

Quarch Technology Ltd

Aon EDSFF Drive Enclosure

Technical Manual

For use with:

QTL3178 – EDSFF x8-0 Drive Enclosure

QTL3271 – EDSFF x8-8 Drive Enclosure

QTL3301 – EDSFF x4-4 Drive Enclosure

Firmware v6.000 and above

March 2026



Change History

1.0	November 2025	First draft
1.1	March 2026	Update for TUV

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About this Manual

Thank you for your purchase of this Quarch product. This manual is intended as a technical reference, describing the features, operations and control API of the unit.

Additional documents available include Quick start guides, Datasheets and Application notes. These can be located on our website: www.quarch.com

This manual provides the following:

- Safety information
- An overview of the product and its features
- Details of the control interfaces
- Command specification
- Locations of additional help and examples.

Product Safety

This product is intended for experienced technical users in a test lab environment. It is capable of stress/damage to devices under test, so it is essential that you are familiar with this manual before using the device.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Intended use

This product is intended to assist in the testing of SSDs and similar products but providing a standard enclosure for the SSD to work in while power analysis and fault injection tests are run.

Safety warnings

The product contains a high-speed fan for cooling. Ensure the fan is not obstructed before powering up the unit.



Additional safety notes

- EDSFF drives are keyed by their physical enclosure. Do NOT insert a drive without its enclosure. Do NOT insert a different EDSFF variant than the enclosure is designed for.

Environmental conditions

Operating temperature range:	10°C to 40°C
Operating humidity:	20-80% (non-condensing)
Maximum altitude:	2000m

Cleaning

Disconnect fully before any cleaning. Wipe clean with damp cloth if necessary.

Do not use any cleaning fluids. Do not submerge the unit

Ensure the unit is completely dry before re-connecting

Manufacturer details

Contact us here for any safety related questions.

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In the Box

Each Aon Drive Enclosure comes with the same basic kit of parts.

QTL3178 (or variant) – Main unit

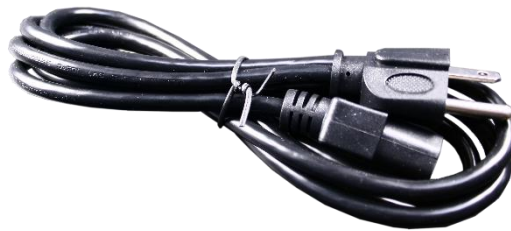
1x Aon Drive Enclosure



1x USB cable



1x PSU and region-specific power cable



Technical Specifications

The Aon Desktop Drive Enclosure range is designed to fit a single EDSFF drive, providing it with power and cooling. A range of connectors and indicators are available to connect the device to your test system.

Multiple different versions of the enclosure are available, supporting E1 and E3 drives. Options for adding power/sideband analysis and choosing the number of PCIe lanes instrumented also exist.

Drive enclosure layout

Front panel



Rear panel



Connections and indicators

Item	Location	Purpose
Trigger In	Rear panel	MCX 3.3v trigger in (ground or 3v3 only)
Trigger Out	Rear panel	MCX 3.3v Trigger out (ground or 3v3 only)
10 pin Input	Rear panel	Power input connection for optional PPM
12V DC	Rear panel	External DC supply, 10A
USB	Rear panel	USB-C port for direct control from a local PC
LAN	Rear panel	100Base-T network port for remote control
Status LED	Front panel	Fault Indicator; Green=OK, Red=Fault
Action LED	Front panel	Record Indicator; Red Flash=Recording/Streaming
Activity LED	Front panel	Multipurpose LED
EDSFF Slot	Front panel	SSD insertion slot (E1 or E3 versions)
MCIO	Top panel	SSD data connection to your host

Power output characteristics

Drive enclosures have a dual-channel power output for a standard EDSFF device up to 25W rating.

Output characteristics

Parameter	Rating
12v Power Supply	12v
3v3 Aux supply	3.3v
Max SSD power rating	25W
Max inrush current	100W

Note: With external QTL1999 / QTL1995 PPM attached, the drive enclosure power is not used, the output characteristics will instead be taken from the PPM technical manual.

Output protection

The external DC power supply is current limited by design.

If the PPM injection port is used to supply power, then the supply limitations of the PPM are the limiting factor as documented in its technical manual.

Introduction

The drive enclosure allows a GEN6 (or slower) SSD to be easily connected to your host system for testing. This can be used as a convenient way of connecting the SSD and it can extend to far more complex testing.

Main features

- Supply of power to an SSD
- Hot-plug / Power cycling control
- Interruption, Isolation and basic monitoring of sidebands
- Variable cooling
- External triggering
- Simple control via GUI or Python (and similar) scripts.

Additional features

These features are dependent on the version of the enclosure that you are using, or require additional equipment

- Isolation and Interruption of high-speed data lanes
- Voltage margining (Via an additional QTL1999 / QTL1995)
- Power Measurement (Via an additional QTL1999 / QTL1995)
- Built in power measurement (with PAM module installed)
- Sideband capture (with PAM module installed)

Margining and Measurement

Power can be captured with the PAM option, or with an external PPM.

Digital sideband capture is available with the PAM option only. Margining is available with the PPM only.

See the related technical manual for the PPM for more information

For capture with the embedded PAM, details are below

Parameter	Options
Analog sample rate	4uS/sample (250k samples/second)
Digital sample rate	1uS/sample (1M samples/second)
Recording sample averaging	0 to 32k samples, in powers of 2 (1, 2, 4, 8...)
Voltage accuracy	$\pm(2\text{mV}+1\%)$
Current accuracy (1mA and up)	$\pm(2\text{mA}+1\%)$
Current accuracy (100uA - 1mA)	$\pm(25\text{uA}+1\%)$

Measurement averaging

Each module has internal RAM for capture. At the full 4uS resolution, this corresponds to around 2.7 seconds of record time. This can be increased by turning off record channels that are not required or by increasing the 'Averaging' setting.

'Averaging' allows multiple samples to be combined to give a single result. This reduces noise in a reading, allows a larger recording time and reduces the amount of storage space required when streaming the recording to disk.

The averaging setting is set in powers of 2 (1, 2, 4, 8...16k, 32k). A setting of '4' will average 4 consecutive samples, reducing the resolution and storage requirements by 4 times.

Even at the highest 32k averaging rate, every 4uS sample is calculated fully in the average, ensuring a very accurate total power consumption number. Each sample within the averaging window is summed together then divided by the number of samples. The calculated value is stored as a single measurement.

Lower averaging rates are used to capture detailed events, such as power up spikes, while larger values make it easier to see longer term power trends.

Streaming mode

Data is 'Streamed', allowing the module to record data over an almost unlimited period of time (depending on the storage space you have available on disk).

The device sends data to the controlling PC in real time, where it can be stored for later analysis. The speed of the connection (USB or LAN) and the power of the PC storing the data will limit the resolution that can be recorded.

A basic logging PC using USB or LAN control is generally able to record indefinitely at an averaging setting of 4 (16uS resolution). Running additional software on the PC may reduce this. Many modern PCs will record at full rate for long periods.

At faster rates, less data may be recorded before streaming automatically terminates. Every measurement taken by the hardware is always recorded. Any interruption to the data stream, or running out of buffer space will halt the capture.

External Triggering

Trigger In

- Begin recording on trigger in

Recording can be started when the trigger is received. In Edge triggered mode, recording will end when the memory is full. In Level triggered mode, recording will end when the trigger is cleared. This allows specific points or regions of operation to be captured.

- Power cycle on trigger in

When enabled, the external trigger can be used to begin a power cycle action

- Glitch on trigger in

When enabled, a trigger event can be used to trigger a glitch/drive action and/or interrupt data or assert a sideband

Trigger Out

Trigger Out can be used to sync external equipment with the enclosure.

- Trigger Out on recording state:

The enclosure will assert Trigger Out when recording is running.

- Trigger Out on current/power threshold:

The enclosure will assert the Trigger Out while either power or current output has exceeded a user-set threshold, or when a digital sideband is asserted. This might be used to identify points in operation where the drive exceeds expected power consumption.

- Trigger out on test event (glitch / power cycle)

The trigger out can be used to indicate that a glitch or power cycle event has been run

- Trigger out on signals

Monitored signals can be used to generate a trigger out. This signal event can also be directed to act as a trigger in, allowing a power up (for example) to run when a host voltage is asserted.

An additional feature allows for a sideband signal to be directed to either or both of the triggering connectors, allowing monitoring of SMBUS or similar.

Signal Monitoring

The 'signal monitoring' feature allows digital sideband signals and tracked power rails to be used as a trigger source or for output.

The state of a monitored signal can also be requested from the module at any time via a command

For a list of signals on the module that support triggering, see the annex at the end of the manual.

Requesting signal state

To get the state of a monitored signal:

SIGna1:[SIGNAL-NAME]:STATus:[HOST?|DEVice?]

Returns the current state of the monitored signal as **HIGH** or **LOW**. The signal state can (if supported) be monitored independently on both the host and device side of the module.

Signal triggering

One or more monitored signals (combined with 'or') can be enabled:

TRIGger:SIGna1[#Signal]:[HOST|DEVice]:ENABle [ON|OFF]

This combined 'signal' event can then be used to trigger another action (such as a hot-plug) or output on the trigger out port.

This feature overlaps to an extent with the 'sideband out' feature below, but it is safer as it only operated on the trigger OUT connector. It also more powerful as the signal event can also be used as an input trigger. Use this unless you really need to monitor 2 signals at the same time.

Sideband out over trigger

Both the trigger IN and OUT ports can be used to monitor a signal in real time.

WARNING: As the trigger IN port can be ordered to OUTPUT a status, there is a risk of two devices driving against each other and causing damage. Before using the live monitoring feature, you must ensure that you do not have any equipment attached that may try to drive the trigger IN port.

To begin live monitoring, first enable the trigger ports you want to use. This is done via additional options to the existing trigger setup commands:

Trigger OUT port:

```
# Set the trigger mode to sideband monitor  
TRIGger:OUT:MODE:SIDEband
```

Trigger IN port (requires double verification)

```
# Set the trigger mode to sideband monitor  
TRIGger:IN:MODE:SIDEband  
# Also set the trigger IN source to sideband out  
TRIGger:IN:SOURCE:SIDEband
```

The commands to control monitoring are:

```
# Select a signal for live monitoring  
TRIGger:MONitor[IN|OUT]:[SIGNAL-NAME]:[HOST|DEVIce]
```

Sets a trigger port to activate live monitoring for a given signal. The host/device parameter selects the side of the module to monitor on.

```
TRIGger:MONitor[IN?|OUT?]
```

Returns the selection for live monitoring on the given trigger port. The response will be in the form **PERST:HOST** or similar (**SIGNAL_NAME:SIDE**)

Controlling the enclosure

The primary control is split into two sections.

The SSD interface is via an MCIO port, which can be connected to a SerialCables PCIe host-card, a PCIe to MCIO adapter or an existing MCIO cable from your host.

Control of the test features is via USB or LAN connection. Both interfaces support all features.

Control options

There are a number of applications and scripted control options for HD Power Modules:

- QPS (Quarch Power Studio)

QPS is a powerful cross-platform software tool that can record and visualize power data, and also access the major 'breaker' features such as power cycling and glitch control. This is the default means of control.

QPS can be run manually or automated from Python (or similar)

- Torridon Terminal

This is a simple terminal application that can connect to a module and send manual commands. It is useful for testing, debugging and small amounts of manual control.

This is a Windows-only application and can be run directly (no installer needed). It can connect to the module over USB or LAN.

- Python scripts

A range of python application note examples are available from our side and can be used to quickly automate all the features of the enclosure for fully automated testing.

Our Python API is freely available from PyPi, and other languages can be used to interface with our simple API if you prefer.

Default Startup State

On power up or reset, the module enters a default state. In this state, the outputs will be turned ON, to the drive will power up by default.

Basic setting	Default value
Power state	ON
Fan mode	AUTO
Glitch mode	NONE
Signal driving	DISABLED
Trigger out	DISABLED
Trigger in	DISABLED

LAN setting	Default value
DHCP	ON
IP address	192.168.1.99
IP mask	255.255.255.0
DNS1,2	0.0.0.0
GATEWAY	192.168.1.1
NetBIOS name	QTL3178-nn-nnn

nn-nnn = Serial number section, as stated on the product label

Factory Reset

Units can be returned to their factory default states with the command:

```
> CONFIG:DEFAULT FACTORY
```

This will reset all user settings, including LAN / IP addresses and similar.

Command Set

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.

- Commands are NOT case sensitive.
- 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.
- Many 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 have a '?' on the end.
- Commands with a preceding '*' are special control/query 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.

Identify commands

These commands allow you to identify the device you are working with.

***IDN?**

Returns the device information and versions

HELLO?

Returns the descriptive name of the module

HELP

Returns basic help to the terminal, including a list of more detailed help commands.

Basic Setup commands

These are standard commands to setup the module

[comments]

Any command beginning with a # character is ignored as a comment.

*RST

Triggers a reset; the module will behave as if it had just been powered on. A reset will cause USB/LAN connections to be lost and the module must be reconnected again.

CONFig:DEFault STATE

Sets the unit to its power on default state. This will leave the unit in the same state as if it was power cycled.

CONFig:DEFault FACTory

Sets the unit to the state it left the factory in. This will set any EEPROM stored parameters to factory defaults. It will not affect the calibration settings for the unit.

If this command changes the NetBIOS name, a power cycle or *RST command will be required for the change to take effect.

Output Control Commands

These commands allow you to set the output voltage levels.

RUN:POWER [UP|DOWN]

Activates/deactivates the outputs. The output voltage will be the current DC voltage setting for the channel when in power up mode.

When used with an XLC injection fixture, or a custom fixture without electronic marking, this command will FAIL. You must run the **CONFIG:OUTPUT MODE** command first, to manually select the output voltage range.

RUN:POWER?

Returns the current power output activation state.

Status Commands

These commands allow you to query the operation of the module

RUN:INTerrupts?

Returns a list of interrupt flags, showing the actions that have occurred. Querying the interrupts will clear the flags (assuming the interrupt item is no longer in effect)

Interrupts are:

TRIGGERED	A trigger in occurred
COMPLETE	An action completed
M_BUFF	Memory is pre-buffering
M_DONE	Memory pre-buffering is done
M_TRIG	Memory recording triggered
R_PART	Recording is available to download (memory not full)
R_FULL	Recording is available to download (memory is full)

Fan commands

Fan control has options to manage the cooling of the enclosure and the SSD under test.

FAN:MODE:[TEMPerature|SPEed]

FAN:MODE?

Set or return the current fan mode.

TEMPERATURE mode: Try to maintain a set temperature within the enclosure (see FAN:TEMPERATURE command for settings)

SPEED mode: Set the fan speed to a constant level

FAN:SPEed:PERcentage:[#Percentage]

FAN:SPEed:PERcentage?

Set or return the fixed speed setting of the fan. Setting this will cause the fan to move to Speed controlled mode. In Temperature controlled mode this will be DISABLED

FAN:SPEEd?

Return the current speed of the fan as a percentage of its maximum rated speed (0 to 100%). This measurement is available in all fan modes

FAN:TEMPerature:[#Celcius]**FAN:TEMPerature?**

Set or return the target temperature for the enclosure in degrees Celsius. Setting this value will cause the fan to move to temperature-controlled mode

Measurement commands

Measurement available depend if PAM to be installed in the enclosure.

These commands return a simple, instantaneous measurement. They are useful in scripts when you do not want to deal with downloading a larger block of measurement data.

PAM Voltage/current/power measurements are always affected by the current 'averaging' setting. A higher averaging setting will produce a more stable and more consistent result when using these commands.

MEASure:OUTputs?

Returns the voltage and current measurements for all channels at the same time from the PAM

MEASure:[channel]:[Unit]?

Returns the value of a single measurement channel from the PAM. See 'help names' for the full list.

For example, read 12v current with: MEASURE:12V:A?

MEASure:TEMPerature[Probe]?

Returns the value of a single temperature probe:
1, 2, 3, SMART

Probes 1-3 are within the enclosure [Where?] and SMART returns the reported temperature of the SSD if it supports (requires SMBUS and multi-master support) so the enclosure can read it

Recording and streaming commands

These commands allow you to configure the capture of data on the PAM (if present)

RECORD:[channel]:[channel_type]:ENABLE [ON|OFF]

RECORD:[channel]:[channel_type]:ENABLE?

Enables/disables the record of each of the available channels,

where [channel] is: 3.3V or 12V

and [channel_type] is: VOLTage or CURrent

Digital channels can also be disabled with a channel type of 'D'

RECORD:TRIGGER:MODE [mode]

RECORD:TRIGGER:MODE?

The trigger mode can be set to one of the following:

PATTERN	Trigger occurs when an output pattern is started.
POWER	Trigger occurs when the power state is changed to 'ON'.
MANUAL	No Trigger; recording starts on issuing RECORD:RUN command.
EXTERNAL	Trigger is taken from the external Trigger In connector (supporting modules only).
THRESHOLD	Trigger is taken from the set current/power threshold levels. Recording will start if any of the limits is exceeded.

RECORD:LIMIT:PERCENTAGE [#percent]

RECORD:LIMIT:PERCENTAGE?

The memory to use for recording can be limited to a percentage of the total capacity. This can be specified as a fraction (e.g., "30.33") for greater resolution.

RECORD:TRIGGER:PRE [#percent]

RECORD:TRIGGER:PRE?

The record function can pre-trigger, to capture data before the trigger occurs. This sets the percentage of available memory to be used for the pre-trigger region.

RECORD:AVERAGING [rate]

RECORD:AVERAGING?

By default, the module collects samples at a rate of 250,000 samples per second. This can be reduced by averaging across multiple measurements to give a longer recorded period.

The averaging option allows 2^n samples to be averaged together for a single recorded reading.

We recommend you instead use the QIS ‘stream mode resample’ command or the quarchpy resample API. This is clearer to understand and consistent with newer devices.

Valid rate enumerations are:

[rate]	Samples averaged	Averaging window
0	No Averaging	N/A
2	2	8 μ S
4	4	16 μ S
8	8	32 μ S
16	16	64 μ S
32	32	0.13 mS
64	64	0.25 mS
128	128	0.5 mS
256	256	1 mS
512	512	2 mS
1K	1024	4.1 mS
2K	2048	8.2 mS
4K	4096	16.4 mS
8K	8192	32.8 mS
16K	16384	65.5 mS
32K	32768	131 mS

RECORD:STREAM

RECORD:STREAM?

Begins (or checks the state of) streaming of measurement data. This is only available after enabling streaming, and requires a stream compatible client to handle the high volume of data.

External triggering commands

TRIGger:OUT:SOURce [RECORD|THRESHOLD|GLITCH|SIGNAL|SIDEband]

TRIGger:OUT:SOURce?

Sets the source of the Trigger Out event. In Pattern mode, the trigger will assert while a pattern is running. In Record mode, the trigger will assert while the recording is running. In Threshold mode, the pattern will assert while any power/current value is above the user-set threshold for that value.

TRIGger:OUT:INVert [ON|OFF]

TRIGger:OUT:INVert?

Configures the global invert of any trigger out event

TRIGger:SIGNAL[#Signal]:[HOST|DEVICE]:ENABLE [ON|OFF]

TRIGger:SIGNAL[#Signal]:[HOST|DEVICE]?

Enables a signal supporting the monitor feature to be used as a trigger source. This also requires that the trigger source is set to 'SIGNAL'

TRIGger:OUT:THRESHOLD:A:[channel] [#mA]

TRIGger:OUT:THRESHOLD:A:[channel]?

[mA] is a current level in milli Amps.

Sets the current threshold for the channel. If the measured current exceeds this level, Trigger Out will be asserted (if the Trigger Out mode is set to threshold).

TRIGger:OUT:THRESHOLD:V:[channel] [#mV]

TRIGger:OUT:THRESHOLD:V:[channel]?

[mV] is a power level in milli volts.

Sets the Voltage threshold for the channel. If the measured voltage exceeds this level, Trigger Out will be asserted (if the Trigger Out mode is set to threshold).

RECOord:TRIGger:EXTerna1:TYPE [EDGE|LEVEL]

RECOord:TRIGger:EXTerna1:TYPE?

Sets the type of external trigger expected that will control the recording start. An Edge trigger will start the recording when the trigger is asserted. The recording will stop when memory is full or when stopped manually.

A Level trigger will start the recording when asserted and will end immediately when de-asserted.

Ethernet commands

Ethernet commands are generally persistent through reset. Some network settings may not take effect until a power cycle.

CONFIg:ETHernet:NAME[xxxx]

CONFIg:ETHernet:NAME?

Sets the NetBIOS name of the unit. This is persistent through reset. You will have to reset/power cycle the unit for the changes to take effect.

CONFIg:ETHernet:IP [x.x.x.x]

CONFIg:ETHernet:IP?

Sets the static IP address of the unit. Setting a static IP address will disable DHCP if it is currently enabled. You will have to reset/power cycle the unit for the change to take effect.

CONFIg:ETHernet:MASK [xxx.xxx.xxx.xxx]

CONFIg:ETHernet:MASK?

Sets the IP mask of the unit.

CONFIg:ETHernet:DNS[1|2] [x.x.x.x]

CONFIg:ETHernet DNS[1|2]?

Sets the primary and secondary DNS addresses for the unit.

CONFIg:ETHernet:GATE[x.x.x.x]

CONFIg:ETHernet GATE?

Sets the Gateway of the unit. You will have to reset/power cycle the unit for the change to take effect.

CONFIg:ETHernet:DHCP [ON|OFF]

CONFIg:ETHernet:DHCP?

Enables/disables the DHCP client. When enabled, the controller will try to obtain an IP address from the local DHCP server.

CONFig:ETHernet:HTTP:PORT [#Number]

CONFig:ETHernet:HTTP:PORT?

Gets/sets the port number to use for HTTP control

CONFig:ETHernet:TCP:PORT [#Number]

CONFig:ETHernet:TCP:PORT?

Gets/sets the port number to use for TCP control

CONFig:ETHernet:REST [ON|OFF]

CONFig:ETHernet:REST?

Gets/sets the enable state for REST control of the device

CONFig:ETHernet:TCP [ON|OFF]

CONFig:ETHernet:TCP?

Gets/sets the enable state for TCP control of the device

CONFig:ETHernet:LOCATE [ON|OFF]

CONFig:ETHernet:LOCATE?

Gets/sets the enable state for the LAN location system. This allows devices to be located on the network via a broadcast packet. Disabling this will prevent applications such as TestMonkey and QIS from locating the module automatically (though manual connection can still be used).

Debug Commands

These commands are used to look at the details of the module and its operation. You may be requested to use these if reporting a fault to Quarch.

*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: Programmable Power Module [The name of the device]
Part#: QTL1999-02                 [The part number of the hardware]
Serial#: QTL1944-02-012          [Serial number of the module]
Enclosure#: QTL1999-02-003       [Enclosure number of the module]
Processor: QTL1159-01,3.50       [Part# and version of firmware]
Bootloader: QTL1170-01,1.00     [Part# and version of bootloader]
FPGA 1: 1.3                      [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.

*SERIAL?

Returns the serial number of the internal power module.

*MAC?

Returns the MAC address of the module

MEASure:VOLT:SELF [channel]?

Returns a self test voltage measurement on the modules internal rails.

channel can be: 1v2 3v3 19v 5v 12v

Customer support from Quarch

There are multiple ways to access the support you need. You can contact us directly or access an extensive range of valuable support materials from <http://quarch.com/support>.

Contact us direct

Get going quickly and easily, with help direct from the engineers:

- Call **+44 1343 508 140** or email support@quarch.com during UK office hours.
- Our international partners are well trained in the use of our products and can deal with many basic technical queries from within your time zone, if you prefer. Check <http://quarch.com/resellers> for the contact details of your regional supplier.

Access support from the Quarch website

You can download up-to-date software and drivers, technical manuals, datasheets and more from our website. To help you get started quickly we provide additional documents, such as examples in Perl, Python and C# and Telnet and Serial instructions.

Key places to visit on the Quarch website

- Register your Quarch product to confirm your international warranty: <http://quarch.com/product-registration>
- Download a wide range of documentation, free applications and drivers to help you make the best possible use of your Quarch tools: <http://quarch.com/content/downloads>
- Access the Quarch support forum (<http://quarch.com/forum>):
 - Find discussion topics, support information and testing ideas.
 - Browse existing topics or login to your user account to ask for information and advice.
- Sign up for Quarch Technical Updates to get the most out of your Quarch products. Updates are published approximately once a quarter and include news about the latest features, tools, application notes and software updates. See <http://quarch.com/content/sign-quarch-technical-updates>.