**Firewire / DIN / SCSI / SATA Tutorial**

### What is Firewire?
Firewire is a high speed communication interconnect standard defined by IEEE-1394. It was originally developed to connect PCs to other PCs or to peripherals such as digital cameras, camcorders, scanners, etc. An attractive advantage is the devices are hot pluggable (live connection/disconnection without data loss or interruption).

### What is SCSI?
Small Computer System Interface or SCSI is a standard and interface for transferring data between PCs and peripherals such as disk drives. Some SCSI interfaces are also found on peripherals such as scanners and CD drives.

### What is SATA?
SATA or Serial ATA is a storage interface used to connect laptop and desktop computers or external mass storage devices such as a hard disk drives or optical drives. SATA can support data transfer rates as high as 3.0 Gbps per device (depending on hardware used).

### What is eSATA?
eSATA or external SATA, was developed in 2004 to provide external high speed connectivity to external storage devices. eSATA technology supports hot plugging and a maximum cable length of 2 meters.

### What is Ultra ATA/133?
Ultra ATA is a high speed interface using parallel transmission to connect not only mass storage devices but other peripherals such as DVD-ROM drives, CD-ROM drives tape drives, and floppy drives.

### What is DIN and Mini DIN?
DIN stands for Deutsches Institut für Normung which is the German standards organization that developed this interface. DIN connectors are available in many configurations from 3 to 9 positions. Also there are several different versions of the 5 pin connector where the angle of the arc swept between the first and last pin can be 180°, 240° or 270°. The most common uses for DIN connectors are analog audio, AT keyboard and mouse connections and MIDI applications.

Mini DIN connectors were also developed by Deutsches Institut für Normung. These connectors are similar to the DIN series but feature a smaller diameter connector and are available in different styles (pin counts and pin orientation). Some popular applications for Mini DIN connectors include S-Video and PS/2 Keyboard and mouse interconnects.

<table>
<thead>
<tr>
<th>Common Application Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SCSI, SATA, eSATA, Ultra ATA/133</td>
</tr>
<tr>
<td>• Firewire</td>
</tr>
<tr>
<td>• DIN and Mini DIN</td>
</tr>
</tbody>
</table>

For more useful information go to....
www.L-com.com/Resources
L-com’s CAES series of external Serial ATA cables provide fast data transfer speeds for external storage devices. SATA is now available “outside the box” These fully shielded cables provide extra protection from EMI/RFI and support speeds up to three Gigabits per second.

**External Serial ATA to Latching SATA II Cable Assemblies, Fully Shielded**

L-com’s CAES2 series of External SATA to SATA II latching cable assemblies connect eSATA external drives/enclosures to SATA II enabled systems. These robust assemblies feature fully shielded cables that provide extra protection from EMI/RFI and support speeds up to three Gigabits per second. The SATA II latching connector ensures a secure connection.

**Serial ATA (SATA) Cable Assemblies with Latching Connectors - Straight and Right Angle Connectors**

L-com’s latching Serial ATA cable assemblies provide a secure connection every time. These SATA assemblies feature two shielded 26 AWG pairs in a PVC jacket, gold plated contacts and two straight polarized seven position connectors. Both straight to straight and straight to right angle versions are offered. Custom lengths are available with modest minimum requirements. Call us today with your custom SATA requirements.

**Serial ATA Cable Assemblies - Straight to Straight and Straight to Right Angle Connectors**

Serial ATA cables are replacing wide Parallel ATA ribbon cables in many applications. The Serial ATA cable is smaller, more flexible and easier to route inside a chassis. With the trend toward miniaturization, these characteristics are beneficial in many product designs. The cables feature two shielded 26 AWG pairs in a PVC jacket, gold plated contacts and two straight polarized seven position connectors. Both straight to straight and straight to right angle connector orientations in lengths of 0.5 and 1 meter.

**Slim SATA Cables**

Slim SATA cables are now available for slimline SATA drives. A compact power and data connector plugs directly into the slimline data drive and splits into a standard latching SATA cable plus a 4 position power connector.

**Ultra ATA 133 Cables - 80 Cond. Round Shielded Cable with Three 40 Signal/40 Ground IDE Connectors**

L-com stocks popular Ultra ATA 133 cable assemblies. When compared to traditional flat ATA cables, these assemblies reduce heat and increase airflow in your case due to their compact round cable design. Features clear cable jacket and boots, 40 twisted pair, 30 AWG double shielded cable and easy to use pull tabs on each connector. Connectors are IDE 40 signal plus 40 ground, color coded and polarized for easy plug in. Also, these cables are compatible with ATA 100, 66, 33 drives and many CD-ROMS, zip drives and tape drives. See diagram below for connector spacing.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Length (inches)</th>
<th>System Board</th>
<th>Slave</th>
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<td>CAATA133-324</td>
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<td>CAATA133-336</td>
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</tr>
</tbody>
</table>

**Ultra ATA 133 Cable Spacing**

Free technical support

Call toll free at 1-800-343-1455 if you have questions about your application.

Shop at L-com.com or call 1-800-343-1455 • E-mail: sales@L-com.com • Fax: 978-689-9484

2010 Master Catalog 1.0 101
Firewire is an emerging high speed communication interconnect standard defined by IEEE-1394. It was originally developed to connect PCs to other PCs or to peripherals such as digital cameras, camcorders, scanners, etc. Current applications include automotive, telecom, data storage, aerospace and a host of others. An attractive advantage is devices are hot pluggable making live connection/disconnection without data loss or interruption possible.

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### Firewire Cable Construction

- **Clear mylar**
- **Braid**
- **Foil**

(2) Power conductors, 22 AWG
(2) Individually braid/foil shielded twisted pairs

**Type 1 to Type 1 cables utilize all six cable conductors (4 data and 2 power).**
**Type 1 to Type 2 cables utilize only the data conductors.**

#### Connectors

- **Type 1 Plug**
- **Type 1 Jack**
- **Type 2 Plug**
- **Type 2 Jack**
- **Type B Plug**
- **Type B Jack**

- **Type 1 (6 position) connectors are typically located on computers and hubs.**
- **Type 2 (4 position) connectors are commonly found on peripheral devices.**
- **Type B (9 position) connectors are commonly found on computers and hubs.**

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**Selecting connectors and cables for new products is one of the design engineer’s most time consuming and complicated tasks.** The L-com catalog with its reference tables, terminology definitions and tech-tips make it the first document I reach for when looking for connectivity products.” - Gerry Chaplin, Principle Marine Research Engineer, University of Rhode Island
### IEEE-1394 Firewire Latching Cable Assemblies, Type 1 – Type 1

These assemblies utilize L-com's CN1394L-1 latching Type 1/6 position connector on both ends of the cable. The latching connector provides mechanical retention to mating connectors providing a secure connection every time. It is easy to un-mate by depressing the release mechanism and supports Firewire 400 Mbps speeds. L-com can manufacture custom cable assemblies with low minimum quantity requirements and short lead times.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>1-9</th>
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<td>CSM94L-3M</td>
<td>IEEE-1394 Firewire Latching Cable, Type 1 Male - Type 1 Male, 3.0m</td>
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<td>CSM94L-5M</td>
<td>IEEE-1394 Firewire Latching Cable, Type 1 Male - Type 1 Male, 5.0m</td>
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<td>30.67</td>
<td>30.03</td>
<td>29.39</td>
</tr>
</tbody>
</table>

### IEEE-1394 Firewire Latching Male Connector, Type 1 (6 Position)

L-com's CN1394L-1 IEEE-1394 Firewire connector is a unique latching male connector that provides mechanical retention to mating connectors providing a secure connection. This latching connector is easy to un-mate by depressing the release mechanism and supports Firewire 400 Mbps speeds. L-com can manufacture custom cable assemblies using this connector with low minimum quantity requirements and short lead times. Or, do it yourself with these easy to solder connectors.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
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<tr>
<td>CN1394L-1</td>
<td>IEEE-1394 Firewire Connector, Type 1 Male</td>
<td>10.95</td>
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</tbody>
</table>

### IEEE-1394 Firewire Adapters - Molded and Fully Shielded

These adapters allow conversion from IEEE-1394 Type 1 (6 pin) to Type 2 (4 pin) and vice versa. Two versions are offered to solve mismatched firewire connector combinations. Featuring a durable fully molded design with internal shielding that protects signals from EMI/RFI interference.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
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<tr>
<td>FWA010FM</td>
<td>IEEE-1394 Firewire Adapter, Type 1 Female - Type 2 Male</td>
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<tr>
<td>FWA011MF</td>
<td>IEEE-1394 Firewire Adapter, Type 1 Male - Type 2 Female</td>
<td>6.50</td>
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</tbody>
</table>

### IEEE-1394 Firewire Shielded Panel Mount Couplers, Type 1 Connectors

This coupler provides a practical and cost effective way to feed Firewire cables through a panel or enclosure. A unique mounting flange makes these units usable in virtually any panel thickness. Features two Type 1 (6 position) female connectors and metal housing. Recommended 4-40 mounting screws must be purchased separately.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>ECF504-94MS</td>
<td>IEEE-1394 Firewire Shielded Coupler, Type 1 Connectors</td>
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<tr>
<td>ECF440</td>
<td>Machine Screws, 4-40 x 5/16”, Pkg/100</td>
<td>4.35</td>
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</table>

### IEEE-1394 Firewire Extender S and the IEEE-1394 Firewire Extender R units to each other.

These versatile rack panels are populated with 32 of our ECF504-94MS fully shielded Firewire couplers featuring Type 1 (6 position) female connectors on each end. Panel color is Black with White legend printed 1-32. Panel size is 3.5” x 19”.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
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<tr>
<td>PR35F504-94MS</td>
<td>IEEE-1394 Firewire Panel, Shielded</td>
<td>279.95</td>
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</table>

### IEEE-1394 Firewire Connector Covers, 6 and 4 Position - Protect Unused Ports, Pkg/10

These covers are perfect for protecting unused female ports in your panel mount couplers or any expensive equipment from physical damage, dirt and dust. Made from soft ABS, these covers attach easily and stay in place with a snug friction fit. Color is Black.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>List Price</th>
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</thead>
<tbody>
<tr>
<td>CAP1394-6P</td>
<td>IEEE-1394 Firewire Protective Cover for Type 2 Jacks, Pkg/10</td>
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</tr>
<tr>
<td>CAP1394-4P</td>
<td>IEEE-1394 Firewire Protective Cover for Type 1 Jacks, Pkg/10</td>
<td>6.50</td>
</tr>
</tbody>
</table>

### IEEE-1394 Fiber Optic Firewire Extender

The Gefen GFN-FW-1394 Fiber Optic Firewire Extender extends your Firewire device up to 1,640 feet away using a single two-strand fiber optic cable. The GFN-FW-1394 Firewire Extender (S) unit is connected to your computer’s Firewire port via the supplied Firewire cable. The Firewire Extender Receiver (R) unit sits next to your Firewire peripherals - up to 1,640 feet away. One two-strand LC-LC fiber optic cable (sold separately) connects the Firewire Extender S and the Firewire Extender R units to each other.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>List Price</th>
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<tbody>
<tr>
<td>GFN-FW-1394</td>
<td>Gefen IEEE-1394 Fiber Optic Firewire Extender</td>
<td>899.00</td>
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</table>

### IEEE-1394 Firewire Adapters, Extenders, Misc. Products

See a complete list of free tips, tutorials and videos at L-com.com/Tips

We want to help you!
See a complete list of free tips, tutorials and videos at L-com.com/Tips

Shop at L-com.com or call 1-800-343-1455  •  E-mail: sales@L-com.com  •  Fax: 978-688-9484
These Premium DK Series are the finest DIN/Mini DIN cables on the market. As the illustration reveals, the painstaking attention to detail beneath the surface makes the difference. All DK cables listed are wired straight-thru, fully populated, double shielded (copper braid and aluminum mylar), 24 AWG and fully over molded. Color: Gray.

## Common DIN and Mini DIN Jack Uses

- **Firewire, DIN, SCSI, SATA**
- **DIN and Mini DIN Cable Assemblies**

### Premium DIN 5 Cables - Fully Populated - Double Shielded

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
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<th>10-24</th>
<th>25-99</th>
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<th>250-499</th>
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<tbody>
<tr>
<td>DK225MM-3</td>
<td>Molded Extension Cable, DIN 5, Male / Female, 3.0 ft</td>
<td>6.75</td>
<td>6.34</td>
<td>5.94</td>
<td>5.54</td>
<td>5.13</td>
</tr>
<tr>
<td>DK225MM-6</td>
<td>Molded Extension Cable, DIN 5, Male / Female, 6.0 ft</td>
<td>9.75</td>
<td>9.16</td>
<td>8.58</td>
<td>8.00</td>
<td>7.41</td>
</tr>
<tr>
<td>DK225MM-10</td>
<td>Molded Extension Cable, DIN 5, Male / Female, 10.0 ft</td>
<td>13.75</td>
<td>12.92</td>
<td>12.10</td>
<td>11.28</td>
<td>10.45</td>
</tr>
<tr>
<td>DK225MM-20</td>
<td>Molded Extension Cable, DIN 5, Male / Female, 20.0 ft</td>
<td>23.75</td>
<td>22.32</td>
<td>20.90</td>
<td>19.48</td>
<td>18.05</td>
</tr>
<tr>
<td>DK225MM-25</td>
<td>Molded Extension Cable, DIN 5, Male / Female, 25.0 ft</td>
<td>28.75</td>
<td>27.02</td>
<td>25.30</td>
<td>23.58</td>
<td>21.85</td>
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### Premium Mini DIN 6 Cables - Fully Populated - Double Shielded

<table>
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<th>Item #</th>
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<tr>
<td>CSMD6BM-20</td>
<td>Molded Extension Cable, Mini DIN 6 Male / Female, 20.0 ft</td>
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<td>27.02</td>
<td>25.30</td>
<td>23.58</td>
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### Premium DIN 5 Cables - Fully Populated - Single Shielded

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<td>5.13</td>
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<tr>
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<td>9.16</td>
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### Premium Mini DIN 6 Cables - Fully Populated - Single Shielded

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<td>27.02</td>
<td>25.30</td>
<td>23.58</td>
<td>21.85</td>
</tr>
</tbody>
</table>

### Economy Mini DIN Cables - Shielded, Molded, Fully Populated

These cables provide an economical choice suitable for many applications and are comparable with most cables on the market. Available with Mini DIN 6 or 8 position connectors. Construction features durable PVC mold, 28 AWG conductors and 360 degree foil shield. Color: Gray.

### Economy Mini DIN 6 Cables - Male to Male and Male to Female

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### Economy Mini DIN 8 Cables - Male to Male and Male to Female

<table>
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</tr>
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“I find your catalog to be an excellent resource in its own right. I’ve even mentioned it to other suppliers as a benchmark for catalogs. It really makes getting what I need very simple.” - Alan W.
DIN and Mini DIN Connectors and Adapters

These adapters are an L-com exclusive. Useful in many applications including S-video, computer mice, keyboards and instrumentation. A unique design permits easy mounting in standard size 0.5” or 0.75” circular or D shaped openings allowing the use of common punch tooling. Adapter bodies are machined from solid brass. Bright nickel plating provides corrosion resistance and a quality appearance. Gold plated contacts ensure reliable connections. Custom versions will be considered with modest minimums. Please contact our Sales Group for assistance.

Did you know... Mini DIN 4 and S-Video are the same interface?

Mini DIN 4 and S-Video Bulkhead Jack to Flying Leads
Machined adapters utilize 4, 6 or 8 26 AWG color coded wires for chassis termination.

- **MD44FJ** Mini DIN 4 Bulkhead Jack / Leads, Front Mount
  - 9.35 8.60 7.85 7.11 6.36
- **MD66FJ** Mini DIN 6 Bulkhead Jack / Leads, Front Mount
  - 9.65 8.88 8.11 7.33 6.56
- **MD88FJ** Mini DIN 8 Bulkhead Jack / Leads, Front Mount
  - 9.95 9.15 8.36 7.56 6.77
- **MD44FR** Mini DIN 4 Bulkhead Jack / Leads, Rear Mount
  - 9.35 8.60 7.85 7.11 6.36
- **MD66FR** Mini DIN 6 Bulkhead Jack / Leads, Rear Mount
  - 9.65 8.88 8.11 7.33 6.56
- **MD88FR** Mini DIN 8 Bulkhead Jack / Leads, Rear Mount
  - 9.95 9.15 8.36 7.56 6.77

**Mini DIN Bulkhead Adapter Styles**

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<td>MD44FF</td>
<td>Feed-Thru Adapter, Mini DIN 4, Female / Female</td>
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<tr>
<td>MD66FF</td>
<td>Feed-Thru Adapter, Mini DIN 6, Female / Female</td>
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<tr>
<td>MD88FF</td>
<td>Feed-Thru Adapter, Mini DIN 8, Female / Female</td>
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**Mini DIN 6 and 8 Gender Changers**

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<tr>
<td>K23-647</td>
<td>Enhanced Adapter, DB9 Female / Mini DIN 6 Female</td>
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<td>K23-646</td>
<td>Generic Adapter, DB9 Male / Mini DIN 6 Female</td>
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**DIN and Mini DIN Feed-thru Adapters - Panel and Wall Plate Mountable**
These exclusive adaptors offer a unique design suitable for panel mounting DIN and Mini DIN adapters. Female-Female gender.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
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<tbody>
<tr>
<td>MD44FF</td>
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<tr>
<td>MD66FF</td>
<td>Feed-Thru Adapter, Mini DIN 6, Female / Female</td>
</tr>
<tr>
<td>MD88FF</td>
<td>Feed-Thru Adapter, Mini DIN 8, Female / Female</td>
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</table>

**Mini DIN Bulkhead Panel Opening**

Secure cable with cable tie to

Typical installation of an MD44FT field installable jack

Prepare coaxial lines. Insert center conductors, shields and tighten set screws. Secure cable with cable tie to connector. Attach to faceplate and install.

Connector reference chart

A handy listing of popular connectors.
L-com.com/ConnectorChart

Visit L-com.com or call 1-800-343-1455 • E-mail: sales@L-com.com • Fax: 978-689-9484

2010 Master Catalog 1.0
Ultra SCSI (SCSI-5) Cables with .8mm Pitch High-Density Connectors, Offset Backshells

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
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<th>Code</th>
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<th>10-24</th>
<th>25-99</th>
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<tr>
<td>CA2000MM-0.5M</td>
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Premium Grade SCSI-3 Cables with Ferrite Cores - Reduce Noise Problems

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Standard Grade SCSI-3 Cables - Fully Molded and Shielded

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LSZH SCSI-3 Cables

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**Interface Modules - DIN Rail Mountable, with Shielded D-Sub and RJ45 Connectors**

These DIN rail mountable interface modules feature a unique series of plated through holes that allow for the insertion of electronic components inline or across any circuit. Modules are available with shielded DB9, DB15, DB25, DB37 and DB50 female connectors. Also listed is a shielded RJ45 jack version. Terminal block connectors accept 26-12 AWG wire, are easily terminated and do not require crimp ferrules. Please inquire on any custom modifications required.

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</table>

**Interface module assembly example**

1. Prepare component leads and insert into the desired positions.
2. Strip wire leads approximately 0.3”, insert stripped wire leads into the desired positions and tighten terminal block screws.

---

**Differential SCSI-1 Cables - Fully Populated, 25 Twisted Pairs, Molded and Shielded**

These differential SCSI-1 cables are built to the 25 pair standard used with most SCSI-1 equipment. The differential interface on the equipment allows longer distances to be achieved by sending information simultaneously along two pairs of wires. DB50 and CN50 cables are fully molded and utilize 26 AWG twisted pairs with foil shielding throughout. Cable length is measured in meters.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>Code</th>
<th>1-9</th>
<th>10-24</th>
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**Differential SCSI-1 Terminators - Compensate for Inherent Impedance Mismatches on SCSI Bus**

Terminators plug into the first and last device on the SCSI bus to match the impedance of the cable to minimize reflected signals. Passive terminators are resistor networks that allow signal voltages to vary with the load and to help curb reflection in a SCSI chain. Active terminators add a voltage regulator to the circuit which allows a consistent signal to be transmitted everywhere on the bus.

<table>
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<th>Item #</th>
<th>Description</th>
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<td>CAT701</td>
<td>SCSI-3 Terminator, HPD868 Male, Active, 2-56 Thumbscrews</td>
<td>B-B</td>
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</tbody>
</table>

**SCSI-2, SCSI-1 Cable Assemblies, Terminators, Adapters and DIN Rail Modules **

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