



WCM1100 (E1) & WCM3100 (E3/DS-3)
Managed Ethernet Extender
V7.9
Quick Start Guide

| | |
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TABLE OF CONTENTS

| | | |
|----------|--|-----------|
| 1 | INTRODUCTION | 7 |
| 2 | WCMx100 APPLICATIONS..... | 8 |
| 2.1 | WCMx100 Normal Mode..... | 8 |
| 2.2 | WCMx100 VLAN Trunk Mode | 8 |
| 2.3 | VLAN Trunk Mode..... | 9 |
| 2.4 | S-Tag Mode..... | 9 |
| 3 | QUICK START CONFIGURATION | 10 |
| 3.1 | Base Label | 10 |
| 3.1.1 | WCM1100 Base Label | 10 |
| 3.1.2 | WCM3100 Base Label | 11 |
| 3.2 | Cold Start the Unit | 11 |
| 3.2.1 | Bit Switches..... | 12 |
| 3.2.1.1 | Bitswitch 1, Boot Mode 0 | 12 |
| 3.2.1.2 | Bitswitch 2, Boot Mode 1 | 12 |
| 3.2.1.3 | Bitswitch 3, DHCP..... | 12 |
| 3.2.1.4 | Bitswitch 4, Framing..... | 12 |
| 3.2.1.5 | Bitswitch 5, Timing..... | 13 |
| 3.2.1.6 | Bitswitch 6, Interface Mode..... | 13 |
| 3.2.1.7 | Bitswitch 7, SFP Mode | 13 |
| 3.2.1.8 | Bitswitch 8, Factory Default | 14 |
| 3.3 | Access the WCMx100..... | 15 |
| 3.4 | Logging onto WCMx100..... | 15 |
| 3.4.1 | User Interface Navigation..... | 16 |
| 3.5 | Configure the WAN interface..... | 17 |
| 3.5.1 | WCM1100 E1 Configuration | 17 |
| 3.5.2 | WCM3100 E3 Configuration | 18 |
| 3.5.3 | WCM3100 DS-3 Configuration | 18 |
| 3.6 | Set IP Address..... | 19 |
| 3.7 | Set Default Route..... | 20 |
| 3.8 | Save the Configuration..... | 21 |
| 3.9 | Warm Start to activate the configuration | 22 |
| 4 | ADVANCED CONFIGURATION | 23 |
| 4.1 | System Configuration..... | 23 |
| 4.1.1 | Setting the Time and Date | 24 |
| 4.1.2 | Setting the Node Name..... | 25 |

| | | |
|------------|--------------------------------------|-----------|
| 4.1.3 | Password..... | 26 |
| 4.1.3.1 | Password Recovery | 26 |
| 4.1.4 | 'View' User | 26 |
| 4.1.5 | Welcome Screen | 27 |
| 4.1.6 | Warm Start..... | 29 |
| 4.1.7 | Cold Start..... | 29 |
| 4.2 | Data Port Configuration | 30 |
| 4.2.1 | LAN Port | 31 |
| 4.2.1.1 | State..... | 32 |
| 4.2.1.2 | Link Status | 32 |
| 4.2.1.3 | Auto Negotiation..... | 32 |
| 4.2.1.4 | Speed..... | 32 |
| 4.2.1.5 | Duplex..... | 32 |
| 4.2.1.6 | Negotiated | 32 |
| 4.2.1.7 | MDI/MDIX | 33 |
| 4.2.1.8 | Counters | 33 |
| 4.2.1.9 | OAM | 34 |
| 4.2.1.9.1 | OAM Mode | 34 |
| 4.2.1.9.2 | OAM Status..... | 35 |
| 4.2.1.10 | Mgmt traffic | 35 |
| 4.2.1.11 | VLAN ID | 36 |
| 4.2.1.12 | QinQ S-TAG ID..... | 36 |
| 4.2.1.13 | default Priority | 36 |
| 4.2.2 | SFP Port..... | 37 |
| 4.2.2.1 | SFP Type..... | 38 |
| 4.2.2.2 | State..... | 38 |
| 4.2.2.3 | Link State | 38 |
| 4.2.2.4 | Speed..... | 38 |
| 4.2.2.5 | Auto Negotiation..... | 38 |
| 4.2.2.6 | Negotiated | 38 |
| 4.2.2.7 | SFP Info | 39 |
| 4.2.2.8 | Counters | 39 |
| 4.2.2.9 | OAM | 40 |
| 4.2.2.9.1 | OAM Mode | 40 |
| 4.2.2.9.2 | OAM Status..... | 41 |
| 4.2.2.10 | mGmt Traffic | 41 |
| 4.2.2.11 | VLAN ID | 42 |
| 4.2.2.12 | QinQ S-TAG ID..... | 42 |
| 4.2.2.13 | default Priority | 42 |
| 4.2.3 | WCM1100 WAN Port..... | 43 |
| 4.2.3.1 | State..... | 44 |
| 4.2.3.2 | Interface | 44 |
| | Timing | 44 |
| 4.2.3.3 | | 44 |
| 4.2.3.4 | RX Sensitivity | 44 |
| 4.2.3.5 | Framing | 45 |
| 4.2.3.6 | Allocation..... | 45 |
| 4.2.3.7 | CRC-4 | 46 |
| 4.2.3.8 | sigNalling..... | 46 |
| 4.2.3.9 | Counters | 46 |
| 4.2.3.10 | OAM | 47 |
| 4.2.3.10.1 | OAM Mode..... | 47 |
| 4.2.3.10.2 | OAM Status | 48 |
| | mGmt Traffic..... | 48 |
| 4.2.3.11 | | 48 |
| 4.2.3.12 | VLAN ID | 49 |
| 4.2.3.13 | QinQ S-TAG ID..... | 49 |
| 4.2.3.14 | default Priority | 49 |

| | | |
|------------|--|-----------|
| 4.2.4 | WCM3100 WAN Port | 50 |
| 4.2.4.1 | State..... | 51 |
| 4.2.4.2 | Interface | 51 |
| 4.2.4.3 | Timing..... | 51 |
| 4.2.4.4 | TX Line Build Out (DS-3 mode Only) | 51 |
| 4.2.4.5 | Framing | 52 |
| 4.2.4.6 | Counters | 52 |
| 4.2.4.7 | OAM | 53 |
| 4.2.4.7.1 | OAM Mode | 53 |
| 4.2.4.7.2 | OAM Status | 54 |
| 4.2.4.8 | mGmt Traffic | 54 |
| 4.2.4.9 | VLAN ID | 55 |
| 4.2.4.10 | QinQ S-TAG ID..... | 55 |
| 4.2.4.11 | default Priority | 55 |
| 4.2.5 | Encapsulation..... | 56 |
| 4.2.5.1 | Flow Control | 56 |
| 4.2.5.2 | Max Frame Size | 56 |
| 4.2.5.3 | Priority Table | 57 |
| 4.2.5.3.1 | 802.1p Mode..... | 57 |
| 4.2.5.3.2 | IP DSCP Mode | 57 |
| 4.2.6 | Traffic Isolation | 58 |
| 4.2.7 | RSTP..... | 58 |
| 4.3 | SNMP Management | 59 |
| 4.3.1 | Read/Write/Trap Community | 59 |
| 4.3.2 | Contact Person | 59 |
| 4.3.3 | Node Name | 60 |
| 4.3.4 | Location | 60 |
| 4.3.5 | Managers | 60 |
| 4.4 | Saving the Configuration | 61 |
| 5 | TFTP SOFTWARE UPDATE | 62 |
| 5.1 | TFTP Configuration..... | 62 |
| 5.1.1 | Client Mode | 62 |
| 5.1.2 | Server Mode | 63 |

1 INTRODUCTION

This guide instructs the user in the use of the WCM1100 Managed Ethernet Extender over E1, or WCM3100 Managed Ethernet Extender over E3/DS-3. This guide describes the functionality of Software Release 7.9.

Throughout this document, the term WCMx100 will be used to describe generic functions, whilst WCM1100 or WCM3100 will be used for product specific areas.

The Metrodata WCMx100 allows for the extension of an Ethernet Service over a PDH, Wide Area Network Connection. The WCMx100 is a managed unit allowing for the effective demarcation between LAN and WAN services. Management of the WCMx100 is achieved using either Telnet or SNMP via either the LAN or WAN ports.

In cases where management is not required, or undesired, the WCMx100 can operate standalone with simple configuration options provided using bit switches located on the underside of the unit.

The Metrodata WCMx100 is a manageable multiport Ethernet Switch with a PDH uplink. The WCMx100 provides two 10/100/1000BaseT Auto Negotiating, Autoswitching Ports as well as a single SFP port supporting either 1000Base-X or 100Base-FX SFP modules. The WCMx100 operates as a layer 2 bridge and as such may be used to extend a LAN segment over a PDH WAN link.

The WCMx100 has an internal LAN switch offering full wire-speed switching between ports. The WCMx100 uses MAC address filtering to filter all local traffic and only forward traffic destined for remote stations. Each of the WCMx100's LAN ports support automatic cross-over switching and will therefore connect directly to a Hub/Switch/Router or PC End Station.

The WCMx100 has support for both tagged and untagged frames, with both VLAN C-Tag, and Provider Bridge S-Tag (QinQ) modes supported.

The WCMx100 supports either IP DSCP, or IEEE802.1p based traffic prioritisation with outgoing traffic being queued in one of four priority queues.

The WCMx100 supports link OAM, IEEE802.3ah and RSTP for loop prevention.

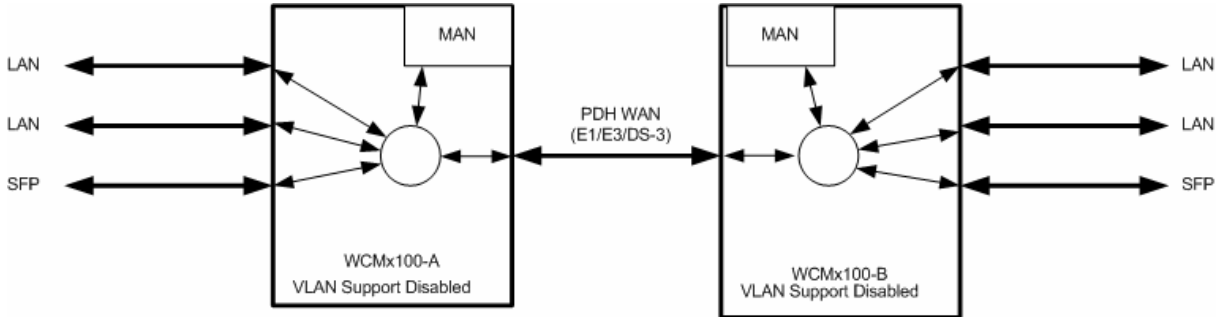
The WCMx100 performs HDLC encapsulation with a single flag between frames to give maximum utilisation of the PDH WAN link. Internal packet buffers enable the WCMx100 to smooth out bursty traffic and prevent packet loss as the higher layer protocols rate adapt to the WAN capacity.

The WCM1100 E1 port supports unframed, framed (with or without CRC-4) or fractional (Nx64k) operating modes.

The WCM3100 supports unframed or framed operation, supporting E3 G.832 or DS-3 C-Bit Framing modes.

2 WCMX100 APPLICATIONS

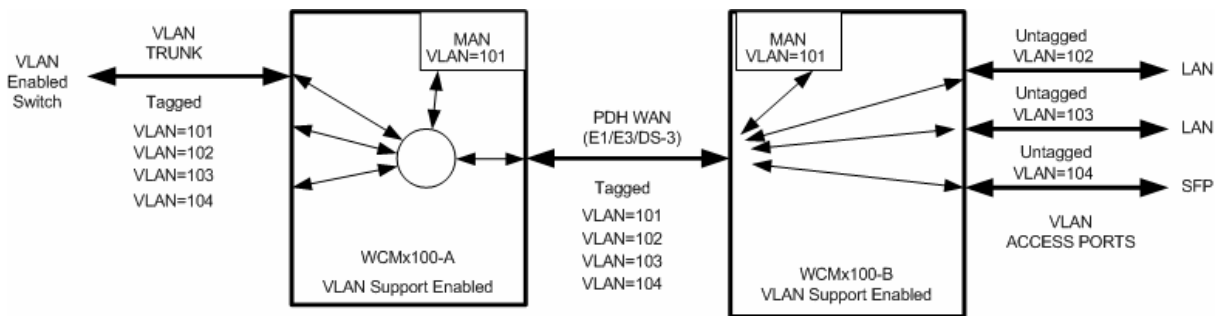
2.1 WCMx100 Normal Mode



In this application, the WCMx100 is operating with Traffic Isolation Disabled. In this mode, the WCMx100 acts as a simple, layer 2, 5 port switch with packets being switched based on MAC address alone. The WCMx100 supports both local and remote switching, and forwarding over the PDH WAN trunk.

Management traffic is not isolated from the through data traffic, and both units may be managed from any port.

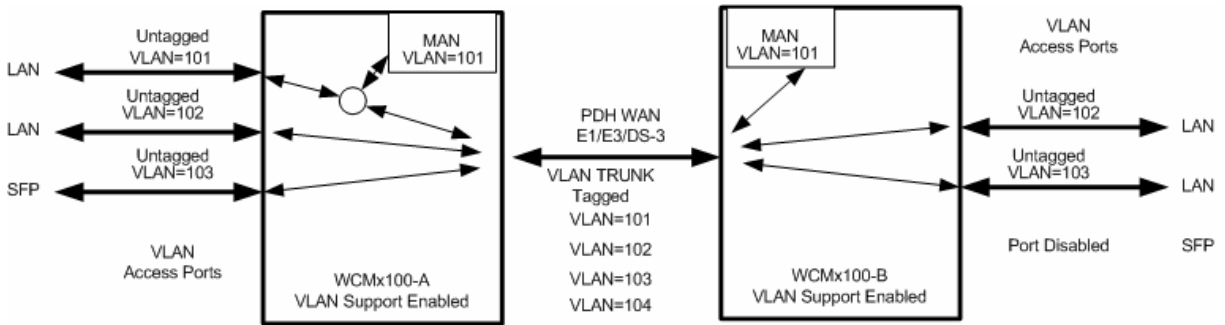
2.2 WCMx100 VLAN Trunk Mode



In this application, WCMx100-A is connected to a VLAN enabled LAN switch. The LAN switch is configured as a VLAN trunk and all packets are tagged with VLAN Tags. WCMx100-A is operating with VLAN support enabled but all ports defined as Trunks. A VLAN ID is allocated to the Manager and thus management traffic is isolated from the user traffic and the management VLAN, in this case 101, can be used to manage the WCMx100's. WCM1100-B is configured with VLAN support enabled but each port is configured as an access port and isolated to a single VLAN.

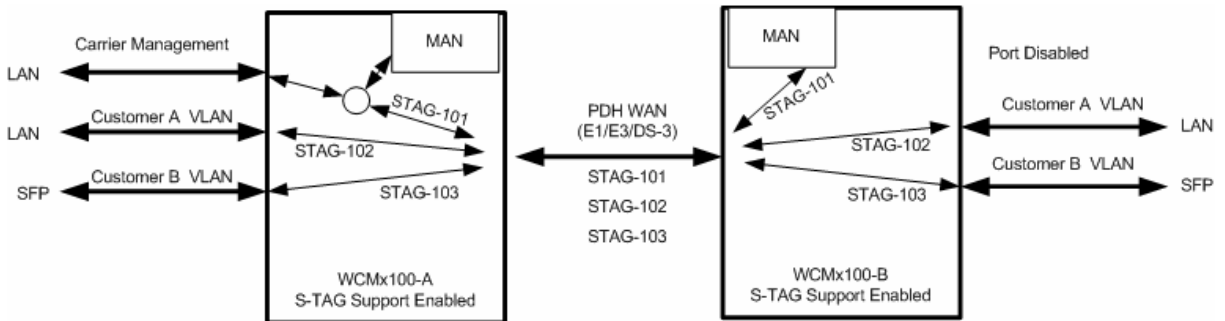
Trunk ports expect packets to be tagged, whilst access ports expect untagged packets and will add tag and priority to incoming packets.

2.3 VLAN Trunk Mode



In this mode, both WCMx100 units have VLAN support enabled, and all ports are defined as access ports. VLAN 101 is used as the management VLAN and in unit WCM1100-A the VLAN group 101 includes the LAN Port 1, the Manager and the PDH WAN port. At the remote end, the SFP port is disabled to prevent customer access to the WCMx100 manager.

2.4 S-Tag Mode



In this mode, the WCMx100 adds a, port based, S-TAG to all incoming traffic. Where customer traffic is already VLAN tagged, this leads to double tagging or 'QinQ' operation. The use of the S-TAG enables the carrier to isolate customer traffic. Carrier management traffic is carried with a separate S-Tag giving management access to both units, and on the customer site the external management access is disabled.

3 QUICK START CONFIGURATION

The following guide gives a simple, quick start introduction to configuring the WCMx100 for Normal Mode operation as shown in section 2.1

3.1 Base Label

There is a label on the underside of each product which defines the cold start default configuration of the unit.

3.1.1 WCM1100 Base Label

Metrodata
Metrodata Ltd
TW20 8RY UK
Tel +44 (0) 1784 744700
Fax +44 (0) 1784 744730

WCM1100
Managed Ethernet Extender
over E1/T1 (AC)
Part No. 80-70-542

For product manual and other information :-
www.metrodata.co.uk
Manufactured in the UK

| Status LED | Meaning |
|--------------------|------------------------|
| Off | No mains power present |
| Red steady | WAN |
| Red/Off Flashing | WAN / LAN Alarm |
| Green/Off Flashing | LAN |
| Green steady | Status OK |

| Bitswitch | Control | ON | OFF |
|-----------|-----------------|-----------------------------|----------------------------|
| 1 | Boot Mode 0 | Proxy Mode Disabled* | Proxy Mode Enabled |
| 2 | Boot Mode 1 | Proxy Mode Server* | Proxy Mode Client, WAN |
| 3 | DHCP | Disabled* | Enabled |
| 4 | Framing | Framed CRC4* | Unframed |
| 5 | Timing | Internal* | Loop |
| 6 | Interface Mode | BNC* | RJ45 |
| 7 | SFP Mode | 1000Base-X* | 100Base-FX |
| 8 | Factory Default | Normal Operation* | Return to Default Settings |

Bold * characters = Factory Default

1 2 3 4 5 6 7 8

OFF ON

RoHS

17-70-1202A (All)

3.1.2 WCM3100 Base Label



Metrodata Ltd
TW20 8RY UK
Tel +44 (0) 1784 744700
Fax +44 (0) 1784 744730

| Status LED | Meaning |
|--------------------|------------------------|
| Off | No mains power present |
| Red steady | E3/T3 Alarm |
| Red/Off Flashing | E3/T3 and Fibre Alarm |
| Green/Off Flashing | Fibre Alarm |
| Green steady | Status OK |

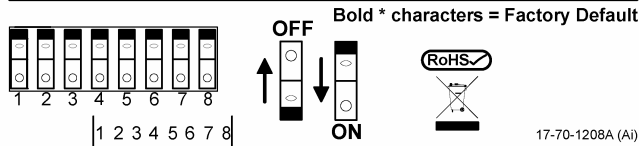
WCM3100
Managed Ethernet Extender
over E3/T3 (AC)

For product manual
and other information :-
www.metrodata.co.uk
Manufactured in the UK

Part No. 80-70-543

Serial No:

| Bitswitch | Control | ON | OFF |
|-----------|-----------------|-----------------------------|----------------------------|
| 1 | Boot Mode 0 | Proxy Mode Disabled* | Proxy Mode Enabled |
| 2 | Boot Mode 1 | Proxy Mode Server* | Proxy Mode Client, WAN |
| 3 | DHCP | Disabled* | Enabled |
| 4 | Framing | Framed* | Unframed |
| 5 | Timing | Internal* | Loop |
| 6 | Interface Mode | E3* | DS3 |
| 7 | SFP Mode | 100Base-X* | 100Base-FX |
| 8 | Factory Default | Normal Operation* | Return to Default Settings |



3.2 Cold Start the Unit

When a WCMx100 is shipped from the factory it will be in the default condition, however with previously used equipment this may not be the case. To return the unit to the default state will require a power cycle and configuration of the bit switches.

The underside of the unit has a set of accessible bit switches and a label, as shown below for the two products:

Ensure all other bit switches are in the desired default positions.

To cold start the unit, first set bit switch 8 (Cold Start) to the OFF (Return to Default Settings) position. Power up the WCMx100, wait for the Status LED to come on in any state, and then power down. To return to normal mode, return bit switch 8 to the ON (Normal Operation) position.

3.2.1 Bit Switches

The bit switches are also used to define the default settings and should be set accordingly as defined below:

3.2.1.1 Bitswitch 1, Boot Mode 0

This bitswitch is used to determine whether the IP proxy management mode is enabled or not. IP proxy mode utilises OAM to remotely manage a WCM1100 device.

| | |
|-----|---------------------|
| ON | Proxy Mode Disabled |
| OFF | Proxy Mode Enabled, |

|

3.2.1.2 Bitswitch 2, Boot Mode 1

This bitswitch is ignored if Proxy Mode is disabled. When Proxy mode is enabled, this mode determines whether the unit acts as Master/Server, or Slave/Client.

| | |
|-----|--------------------|
| ON | Proxy Mode, Server |
| OFF | Proxy Mode, Client |

3.2.1.3 Bitswitch 3, DHCP

This bitswitch enables DHCP for IP address allocation.

| | |
|-----|---------------|
| ON | DHCP Disabled |
| OFF | DHCP Enabled |

3.2.1.4 Bitswitch 4, Framing

This bitswitch determines the operating mode of the PDH WAN interface.

| | |
|-----|---|
| ON | E1 G.703, G.704 Framed with CRC-4 Enabled (WCM1100) |
| | E3 G.703, G.832 Framed (WCM3100) |
| | DS-3 G.703 C-Bit Framed (WCM3100) |
| OFF | E1/E3/DS-3 G.703 Unframed |

3.2.1.5 Bitswitch 5, Timing

This bitswitch determines the timing source for the PDH WAN interface

- ON Internal Timing
- OFF Loop Timing

Note, it is vital that one end of PDH WAN link is set to internal, as loop/loop will give an unstable system.

3.2.1.6 Bitswitch 6, Interface Mode

This bitswitch selects between the two optional interface modes,

For WCM1100, E1 Interface

- ON BNC, Unbalanced 75Ohm
- OFF RJ45, Balanced 120Ohm

For WCM3100,

- ON E3 G.703
- OFF DS-3 G.703

3.2.1.7 Bitswitch 7, SFP Mode

This bitswitch is used to force the configuration of the SFP interface to match the SFP type inserted.

- ON 1000Base-X SFP
- OFF 100Base-FX SFP

3.2.1.8 Bitswitch 8, Factory Default

This bitswitch will clear the stored configuration and return the unit to the default settings as defined by the bit switches.

- | | |
|-----|---|
| ON | Normal Operation |
| OFF | Factory Cold Start, load default settings |

The main use of this switch is to ensure a unit can be accessed in the event that the password has been lost.

3.3 Access the WCMx100

Initial access to the WCMx100 is made using the Terminal Port on the rear panel of the unit. The Terminal port defaults to 19200baud, 8bit, No Parity, 1 Stop Bit. The 9 Way D-Type is configured as a DCE port with standard pinout as shown below:

| Pin | Direction | Signal |
|-----|-----------|----------------|
| 1 | out | DCD |
| 2 | out | RXD* |
| 3 | In | TXD* |
| 4 | In | DTR |
| 5 | | Signal Ground* |
| 6 | out | DSR |
| 7 | In | RTS |
| 8 | out | CTS |
| 9 | | no connect |

Figure 3.3 Terminal Port Connector Pin Configuration

3.4 Logging onto WCMx100

The initial access to the WCMx100 must use a terminal connected to the terminal port.

The WCMx100 has a password protected, menu driven user interface. When a management session is connected to the WCMx100, the welcome banner will be displayed as shown:

Metrodata WCM1100: Local connection to ""
Password ('view' to view only) :

or

Metrodata WCM3100: Local connection to ""
Password ('view' to view only) :

At the prompt, enter the password to gain access to the WCMx100. The default password is the product name, ie "wcm1100" or "wcm3100". 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 WCMx100 " "                               Alarms: Major

MAIN SET-UP

Global status          <display>
alarm eXtension        <menu>

Data port set-up      <menu>
V.24 set-up           <menu>
Management            <menu>
System                <menu>
Update EEPROM

Testing               <menu>

Performance data      <menu>

First CAPITAL - select item

<escape> - exit menu

```

3.4.1 User Interface Navigation

The WCM1100 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.

3.5 Configure the WAN interface

In order for two WCMx100 units to communicate they must be connected using the PDH WAN port. The WAN interface must be configured to match the network NTU configuration.

The WAN port is configured by selecting the Data Port Set-Up Menu,

```

Metrodata WCMx100 ""                               Alarms: Major

DATA PORT SET-UP

lan1          <menu>
lan2          <menu>
SFP           <menu>
WAN           <menu>

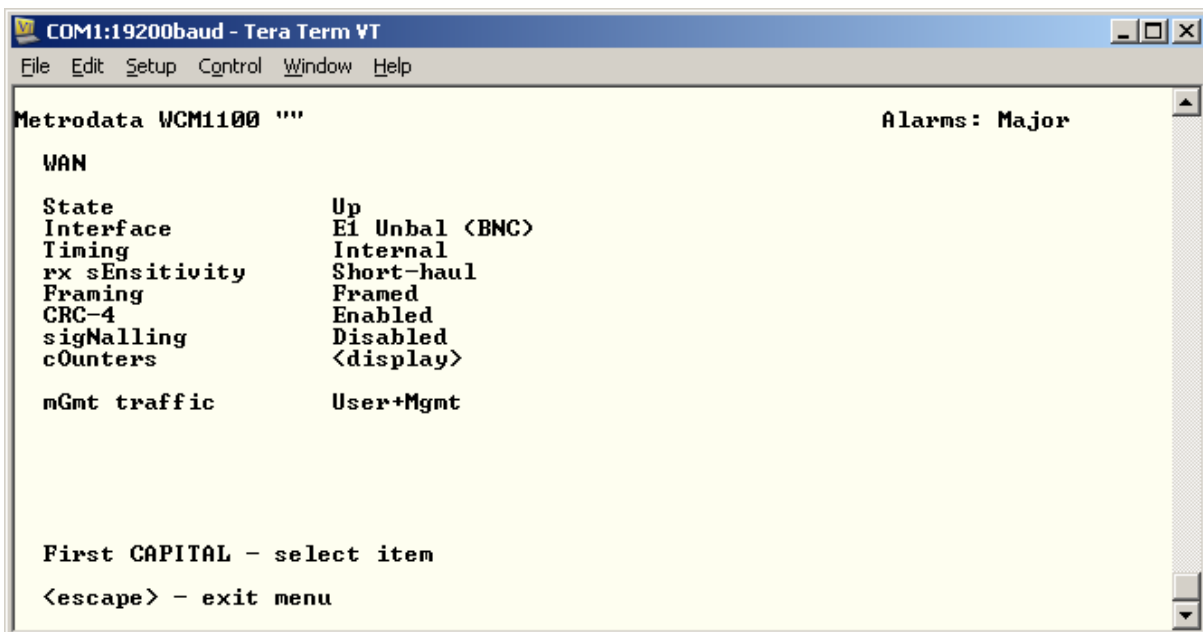
Encapsulation <menu>
traffic Isolation <menu>
RSTP         <menu>

First CAPITAL - select item

<escape> - exit menu

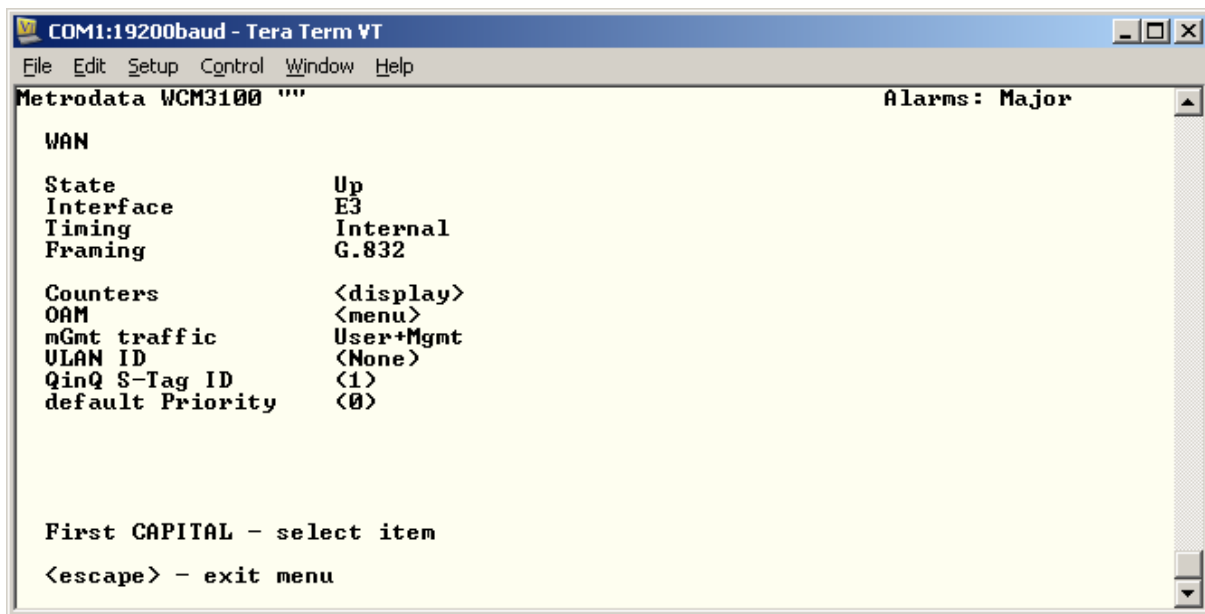
```

3.5.1 WCM1100 E1 Configuration



Ensure that the interface, timing and framing modes are correctly set to match the network NTU settings.

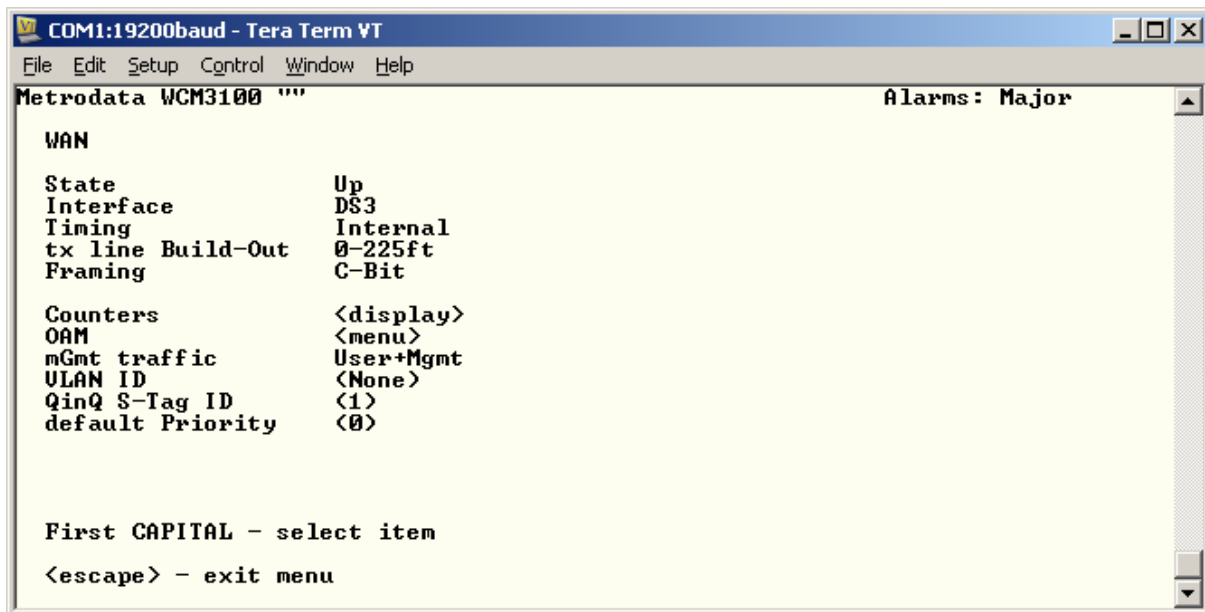
3.5.2 WCM3100 E3 Configuration



```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM3100 "" Alarms: Major
WAN
State Up
Interface E3
Timing Internal
Framing G.832
Counters <display>
OAM <menu>
mGmt traffic User+Mgmt
ULAN ID <None>
QinQ S-Tag ID <1>
default Priority <0>
First CAPITAL - select item
<escape> - exit menu
```

For the E3 interface, the framing mode (G.832 or Unframed) must be configured as well as the interface timing.

3.5.3 WCM3100 DS-3 Configuration



```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM3100 "" Alarms: Major
WAN
State Up
Interface DS3
Timing Internal
tx line Build-Out 0-225ft
Framing C-Bit
Counters <display>
OAM <menu>
mGmt traffic User+Mgmt
ULAN ID <None>
QinQ S-Tag ID <1>
default Priority <0>
First CAPITAL - select item
<escape> - exit menu
```

When DS-3 mode is selected, the framing mode (C-Bit or Unframed) must be set as well as the interface timing. Additionally, the transmitter power must be configured by setting the line build out to support either short (<225ft) or longer cable runs.

3.6 Set IP Address

From the Main Setup Menu, select Management,

```
Metrodata WCMx100 " "                               Alarms: Major

MANAGEMENT

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

First CAPITAL - select item

<escape> - exit menu
```

and then the Interface Menu.

```
Metrodata WCMx100 " "                               Alarms: Major

INTERFACE

State            Up
Phys. address    0:c0:81:0:13:85
DHCP             Off
IP addr          169.254.42.42
Net mask         255.255.0.0
Broadcast address from bit 1
AT table        <display>
sTats.          <display>
VLAN ID         (0)
QinQ S-Tag ID   (1)
802.1p priority 0

traffic isOlation <menu>

First CAPITAL - select item

<escape> - exit menu
```

To change the IP settings for installation:

| | |
|------------|--|
| DHCP | For operation in a DHCP enabled network and automatic IP address allocation set this parameter to ON to enable DHCP address allocation. |
| IP Address | If DHCP is not used, you must manually assign the required IP address for correct installation into the network. (Note the default IP address is set to 169.254.42.42) |
| Net mask | If DHCP is not used, you must assign the required network mask for correct installation into the network. |

3.7 Set Default Route

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

```

Metrodata WCMx100 ""                               Alarms: Major
IP
default TTL           32
Max reassy time      0 sec
DSCP priority        0
Routing table        <display>
Forwarding           Disabled
Stats.               <display>

First CAPITAL - select item

<escape> - exit menu

```

then select the Routing Table menu and set the default route,

```

Metrodata WCMx100 ""                               Alarms: Major
Destination      Next Hop          I/f  Type      Prot.  Age      Mask
-----
169.254.0.0     0.0.0.0           Mgmt direct  local  157     255.255.0.0

A - add entry
D - delete entry
any other key to exit:
Add route.
Destination: 0.0.0.0
Mask: 0.0.0.0
Next-hop: 169.254.0.254

```

```

Metrodata WCMx100 ""                               Alarms: Major
Destination      Next Hop          I/f  Type      Prot.  Age      Mask
-----
169.254.0.0      0.0.0.0          Mgmt direct  local  182     255.255.0.0
0.0.0.0          169.254.0.254  Mgmt indirect local   0       0.0.0.0

```

```

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

```

Add a new route table entry with destination and mask as 0.0.0.0 and configure the next hop as required.

3.8 Save the Configuration

From the Main Set Up menu, select the Update EEPROM option to save the configuration to non volatile memory. Answer 'Y' at the prompt.

```

Metrodata WCMx100 ""                               Alarms: Major

MAIN SET-UP

Global status      <display>
alarm eXtension    <menu>

Data port set-up   <menu>
V.24 set-up        <menu>
Management         <menu>
System             <menu>
Update EEPROM

Testing            <menu>

Performance data   <menu>

First CAPITAL - select item

<escape> - exit menu

```

3.9 Warm Start to activate the configuration

From the Main Set Up Menu, select system and then Warm start.

```
Metrodata WCMx100 " "                               Alarms: Major
SYSTEM
Time & date          <menu>
Node name
Password             *****
'View' user          Enabled
weLcome screen      <menu>
Software version     7.9

Output config        <display>
Input config

Warm start
Cold start
Event logs           <menu>

First CAPITAL - select item

<escape> - exit menu
```

Select the Warm Start option and the unit will now reboot and will operate as a simple managed, layer 2 bridge.

4 ADVANCED CONFIGURATION

4.1 System Configuration

The system menu provides the basic administrative configuration items for the WCMx100 and should be configured first. The System Menu is shown below:

```
Metrodata WCMx100 " "                               Alarms: Major

SYSTEM

Time & date          <menu>
Node name
Password            *****
'View' user         Enabled
weLcome screen     <menu>
Software version    7.9

Output config       <display>
Input config

Warm start
Cold start
Event logs         <menu>

First CAPITAL - select item

<escape> - exit menu
```

4.1.1 *Setting the Time and Date*

The WCMx100 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 WCMx100 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 WCMx100 " "                               Alarms: Major

TIME & DATE

local Time           00:05:29
local Date           Sat 1/1/2000
system up time       0d0h5m29s
time Zone            GMT+0
NTP server           0.0.0.0
last sync            never
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 WCMx100 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, however since these are non volatile and not maintained over a power cycle it is not recommended. Additionally the system up time parameter is provided.

4.1.2 *Setting the Node Name*

To enable identification of the WCMx100 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 WCMx100 "WCMx100 Node A"                               Alarms: Major

SYSTEM

Time & date                <menu>
Node name                   WCMx100 Node A
Password                    *****
'View' user                 Enabled
weLcome screen             <menu>
Software version            7.9

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 "WCM1x00 Node A" it is displayed at the top of each user menu to assist the user identify which device is currently connected.

4.1.3 Password

The password for the WCMx100 may be changed from the system menu. The default password is the product name, ie “wcm1100” or “wcm3100”, however for deployment a more secure password may be required.

To change the unit password, select “Password” from the system menu. The WCMx100 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.

4.1.3.1 Password Recovery

If for any reason, the password for access to the WCMx100 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, “wcm1000” or “wcm3100”.

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

4.1.4 ‘View’ User

The WCMx100 supports two levels of access: admin and view. An Admin user has full access rights over the WCMx100 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.

4.1.5 Welcome Screen

By default, the initial access to the WCMx100 will display the welcome banner as shown below:

```
Metrodata WCMx100: Local connection to ""  
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 WCMx100 "WCMx100 Node A"                               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 WCMx100 "WCMx100 Node A"                               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 WCMx100 "WCMx100 Node A" 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 WCMx100
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 WCM3100 "WCM1x00 Node A" Alarms: Major
```

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

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

```
Welcome to the WCMx100
```

```
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 WCMx100

Please enter the password>

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

4.1.6 Warm Start

A warm Start will force the WCMx100 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 WCMx100 will indicate that a warm start is in progress and then close the connection.

4.1.7 Cold Start

Cold Start will return the WCMx100 to the factory default condition and 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 and return the unit to the default state.

4.2 Data Port Configuration

This section deals with the configuration of each of the user data port types including WAN, and LAN ports. A simple configuration will be shown for each type of port.

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

```
Metrodata WCMx100 " "                               Alarms: Major  
  
DATA PORT SET-UP  
  
lan1          <menu>  
lan2          <menu>  
SFP           <menu>  
WAN           <menu>  
  
Encapsulation <menu>  
traffic Isolation <menu>  
RSTP         <menu>  
  
First CAPITAL - select item  
  
<escape> - exit menu
```

4.2.1 LAN Port

The WCMx100 has two external copper LAN ports which by default operate in 10/100/1000BaseT auto negotiating, auto crossover mode. The LAN ports are presented on RJ45 connectors and support access to the other external local LAN ports, the management processor or the WAN forwarding port.

The LAN port menu allows for configuration of the LAN port parameters and VLAN settings

```

Metrodata WCMx100 " "                               Alarms: Major

LAN1

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

Counters              <display>
OAM                   <menu>
mGmt traffic          User+Mgmt
VLAN ID               (None)
QinQ S-Tag ID        (1)

First CAPITAL - select item
> - next page
<escape> - exit menu

```

and the next page

```

Metrodata WCMx100 " "                               Alarms: Major

LAN1
<
default Priority      (0)

First CAPITAL - select item
< - prev page
<escape> - exit menu

```

4.2.1.1 State

The port state is the administrative state of this port. The state may be up or down. When 'UP', the port is enabled and will generate a Major Alarm if the link is physically down. When in the 'DOWN' state, the port is disabled.

4.2.1.2 Link Status

The Link Status is a display of the current link status. If the link is up, the link status will show UP and vice versa. Only when the link status is UP are the operating parameters valid when in auto negotiating mode.

4.2.1.3 Auto Negotiation

The port may be configured to automatically determine the optimal operating parameters for link speed and duplex. Alternatively, it may be disabled to enable configuration of fixed operating parameters.

Note, the Auto Negotiating algorithm works optimally with a link partner that also supports auto negotiation. For operation where one end of a link uses fixed configuration and does not negotiate, it must be noted that only Speed, 10 or 100M, can be determined, the auto negotiating node will fall back to use half duplex. 1000M operation requires auto negotiation to be used.

4.2.1.4 Speed

When in auto negotiating mode, the speed displayed is the highest that will be advertised to the link partner. In non auto negotiating mode, the speed is manually set by the user.

4.2.1.5 Duplex

When in auto negotiating mode, the duplex displayed is the highest that will be advertised to the link partner. In non auto negotiating mode, the duplex is manually set by the user.

4.2.1.6 Negotiated

This item displays the actual operating parameters of the link following auto negotiation and may take the values:

| | |
|---------|-----------------------|
| 1000/FD | 1000Mbps, Full Duplex |
| 100/FD | 100Mbps, Full Duplex |
| 100/HD | 100Mbps, Half Duplex |
| 10/FD | 10Mbps, Full Duplex |
| 10/HD | 10Mbps, Half Duplex |

4.2.1.7 MDI/MDIX

By default, the ports support automatic crossover configuration when required. The port may be configured as follows:

| | |
|------|--|
| AUTO | Auto Sense and configure |
| MDI | Present MDI interface, direct connection to switch |
| MDIX | Present MDIX Interface, direct connection to PC |

4.2.1.8 Counters

Each LAN port provides a set of counters supporting the basic MIB-2 SNMP parameters as below:

Interface Statistics

| | |
|-------------------|--------|
| ifInOctets | 808916 |
| ifInUcastPkts | 2012 |
| ifInNUcastPkts | 5600 |
| ifInDiscards | 0 |
| ifInErrors | 0 |
| ifInUnknownProtos | 0 |
| ifOutOctets | 186612 |
| ifOutUcastPkts | 2562 |
| ifOutNUcastPkts | 1 |
| ifOutDiscards | 0 |
| ifOutErrors | 0 |

4.2.1.9 OAM

The WCMx100 supports IEEE 802.3ah Link OAM which may be configured on a per port basis:

```
Metrodata WCMx100 " " Alarms: Major
OAM
Mode Active
Status <display>
```

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

4.2.1.9.1 OAM Mode

The port may be configured to be:

| | |
|----------|--|
| Disabled | OAM packets not generated, and discarded |
| Active | OAM status requests generated once per second |
| Passive | OAM Status Updates will be generated in response to Status Requests. |

4.2.1.9.2 OAM Status

When two ports are running OAM, the status screen enables the user to determine the status of the remote device.

Metrodata WCMx100 "" Alarms: Major

```

                                OAM STATUS
                                -----
                                | Local   | Local   | Peer   | Peer   | Peer   | Peer   |
                                | Status  | Support | Mode   | MAC address | VendorInfo | Support |
                                |-----|-----|-----|-----|-----|-----|
LAN1      | Fault  | L      |
Remote Status
-----
Not available
    
```

<Escape> - exit, other key - refresh

Where the peer device is another Metrodata device, proprietary extensions to OAM are used to report further peer status information.

4.2.1.10 Mgmt traffic

In order to provide traffic isolation this parameter defines what type of traffic passes over this interface. The options are as below

- User + Mgmt This port carries user and management traffic. Management frames are switched to the processor, whilst user frames are switched to the WAN port.
- User only This port only carries user traffic and ALL frames are switched to the WAN port with no access to the management processor
- Mgmt only This port only carries Management Traffic and all frames are forwarded to the management processor with no frames forwarded to the WAN port.

4.2.1.11 VLAN ID

If the Traffic Isolation mode is set to VLAN then the LAN port may be configured as either ACCESS, or TRUNK.

A port is configured as an Access Port if it is assigned to a VLAN, ie given a VLAN ID between 1 and 4095. All frames ingressing this port will have a VLAN Tag added, and on egress will have the tag removed. This configuration item defines the VLAN ID which will be added and may be in the range (1 to 4095). One or more ports may be assigned to the same VLAN and packets will then only switch between those ports and trunk ports.

A port is configured as TRUNK, if the VLAN ID 0 or none is selected. In this case frames ingress, or egress, with tags unchanged. A trunk is assumed to be a member of all VLANs

4.2.1.12 QinQ S-TAG ID

If the Traffic Isolation mode is set to QinQ then the LAN port may be assigned provider mode Service Tag, S-TAG. and all frames ingressing this port will have the S-Tag added. This configuration item defines the S-TAG ID which will be added and may be in the range (1 to 4095). One or more ports may be assigned the same S-TAG and packets will then only switch between those ports and the WAN interface.

In QinQ mode, ingress packets may be tagged or untagged and all will have a single S-TAG stripped before egress.

4.2.1.13 default Priority

When the traffic isolation mode is VLAN, this is the priority value that is added with the VLAN ID during ingress at an Access Port. In QinQ mode, untagged packets are given this default priority, whilst tagged packets promote the C-TAG priority to the S-TAG priority.

4.2.2 SFP Port

The SFP port configuration menu is accessed via the data port set up menu and is as shown below:

```
Metrodata WCMx100 " "                               Alarms: Major

SFP

sfp type          1000BASE-SX
State             Up
link status       Down
spEed             1000M
Auto-negotiation Enabled
negotiated        ---
sfp Info          <display>

Counters          <display>
OAM               <menu>
mGmt traffic      User+Mgmt
VLAN ID           (None)
QinQ S-Tag ID    (1)

>

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

and next page

```
Metrodata WCMx100 " "                               Alarms: Major

OAM

Mode              Active
Status            <display>

First CAPITAL - select item

<escape> - exit menu
```

4.2.2.1 SFP Type

This display item indicates the type of SFP fitted. This value is read from the SFP device itself and is a decode of the interface type bytes according to the SFP MSA definition.

Metrodata supplied SFP devices will indicate the SFP type, however some lower cost, lower quality SFP devices may not be correctly programmed and will indicate "UNKNOWN" as the device type cannot be determined.

If no SFP is fitted, this will show "NOT FITTED"

4.2.2.2 State

This setting defines the administrative state of the port and may be UP or DOWN. When the state is DOWN, no alarm processing is performed. If an SFP is not fitted, it is important to change this state to DOWN to prevent the SFP MAJOR alarm being generated.

4.2.2.3 Link State

When the SFP is fitted, this displays the operational state of the link and also may be UP or DOWN.

4.2.2.4 Speed

The speed setting replicates the underside switch 7 setting and selects between 1000BaseX and 100BaseFX operating mode.

This setting should be set to match the SFP device inserted.

Alternatively, this can be set to AUTO, in which case the software will read the device type from the SFP and select either 1000BaseX or 100BaseFX determined by the information read back.

4.2.2.5 Auto Negotiation

When operating in 1000baseX mode, Auto negotiation must be enabled.

4.2.2.6 Negotiated

When Auto Negotiation is enabled, this displays the mode negotiated.

4.2.2.7 SFP Info

This menu displays further information regarding the SFP device:

```

Metrodata WCMx100 " "                               Alarms: Major
                                                    EoPDH SFP Info           Slot: 0
                                                    -----
Status      Type      Vendor      Part No.      Transmit
-----
Good        1000BASE-SX  HG GENUINE  MXPDP-248S-F  850nm

```

<Escape> - exit, other key - refresh

4.2.2.8 Counters

The counters option displays the MIB-2 statistics gathered for the WAN port.

```

Metrodata WCMx100 " "                               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

```

<Escape> - exit, C - clear, other key - refresh

4.2.2.9 OAM

The WCMx100 supports IEEE 802.3ah Link OAM which may be configured on a per port basis:

```
Metrodata WCMx100 " "                               Alarms: Major
OAM
Mode           Active
Status         <display>
```

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

4.2.2.9.1 OAM Mode

The port may be configured to be:

| | |
|----------|--|
| Disabled | OAM packets not generated, and discarded |
| Active | OAM status requests generated once per second |
| Passive | OAM Status Updates will be generated in response to Status Requests. |

4.2.2.9.2 OAM Status

When two ports are running OAM, the status screen enables the user to determine the status of the remote device.

Metrodata WCMx100 "" Alarms: Major

```

                                OAM STATUS
                                -----
                                | Local   | Local   | Peer   | Peer   | Peer   | Peer   |
                                | Status  | Support | Mode   | MAC address | VendorInfo | Support |
                                |-----|-----|-----|-----|-----|-----|
SFP      | Fault  |      L |      |      |      |      |
Remote Status
-----
Not available
    
```

<Escape> - exit, other key - refresh

Where the peer device is another Metrodata device, proprietary extensions to OAM are used to report further peer status information.

4.2.2.10 mGmt Traffic

In order to provide traffic isolation this parameter defines what type of traffic passes over this interface. The options are as below

- User + Mgmt** This port carries user and management traffic. Management frames are switched to the processor, whilst user frames are switched to the LAN ports.
- User only** This port only carries user traffic and ALL frames are switched to the LAN ports with no access to the management processor
- Mgmt only** This port only carries Management Traffic and all frames are forwarded to the management processor with no frames forwarded to the LAN ports. This state **MUST** be avoided as it would prevent any user data passing over the E1 interface.

4.2.2.11 VLAN ID

If the Traffic Isolation mode is set to VLAN then the LAN port may be configured as either ACCESS, or TRUNK.

A port is configured as an Access Port if it is assigned to a VLAN, ie given a VLAN ID between 1 and 4095. All frames ingressing this port will have a VLAN Tag added, and on egress will have the tag removed. This configuration item defines the VLAN ID which will be added and may be in the range (1 to 4095). One or more ports may be assigned to the same VLAN and packets will then only switch between those ports and trunk ports.

A port is configured as TRUNK, if the VLAN ID 0 or none is selected. In this case frames ingress, or egress, with tags unchanged. A trunk is assumed to be a member of all VLANs

4.2.2.12 QinQ S-TAG ID

If the Traffic Isolation mode is set to QinQ then the LAN port may be assigned provider mode Service Tag, S-TAG. and all frames ingressing this port will have the S-Tag added. This configuration item defines the S-TAG ID which will be added and may be in the range (1 to 4095). One or more ports may be assigned the same S-TAG and packets will then only switch between those ports and the WAN interface.

In QinQ mode, ingress packets may be tagged or untagged and all will have a single S-TAG stripped before egress.

4.2.2.13 default Priority

When the traffic isolation mode is VLAN, this is the priority value that is added with the VLAN ID during ingress at an Access Port. In QinQ mode, untagged packets are given this default priority, whilst tagged packets promote the C-TAG priority to the S-TAG priority.

4.2.3 WCM1100 WAN Port

The WCM1100 WAN Port menu is as below:

```

COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM1100 "" Alarms: Major
WAN
State Up
Interface Ei Unbal <BNC>
Timing Internal
rx sEnsitivity Short-haul
Framing Framed
crc-4 Enabled
sigNalling Disabled

Counters <display>
OAM <menu>
nGmt traffic User+Mgmt
ULAN ID <None>
QinQ S-Tag ID <1>

First CAPITAL - select item
> - next page
<escape> - exit menu

```

and next page

```

COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM1100 "" Alarms: Major
WAN
<
default Priority <0>

First CAPITAL - select item
< - prev page
<escape> - exit menu

```

The available options are as below:

4.2.3.1 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.

4.2.3.2 Interface

The E1 port physical interface may be selected as below:

| | |
|------------------|--|
| 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. |

4.2.3.3 Timing

The E1 port may be operated in either:

| | |
|----------|--|
| Internal | E1 Transmit Timing derived from the internal oscillator |
| Loop | E1 Transmit Timing derived from the E1 Receive Timing. Under loss of signal conditions, the timing will fall back to the local oscillator. |

4.2.3.4 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 |

4.2.3.5 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 |

4.2.3.6 Allocation

When Fractional Framing mode is selected, this configuration item allows the required timeslots to be configured.

```

COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM1100 "" Alarms: Major
WAN
State Up
Interface E1 Unbal <BNC>
Timing Internal
rx sensitivity Short-haul
Framing Fractional
crc-4 Enabled
sigNalling Disabled
Allocation 1,2,5-7

Counters <display>
OAM <menu>
nGmt traffic User+Mgmt
ULAN ID <None>

First CAPITAL - select item
> - next page
<escape> - exit menu

```

The timeslot allocation may be contiguous or non contiguous and may be defined as follows:

| | |
|---------|---------------------------------------|
| 1,2,3 | Select timeslot 1, 2 and 3 |
| 1-3 | Select timeslot 1 to 3 |
| 1,2,5-7 | Select timeslots 1, 2 and 5, 6 and 7. |

4.2.3.7 CRC-4

When operating in Framed or Fractional mode CRC-4 multiframe mode may be enabled or disabled.

4.2.3.8 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.

4.2.3.9 Counters

The counters option displays the MIB-2 statistics gathered for the WAN port.

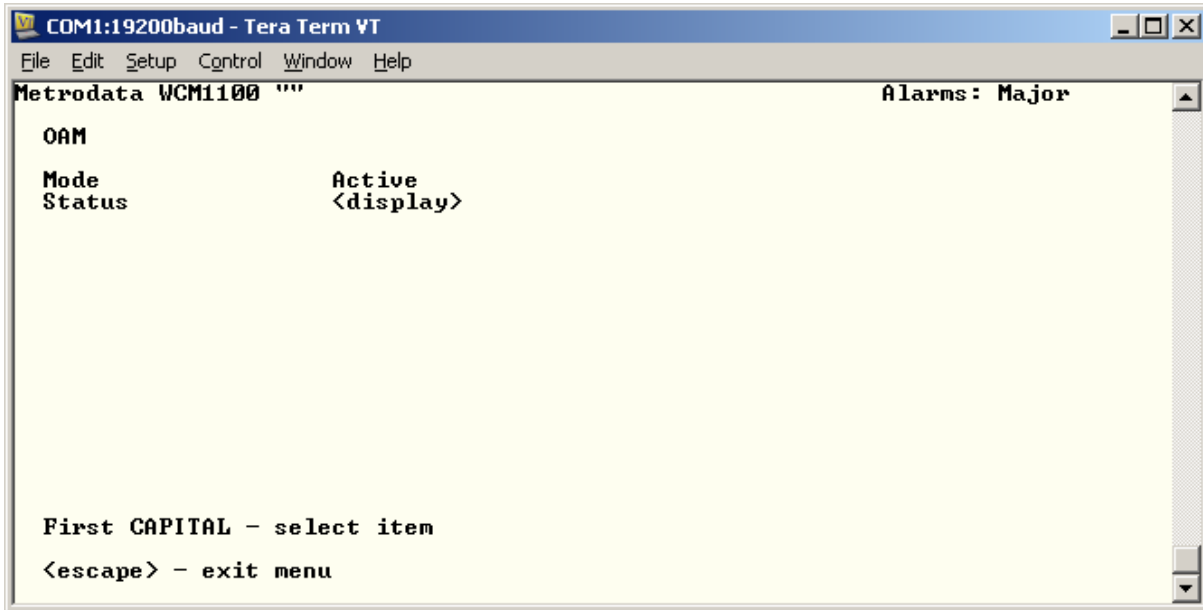
```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM1100 ''' Alarms: Major
-----
Interface Statistics          Encap/Decap Statistics
-----
ifInOctets                   0          Encap Frames              7
ifInUcastPkts                0          Decap Good Packets       0
ifInNUcastPkts               0          Decap Bad Packets        0
ifInDiscards                 0
ifInErrors                   0
ifInUnknownProtos            0
ifOutOctets                  448
ifOutUcastPkts               0
ifOutNUcastPkts              7
ifOutDiscards                0
ifOutErrors                  0

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

Additionally, the WAN ports displays the statistics for the packet encapsulator. Since the WAN port operates at a lower speed than the LAN ports, there may be traffic overload leading to packet discards. The Interface Statistics contain the frames that enter/leave the WAN port on the system side. The ifIn statistics correspond to the Encap Frames count and thus if the combined "ifInUcastPkts" and "ifInNUcastPkts" counts are greater than the Encap Frames, it is a sign that packets are being discarded due to WAN link overload.

4.2.3.10 OAM

The WCM1100 WAN Port supports IEEE 802.3ah Link OAM which may be configured on a per port basis:



4.2.3.10.1 OAM Mode

The port may be configured to be:

| | |
|----------|--|
| Disabled | OAM packets not generated, and discarded |
| Active | OAM status requests generated once per second |
| Passive | OAM Status Updates will be generated in response to Status Requests. |

4.2.3.10.2 OAM Status

When two ports are running OAM, the status screen enables the user to determine the status of the remote device.

```

COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM1100 "" Alarms: Major
OAM STATUS
-----
: Local : Local : Peer : Peer : Peer : Peer
: Status : Support : Mode : MAC address : VendorInfo : Support
-----
WAN      Fault      L
Remote Status
-----
Not available

<Escape> - exit, other key - refresh

```

Where the peer device is another Metrodata device, proprietary extensions to OAM are used to report further peer status information.

4.2.3.11 mGmt Traffic

In order to provide traffic isolation this parameter defines what type of traffic passes over this interface. The options are as below

- User + Mgmt This port carries user and management traffic. Management frames are switched to the processor, whilst user frames are switched to the LAN ports.
- User only This port only carries user traffic and ALL frames are switched to the LAN ports with no access to the management processor
- Mgmt only This port only carries Management Traffic and all frames are forwarded to the management processor with no frames forwarded to the LAN ports. This state MUST be avoided as it would prevent any user data passing over the E1 interface.

4.2.3.12 VLAN ID

If the Traffic Isolation mode is set to VLAN then the WAN port may be configured as either ACCESS, or TRUNK.

A port is configured as an Access Port if it is assigned to a VLAN, ie given a VLAN ID between 1 and 4095. All frames ingressing this port will have a VLAN Tag added, and on egress will have the tag removed. This configuration item defines the VLAN ID which will be added and may be in the range (1 to 4095). One or more ports may be assigned to the same VLAN and packets will then only switch between those ports and trunk ports.

A port is configured as TRUNK, if the VLAN ID 0 or none is selected. In this case frames ingress, or egress, with tags unchanged. A trunk is assumed to be a member of all VLANs

In normal operation, the WAN port will be assigned Trunk Status.

4.2.3.13 QinQ S-TAG ID

If the Traffic Isolation mode is set to QinQ then the WAN port may be assigned provider mode Service Tag, S-TAG. and all frames ingressing this port will have the S-Tag added. This configuration item defines the S-TAG ID which will be added and may be in the range (1 to 4095). One or more ports may be assigned the same S-TAG and packets will then only switch between those ports and the WAN interface.

In QinQ mode, ingress packets may be tagged or untagged and all will have a single S-TAG stripped before egress.

4.2.3.14 default Priority

When the traffic isolation mode is VLAN, this is the priority value that is added with the VLAN ID during ingress at an Access Port. In QinQ mode, untagged packets are given this default priority, whilst tagged packets promote the C-TAG priority to the S-TAG priority.

4.2.4 WCM3100 WAN Port

The WCM3100 WAN Port menu is as below:

```

COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM3100 "" Alarms: Major
WAN
State Up
Interface E3
Timing Internal
Framing G.832
Counters <display>
OAM <menu>
mGmt traffic User+Mgmt
ULAN ID <None>
QinQ S-Tag ID <1>
default Priority <0>
First CAPITAL - select item
<escape> - exit menu

```

and when DS-3 is selected

```

COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM3100 "" Alarms: Major
WAN
State Up
Interface DS3
Timing Internal
tx line Build-Out 0-225ft
Framing C-Bit
Counters <display>
OAM <menu>
mGmt traffic User+Mgmt
ULAN ID <None>
QinQ S-Tag ID <1>
default Priority <0>
First CAPITAL - select item
<escape> - exit menu

```

The available options are as below:

4.2.4.1 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.

4.2.4.2 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. |

4.2.4.3 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. |

4.2.4.4 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. |

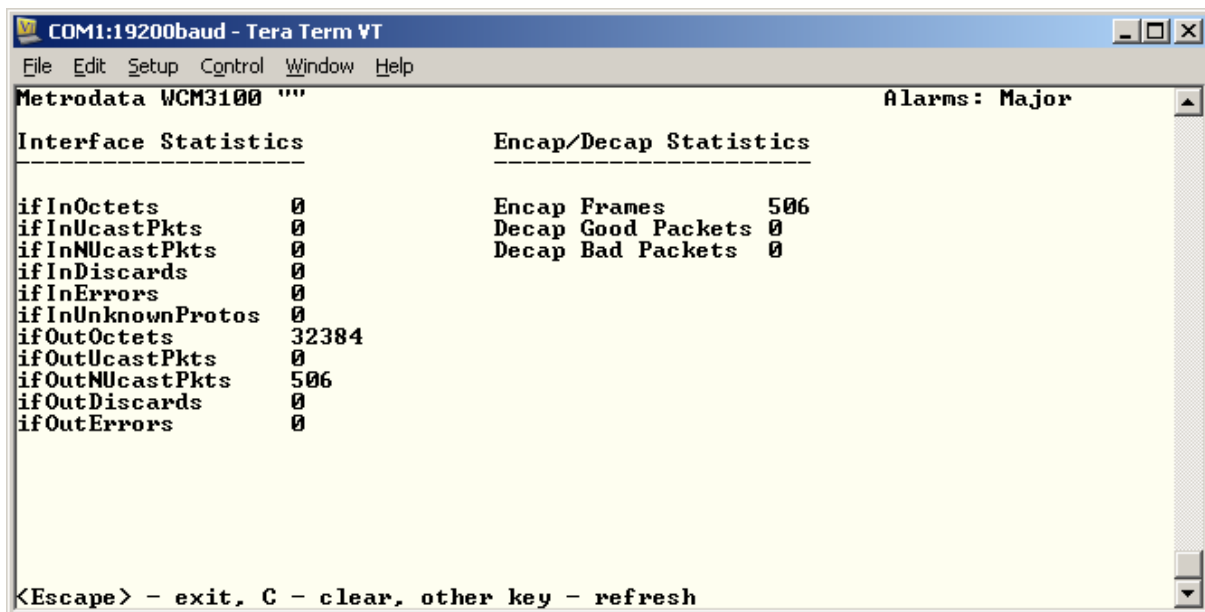
4.2.4.5 Framing

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 |

4.2.4.6 Counters

The counters option displays the MIB-2 statistics gathered for the WAN port.



The screenshot shows a terminal window titled "COM1:19200baud - Tera Term VT". The window displays the following statistics:

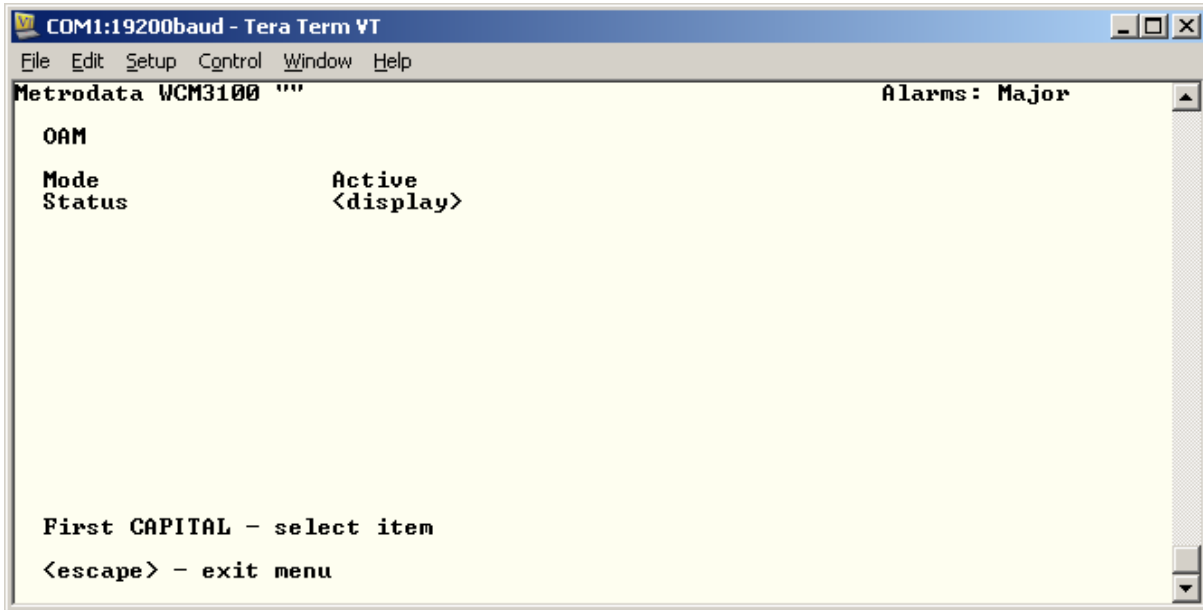
```
Metrolata WCM3100 "" Alarms: Major
-----
Interface Statistics          Encap/Decap Statistics
-----
ifInOctets                   0          Encap Frames           506
ifInUcastPkts                0          Decap Good Packets    0
ifInNUcastPkts              0          Decap Bad Packets     0
ifInDiscards                 0
ifInErrors                   0
ifInUnknownProtos           0
ifOutOctets                  32384
ifOutUcastPkts               0
ifOutNUcastPkts             506
ifOutDiscards                0
ifOutErrors                  0
```

<Escape> - exit, C - clear, other key - refresh

Additionally, the WAN ports displays the statistics for the packet encapsulator. Since the WAN port operates at a lower speed than the LAN ports, there may be traffic overload leading to packet discards. The Interface Statistics contain the frames that enter/leave the WAN port on the system side. The ifIn statistics correspond to the Encap Frames count and thus if the combined "ifInUcastPkts" and "ifInNUcastPkts" counts are greater than the Encap Frames, it is a sign that packets are being discarded due to WAN link overload.

4.2.4.7 OAM

The WCM3100 WAN Port supports IEEE 802.3ah Link OAM which may be configured on a per port basis:



4.2.4.7.1 OAM Mode

The port may be configured to be:

| | |
|----------|--|
| Disabled | OAM packets not generated, and discarded |
| Active | OAM status requests generated once per second |
| Passive | OAM Status Updates will be generated in response to Status Requests. |

4.2.4.7.2 OAM Status

When two ports are running OAM, the status screen enables the user to determine the status of the remote device.

```

COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM3100 "" Alarms: Major
OAM STATUS
-----
      | Local | Local | Peer | Peer | Peer | Peer
      | Status | Support | Mode | MAC address | VendorInfo | Support
-----+-----+-----+-----+-----+-----
WAN   | Fault |      L |      |      |      |
Remote Status
-----
Not available

<Escape> - exit, other key - refresh

```

Where the peer device is another Metrodata device, proprietary extensions to OAM are used to report further peer status information.

4.2.4.8 mGmt Traffic

In order to provide traffic isolation this parameter defines what type of traffic passes over this interface. The options are as below

- User + Mgmt This port carries user and management traffic. Management frames are switched to the processor, whilst user frames are switched to the LAN ports.
- User only This port only carries user traffic and ALL frames are switched to the LAN ports with no access to the management processor
- Mgmt only This port only carries Management Traffic and all frames are forwarded to the management processor with no frames forwarded to the LAN ports. This state MUST be avoided as it would prevent any user data passing over the E1 interface.

4.2.4.9 VLAN ID

If the Traffic Isolation mode is set to VLAN then the WAN port may be configured as either ACCESS, or TRUNK.

A port is configured as an Access Port if it is assigned to a VLAN, ie given a VLAN ID between 1 and 4095. All frames ingressing this port will have a VLAN Tag added, and on egress will have the tag removed. This configuration item defines the VLAN ID which will be added and may be in the range (1 to 4095). One or more ports may be assigned to the same VLAN and packets will then only switch between those ports and trunk ports.

A port is configured as TRUNK, if the VLAN ID 0 or none is selected. In this case frames ingress, or egress, with tags unchanged. A trunk is assumed to be a member of all VLANs

In normal operation, the WAN port will be assigned Trunk Status.

4.2.4.10 QinQ S-TAG ID

If the Traffic Isolation mode is set to QinQ then the WAN port may be assigned provider mode Service Tag, S-TAG. and all frames ingressing this port will have the S-Tag added. This configuration item defines the S-TAG ID which will be added and may be in the range (1 to 4095). One or more ports may be assigned the same S-TAG and packets will then only switch between those ports and the WAN interface.

In QinQ mode, ingress packets may be tagged or untagged and all will have a single S-TAG stripped before egress.

4.2.4.11 default Priority

When the traffic isolation mode is VLAN, this is the priority value that is added with the VLAN ID during ingress at an Access Port. In QinQ mode, untagged packets are given this default priority, whilst tagged packets promote the C-TAG priority to the S-TAG priority.

4.2.5 Encapsulation

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

Metrodata WCMx100 ""

Alarms: Major

ENCAPSULATION

| | |
|----------------|----------|
| Encapsulation | HDLC |
| HDLC FCS | 16-bit |
| strip MAC FCS | Yes |
| Flow control | Disabled |
| maX frame size | 2048 |
| Priority Table | <menu> |

First CAPITAL - select item

<escape> - exit menu

In the Version 7.9 software release the only mode supported is HDLC encapsulation using a 16bit FCS and MAC frame checksum removal.

4.2.5.1 Flow Control

The WCMx100 may be configured to use IEEE 802.3x pause frame based flow control when loss less operation is desired. If Flow control is to be enabled, all ports MUST be configured for Auto Negotiation.

Enabling flow control disables the priority queue support and must be used with care since flow control is not selective and may well block important traffic due to overload with low priority traffic.

4.2.5.2 Max Frame Size

The WCMx100 supports jumbo frames up to 10k bytes in size. The maximum frame size is configurable to support either

1522, 2048, 10k

4.2.5.3 Priority Table

The WCMx100 support priority queuing and may be configured to use the 802.1p priority tag, or the IP DSCP flag as the priority indication.

The WCMx100 supports 4 levels of priority queuing on the WAN port. The Priority table menu allows the user to map the 8 levels of 802.1p, and 64 levels of DSCP to the four levels of the WCMx100.

4.2.5.3.1 802.1p Mode

```
Metrodata WCM3100 " "                               Alarms: Major

PRIORITY TABLE

Priority Scheme      802.1p

1 High              6,7
2 Medium            4,5
3 Low               2,3
4 Best Effort       0,1

Restore Defaults

First CAPITAL - select item

<escape> - exit menu
```

4.2.5.3.2 IP DSCP Mode

```
Metrodata WCM3100 " "                               Alarms: Major

PRIORITY TABLE

Priority Scheme      DSCP

1 High              40-63
2 Medium            24-39
3 Low               8-23
4 Best Effort       0-7

Restore Defaults

First CAPITAL - select item

<escape> - exit menu
```

4.2.6 Traffic Isolation

The WCMx100 contains a VLAN aware switch and will support Access and Trunk ports with VLAN tags and Priorities being added on ingress to an Access port. The WCMx100 also offers QinQ S-Tag access ports to enable carriers to group customer traffic within a single group.

```
Metrodata WCMx100 " " Alarms: Major
```

```
TRAFFIC ISOLATION
```

```
Isolation mode      None  
QinQ EtherType     (9100)
```

```
First CAPITAL - select item
```

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

4.2.7 RSTP

The WCMx100 supports Rapid Spanning Tree to prevent loops when back up or resilient connections are made.

```
Metrodata WCMx100 " " Alarms: Major
```

```
RSTP
```

```
Mode                Enabled  
Priority             8  
maxAge              20  
Hello time          2  
Forward delay       15  
Tx Hold             1  
Version             rstp  
Status              <display>
```

```
First CAPITAL - select item
```

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

4.3 *SNMP Management*

The WCMx100 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 WCMx100 ""                               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

4.3.1 *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.

4.3.2 *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.

4.3.3 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.

4.3.4 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.

4.3.5 Managers

To enable access to the WCMx100 using SNMP, specific manager addresses must be configured. Once a Manager is assigned, the WCMx100 will respond to polls and generate traps for that manager. The WCMx100 supports up to 10 configured Network Management Stations.

The Add Manager Menu is as below:

```
Metrodata WCMx100 " "                               Alarms: Major
ADD MANAGER
IP address      0.0.0.0
Access rights   None
receives Traps  No
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.

4.4 Saving the Configuration

Once the WCMx100 has been configured, the configuration must be saved to the EEPROM to provide non-volatile storage.

```
Metrodata WCMx100 " "                               Alarms: Major

MAIN SET-UP

Global status          <display>
alarm eXtension        <menu>

Data port set-up      <menu>
V.24 set-up           <menu>
Management             <menu>
System                 <menu>
Update EEPROM

Testing                <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.

5 TFTP SOFTWARE UPDATE

The WCMx100 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.

5.1 TFTP Configuration

Under the management menu, select TFTP and enter the parameters as required:

5.1.1 Client Mode

Select client mode to display the menu as below:

```
Metrodata WCMx100 ""                               Alarms: Major
TFTP
Mode                Client
remote IP           0.0.0.0
Get new software    <display>
get Config.
Put config.

First CAPITAL - select item

<escape> - exit menu
```

In client mode, an external server is required. Enter the IP address of the TFTP server and then issue the Get new Software command.

Once the software has been downloaded it will prompt to check you wish to proceed with the upgrade. Once the upgrade is completed, the WCMx100 will restart.

5.1.2 Server Mode

Select SERVER mode to display the menu as below:

```
Metrodata WCMx100 " "                               Alarms: Major
TFTP
Mode                Server
remote IP           0.0.0.0
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 "WCMx100 IP Address" put "Source Filename" "Software File Name"
```

eg

```
tftp -i 192.168.0.1 put wcm1100.79 software
```

Which will load a file named "wcm1100.79" onto the WCMx100 with IP address 192.168.0.1 and load as a file called "software"