

# Quarch Technology Ltd

## QTL1817 - 40 Port SAS Switch

### Technical Manual

For use with:

**QTL1817 – 6Gb/S 40 Port SAS Switch**

Using Quarch firmware version 4.508 and above

Wednesday, 10 December 2014



## Change History

1.0	24 <sup>th</sup> June 2014	Initial Release - DRAFT
1.1	1 <sup>st</sup> August 2014	Updated command listings
1.2	9 <sup>th</sup> October	Added user access and logging commands
1.3	8 <sup>th</sup> December 2014	New configuration commands

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## Introduction

The 6Gbps 40 Port SAS Switch has 40 MiniSAS HD device ports. Connections can be automatically and remotely routed between any one of the 40 ports and their individual lanes. This provides an automated solution for remote re-cabling of systems. The duration between disconnecting and reconnecting can be varied from 0s to 10s in 1s intervals.

Data rates of up to 6Gbps per lane are supported. The product is based around a fully non-blocking asynchronous cross point switch. Details of the electrical connections can be found below.

In addition to simple connections, port forwarding allows data to be duplicated to one or more additional ports, which can be connected to a scope, analyser or similar.

## Operational Safety

**This product is designed solely for use by qualified personnel in a laboratory environment. Read the following limitations fully. Quarch Technology cannot be held liable for failure if the equipment is modified or operated in a fashion other than that specified below.**

**Torridon is a modular system. This manual should be used in conjunction with the relevant Technical Manual for each of the system modules that you are using.**

## Equipment Ratings

Requires a 100-240v 50/60Hz 5A Mains supply, via an IEC connector on the rear panel

## Environmental Conditions

Operating Temp:	5°C to 40°C (41°F to 104°F)
Storage Temp:	0°C to 45°C (32°F to 113°F)
Operating Humidity:	20% to 80% (non condensing)
Storage Humidity:	20% to 80% (non condensing)

Quarch modules are not recommended for repeated temperature/humidity cycling. Modules used in this way may have a shorter operating life-span.

## Cleaning and Maintenance

The product may be dusted with a dry cloth. Water and alcohol based (or any other liquid) cleaners should not be used.

All parts of the system should be inspected before and after use.

Damaged products should not be used and cannot be repaired by the user. Please contact Quarch to arrange for repair.

### **Manufacturer Details**

The product is designed and manufactured by:

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## Technical Specifications

### Power Supply

The module requires 100-240v AC mains power, which is connected via a standard C13 mains cable on the rear of the unit.

### Electrical Characteristics:

Each MiniSAS HD port is comprised of 4 lanes which may be configured as a group or separately. The incoming signal is re-driven but not retimed. This gives high signal quality whilst preserving timing characteristics of the original signal. The signal received on one lane may be transmitted on any number of other lanes.

The following table shows receiver / transmitter characteristics at the internal IC

Parameter	Min	Typical	Max
Data Rate	125Mb/s	6Gb/s	6.5Gb/s
Input differential voltage range	200mV pp	-	2000 mV <sub>pp</sub>
Output differential voltage swing (Programmable)	440mV pp	-	1500mV <sub>pp</sub>
Output rise/fall time (20%-80%)	-	40 pS	-
Deterministic output jitter	-	-	130 mUI <sub>pp</sub>
Random output jitter	-	-	5 mUI <sub>RMS</sub>
Propagation delay	-	-	1.5 nS
Channel to channel skew	-	-	150 pS

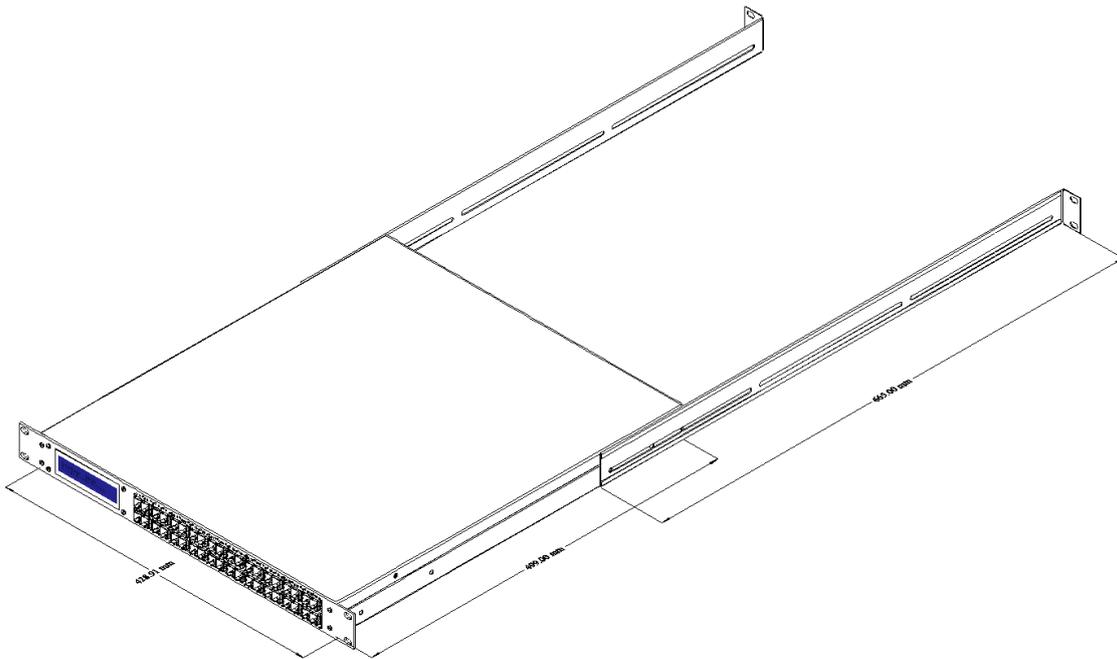
## Cable Support:

Each port can support Passive or Active Cables compliant to SFF-8449 operating at data rates up to 6Gb/S. Cable Management Interface Data may be read from each port individually through the command line interface.

## Mechanical Characteristics:

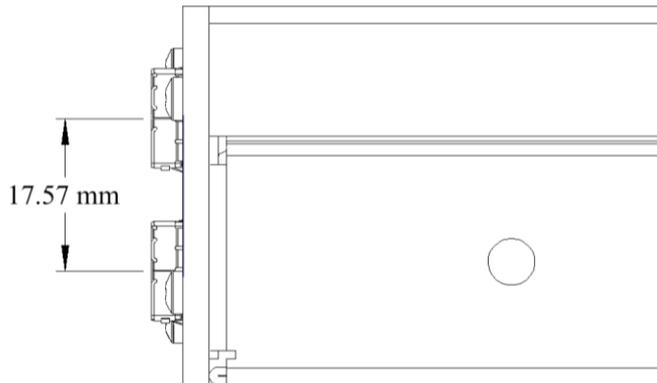
The unit occupies 1U of rack space in a 19" Rack.

The unit is 20" (499mm) deep, and the supplied mounts may be adjusted to fit racks of depth 27-41in (665-1043mm)



### Non Conformities:

The vertical distance between the port connectors is 17.57mm due to mechanical and signal constraints. The SFF8644 specification allows an HD connector to have height 20.3mm, in practice this height is only required by optical modules. Two larger optical modules cannot be plugged into adjacent vertical ports as they will interfere with each other.



## Control Interfaces

The switch has 3 control interfaces on the rear of the unit. Each interface uses the same command set, specified later in this manual.

### USB

A standard USB 2.0 type B socket on the rear allows for firmware updates or direct USB control from a Windows PC. This mode of control requires installation of the Quarch USB driver package. To connect over USB, you will need to use Quarch software: TorridonTerminal or the Quarch .NET API.

Commands sent over the USB link are not limited by the access control system and will always run with admin privileges.

**RS-232 Serial**

Simple ASCII serial control is provided via an RJ45 socket on the rear. The supplied cable converts this to a standard DB-9 serial cable.

RJ45 Connector Pinout:

Pin Number	Name	Direction
1	N/C	-
2	N/C	-
3	N/C	-
4	GROUND	-
5	RS232_OUT	OUT FROM SWITCH
6	RS232_IN	IN TO SWITCH
7	RS232_RTS	OUT FROM SWITCH
8	RS232_CTS	IN TO SWITCH

*Serial Terminal Settings:*

*19,200 Baud*

*8 Bit Data*

*1 Stop Bit*

*No Parity*

*No Flow Control*

Commands sent over the RS-232 link are not limited by the access control system and will always run with admin privileges.

### **Ethernet LAN**

A 10Base-T RJ-45 LAN socket provides remote network access. This interface supports DHCP, NetBIOS names and full manual control over IP/Mask/Gateway and DNS addresses.

2 Modes of connection are available for LAN control:

#### *Telnet*

A standard Telnet session can be opened via any standard scripting language or Telnet client. Only one user can be connected at a time.

Commands sent over the Telnet link are not limited by the access control system and will always run with admin privileges.

### **ReST**

A ReST interface allows the Switch to be treated as a basic web device. Commands are sent as an HTTP GET request, which can be done easily from any browser or script language.

Standard commands are used, with the command text appended on the end of the web address of the switch. For example, the command:

***MUX:CONNECT 1 6***

becomes:

***http://192.168.1.16/MUX:CONNECT 1 6***

or

***http://myswitchname/MUX:CONNECT 1 6*** (If using NetBIOS names)

The response will be returned as a simple string of ASCII text in the body of the page. The 'RESTClient' addin for Firefox is a simple way to get started with ReST control.

ReST commands can be sent from multiple users at the same time, allowing multi-user control. In this case, commands will be executed in the order they arrive.

**NOTES:** Connection commands can take several seconds to complete (depending on the user selected delay). Only ONE connection command can be in process at a time. Following connection commands will be rejected with an error message until the first is complete. The user can then re-submit their command.

Commands sent over the ReST link can be limited by the access control system. In this case an 8 character user ID then an '@' sign must be prefixed to the beginning of EVERY command:

***http://myswitchname/dave1234@MUX:CONNECT 1 6***

## Access Control

As multiple users can control the switch via the ReST interface, a basic user access system is implemented and switched OFF by default.

When enabled through **CONFig:USER:CONtrol ON** the format of ReST commands is changed

Standard Command (No Access Control)

***http://192.168.1.1/MUX:CON 1 7***

User Access control on:

***http://192.168.1.1/dave1234@MUX:CON 1 7***

In this example, the user ID is 'dave1234'. User IDs are always 8 characters long and are not case sensitive.

- If 'dave1234' is not found in the user table, an error will be returned
- If 'dave1234' exists but does not have access to both ports 1 and 7, an error will be returned.

Up to 10 different users can be stored on the system. Each user can be granted access to any of the switch ports. An 'ADMIN' permission can also be granted to users. Only admin users can change user permissions or reset the switch.

USB, Serial and Telnet connection modes always run at ADMIN level and do NOT require a user ID to be prefixed to the commands. This allows easy management of the unit, while providing a simple way to assign ports to specific users.

See the command listing for details of the user setup control.

## Command Logging

To assist with monitoring of the switch, all commands are logged in a 1000 line circular buffer. The log can be listed to the commands that were run, and the User ID that ran them.

Log data recorded is:

- Command execution time
- User ID (or command source, if access control is not in use)
- Command response code
- Command string

This is returned in the form:

```
0x0002 Oct 9 13:24:15 dave1234 0x00 conf log dump 1 7
```

[Index Number] [Date string] [User ID] [Error Code] [Command String]

The command log is returned with the command:

**CONFig:LOG:DUMP 10** (Returns the last 10 command)

**CONFig:LOG:DUMP 100 10** (Returns the 10 command, beginning 100 commands in the past)

## Usage Overview

### Terminology

The switch has 40 wide ports which each comprise of 4 lanes; most commands may be applied to all four lanes as a group or to an individual lane. Ports are specified by number (1 = all 4 lanes on port 1) and lanes are specified by Port and Lane (1.3 = port 1, lane 3)

Port numbers start from 1 and Lane numbers start from 0.

### Voltage Measurements

The modules are capable of measuring various voltages for self-test. The following measurement points are available:

Measurement Command	Description	Resolution / Accuracy
<b>MEASure:VOLTage:SELF 3v3?</b>	Returns the voltage of the modules internal 3.3v power rail	64mV / 5%
<b>MEASure:VOLTage:SELF 12v?</b>	Returns the voltage of the modules internal 12v power rail. This will read 0 in standby mode	64mV / 5%
<b>MEASure:VOLTage:SELF 5vSB?</b>	Returns the voltage of the modules internal 5v standby power rail	64mV / 5%

## Default Start up State

On power up or reset, the control modules enter a default state. Each port is connected to its neighbour as shown below. The switch does not differentiate between Initiators and Targets, an Initiator may be plugged into any port as may a target, This may result in illegal SAS configurations if the device is miss-cabled or set up incorrectly but it will not cause damage to any equipment.

Port	Connected to
1	2
3	4
5	6
7	8
9	10
11	12
...	...
39	40

All ports reset to the same default DFE settings:

Amplitude: 2

Equalization: 6

Emphasis: 0

## LCD Display

The LCD display on the front of the unit shows current status and connection mappings

A few seconds after startup, the first line of the display will show:

```
OK          192.168.1.56
```

When in standby mode, this will change to:

```
STBY       192.168.1.56
```

In event of a unit failure, this will change to:

```
ERR        192.168.1.56
```

The *\*TST?* Command can then be used to identify the problem

The second line of the display pages every few seconds to show the current connection mappings. Connections are shown in order from 1-40.

For each connection, we can see which port is the source of its transmitted data. We can also see a few special cases such as ports that have full bi-directional links with each other and ports with complex mappings.

```
1x7   2x5   3<2   4<M   5--
```

In the above example, we can see that:

- Port 1 has a full bi-directional connection to port 7 (shown by the 'x')
- Port 2 has a full bi-directional connection to port 5
- The source of Port 3's data is Port 2. This is a 'forwarding' link that is duplicating the traffic flowing between ports 2 and 5.
- Port 4 is taking its data from multiple (M) sources. In this case the individual lanes of port 4 must have been set (rather than setting the entire port). Perhaps this port is switching 2 lanes within a port, or joining individual lanes from 2 or more other ports.
- Port 5 is not transmitting (it is off), but it may still be a source of data for another port.

## Controlling the Module

The module can be controlled either by:

- Serial ASCII terminal (such as HyperTerminal)  
This is normally used with scripted commands to automate a series of tests. The commands are normally generated by a script or user code (PERL, TCL, C, C# or similar).
- Telnet Terminal. This mode uses exactly the same commands as the serial ASCII terminal
- ReST  
A simple http based web server, using identical commands to the Serial and Telnet options
- USB  
Quarch's TestMonkey/TorridonTerminal/API applications can control a module via USB

## Command Set

When connected via a serial terminal, the module has a simple command line interface

### SCPI Style Commands

These commands are based on the SCPI style control system that is used by many manufacturers of test instruments. The entire SCPI specification has NOT been implemented but the command structure will be very familiar to anyone who has used it before.

- SCPI commands are NOT case sensitive
- SCPI commands are in a hierarchy separated by ':' (LEVe11:LEVe12:LEVe13)
- Most words have a short form (e.g. 'register' shortens to 'reg'). This will be documented as REGister, where the short form is shown in capitals.
- Some commands take parameters. These are separated by spaces after the main part of the command (e.g. "meas:volt:self 3v3?" Obtains the 3v3 self test measurement)
- Query commands that return a value all have a '?' on the end
- Commands with a preceding '\*' are basic control commands, found on all devices
- Commands that do not return a particular value will return "OK" or "FAIL". Unless disabled, the fail response will also append a text description for the failure if it can be determined.

**# [comments]**

Any line beginning with a # character is ignored as a comment. This allows commenting of scripts for use with the module.

**\*RST**

Triggers a reset, the module will behave as if it had just been powered on

**\*CLR**

Clear the terminal window and displays the normal start screen. Also runs the internal self test. The same action can be performed by pressing return on a blank line.

**\*IDN?**

Displays a standard set of information, identifying the device. An example return is shown below

Family: Torridon System	[The parent family of the device]
Name: Ethernet Cable Pull Module	[The name of the device]
Part#: QTL1271-01	[The part number of the hardware]
Processor: QTL1159-01,3.50	[Part# and version of firmware]
Bootloader: QTL1170-01,1.00	[Part# and version of bootloader]
FPGA 1:1.0	[Version of FPGA core]

**\*TST?**

Runs a set of standard tests to confirm the device is operating correctly, these tests are also performed at start up. Returns 'OK' or 'FAIL' followed by a list of errors that occurred, each on a new line.

**\*GRAB**

Special command, grabs control from an active Telnet session. This command can be sent as a ReST command ONLY and will terminate any active Telnet connection. This allows a remote ReST user to take control of the unit if a Telnet session has been left open (and is therefore blocking the control).

**CONFig:MODE BOOT**

Configures the card for boot loader mode (to update the firmware), requires an update utility on the PC.

**CONFig:MESSages [SHORT|USER]****CONFig:MESSages?**

Gets or sets the mode for messages that are returned to the user's terminal

**Short:** Only a "FAIL" or "OK" will be returned

**User:** Full error messages are returned to the user on failure

**CONFig:TERMinal USER**

Sets the terminal response mode to the default 'User' setting. This is intended for use with HyperTerminal or similar and manually typed commands

**CONFig:TERMinal SCRIPT**

Sets the terminal response mode for easier parsing. Especially useful from a UNIX/LINUX based system. Characters sent from the PC are not echoed by the device and a <CR><LF> is sent after the cursor to force a flush of the USART buffer.

**CONFig:TERMinal?**

Returns the current terminal mode

**CONFig:DEFault STATE**

Resets the state of the module. This will set all source/signal/glitch etc logic to its default power-on values. Terminal setting will not be affected. This command allows the module to be brought back to a known state without resetting it.

**CONFig:DEFault FACTory**

Resets the module back to its factory defaults. This will reset any persistent settings such as a static IP address.

### Switch Signal Names

The switch allows full connections between ports and also partial connections.

Port Name	Description
[PORT]	Every lane of port [PORT] (where PORT is a number from 1-40).
[PORT].[LANE]	Specific Lane on the specified port (where LANE is a number from 0 to 3)

## Switch Commands

All switch command required the relevant PORT privilege when access control is on

### **MUX:CONnect [PORT] [PORT]**

Creates a bidirectional connection of all signals between the two ports, any other connections or forwards to/from either port are turned off. [PORT] must be a number from 1 to 40.

### **MUX:CONnect [PORT].[LANE] [PORT].[LANE]**

Connects one lane of one port to one lane on a another. [Port] must be a number from 1 to 40 and [Lane] must be a number from 0 to 3. Any previous connection to either lane is removed.

### **MUX:FORward [PORT 1] [PORT 2]**

Forwards all traffic received at [PORT 1] to [PORT 2] This differs from MUX:CONnect [PORT] [PORT] because it is unidirectional and does not remove existing connections or forwards to other ports.

### **MUX:FORward [PORT 1].[LANE] [PORT 2].[LANE]**

Forwards [Port 1].[Lane] to [Port 2]. [Lane] . This differs from MUX:CONnect [PORT].[LANE] [PORT].[LANE] because it is unidirectional and does not remove existing connections or forwards to other ports.

### **MUX:[PORT]:SOURce?**

Returns the ports or lanes that [PORT] is receiving data from. If the port is not enabled then "(OFF)" will also be displayed. This indicates that the transmitter on the port/lane is turned off.

### **MUX:ALL:SOURce?**

Returns the ports or lanes that each port is receiving data from. This returns the source of every port in turn. The format is identical to the basic "source?" command but with multiple returns.

### **MUX:[PORT].[LANE]:SOURce?**

Returns the lane that [PORT].[LANE] is receiving data from

### **MUX:OFF [PORT|ALL]**

Turns off the transmitter for [Port], or if ALL is used, it turns off all ports

### **MUX:OFF [Port].[Lane]**

Turns off the transmitter for the specified [Lane] on the specified [Port].

## Config Commands

### **CONFig:MUX:DELay #**

Set the duration in seconds between disconnecting and reconnecting when making a connection. CONFig:MUX:Delay 0 gives approx 1ms switching time.

### **CONFig:MUX:DELay ?**

Return the current delay.

### **CONFig:MUX:[PORT]:PREemphasis #**

### **CONFig:MUX:[PORT]:PREemphasis ?**

Set the level of transmit de-emphasis for the [PORT] according to the following table:

0	No De-Emphasis
...	...
7	~12dB output de-emphasis

### **CONFig:MUX:[PORT]:EQUalisation #**

### **CONFig:MUX:[PORT]:EQUalisation ?**

Set the level of receiver equalization on [PORT] from 0 (minimum) to 15 (maximum). All values can be used, the values not displayed in the table will provide an intermediate value.

0	Minimum Equalization
15	Maximum Equalization

### **CONFig:MUX:[PORT]:AMPlitude #**

### **CONFig:MUX:[PORT]:AMPlitude ?**

Set the transmitter differential amplitude for [PORT] from 0 (minimum) to 2 (maximum)

0	600mVp-p
1	800 mVp-p
2	1200mVp-p

**CONFig:POWER [ON | OFF]****CONFig:POWER?**

Turns the main 12v power output from the supply on/off. When off, the unit will enter standby mode for reduced power consumption. In this mode, connection mappings and DFE settings will be retained, but all SAS connections will cease to work. Running any connection command will automatically bring the unit out of standby.

This command required ADMIN privileges.

**CONFig:MUX:LOAD:MAPpings [ON | OFF]****CONFig:MUX:LOAD:MAPpings?**

When enabled, the switch connection mapping will be stored in EEPROM and reloaded in the event of a reset or power cycle. This will cause the switch to come back up in its 'last' state, rather than the default state.

This command required ADMIN privileges.

## User Access Commands

**CONFig:USER:CONTRol [ON | OFF]****CONFig:USER:CONTRol?**

Turns user access control on/off. When enabled, and commands sent through the ReST interface must be prefixed with a valid 8 character user ID. Execution of certain commands will be prevented unless the user has the correct permission

This command required ADMIN privileges.

**CONFig:USER:CLEAR**

Deletes all users from the user table.

This command requires ADMIN privileges.

**CONFig:USER:DUMP [#Start] [#End\*]**

Dumps one or more user's data. In the following format:

```
USER INDEX: 1
USER ID   : dave1234
00000 00000 11111 11111
00000 00000 00000 00000
```

Ports that the user has access to are shown by '1'. In this case user dave1234 has access to ports 11 to 20.

This command requires ADMIN privileges.

#Start	Start index from 0 to 9
#End*	Optional parameter index from 0 to 9, dumps multiple users

**CONFig:USER:[#UserIndex]:SET [#UserId] [All\*]**

Adds/overwrites a user entry. No port privileges are granted by default unless the 'ALL' parameter is used.

#UserIndex	Index value from 0 to 9
#UserId	User ID string, must be 8 characters
#All*	Optional parameter 'ALL' grants access to all ports

This command requires ADMIN privileges.

**CONFig:USER:[#UserIndex] DROP**

Deleted the user at the given index

#UserIndex	Index value from 0 to 9
------------	-------------------------

This command requires ADMIN privileges.

**CONFig:USER:[#UserIndex]:GRAnt [#Start] [#End\*]**

Grants user access to a single port, or a range of ports

#UserIndex	Index value from 0 to 9
#Start	Start port index from 1 to 40
#End*	Optional Parameter. End port index from 1 to 40

This command requires ADMIN privileges.

**CONFig:USER:[#UserIndex]:REVoKe [#Start] [#End\*]**

Revokes user access to a single port, or a range of ports

#UserIndex	Index value from 0 to 9
#Start	Start port index from 1 to 40
#End*	Optional Parameter. End port index from 1 to 40

This command requires ADMIN privileges.

**CONFig:USER:[#UserIndex]:GRAnt ADMIN**

Grants user administrator privileges

#UserIndex	Index value from 0 to 9
------------	-------------------------

This command requires ADMIN privileges.

**CONFig:USER:[#UserIndex]:REVoKe ADMIN**

Revokes user administrator privileges

#UserIndex	Index value from 0 to 9
------------	-------------------------

This command requires ADMIN privileges.

## Ethernet Control

The module contains an internal Ethernet bridge that allows full terminal control via most standard Telnet or ReST clients.

By default, the Ethernet settings will have DHCP enabled to obtain an IP address automatically. If your network supports DHCP and NetBIOS, you will be able to connect to the module simply using its Serial number, for example:

***Telnet.exe QTL1817-01-005***

The module will display its IP address on the front panel LCD. This will update dynamically if the IP address changes. If NetBIOS is not available, you can always connect with this address:

***Telnet.exe 192.168.1.84***

If you need to set a fixed IP address, or alter any other Ethernet settings, you should connect to the module to the PC via a USB/serial connection. While you can alter settings via Telnet/ReST, if you actions cause the IP address to change, then your connection will terminate!

The Ethernet setup commands are:

**CONFig:ETHernet IP xxx.xxx.xxx.xxx**

**CONFig:ETHernet IP?**

Set and read the current IP address. Setting a new IP address will disable the DHCP function (if enabled). To return to automatic DHCP addressing, the DHCP setting must be manually re-enabled.

**CONFig:ETHernet MASK xxx.xxx.xxx.xxx**

**CONFig:ETHernet MASK?**

Set and read the current IP mask. Setting a new IP mask will disable the DHCP function (if enabled). To return to automatic DHCP addressing, the DHCP setting must be manually re-enabled.

**CONFig:ETHernet GATEway xxx.xxx.xxx.xxx**

**CONFig:ETHernet GATEway?**

Set and read the current IP gateway. Setting a new IP gateway will disable the DHCP function (if enabled). To return to automatic DHCP addressing, the DHCP setting must be manually re-enabled.

**CONFig:ETHernet DNS1 xxx.xxx.xxx.xxx**

**CONFig:ETHernet DNS1?**

Set and read the current DNS1 address. Setting a new address will disable the DHCP function (if enabled). To return to automatic DHCP addressing, the DHCP setting must be manually re-enabled.

**CONFig:ETHernet DNS2 xxx.xxx.xxx.xxx**

**CONFig:ETHernet DNS2?**

Set and read the current DNS1 address. Setting a new address will disable the DHCP function (if enabled). To return to automatic DHCP addressing, the DHCP setting must be manually re-enabled.

**CONFig:ETHernet NAME**

**CONFig:ETHernet NAME?**

Set and read the current NetBIOS name assigned to the unit. This provides a simple way to locate the module on the network.

**CONFig:ETHernet DHCP [ON | OFF]**

**CONFig:ETHernet DHCP?**

Set and read the DHCP enable state. Turning this on will override and static IP address that you have previously specified

## Error Codes

Invalid commands, or commands that fail to execute as expected, will return an error message in the form:

***FAIL: 0x11 –Bad Command, type ‘help’ for command list***

Similarly, the logging function stores the status code number for each command sent. The following table describes the possible codes:

Code	Description
0x00	-Command success
0x11	-Bad Command, type 'help' for command list
0x12	-Too many arguments
0x13	-Not enough arguments specified
0x14	-Arguments must be hex values i.e. \"0x1F\"
0x15	-Invalid argument, type 'help' for command list
0x16	-Numeric value not in valid range
0x17	-Item selected in command does not exist
0x18	-Command length was incorrect
0x19	-Command was too long
0x1A	-Bad address in address list
0x1B	-Command does not support an item group
0x20	-Internal hardware fault
0x21	-Addressed hardware not present in this device
0x22	-Measurement not known, did you miss the '?'

0x23	-Failed to verify data was written correctly
0x24	-Device timed out with incomplete response
0x28	-Comms is locked to USART
0x29	-Comms is locked to USB
0x2A	-Comms is locked to TELNET
0x2B	-Command is not supported on this device
0x2C	-Measurement not known
0x2D	-Requested setting not available, using nearest value
0x2E	-Internal comms verification failed
0x2F	-Power cycle required for setting to take effect
0x30	-Software does not support that action
0x31	-Current bootloader does not support that command
0x32	-Current setting is invalid or not recognised
0x33	-Value already written, cannot be changed
0x40	-Action did not complete
0x41	-Failed to change state of action
0x42	-Memory card not present or not initialised
0x43	-Memory card IO operation failed
0x44	-Not enough memory for the requested operation
0x45	-Operation timed out before it could be completed
0x50	-User ID not in user access table
0x51	-User ID does not have the required permission

0x52	-User index is blank, set the user index first
0x53	-Valid user ID not found in command string
0x54	-User ID delimiter found, but access control is off
N/A	-Unknown error code (Please contact Quarch)