



LHM1000 Managed Ethernet Extender
Quick Start Guide

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1 INTRODUCTION

The Metrodata LHM1000 allows for the extension of an Ethernet Service over a HSSI, Wide Area Network Connection. The LHM1000 is a managed unit allowing for the effective demarcation between LAN and WAN services. Management of the LHM1000 is achieved using either Telnet or SNMP via either the LAN or WAN ports.

In cases where management is not required, or undesired, the LHM1000 can operate standalone with simple configuration options provided using bit switches located on the underside of the unit.

The Metrodata LHM1000 is a manageable multiport Ethernet Switch with a HSSI uplink. The LHM1000 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 LHM1000 operate as a layer 2 bridge and as such may be used to extend a LAN segment over a HSSI WAN link.

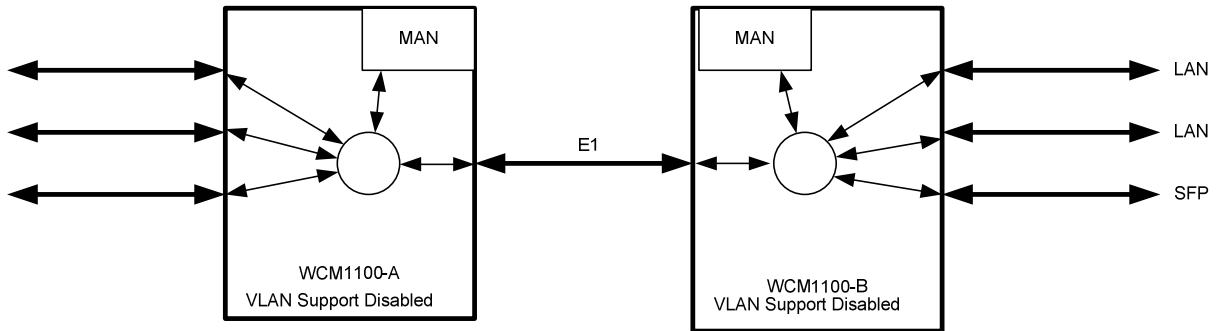
The LHM1000 has an internal LAN switch offering full wire-speed switching between ports. The LHM1000 uses MAC address filtering to filter all local traffic and only forward traffic destined for remote stations. Each of the LHM1000's LAN ports support automatic cross-over switching and will therefore connect directly to a Hub/Switch/Router or PC End Station.

The LHM1000 has support for both tagged and untagged frames, with both VLAN C-Tag, and Provider Bridge S-Tag (QinQ) modes supported.

The LHM1000 performs HDLC encapsulation with a single flag between frames to give maximum utilisation of the HSSI WAN link. Internal packet buffers enable the LHM1000 to smooth out bursty traffic and prevent packet loss as the higher layer protocols rate adapt to the HSSI capacity. The HSSI port supports unframed operating modes.

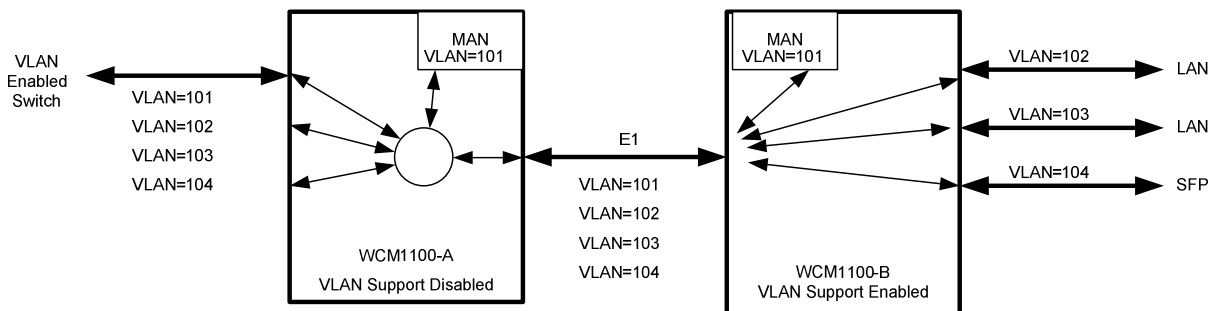
2 LHM1000 APPLICATIONS

2.1 LHM1000 Normal Mode



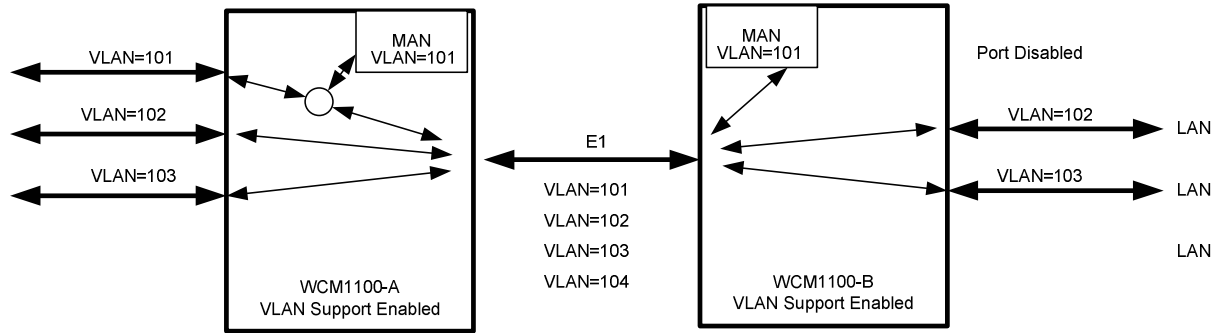
In this application, the LHM1000 is operating with Traffic Isolation Disabled. In this mode, the LHM1000 acts as a simple, layer 2, 5 port switch with packets being switched based on MAC address alone. The LHM1000 supports both local and remote switching.

2.2 LHM1000 VLAN Trunk Mode



In this application, LHM1000-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. LHM1000-A is operating with VLAN support disabled, but with a VLAN ID allocated to the Manager. In this way, the management VLAN, in this case 101 can be used to manage the LHM1000. LHM1000-B is configured with VLAN support enabled and thus each port is isolated to a single VLAN.

2.3 VLAN Mode



In this mode, both LHM1000 units have VLAN support enabled. VLAN 101 is used as the management VLAN and in unit LHM1000-A the VLAN group 101 includes the LAN Port 1, the Manager and the HSSI port. At the remote end, Port 1 is disabled to prevent customer access to the LHM1000 manager.

3 QUICK START CONFIGURATION

The following guide gives a simple, quick start introduction to configuring the LHM1000 for Normal Mode operation as shown in section 2.1

3.1 Cold Start the Unit

When a LHM1000 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 LHM1000 has a set of accessible bit switches and a label as shown below:



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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

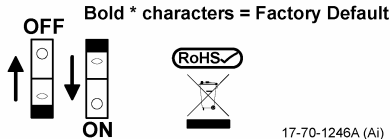
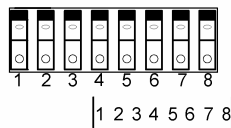
LHM1000
Managed Ethernet Extender
over HSSI (AC)

Part No. 80-70-544

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

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			
5			
6			
7	SFP Mode	1000Base-X*	100Base-FX
8	Factory Default	Normal Operation*	Return to Default Settings



To cold start the unit, first set bit switch 8 (Cold Start) to the OFF (Factory Default) position. Power up the LHM1000, 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. Ensure all other bit switches are in the default positions as shown on the label. Power up the unit which will now be in the factory default state.

3.1.1 Bit Switches

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

3.1.1.1 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 LHM1000 device.

ON	Proxy Mode Disabled
OFF	Proxy Mode Enabled,

|

3.1.1.2 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

3.1.1.3 Bitswitch 3, DHCP

This bitswitch enables DHCP for IP address allocation on the LHM1000.

ON	DHCP Disabled
OFF	DHCP Enabled

3.1.1.4 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

3.1.1.5 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.

3.2 Access the LHM1000

Initial access to the LHM1000 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.

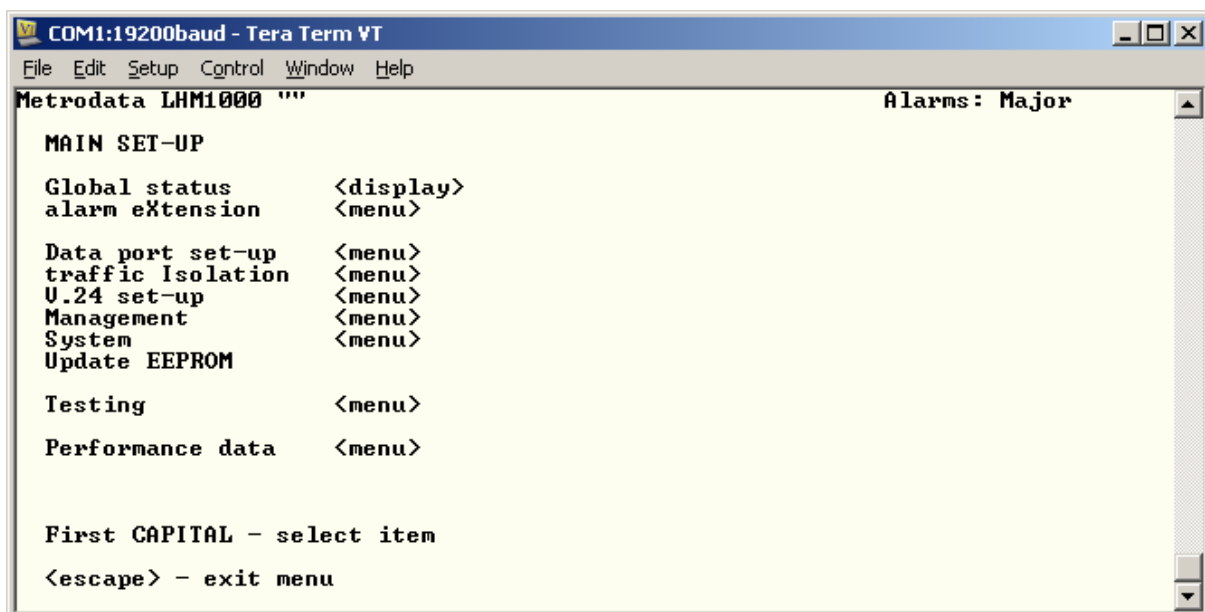
3.3 Logging onto LHM1000

The initial access to the LHM1000 must use a terminal connected to the terminal port.

The LHM1000 has a password protected, menu driven user interface. When a management session is connected to the LHM1000, the welcome banner will be displayed as shown:

**Metrodata LHM1000: Local connection to ""
Password ('view' to view only) :**

At the prompt, enter the password to gain access to the LHM1000. The default password is "LHM1000". 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:



```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata LHM1000 "" Alarms: Major
MAIN SET-UP
Global status      <display>
alarm eXtension    <menu>
Data port set-up   <menu>
traffic Isolation  <menu>
U.24 set-up        <menu>
Management         <menu>
System             <menu>
Update EEPROM
Testing            <menu>
Performance data   <menu>
First CAPITAL - select item
<escape> - exit menu
```

3.3.1 User Interface Navigation

The LHM1000 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:

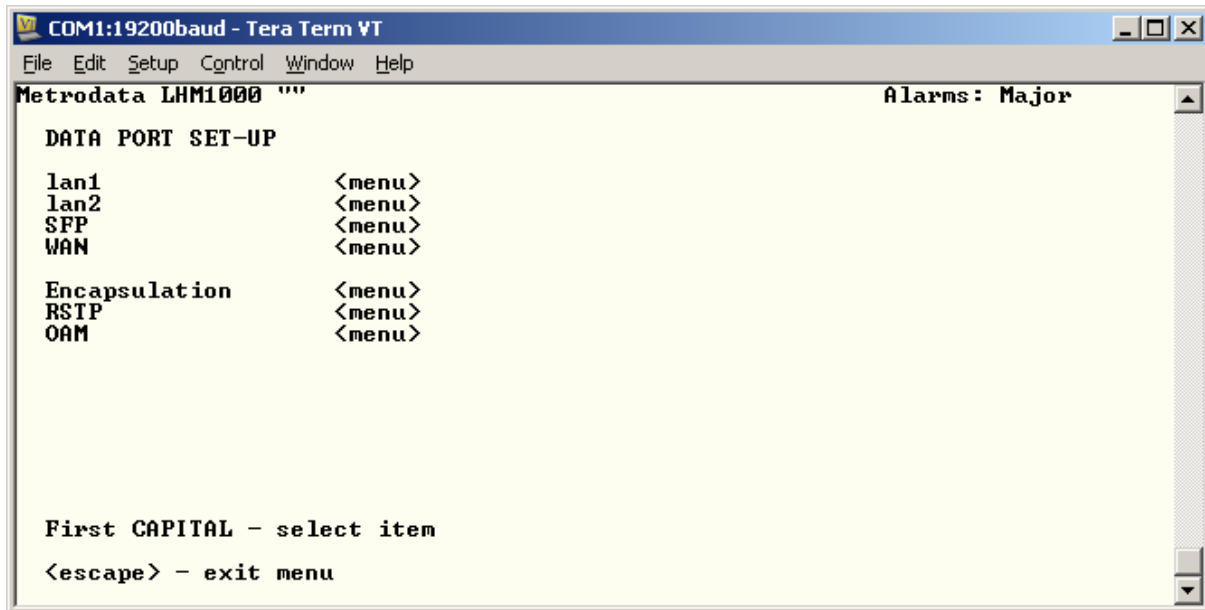
<ESC>	This will exit the current menu, or log out from the main set up menu.
<SPACE>	This will toggle through a list of selectable options
<ENTER>	This will select an item

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

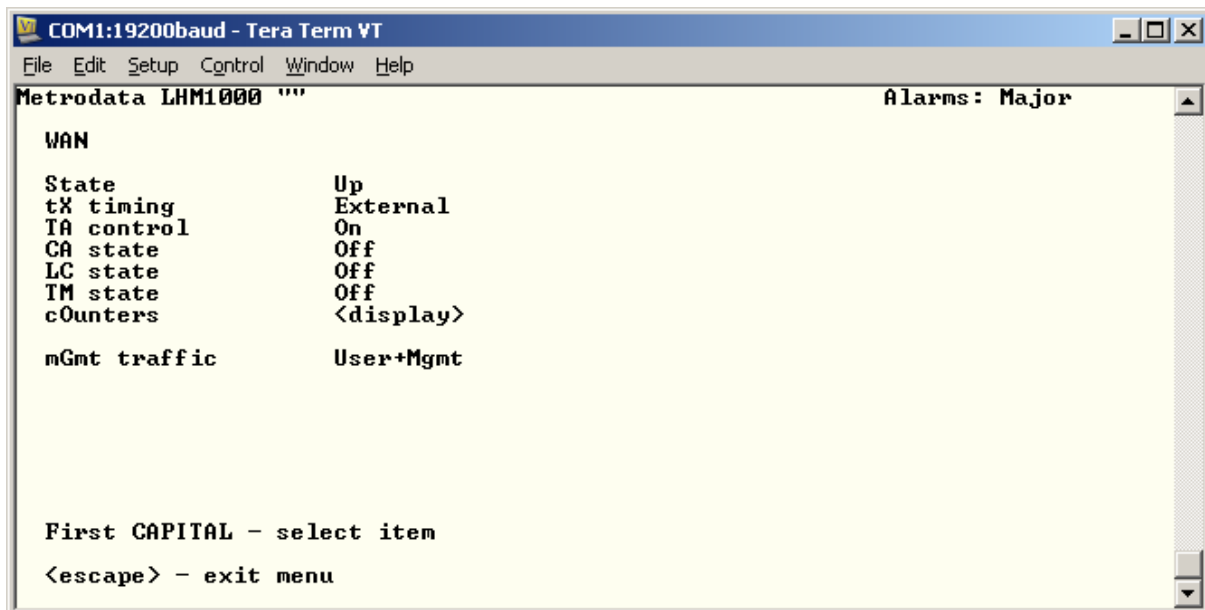
3.4 Configure the WAN interface

In order for two LHM1000 units to communicate they must be connected using the HSSI WAN port.

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



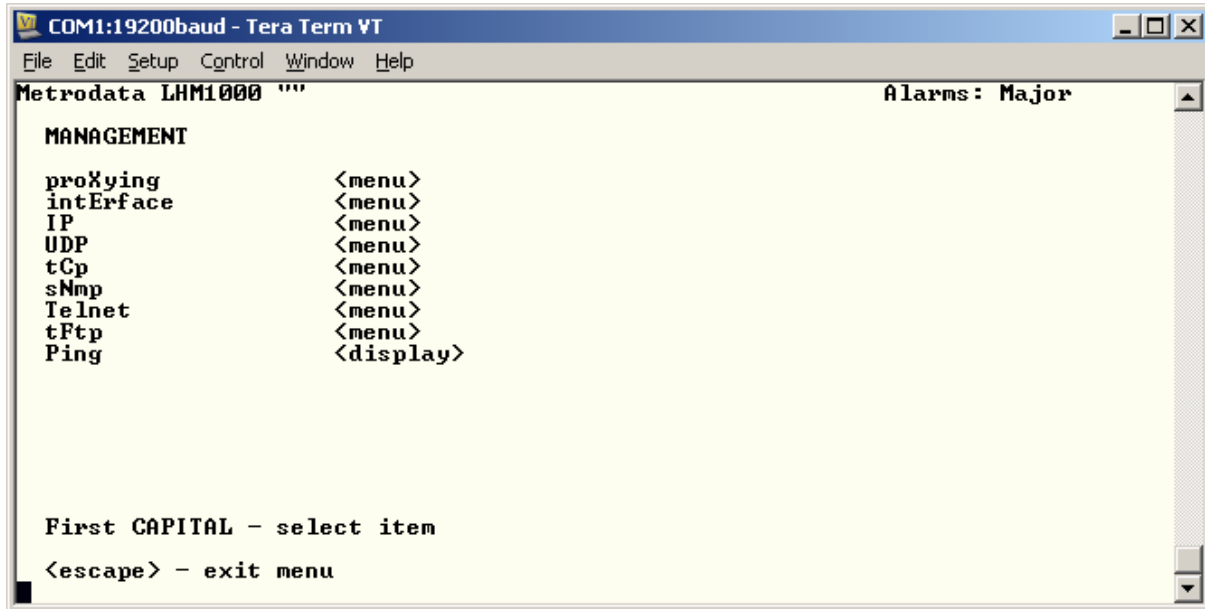
and then select the WAN (HSSI) port:



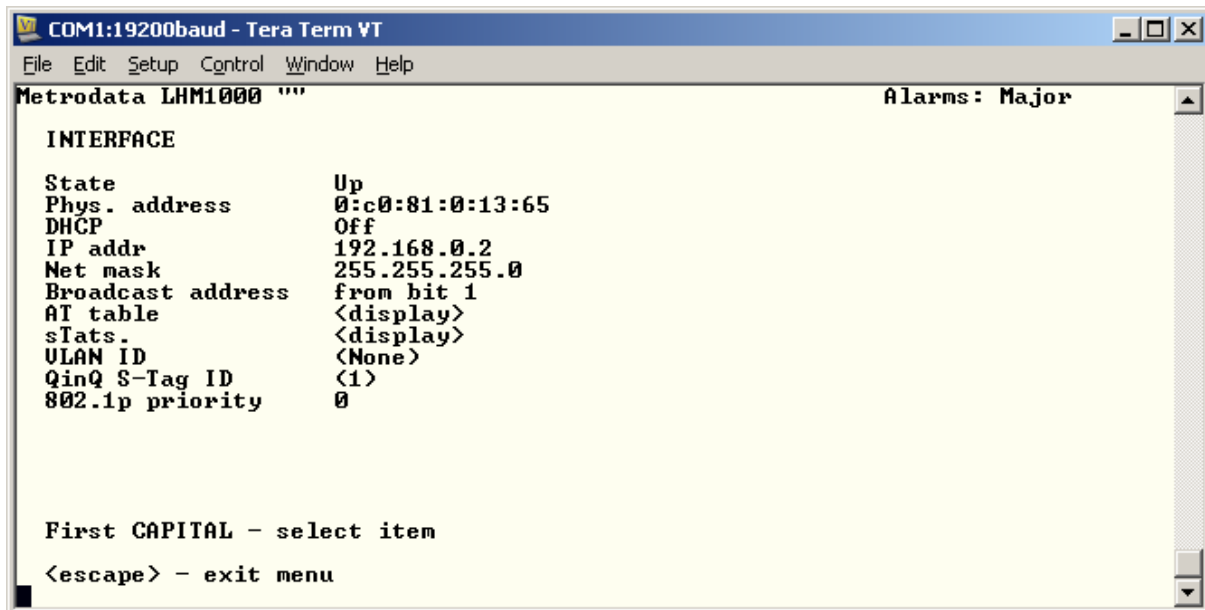
Ensure that the interface and framing modes are correctly set.

3.5 Set IP Address

From the Main Setup Menu, select Management,



and then the Interface Menu.

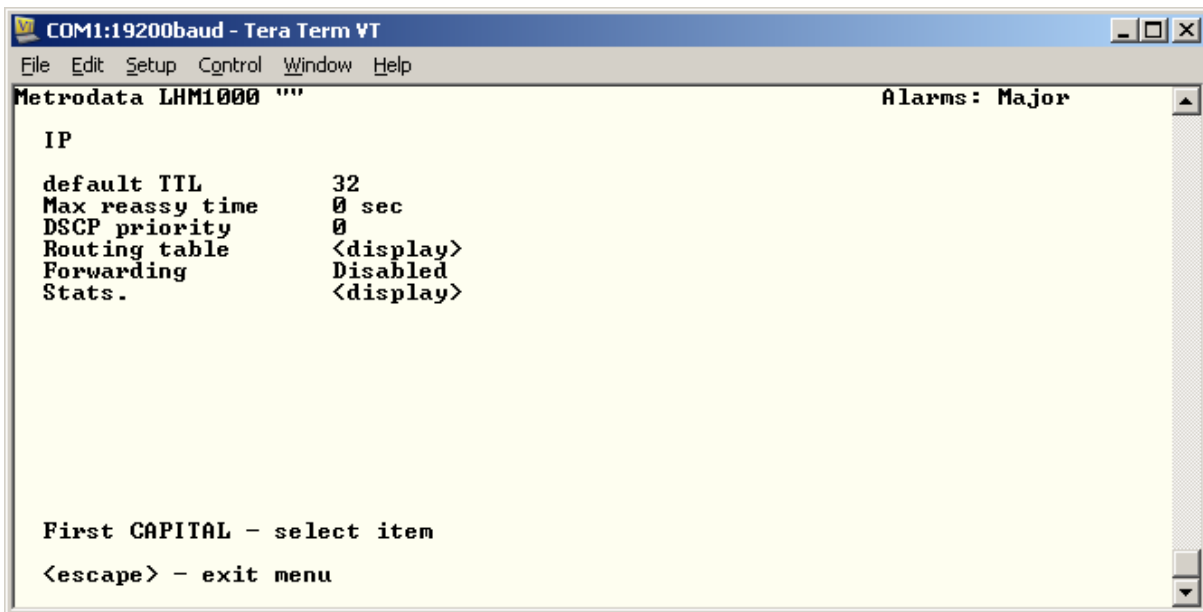


To change the IP settings for installation:

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.
Net mask	If DHCP is not used, you must assign the required network mask for correct installation into the network.

3.6 Set Default Route

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



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

```
Metrodata LHM1000 "" 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.

```

COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata LHM1000 "" Alarms: Major
Destination Next Hop I/f Type Prot. Age Mask
-----
192.168.0.0 0.0.0.0 Mgmt direct local 1107 255.255.255.0

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: 192.168.0.254

Metrodata LHM1000 "" Alarms: Major
Destination Next Hop I/f Type Prot. Age Mask
-----
192.168.0.0 0.0.0.0 Mgmt direct local 1132 255.255.255.0
0.0.0.0 192.168.0.254 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.

3.7 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.

```

COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata LHM1000 "" Alarms: Major

MAIN SET-UP

Global status <display>
alarm extension <menu>

Data port set-up <menu>
traffic Isolation <menu>
U.24 set-up <menu>
Management <menu>
System <menu>
Update EEPROM

Testing <menu>

Performance data <menu>

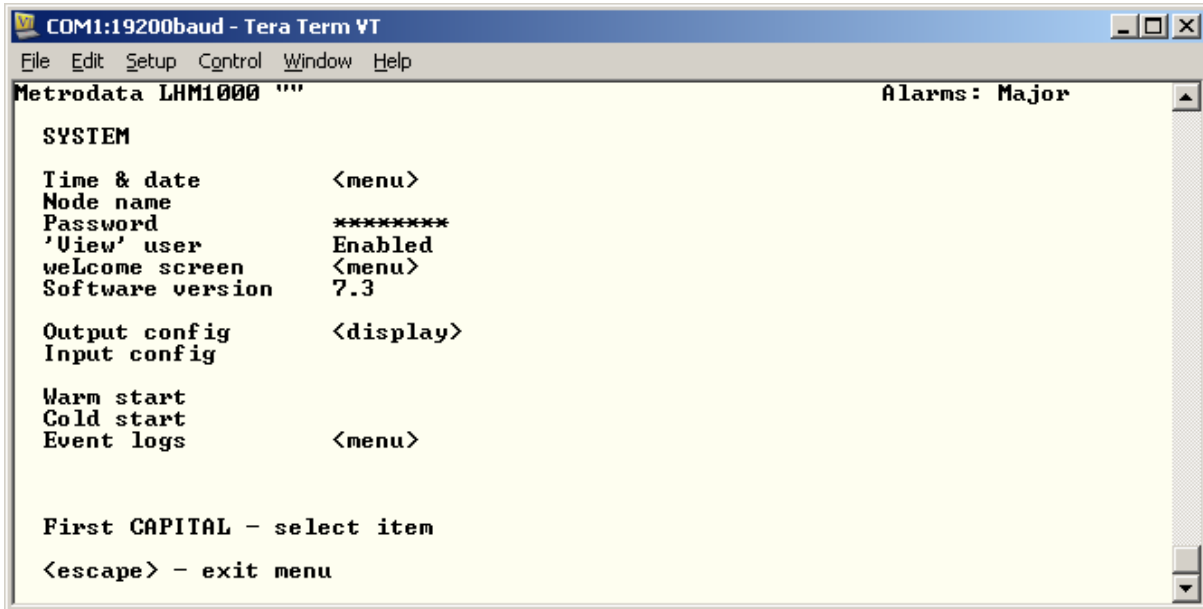
First CAPITAL - select item

<escape> - exit menu

```

3.8 Warm Start to activate the configuration

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



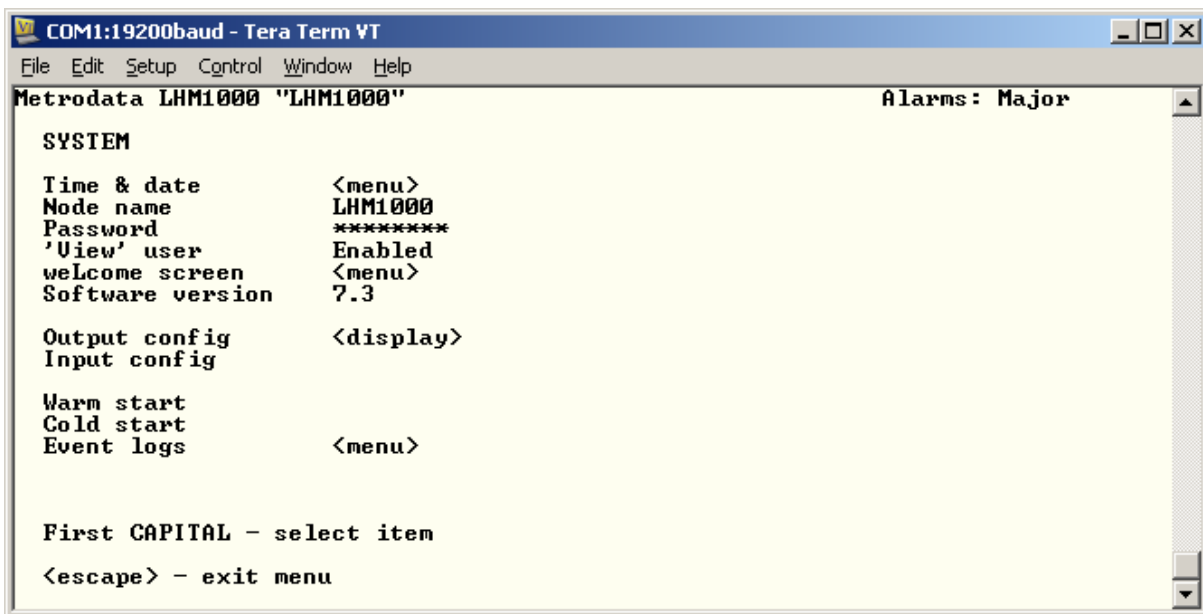
```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata LHM1000 "" Alarms: Major
SYSTEM
Time & date <menu>
Node name
Password *****
'View' user Enabled
welcome screen <menu>
Software version 7.3
Output config <display>
Input config
Warm start
Cold start
Event logs <menu>
First CAPITAL - select item
<escape> - exit menu
```

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 LHM1000 and should be configured first. The System Menu is shown below:



The screenshot shows a terminal window titled "COM1:19200baud - Tera Term VT". The menu content is as follows:

```
Metrolata LHM1000 "LHM1000"           Alarms: Major
SYSTEM
Time & date           <menu>
Node name             LHM1000
Password             *****
'View' user          Enabled
welcome screen       <menu>
Software version     7.3

Output config        <display>
Input config

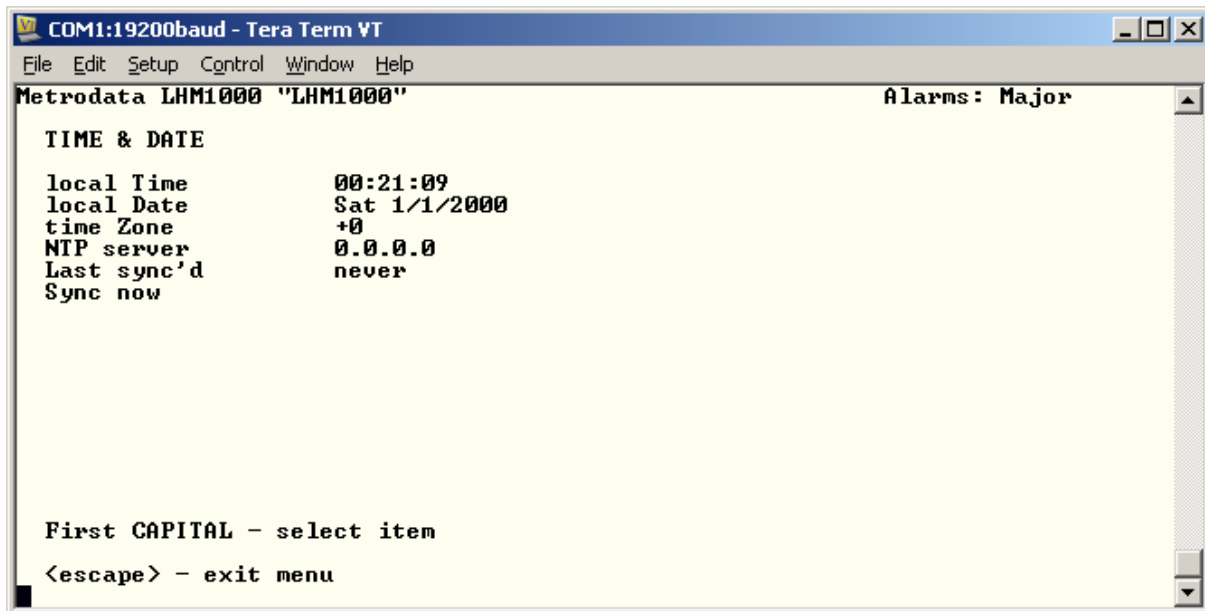
Warm start
Cold start
Event logs           <menu>

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

4.1.1 Setting the Time and Date

The LHM1000 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 LHM1000 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:



```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata LHM1000 "LHM1000" Alarms: Major
TIME & DATE
local Time      00:21:09
local Date     Sat 1/1/2000
time Zone      +0
NTP server     0.0.0.0
Last sync'd    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 LHM1000 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.

4.1.2 *Setting the Node Name*

To enable identification of the LHM1000 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.

4.1.3 Password

The password for the LHM1000 may be changed from the system menu. The default password is "lhm1000", however for deployment a more secure password may be required.

To change the unit password, select "Password" from the system menu. The LHM1000 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 LHM1000 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 "lhm1000".

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 LHM1000 supports two levels of access: admin and view. An Admin user has full access rights over the LHM1000 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.

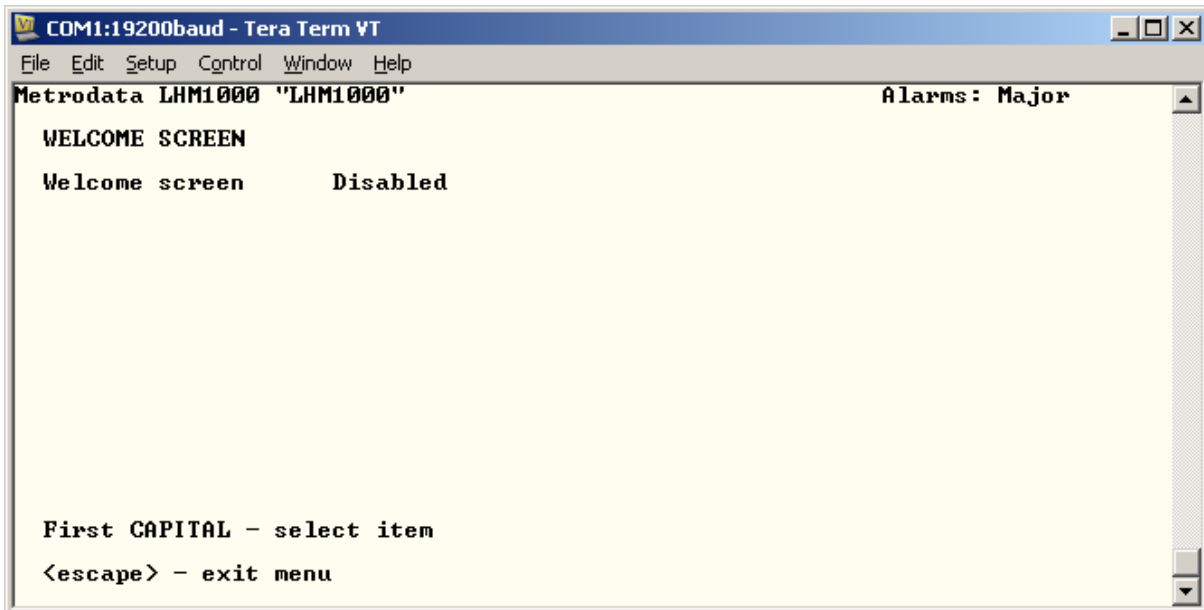
4.1.5 Welcome Screen

By default, the initial access to the LHM1000 will display the welcome banner as shown below:

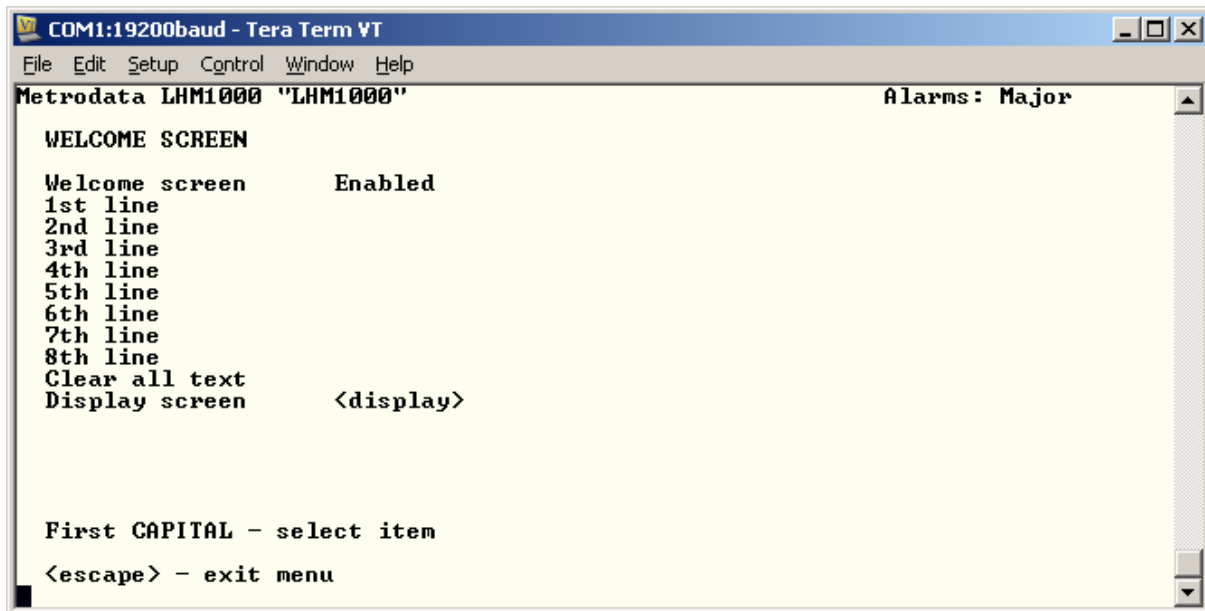
```
Metrodata LHM1000:    Local connection to ""  
Password ('view' to view only) :
```

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:

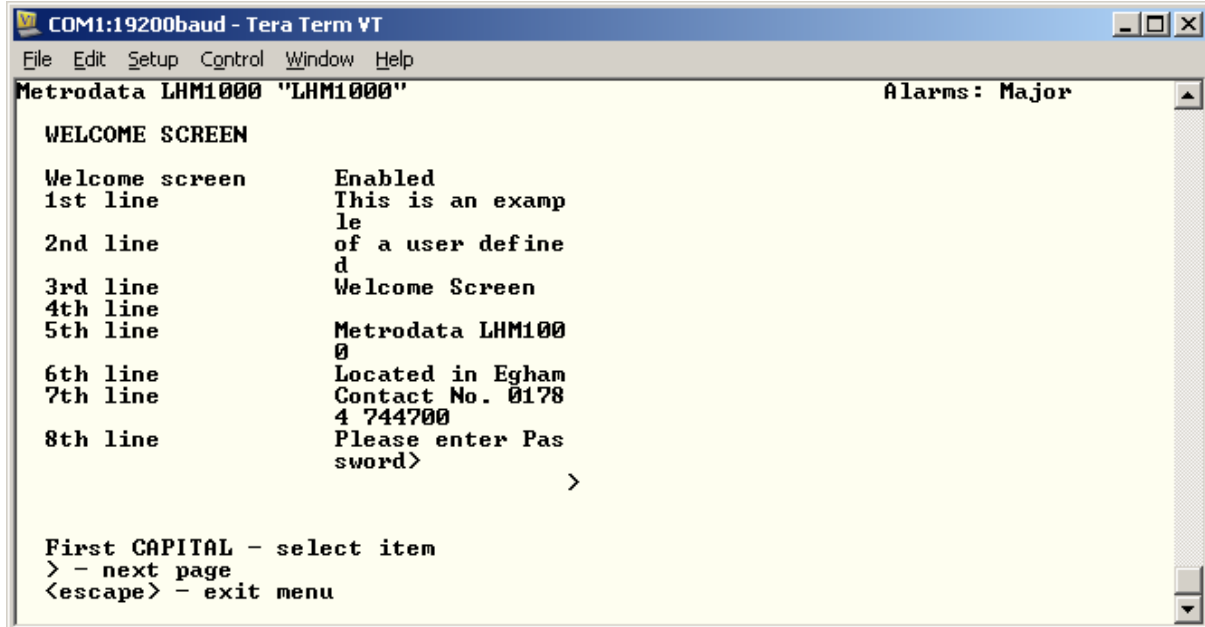


If a customized welcome is required, change to enabled and the menu will change as shown below:



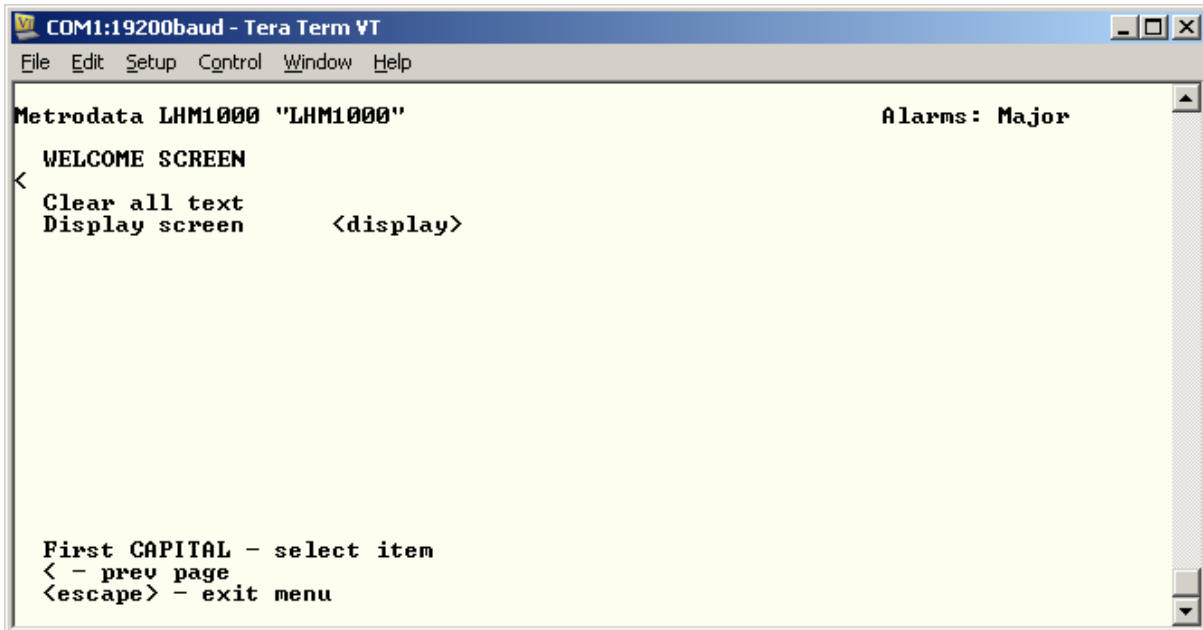
```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata LHM1000 "LHM1000" Alarms: Major
WELCOME SCREEN
Welcome screen Enabled
1st line
2nd line
3rd line
4th line
5th line
6th line
7th line
8th line
Clear all text
Display screen <display>
First CAPITAL - select item
<escape> - 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:



```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata LHM1000 "LHM1000" Alarms: Major
WELCOME SCREEN
Welcome screen Enabled
1st line This is an exam
2nd line ple
3rd line of a user define
4th line d
5th line Welcome Screen
6th line Metrodata LHM100
7th line 0
8th line Located in Egham
Contact No. 0178
4 744700
Please enter Pas
sword>
First CAPITAL - select item
> - next page
<escape> - exit menu
```

Once the welcome message has been defined, it may be displayed using the display screen option. In some cases, as above, the screen splits over two pages, the '>' indicates a second page is available. Typing '>' leads to the next page as below:

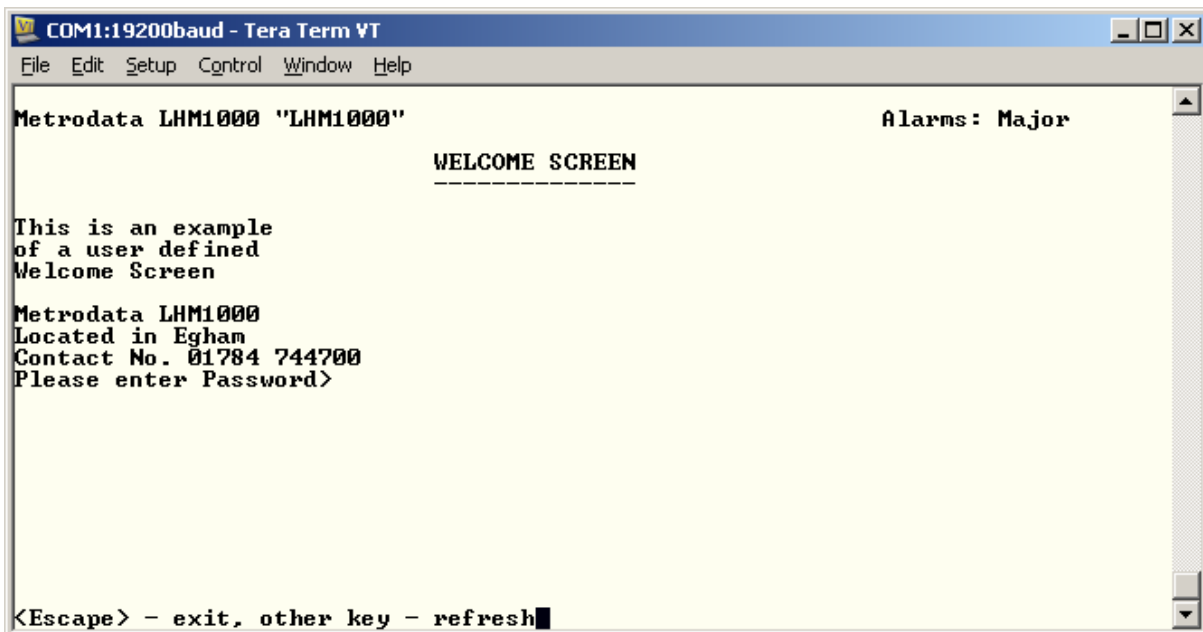


The screenshot shows a terminal window titled "COM1:19200baud - Tera Term VT". The menu text is as follows:

```
Metrodata LHM1000 "LHM1000"                               Alarms: Major
WELCOME SCREEN
<
Clear all text
Display screen          <display>

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

and for this example, the Display Screen shows:



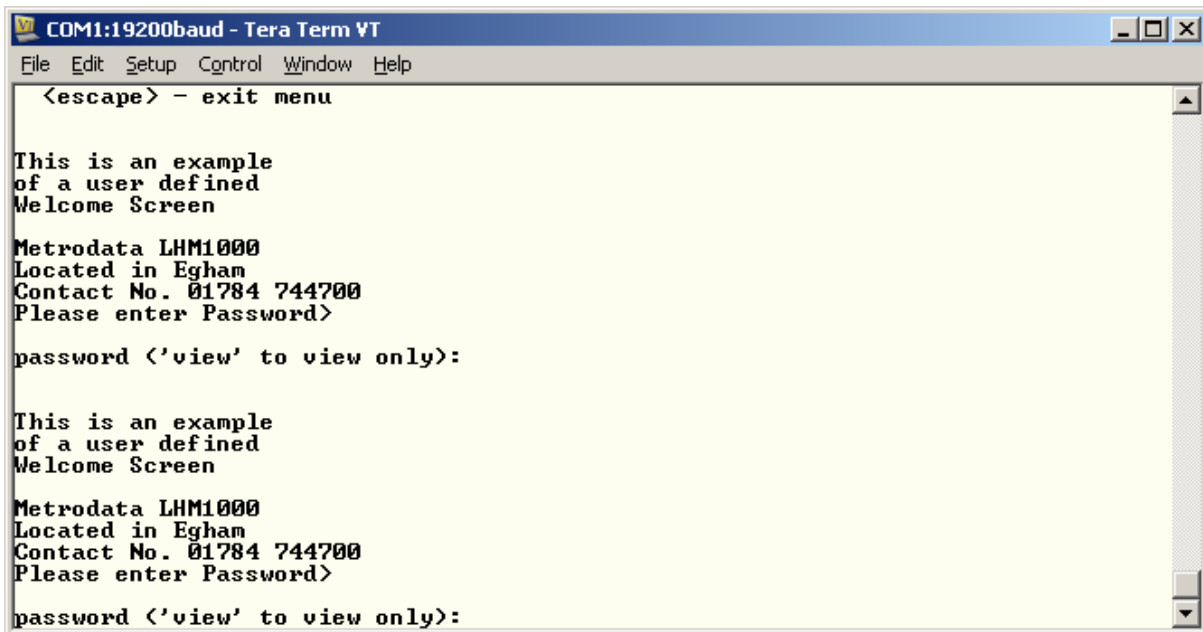
The screenshot shows the same terminal window with the following display screen content:

```
Metrodata LHM1000 "LHM1000"                               Alarms: Major
                               WELCOME SCREEN
                               -----
This is an example
of a user defined
Welcome Screen

Metrodata LHM1000
Located in Egham
Contact No. 01784 744700
Please enter Password>

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

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

A screenshot of a Tera Term VT terminal window titled "COM1:19200baud - Tera Term VT". The window has a menu bar with "File", "Edit", "Setup", "Control", "Window", and "Help". The terminal content shows a user-defined welcome screen. It starts with "<escape> - exit menu". The main text reads: "This is an example of a user defined Welcome Screen", "Metrodata LHM1000", "Located in Egham", "Contact No. 01784 744700", "Please enter Password>". Below this, it shows "password ('view' to view only):" followed by a blank line. The same text is repeated once more. The terminal has a scroll bar on the right side.

4.1.6 Warm Start

A warm Start will force the LHM1000 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 LHM1000 will indicate that a warm start is in progress and then close the connection.

4.1.7 Cold Start

Cold Start will return the LHM1000 to the factory default condition and as defined by the bit switch settings.

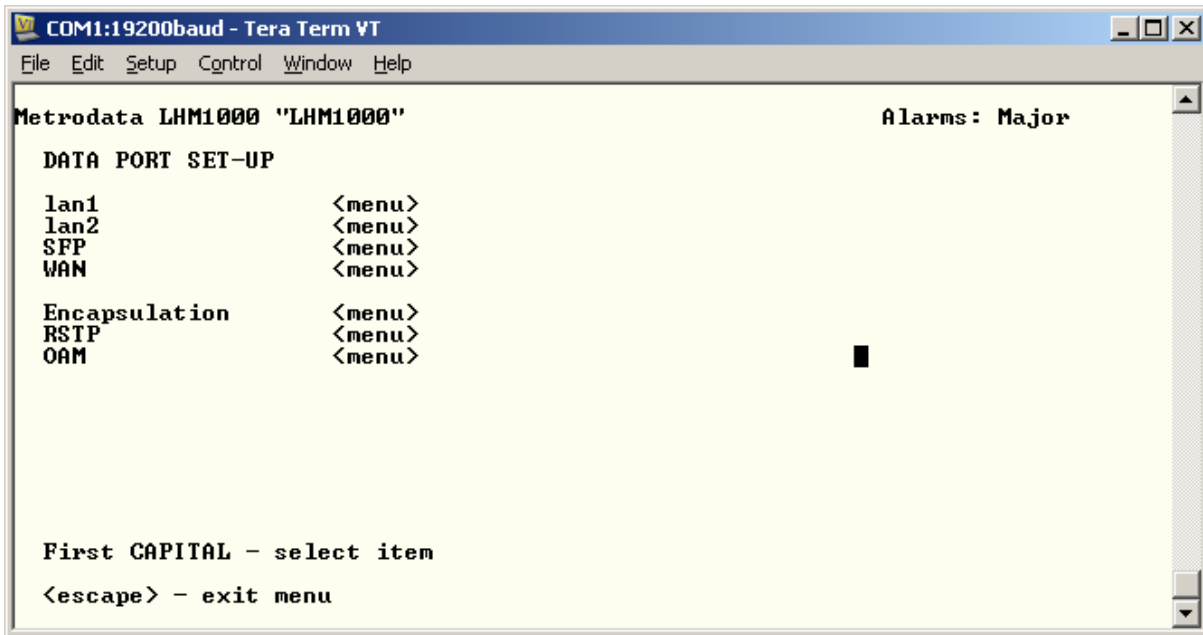
Note, that a cold start will erase IP addresses and Routing Table entries and it is therefore highly likely that remote access will be lost following a cold start.

For this reason a cold start request must be confirmed before it is actioned.

4.2 Configuration of the Data Ports

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

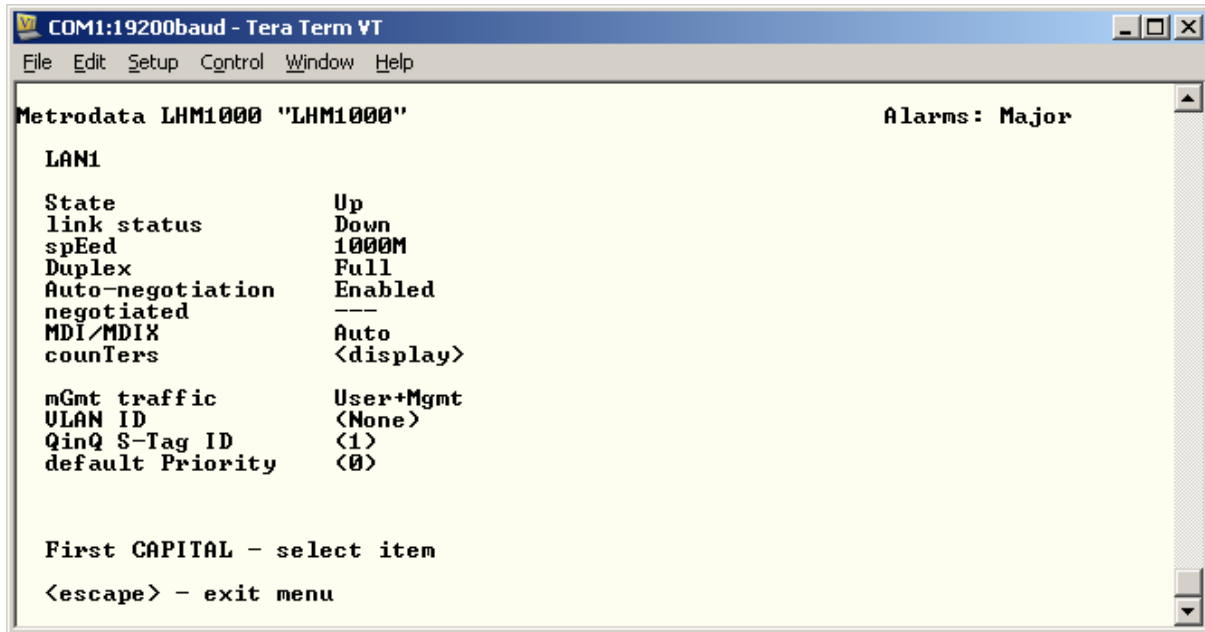
The port configuration is accessed from the main setup menu by selecting the data port menu. The data port menu gives the following options



4.2.1 LAN Port

The LHM1000 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 E1 forwarding port.

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



```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata LHM1000 "LHM1000"           Alarms: Major
LAN1
State                               Up
link status                         Down
spEed                               1000M
Duplex                              Full
Auto-negotiation                    Enabled
negotiated                          ---
MDI/MDIX                            Auto
counters                            <display>

mGmt traffic                        User+Mgmt
VLAN ID                             <None>
QinQ S-Tag ID                       <1>
default Priority                     <0>

First CAPITAL - select item
<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.

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 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.

4.2.1.10 VLAN ID

If the Traffic Isolation mode is set to VLAN then the LAN port may be assigned to a VLAN. and all frames ingressing this port will have a VLAN Tag added. 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 the HSSI interface.

In VLAN mode, packets are expected to ingress the LAN ports untagged, and will have any tags stripped before egress.

4.2.1.11 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 HSSI interface.

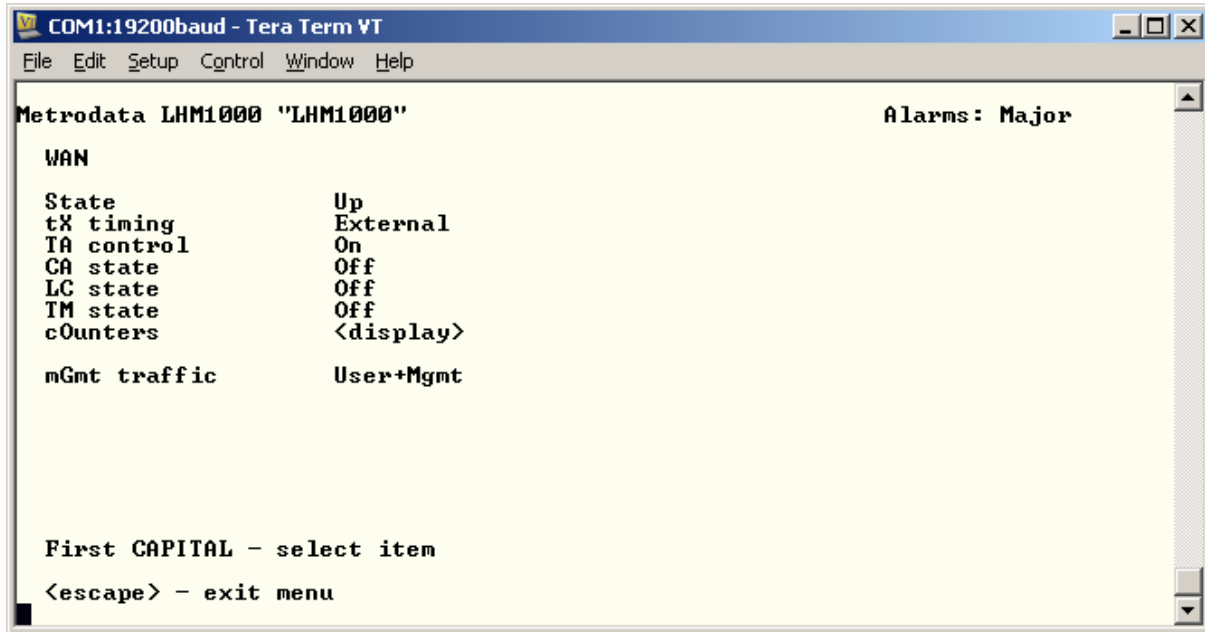
In QinQ mode, ingress packets may be tagged or untagged and all will have a single S-TAG stripped before egress.

4.2.1.12 default Priority

When the traffic isolation mode is VLAN, this is the priority value that is added with the VLAN ID during ingress. 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 WAN Port

The WAN Port menu is as below:



The available options are as below:

4.2.2.1 State

The HSSI Port Administrative State may be selected as below:

UP	Port Administrative State UP
DOWN	Port Administrative State Down.

4.2.2.2 Timing

The HSSI port may be operated in either:

External	HSSI Port uses DCE supplied timing
Internal	For Test purposes, the HSSI Port may source TT from the local oscillator.

4.2.2.3 TA Control

The HSSI port provides the TA HSSI control signal. The state may be ON or OFF. Normal operation should use ON

4.2.2.4 CA State

This display item displays the state of the incoming CA control.

4.2.2.5 LC State

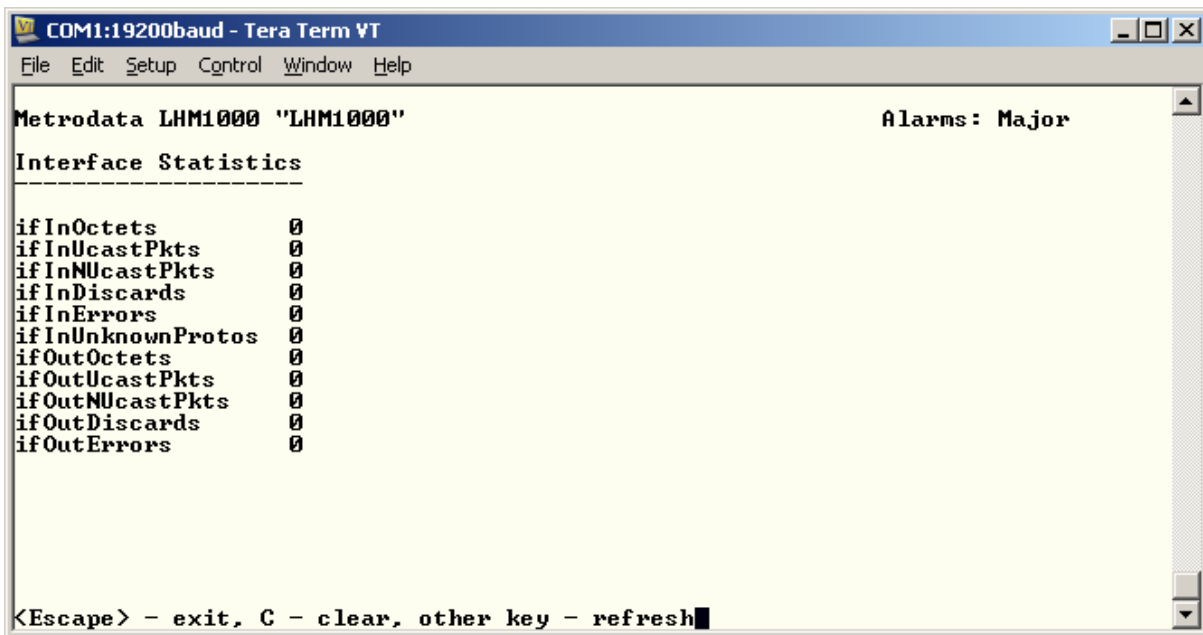
This display item displays the state of the incoming LC signal

4.2.2.6 TM State

This display item displays the state of the incoming TM signal

4.2.2.7 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 contains the following text:

```
Metrodata LHM1000 "LHM1000"           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
```

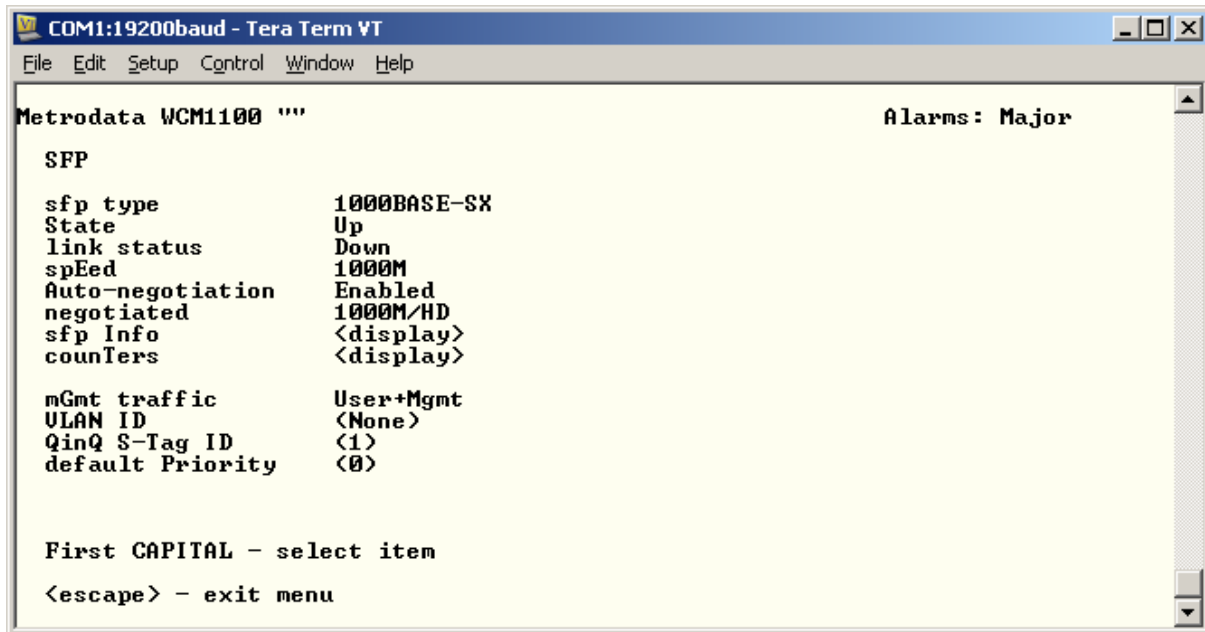
4.2.2.8 mGmt Traffic

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. |

4.2.3 SFP Port

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



```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM1100 "" Alarms: Major
SFP
sfp type          1000BASE-SX
State             Up
link status       Down
spEed             1000M
Auto-negotiation Enabled
negotiated        1000M/HD
sfp Info          <display>
counTers          <display>

mGmt traffic      User+Mgmt
ULAN ID           <None>
QinQ S-Tag ID    <1>
default Priority  <0>

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

4.2.3.1 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"

4.2.3.2 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.

4.2.3.3 Link State

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

4.2.3.4 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.

4.2.3.5 Auto Negotiation

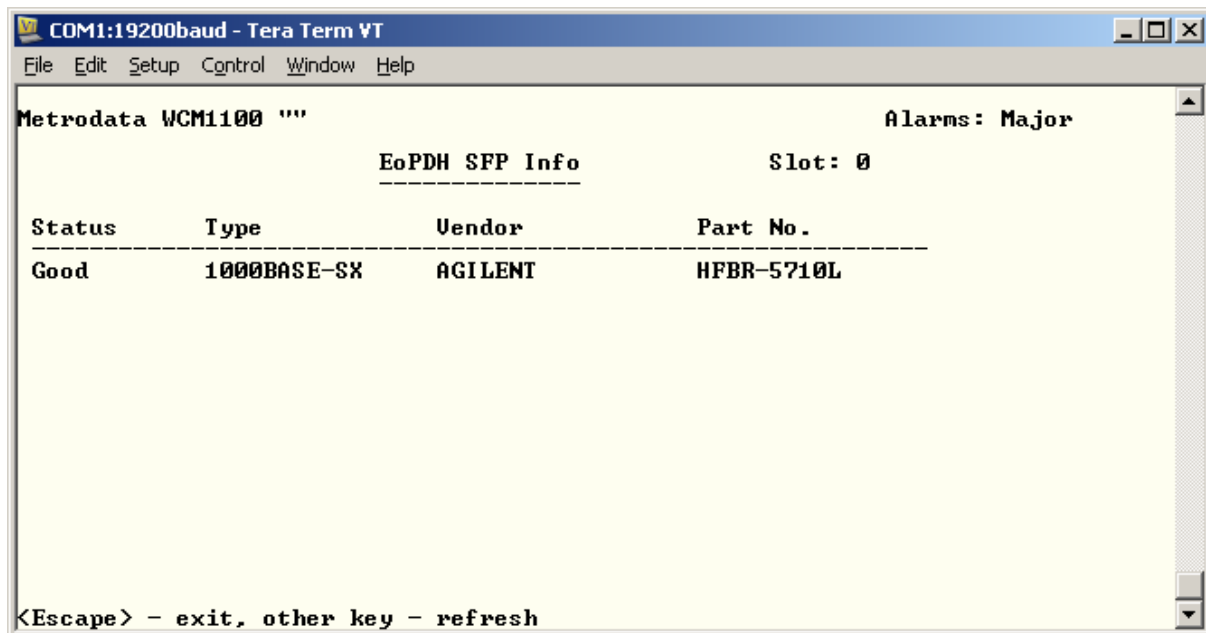
When operating in 1000baseX mode, Auto negotiation must be enabled.

4.2.3.6 Negotiated

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

4.2.3.7 SFP Info

This menu displays further information regarding the SFP device:



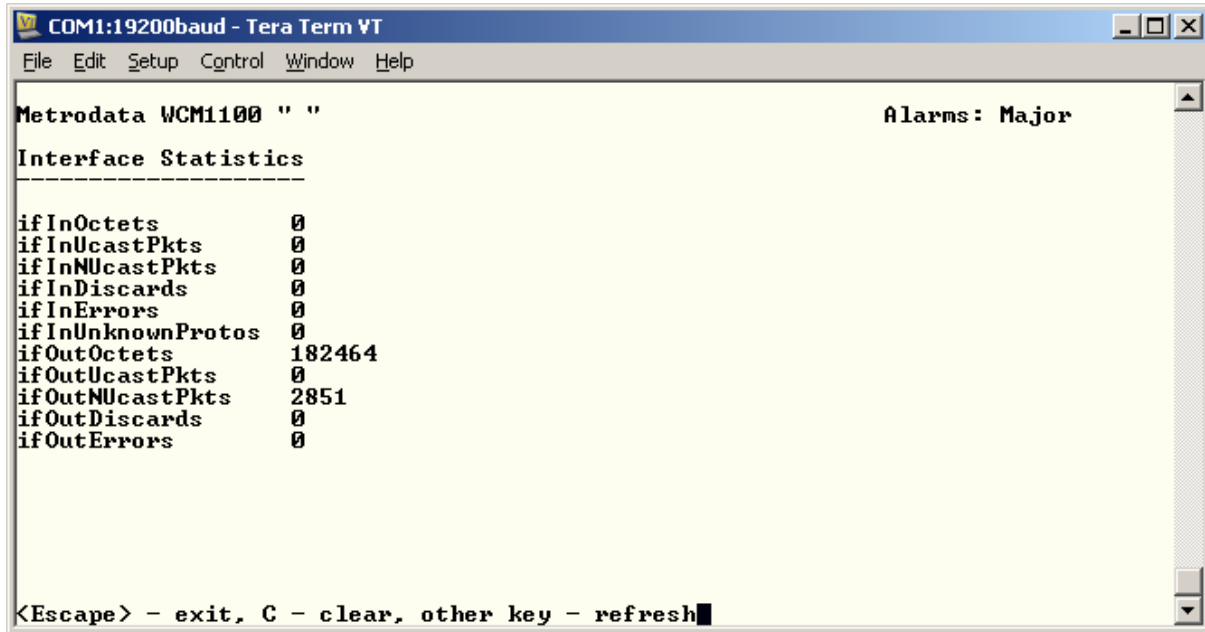
The screenshot shows a terminal window titled "COM1:19200baud - Tera Term VT". The window contains the following text:

```
Metrodata WCM1100 ""                               Alarms: Major
                                     EoPDH SFP Info           Slot: 0
                                     -----
Status      Type           Vendor           Part No.
-----
Good        1000BASE-SX          AGILENT          HFBR-5710L

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

4.2.3.8 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
-----
ifInOctets          0
ifInUcastPkts      0
ifInNUcastPkts     0
ifInDiscards       0
ifInErrors         0
ifInUnknownProtos 0
ifOutOctets        182464
ifOutUcastPkts     0
ifOutNUcastPkts   2851
ifOutDiscards      0
ifOutErrors        0
<Escape> - exit, C - clear, other key - refresh
```

4.2.3.9 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. |

4.2.3.10 VLAN ID

If the Traffic Isolation mode is set to VLAN then the LAN port may be assigned to a VLAN. and all frames ingressing this port will have a VLAN Tag added. 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 the E1 interface.

In VLAN mode, packets are expected to ingress the LAN ports untagged, and will have any tags stripped before egress.

4.2.3.11 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 E1 interface.

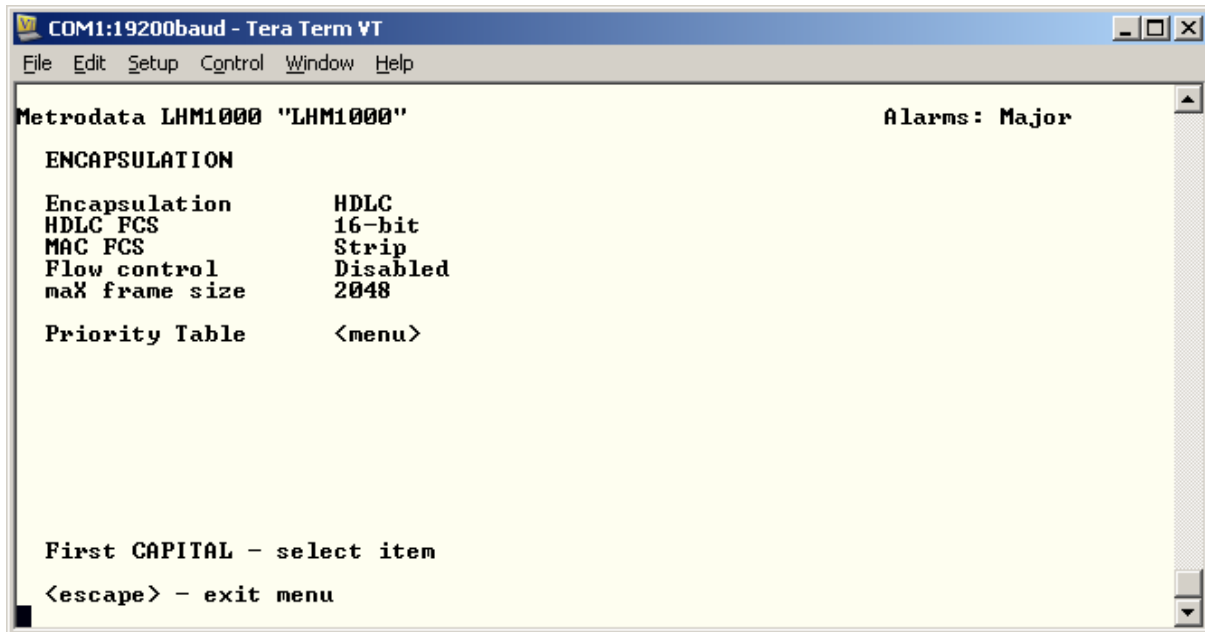
In QinQ mode, ingress packets may be tagged or untagged and all will have a single S-TAG stripped before egress.

4.2.3.12 default Priority

When the traffic isolation mode is VLAN, this is the priority value that is added with the VLAN ID during ingress. 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 Encapsulation

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



In the Version 7.2 software release the only mode supported is HDLC encapsulation using a 16bit FCS and MAC frame checksum removal.

4.2.4.1 Flow Control

The LHM1000 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.

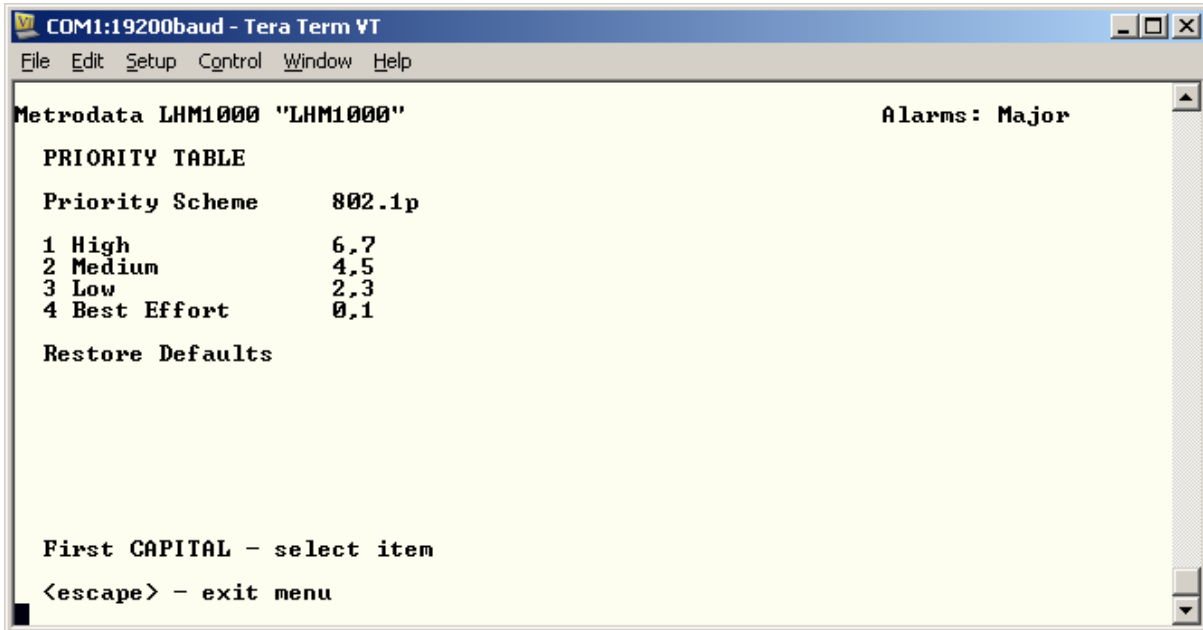
4.2.4.2 Max Frame Size

The LHM1000 supports jumbo frames up to 10k bytes in size. The maximum frame size is configurable to support either

1522, 2048, 10k

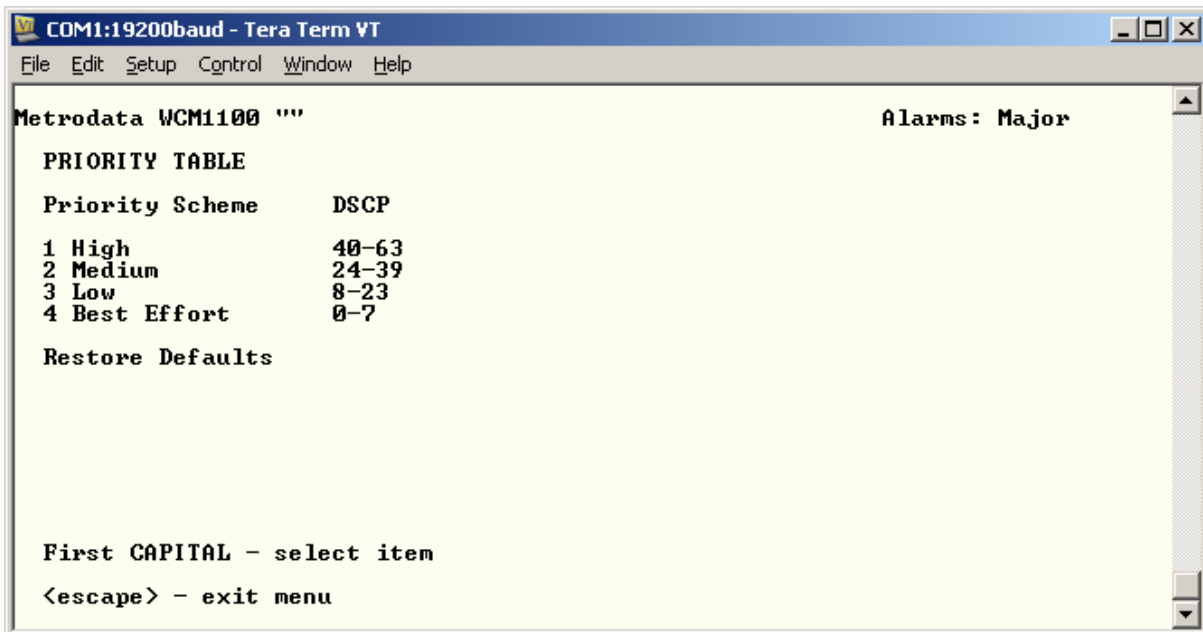
4.2.4.3 Priority Table

The LHM1000 support priority queuing and may be configured to use the 802.1p priority tag, or the IP DSCP flag as the priority indication.



```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata LHM1000 "LHM1000" 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
```



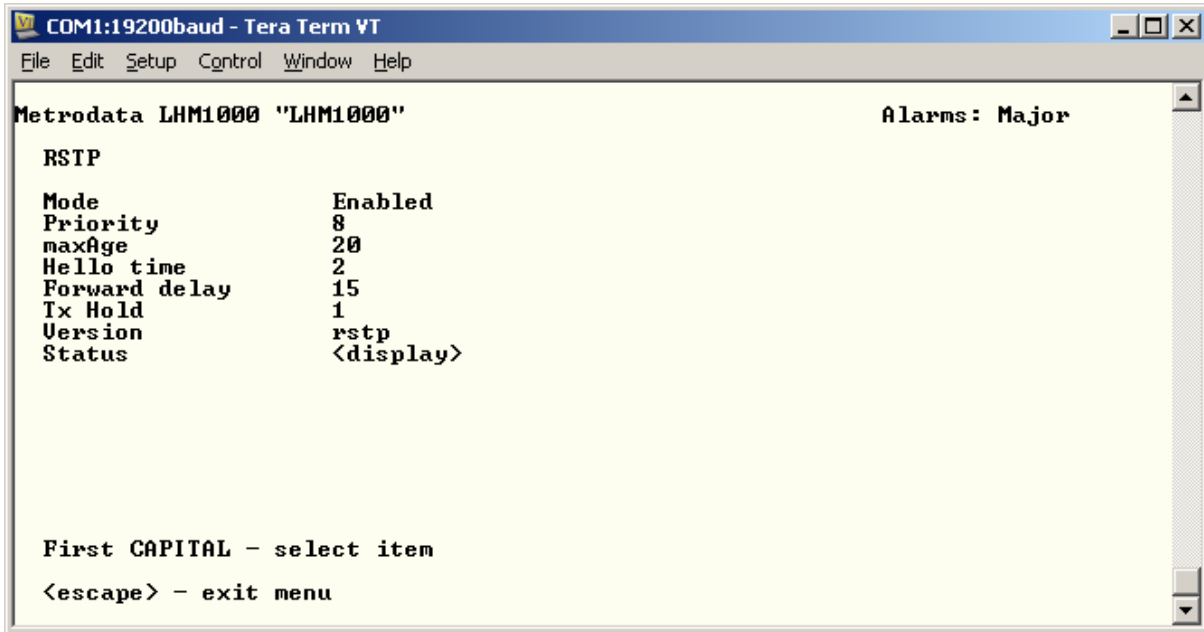
```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata WCM1100 "" Alarms: Major
  PRIORITY TABLE
  Priority Scheme      DSCP
  1 High              40-63
  2 Medium            24-39
  3 Low                8-23
  4 Best Effort       0-7
  Restore Defaults

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

The LHM1000 supports four levels of priority. These two menu allows the user to map the 8 levels of 802.1p or 64 levels of DSCP to these four levels.

4.2.5 RSTP

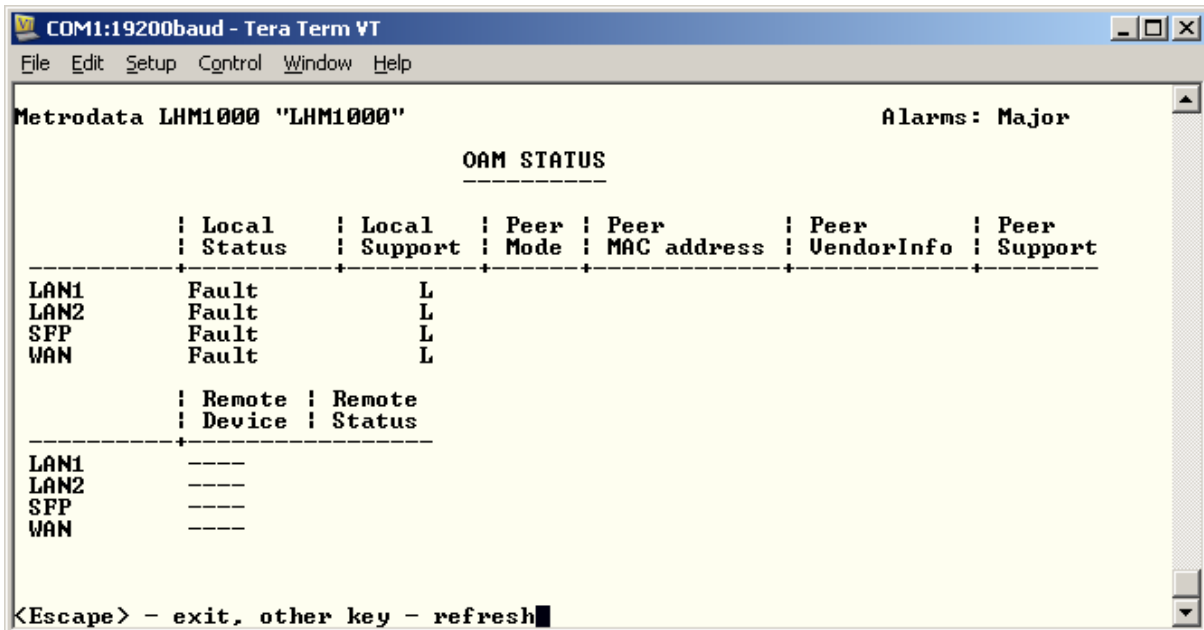
The LHM1000 supports Rapid Spanning Tree to prevent loops when back up or resilient connections are made.



4.2.6 OAM

The LHM1000 supports IEEE 802.3ah Link OAM. This may be configured as

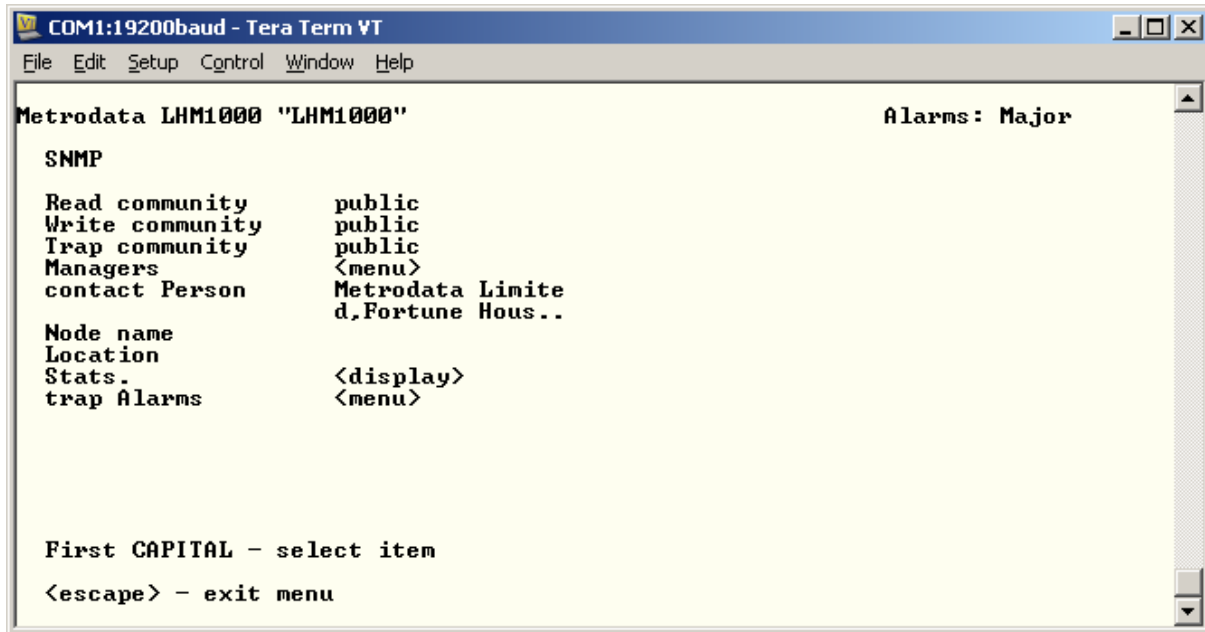
DISABLED, ACTIVE, PASSIVE



4.3 SNMP Management

The LHM1000 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



```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata LHM1000 "LHM1000"           Alarms: Major
SNMP
Read community      public
Write community     public
Trap community      public
Managers            <menu>
contact Person      Metrodata Limite
                    d.Fortune Hous..
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.

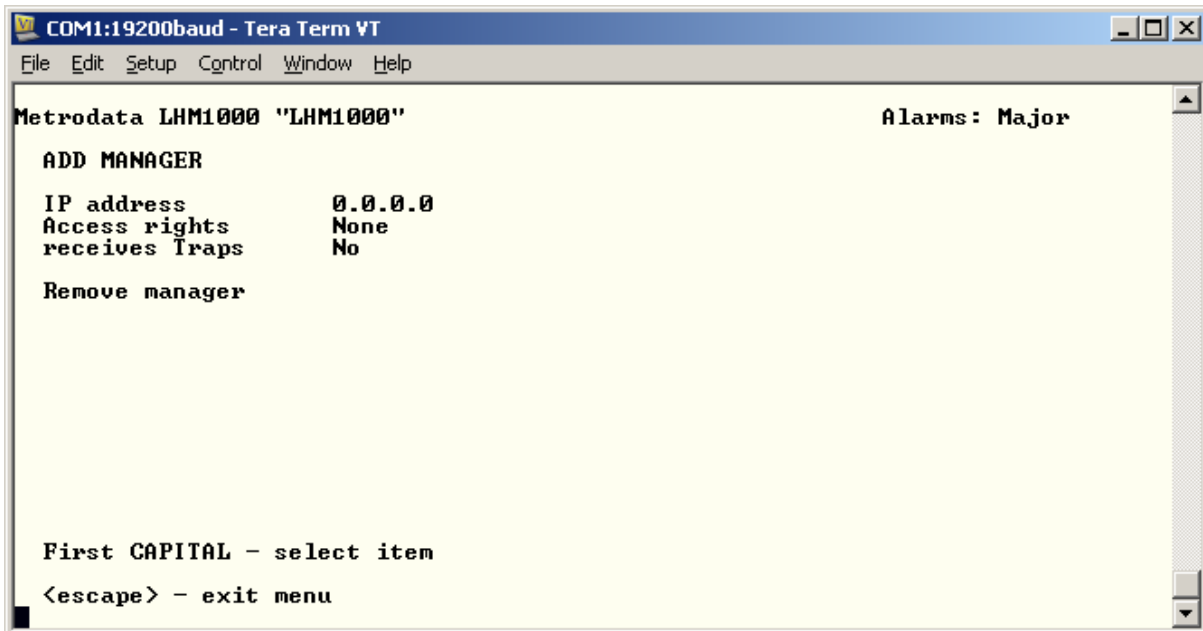
4.3.4 Location

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 LHM1000 using SNMP, specific manager addresses must be configured. Once a Manager is assigned, the LHM1000 will respond to polls and generate traps for that manager. The LHM1000 supports up to 10 configured Network Management Stations.

The Add Manager Menu is as below:



The IP address is the IP address of the assigned Network Management Station.

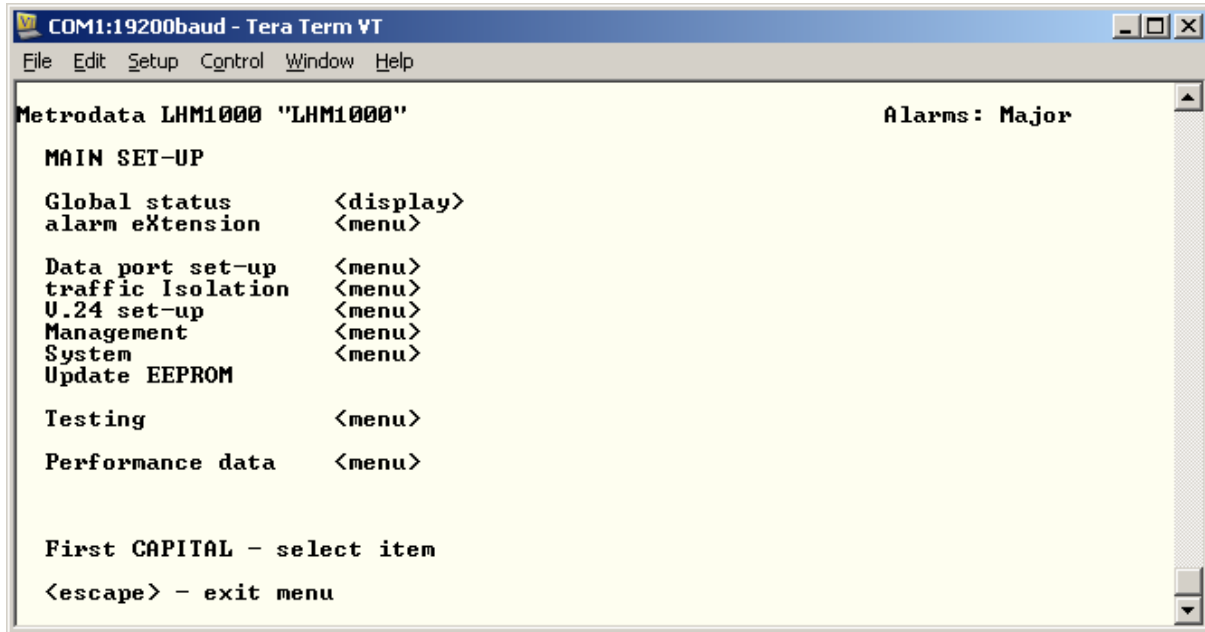
The Access Rights supported are:

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 LHM1000 has been configured, the configuration must be saved to the EEPROM to provide non-volatile storage.



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 LHM1000 may be upgraded in the field using TFTP to upgrade the application software, or to save or load the configuration.

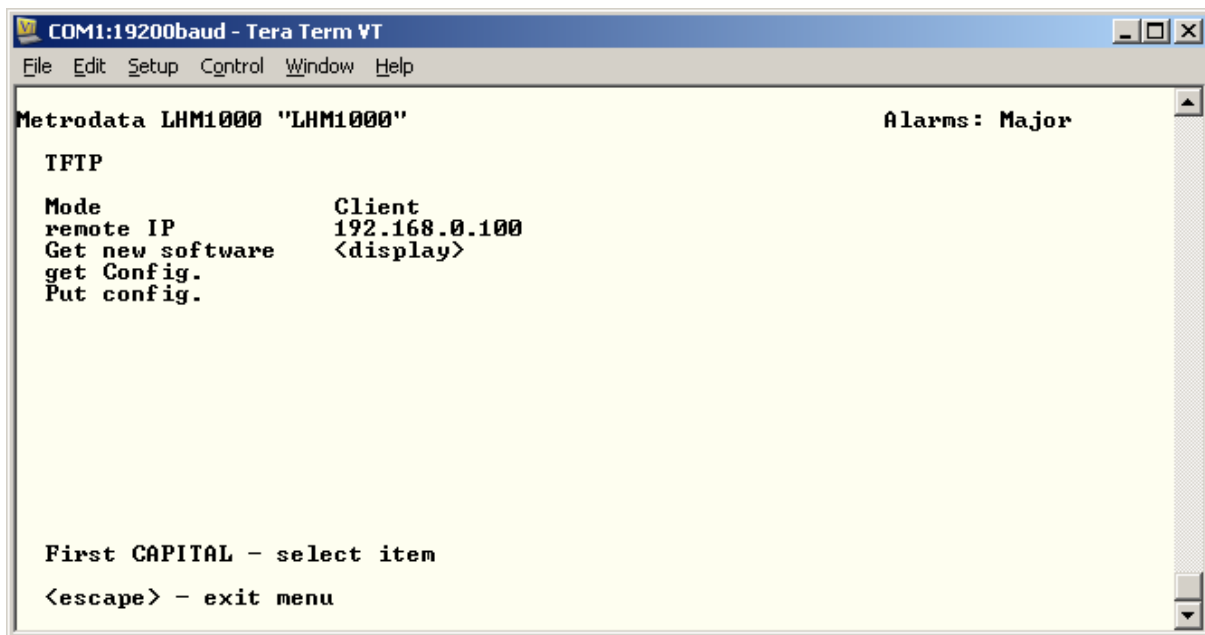
In networks where firewalls and NAT addressing is used server mode must be used otherwise either client or sever mode may be used.

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:



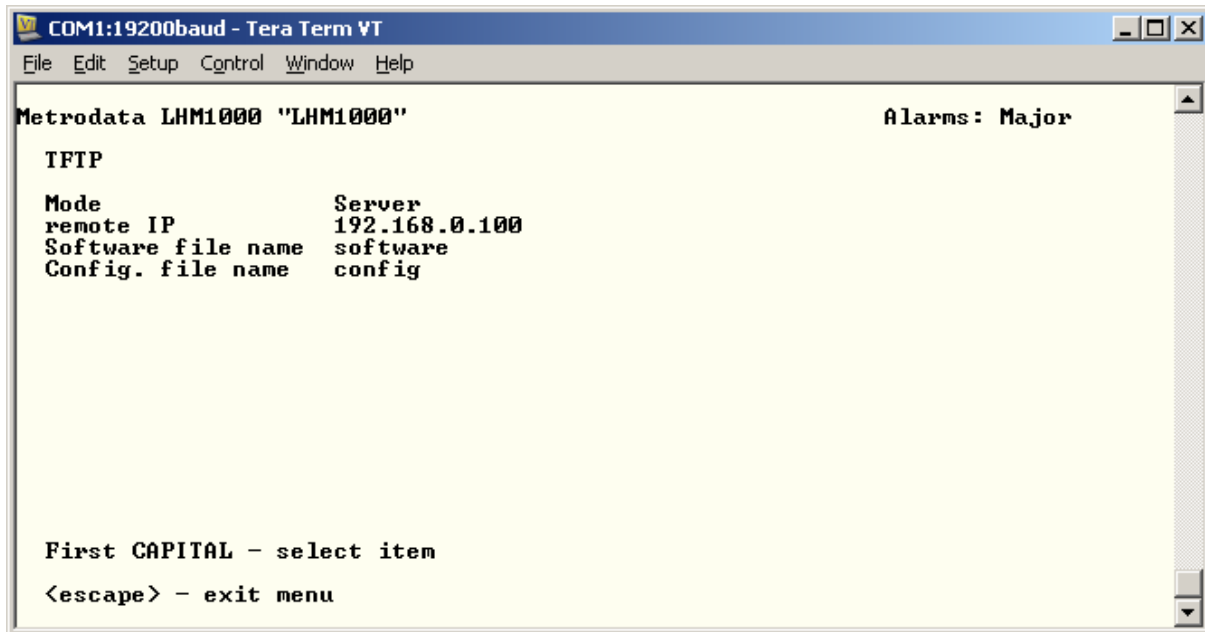
```
COM1:19200baud - Tera Term VT
File Edit Setup Control Window Help
Metrodata LHM1000 "LHM1000"                               Alarms: Major
TFTP
Mode Client
remote IP 192.168.0.100
Get new software <display>
get Config.
Put config.

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.

5.1.2 Server Mode

Select SERVER mode to display the menu as below:



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 "WCM1000 IP Address" put "Source Filename" "Software File Name"
```

eg

```
tftp -i 192.168.0.1 put LHM1000.73 software
```

Which will load a file named "LHM1000.73" onto the LHM1000 with IP address 192.168.0.1 and load as a file called "software"