Network Business Unit
Mission Statement

Our goal is to be the preferred technology partner for copper connectivity interface solutions to leading suppliers of communication network equipment & devices.

Core Skills

• Demonstrated design/engineering and high volume expertise
• Strong relationships with leading electronic OEM’s, CEM’s & PHY companies
• Excellent value and outstanding quality products delivered from high-volume production facilities
• Geographic proximity to customers’ design and production sites
• Worldwide distribution support

Resources

• Pulse Networking Website
  » Buy Now
  » Sample Portal
  » Datasheets, RoHS CoC, 3d Models
  » Application Guides/Technical Papers/Videos
  » Easy to use Product Finder
  » New Product Releases
• Technical Support
  » America’s
    Prodfonetworkamericas@pulseelectronics.com
  » Europe, Middle East, Africa:
    Comms-Apps-Europe@pulseelectronics.com
  » Asia, Australia (Pacific Rim), Korea
    Prodfonetworkapac@pulseelectronics.com

Networking.PulseElectronics.com
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**Pulse Authorized Distributors**

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Pulse Electronics is developing the next generation of networking components to support the future expansion of the following markets and applications. Pulse has a full line of network products which include Ethernet Transformers, Ethernet Connector Modules, Connectors, RF Inductors, Common Mode Chokes, and Telecom Magnetics and Filters.

**Transportation**
- Infotainment
- Body Controls
- ADAS
- Cameras/Radar
- Battery Management Systems
- Telemetry

**Consumer**
- ONT
- Femtocell
- Gateway/Router
- Security
- Home Automation
- Displays/TV’s

**Industrial Market**
- Automation
- Process Controls
- Communications
- Robot controls
- Security Displays
- Smart Grid

**Medical**
- In Fusion Pumps
- Imaging
- Ventilators
- Diagnostics
- Monitors

**Communications**
- Switches
- Routers
- Gateways
- Access points
- Basestations
Pulse releases the AE5002 1000Base-T1 common mode choke for automotive Ethernet applications. In addition to the 1000Base-T1 Pulse has released AE2002 100Base-T1 CMC and is in process of releasing the 100Base-T1 Power over Data Lines (PoDL) AE3003/AE3005/AE3006 CMC. Pulse’s parts are designed to operate from -40°C up to +125°C, have high reliability, high volume manufacturing, long term manufacturing support, and meet AEC-Q200 requirements.

### Features and Benefits
- Designed to meet IEEE 802.3bp/bu/bw
- Qualified at Marvell, Broadcom, Valens
- Meets AEC-Q200 requirements
- IATF 16949:2016 Factory
- Operating Temp. from -40°C up to +125°C
- PPAP Documentation Available
- Fully Automated Production

### Applications
- Infotainment
- Advanced Driver Assist Systems (ADAS) Body Control
- Camera/Radar
- Gateways
- Backbone Diagnostics
- Telemetry

### New Products

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Speed</th>
<th>Part Type</th>
<th>PoDL Rating</th>
<th>Package Size</th>
<th>Production Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE2002</td>
<td>100Base-T1</td>
<td>CMC</td>
<td>Non-PoDL</td>
<td>1812</td>
<td>Released</td>
</tr>
<tr>
<td>AE5002</td>
<td>1000Base-T1</td>
<td>CMC</td>
<td>Non-PoDL</td>
<td>1812</td>
<td>Released</td>
</tr>
<tr>
<td>AE3003</td>
<td>100Base-T1</td>
<td>CMC</td>
<td>300mA</td>
<td>2518</td>
<td>Target Release Q2 ’19</td>
</tr>
<tr>
<td>AE3005</td>
<td>100Base-T1</td>
<td>CMC</td>
<td>350mA</td>
<td>2518</td>
<td>Target Release Q2 ’19</td>
</tr>
<tr>
<td>AE3006</td>
<td>100Base-T1</td>
<td>CMC</td>
<td>470mA</td>
<td>2518</td>
<td>Target Release Q2 ’19</td>
</tr>
<tr>
<td>AL0470</td>
<td>100Base-T1</td>
<td>Dual Inductor</td>
<td>470mA</td>
<td>N/A</td>
<td>Target Release Q4 ’19</td>
</tr>
</tbody>
</table>
Pulse’s latest JXR8 PIP Tab down series of 1x2 Ethernet connector modules are designed to provide isolation and noise reduction in a single solution. Pulse parts operate with a wide range of industrial protocols. These 1x2 Tab Down connectors are compact and make it easy for designers to layout their PCB’s. The PIP capability allows for these parts to be reflow soldered removing one step in the manufacturing process.

### Features and Benefits

- Designed to meet IEEE802.3u (100BASE-TX) and 802.3ab (1000BASE-T) standards
- -40°C to +85°C operating temperature
- Pin-in-Paste (PIP) Soldering
- Suitable for CAT 3, CAT 5 UTP or higher
- Compact form factor optimizing board space
- Supports all major PHY manufactures

### Applications

- Industrial Automation
- Process or Remote Control and Monitoring
- Campus
- Factory or Rugged Communication Networks
- Power over Ethernet
- Touch Screen Display & Panels
- Security & Image processing
- Access Control

### New Products

#### 1x2 Tab Down Pin-In-Paste (PIP) Ethernet Connectors

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Tab Location</th>
<th>No. of Ports</th>
<th>Speed</th>
<th>LED Left/Right</th>
<th>Contact Plating</th>
</tr>
</thead>
<tbody>
<tr>
<td>JXR8-1001NL</td>
<td>DOWN</td>
<td>1x2</td>
<td>100Base-TX</td>
<td>Green/Yellow</td>
<td>15uinch</td>
</tr>
<tr>
<td>JXR8-1002NL</td>
<td>DOWN</td>
<td>1x2</td>
<td>1000Base-T</td>
<td>Green/Yellow</td>
<td>15uinch</td>
</tr>
<tr>
<td>JXR8-1003NL*</td>
<td>DOWN</td>
<td>1x2</td>
<td>Cat 5e</td>
<td>Green/Yellow</td>
<td>15uinch</td>
</tr>
</tbody>
</table>

*No Magnetics

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New Products

HDBaseT Connector Module & Industrial Temperature Discrete Modules

Pulse Electronics expands their HDBaseT product portfolio with a series of industrial temperature -40°C to +85°C HDBaseT magnetic modules. Pulse HDBaseT magnetic modules include a transformer and common mode choke that offer safety isolation and EMI noise reduction in a single package. In addition, Pulse has released the first ever HDBaseT Integrated connector module. This offers designers option to reduce board space and simplify board layout. The HDBaseT technology enables 5Play feature set, which includes ultra-high definition 4k video, audio, 100Base-TX Ethernet, various control signals, and up to 100W of power, on a single 100m CAT5e/6 cable.

Features and Benefits

- Compatible with Valens chipsets
- Supports Power Over HDBaseT up to 140W
- Suitable for a variety of HDBaseT applications
- High volume production
- Industry standard footprint

Application

- Blu-ray, DVD, Recorders
- Displays
- Digital Set Top Box
- PC’s
- Projectors
- A/V Receivers
- Game Consoles
- HDMI repeaters, Splitters, Switches

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>PoE (W)</th>
<th>Valens PHY</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDX8004NL</td>
<td>SIN, HDBaseT, SMT, -40°C to +85°C</td>
<td>60W</td>
<td>VS010, VS020, VS100, VS200, VS210, VS2000, VS2310</td>
</tr>
<tr>
<td>HDX8005NL</td>
<td>SIN, HDBaseT, SMT, -40°C to +85°C</td>
<td>100W</td>
<td>VS010, VS020, VS100, VS200, VS210, VS2000, VS2310</td>
</tr>
<tr>
<td>HDX8006NL</td>
<td>SIN, HDBaseT, SMT, -40°C to +85°C</td>
<td>140W</td>
<td>VS010, VS020, VS100, VS200, VS210, VS2000, VS2310</td>
</tr>
<tr>
<td>HDX8008NL</td>
<td>SIN, HDBaseT, SMT, -40°C to +85°C</td>
<td>60W</td>
<td>VS010, VS020, VS100, VS200, VS210, VS2000, VS2310</td>
</tr>
<tr>
<td>JK0-8001NL</td>
<td>1x1, HDBaseT, TH, 0°C to +85°C</td>
<td>30W</td>
<td>VS010, VS020, VS100, VS200, VS210, VS2000, VS2310</td>
</tr>
</tbody>
</table>
Pulse electronics introduces 2.5GBase-T and 5GBase-T Ethernet magnetics supporting 4P PoE connections in a new low profile package for multiple Ethernet applications. The parts are compatible with all major 2.5G/5GBase-T PHY suppliers. The parts are ideal for applications requiring higher bandwidth, PoE function, and lower overall package height such as LTE base stations, 802.11ac wireless access points, NIC cards, high speed routers, switches and video displays.

**Features and Benefits**

- Designed to meet IEEE802.3bz for 2.5GBase-T and 5GBase-T
- Compatible with all Major PHYs
- Low profile package
- 4P PoE 60W
- Operates from -40°C to +85°C
- High volume, High reliability manufacturing

**Applications**

- 802.11ac Wireless Access Points
- NIC Cards
- LTE Base Stations
- Video Displays
- High Speed Routers & Switches

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Speed</th>
<th>Ports</th>
<th>PoE</th>
<th>Operating Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HX4110NL</td>
<td>2.5GBASE-T</td>
<td>Single</td>
<td>60W</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>HX51010NL</td>
<td>5GBASE-T</td>
<td>Single</td>
<td>60W</td>
<td>-40°C to +85°C</td>
</tr>
</tbody>
</table>
Pulse Electronics has expanded its Chip Choke product range for Automotive CANbus applications. The PE-1210ACC size offers chip chokes accredited to the Automotive Reliability standard AEC-Q200 and complements our existing PE-1812ACC series. They combine small size with the same excellent suppression performance needed for automotive networks and transportation solutions using CAN, CAN-FD, A2B and isoSPI.

**PE-1210ACCCXXXSTS Series**

### Features and Benefits
- Offers small size and big performance for filtering EMC on CANbus lines
- Meets AEC-Q200 requirements for Automotive Environments
- Operating temp. -40°C up to +150°C
- Multiple Impedance or Inductance value for optimizing EMC on other LVD Signal Lines

### Applications
- In Vehicle Networks and Communications
- Battery Management Solutions
- Infotainment Systems
- Body Control

### Electrical Specifications @ 25°C - Operating Temperature -55°C to +150°C

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Common Mode Impedance (10MHz)</th>
<th>Inductance (µH)</th>
<th>Standard Tolerance</th>
<th>RDC (Ω Max)</th>
<th>IDC (A Max)</th>
<th>Rated Volatage (V) Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Typ.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PE-1210ACC110STS</td>
<td>300</td>
<td>550</td>
<td>11</td>
<td>+50/-30%</td>
<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>PE-1210ACC220STS</td>
<td>500</td>
<td>1100</td>
<td>22</td>
<td>+50/-30%</td>
<td>0.5</td>
<td>0.25</td>
</tr>
<tr>
<td>PE-1210ACC510STS</td>
<td>1000</td>
<td>2600</td>
<td>51</td>
<td>+50/-30%</td>
<td>0.7</td>
<td>0.2</td>
</tr>
<tr>
<td>PE-1210ACC101STS</td>
<td>2200</td>
<td>5100</td>
<td>100</td>
<td>+50/-30%</td>
<td>1.5</td>
<td>0.15</td>
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</tbody>
</table>
Pulse releases the HXU6200NL four pair 30W ethernet magnetics for Medical applications. The part is qualified to UL 60601, 2 means of operator protection (2 MOOP), PoE capable up to 30W, operating temperature of -40°C to +85°C, voltage isolation of 3000Vrms, and provides 4.0mm Creepage and 2.5mm Air clearance.

**Features and Benefits**

- UL60601-1 Qualified
- 2 MOOP
- 4P PoE 30W
- Operating Temp. from -40°C up to +85°C
- 3KVrms Voltage isolation
- 4mm Creepage
- 2.5mm Air Clearance
- +15 years production support

**Applications**

- MRI Machine
- Surgical Equipment
- CPAP
- Infusion Pumps
- Dialysis equipment

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Number of Ports</th>
<th>Max. Power</th>
<th>Voltage Isolation</th>
<th>Creepage</th>
<th>Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>HXU6200NL</td>
<td>Single</td>
<td>30W</td>
<td>3KVrms</td>
<td>4mm</td>
<td>2.5mm</td>
</tr>
</tbody>
</table>
High Isolation Industrial & Medical Magnetics

Pulse Electronics Networking has released products dedicated to supporting the safety requirements where high working voltages, surges and transient voltages are present. Especially aimed towards the Energy, Smart Metering, Industrial control and Measurement, and Medical market sectors. Pulse parts have multiple options for working voltages, isolation voltages, and surge/impulse. In addition, we can meet functional, basic, supplementary and reinforced insulation requirements. Our parts are designed to meet the most stringent safety standards.

HXXXXXXXNL Series

### Features and Benefits

- Small footprint for High Isolation
- Meets or exceeds relevant safety standards for Industrial and medical applications
- Insulation supports >4KV for 1 minute.
- Added Surge or Impulse Tested options
- Operate temperature -40°C up to +85°C
- Optimized for use in Industrial Fast Ethernet, 1 and 2.5 Gigabit, TSN and other LVDS links
- Supports remote DC power feeding by PoE/PoE+ over Cat5 Cabling

### Applications

- Electricity Meters - 2 & 3 Phase
- Battery Management Solutions
- Instrumentation and Measurement Links
- AC Motor Drives
- MRI Machine, CPAP, Dialysis Equipment
- Industrial Remote Access Points & Sensors

### Part Number Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Speed</th>
<th>Insulation</th>
<th>IEC STD (working voltage)</th>
<th>Surge or Impulse</th>
<th>Voltage Breakdown</th>
<th>Size (mm) (L x W x H)</th>
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</thead>
<tbody>
<tr>
<td>HX1224CNL</td>
<td>100Base-TX</td>
<td>Reinforced &gt;4mm Creepage &gt;5mm Clearance</td>
<td>IEC60950 250Vrms UL file# E133523</td>
<td>-</td>
<td>4KV rms / 60s</td>
<td>13.6 x 15.0 x 6.2</td>
</tr>
<tr>
<td>HX1333NL</td>
<td>100Base-TX</td>
<td>Reinforced &gt;8.6mm C/C</td>
<td>IEC60950 600V</td>
<td>12KV Impulse per IEC61010</td>
<td>4.5KV rms / 60s</td>
<td>17.1 x 14.7 x 8.6</td>
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<tr>
<td>HX1339NL</td>
<td>100Base-TX</td>
<td>Supplementary &gt;10mm Creepage &gt;7mm Clearance</td>
<td>IEC61010-1 250V</td>
<td>-</td>
<td>4.5KV rms / 60s</td>
<td>15.2 x 15.2 x 7.6</td>
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<tr>
<td>H5187NL</td>
<td>1000Base-T</td>
<td>Functional</td>
<td>IEC60950</td>
<td>-</td>
<td>5KV rms / 60s</td>
<td>18.5 x 15.9 x 9.8</td>
</tr>
<tr>
<td>HX5026NL</td>
<td>1000Base-T</td>
<td>Functional</td>
<td>IEC60950</td>
<td>-</td>
<td>4KV rms / 60s</td>
<td>18.2 x 16.0 x 6.6</td>
</tr>
<tr>
<td>HX5224CNL</td>
<td>1000Base-T</td>
<td>Reinforced &gt;4mm Creepage &gt;5mm Clearance</td>
<td>IEC60950 250Vrms UL file# E133523</td>
<td>-</td>
<td>4KV rms / 60s</td>
<td>18.5 x 15.9 x 9.8</td>
</tr>
<tr>
<td>HX4019NL</td>
<td>2.5GBase-T</td>
<td>Functional</td>
<td>IEC60950</td>
<td>4KV impulse</td>
<td>3KV rms / 60s</td>
<td>18.2 x 16.0 x 6.6</td>
</tr>
</tbody>
</table>
1X1 1G/2.5G/5G/10GBase-T 4P PoE Top Entry Series

Pulse Electronics introduces the J1V series of 1x1 Top Entry 1000Base-T to 10GBASE-T 4P PoE Pin-in-Paste Ethernet Connector Modules. These parts have options for LED’s and 4 and 5 channel magnetics for 10GBase-T. The package is ideal for applications requiring higher bandwidth and higher power such as Base Stations, IPTV, Gateways, Video Displays, and Thin Clients.

Features and Benefits

- 1x1 Top Entry
- 1000Base-T, 2.5GBase-T, 5GBase-T, 10GBase-T performance
- 4P PoE up to 100W
- Pin-in-Paste (PIP) Soldering
- 4 & 5 Channel available
- RoHS 6/6 capable
- Compatible with all major PHY’s

Applications

- Base Stations
- IPTV
- Video Displays
- Gateways
- Thin Clients

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Speed</th>
<th>IEEE Specification</th>
<th>PoE Watts</th>
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</thead>
<tbody>
<tr>
<td>J1V-U2100NL</td>
<td>1x1 Top Entry</td>
<td>1000Base-T</td>
<td>802.3ab</td>
<td>75W</td>
</tr>
<tr>
<td>J1V-U2500NL</td>
<td>1x1 Top Entry</td>
<td>2.5GBase-T</td>
<td>802.3bz</td>
<td>100W</td>
</tr>
<tr>
<td>J1V-U5000NL</td>
<td>1x1 Top Entry</td>
<td>5GBase-T</td>
<td>802.3bz</td>
<td>72W</td>
</tr>
<tr>
<td>J1V-U7000NL</td>
<td>1x1 Top Entry</td>
<td>10GBase-T</td>
<td>802.3an</td>
<td>60W</td>
</tr>
</tbody>
</table>
New Products

140W 4P PoE Ethernet Transformers and Ethernet Connector Modules

Pulse has designed our 1000BASE-T PoE parts to allow for maximum power of 140W. Pulse has both Ethernet magnetics and Ethernet connector modules that accommodate the higher power. The parts are compatible with all major 1000BASE-T PHY’s. The parts are ideal for applications requiring higher power like Notebooks, Base stations, Access points, Video Displays, and Gateways.

Features and Benefits

- 140W max. power
- Multiple package options
- Compatible with all major PHY’s
- In Volume Production
- Industry Standard Footprint

Applications

- Base Stations
- Access Points
- Notebooks
- Video Displays
- Gateways

<table>
<thead>
<tr>
<th>Part Number</th>
<th># of Ports</th>
<th>Max. Power</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>HX6098NL</td>
<td>Single</td>
<td>140W</td>
<td>1000BASE-T</td>
</tr>
<tr>
<td>JKO-0229NL</td>
<td>1x1</td>
<td>140W</td>
<td>1000BASE-T</td>
</tr>
<tr>
<td>JOB-3563NL</td>
<td>2x6</td>
<td>140W</td>
<td>1000BASE-T</td>
</tr>
</tbody>
</table>
Ethernet Transformers

**Specifications**

- IEEE 802.3 compliant to 10G
- HDBaseT Compliant
- High Isolation up to 6kV
- Higher reliability (Carrier class & AEC-Q200)
- Single, Dual, Quad packages
- SMT & BGA options
- Extended Temperature -40°C to +85°C
- PoE++ Capable up to 140W

Ethernet Connector Modules

**Specifications**

- IEEE 802.3 compliant to 10G
- Thru-Hole, Press Fit, Pin-In-Paste, SMT options
- Multiple platforms - 1x1, 1xN, 2xN Tab up, Tab down, Side entry, Top entry, Low Profile, Offset
- Higher isolation (TVSS, surge)
- With and without LED’s
- Extended temperature -40°C to +85°C
- PoE++ Capable up to 140W
Product Overview

Battery Management Isolation Transformers

- **Specifications**
  - Support serial Daisy Chain isoSPI, SPI and other signal isolation
  - Meets AEC-Q200 requirements
  - Operating temp. -40°C up to +125°C
  - Multiple options for working voltages and voltage isolation
  - Safety Isolation and EMI Noise Suppression

BMS Isolation transformers and common mode chokes

RJ45 Connectors

- **Specifications**
  - Multiple Platforms - 1x1, 1xN, 2xN, Side entry, Top entry, Offset, Low profile
  - CAT3 to CAT5e connectors available
  - With & without LED’s
  - With & without shields
  - Cat 6a coming soon
Product Overview

IO Connectors

Specifications

- USB 3.1 Type C, USB 3.0, Thunderbolt
- High Speed (5G/s ~ 10G/s performance)
- Right Angle/Vertical, THT/SMT options

Fiber Optic Connectors, Cages & Transceivers

Specifications

SFP/SFP+ Connectors & Cages
- 1G & 10G performance
- 1xN & 2xN Platforms
- Standard industry footprints
- EMI shielding options
- Signal integrity simulations

Transceivers
- Hot Pluggable SFP and SFP+ footprints
- Compliant to Ethernet and Fiber Channel standards
- Standard reaches from very short to long haul
- SFF-8472 compliant Diagnostic Monitoring Interface
- Support up to 11.1Gbps
Product Overview

RF Modules & Baluns

Filter Components

Specifications

- RF Chip Inductors
- EMI Suppression Ferrite Beads
- Chip Chokes
- Array type beads

Telecommunication Transformers

Specifications

- T1/E1, T2/E2, ISDN, VDSL2, G. Fast(106MHz, 212MHz)
- Smallest Footprint
- Custom & Catalog Solutions
- Surface Mount and Thru-Hole
- Functional, Basic, Supplementary, and Reinforced options
- Extended Temperature options
- RoHS-6 Compliant

Specifications

- Multi band filter & modules (SMT, TH)
- Diplexers/Triplexers
- High rejection, low loss
- Excellent return loss
- Compliant to Docsis & MoCA
- Transmission line Baluns & Splitters
- Isolation matching Baluns
- IOT antenna matching Baluns
Product Overview

MSAN Filters

Specifications

- VDSL2 up to 30 MHz
- Extended temperature options
- Low profile options
- Single & Dual
- Standards: Europe, US, UK, China
- Integrated protection option
- Surface Mount and Thru-Hole
- Standard Footprints
- RoHS-6 Compliant

Broadband Filters

Specifications

- VDSL2 up to 30MHz
- Video grade
- ANSI & ETSI spec. compliance
- Single & Dual In-Line
- Dual In-Line with DSL Jack
- Alarm Filters

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Pulse Authorized Distributors

**North America:**

Arrow, Avnet, Digi-Key, Mouser, Sager, TTI, Master, Newark-E14, Future

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- Ireland: FMG Electronics Ltd
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- Poland: Gamma
- Russia: Macro, MT-System, Petro-in-Trade, EFO
- UK: Solid State Supplies AB

**Asia:**

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- Taiwan: Avnet, Arrow, Quadrep, Lestina, TTI
- Japan: Avnet, Takachiho, Chip1stop, Mouser, Okaya Electronics
- Korea: Avnet, Arrow, Changnam, Taekyung
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- South Asia: Avnet, Arrow, Quadrep, TTI
Connecting people now and in the future

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