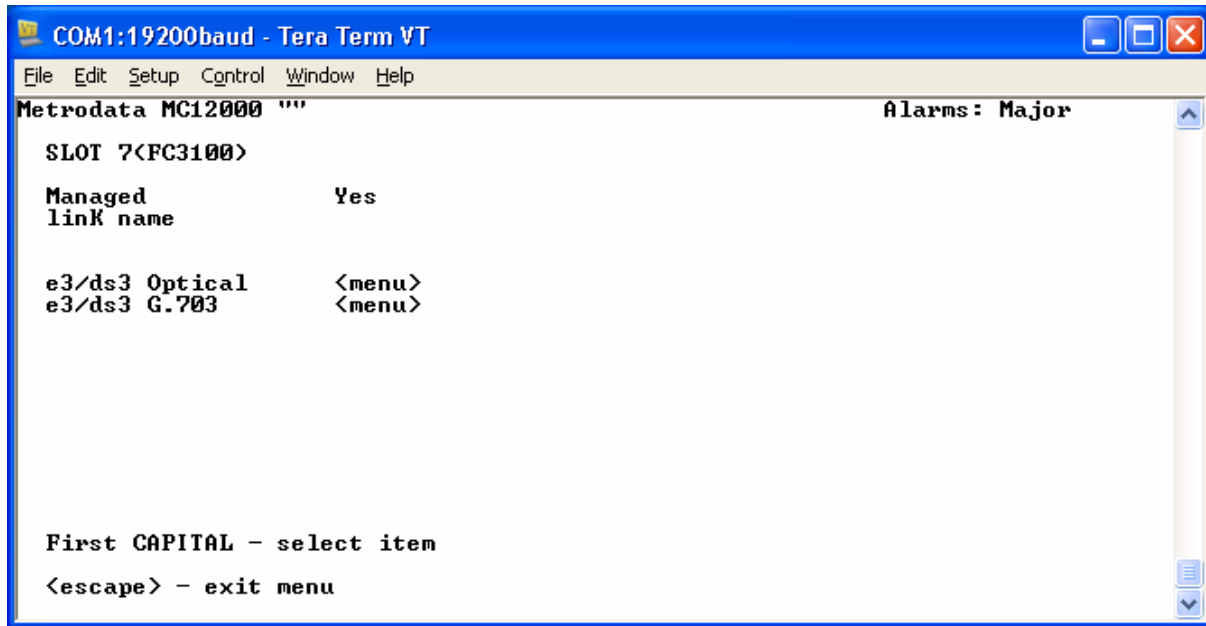
This option defines the sensitivity of the E1 receiver. By increasing the sensitivity more loss may be tolerated in the cable, and hence longer cable runs may be supported.

Options

Short-Haul	Sensitivity -12dB
Long-Haul	Sensitivity -43dB

3.3.2 FC3x00

Selecting an FC3x00 IO module will lead to the following menu



The FC3x00 module may operate in stand alone mode, where the manager simply monitors the status of the FC3x00, or it may be operated in fully managed mode where the configuration is controlled from the user interface.

3.3.2.1 Link Name

In order to assist identification of the link being configured a label may be applied. The label may be up to 32 characters.

3.3.2.2 Managed

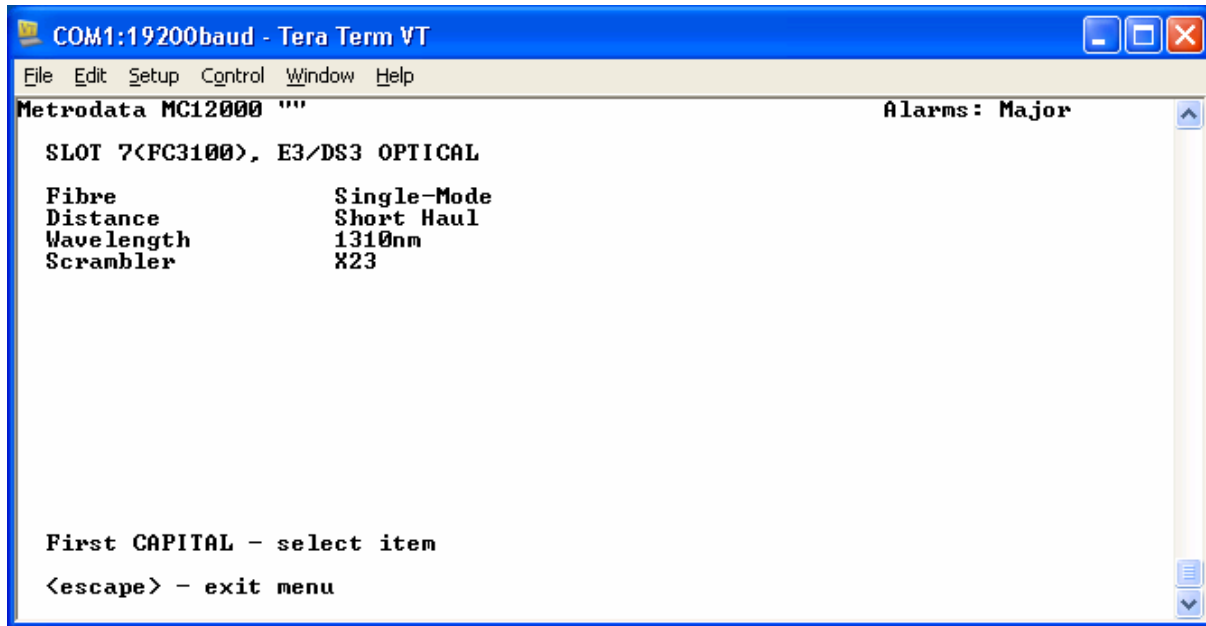
The Managed menu item is used to select the operating mode of the FC3x00.

- | | |
|-----|--|
| NO | The FC3x00 is configured using the PCB mounted bit switches and the manager simply monitors the status of the FC3x00 Module. |
| YES | The FC3x00 is configured according to the user configuration. |

In unmanaged mode, the following menu items are all for information only and cannot be changed, however if managed mode is enabled, some items may be configured.

3.3.2.3 E3/DS3 Optical Port Configuration

The NRZ menu enables configuration or monitoring of the Optical Interface.



3.3.2.3.1 Fibre

This parameter, non configurable, displays the fibre type supported by the transceiver fitted to the FC3x00 module:

Options:

Multi-Mode	50/125 or 62.5/125 Multi Mode Fibers Supported
Single Mode	9/125 Single Mode Fibre Supported

3.3.2.3.2 Distance

This display item displays the drive capability of the fibre transceiver.

Options:

Short Haul	Multi-Mode	2km approx
Short Haul	Single Mode	25km approx
Long Haul	Single Mode	70km approx

3.3.2.3.3 Type

This display item details the type of transceiver fitted and also the transmit wavelength.

Options:

Duplex,	1300nm
Duplex,	1550nm
Bidir,	Tx 1310nm
Bidir,	Tx 1550nm

The bidirectional transceivers support transport over a single fibre by utilizing CWDM and transmitting and receiving on different wavelengths. For single fibre operation, a matched pair of transceivers must be used.

3.3.2.3.4 Scrambler

To maintain a DC balance on the fibre, a balanced 1's density is required and a scrambler should be used.

Options:

X23	X23 scrambler (default)
X3	X3 scrambler

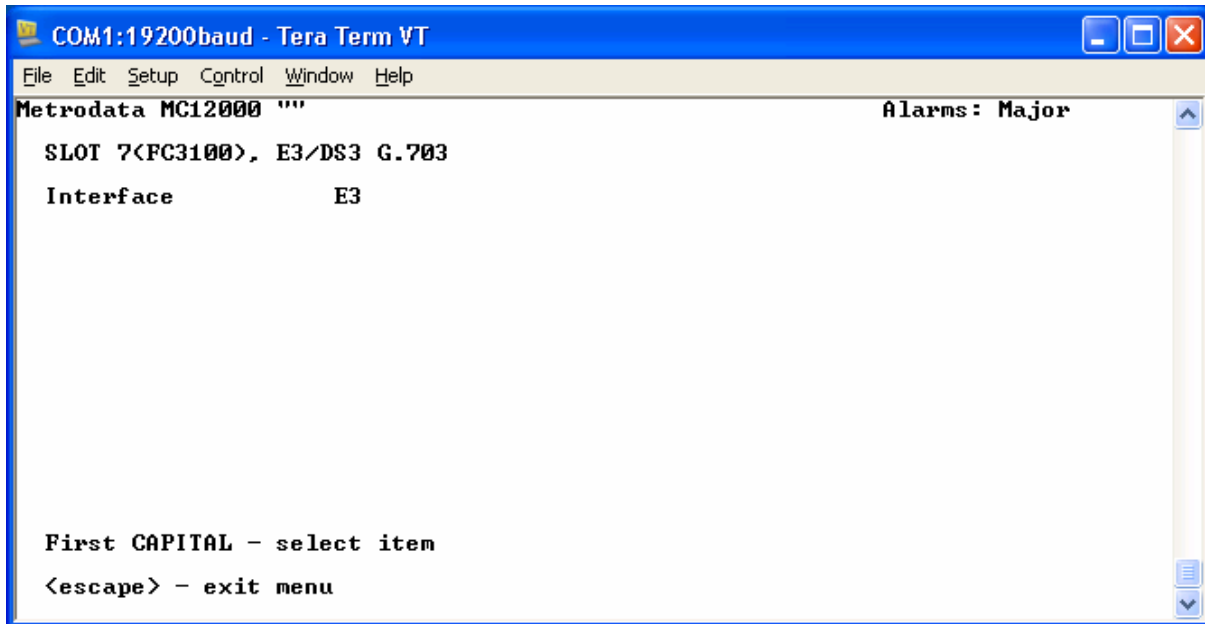
The X23 scrambler is a strong scrambler which utilizes 23 bits with dual feedback and should be used in most applications.

X3 is a much weaker scrambler, and is only for use with older version standalone FC3x00 units that only support X3.

3.3.2.4 E3/DS3 G703 Port Configuration Menu

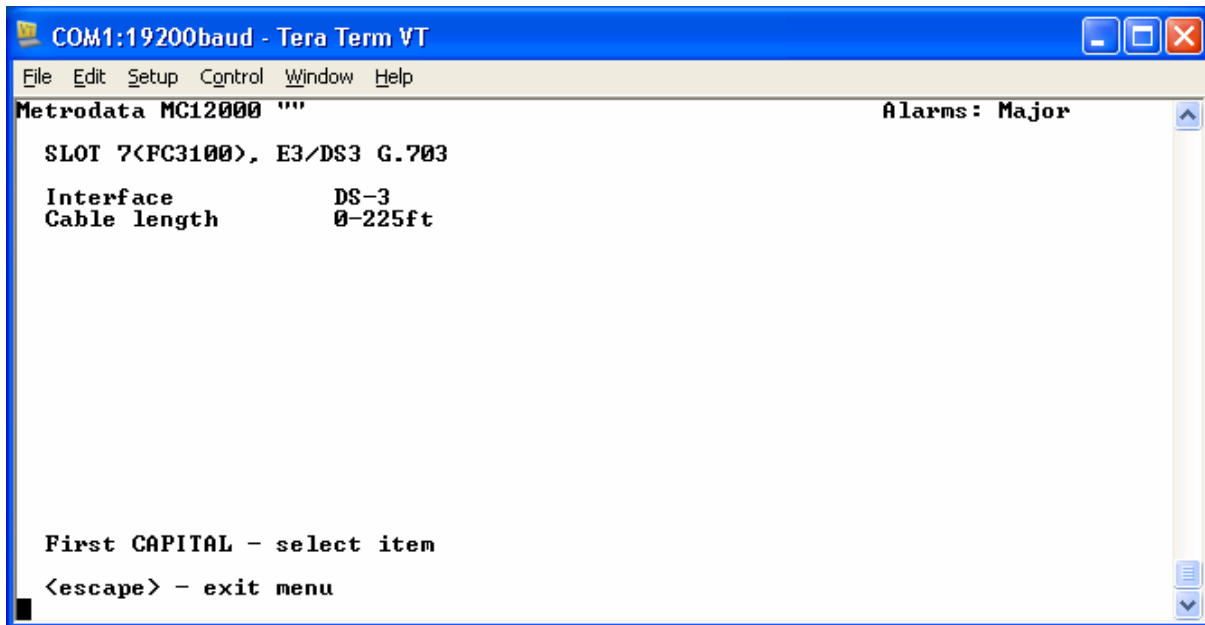
The G703 menu enables the configuration of the G703 interface. The menu is as shown below showing both the E3 and DS-3 options:

3.3.2.4.1 E3 Mode



In E3 mode, there are no additional configuration items. However the interface may be changed to select DS-3 mode.

3.3.2.4.2 DS-3 Mode



In DS-3 mode, the additional parameter – Cable Length, must be configured.

Options

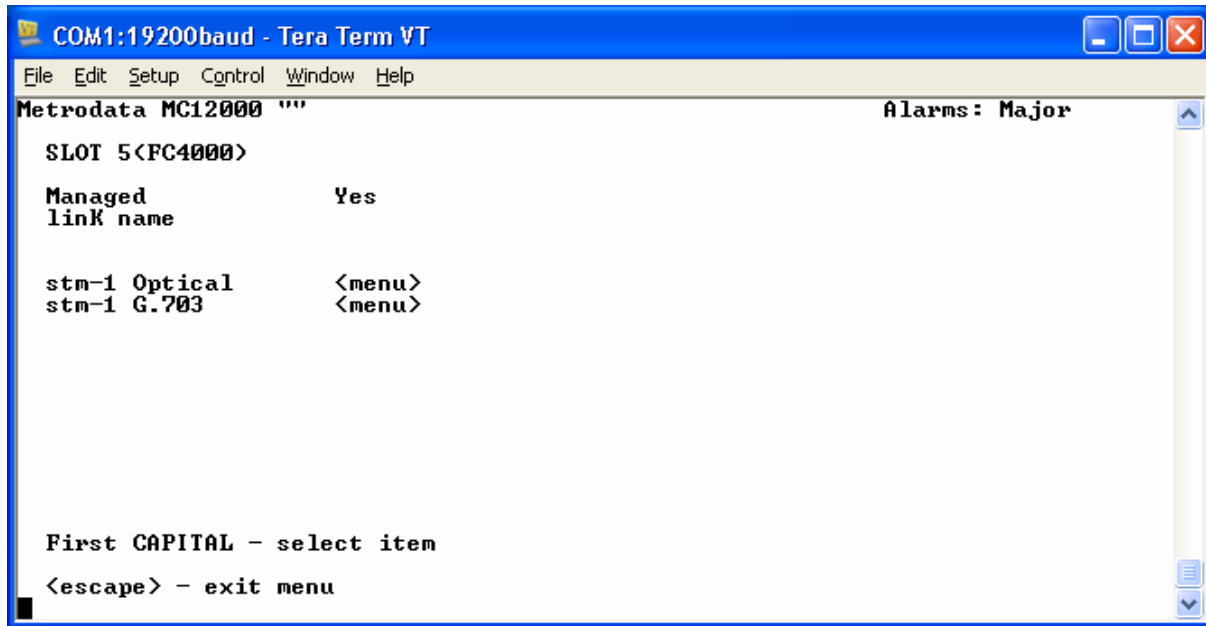
0 – 225ft

225 – 450ft

It is important to ensure the cable length parameter is selected correctly otherwise receiver overdrive may occur. Overdrive is also a possibility when very short cables, (less than 10m), and will often lead to errors. This issue is due to the DS-3 specification defining the pulse mask at the end of the cable run, rather than at source hence short cables will have larger signals. With very short cable runs, if line errors are encountered, 10dB attenuators may be added inline to get the circuit running error free.

3.3.3 FC4x00

Selecting an FC4x00 IO module will lead to the following menu



The FC4x00 module may operate in stand alone mode, where the manager simply monitors the status of the FC4x00, or it may be operated in fully managed mode where the configuration is controlled from the user interface.

3.3.3.1 Link Name

In order to assist identification of the link being configured a label may be applied. The label may be up to 32 characters.

3.3.3.2 Managed

The Managed menu item is used to select the operating mode of the FC4x00.

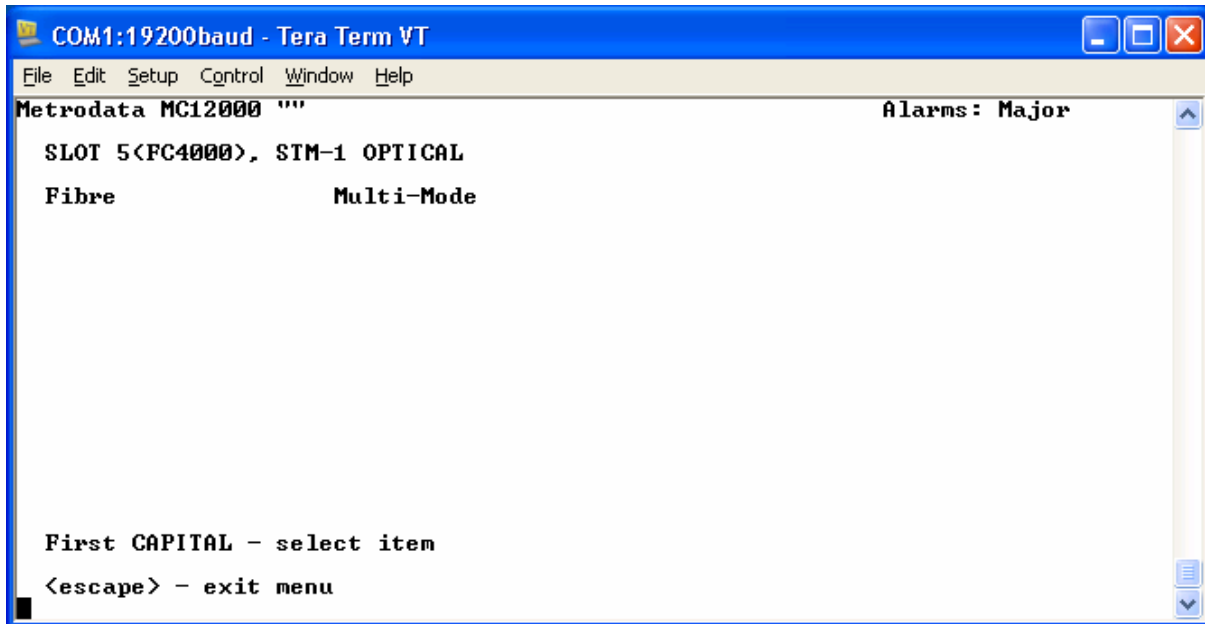
- | | |
|-----|--|
| NO | The FC4x00 is configured using the PCB mounted bit switches and the manager simply monitors the status of the FC4x00 Module. |
| YES | The FC4x00 is configured according to the user configuration. |

In unmanaged mode, the following menu items are all for information only and cannot be changed, however if managed mode is enabled, some items may be configured.

3.3.3.3 STM-1 Optical Port Configuration

The FC4x00 provides a transparent media conversion function and supports both SDH or SONET circuits.

The optical port configuration menu is as below:



3.3.3.3.1 Fibre

This parameter, non configurable, displays the fibre type supported by the transceiver fitted to the FC3x00 module:

Options:

- | | |
|-------------|--|
| Multi-Mode | 50/125 or 62.5/125 Multi Mode Fibers Supported |
| Single Mode | 9/125 Single Mode Fibre Supported |

3.3.3.3.2 Distance

This display item displays the drive capability of the fibre transceiver.

Options:

- | | | |
|------------|-------------|-------------|
| Short Haul | Multi-Mode | 2km approx |
| Short Haul | Single Mode | 25km approx |
| Long Haul | Single Mode | 70km approx |

3.3.3.3 Type

This display item details the type of transceiver fitted and also the transmit wavelength.

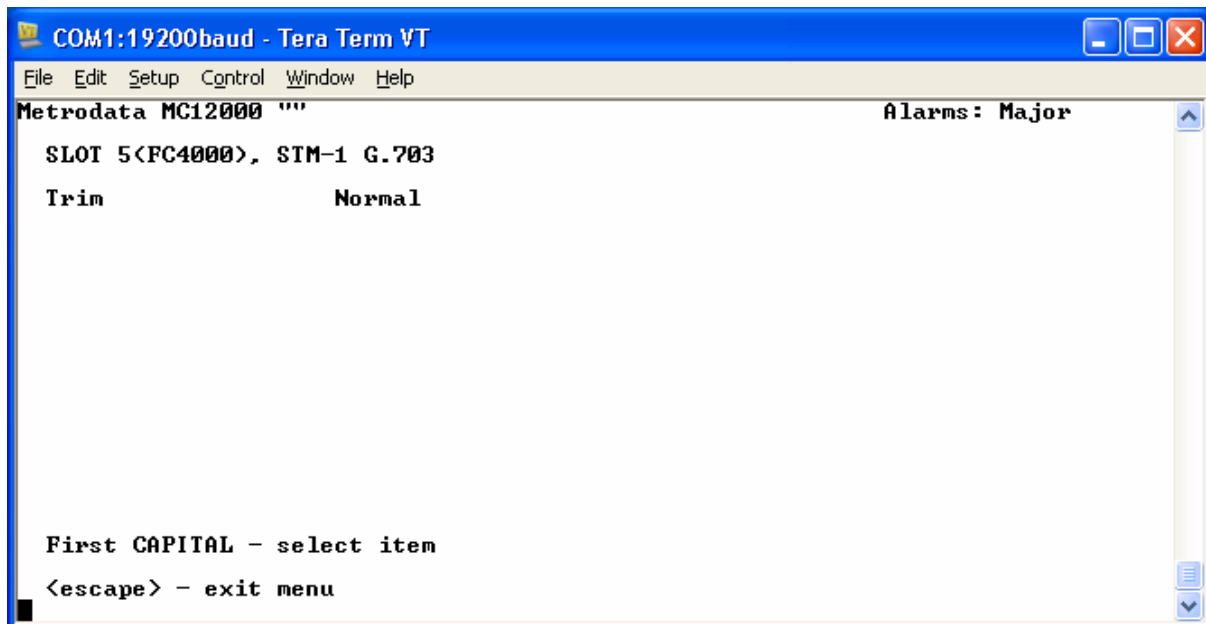
Options:

Duplex,	1300nm
Duplex,	1550nm
Bidir,	Tx 1310nm
Bidir,	Tx 1550nm

The bidirectional transceivers support transport over a single fibre by utilizing CWDM and transmitting and receiving on different wavelengths. For single fibre operation, a matched pair of transceivers must be used.

3.3.3.4 STM-1 G703 Port Configuration

The FC4x00 supports the following configuration options for the G.703 port



The TRIM level allows the pulse amplitude to be adjusted to allow for varying cable lengths if problems are encountered. If a circuit is experiencing a high number of BPV errors then the transmitter may need to be trimmed, but otherwise it should not be changed.

3.3.4 FCC9000

The FCC9000 is a dual media converter module for the MetroConnect MC12000 Chassis. It is designed for use with the MetroConnect FCM8000 and FCM9000 standalone EDD device. The FCC9000 comprises two media converters, presenting one 10/100/1000BaseT RJ45 port and a pair of SFP ports capable of supporting either 1000Base-X or 100BaseFX SFP modules. The FCC9000 supports basic Copper to Fibre or Fibre to Fibre modes of operation.

When the FCC9000 is installed in the MC12000 chassis, the card is configured using the data port menu:

```
Metrodata MC12000 "MC12000"                      Alarms: Major
SLOT 1(FCC9000)
Managed                      Yes
module 1                      <menu>
module 2                      <menu>

First CAPITAL - select item
<escape> - exit menu
```

3.3.4.1 Managed Mode

The FCC9000 should always be operated in managed mode to enable functions such as OAM, Management and Performance Monitoring.

3.3.4.2 Module Configuration

The FCC9000 comprises two separate media converter modules, Module 1 and Module 2. The SFP ports on the front panel are labeled 1.1 and 1.2 for Module 1, and 2.1 and 2.2 for Module 2.

The modules are fully independent and are configured separately. Both modules offer the same configuration options and are configured using the Module menu as follows:

```
Metrodata MC12000 "MC12000"                                Alarms: Major
SLOT 1(FCC9000), MODULE 1
link name                Customer 1 - London
Operational Modes        <menu>
LAN                       <menu>
sfp1                     <menu>
sfp2                     <menu>

First CAPITAL - select item
<escape> - exit menu
```

The module menu is identical for Module 2.

3.3.4.2.1 Link Name

In order to assist identification of the link being configured, a label may be applied. The label may be up to 32 characters.

3.3.4.2.2 Operational Modes

The Operational Mode allows the traffic streams to be un-modified, VLAN tagged or S-Tagged as they traverse the FCC9000.

The configuration menu is shown below:

```
Metrodata MC12000 "MC12000"                      Alarms: Major
OPERATIONAL MODES, SLOT 1(FCC9000) MODULE 1

VLAN Mode          C-VLAN
Backplane VLANs    4095
Inter-module VLANs -

backplane Counters <display>

Flow control       Disabled
maX frame size     1522

Priority Trans      <menu>

First CAPITAL - select item
<escape> - exit menu
```

3.3.4.2.2.1 VLAN Mode

The isolation mode selects which, if any, tagging is to be applied.

Options

C-VLAN	Packets entering a port are VLAN Tagged, or passed unmodified.
QinQ	Packets entering a port are S-Tag Tagged

3.3.4.2.2.2 Backplane VLANs

In order to manage remote units from a single management access to the MC12000, VLAN connections may be made using the 100M connection on the backplane.

Backplane VLANs also allow for inter card communication via the backplane.

For management purposes, only a single VLAN should be allocated, however for fan out, or inter card communications multiple VLAN's may be allocated.

Range: 1 to 4095

3.3.4.2.2.3 *Inter-Module VLANs*

The FCC9000 has two independent media converter modules, however it is possible to configure VLANs to cross between the two converters to effectively make a single 6 port switch. Allocate VLANs that are required to pass between the two modules.

Range: 0 to 4095

Note, allocating 0, enables untagged frames to pass between modules.

3.3.4.2.2.4 *Backplane Counters*

These statistics are available to verify the traffic flowing across the backplane to/from the FCC9000.

Metrodata MC12000 "MC12000"

Alarms: Major

Backplane Statistics, Slot 1

InOctets	0
InUcastPkts	0
InNUcastPkts	0
InDiscards	0
InErrors	0
InUnknownProtos	0
OutOctets	0
OutUcastPkts	0
OutNUcastPkts	0
OutDiscards	0
OutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.4.2.2.5 *Flow Control*

The FCC9000 supports IEEE802.3X pause frame based flow control as a congestion control mechanism. If this is enabled, then it will be advertised on all auto negotiating ports.

Options

Enabled	Advertise flow control on auto negotiating ports
Disabled	No flow control.

3.3.4.2.2.6 *Max Frame Size*

The max frame size defines the maximum frame size that will pass:

1522	Standard MAC, or single VLAN tagged frames
2048	Mini Jumbo Frames
10k	Jumbo Frames

3.3.4.2.2.7 *Priority Translation*

The priority translation is used to map the 64 levels of DSCP to the 8 levels of IEEE 802.1p priority, and also to map these priority levels to the 4 levels of priority queues available.

Metrodata MC12000 "MC12000"

Alarms: Major

PRIORITY TRANSLATION, SLOT 1(FCC9000) MODULE 1

pcp 6/7	DSCP 48-63
pcp 4/5	DSCP 32-47
pcp 2/3	DSCP 16-31
pcp 0/1	DSCP 0-15

Restore Defaults

First CAPITAL - select item
<escape> - exit menu

3.3.4.2.3 SFP Configuration

This menu allows configuration of the SFP interface(s)

```
Metrodata MC12000 "MC12000"                                Alarms: Major
SLOT 1(FCC9000) MODULE 1, SFP1
sfp type              1000BASE-SX
State                 Up
link status           Up
max spEed             1000M
Auto-negotiation      Enabled
negotiated            1000M/FD
sFP Management        <menu>
Tagging & Priority     <menu>
OAM                   <menu>
linK Loss Fwding      Disabled
Counters              <display>

First CAPITAL - select item
<escape> - exit menu
```

3.3.4.2.3.1 SFP Type

The SFP type is read from the EEPROM on board the SFP module.

3.3.4.2.3.2 State

This configuration item defines the administrative status for the SFP port.

Options:

Up	Port is enabled, Alarms are generated if required
Down	Port is disabled, no alarms generated

For normal operation, a port must be in the administrative Up state, however when ports are not connected they should be disabled to prevent them generating alarms.

3.3.4.2.3.3 *Link Status*

The Link Status item is a real time indication of the current state of the link.

Options:

Up	Link is UP, traffic may pass
Down	Link Down,

3.3.4.2.3.4 *(Max) Speed*

The speed setting selects the operating speed of the SFP port. When auto negotiation is enabled, the speed setting determines the highest speed advertised.

Options

1000M	Use with 1000BaseX SFP
100M	Use with OC-3/100BaseFX SFP

3.3.4.2.3.5 *Auto Negotiation*

This configures the port for auto negotiation.

Options

Enabled	Port will Auto Negotiate
Disabled	Port is fixed

Note, 1000BaseX should always have auto negotiation enabled.

3.3.4.2.3.6 *Negotiated*

This display item shows the results of the auto negotiation process.

Options

----	Auto Negotiation not completed
1000M/FD	1000M, Full Duplex
100M/FD	100M, Full Duplex
100M/HD	100M, Half Duplex

3.3.4.2.3.7 *Link Loss Forwarding*

Link Loss Forwarding propagates the physical link state, ie if Port B is down, then LLF will force port A down. In this way, devices connected via the media converter will see the link fault if it occurs downstream.

In a managed network, with remote management or OAM, LLF should be disabled otherwise a remote fault will disable the link used for management.

Options:

Disabled

Enabled

3.3.4.2.3.8 *SFP Management*

The SFP management menu gives the user the option of displaying the SFP information including module details and when available the diagnostics information. The menu also allows the notifications to be defined to allow for traps and alarms to be generated based on the SFP diagnostic information.

The SFP management menu is shown below:

```
Metrodata MC12000 ""                               Alarms: none

  SFP MANAGEMENT

  Device Details      <display>
  Notifications       <menu>


First CAPITAL - select item
<escape> - exit menu
```

3.3.4.2.3.8.1 Device Details

This menu displays further information regarding the SFP device:

Metrodata MC12000 ""

Alarms: Major

SFP Info

Interface: 1.1.SFP1

Status	Type	Vendor	Part No.	Transmit Wavelength
Good	1000BASE-LX	HG GENUINE	MXPD-243S-G	1310nm

SFP Diagnostic Info

Diagnostic Item	Status	Current Value	Unit	Alarm Threshold High	Alarm Threshold Low	Warning Threshold High	Warning Threshold Low
Tx Power	OK	-6	dBm	-1	-11	-2	-8
Rx Power	OK	-5	dBm	-3	-19	-5	-17
Bias	OK	15.1	mA	60.0	1.0	50.0	1.0
Temp	OK	54	C	85	-5	80	0
Supply	OK	3.27	V	3.60	3.0	3.50	3.10

<Esc> - exit, <Enter> - refresh

Where the fitted SFP supports the extended diagnostic interface, the extra information is displayed.

3.3.4.2.3.8.2 Notifications

The Notifications menu allows traps and alarms to be generated based on alarms or warnings raised by the SFP diagnostic information.

The menu is shown below, with a common set up with traps/alarms enabled for the high temperature and low receive power.

Metrodata WCM3100 "WCM3100_Left"

Alarms: none

NOTIFICATIONS

1 - Temp High	Alarm & Warning
2 - Temp Low	None
3 - Supply High	None
4 - Supply Low	None
5 - Bias High	None
6 - Bias Low	None
7 - Tx Power High	None
8 - Tx Power Low	None
9 - Rx Power High	None
A - Rx Power Low	Alarm & Warning
B - SFP Removed	None
C - OTDR Fault	None

First CAPITAL - select item
<escape> - exit menu

The options for each notification setting, is as follows:

None	Do not generate a trap or alarm for this diagnostic parameter
Alarm	Generate an alarm and trap when the Alarm threshold is exceeded.
Alarm & Warning	Generate an alarm and trap when either the Alarm or Warning threshold has been exceeded.

3.3.4.2.3.9 Counters

The FCC9000 provides the basic SNMP MIB-2 counters for the interface as shown

```
Metrodata MC12000 "MC12000"                      Alarms: Major
Interface Statistics
-----
ifInOctets           0
ifInUcastPkts        0
ifInNUcastPkts       0
ifInDiscards         0
ifInErrors           0
ifInUnknownProtos    0
ifOutOctets          0
ifOutUcastPkts        0
ifOutNUcastPkts       0
ifOutDiscards         0
ifOutErrors           0
```

<Esc> - exit, C - clear, <Enter> - refresh

3.3.4.2.3.10 OAM

The FCC9000 offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled	OAM processing disabled for this port
Active	FCC9000 Generates OAM PDU Requests
Passive	FCC9000 Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

	Local Status	Local Support	Peer Mode	Peer MAC address	Peer VendorInfo	Peer Support
1.2.SFP1	SendAny	L	active	00c0810013ad	00000047	L

Remote Status

Unit: FCM9004

Node name: "FCM9004_Fibre"

Interface: WAN

Interface	AdSt	OpSt
LAN1	Up	Up
LAN2	Down	Down
LAN3	Down	Down
LAN4	Down	Down
SFP	Down	Down

<Esc> - exit, <Enter> - refresh

3.3.4.2.3.11 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 1.1.SFP1

vlan Alloc	1-255
Untagged	Leave Untagged
Priority Source	C-Tag, Default
Default Priority	0
Control C-VLAN	1

First CAPITAL - select item
<escape> - exit menu

3.3.4.2.3.11.1 VLAN Allocation

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.4.2.3.11.2 Untagged

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.4.2.3.11.3 Default VLAN

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.4.2.3.11.4 Priority Source

When a frame enters a port the frame priority may be sourced from several sources. In the case of Tagged frames the PCP may even be overwritten in some configurations.. The options are:

Default	Simply push the defined port priority to all frames
C-Tag, Default	Use the priority of the incoming C-Tag thus maintaining the frame priority, otherwise use the default setting for untagged frames.
DSCP, Default	Use the priority of the incoming DSCP value, or the default setting if no DSCP present.
C-Tag, DSCP, Def	In this mode, the priority sources are used in the order of incoming c-tag, if not tag is present then use the DSCP value if present, and finally if no other option exists use the default port priority value.

3.3.4.2.3.11.5 Default Priority

When no other priority source is available, the default priority value will be used.

Valid priority values are 0 to 7

3.3.4.2.3.11.6 Control C-VLAN

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used on the FCC9000, and may be ignored.

3.3.4.2.4 LAN Configuration

This menu allows configuration of the LAN interface

```
Metrodata MC12000 "MC12000"                      Alarms: Major
SLOT 1(FCC9000) MODULE 1, LAN

State                Up
link status          Down
max spEed            1000M
max Duplex           Full
Auto-negotiation     Enabled
negotiated           ---
MDI/MDIX             Auto

Tagging & Priority    <menu>
OAM                  <menu>
linK Loss Fwding     Disabled
Counters             <display>

First CAPITAL - select item
<escape> - exit menu
```

3.3.4.2.4.1 State

This configuration item defines the administrative status for the LAN port.

Options:

Up	Port is enabled, Alarms are generated if required
Down	Port is disabled, no alarms generated

For normal operation, a port must be in the administrative Up state, however when ports are not connected they should be disabled to prevent them generating alarms.

3.3.4.2.4.2 Link Status

The Link Status item is a real time indication of the current state of the link.

Options:

Up	Link is UP, traffic may pass
Down	Link Down,

3.3.4.2.4.3 (Max)Speed

When Auto Negotiation is disabled, this sets the operating speed of the port. When Auto Negotiation is enabled, this setting defines the maximum speed to be advertised.

Options

1000M

100M

10M

3.3.4.2.4.4 (Max) Duplex

When Auto Negotiation is disabled, this sets the operating duplex mode of the port. When Auto Negotiation is enabled, this setting defines the maximum duplex to be advertised.

Options

Full

Half

3.3.4.2.4.5 Auto Negotiation

This configures the port for auto negotiation.

Options

Enabled Port will Auto Negotiate

Disabled Port is fixed

3.3.4.2.4.6 *Negotiated*

This display item shows the results of the auto negotiation process.

Options

----	Auto Negotiation not completed
1000M/FD	1000M, Full Duplex
100M/FD	100M, Full Duplex
100M/HD	100M, Half Duplex
10M/FD	10M, Full Duplex
10M/HD	10M, Half Duplex

3.3.4.2.4.6.1 MDI/MDIX

The RJ45 port may be configured to automatically sense the interface type and automatically configure itself for MDI or MDIX operation. This mode ensures a straight cable can always be used. Alternatively, the port mode may be fixed.

Options

Auto	Auto Detect the connection required
MDI	Present MDI for connection to Switch Port
MDIX	Present MDIX for connection to PC

3.3.4.2.4.7 *Link Loss Forwarding*

Link Loss Forwarding propagates the physical link state, ie if Port A is down, then LLF will force port B down. In this way, devices connected via the media converter will see the link fault if it occurs downstream.

In a managed network, with remote management or OAM, LSF should be disabled otherwise a remote fault will disable the link used for management.

Options:

- Disabled
- Enabled

3.3.4.2.4.8 Counters

The FCC9000 provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.4.2.4.9 OAM

The FCC9000 offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active FCC9000 Generates OAM PDU Requests

Passive FCC9000 Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS						

	Local Status	Local Support	Peer Mode	Peer MAC address	Peer VendorInfo	Peer Support
-----	-----	-----	-----	-----	-----	-----
1.1.LAN	Fault	L				

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.4.2.4.10 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 1.1.LAN

```

vlan Alloc      1-255
Untagged        Leave Untagged

Priority Source  C-Tag, Default
Default Priority 0

Control C-VLAN  1
  
```

First CAPITAL - select item
<escape> - exit menu

3.3.4.2.4.10.1 VLAN Allocation

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.4.2.4.10.2 Untagged

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.4.2.4.10.3 Default VLAN

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.4.2.4.10.4 Priority Source

When the untagged actionWhen a frame enters a port the frame priority may be sourced from several sources. In the case of Tagged frames the PCP may even be overwritten in some configurations.. The options are:

Default	Simply push the defined port priority to all frames
C-Tag, Default	Use the priority of the incoming C-Tag thus maintaining the frame priority, otherwise use the default setting for untagged frames.
DSCP, Default	Use the priority of the incoming DSCP value, or the default setting if no DSCP present.
C-Tag, DSCP, Def	In this mode, the priority sources are used in the order of incoming c-tag, if not tag is present then use the DSCP value if present, and finally if no other option exists use the default port priority value.

3.3.4.2.4.10.5 Default Priority

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.4.2.4.10.6 Control C-VLAN

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used on the FCC9000, and may be ignored.

3.3.5 WCC-Serial

The WCC-Serial Module may be configured by selecting the Module Slot number at the Port Set-Up Menu. The main WCC-Serial Configuration screen is shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 2(WCC-SERIAL)

Managed Yes
link name To the WCM-Serial

Operational Modes <menu>

LAN <menu>
SFP <menu>
VCG <menu>
WAN <menu>

First CAPITAL - select item
<escape> - exit menu

3.3.5.1 Link Name

In order to assist identification of the link being configured a label may be applied. The label may be upto 32 characters.

3.3.5.2 Managed Mode

The WCC-Serial should always be operated in managed mode to enable functions such as OAM, Management and Performance Monitoring.

3.3.5.2.1 Operational Modes

The Operational Mode allows the traffic streams to be un-modified, VLAN tagged or S-Tagged as they traverse the WCC-Serial.

The configuration menu is shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

OPERATIONAL MODES, SLOT 2(WCC-SERIAL)

VLAN Mode C-VLAN
Backplane VLANs 4095

backplane Counters <display>

Flow control Disabled
maX frame size 2048

Priority Trans <menu>

First CAPITAL - select item
<escape> - exit menu

3.3.5.2.1.1 VLAN Mode

The isolation mode selects which, if any, tagging is to be applied.

Options

C-VLAN	Packets entering a port are VLAN Tagged, or passed unmodified.
QinQ	Packets entering a port are S-Tag Tagged

3.3.5.2.1.2 Backplane VLANs

In order to manage remote units from a single management access to the MC12000, VLAN connections may be made using the 100M connection on the backplane.

Backplane VLANs also allow for inter card communication via the backplane.

For management purposes, only a single VLAN should be allocated, however for fan out, or inter card communications multiple VLAN's may be allocated.

Range: 1 to 4095

3.3.5.2.1.3 *Backplane Counters*

These statistics are available to verify the traffic flowing across the backplane to/from the WCC-Serial.

Metrodata MC12000 "MC12000"

Alarms: Major

Backplane Statistics, Slot 2

InOctets 27874602
InUcastPkts 6435
InNUcastPkts 368879
InDiscards 15
InErrors 0
InUnknownProtos 0
OutOctets 23225444
OutUcastPkts 5526
OutNUcastPkts 333346
OutDiscards 0
OutErrors 0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.5.2.1.4 *Flow Control*

The WCM-Serial supports IEEE802.3X pause frame based flow control as a congestion control mechanism. If this is enabled, then it will be advertised on all auto negotiating ports.

Options

Enabled	Advertise flow control on auto negotiating ports
Disabled	No flow control.

3.3.5.2.1.5 *Max Frame Size*

The max frame size defines the maximum frame size that will pass:

1523	Standard MAC, or single VLAN tagged frames
2049	Mini Jumbo Frames

Note, the WCC-Serial does not support 10k jumbo frames.

3.3.5.2.1.6 *Priority Translation*

The priority translation is used to map the 64 levels of DSCP to the 8 levels of IEEE 802.1p priority, and also to map these priority levels to the 4 levels of priority queues available.

Metrodata MC12000 "MC12000"

Alarms: Major

PRIORITY TRANSLATION, SLOT 2(WCC-SERIAL)

pcp 6/7	DSCP 48-63
pcp 4/5	DSCP 32-47
pcp 2/3	DSCP 16-31
pcp 0/1	DSCP 0-15

Restore Defaults

First CAPITAL - select item
<escape> - exit menu

3.3.5.3 LAN Port Configuration

This menu allows configuration of the LAN interface

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 2(WCC-SERIAL), LAN

State	Up
link status	Down
max spEed	1000M
max Duplex	Full
Auto-negotiation	Enabled
negotiated	---
MDI/MDIX	Auto
Tagging & Priority	<menu>
OAM	<menu>
link Loss Fwding	Disabled
Counters	<display>

First CAPITAL - select item
<escape> - exit menu

3.3.5.3.1 State

This configuration item defines the administrative status for the LAN port.

Options:

Up	Port is enabled, Alarms are generated if required
Down	Port is disabled, no alarms generated

For normal operation, a port must be in the administrative Up state, however when ports are not connected they should be disabled to prevent them generating alarms.

3.3.5.3.2 Link Status

The Link Status item is a real time indication of the current state of the link.

Options:

Up	Link is UP, traffic may pass
Down	Link Down,

3.3.5.3.3 (Max) Speed

When Auto Negotiation is disabled, this sets the operating speed of the port. When Auto Negotiation is enabled, this setting defines the maximum speed to be advertised.

Options

1000M

100M

10M

3.3.5.3.4 (Max)Duplex

When Auto Negotiation is disabled, this sets the operating duplex mode of the port. When Auto Negotiation is enabled, this setting defines the maximum duplex to be advertised.

Options

Full

Half

3.3.5.3.5 Auto Negotiation

This configures the port for auto negotiation.

Options

Enabled Port will Auto Negotiate

Disabled Port is fixed

3.3.5.3.6 Negotiated

This display item shows the results of the auto negotiation process.

Options

----	Auto Negotiation not completed
1000M/FD	1000M, Full Duplex
100M/FD	100M, Full Duplex
100M/HD	100M, Half Duplex
10M/FD	10M, Full Duplex
10M/HD	10M, Half Duplex

3.3.5.3.7 MDI/MDIX

The RJ45 port may be configured to automatically sense the interface type and automatically configure itself for MDI or MDIX operation. This mode ensures a straight cable can always be used. Alternatively, the port mode may be fixed.

Options

Auto	Auto Detect the connection required
MDI	Present MDI for connection to Switch Port
MDIX	Present MDIX for connection to PC

3.3.5.3.8 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 2.LAN

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.5.3.8.1 *VLAN Allocation*

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.5.3.8.2 *Untagged*

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.5.3.8.3 Default VLAN

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.5.3.8.4 Priority Source

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.5.3.8.5 Default Priority

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.5.3.8.6 Control C-VLAN

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used on the WCC-Serial LAN port, and may be ignored.

3.3.5.3.9 Counters

The WCC-Serial provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.5.3.10 OAM

The WCC-Serial offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC-Serial Generates OAM PDU Requests

Passive WCC-Serial Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

	Local	Local	Peer	Peer	Peer	Peer	
	Status	Support	Mode	MAC address	VendorInfo	Support	
-----+-----+-----+-----+-----+-----+-----							
2.LAN	Fault		L				

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.5.4 SFP Configuration

This menu allows configuration of the SFP interface

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 2(WCC-SERIAL), SFP

sfp type	1000BASE-LX
State	Down
spEed	100M
Duplex	Full
Auto-negotiation	Disabled
sFP Management	<menu>

Tagging & Priority	<menu>
OAM	<menu>
link Loss Fwding	Disabled
Counters	<display>

First CAPITAL - select item
<escape> - exit menu

3.3.5.4.1 SFP Type

The SFP type shows a decode of the SFP EEPROM according to the SFP-MSA agreement. This shows a decode of bytes 3 to 10 of the EEPROM

For Gigabit Operation the valid types are

1000Base-SX	Multi Mode, 850nm
1000Base-LX	Single Mode, 1300nm

For 100M operation the valid types are

OC-3 Multi Mode
OC-3 Single Mode

Where other types of SFP are used, other decodes may be displayed. If the decode is not valid, then UNKNOWN will be shown, and where the SFP is not fitted, NOT FITTED will be shown.

3.3.5.4.2 State

This configuration item defines the administrative status for the SFP port.

Options:

- | | |
|------|---|
| Up | Port is enabled, Alarms are generated if required |
| Down | Port is disabled, no alarms generated |

For normal operation, a port must be in the administrative Up state, however when ports are not connected they should be disabled to prevent them generating alarms.

3.3.5.4.3 Link Status

The Link Status item is a real time indication of the current state of the link.

Options:

- | | |
|------|------------------------------|
| Up | Link is UP, traffic may pass |
| Down | Link Down, |

3.3.5.4.4 (Max)Speed

The speed setting selects the operating speed of the SFP port.

Options

- | | |
|-------|-----------------------------|
| 1000M | Use with 1000BaseX SFP |
| 100M | Use with OC-3/100BaseFX SFP |

3.3.5.4.5 Duplex

The duplex setting sets the Duplex mode of the SFP port. This is only valid for 100baseFX mode.

- | | |
|------|-------------|
| Full | Full Duplex |
| Half | Half Duplex |

3.3.5.4.6 Auto Negotiation

This configures the port for auto negotiation.

Options

Enabled	Port will Auto Negotiate
Disabled	Port is fixed

Note, 1000BaseX should always have auto negotiation enabled.

3.3.5.4.7 Negotiated

This display item shows the results of the auto negotiation process.

Options

----	Auto Negotiation not completed
1000M/FD	1000M, Full Duplex
100M/FD	100M, Full Duplex
100M/HD	100M, Half Duplex

3.3.5.4.7.1 SFP Management

The SFP management menu gives the user the option of displaying the SFP information including module details and when available the diagnostics information. The menu also allows the notifications to be defined to allow for traps and alarms to be generated based on the SFP diagnostic information.

The SFP management menu is shown below:

```
Metrodata MC12000 ""                               Alarms: none
SFP MANAGEMENT
Device Details      <display>
Notifications       <menu>
```

```
First CAPITAL - select item
<escape> - exit menu
```

3.3.5.4.7.1.1 Device Details

This menu displays further information regarding the SFP device:

Metrodata MC12000 ""

Alarms: Major

SFP Info

Interface: 2.SFP

Status	Type	Vendor	Part No.	Transmit Wavelength
Good	1000BASE-LX	HG GENUINE	MXPD-243S-G	1310nm

SFP Diagnostic Info

Diagnostic Item	Status	Current Value	Unit	Alarm Threshold High	Alarm Threshold Low	Warning Threshold High	Warning Threshold Low
Tx Power	OK	-6	dBm	-1	-11	-2	-8
Rx Power	OK	-5	dBm	-3	-19	-5	-17
Bias	OK	15.1	mA	60.0	1.0	50.0	1.0
Temp	OK	54	C	85	-5	80	0
Supply	OK	3.27	V	3.60	3.0	3.50	3.10

<Esc> - exit, <Enter> - refresh

Where the fitted SFP supports the extended diagnostic interface, the extra information is displayed.

3.3.5.4.7.1.2 Notifications

The Notifications menu allows traps and alarms to be generated based on alarms or warnings raised by the SFP diagnostic information.

The menu is shown below, with a common set up with traps/alarms enabled for the high temperature and low receive power.

Metrodata MC12000 "MC12000"

Alarms: none

NOTIFICATIONS

1 - Temp High	Alarm & Warning
2 - Temp Low	None
3 - Supply High	None
4 - Supply Low	None
5 - Bias High	None
6 - Bias Low	None
7 - Tx Power High	None
8 - Tx Power Low	None
9 - Rx Power High	None
A - Rx Power Low	Alarm & Warning
B - SFP Removed	None
C - OTDR Fault	None

First CAPITAL - select item
<escape> - exit menu

The options for each notification is as follows:

None	Do not generate a trap or alarm for this diagnostic parameter
Alarm	Generate an alarm and trap when the Alarm threshold is exceeded.
Alarm & Warning	Generate an alarm and trap when either the Alarm or Warning threshold has been exceeded.

3.3.5.4.7.2 Counters

The WCC-Serial provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.5.4.8 OAM

The WCC-Serial offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC-Serial Generates OAM PDU Requests

Passive WCC-Serial Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

```
-----  
      | Local   | Local   | Peer | Peer   | Peer   | Peer  
      | Status  | Support | Mode | MAC address | VendorInfo | Support  
-----+-----+-----+-----+-----+-----  
2.SFP   Fault           L
```

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.5.4.9 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 2.SFP

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.5.4.9.1 VLAN Allocation

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.5.4.9.2 Untagged

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.5.4.9.3 Default VLAN

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.5.4.9.4 Priority Source

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.5.4.9.5 Default Priority

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.5.4.9.6 Control C-VLAN

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used on the WCC-Serial SFP port, and may be ignored.

3.3.5.5 WAN Configuration

The WAN configuration menu alters depending upon which cable type is connected to the port. The cables contain an identifier and the multi serial interface will adapt itself to provide the required interface, DTE or DCE; and electrical specification, X.21, V.36, EIA-530, V.35, RS-232.

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 2(WCC-SERIAL), WAN

State	Up
interface	No Cable
mode	DCE
sSpeed	2048kbps
cTs control	On
CD control	On
DSR control	On
RTS state	Off
DTR state	Off

First CAPITAL - select item
<escape> - exit menu

3.3.5.5.1 State

This menu item configures the ADMIN state of the WAN port. For normal operation the port must be in the UP state. Unused ports should be placed in the down state to prevent alarms being generated.

3.3.5.5.2 Interface

This read only display item shows the electrical specification of the attached cable. The supported options are

No Cable	No Cable Attached, or incorrect cable used
X.21	CAB-X21-MT or CAB-X21-FC Fitted
V.35	CAB-V35-MT or CAB-V35-FC Fitted
V.36	CAB-V36-MT or CAB-V36-FC Fitted
EIA-530	CAB-530-MT Fitted

3.3.5.5.3 Mode

The WCC-Serial interface can operate as either DTE (for connection to a NTU / Modem) or DCE (for back to back testing)

3.3.5.5.4 Speed

When in DCE mode, the WCC-Serial can generate clocks. The clock may be set in Nx64k steps up to a maximum of 8.192Mbps.

3.3.5.5.5 Modem Controls

Serial interfaces support control lines to signal the state of the line and to provide handshaking to ensure error free transmission.

On the module, there are output controls and input controls. The output controls, eg RTS (V35) or C (X.21) may be controlled by changing the control setting. The options are as below:

- ON Control is always ON
- OFF Control is always OFF

The module reports the state of the input control

- ON Control is received ON
- OFF Control is received OFF

3.3.5.6 VCG Configuration

The VCG menu allows the frame encapsulation parameters to be configured for the transport of frames over the WAN port.

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 2(WCC-SERIAL), VCG

State Up
Encapsulation <menu>

LCAS/VCAT Off
lcas statUs <display>

Tagging & Priority <menu>
OAM <menu>
linK Loss Fwding Disabled
Counters <display>

First CAPITAL - select item
<escape> - exit menu

3.3.5.6.1 State

The state controls the administrative state of the interface. For normal operation the state must be up.

3.3.5.6.2 Encapsulation

Metrodata MC12000 "MC12000"

Alarms: Major

ENCAPSULATION, 2.VCG

Encapsulation HDLC
HDLC FCS 16-bit
strip MAC FCS Yes
paYload scrambler Disabled

Priority Table <menu>

First CAPITAL - select item
<escape> - exit menu

3.3.5.6.2.1 *Encapsulation*

The encapsulation menu configures the method of transporting Ethernet packets across the serial interface. As the serial interface operates unframed, and therefore bit synchronous, the WCC-Serial only supports HDLC encapsulation.

3.3.5.6.2.2 *HDLC FCS*

To allow bit errors encountered on the serial interface to be detected the HDLC frame is protected by a frame check sequence. The options are

16bit FCS

32bit FCS

The choice of which to use is down to a tradeoff between error detection and overhead. In normal operation, the 16 bit FCS is used with no problems.

3.3.5.6.2.3 *Strip MAC FCS*

Ethernet Frames are protected against error with a 32 bit, 4 byte FCS. As packets will be protected by a HDLC FCS when traversing the serial link the MAC FCS may be stripped and then regenerated at the far end.

Stripping the MAC FCS is performed to reduce the overhead.

3.3.5.6.2.4 *Payload Scrambler*

The payload scrambler provides an element of security, however its main use is to improve the 1's density of the signal.

3.3.5.6.2.5 *Priority Table*

The priority table allows the mapping of the 64 DSCP levels to the 8 levels of VLAN priority.

3.3.5.6.3 LCAS/VCAT

The WCC-Serial is a single link device, and does not support LCAS/VCAT.

3.3.5.6.4 Counters

The WCC-Serial provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

The WCC-Serial VCG counters use the IfInUcastPkts / IfOutUcastPkt and IfInError counters for receive good packets, transmitted packets and received error packets.

3.3.5.6.5 OAM

The WCC-Serial offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC-Serial Generates OAM PDU Requests

Passive WCC-Serial Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

	Local Status	Local Support	Peer Mode	Peer MAC address	Peer VendorInfo	Peer Support
2.VCG	ActiveLoc	L				

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.5.6.6 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 2.VCG

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.5.6.6.1 *VLAN Allocation*

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.5.6.6.2 *Untagged*

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.5.6.6.3 *Default VLAN*

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.5.6.6.4 *Priority Source*

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.5.6.6.5 *Default Priority*

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.5.6.6.6 *Control C-VLAN*

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used on the FCC9000, and may be ignored.

3.3.6 WCC1100

The WCC1100 Module may be configured by selecting the Module Slot number at the Port Set-Up Menu. The main WCC1100 Configuration screen is shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 9(WCC1100)

Managed Yes
link name To the WCC1100

Operational Modes <menu>

LAN <menu>
SFP <menu>
VCG <menu>
WAN <menu>

First CAPITAL - select item
<escape> - exit menu

3.3.6.1 Link Name

In order to assist identification of the link being configured a label may be applied. The label may be upto 32 characters.

3.3.6.2 Managed Mode

The WCC1100 should always be operated in managed mode to enable functions such as OAM, Management and Performance Monitoring.

3.3.6.2.1 Operational Modes

The Operational Mode allows the traffic streams to be un-modified, VLAN tagged or S-Tagged as they traverse the WCC1100.

The configuration menu is shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

OPERATIONAL MODES, SLOT 9(WCC1100)

VLAN Mode C-VLAN
Backplane VLANs 4095

backplane Counters <display>

Flow control Disabled
maX frame size 2048

Priority Trans <menu>

First CAPITAL - select item
<escape> - exit menu

3.3.6.2.1.1 VLAN Mode

The isolation mode selects which, if any, tagging is to be applied.

Options

C-VLAN	Packets entering a port are VLAN Tagged, or passed unmodified.
QinQ	Packets entering a port are S-Tag Tagged

3.3.6.2.1.2 Backplane VLANs

In order to manage remote units from a single management access to the MC12000, VLAN connections may be made using the 100M connection on the backplane.

Backplane VLANs also allow for inter card communication via the backplane.

For management purposes, only a single VLAN should be allocated, however for fan out, or inter card communications multiple VLAN's may be allocated.

Range: 1 to 4095

3.3.6.2.1.3 *Backplane Counters*

These statistics are available to verify the traffic flowing across the backplane to/from the WCC1100.

Metrodata MC12000 "MC12000"

Alarms: Major

Backplane Statistics, Slot 9

```
-----  
InOctets          27874602  
InUcastPkts       6435  
InNUcastPkts      368879  
InDiscards        15  
InErrors          0  
InUnknownProtos   0  
OutOctets         23225444  
OutUcastPkts      5526  
OutNUcastPkts     333346  
OutDiscards       0  
OutErrors         0
```

<Esc> - exit, C - clear, <Enter> - refresh

3.3.6.2.1.4 *Flow Control*

The WCM1100 supports IEEE802.3X pause frame based flow control as a congestion control mechanism. If this is enabled, then it will be advertised on all auto negotiating ports.

Options

Enabled	Advertise flow control on auto negotiating ports
Disabled	No flow control.

3.3.6.2.1.5 *Max Frame Size*

The max frame size defines the maximum frame size that will pass:

1524	Standard MAC, or single VLAN tagged frames
2050	Mini Jumbo Frames

Note, the WCC1100 does not support 10k jumbo frames.

3.3.6.2.1.6 *Priority Translation*

The priority translation is used to map the 64 levels of DSCP to the 8 levels of IEEE 802.1p priority, and also to map these priority levels to the 4 levels of priority queues available.

Metrodata MC12000 "MC12000"

Alarms: Major

PRIORITY TRANSLATION, SLOT 9(WCC1100)

pcp 6/7	DSCP 48-63
pcp 4/5	DSCP 32-47
pcp 2/3	DSCP 16-31
pcp 0/1	DSCP 0-15

Restore Defaults

First CAPITAL - select item
<escape> - exit menu

3.3.6.3 LAN Port Configuration

This menu allows configuration of the LAN interface

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 9(WCC1100), LAN

State	Up
link status	Down
max spEed	1000M
max Duplex	Full
Auto-negotiation	Enabled
negotiated	---
MDI/MDIX	Auto
Tagging & Priority	<menu>
OAM	<menu>
link Loss Fwding	Disabled
Counters	<display>

First CAPITAL - select item
<escape> - exit menu

3.3.6.3.1 State

This configuration item defines the administrative status for the LAN port.

Options:

Up	Port is enabled, Alarms are generated if required
Down	Port is disabled, no alarms generated

For normal operation, a port must be in the administrative Up state, however when ports are not connected they should be disabled to prevent them generating alarms.

3.3.6.3.2 Link Status

The Link Status item is a real time indication of the current state of the link.

Options:

Up	Link is UP, traffic may pass
Down	Link Down,

3.3.6.3.3 (Max) Speed

When Auto Negotiation is disabled, this sets the operating speed of the port. When Auto Negotiation is enabled, this setting defines the maximum speed to be advertised.

Options

1000M

100M

10M

3.3.6.3.4 (Max)Duplex

When Auto Negotiation is disabled, this sets the operating duplex mode of the port. When Auto Negotiation is enabled, this setting defines the maximum duplex to be advertised.

Options

Full

Half

3.3.6.3.5 Auto Negotiation

This configures the port for auto negotiation.

Options

Enabled Port will Auto Negotiate

Disabled Port is fixed

3.3.6.3.6 Negotiated

This display item shows the results of the auto negotiation process.

Options

----	Auto Negotiation not completed
1000M/FD	1000M, Full Duplex
100M/FD	100M, Full Duplex
100M/HD	100M, Half Duplex
10M/FD	10M, Full Duplex
10M/HD	10M, Half Duplex

3.3.6.3.7 MDI/MDIX

The RJ45 port may be configured to automatically sense the interface type and automatically configure itself for MDI or MDIX operation. This mode ensures a straight cable can always be used. Alternatively, the port mode may be fixed.

Options

Auto	Auto Detect the connection required
MDI	Present MDI for connection to Switch Port
MDIX	Present MDIX for connection to PC

3.3.6.3.8 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 9.LAN

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.6.3.8.1 *VLAN Allocation*

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.6.3.8.2 *Untagged*

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.6.3.8.3 *Default VLAN*

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.6.3.8.4 *Priority Source*

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.6.3.8.5 *Default Priority*

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.6.3.8.6 *Control C-VLAN*

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used on the WCC1100 LAN port, and may be ignored.

3.3.6.3.9 Counters

The WCC1100 provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.6.3.10 OAM

The WCC1100 offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC1100 Generates OAM PDU Requests

Passive WCC1100 Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

	Local Status	Local Support	Peer Mode	Peer MAC address	Peer VendorInfo	Peer Support
9.LAN	Fault	L				

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.6.4 SFP Configuration

This menu allows configuration of the SFP interface

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 9(WCC1100), SFP

sfp type	1000BASE-LX
State	Down
spEed	100M
Duplex	Full
Auto-negotiation	Disabled
sFP Management	<menu>

Tagging & Priority	<menu>
OAM	<menu>
link Loss Fwding	Disabled
Counters	<display>

First CAPITAL - select item
<escape> - exit menu

3.3.6.4.1 SFP Type

The SFP type shows a decode of the SFP EEPROM according to the SFP-MSA agreement. This shows a decode of bytes 3 to 10 of the EEPROM

For Gigabit Operation the valid types are

1000Base-SX	Multi Mode, 850nm
1000Base-LX	Single Mode, 1300nm

For 100M operation the valid types are

OC-3 Multi Mode
OC-3 Single Mode

Where other types of SFP are used, other decodes may be displayed. If the decode is not valid, then UNKNOWN will be shown, and where the SFP is not fitted, NOT FITTED will be shown.

3.3.6.4.2 State

This configuration item defines the administrative status for the SFP port.

Options:

- | | |
|------|---|
| Up | Port is enabled, Alarms are generated if required |
| Down | Port is disabled, no alarms generated |

For normal operation, a port must be in the administrative Up state, however when ports are not connected they should be disabled to prevent them generating alarms.

3.3.6.4.3 Link Status

The Link Status item is a real time indication of the current state of the link.

Options:

- | | |
|------|------------------------------|
| Up | Link is UP, traffic may pass |
| Down | Link Down, |

3.3.6.4.4 (Max)Speed

The speed setting selects the operating speed of the SFP port.

Options

- | | |
|-------|-----------------------------|
| 1000M | Use with 1000BaseX SFP |
| 100M | Use with OC-3/100BaseFX SFP |

3.3.6.4.5 Duplex

The duplex setting sets the Duplex mode of the SFP port. This is only valid for 100baseFX mode.

- | | |
|------|-------------|
| Full | Full Duplex |
| Half | Half Duplex |

3.3.6.4.6 Auto Negotiation

This configures the port for auto negotiation.

Options

Enabled	Port will Auto Negotiate
Disabled	Port is fixed

Note, 1000BaseX should always have auto negotiation enabled.

3.3.6.4.7 Negotiated

This display item shows the results of the auto negotiation process.

Options

----	Auto Negotiation not completed
1000M/FD	1000M, Full Duplex
100M/FD	100M, Full Duplex
100M/HD	100M, Half Duplex

3.3.6.4.7.1 SFP Management

The SFP management menu gives the user the option of displaying the SFP information including module details and when available the diagnostics information. The menu also allows the notifications to be defined to allow for traps and alarms to be generated based on the SFP diagnostic information.

The SFP management menu is shown below:

```
Metrodata MC12000 ""                               Alarms: none
SFP MANAGEMENT
Device Details      <display>
Notifications       <menu>
```

```
First CAPITAL - select item
<escape> - exit menu
```

3.3.6.4.7.1.1 Device Details

This menu displays further information regarding the SFP device:

Metrodata MC12000 "MC12000"

Alarms: Major

SFP Info

Interface: 9.SFP

Status	Type	Vendor	Part No.	Transmit Wavelength
Good	1000BASE-LX	HG GENUINE	MXPD-243S-G	1310nm

SFP Diagnostic Info

Diagnostic Item	Status	Current Value	Unit	Alarm Threshold High	Alarm Threshold Low	Warning Threshold High	Warning Threshold Low
Tx Power	OK	-6	dBm	-1	-11	-2	-8
Rx Power	OK	-5	dBm	-3	-19	-5	-17
Bias	OK	15.1	mA	60.0	1.0	50.0	1.0
Temp	OK	54	C	85	-5	80	0
Supply	OK	3.27	V	3.60	3.0	3.50	3.10

<Esc> - exit, <Enter> - refresh

Where the fitted SFP supports the extended diagnostic interface, the extra information is displayed.

3.3.6.4.7.1.2 Notifications

The Notifications menu allows traps and alarms to be generated based on alarms or warnings raised by the SFP diagnostic information.

The menu is shown below, with a common set up with traps/alarms enabled for the high temperature and low receive power.

Metrodata WCM3100 "WCM3100_Left"

Alarms: none

NOTIFICATIONS

1 - Temp High	Alarm & Warning
2 - Temp Low	None
3 - Supply High	None
4 - Supply Low	None
5 - Bias High	None
6 - Bias Low	None
7 - Tx Power High	None
8 - Tx Power Low	None
9 - Rx Power High	None
A - Rx Power Low	Alarm & Warning
B - SFP Removed	None
C - OTDR Fault	None

First CAPITAL - select item

<escape> - exit menu

The options for each notification setting is as follows:

None	Do not generate a trap or alarm for this diagnostic parameter
Alarm	Generate an alarm and trap when the Alarm threshold is exceeded.
Alarm & Warning	Generate an alarm and trap when either the Alarm or Warning threshold has been exceeded.

3.3.6.4.7.2 Counters

The WCC1100 provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.6.4.8 OAM

The WCC-Serial offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC1100 Generates OAM PDU Requests

Passive WCC1100 Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

```
-----  
      | Local   | Local   | Peer | Peer   | Peer   | Peer  
      | Status  | Support | Mode | MAC address | VendorInfo | Support  
-----+-----+-----+-----+-----+-----  
9.SFP   Fault           L
```

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.6.4.9 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 9.SFP

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.6.4.9.1 VLAN Allocation

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.6.4.9.2 Untagged

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.6.4.9.3 *Default VLAN*

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.6.4.9.4 *Priority Source*

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.6.4.9.5 *Default Priority*

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.6.4.9.6 *Control C-VLAN*

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used on the WCC1100 SFP port, and may be ignored.

3.3.6.5 WAN Configuration

The WAN configuration menu is used to define the physical layer parameters for the WAN port.

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 9(WCC1100), WAN

State	Up
Interface	E1 Unbal (BNC)
Timing	Internal
rx sensitivity	Short-haul
Framing	Framed
crc-4	Enabled
signalling	Disabled

First CAPITAL - select item
<escape> - exit menu

3.3.6.5.1 State

This menu item configures the ADMIN state of the WAN port. For normal operation the port must be in the UP state. Unused ports should be placed in the down state to prevent alarms being generated.

3.3.6.5.2 Interface

The Interface allows the user to select the WAN interface operating mode and type of physical presentation:

E1 Unbal (BNC)	75ohm, Coax presented on BNC connectors
E1 Balanced (RJ45)	120Ohm, Twisted Pair presented on RJ45
T1 (RJ45)	100Ohm, Twisted pair presented on RJ45

3.3.6.5.3 Timing

The WCC1100 WAN interface can operate with either

Internal	Use local oscillator for transmit timing
Loop	Use line receive timing for the transmit timing

3.3.6.5.4 Rx Sensitivity

For E1 interfaces, the receiver sensitivity may be increased to allow for greater cable loss, and therefore greater cable length support.

Short Haul

Long Haul

3.3.6.5.5 Framing

The E1 interface may be configured to operating in several framing modes as below

Unframed	No Framing
Framed	E1 G.704 / T1 ESF

3.3.6.5.6 CRC-4

The E1 framing may be extended with the CRC-4 multiframe to provide frame bit error detection capabilities:

3.3.6.5.7 Signalling

When the WCC1100 is used with a link supporting signaling in timeslot 16, the WCC1100 may be configured to avoid using the timeslot for payload data.

3.3.6.6 VCG Configuration

The VCG menu allows the frame encapsulation parameters to be configured for the transport of frames over the WAN port.

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 9(WCC1100), VCG

State	Up
Encapsulation	<menu>
LCAS/VCAT	Off
lcas statUs	<display>
Tagging & Priority	<menu>
OAM	<menu>
linK Loss Fwding	Disabled
Counters	<display>

First CAPITAL - select item
<escape> - exit menu

3.3.6.6.1 State

The state controls the administrative state of the interface. For normal operation the state must be up.

3.3.6.6.2 Encapsulation

This menu allows the configuration of the packet encapsulation mode for transporting packets across the WAN port.

Metrodata MC12000 "MC12000"

Alarms: Major

ENCAPSULATION, 9.VCG

Encapsulation	HDLC
HDLC FCS	16-bit
strip MAC FCS	Yes
paYload scrambler	Disabled
Priority Table	<menu>

First CAPITAL - select item
<escape> - exit menu

3.3.6.6.2.1 *Encapsulation*

The WCC1100 supports bit synchronous HDLC encapsulation for unframed, or framed interfaces, or alternatively X.86 LAPS or GFP byte synchronous modes for Framed interfaces.

3.3.6.6.2.1.1 HDLC

Only HDLC mode is supported on the WCC1100 when unframed interfaces are selected. HDLC may also be used for lower overhead when framed interfaces are used. HDLC uses flags (0x7E) and bit stuffing to transmit packets over the WAN interface. When operating in HDLC mode, there are several parameters which can be changed

3.3.6.6.2.1.1.1 *HDLC FCS*

When a packet is encapsulated a frame check sequence is added to the end of the packet to enable transmission error detection. The options here are

- | | |
|--------|--|
| 16 bit | A 16 bit FCS is calculated and added to the packet |
| 32 bit | A 32 bit FCS is calculated and added to the packet |

Both ends of the link **MUST** match otherwise traffic will not flow, For operation with an unmanaged WC product, 16 bit mode must be used.

3.3.6.6.2.1.1.2 *Strip MAC FCS*

A LAN packet is protected by a 32 bit FCS. Since the encapsulator will add an HDLC FCS it is possible to save bandwidth by removing the Ethernet FCS and recalculate at the far end.

Both ends of the link **MUST** match otherwise traffic will not flow, For operation with an unmanaged WC product, or previous software version MAC FCS Stripping mode must be used.

For greatest protection against errors, MAC stripping should be disabled and the frame FCS sent end to end to protect against any internal errors. This requires extra overhead, so it is a trade off between error protection and bandwidth.

3.3.6.6.2.1.1.3 Payload Scrambler

For security purposes and to ensure a good ones density an X⁴³ scrambler may be applied

Both ends of the link MUST match otherwise traffic will not flow, For operation with an unmanaged WC product, or previous software version the payload scrambling must be disabled

3.3.6.6.2.1.2 X.86

The WCC1100 offers X.86 LAPS encapsulation when used on a framed, byte synchronous interface. X.86 uses flags to delimit and pad, and appends a four byte header to the packet along with a 32 bit FCS. Additional options are:

3.3.6.6.2.1.2.1 Strip MAC FCS

A LAN packet is protected by a 32 bit FCS. Since the encapsulator will add an X.86 FCS it is possible to save bandwidth by removing the Ethernet FCS and recalculate at the far end.

Both ends of the link MUST match otherwise traffic will not flow.

3.3.6.6.2.1.2.2 Payload Scrambler

For security purposes and to ensure a good ones density an X⁴³ scrambler may be applied

Both ends of the link MUST match otherwise traffic will not flow.

3.3.6.6.2.1.3 GFP

The WCC1100 offers GFP encapsulation when used on a framed, byte synchronous interface. GFP uses idle packets to delimit and pad, and appends a four byte header to the packet along with a 32 bit FCS. Additional options are:

Metrodata MC12000 "MC12000"

Alarms: Major

ENCAPSULATION, 9.VCG

Encapsulation	GFP
GFP FCS	Enabled
strip MAC FCS	Yes
paYload scrambler	Enabled
Priority Table	<menu>

First CAPITAL - select item
<escape> - exit menu

3.3.6.6.2.1.3.1 GFP FCS

The GFP FCS, frame check sequence, may be added to the frame to provide error protection. The GFP FCS should always be enabled as this will allow the decapsulator to detect frame errors.

3.3.6.6.2.1.3.2 Strip MAC FCS

A LAN packet is protected by a 32 bit FCS. Since the encapsulator will add an GFP FCS it is possible to save bandwidth by removing the Ethernet FCS and recalculate at the far end.

Both ends of the link MUST match otherwise traffic will not flow.

3.3.6.6.2.1.3.3 Payload Scrambler

For security purposes and to ensure a good ones density an X⁴³ scrambler may be applied

Both ends of the link MUST match otherwise traffic will not flow.

3.3.6.6.2 *Priority Table*

The priority table allows the mapping of the 64 DSCP levels to the 8 levels of VLAN priority.

3.3.6.6.3 LCAS/VCAT

The WCC1100 is a single link device, and does not support LCAS/VCAT.

3.3.6.6.4 Counters

The WCC1100 provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

The WCC1100 VCG counters use the IfInUcastPkts / IfOutUcastPkt and IfInError counters for receive good packets, transmitted packets and received error packets.

3.3.6.6.5 OAM

The WCC1100 offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC-Serial Generates OAM PDU Requests

Passive WCC-Serial Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

```
-----
      | Local   | Local   | Peer | Peer   | Peer   | Peer
      | Status  | Support | Mode | MAC address | VendorInfo | Support
-----+-----+-----+-----+-----+-----+-----
9.VCG  ActiveLoc      L
```

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.6.6.6 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 9.VCG

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.6.6.6.1 *VLAN Allocation*

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.6.6.6.2 *Untagged*

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.6.6.3 *Default VLAN*

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.6.6.4 *Priority Source*

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.6.6.5 *Default Priority*

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.6.6.6 *Control C-VLAN*

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used WCC1100 VCG for transmission of OAM control frames.

3.3.7 WCC1400 / WCC1800

The WCC1400 or WCC1800 Module may be configured by selecting the Module Slot number at the Port Set-Up Menu. The main WCC1800 Configuration screen is shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 4(WCC1800)

Managed	Yes
link name	To the WCM-Serial

Operational Modes	<menu>
-------------------	--------

LAN	<menu>
SFP	<menu>
VCG	<menu>
WAN	<menu>

First CAPITAL - select item
<escape> - exit menu

3.3.7.1 Link Name

In order to assist identification of the link being configured a label may be applied. The label may be upto 32 characters.

3.3.7.2 Managed Mode

The WCC1800 should always be operated in managed mode to enable functions such as OAM, Management and Performance Monitoring.

3.3.7.2.1 Operational Modes

The Operational Mode allows the traffic streams to be un-modified, VLAN tagged or S-Tagged as they traverse the WCC1800.

The configuration menu is shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

OPERATIONAL MODES, SLOT 4(WCC1800)

VLAN Mode C-VLAN
Backplane VLANs 4095

backplane Counters <display>

Flow control Disabled
maX frame size 2048

Priority Trans <menu>

First CAPITAL - select item
<escape> - exit menu

3.3.7.2.1.1 VLAN Mode

The isolation mode selects which, if any, tagging is to be applied.

Options

C-VLAN	Packets entering a port are VLAN Tagged, or passed unmodified.
QinQ	Packets entering a port are S-Tag Tagged

3.3.7.2.1.2 Backplane VLANs

In order to manage remote units from a single management access to the MC12000, VLAN connections may be made using the 100M connection on the backplane.

Backplane VLANs also allow for intercard communication via the backplane.

For management purposes, only a single VLAN should be allocated, however for fan out, or intercard communications multiple VLAN's may be allocated.

Range: 1 to 4095

3.3.7.2.1.3 *Backplane Counters*

These statistics are available to verify the traffic flowing across the backplane to/from the WCC1800.

Metrodata MC12000 "MC12000"

Alarms: Major

Backplane Statistics, Slot 4

InOctets 27874602
InUcastPkts 6435
InNUcastPkts 368879
InDiscards 15
InErrors 0
InUnknownProtos 0
OutOctets 23225444
OutUcastPkts 5526
OutNUcastPkts 333346
OutDiscards 0
OutErrors 0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.7.2.1.4 *Flow Control*

The WCM1800 supports IEEE802.3X pause frame based flow control as a congestion control mechanism. If this is enabled, then it will be advertised on all auto negotiating ports.

Options

Enabled	Advertise flow control on auto negotiating ports
Disabled	No flow control.

3.3.7.2.1.5 *Max Frame Size*

The max frame size defines the maximum frame size that will pass:

1525	Standard MAC, or single VLAN tagged frames
2051	Mini Jumbo Frames

Note, the WCC1800 does not support 10k jumbo frames.

3.3.7.2.1.6 *Priority Translation*

The priority translation is used to map the 64 levels of DSCP to the 8 levels of IEEE 802.1p priority, and also to map these priority levels to the 4 levels of priority queues available.

Metrodata MC12000 "MC12000"

Alarms: Major

PRIORITY TRANSLATION, SLOT 4(WCC1800)

pcp 6/7	DSCP 48-63
pcp 4/5	DSCP 32-47
pcp 2/3	DSCP 16-31
pcp 0/1	DSCP 0-15

Restore Defaults

First CAPITAL - select item
<escape> - exit menu

3.3.7.3 LAN Port Configuration

This menu allows configuration of the LAN interface

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 4(WCC1800), LAN

State	Up
link status	Down
max spEed	1000M
max Duplex	Full
Auto-negotiation	Enabled
negotiated	---
MDI/MDIX	Auto
Tagging & Priority	<menu>
OAM	<menu>
link Loss Fwding	Disabled
Counters	<display>

First CAPITAL - select item
<escape> - exit menu

3.3.7.3.1 State

This configuration item defines the administrative status for the LAN port.

Options:

Up	Port is enabled, Alarms are generated if required
Down	Port is disabled, no alarms generated

For normal operation, a port must be in the administrative Up state, however when ports are not connected they should be disabled to prevent them generating alarms.

3.3.7.3.2 Link Status

The Link Status item is a real time indication of the current state of the link.

Options:

Up	Link is UP, traffic may pass
Down	Link Down,

3.3.7.3.3 (Max) Speed

When Auto Negotiation is disabled, this sets the operating speed of the port. When Auto Negotiation is enabled, this setting defines the maximum speed to be advertised.

Options

1000M

100M

10M

3.3.7.3.4 (Max)Duplex

When Auto Negotiation is disabled, this sets the operating duplex mode of the port. When Auto Negotiation is enabled, this setting defines the maximum duplex to be advertised.

Options

Full

Half

3.3.7.3.5 Auto Negotiation

This configures the port for auto negotiation.

Options

Enabled Port will Auto Negotiate

Disabled Port is fixed

3.3.7.3.6 Negotiated

This display item shows the results of the auto negotiation process.

Options

----	Auto Negotiation not completed
1000M/FD	1000M, Full Duplex
100M/FD	100M, Full Duplex
100M/HD	100M, Half Duplex
10M/FD	10M, Full Duplex
10M/HD	10M, Half Duplex

3.3.7.3.7 MDI/MDIX

The RJ45 port may be configured to automatically sense the interface type and automatically configure itself for MDI or MDIX operation. This mode ensures a straight cable can always be used. Alternatively, the port mode may be fixed.

Options

Auto	Auto Detect the connection required
MDI	Present MDI for connection to Switch Port
MDIX	Present MDIX for connection to PC

3.3.7.3.8 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 4.LAN

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.7.3.8.1 *VLAN Allocation*

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.7.3.8.2 *Untagged*

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.7.3.8.3 *Default VLAN*

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.7.3.8.4 *Priority Source*

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.7.3.8.5 *Default Priority*

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.7.3.8.6 *Control C-VLAN*

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used on the WCC1800 LAN port, and may be ignored.

3.3.7.3.9 Counters

The WCC1800 provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.7.3.10 OAM

The WCC1800l offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC1800 Generates OAM PDU Requests

Passive WCC1800 Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

	Local Status	Local Support	Peer Mode	Peer MAC address	Peer VendorInfo	Peer Support
4.LAN	Fault	L				

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.7.4 SFP Configuration

This menu allows configuration of the SFP interface

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 4(WCC1800), SFP

sfp type	1000BASE-LX
State	Down
spEed	100M
Duplex	Full
Auto-negotiation	Disabled
sFP Management	<menu>

Tagging & Priority	<menu>
OAM	<menu>
link Loss Fwding	Disabled
Counters	<display>

First CAPITAL - select item
<escape> - exit menu

3.3.7.4.1 SFP Type

The SFP type shows a decode of the SFP EEPROM according to the SFP-MSA agreement. This shows a decode of bytes 3 to 10 of the EEPROM

For Gigabit Operation the valid types are

1000Base-SX	Multi Mode, 850nm
1000Base-LX	Single Mode, 1300nm

For 100M operation the valid types are

OC-3 Multi Mode
OC-3 Single Mode

Where other types of SFP are used, other decodes may be displayed. If the decode is not valid, then UNKNOWN will be shown, and where the SFP is not fitted, NOT FITTED will be shown.

3.3.7.4.2 State

This configuration item defines the administrative status for the SFP port.

Options:

- | | |
|------|---|
| Up | Port is enabled, Alarms are generated if required |
| Down | Port is disabled, no alarms generated |

For normal operation, a port must be in the administrative Up state, however when ports are not connected they should be disabled to prevent them generating alarms.

3.3.7.4.3 Link Status

The Link Status item is a real time indication of the current state of the link.

Options:

- | | |
|------|------------------------------|
| Up | Link is UP, traffic may pass |
| Down | Link Down, |

3.3.7.4.4 (Max)Speed

The speed setting selects the operating speed of the SFP port.

Options

- | | |
|-------|-----------------------------|
| 1000M | Use with 1000BaseX SFP |
| 100M | Use with OC-3/100BaseFX SFP |

3.3.7.4.5 Duplex

The duplex setting sets the Duplex mode of the SFP port. This is only valid for 100baseFX mode.

- | | |
|------|-------------|
| Full | Full Duplex |
| Half | Half Duplex |

3.3.7.4.6 Auto Negotiation

This configures the port for auto negotiation.

Options

Enabled	Port will Auto Negotiate
Disabled	Port is fixed

Note, 1000BaseX should always have auto negotiation enabled.

3.3.7.4.7 Negotiated

This display item shows the results of the auto negotiation process.

Options

----	Auto Negotiation not completed
1000M/FD	1000M, Full Duplex
100M/FD	100M, Full Duplex
100M/HD	100M, Half Duplex

3.3.7.4.8 SFP Management

The SFP management menu gives the user the option of displaying the SFP information including module details and when available the diagnostics information. The menu also allows the notifications to be defined to allow for traps and alarms to be generated based on the SFP diagnostic information.

The SFP management menu is shown below:

```
Metrodata MC12000 ""                               Alarms: none
SFP MANAGEMENT
Device Details      <display>
Notifications       <menu>
```

```
First CAPITAL - select item
<escape> - exit menu
```

3.3.7.4.8.1 Device Details

This menu displays further information regarding the SFP device:

Metrodata MC12000 ""

Alarms: Major

SFP Info

Interface: 4.SFP

Status	Type	Vendor	Part No.	Transmit Wavelength
Good	1000BASE-LX	HG GENUINE	MXPD-243S-G	1310nm

SFP Diagnostic Info

Diagnostic Item	Status	Current Value	Unit	Alarm Threshold High	Alarm Threshold Low	Warning Threshold High	Warning Threshold Low
Tx Power	OK	-6	dBm	-1	-11	-2	-8
Rx Power	OK	-5	dBm	-3	-19	-5	-17
Bias	OK	15.1	mA	60.0	1.0	50.0	1.0
Temp	OK	54	C	85	-5	80	0
Supply	OK	3.27	V	3.60	3.0	3.50	3.10

<Esc> - exit, <Enter> - refresh

Where the fitted SFP supports the extended diagnostic interface, the extra information is displayed.

3.3.7.4.8.2 Notifications

The Notifications menu allows traps and alarms to be generated based on alarms or warnings raised by the SFP diagnostic information.

The menu is shown below, with a common set up with traps/alarms enabled for the high temperature and low receive power.

Metrodata WCM3100 "WCM3100_Left"

Alarms: none

NOTIFICATIONS

1 - Temp High	Alarm & Warning
2 - Temp Low	None
3 - Supply High	None
4 - Supply Low	None
5 - Bias High	None
6 - Bias Low	None
7 - Tx Power High	None
8 - Tx Power Low	None
9 - Rx Power High	None
A - Rx Power Low	Alarm & Warning
B - SFP Removed	None
C - OTDR Fault	None

First CAPITAL - select item

<escape> - exit menu

The options for each notification setting is as follows:

None	Do not generate a trap or alarm for this diagnostic parameter
Alarm	Generate an alarm and trap when the Alarm threshold is exceeded.
Alarm & Warning	Generate an alarm and trap when either the Alarm or Warning threshold has been exceeded.

3.3.7.4.9 Counters

The WCC1800 provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.7.4.10 OAM

The WCC1800 offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC-Serial Generates OAM PDU Requests

Passive WCC-Serial Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

```
-----  
      | Local   | Local   | Peer | Peer   | Peer   | Peer  
      | Status  | Support | Mode | MAC address | VendorInfo | Support  
-----+-----+-----+-----+-----+-----  
4.SFP  Fault          L
```

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.7.4.11 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 4.SFP

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.7.4.11.1 VLAN Allocation

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.7.4.11.2 Untagged

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.7.4.11.3 Default VLAN

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.7.4.11.4 Priority Source

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.7.4.11.5 Default Priority

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.7.4.11.6 Control C-VLAN

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used on the WCC1800 SFP port, and may be ignored.

3.3.7.5 WAN Port

The WCC1800 module has multiple E1 WAN ports and each must be selected and configured individually.

In most cases, the only WAN port configuration is to disable the unused ports to prevent them generating alarms.

WAN Port menu is as below:

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 4(WCC1800), WAN1

State	Up
Interface	E1 Unbal (BNC)
Timing	Internal
rx sensitivity	Short-haul
Framing	Framed
crc-4	Enabled
sigNalling	Disabled
VCG	1

First CAPITAL - select item
<escape> - exit menu

The available options are as below:

3.3.7.5.1 State

The state configuration defines the Administrative State of the WAN port. For normal operation it must be set to UP.

In applications where the WAN link is not used, the state should be set to Down to disable the alarm processing on the WAN port.

3.3.7.5.2 Interface

The E1 port physical interface is a fixed display item and displays the interface type fitted. The options are

Unbalanced (BNC)	E1 port operates in 75ohm, unbalanced mode presented on BNC connectors
Balanced (RJ45)	E1 port operates in 120ohm, balanced mode presented on the RJ45 connector.

3.3.7.5.3 Timing

The E1 port must be operated in internal timing mode to ensure all members of the VCG bonded group operate in a synchronous manner:

Internal	E1 Transmit Timing derived from the internal oscillator
----------	---

3.3.7.5.4 RX Sensitivity

The E1 port supports both short and long haul modes of operation. The Rx Sensitivity mode may be toggled between

Short Haul	max cable loss 12 dB
Long Haul	max cable loss 43 dB

3.3.7.5.5 Framing

The WAN port may be configured to operate in the following modes

Unframed	Clear channel, 2.048Mbps
Framed	G.704 Framed, 1.984Mbps payload
Fractional	G.704 Framed, Nx64

For VCG multiple link operation, Framed mode must be selected.

3.3.7.5.6 CRC-4

When operating in Framed or Fractional mode CRC-4 multiframe mode may be enabled or disabled.

For VCG multiple link operation, CRC-4 mode must be selected.

3.3.7.5.7 sigNalling

When operating in framed mode, the signaling option determines whether timeslot 16 is available for payload. With Signalling Enabled timeslot 16 is not used for payload giving a link capacity of 1.920Mbps rather than 1.984Mbps.

For VCG multiple link operation, Signalling mode must be disabled.

3.3.7.5.8 VCG

The VCG menu item displays which VCG bonding group this E1 link is a member of.

3.3.7.6 VCG Configuration

The WCC1800 supports up to 4 VCG's. Each VCG is a collection of 1 or more E1 WAN links combined to form a higher bandwidth aggregate connection.

The VCG menu allows the frame encapsulation parameters to be configured for the transport of frames over the WAN port.

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 4(WCC1800), VCG1

State	Up
Encapsulation	<menu>
LCAS/VCAT	Off
lcas statUs	<display>
WAN Allocation	1-8
Tagging & Priority	<menu>
OAM	<menu>
linK Loss Fwding	Disabled
Counters	<display>

First CAPITAL - select item
<escape> - exit menu

3.3.7.6.1 State

The state controls the administrative state of the interface. For normal operation the state must be up.

3.3.7.6.2 Encapsulation

This menu allows the configuration of the packet encapsulation mode for transporting packets across the WAN port.

Metrodata WCM1800 "WCM1800 Node A"

Alarms: Major

ENCAPSULATION, 4.VCG1

Encapsulation	GFP
GFP FCS	Enabled
strip MAC FCS	Yes
paYload scrambler	Enabled

Priority Table	<menu>
----------------	--------

First CAPITAL - select item
<escape> - exit menu

The WCM product range supports bit synchronous HDLC encapsulation for unframed, or framed interfaces, or alternatively X.86 LAPS or GFP byte synchronous modes for Framed interfaces.

For multi link operation, GFP should be selected.

3.3.7.6.2.1 *GFP*

The WCC1800 offers GFP encapsulation when used on a framed, byte synchronous interface. GFP uses idle packets to delimit and pad, and appends a four byte header to the packet along with a 32 bit FCS. Additional options are:

Metrodata MC12000 "MC12000"

Alarms: Major

ENCAPSULATION, 4.VCG1

Encapsulation	GFP
GFP FCS	Enabled
strip MAC FCS	Yes
paYload scrambler	Enabled

Priority Table	<menu>
----------------	--------

First CAPITAL - select item
<escape> - exit menu

3.3.7.6.2.2 *GFP FCS*

The GFP FCS, frame check sequence, may be added to the frame to provide error protection. The GFP FCS should always be enabled as this will allow the decapsulator to detect frame errors.

3.3.7.6.2.3 *Strip MAC FCS*

A LAN packet is protected by a 32 bit FCS. Since the encapsulator will add a GFP FCS it is possible to save bandwidth by removing the Ethernet FCS and recalculate at the far end.

Both ends of the link MUST match otherwise traffic will not flow.

3.3.7.6.2.4 *Payload Scrambler*

For security purposes and to ensure a good ones density an X⁴³ scrambler may be applied

Both ends of the link MUST match otherwise traffic will not flow.

3.3.7.6.3 HDLC

HDLC mode must be selected when single link VCG's are used over unframed, or fractional interfaces. HDLC uses flags (0x7E) and bit stuffing to transmit packets over the WAN interface. When operating in HDLC mode, there are several parameters which can be changed

3.3.7.6.3.1 HDLC FCS

When a packet is encapsulated a frame check sequence is added to the end of the packet to enable transmission error detection. The options here are

16 bit A 16 bit FCS is calculated and added to the packet

32 bit A 32 bit FCS is calculated and added to the packet

Both ends of the link **MUST** match otherwise traffic will not flow, For operation with an unmanaged WC product, 16 bit mode must be used.

3.3.7.6.3.2 Strip MAC FCS

A LAN packet is protected by a 32 bit FCS. Since the encapsulator will add an HDLC FCS it is possible to save bandwidth by removing the Ethernet FCS and recalculate at the far end.

Both ends of the link **MUST** match otherwise traffic will not flow, For operation with an unmanaged WC product, or previous software version MAC FCS Stripping mode must be used.

For greatest protection against errors, MAC stripping should be disabled and the frame FCS sent end to end to protect against any internal errors. This requires extra overhead, so it is a trade off between error protection and bandwidth.

3.3.7.6.3.3 *Payload Scrambler*

For security purposes and to ensure a good ones density an X⁴³ scrambler may be applied

Both ends of the link MUST match otherwise traffic will not flow, For operation with an unmanaged WC product, or previous software version the payload scrambling must be disabled

3.3.7.6.4 X.86

The WCM offers X.86 LAPS encapsulation when used on a framed, byte synchronous interface. X.86 uses flags to delimit and pad, and appends a four byte header to the packet along with a 32 bit FCS. Additional options are:

3.3.7.6.4.1 *Strip MAC FCS*

A LAN packet is protected by a 32 bit FCS. Since the encapsulator will add an HDLC FCS it is possible to save bandwidth by removing the Ethernet FCS and recalculate at the far end.

Both ends of the link MUST match otherwise traffic will not flow.

3.3.7.6.4.2 *Payload Scrambler*

For security purposes and to ensure a good ones density an X⁴³ scrambler may be applied

Both ends of the link MUST match otherwise traffic will not flow.

3.3.7.6.4.3 *Priority Table*

The priority table allows the mapping of the 64 DSCP levels to the 8 levels of VLAN priority.

3.3.7.6.5 LCAS/VCAT

The WCC1800 has 8 E1 interfaces, whilst the WCC1400 has 4 E1 interfaces. Using VCAT (Virtual Concatenation) allows the links to be bonded together to give a higher bandwidth link, .LCAS (Link Capacity Adjustment Scheme) allows failed links to be removed and the connection restored automatically.

The options are

- OFF Single Links only may be allocated to the VCG
- VCAT only Multiple links may be bonded together using VCAT, however, if any one link fails, the whole link will fail.
- VCAT + LCAS Multiple links may be bonded together using VCAT, and if any link fails, or additional links needs to be added, LCAS will make the adjustments automatically to maintain the link.

3.3.7.6.6 LCAS Status

The LCAS status display allows faults on the bonded link to be diagnosed. The status display is shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

LCAS Status

trib h/w vcg			outbound (source)				inbound (sink)				lom	
			sending		receiving		receiving		sending			
			sq	ctrl	mst	rsack	sq	ctrl	gid	mst	rsack	
1	0	1	0	norm	okay	0	0	norm	c3d3	okay	0	n
2	1	1	1	norm	okay	0	1	norm	c3d3	okay	0	n
3	2	1	2	norm	okay	0	2	norm	c3d3	okay	0	n
4	3	1	3	dnu	fail	0	15	norm	6f50	fail	0	y
5	4	1	4	norm	okay	0	4	norm	c3d3	okay	0	n
6	5	1	5	norm	okay	0	5	norm	c3d3	okay	0	n
7	6	1	6	norm	okay	0	6	norm	c3d3	okay	0	n
8	7	1	7	eos	okay	0	7	eos	c3d3	okay	0	n

<Esc> - exit, <Enter> - refresh

3.3.7.6.7 Counters

The WCC1800 provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

The WCC1800 VCG counters use the IfInUcastPkts / IfOutUcastPkt and IfInError counters for receive good packets, transmitted packets and received error packets.

3.3.7.6.8 OAM

The WCC1800 offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC1800 Generates OAM PDU Requests

Passive WCC1800 Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

	Local Status	Local Support	Peer Mode	Peer MAC address	Peer VendorInfo	Peer Support
4.VCG	ActiveLoc	L				

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.7.6.9 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 4.VCG

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.7.6.9.1 *VLAN Allocation*

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.7.6.9.2 *Untagged*

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.7.6.9.3 *Default VLAN*

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.7.6.9.4 *Priority Source*

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.7.6.9.5 *Default Priority*

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.7.6.9.6 *Control C-VLAN*

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is used on the WCC1800 VCG to direct the OAM traffic down the particular VCG. The control VLAN must be a member of the allocation for the VCG.

3.3.8 WCC3200

The WCC3200 Module may be configured by selecting the Module Slot number at the Data Port Set-Up Menu. The main WCC3200 Configuration screen is shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 3(WCC3200)

Managed Yes
link name E3 Fanout

Operational Modes <menu>

LAN <menu>
SFP <menu>
VCG <menu>
WAN <menu>

First CAPITAL - select item
<escape> - exit menu

3.3.8.1 Link Name

In order to assist identification of the link being configured a label may be applied. The label may be upto 32 characters.

3.3.8.2 Managed Mode

The WCC3200 should always be operated in managed mode to enable functions such as OAM, Management and Performance Monitoring.

3.3.8.2.1 Operational Modes

The Operational Mode allows the traffic streams to be un-modified, VLAN tagged or S-Tagged as they traverse the WCC3200.

The configuration menu is shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

OPERATIONAL MODES, SLOT 3(WCC3200)

VLAN Mode C-VLAN
Backplane VLANs 4095

backplane Counters <display>

Flow control Disabled
maX frame size 2048

Priority Trans <menu>

First CAPITAL - select item
<escape> - exit menu

3.3.8.2.1.1 VLAN Mode

The isolation mode selects which, if any, tagging is to be applied.

Options

C-VLAN	Packets entering a port are VLAN Tagged, or passed unmodified.
QinQ	Packets entering a port are S-Tag Tagged

3.3.8.2.1.2 Backplane VLANs

In order to manage remote units from a single management access to the MC12000, VLAN connections may be made using the 100M connection on the backplane.

Backplane VLANs also allow for inter card communication via the backplane.

For management purposes, only a single VLAN should be allocated, however for fan out, or inter card communications multiple VLAN's may be allocated.

Range: 1 to 4095

3.3.8.2.1.3 *Backplane Counters*

These statistics are available to verify the traffic flowing across the backplane to/from the WCC3200.

Metrodata MC12000 "MC12000"

Alarms: Major

Backplane Statistics, Slot 3

InOctets 27874602
InUcastPkts 6435
InNUcastPkts 368879
InDiscards 15
InErrors 0
InUnknownProtos 0
OutOctets 23225444
OutUcastPkts 5526
OutNUcastPkts 333346
OutDiscards 0
OutErrors 0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.8.2.1.4 *Flow Control*

The WCM3200 supports IEEE802.3X pause frame based flow control as a congestion control mechanism. If this is enabled, then it will be advertised on all auto negotiating ports.

Options

Enabled	Advertise flow control on auto negotiating ports
Disabled	No flow control.

3.3.8.2.1.5 *Max Frame Size*

The max frame size defines the maximum frame size that will pass:

1526	Standard MAC, or single VLAN tagged frames
2052	Mini Jumbo Frames

Note, the WCC3200 does not support 10k jumbo frames.

3.3.8.2.1.6 *Priority Translation*

The priority translation is used to map the 64 levels of DSCP to the 8 levels of IEEE 802.1p priority, and also to map these priority levels to the 4 levels of priority queues available.

Metrodata MC12000 "MC12000"

Alarms: Major

PRIORITY TRANSLATION, SLOT 2(WCC-SERIAL)

pcp 6/7	DSCP 48-63
pcp 4/5	DSCP 32-47
pcp 2/3	DSCP 16-31
pcp 0/1	DSCP 0-15

Restore Defaults

First CAPITAL - select item
<escape> - exit menu

3.3.8.3 LAN Port Configuration

This menu allows configuration of the LAN interface

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 3(WCC3200), LAN

State	Up
link status	Down
max spEed	1000M
max Duplex	Full
Auto-negotiation	Enabled
negotiated	---
MDI/MDIX	Auto
Tagging & Priority	<menu>
OAM	<menu>
link Loss Fwding	Disabled
Counters	<display>

First CAPITAL - select item
<escape> - exit menu

3.3.8.3.1 State

This configuration item defines the administrative status for the LAN port.

Options:

Up	Port is enabled, Alarms are generated if required
Down	Port is disabled, no alarms generated

For normal operation, a port must be in the administrative Up state, however when ports are not connected they should be disabled to prevent them generating alarms.

3.3.8.3.2 Link Status

The Link Status item is a real time indication of the current state of the link.

Options:

Up	Link is UP, traffic may pass
Down	Link Down,

3.3.8.3.3 (Max) Speed

When Auto Negotiation is disabled, this sets the operating speed of the port. When Auto Negotiation is enabled, this setting defines the maximum speed to be advertised.

Options

1000M

100M

10M

3.3.8.3.4 (Max)Duplex

When Auto Negotiation is disabled, this sets the operating duplex mode of the port. When Auto Negotiation is enabled, this setting defines the maximum duplex to be advertised.

Options

Full

Half

3.3.8.3.5 Auto Negotiation

This configures the port for auto negotiation.

Options

Enabled Port will Auto Negotiate

Disabled Port is fixed

3.3.8.3.6 Negotiated

This display item shows the results of the auto negotiation process.

Options

----	Auto Negotiation not completed
1000M/FD	1000M, Full Duplex
100M/FD	100M, Full Duplex
100M/HD	100M, Half Duplex
10M/FD	10M, Full Duplex
10M/HD	10M, Half Duplex

3.3.8.3.7 MDI/MDIX

The RJ45 port may be configured to automatically sense the interface type and automatically configure itself for MDI or MDIX operation. This mode ensures a straight cable can always be used. Alternatively, the port mode may be fixed.

Options

Auto	Auto Detect the connection required
MDI	Present MDI for connection to Switch Port
MDIX	Present MDIX for connection to PC

3.3.8.3.8 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 3.LAN

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.8.3.8.1 *VLAN Allocation*

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.8.3.8.2 *Untagged*

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.8.3.8.3 *Default VLAN*

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.8.3.8.4 *Priority Source*

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.8.3.8.5 *Default Priority*

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.8.3.8.6 *Control C-VLAN*

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used on the WCC3200 LAN port, and may be ignored.

3.3.8.3.9 Counters

The WCC3200 provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.8.3.10 OAM

The WCC3200 offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC3200 Generates OAM PDU Requests

Passive WCC3200 Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

	Local Status	Local Support	Peer Mode	Peer MAC address	Peer VendorInfo	Peer Support
3.LAN	Fault	L				

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.8.4 SFP Configuration

This menu allows configuration of the SFP interface

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 3(WCC3200), SFP

sfp type	1000BASE-LX
State	Down
spEed	100M
Duplex	Full
Auto-negotiation	Disabled
sFP Management	<menu>

Tagging & Priority	<menu>
OAM	<menu>
link Loss Fwding	Disabled
Counters	<display>

First CAPITAL - select item
<escape> - exit menu

3.3.8.4.1 SFP Type

The SFP type shows a decode of the SFP EEPROM according to the SFP-MSA agreement. This shows a decode of bytes 3 to 10 of the EEPROM

For Gigabit Operation the valid types are

1000Base-SX	Multi Mode, 850nm
1000Base-LX	Single Mode, 1300nm

For 100M operation the valid types are

OC-3 Multi Mode
OC-3 Single Mode

Where other types of SFP are used, other decodes may be displayed. If the decode is not valid, then UNKNOWN will be shown, and where the SFP is not fitted, NOT FITTED will be shown.

3.3.8.4.2 State

This configuration item defines the administrative status for the SFP port.

Options:

- | | |
|------|---|
| Up | Port is enabled, Alarms are generated if required |
| Down | Port is disabled, no alarms generated |

For normal operation, a port must be in the administrative Up state, however when ports are not connected they should be disabled to prevent them generating alarms.

3.3.8.4.3 Link Status

The Link Status item is a real time indication of the current state of the link.

Options:

- | | |
|------|------------------------------|
| Up | Link is UP, traffic may pass |
| Down | Link Down, |

3.3.8.4.4 (Max)Speed

The speed setting selects the operating speed of the SFP port.

Options

- | | |
|-------|-----------------------------|
| 1000M | Use with 1000BaseX SFP |
| 100M | Use with OC-3/100BaseFX SFP |

3.3.8.4.5 Duplex

The duplex setting sets the Duplex mode of the SFP port. This is only valid for 100baseFX mode.

- | | |
|------|-------------|
| Full | Full Duplex |
| Half | Half Duplex |

3.3.8.4.6 Auto Negotiation

This configures the port for auto negotiation.

Options

Enabled	Port will Auto Negotiate
Disabled	Port is fixed

Note, 1000BaseX should always have auto negotiation enabled.

3.3.8.4.7 Negotiated

This display item shows the results of the auto negotiation process.

Options

----	Auto Negotiation not completed
1000M/FD	1000M, Full Duplex
100M/FD	100M, Full Duplex
100M/HD	100M, Half Duplex

3.3.8.4.7.1 SFP Management

The SFP management menu gives the user the option of displaying the SFP information including module details and when available the diagnostics information. The menu also allows the notifications to be defined to allow for traps and alarms to be generated based on the SFP diagnostic information.

The SFP management menu is shown below:

Metrodata MC12000 "MC12000"

Alarms: none

SFP MANAGEMENT

Device Details <display>
Notifications <menu>

First CAPITAL - select item
<escape> - exit menu

3.3.8.4.7.1.1 Device Details

This menu displays further information regarding the SFP device:

Metrodata MC12000 "MC12000"

Alarms: Major

SFP Info

Interface: 3.SFP

Status	Type	Vendor	Part No.	Transmit Wavelength
Good	1000BASE-LX	HG GENUINE	MXPD-243S-G	1310nm

SFP Diagnostic Info

Diagnostic Item	Status	Current Value	Unit	Alarm Threshold High	Alarm Threshold Low	Warning Threshold High	Warning Threshold Low
Tx Power	OK	-6	dBm	-1	-11	-2	-8
Rx Power	OK	-5	dBm	-3	-19	-5	-17
Bias	OK	15.1	mA	60.0	1.0	50.0	1.0
Temp	OK	54	C	85	-5	80	0
Supply	OK	3.27	V	3.60	3.0	3.50	3.10

<Esc> - exit, <Enter> - refresh

Where the fitted SFP supports the extended diagnostic interface, the extra information is displayed.

3.3.8.4.7.1.2 Notifications

The Notifications menu allows traps and alarms to be generated based on alarms or warnings raised by the SFP diagnostic information.

The menu is shown below, with a common set up with traps/alarms enabled for the high temperature and low receive power.

Metrodata MC12000 "MC12000"

Alarms: none

NOTIFICATIONS

1 - Temp High	Alarm & Warning
2 - Temp Low	None
3 - Supply High	None
4 - Supply Low	None
5 - Bias High	None
6 - Bias Low	None
7 - Tx Power High	None
8 - Tx Power Low	None
9 - Rx Power High	None
A - Rx Power Low	Alarm & Warning
B - SFP Removed	None
C - OTDR Fault	None

First CAPITAL - select item

<escape> - exit menu

The options for each notification setting is as follows:

None	Do not generate a trap or alarm for this diagnostic parameter
Alarm	Generate an alarm and trap when the Alarm threshold is exceeded.
Alarm & Warning	Generate an alarm and trap when either the Alarm or Warning threshold has been exceeded.

3.3.8.4.7.2 Counters

The WCC3200 provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

3.3.8.4.8 OAM

The WCC3200 offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC3200 Generates OAM PDU Requests

Passive WCC3200l Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

	Local	Local	Peer	Peer	Peer	Peer
	Status	Support	Mode	MAC address	VendorInfo	Support
3.SFP	Fault	L				

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.8.4.9 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 3.SFP

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.8.4.9.1 VLAN Allocation

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.8.4.9.2 Untagged

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.8.4.9.3 *Default VLAN*

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.8.4.9.4 *Priority Source*

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.8.4.9.5 *Default Priority*

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.8.4.9.6 *Control C-VLAN*

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is not used on the WCC3200 SFP port, and may be ignored.

3.3.8.5 WAN Port

The WCC3200 has 2 E3/DS-3 WAN ports and the WAN Port menu is as below:

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 3(WCC3200), WAN1

State	Up
Interface	E3
Timing	Internal
Framing	G.832

First CAPITAL - select item
<escape> - exit menu

and when DS-3 is selected

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 3(WCC3200), WAN1

State	Up
Interface	DS3
Timing	Internal
tx line Build-Out	0-225ft
Framing	C-Bit

First CAPITAL - select item
<escape> - exit menu

The available options are as below:

3.3.8.5.1 State

The state configuration defines the Administrative State of the WAN port. For normal operation it must be set to UP.

In applications where the WAN link is not used, the state should be set to Down to disable the alarm processing on the WAN port.

3.3.8.5.2 Interface

The WAN port physical interface may be selected as below:

E3	The WAN port operates in E3, G.703 mode at 34.368Mbps. The interface can operate in G.832 Framed mode or clear channel, unframed mode.
DS-3	The WAN port operates in DS-3, G703 mode at 44.736Mbps. The interface can operate in C-Bit Framed mode or clear channel, unframed mode.

3.3.8.5.3 Timing

The WAN port may be operated in either:

Internal	Transmit Timing derived from the internal oscillator
Loop	Transmit Timing derived from the Receive Timing. Under loss of signal conditions, the timing will fall back to the local oscillator.

3.3.8.5.4 TX Line Build Out (DS-3 mode Only)

The DS-3 standard defines the wave shape at the far end of the cable and as such to prevent overdrive of a short cable run, the transmitter power may be reduced.

The line build out configures the interface to drive cables of differing lengths as below:

0 – 225ft	Set for Shorter cable runs
>225ft	Set for longer cable runs upto 450ft.

3.3.8.5.5 Framing

The WAN port may be configured to operate in the following modes

Unframed	Clear channel, E3 or DS-3
Framed	G.832 E3 / C-Bit DS-3

3.3.8.6 VCG Configuration

The VCG menu allows the frame encapsulation parameters to be configured for the transport of frames over the WAN port.

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 3(WCC3200), VCG1

State	Up
Encapsulation	<menu>
LCAS/VCAT	Off
lcas statUs	<display>
Tagging & Priority	<menu>
OAM	<menu>
linK Loss Fwding	Disabled
Counters	<display>

First CAPITAL - select item
<escape> - exit menu

3.3.8.6.1 State

The state controls the administrative state of the interface. For normal operation the state must be up.

3.3.8.6.2 Encapsulation

This menu allows the configuration of the packet encapsulation mode for transporting packets across the WAN port.

Metrodata MC12000 "MC12000"

Alarms: Major

ENCAPSULATION, 3.VCG1

Encapsulation	GFP
GFP FCS	Enabled
strip MAC FCS	Yes
paYload scrambler	Enabled
Priority Table	<menu>

First CAPITAL - select item
<escape> - exit menu

The WCC3200 supports bit synchronous HDLC encapsulation for unframed, or framed interfaces, or alternatively X.86 LAPS or GFP byte synchronous modes for Framed interfaces.

3.3.8.6.3 GFP

The WCC3200 offers GFP encapsulation when used on a framed, byte synchronous interface. GFP uses idle packets to delimit and pad, and appends a four byte header to the packet along with a 32 bit FCS. Additional options are:

Metrodata MC12000 "MC12000"

Alarms: Major

ENCAPSULATION, 3.VCG1

Encapsulation	GFP
GFP FCS	Enabled
strip MAC FCS	Yes
paYload scrambler	Enabled

Priority Table	<menu>
----------------	--------

First CAPITAL - select item
<escape> - exit menu

3.3.8.6.3.1 *GFP FCS*

The GFP FCS, frame check sequence, may be added to the frame to provide error protection. The GFP FCS should always be enabled as this will allow the decapsulator to detect frame errors.

3.3.8.6.3.2 *Strip MAC FCS*

A LAN packet is protected by a 32 bit FCS. Since the encapsulator will add a GFP FCS it is possible to save bandwidth by removing the Ethernet FCS and recalculate at the far end.

Both ends of the link **MUST** match otherwise traffic will not flow.

3.3.8.6.3.3 *Payload Scrambler*

For security purposes and to ensure a good ones density an X⁴³ scrambler may be applied

Both ends of the link MUST match otherwise traffic will not flow.

3.3.8.6.4 HDLC

HDLC mode must be selected when single link VCG's are used over unframed, or fractional interfaces. HDLC uses flags (0x7E) and bit stuffing to transmit packets over the WAN interface. When operating in HDLC mode, there are several parameters which can be changed

3.3.8.6.4.1 *HDLC FCS*

When a packet is encapsulated a frame check sequence is added to the end of the packet to enable transmission error detection. The options here are

16 bit A 16 bit FCS is calculated and added to the packet

32 bit A 32 bit FCS is calculated and added to the packet

Both ends of the link MUST match otherwise traffic will not flow, For operation with an unmanaged WC product, 16 bit mode must be used.

3.3.8.6.4.2 *Strip MAC FCS*

A LAN packet is protected by a 32 bit FCS. Since the encapsulator will add an HDLC FCS it is possible to save bandwidth by removing the Ethernet FCS and recalculate at the far end.

Both ends of the link MUST match otherwise traffic will not flow, For operation with an unmanaged WC product, or previous software version MAC FCS Stripping mode must be used.

For greatest protection against errors, MAC stripping should be disabled and the frame FCS sent end to end to protect against any internal errors. This requires extra overhead, so it is a trade off between error protection and bandwidth.

3.3.8.6.4.3 *Payload Scrambler*

For security purposes and to ensure a good ones density an X⁴³ scrambler may be applied

Both ends of the link MUST match otherwise traffic will not flow, For operation with an unmanaged WC product, or previous software version the payload scrambling must be disabled

3.3.8.6.5 X.86

The WCC3200 offers X.86 LAPS encapsulation when used on a framed, byte synchronous interface. X.86 uses flags to delimit and pad, and appends a four byte header to the packet along with a 32 bit FCS. Additional options are:

3.3.8.6.5.1 *Strip MAC FCS*

A LAN packet is protected by a 32 bit FCS. Since the encapsulator will add an HDLC FCS it is possible to save bandwidth by removing the Ethernet FCS and recalculate at the far end.

Both ends of the link MUST match otherwise traffic will not flow.

3.3.8.6.5.2 *Payload Scrambler*

For security purposes and to ensure a good ones density an X⁴³ scrambler may be applied

Both ends of the link MUST match otherwise traffic will not flow.

3.3.8.6.5.3 *Priority Table*

The priority table allows the mapping of the 64 DSCP levels to the 8 levels of VLAN priority.

3.3.8.6.6 LCAS/VCAT

The WCC3200 does not currently support LCAS/VCAT which will be an upgrade in a subsequent software release.

3.3.8.6.7 Counters

The WCC3200 provides the basic SNMP MIB-2 counters for the interface as shown

Metrodata MC12000 "MC12000"

Alarms: Major

Interface Statistics

ifInOctets	0
ifInUcastPkts	0
ifInNUcastPkts	0
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	0
ifOutDiscards	0
ifOutErrors	0

<Esc> - exit, C - clear, <Enter> - refresh

The WCC3200 VCG counters use the IfInUcastPkts / IfOutUcastPkt and IfInError counters for receive good packets, transmitted packets and received error packets.

3.3.8.6.8 OAM

The WCC3200 offers monitoring using IEEE802.3ah Link OAM. OAM is configured on a per port basis and may be configured as follows:

Options

Disabled

Active WCC3200 Generates OAM PDU Requests

Passive WCC3200 Waits for requests and then responds

When OAM is enabled, either active or passive, the current status may be displayed as below:

Metrodata MC12000 "MC12000"

Alarms: Major

OAM STATUS

	Local Status	Local Support	Peer Mode	Peer MAC address	Peer VendorInfo	Peer Support
3.VCG1	Active	Loc	L			

Remote Status

Not available

<Esc> - exit, <Enter> - refresh

3.3.8.6.9 Tagging and Priority

The tagging and priority menu is shown below, and allows the user to control how the traffic flows through the port:

Metrodata MC12000 "MC12000"

Alarms: Major

TAGGING & PRIORITY, 3.VCG1

vlan Alloc 1-255
Untagged Leave Untagged

Priority Source C-Tag, Default
Default Priority 0

Control C-VLAN 1

First CAPITAL - select item
<escape> - exit menu

3.3.8.6.9.1 *VLAN Allocation*

The VLAN allocation selects the range of valid VLAN ID's that may traverse this port.

The valid range is 1 to 4095.

Frames arriving with a VLAN ID outside of the allocated range will be discarded.

3.3.8.6.9.2 *Untagged*

The untagged action item defines what action should be taken when an untagged frame arrives at the port. The valid options are:

Leave Untagged	Simply pass the frame unmodified and allow un tagged frames
Discard	Discard untagged frames
Add Default Tag	When an untagged frame arrives at the port, it will have the port default VLAN tag pushed.

3.3.8.6.9.3 *Default VLAN*

When the untagged action is defined as Add Default Tag, the value specified as default VLAN will be pushed onto the frame.

The valid range is 1-4095, and must be a single value.

3.3.8.6.9.4 *Priority Source*

The priority source is used to determine the source of the priority value in the frames egress tag. The options are as below:

Default	Use the default port priority for all frames ingressing this port. This will overwrite any incoming tag PCP bits with the default value.
C-Tag, Default	For incoming tagged frames, use the priority PCP bits from the received tag, for untagged frames use the port default priority.
DSCP, Default	For incoming IP frames use the DSCP priority, with the translation to determine the PCP value. For non IP use the default value.
C-Tag, DSCP, Default	For incoming tagged frames, the priority will be taken from the tag PCP priority. For untagged frames, the DSCP value will be used, according to the priority translation setting where available, otherwise the port default priority setting will be used.

3.3.8.6.9.5 *Default Priority*

When no other priority source is available, the default priority value will be used for the pushed Tag.

Valid priority values are 0 to 7

3.3.8.6.9.6 *Control C-VLAN*

The control VLAN is intended for use by flow based protocols such as CFM, or L2CP when used on LAN or SFP ports. The control C-VLAN is used on the WCC3200 VCG to direct OAM to the correct link.

3.4 V.24 Setup

The V.24 setup menu configures the local terminal interface for the MC12000. The menu is shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

V.24 SET-UP

Usage	Console
Console set-up	<menu>

First CAPITAL - select item
<escape> - exit menu

3.4.1 Usage

When a service provider installs a unit on a customer site, it may be desirable to prevent local management access to the device. The MC12000 offers the option of disabling the terminal interface preventing access.

Options:

Console	Normal terminal interface available
Disabled	Terminal port disabled.

When the console is disabled, any attempt to access the MC12000 unit via the terminal port will receive the following prompt:

Console is disabled.

A disabled console may be restored by either cold starting the unit, or from a telnet/ssh management session.

3.4.2 Console Set Up

This menu defines the operating parameters of the terminal interface as shown:

Metrodata MC12000 "MC12000"

Alarms: Major

CONSOLE SET-UP

Terminal type	TTY
via Modem	No
Baud rate	19200 bps
Parity	None
Data bits	8
Stop bits	2
Load new config.	

First CAPITAL - select item
<escape> - exit menu

3.4.2.1 Terminal Type

The terminal type setting defines the output type of the user interface. There are 3 settings:

TTY	A simple terminal interface sent line by line with scrolling screens and no cursor control, or graphics
VT100	Enhanced display for VT100 emulation with highlighted characters, cursor control and graphic borders
ANSI	Enhanced Vt100 mode

3.4.2.2 via Modem

The MC12000 supports management access via a dial up modem. When a call is connected the terminal activates when DTR is raised by the modem, and will automatically disconnect when DTR is negated.

Options

No	Normal Terminal operation, 3 wire connection may be used
Yes	Hardware Control based interface, full RS-232 interface needed including DTR control signal

3.4.2.3 Baud Rate

This sets the baud rate for the terminal interface. The default setting is 19200baud.

The options are:

2400
4800
9600
19200

3.4.2.4 Parity

This sets the parity for the terminal interface. The default setting is None

The options are:

None
Odd
Even

3.4.2.5 Data Bits

This sets the number of data bits per character for the terminal interface. The default setting is 8.

The options are

8
7

3.4.2.6 Stop Bits

This sets the number of stop bits per character for the terminal interace. The default setting is 2.

The options are

2

1

3.4.2.7 Load New Config

Once the parameters for the terminal interface have all been configured, they must be loaded using the Load New Config command.

Once loaded, the new parameters will be in use, and the terminal emulator will also need to be changed to match the required settings.

3.5 Management Entity

The management entity menu defines the IP functionality of the MC12000 unit to enable remote management access.

Metrodata MC12000 "MC12000"

Alarms: Major

MANAGEMENT ENTITY

proXying	<menu>
intErface	<menu>
IP	<menu>
UDP	<menu>
tCp	<menu>
sNmp	<menu>
Telnet/SSH	<menu>
tFtp	<menu>
Ping	<display>

First CAPITAL - select item
<escape> - exit menu

3.5.1 Proxying

The MC12000 supports proxy mode management where a local unit acts as a proxy server and is configured with the IP address of the remote unit. The remote unit may be simply installed in proxy client mode and it will assume all IP configuration from the proxy server unit.

Proxying uses a proprietary extension to IEEE 802.3ah OAM and as such will only be available for direct connections between units.

Metrodata MC12000 ""

Alarms: Major

PROXYING

Mode	Disabled
------	----------

First CAPITAL - select item
<escape> - exit menu

3.5.1.1 Server Mode Proxy

Setting the mode to Server enables the MC12000 unit to act as a proxy server to a group of proxy clients attached to each of the ports. As a proxy server, the MC12000 unit will respond to ARP for remote proxy IP addresses and communicate using an in band management protocol with the client.

A client can be supported at the far end of each port of the unit, though in general, only remote units connected via the VCG will be managed as proxy clients. The proxy client set up menu is shown below:

Metrodata MC12000 ""

Alarms: Major

SLOT 1(FCC9000), SFP2

Proxying	Enabled
Host interface	Mgmt
DHCP	Off
IP address	169.254.42.50
Net mask	255.255.0.0

First CAPITAL - select item
<escape> - exit menu

Proxy mode management should be used where multiple VCG groups are used on the WCC3200 or WCM1800 modules to enable management of the remote devices. Otherwise, normal VLAN based management should be used.

3.5.1.1.1 Proxying

For each client, proxying may be either Enabled or disabled.

Enabled	Proxy mode active on this link,
Disabled	Proxy mode disabled on this link

3.5.1.1.2 Host Interface

This is a display item only and cannot be changed. It indicates that the proxy client will use the remote management interface.

3.5.1.1.3 DHCP

For each proxy client, DHCP may be enabled such that the IP address will be administered automatically, otherwise it may be disabled, for manual IP address setting.

3.5.1.1.4 IP Address

If DHCP is enabled, this will display the IP address served by the DHCP server, or if no server is available it will have the initial default IP address of 169.254.42.xx where xx is dependant upon which port the client is defined.

If DHCP is not enabled, enter the IP address for the remote device.

3.5.1.1.5 Network Mask

If DHCP is enabled, this will display the net mask served by the DHCP server, or if no server is available it will have the default net mask of 255.255.0.0.

If DHCP is not enabled, enter the required net mask for the remote device.

3.5.1.2 *Client Mode Proxy*

Client mode proxy should not be used on the MC12000.

3.5.2 Interface

The interface menu is used to define the IP parameters for the unit management entity as shown in the menu screen below:

Metrodata MC12000 "MC12000"

Alarms: Major

INTERFACE

State	Up
Phys. address	0:c0:81:0:14:55
DHCP	Off
IP addr	192.168.0.1
Net mask	255.255.255.0
AT table	<display>
sTats.	<display>
c-VLAN	None
QinQ/S-VLAN	0
802.1p priority	0
Override incoming	No

First CAPITAL - select item
<escape> - exit menu

3.5.2.1 State

This defines the administrative stat for the management entity. For management access this must be set to up.

3.5.2.2 Physical Address

The physical address is the unique MAC address assigned to this unit. This address will be of the form:

00:C0:81:xx:yy:zz where 00:C0:81 is the Metrodata OUI, and xx.yy.zz is the unit identifier

3.5.2.3 DHCP

The management entity can use DHCP for automatic IP address allocation, or it may be disabled for manual administration.

Options

ON	DHCP active, will try to get an IP address from a DHCP server, otherwise will use the default IP address 169.254.42.42
----	--

OFF DHCP inactive, manual setting of IP address required.

3.5.2.4 IP Address

If DHCP is enabled, this will display the IP address allocated, or the default unit address of 169.254.42.42 if no server can be found.

If DHCP is not available, enter the required IP address.

3.5.2.5 Network Mask

If DHCP is enabled, this will display the net mask allocated, or the default mask of 255.255.0.0 if no server can be found.

If DHCP is not available, enter the required net mask

3.5.2.6 AT Table

The AT table is a display of the ARP resolutions that the MC12000 unit has made as shown below:

Metrodata MC12000 ""

Alarms: Major

AT TABLE

IP Address	Ethernet Address	Age
192.168.100.48	0.19.99.46.b7.8d	13

<Esc> - exit, <Enter> - refresh

3.5.2.7 Statistics

The management interface provides a full set of MIB-2 IfTable statistics for the port as shown below:

Metrodata MC12000 ""

Alarms: Major

Interface Statistics -----

ifInOctets	12451
ifInUcastPkts	0
ifInNUcastPkts	141
ifInDiscards	0
ifInErrors	0
ifInUnknownProtos	0
ifOutOctets	0
ifOutUcastPkts	0
ifOutNUcastPkts	2
ifOutDiscards	0
ifOutErrors	0
ifOutQLen	0

<Esc> - exit, <Enter> - refresh

3.5.2.8 c-VLAN

Management access to the device may be tagged or untagged with a C-VLAN tag. This tag is supported in both C-VLAN and QinQ/S-VLAN mode of operation.

If no C-Tag is required enter 0 for None, otherwise enter the VLAN ID for the management connection in the range 1 to 4095.

3.5.2.9 QinQ/S-VLAN

When the device is in QinQ/S-VLAN mode, the management traffic will need to be configured with an S-Tag defined by either the Access port default tag setting, or the SVID used on a trunk port. The valid range is 1 to 4095.

3.5.2.10 802.1p Priority

When the Manager transmits a tagged packet, C-Tag, or S-Tag this priority setting is used as the PCP info in the tag.

The valid range is 0 to 7, with 7 being highest priority.

3.5.2.11 *Override Incoming*

The override incoming frame priority option allows management frames to be promoted to higher priority regardless of the incoming PCP tag value.

3.5.3 *IP*

The IP menu defines the layer 3 functionality for the manager interface and is shown below:

Metrodata MC12000 ""

Alarms: Major

IP

default TTL	32
DSCP priority	0
Routing table	<display>
Forwarding	Disabled
Stats.	<display>

First CAPITAL - select item
<escape> - exit menu

3.5.3.1 *Default TTL*

The default TTL setting is used as the TTL field in all management IP packets transmitted. The default value is 32. The TTL value is decremented at each router hop and is intended to prevent undelivered packets circulating the internet forever.

The valid range is 1 to 255

3.5.3.2 *DSCP Priority*

The configured DSCP value will be used in all IP frames transmitted by the manager. The permitted range is 0 to 63 and where DSCP priority is used, should be set to match the high priority setting of the network to prevent management traffic packet loss.

3.5.3.3 Routing Table

Where management frames are destined for IP subnets that are not part of the local subnet, a router must be used. To assist the manager in understanding how to route frames to remote subnets, the IP routing table gives directions on how to reach each remote destination.

The routing table with a default route added automatically by DHCP is shown below:

Metrodata MC12000 "MC12000"							Alarms: Major
Destination	Next Hop	I/f	Type	Prot.	Age		Mask
192.168.100.0	0.0.0.0	Mgmt	direct	local	1653	255.255.255.0	
0.0.0.0	192.168.100.113	Mgmt	indirect	local	1653	0.0.0.0	

A - add entry
D - delete entry
any other key to exit:

3.5.3.3.1 Add a new Route

To add a new route, simply select Add Entry, and then enter the remote subnet, net mask and next hop router address as shown below

Metrodata MC12000 "MC12000"							Alarms: Major
Destination	Next Hop	I/f	Type	Prot.	Age		Mask
192.168.100.0	0.0.0.0	Mgmt	direct	local	1772	255.255.255.0	
0.0.0.0	192.168.100.113	Mgmt	indirect	local	1772	0.0.0.0	

A - add entry
D - delete entry
any other key to exit:
Add route.
Destination: 192.168.0.0
Mask: 255.255.255.0
Next-hop: 192.168.100.229

Metrodata MC12000 "MC12000"							Alarms: Major
Destination	Next Hop	I/f	Type	Prot.	Age		Mask
192.168.100.0	0.0.0.0	Mgmt	direct	local	1877	255.255.255.0	
0.0.0.0	192.168.100.113	Mgmt	indirect	local	1877	0.0.0.0	
192.168.0.0	192.168.100.229	Mgmt	indirect	local	0	255.255.255.0	

A - add entry
D - delete entry
any other key to exit:

3.5.3.3.2 Delete a Route

To delete a routing table entry, select delete entry and enter the IP address of the subnet you wish to delete along with the net mask as shown

```
Metrodata MC12000 "MC12000"
Destination      Next Hop          I/f  Type      Prot.  Age      Alarms: Major
-----
192.168.100.0    0.0.0.0           Mgmt direct   local  2019     255.255.255.0
0.0.0.0          192.168.100.113  Mgmt indirect local  2019     0.0.0.0
192.168.0.0      192.168.100.229  Mgmt indirect local  142      255.255.255.0
```

```
A - add entry
D - delete entry
any other key to exit:
Delete route.
Destination: 192.168.0.0
Mask: 255.255.255.0
```

```
Metrodata MC12000 "MC12000"
Destination      Next Hop          I/f  Type      Prot.  Age      Alarms: Major
-----
192.168.100.0    0.0.0.0           Mgmt direct   local  2032     255.255.255.0
0.0.0.0          192.168.100.113  Mgmt indirect local  2032     0.0.0.0
```

```
A - add entry
D - delete entry
any other key to exit:
```

3.5.3.4 Forwarding

For products that provide a routing function, forwarding enables packets to be forwarded between IP subnets, the MC12000 product range does not support routing and as such forwarding is fixed as disabled.

3.5.3.5 Statistics

The Management IP Layer provides a comprehensive list of the IP and ICMP layer statistics for assistance when diagnosing problems or monitoring performance in the network.

The available statistics are shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

IP Statistics

ipInReceives	843
ipInHdrErrors	0
ipInAddrErrors	1
ipForwDatagrams	0
ipInUnknownProtos	0
ipInDiscards	0
ipInDelivers	842
ipOutRequests	2
ipOutDiscards	0
ipOutNoRoutes	0
ipReasmReqds	0
ipReasmOKs	0
ipReasmFails	0
ipFragOKs	0
ipFragFails	0
ipFragCreates	0
ipRoutingDiscards	0

press any key to continue

icmpInMsgs	0
icmpInErrors	0
icmpInDestUnreachs	0
icmpInTimeExcds	0
icmpInParmProbs	0
icmpInSrcQuenchs	0
icmpInRedirects	0
icmpInEchos	0
icmpInEchoReps	0
icmpInTimestamps	0
icmpInTimestampReps	0
icmpInAddrMasks	0
icmpInAddrMaskReps	0
icmpOutMsgs	0
icmpOutErrors	0
icmpOutDestUnreachs	0
icmpOutTimeExcds	0
icmpOutParmProbs	0
icmpOutSrcQuenchs	0
icmpOutRedirects	0

press any key to continue

icmpOutEchos	0
icmpOutEchoReps	0
icmpOutTimestamps	0
icmpOutTimestampReps	0
icmpOutAddrMasks	0
icmpOutAddrMaskReps	0

press any key to continue

3.5.4 UDP

The UDP menu displays the port numbers used for SNMP Get and Set operations as well as for Trap operation. These should not be altered.

Metrodata MC12000 ""

Alarms: Major

UDP

snmp Port	161
snmp Trap port	162
Stats.	<display>

First CAPITAL - select item
<escape> - exit menu

3.5.4.1 Statistics

The UDP statistics menu displays the UDP statistics available in SNMP MIB-2 for a UDP interface.

Metrodata MC12000 ""

Alarms: Major

UDP Statistics

udpInDatagrams	940
udpNoPorts	929
udpInErrors	0
udpOutDatagrams	2

press any key to continue

3.5.5 TCP

The TCP menu is shown below:

Metrodata MC12000 ""

Alarms: Major

TCP

Stats.	<display>
Conn table	<display>

First CAPITAL - select item
<escape> - exit menu

3.5.5.1 Statistics

The statistics menu displays the SNMP MIB-2 IfTable TCP statistics as shown:

```
Metrodata MC12000 ""                                     Alarms: Major
TCP Statistics
-----
tcpActiveOpens      1
tcpPassiveOpens     0
tcpAttemptFails     0
tcpEstabResets      0
tcpInSegs           13
tcpOutSegs          7
tcpRetransSegs      0
tcpInErrs           0
tcpOutRsts          0

press any key to continue
```

3.5.5.2 Connection Table

The Connection table displays a list, and status of TCP connections to the management entity of the MC12000 device.

```
Metrodata MC12000 ""                                     Alarms: Major

  TCP CONNECTION TABLE
  -----
  State      LocalAddress  Loc Port  RemAddress  Rem Port
  -----
established 192.168.100.39  23        192.168.100.48  3665
```

<Esc> - exit, <Enter> - refresh

Note, a maximum of four simultaneous TCP Telnet or SSH sessions may be opened at any one time, further attempts to open sessions will lead to the session being rejected. When enabled, TACACS+ always has a session available for use so cannot be locked out.

3.5.6 *SNMP Management*

The MC12000 needs to be configured with the details of the SNMP Network Management Station before the unit will generate traps, or respond to SNMP polls.

The SNMP parameters are configured using the SNMP menu found under the Management menu

```
Metrodata MC12000 ""                               Alarms: Major

SNMP

Read community      public
Write community     public
Trap community      public
Managers            <menu>
contact Person      Metrodata Limited,Fortune House,
                   Crabtree Office Village,Eversl..

Node name
Location
Stats.              <display>
trap Alarms         <menu>


First CAPITAL - select item
<escape> - exit menu
```

3.5.6.1 *Read/Write/Trap Community*

To provide a level of security, communities are used to control access to the unit via SNMP. Separate communities may be configured for Read/Write or Trap access.

3.5.6.2 *Contact Person*

The contact person is the SNMP MIB-2 system SysContact parameter, the default setting is:

Metrodata Limited, Fortune House, Eversley Way, Egham, Surrey, TW20 8RY

The parameter may be up to 255 characters and should be configured to reflect the actual installation requirements.

3.5.6.3 Node Name

The node name is the SNMP MIB-2 system SysName parameter. By default this entry is blank. The parameter may be up to 255 characters and should be configured to reflect the actual installation requirements.

3.5.6.4 Location

The location is the SNMP MIB-2 system SysLocation parameter. By default this entry is blank. The parameter may be up to 255 characters and should be configured to reflect the actual installation requirements.

3.5.6.5 Managers

To enable access to the MC12000 using SNMP, specific manager addresses must be configured. Once a Manager is assigned, the MC12000 will respond to polls and generate traps for that manager. The MC12000 supports up to 10 configured Network Management Stations.

The Add Manager Menu is as below:

```
Metrodata MC12000 "MC12000"                               Alarms: Major

  2 - 192.168.100.38

  IP address          192.168.100.38
  Access rights       Read-Write
  receives Traps      Yes
  snmp Version        SNMPv2c

  Remove manager

  First CAPITAL - select item
  <escape> - exit menu
```

The IP address is the IP address of the assigned Network Management Station.

The Access Rights supported are:

None	No Access
Read Only	Only SNMP GET access is allowed
Read-Write	SNMP GET/SET access allowed

The Receive Traps parameter determines whether, under alarm conditions, Traps should be sent to this Network Manager.

3.5.6.6 Statistics

The MC12000 management entity provides a set of SNMP MIB-2 IfTable SNMP statistics for the interface:

```
Metrodata MC12000 ""                      Alarms: Major
SNMP Statistics
-----
snmpInPkts                0
snmpOutPkts               0
snmpInBadVersions         0
snmpInBadCommunityNames  0
snmpInBadCommunityUses    0
snmpInASNParseErrs        0
snmpInTooBigs             0
snmpInNoSuchNames         0
snmpInBadValues           0
snmpInReadOnlys           0
snmpInGenErrs             0
snmpInTotalReqVars        0
snmpInTotalSetVars        0
snmpInGetRequests         0
snmpInGetNexts            0
snmpInSetRequests         0
snmpInGetResponses        0
snmpInTraps               0

press any key to continue:

snmpOutTooBigs            0
snmpOutNoSuchNames        0
snmpOutBadValues          0
snmpOutGenErrs            0
snmpOutGetRequests        0
snmpOutGetNexts           0
snmpOutSetRequests        0
snmpOutGetResponses        0
snmpOutTraps              0

press any key to continue
```

3.5.6.7 Trap Alarms

The WCM units have a large number of interfaces, all with a large number of alarms and possible sources of trap generation. This menu allows the individual alarm conditions to be defined as to whether they will force a trap to be generated or not.

There is a separate configuration menu for each port type within the unit as shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

TRAP ALARMS

- 1 - 1(FCC9000) <menu>
- 2 - 2(WCC-Serial) <menu>
- 3 - 3(WCC3200) <menu>
- 4 - 4(WCC1800) <menu>

First CAPITAL - select item
<escape> - exit menu

3.5.6.7.1 LAN Port Trap Definitions

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 1(FCC9000), LAN

- 1 - LKDN Trap
- 3 - LLF Trap
- 5 - OAM Trap
- 6 - CFM Trap

First CAPITAL - select item
<escape> - exit menu

The alarm definitions for the LAN port are as follows

LKDN	Link Down
LLF	Port in Link Loss Forwarding State
OAM	Loss of OAM (802.3ah) contact with peer device
CFM	Loss of CFM (802.1ag) contact with peer MEP

3.5.6.7.2 SFP Port Trap Definitions

Metrodata MC12000 ""

Alarms: Major

SLOT 1(FCC9000), SFP1

0 - LOS	Trap
1 - LKDN	Trap
2 - NF	Trap
3 - LLF	Trap
4 - FEFI	Trap
5 - OAM	Trap
6 - CFM	Trap
7 - SFPA	Trap
8 - SFPW	Trap
9 - OTDR	No trap

First CAPITAL - select item
<escape> - exit menu

The alarm definitions for the SFP port are as follows

LOS	Loss of Optical Signal
LKDN	Link Down
NF	SFP not fitted
LLF	Port in Link Loss Forwarding State
FEFI	Far end Fault Indication received (100BaseFX only)
OAM	Loss of OAM (802.3ah) contact with peer device
CFM	Loss of CFM (802.1ag) contact with peer MEP
SFPA	SFP Diagnostic Alarm Threshold Alarm
SFPW	SFP Diagnostic Warning Threshold Alarm

3.5.6.7.3 VCG Port Trap Defintions

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 2(WCC-SERIAL), VCG

1 - LKDN	Trap
3 - LLF	Trap
4 - DEG	Trap
5 - OAM	Trap
6 - CFM	Trap

First CAPITAL - select item
<escape> - exit menu

The alarm definitions for the VCG port are as follows

LKDN	Link Down
LLF	Port in Link Loss Forwarding State
DEG	One or more links in multi link VCG failed
OAM	Loss of OAM (802.3ah) contact with peer device
CFM	Loss of CFM (802.1ag) contact with peer MEP

3.5.6.7.4 WAN Port Trap Defintions

Metrodata MC12000 "MC12000"

Alarms: Major

SLOT 3(WCC3200), WAN1

0 - LOS	Trap
1 - LOF	Trap
2 - BOOS	Trap
3 - AIS	Trap
4 - RAI	Trap
9 - DNU	Trap
A - LOM	Trap

First CAPITAL - select item
<escape> - exit menu

The alarm definitions for the WAN port are as follows

LOS	Loss of Signal
LOF	Loss of Frame
AIS	All 1's Received
RAI	Remote Alarm Indication
LOM	Loss of VCAT Multiframe Alignment
BOOS	BERT out of sync
DNU	Port in LCAS DNU (Do not Use) State

3.5.7 Telnet / SSH

The MC12000 unit allows remote management by either TELNET or the more secure, encrypted SSH V2. This menu configures the device for remote management access as shown:

Metrodata MC12000 ""

Alarms: Major

TELNET/SSH

Access Method	Telnet
Timeout	60

First CAPITAL - select item
<escape> - exit menu

3.5.7.1 Access Method

The Access method allows for selection between Telnet and SSH V2. When SSH is selected, Telnet access is not permitted.

3.5.7.2 Timeout

To prevent a management session from being left open permanently with associated security risks, an inactivity timeout is applied to the connection for both Telnet and SSH.

If there is no activity detected during the timeout period, the management session will be closed by the MC12000 unit.

Note, that for SSH keep alive packet reception will not maintain the session, only data transfer packets will count.

The timeout is defined in seconds, in the range 1 to 900. The default value of 60 is usually too short for normal use, however and a value of 600 (5 minutes is usually more suitable)

For testing, a timeout of 0 may be used which disables the timeout. This should be avoided with real unit deployments as this will prevent sessions timing out, and may lead to a user being locked out as the 4 TCP session limit is reached.

3.5.8 TFTP

The MC12000 may be upgraded in the field using TFTP to upgrade the application software, or to save or load the configuration.

In networks where firewalls and NAT addressing is used server mode must be used otherwise either client or sever mode may be used.

3.5.8.1 TFTP Configuration

Under the management menu, select TFTP and enter the parameters as required:

3.5.8.1.1 Client Mode

Select client mode to display the menu as below:

Metrodata MC12000 ""

Alarms: Major

TFTP

Mode	Client
remote IP	192.168.0.100
Get new software	<display>
Boot s/w upgrade	<display>
get Config.	
Put config.	
put Report	

First CAPITAL - select item
<escape> - exit menu

3.5.8.1.1.1 Remote IP

This defines the IP address of the TFTP server which will be used.

3.5.8.1.1.2 *Get New Software*

The Get New Software option is selected for performing a main application code update. Following the Get New Software option the warning message below will appear:

Metrodata MC12000 ""

Alarms: Major

TFTP Software Upgrade

CAUTION: Proceeding further will mean that the unit must be re-started, and the performance log may be cleared, even if the upgrade is unsuccessful. Are you sure you wish to continue?

If you wish to proceed, then confirm Y, and then enter the file name of the application software to download:

File name: MC12000.819

Whilst the download takes place, the current block received count will increase to indicate that the download is happening.

Once the file is downloaded

File name: MC12000.819

Blocks received: 3939

File received successfully, length 2016261.

File contains:

Unit Description: MC12000

Software Version: 8.19.[mh].1.78 22/03/2013 12:42:28 unreleased

This will replace:

Unit Description: wcm1100

Software Version: 8.19.[mh].1.77 22/03/2013 12:42:28 unreleased

The software will now be updated.

Are you sure this is what you want to do?

If the correct file has been downloaded, and you wish to proceed with the update confirm the prompt with Y. At this point the firmware will be programmed into the non volatile flash after which point the unit will reboot and reload the updated application.

Software upgrade is a failsafe process with a dual copy of the application being stored in flash. The primary copy stored is the version that was shipped from the factory and is NEVER erased, software upgrades are loaded into a secondary storage area.

3.5.8.1.1.3 *Boot S/W Upgrade*

Unfortunately it is sometimes necessary to update the boot loader firmware in the WCM device to enable certain functions. The upgrade to V8.19 is one such version where changes to the boot loader were necessary.

Please note, the boot firmware update procedure is not failsafe, and as such it is important that a unit is not powered down, or restarted during the update process.

The Boot S/W update option is selected for performing a boot code update. Following the Boot S/W update option the warning message below will appear:

Metrodata MC12000 ""

Alarms: Major

TFTP Software Upgrade

CAUTION: Proceeding further will mean that the unit must be re-started, and the performance log may be cleared, even if the upgrade is unsuccessful. Are you sure you wish to continue?

If you wish to proceed, then confirm Y, and then enter the file name of the boot software to download:

File name: MC12000b.819

Whilst the download takes place, the current block received count will increase to indicate that the download is happening.

Once the file is downloaded

File name: MC12000b.819

Blocks received: 4057

File received successfully, length 131074.
The software will now be updated.
Are you sure this is what you want to do?

If the correct file has been downloaded, and you wish to proceed with the update confirm the prompt with Y. At this point the firmware will be programmed into the non volatile flash after which point the unit will reboot and reload the updated application.

WARNING : DO NOT POWER THE MC12000 DOWN AT THIS POINT UNTIL THE BOOT UPGRADE PROCEDURE HAS COMPLETED AND THE UNIT REBOOTED.

3.5.8.1.1.4 *Get Configuration File*

If a configuration file exists on a central server it may be loaded onto a unit using TFTP through the Get Config menu option. At the prompt enter the required filename.

```
Enter file name, then wait
> mc12000.cfg
```

Once the file has downloaded, the unit will save it to the non volatile EEPROM and will then reboot and restart with the new configuration file loaded.

3.5.8.1.1.5 *Put Configuration File*

When a MC12000 unit has been configured, the configuration file may be saved to a central server using TFTP. To store the configuration file, select Put Config and then enter the file name when requested:

```
Enter file name, then wait
> mc12000.cfg
Transfer complete. Any key to continue.
```

3.5.8.1.1.6 *put Report*

For units that support SAM service validation tests, the put report option will allow the generated service birth certificate to be uploaded. This is not supported on the MC12000 units.

3.5.8.1.2 Server Mode

Select SERVER mode to display the menu as below:

```
Metrodata MC12000 ""                               Alarms: Major

TFTP

Mode                Server
remote IP           192.168.100.70
Software file name   software
Config. file name    config

First CAPITAL - select item
<escape> - exit menu
```

In server mode, the transfer is initiated from an external client. If the file downloaded matches that configured for Software or Config then they will be used to upgrade the software or configuration.

To use TFTP, the IP address of the remote server must be entered.

For security reasons, it is recommended to change the default settings for software and config file names to prevent unauthorised updates.

To initiate a TFTP transfer from a windows PC, select a DOS window and then type the command

```
tftp -i "MC12000 IP Address" put "Source Filename" "Software File Name"
```

eg

```
tftp -i 192.168.0.1 put MC12000.819 software
```

Which will load a file named "MC12000.819" onto the MC12000 with IP address 192.168.0.1 and load as a file called "software"

3.5.8.2 Ping

Ping is a simple IP/ICMP utility that enables the management connectivity to be verified. Simply enter the IP address of the remote unit and ping will repeatedly send an ICMP Echo request, as shown below:

```
Metrodata MC12000 ""  
Destination: 192.168.100.70  
press any key to stop test  
sending...okay, time=1.7ms  
sending...okay, time=1.0ms  
sending...okay, time=0.9ms
```

Alarms: Major

3.6 Saving the Configuration

Once the MC12000 has been configured, the configuration must be saved to the EEPROM to provide non-volatile storage.

Metrodata MC12000 ""

Alarms: Major

MAIN SET-UP

Global status <display>
alarm eXtension <menu>

Operational Modes <menu>
Port set-up <menu>
V.24 set-up <menu>
Management Entity <menu>
System <menu>
Update EEPROM

circuit/flow Tests <menu>

performance Data <menu>

First CAPITAL - select item
<escape> - exit menu

To save the configuration, select "Update EEPROM" from the Main Setup Menu. At the prompt, respond <Y> and the configuration will be saved.

If the configuration is changed and not saved to EEPROM, the configuration will be lost at the next restart, whether a warm start or power cycle.

3.7 Global Status

The global status screen provides an overview of the status of the entire MC12000 unit and all modules contained within it. The Global Status screen is shown below:

Metrodata MC12000 "MC12000"

Alarms: Major

PSU1 ok
PSU2 REMOVED

GLOBAL STATUS

History last cleared:
-

Sl	Card	Man	Tst	Port	Status	Port	Status	Port	Status	Port	Status
1	FCC9000	Yes	No	1.LAN	LKDN	1.SFP1	NF				
2	WCC-Seria	Yes	No	LAN	LKDN	VCG	OAM	WAN	LKDN		
3	WCC3200	Yes	No	LAN	LKDN	SFP	NF	VCGs	OAM	WAns	LOS
4	WCC1800	Yes	No	LAN	LKDN	SFP		VCGs	DEG	WAns	LOS
6	WCC1800	Yes	No	LAN	LKDN	SFP		VCGs	LKDN	WAns	LOS
8	FCC9000	Yes	No	1.LAN	LKDN						
				2.SFP1	NF						
9	WCC1100	Yes	No	LAN	LKDN	SFP	NF	VCGs	-	WAns	LOS

<Esc> - exit, H - clear hist, S - summary, 1-C - card status, <Enter> - refresh

And for certain cards which have multiple ports (indicated by the s on the end of VCGs or WAns) may be expanded to give further module details by selecting the slot number/letter

Metrodata MC12000 "MC12000"

Alarms: Major

GLOBAL STATUS

History last cleared:
-

Slot:	4	WAN	VCG	State	Alarms
Card:	WCC1800				
Managed:	Yes	1	1	Up	los
Test:	No	2	1	Up	los
VLAN Mode:	C-VLAN	3	1	Up	los
Backplane Alloc:		4	1	Up	LOS e
		5	1	Up	los
		6	1	Up	los
		7	1	Up	los
		8	1	Up	los
Interf	Admin	State	Alarms	Mode	Speed Duplex Alloc
LAN	Up	LKDN	Auto	-	- 42
SFP	Down				
VCG1	Up	DEG			42
VCG2	Down				
VCG3	Down				
VCG4	Down				

<Esc> - exit, H - clear hist, S - summary, 1-C - card status, <Enter> - refresh

In all cases the state of the module ports are displayed,

UPPER CASE ALARM	Current Alarm
lower case alarm	Historic alarm, was present but has now cleared.
-	No alarm since alarms last cleared.

3.7.1 Clear History

The historic alarms (lower case) may be cleared by typing H/h. This will clear all lower case alarms to -, however current alarms will be preserved.

4 SNMP MANAGEMENT

The MetroConnect supports SNMP V1 and V2c for both read and write access. Additionally the MetroConnect will generate unsolicited traps. The MetroConnect must be configured with the IP address of an NMS before it will generate traps or respond to SNMP Polls..

The MetroConnect requires the following MIBs

RFC-1213	MIB-2
METROHDR.MIB	Metrodata Enterprise Definitions
METROMSC.MIB	Metrodata Enterprise Miscellaneous Definitions
METROTRP2.MIB	Metrodata Enterprise Trap Definitions
MET_SFP.MIB	SFP Support Defintions

4.1 MIB-2, sysObjectID

The MetroConnect uses the following OID

Enterprises.503.1.53

Where

503	=	Metrodata Enterprise MIB (METROHDR)
1	=	MetroSysObjectID
53	=	MetroConnect

4.2 Traps

Traps are unsolicited messages issued when a given condition arises in the product that has to be signalled to the management system without waiting for the device to be polled.

The MetroConnect generates standard traps as per RFC-1215 as well as enterprise specific traps as defined in METROTR2.MIB.

Traps on the MetroConnect are all generated using the TRAP-V1 PDU. The METROTR2 MIB utilises the TRAP-TYPE macro as defined in RFC-1215. The MetroConnect will issue traps on the occurrence of physical faults on the interfaces.

METROTR2 is a generic trap database, and as such the interface generating the trap is included in the definition.

4.2.1 Trap Enterprise Field

The MetroConnect will issue traps with the ENTERPRISE field set to

Enterprises.503.3 Enterprises.metro.metroTraps

4.2.2 Trap Interface Field

The MetroConnect allocates the following interface ifIndex values

$\text{IfIndex} = 32 + 512 * \text{Slot} + 32 * \text{Port} + \text{Card Type}$

4.2.2.1 FC1000 Port Numbers

The FC1000 has two ports for SNMP indexed as follows

Port 1 Fibre Interface

Port 2 G.703 Interface (E1)

4.2.2.2 FC3000 Port Numbers

The FC3000 has two ports for SNMP indexed as follows

Port 1 Fibre Interface

Port 2 G.703 Interface (E3/DS-3)

4.2.2.3 FC4000 Port Numbers

The FC4000 has two ports for SNMP indexed as follows

Port 1 Fibre Interface

Port 2 G.703 Interface (STM-1/OC-3)

4.2.2.4 WC1000 Port Numbers

The WC1000 has two ports for SNMP indexed as follows

Port 1 LAN Interface

Port 2 G.703 Interface (E1)

4.2.3 Trap Types

The MetroConnect supports the following generic trap types

Trap Type 1	Warm Start
Trap Type 2	Link Down
Trap Type 3	Link Up
Trap Type 6	Enterprise Specific Trap

Other trap types are not supported, or generated by the MetroConnect.

4.2.3.1 Generic Trap 1, Warm Start

When the unit powers up and initialises, it will issue a single warm start trap to indicate that the MetroConnect has warm started.

Note, cold start is not issued, since the cold start returns the MetroConnect to the factory default condition with no SNMP managers configured.

4.2.3.2 Generic Trap 2, Link Down

When any of the external ports are in an alarmed state, a Link Down Trap will be issued on entry into the alarmed condition.

For a G.703 port, a Link Down Trap is issued on detection of either Loss of Signal, or AIS conditions.

For a Fibre port, a Link Down Trap is issued on detection of Loss of Signal.

For LAN ports, a Link Down Trap is issued when the port is in the “link down” state. The link down may be due to a cable disconnection or a mismatch between link partners.

The generic Link Down Trap contains the IfIndex value to indicate which port has entered the Link Down state.

4.2.3.3 Generic Trap 3, Link Up

When any of the external ports are not in an alarmed state, a Link Up Trap will be issued on exit from the alarmed condition.

For a G.703 port, a Link Up Trap is issued when the Loss of Signal, or AIS condition is no longer present.

For a Fibre Port, a Link Up trap is issued when the Loss of Signal condition is no longer present.

For LAN ports, a Link Up Trap is issued when the port is in the “link up” state. The link up indicates completion of the auto negotiation, or compatible link partners.

The generic link up trap contains the IfIndex value to indicate which port has returned to the link up state.

4.2.3.4 Generic Trap 6, Enterprise Specific Trap

4.2.3.4.1 Enterprise Specific Trap 1

When a port enters the alarmed state, i.e. Link Down, the MetroConnect will issue this trap to give more detailed information than the simple link down trap.

Trap 1 MetroOtherMajorStart

The MetroOtherMajorStart trap also includes the IfIndex value to indicate which port has entered the Major Alarm state.

4.2.3.4.2 Enterprise Specific Trap 3

When a port exits the alarmed state, i.e. Link Up, the MetroConnect will issue this trap to give more detailed information than the simple link up trap.

Trap 3 metroOtherMajorEnd

The MetroOtherMajorEnd trap also includes the IfIndex value to indicate which port has exited the Major Alarm state.

4.2.3.4.3 Enterprise Specific Trap 13

When the MetroConnect powers up, or warm starts, it will issue this trap to augment the generic “warm start” trap..

Trap 13 metroPowerUp