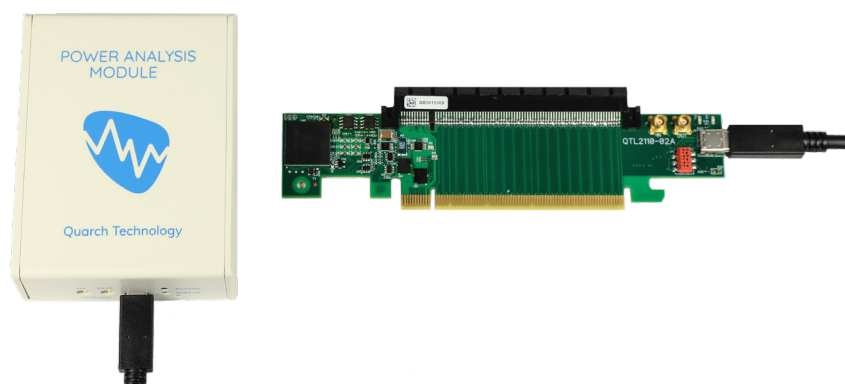# Power Analysis Modules

Capture and analysis of power and control signals across a wide range of interfaces

Quarch
Technology

# Power Analysis Modules

**Capture and analysis of power and control signals across a wide range of interfaces**

## Highlights

- Multi rail DC voltage/current/power measurement
- High power mains analysis via 3-phase PAM
- Digital side-band capture
- Oscilloscope function allows accurate power recording
- Low current measurement system, accurate at uA range
- Plug-and-play fixtures support a range of different interfaces
- Simple automation options

## Use Cases

| | |
|---|---|
| **Characterisation** | Power consumption monitoring over long periods and different use cases |
| **Power Quality** | See power up ramps, voltage noise and unusual power events |
| **Sideband analysis** | Capture side-band transitions and timings |
| **Automation** | Simple scripted control for complex unsupervised testing |
| **External Triggering** | Link to external test equipment to increase your test options |

## Measurement

Voltage and Current are simultaneously sampled, to give the most accurate possible power measurement.  High resolution sideband capture allows you to see the precise time that sidebands assert in comparison to a power event.

Long term recording allows hours or even days of capture at high resolution.  This is an order of magnitude more than is available on most alternative capture options.

Quarch Power Studio allows you to add custom channels, annotations and comments.  This provides you with a full overview of the performance of your product.  Full access to raw data for your own processing is provided.

## Control and Automation

Basic capture in Power Studio can be setup and run in seconds. USB and LAN control options allow for both bench testing and remote lab environments.

Our Python API allows automation of Power Studio, or direct access to the PAM to capture raw data

Application notes are available to help you get started quickly
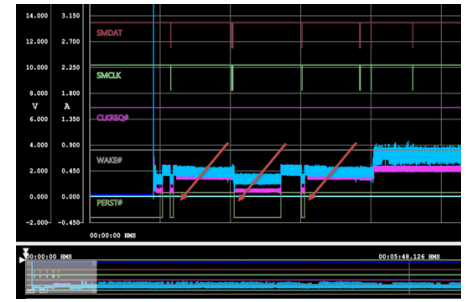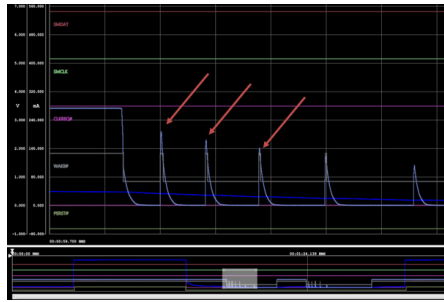
## Supplied Parts

**QTL2312**          - External PSU, 2 meter USB cable, USB-C cable to connect to fixture
**Fixtures**          - No supplied parts, requires QTL2312

## Also Required

**Downloads**          - Our website contains many useful downloads to help you get started: www.quarch.com
                                        **USB Drivers**
                                        **Technical Manuals**
                                        **Quick Start Guides**
                                        **Example Scripts**
                                        **Power Studio Application**

## Support

Quarch provides direct support to all customers, regardless of the sales channel you use to purchase our equipment.  We are available over email, or by phone during UK office hours.  Our regional partners are also trained to handle many of the most common questions you might have.

Our support is normally free, though there may be charges if you require on-site training or significant development work.  Please contact us if there is anything we can do to help.

Pleas see our website for access to drivers, technical manuals, quick-start guides, example scripts and more

| **Email** | **Phone** | **Web** |
| --- | --- | --- |
| support@quarch.com | +44 1343 508 140 | www.quarch.com/support |

## Ordering

Quarch have a network of specialist partners around the world.  Please contact our partner in your region if you require a quote.

We recommend evaluating our products before purchase, so our partners will be happy to arrange a free evaluation unit.

## Regional Contact Details

**North America**
SerialCables LLC
Colorado, California

Web      www.serialcables.com

**China, Hong Kong**
Saniffer
Hong Kong

Web      www.saniffer.com

**India**
ESA Group
Bangalore

Web      www.esaindia.com

**Taiwan**
Reeper Technology
Taipei

Web      www.reeper.com.tw/

**Israel**
EMY-Tech
Misgav

Web      www.emy-tech.com

**Europe and ROW**
Quarch Technology
Scotland, UK

Web      www.quarch.com

**South Korea**
JWill Technology
Seoul

Web      www.jwill.co.kr

**UK & Ireland**
GCH Services
Slough

Web      www.gch-services.com

## Products Versions

| Product Code | Product Options | |
|---|---|---|
| **QTLXXXX** | **QTL2312/KIT_1M** | Power Analysis Module - 1M cable to fixture |
| | **QTL2312/KIT_2M** | Power Analysis Module - 2M cable to fixture |
| | **QTL2312/KIT_3M** | Power Analysis Module - 3M cable to fixture |

## PAM Fixtures - For QTL2312

| Product Code | Description |
|---|---|
| QTL2347 | Gen4 PCIe x16 PAM Fixture<br>Test fixture for x16 PCIe Slot based devices up to Gen4 speeds |
| QTL2573 | Gen4 M.2 PAM Fixture<br>Test fixture for M.2 M-key based devices up to Gen4 speeds |
| QTL2525 | Gen4 SFF Drive PAM Fixture<br>Test fixture for U.2, U.3, SAS and SATA devices up to Gen4 speeds |
| QTL2608 | 2 Channel Custom PAM Fixture<br>Test fixture for custom wiring looms (2 power and 16 digital channels) |
| QTL2623 | 4 Channel Custom PAM Fixture<br>Test fixture for custom wiring looms (4 power and 16 digital channels) |
| QTL2628 | External Shunt Custom PAM Fixture<br>Test fixture for embedded shunts (4 power and 16 digital channels) |
| QTL2673 | Gen4 EDSFF E1 x4 PAM Fixture<br>Test fixtures for EDSFF E1 x4 devices us to Gen4 speeds |
| QTL2788 | Gen5 SFF PAM Fixture<br>Test fixtures for U.2, U.3 and SAS/SATA devices us to Gen5 speeds |
| QTL2980 | Gen5 Vertical M.2 PAM Fixture<br>Test fixtures for M.2 M-key devices up to Gen5 speeds |
| QTL2910 | Gen5 AIC x16 PAM Fixture<br>Test fixtures for Gen5 AIC x16 devices up to Gen5 speeds |
| QTL2983 | Gen5 AIC x16 PAM Fixture with AUX power<br>Test fixtures for Gen5 AIC x16 devices up to Gen5 speeds with AUX power requirements |
| QTL2887 | Gen5 EDSFF E1 x4 PAM Fixture<br>Test fixtures for EDSFF E1 x4 devices us to Gen5 speeds |
| QTL2888 | Gen5 EDSFF E3 x4 PAM Fixture<br>Test fixtures for EDSFF E3 x4 devices us to Gen5 speeds |
| QTL3024 | Gen5 OCP 3.0 NIC PAM Fixture<br>Test fixtures for OCP 3.0 NIC devices up to Gen5 speeds |
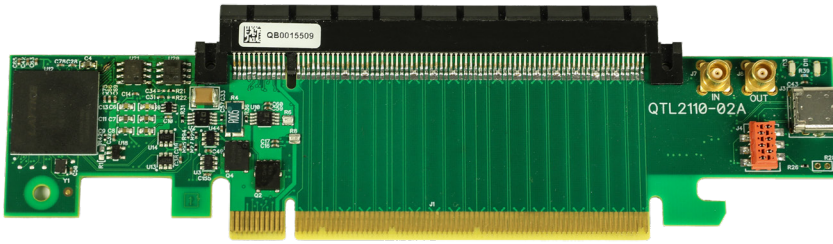
QTL2347 Gen4 PCIe x16 PAM Fixture



SFF-8639 - U.2/U.2/SAS/SATA PAM Fixture



2 Channel Custom PAM Fixture

## Technical Information - PAM Controller

| Output Characteristics | QTL2312 |
|---|---|
| Input Voltage | 12V DC |
| Form Factor | Desk Unit |
| Control Ports | USB, LAN |
| Injection Fixture Cable | USB-C |
| External Triggering | MCX IN/OUT |

## Technical Information - Injection Fixtures

| Measurement Accuracy | QTL2347 | QTL2573 | QTL2525 | QTL2608 |
|---|---|---|---|---|
| Form Factor | GEN4 AIC x16 | Gen4 M.2 | Gen4 SFF | Custom Loom |
| Base Sampling Rate | 250 KHz | | | |
| Sample Averaging | 1 to 32K Samples | | | |
| Voltage Range | 40mV - 19V | | | 40mV - 15V |
| Current Range | 100uA - 13A | | | 100uA - 12A |
| Typical Voltage Accuracy | ±(2mV+1%) | | | |
| Current Accuracy (100uA-1mA) | ±(25uA+1%) | | | |
| Current Accuracy (1mA-13A) | ±(2mA+1%) | | | |

| Measurement Accuracy | QTL2623 | QTL2628 | QTL2673 | QTL2788 |
|---|---|---|---|---|
| Form Factor | Custom Loom | | GEN4 E1 x4 | SFF |
| Base Sampling Rate | 250 KHz | | | |
| Sample Averaging | 1 to 32K Samples | | | |
| Voltage Range | 40mV - 15V | | 40mV - 19V | |
| Current Range | 10mA - 12A | uA - kA[1] | 100uA - 13A | 100uA - 13A |
| Typical Voltage Accuracy | ±(2mV+1%) | | | |
| Current Accuracy (100uA-1mA) | N/A | Shunt Dependant | ±(25uA+1%) | |
| Current Accuracy (1mA-13A) | ±(2mA+1%)[2] | Shunt Dependant | ±(2mA+1%) | |

[1] Subject to your shunt resistor, 65mV max differential across shunt, see technical manual for details

[2] Accuracy applies to unit current range which is 10mA to 12A

| Measurement Accuracy | QTL2980 | QTL2910 | QTL2983 | QTL2887 | QTL2888 |
|---|---|---|---|---|---|
| Form Factor | Gen5 M.2 | Gen5 x16 AIC | Gen5 x16 AIC +AUX | Gen5 EDSFF E1 | Gen5 EDSFF E3 |
| Base Sampling Rate | | | 250 KHz | | |
| Sample Averaging | | | 1 to 32K Samples | | |
| Voltage Range | 40mV - 19V | | 500mV - 16V | 40mV - 19V | |
| Current Range | 100uA - 13A | | ±162.5A*1 | 100uA - 13A | |
| Typical Voltage Accuracy | | | ±(2mV+1%) | | |
| Current Accuracy (100uA-1mA) | ±(25uA+1%) | | N/A | ±(25uA+1%) | |
| Current Accuracy (1mA-13A) | ±(2mA+1%) | | ±(25mA + 1%)*2 | ±(2mA+1%) | |

*1 Max range for 12Vaux channel, other channels: 12V=±32.5A, 3v3=±13A, 3v3Aux=±3.25A

*2 This is the worst case on the 12Vaux channel, other channels are more accurate (3v3 is 2mA+1%)

| Measurement Accuracy | QTL3024 |
|---|---|
| Form Factor | OCP 3.0 NIC |
| Base Sampling Rate | 250 KHz |
| Sample Averaging | 1 to 32K Samples |
| Voltage Range | 40mV - 15V |
| Current Range | 100uA - 12A |
| Typical Voltage Accuracy | ±(2mV+1%) |
| Current Accuracy (100uA-1mA) | ±(25uA+1%) |
| Current Accuracy (1mA-13A) | ±(2mA+1%) |

| Monitored Rails | QTL2347 | QTL2573 | QTL2525 | QTL2608 |
|---|---|---|---|---|
| **Power Monitoring** | 3v3, 12v, 3v3_Aux | 3v3 | 12v, 5v, 3v3_Aux | 2 Power Rails |
| **Digital Monitoring** | PERST, WAKE, CLKREQ, SMDAT, SMCLK | CLKREQ, PERST, PEWAKE, SUSCLK, PEDET, ALERT, SMB_DATA, SMB, CLK, LED_1, DEVSLP, MFG_DATA, MFG_CLK | PERST, WAKE, PERSTB, SMBCLK, SMBDAT | 16 Digital Channels |

| Monitored Rails | QTL2623 | QTL2628 | QTL2673 | QTL2788 |
|---|---|---|---|---|
| **Power Monitoring** | 4 Power Rails | 4 Power Rails | 12v, 3v3_Aux | 12v, 5v, 3v3_Aux |
| **Digital Monitoring** | 16 Digital Channels | 16 Digital Channels | PRSNT0, PERST0, PERST1/CLKREQ, LED, SMBRST, SMBCLK, SMBDAT, PWRDIS, MFG, DUALPORTEN, RFU | PERST, WAKE, PERSTB, SMBCLK, SMBDAT |

| Monitored Rails | QTL2980 | QTL2910 | QTL2983 | QTL2887/ QTL2888 |
|---|---|---|---|---|
| **Power Monitoring** | 3v3 | 3v3, 12v, 3v3_Aux | 12v, 3v3, 12v_Aux, 3v3_Aux | 12v, 3v3_Aux |
| **Digital Monitoring** | CLKREQ, PERST, PEWAKE, SUSCLK, PEDET, ALERT, SMB_DATA, SMB, CLK, LED_1, DEVSLP, MFG_DATA, MFG_CLK | PERST, WAKE, CLKREQ, SMDAT, SMCLK | PERST, WAKE, CLKREQ,, PWRBRK SMDAT, SMCLK, REFCLK_LOS | PRSNT0, PERST0, PERST1/CLKREQ, LED, SMBRST, SMBCLK, SMBDAT, PWRDIS, MFG, DUALPORTEN, RFU |

| Monitored Rails | QTL3024 |
|---|---|
| **Power Monitoring** | 3v3, 12v |
| **Digital Monitoring** | BIF0#, BIF1#, BIF2#, PWRBRK#, WAKE#, NIC_PWR_GOOD, MAIN_PWR_EN, AUX_ PWR_EN, PERST0#, PERST1#, PERST2#, PERST3# REFCLK_OK |