<table>
<thead>
<tr>
<th>ATTO Model #</th>
<th>Speed</th>
<th>Form Factor</th>
<th>Transceiver</th>
<th>Common Cable Options to use</th>
<th>Max Cable Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFRM-N322</td>
<td>25GbE</td>
<td>SFP28</td>
<td>25GBASE-SR</td>
<td>Multimode fiber optic cable with LC connectors</td>
<td>70m with OM3, 100m with OM4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td>AOC with integrated 25GBASE-SR SFP28 transcievers</td>
<td>70m with OM3, 100m with OM4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25GBASE-LR</td>
<td>Single-mode fiber optic cable with LC connectors</td>
<td>10km</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td>Direct attached passive 25GBASE-CR twinax cable with SFP28 integrated connectors</td>
<td>3-5m</td>
</tr>
<tr>
<td>FFRM-N351</td>
<td>25/40/50GbE</td>
<td>QSFP28</td>
<td>100BASE-SR4</td>
<td>100BASE-SR4 Multimode fiber optic cable with MPO connectors</td>
<td>70m with OM3</td>
</tr>
<tr>
<td>FFRM-N352</td>
<td></td>
<td></td>
<td>N/A</td>
<td>AOC with integrated 100BASE-SR4 QSFP28 transcievers</td>
<td>70m with OM3, 100m with OM4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSM4</td>
<td>Optical cable with four parallel Single-mode fibers using MPO connectors</td>
<td>500m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CWDM4</td>
<td>Single-mode fiber optic cable with LC connectors</td>
<td>2km</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100BASE-LR4</td>
<td>100BASE-LR4 Single-mode fiber optic cable with MPO connectors</td>
<td>10km</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td>Direct attached passive 100BASE-CR4 twinax copper cable with QSFP28 integrated connectors</td>
<td>3-5m</td>
</tr>
<tr>
<td>FFRM-N311</td>
<td>25/40/50/100GbE</td>
<td>QSFP28</td>
<td>100BASE-SR4</td>
<td>100BASE-SR4 Multimode fiber optic cable with MPO connectors</td>
<td>70m with OM3, 100m with OM4</td>
</tr>
<tr>
<td>FFRM-N312</td>
<td></td>
<td></td>
<td>N/A</td>
<td>AOC with integrated 100BASE-SR4 QSFP28 transcievers</td>
<td>70m with OM3, 100m with OM4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PSM4</td>
<td>Optical cable with four parallel Single-mode fibers using MPO connectors</td>
<td>500m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CWDM4</td>
<td>Single-mode fiber optic cable with LC connectors</td>
<td>2km</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100BASE-LR4</td>
<td>100BASE-LR4 Single-mode fiber optic cable with LC connectors</td>
<td>10km</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td>Direct attached passive 100BASE-CR4 twinax copper cable with QSFP28 integrated connectors</td>
<td>3-5m</td>
</tr>
<tr>
<td>FFRM-NQ41</td>
<td>40GbE</td>
<td>QSFP+</td>
<td>40BASE-SR4</td>
<td>Multimode 40BASE-SR4 fiber optic cable with MPO connectors</td>
<td>100m with OM3, 150m with OM4</td>
</tr>
<tr>
<td>FFRM-NQ42</td>
<td></td>
<td></td>
<td>N/A</td>
<td>AOC with integrated 40BASE-SR4 QSFP+ transcievers</td>
<td>100m with OM3, 150m with OM4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40BASE-LR4</td>
<td>Single-mode 40BASE-LR4 fiber optic cable with LC connectors</td>
<td>10km</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td>Direct attached passive copper cable with 40BASE-CR4 QSFP+ integrated connectors</td>
<td>7m</td>
</tr>
</tbody>
</table>
## ATTO Ethernet Connectivity Reference Guide

<table>
<thead>
<tr>
<th>ATTO Model #</th>
<th>Speed</th>
<th>Connection Form Factor</th>
<th>Transceiver</th>
<th>Common Cable Options to use</th>
<th>Max Cable Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLNQ-3401</td>
<td></td>
<td></td>
<td>40GBASE-SR4</td>
<td>Multimode 40GBASE-SR4 fiber optic cable with MPO connectors</td>
<td>100m with OM3</td>
</tr>
<tr>
<td>TLNQ-3402</td>
<td></td>
<td></td>
<td>N/A</td>
<td>AOC with integrated SR4 QSFP+ transceivers</td>
<td>100m with OM3, 150m with OM4</td>
</tr>
<tr>
<td>Shipped with QSFP+ Transceiver</td>
<td>Thunderbolt™ 3 to 40GbE</td>
<td>QSFP+</td>
<td>40GBASE-LR4</td>
<td>Single-mode 40GBASE-LR4 fiber optic cable with MPO connectors</td>
<td>10km</td>
</tr>
<tr>
<td>Shipped with QSFP+ Transceiver</td>
<td></td>
<td></td>
<td>N/A</td>
<td>Direct attached passive copper cable with 40GBASE-CR4 QSFP+ integrated connectors</td>
<td>7m</td>
</tr>
<tr>
<td>FFRM-NS11</td>
<td></td>
<td></td>
<td>10GBASE-SR</td>
<td>Multimode fiber optic cable with LC connectors</td>
<td>300m with OM3, 400m with OM4</td>
</tr>
<tr>
<td>FFRM-NS12</td>
<td></td>
<td></td>
<td>N/A</td>
<td>AOC with integrated SR SFP+ transceivers</td>
<td>300m with OM3, 400m with OM4</td>
</tr>
<tr>
<td>FFRM-NS14</td>
<td></td>
<td></td>
<td>10GBASE-LR</td>
<td>Single-mode fiber optic cable with LC connectors</td>
<td>10km</td>
</tr>
<tr>
<td>TLNS-2101</td>
<td>10GbE</td>
<td>SFP+</td>
<td>N/A</td>
<td>Direct attached passive copper cable with SFP+ integrated connectors</td>
<td>100m</td>
</tr>
<tr>
<td>TLNS-2102</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shipped with SFP+ Transceiver</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FFRM-NT11</td>
<td>10GbE</td>
<td>RJ45</td>
<td>N/A</td>
<td>Cat 6,6a or 7 copper twisted pair</td>
<td>55m with Cat 6, 100m with Cat 6a, 7</td>
</tr>
<tr>
<td>FFRM-NT12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLNS-3101</td>
<td></td>
<td></td>
<td>10GBASE-SR</td>
<td>Multimode fiber optic cable with LC connectors</td>
<td>300m with OM3, 400m with OM4</td>
</tr>
<tr>
<td>TLNS-3102</td>
<td></td>
<td></td>
<td>N/A</td>
<td>AOC with integrated SR SFP+ transceivers</td>
<td>300m with OM3, 400m with OM4</td>
</tr>
<tr>
<td>Shipped with QSA converter and SFP+ transceiver</td>
<td>Thunderbolt 3 to 10GbE</td>
<td>SFP+</td>
<td>10GBASE-LR</td>
<td>Single-mode fiber optic cable with LC connectors</td>
<td>10km</td>
</tr>
<tr>
<td>Shipped with QSA converter and SFP+ transceiver</td>
<td></td>
<td></td>
<td>N/A</td>
<td>Direct attached passive copper cable with SFP+ integrated connectors</td>
<td>15km</td>
</tr>
<tr>
<td>TLNT-2102</td>
<td></td>
<td></td>
<td>N/A</td>
<td>Cat 6,6a or 7 copper twisted pair</td>
<td>55m with Cat 6, 100m with Cat 6a, 7</td>
</tr>
</tbody>
</table>

Maximum cable lengths may vary by manufacturer. Verify the specifications from your cable supplier. There are many other connectivity options available. Contact ATTO Tech Support for more information.
## ATTO Ethernet Connectivity Reference Guide

### Transceiver
Electrical to optical converter for transmitting and receiving over one or more lanes.

<table>
<thead>
<tr>
<th><strong>SFP+ (Small Formfactor Pluggable)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical transceiver rated for one lane of 10Gb/s in each direction. Commonly used with 10Gb Ethernet. Optical cables with LC connectors are plugged in.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>QSFP+ (Quad Small Form Factor Pluggable)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical transceiver with four lanes of 10Gb/s in each direction. The four lanes are combined into a single channel for 40Gb Ethernet. Optical cables with MPO connectors are plugged in.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>SFP28</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical transceiver rated for one lane at 25Gb/s in each direction. Commonly used with 25Gb Ethernet. Optical cables with MPO connectors are plugged in.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>QSFP28</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical transceiver with four lanes of 25Gb/s in each direction. The four lanes are combined into a single channel for use with 100Gb Ethernet. Two lanes are combined for 50Gb Ethernet. Optical cables with MPO connectors are plugged in.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>LC</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Small form factor connector for multi-mode or single-mode fiber optic cables. Used to plug into SFP+ transceivers, or Long Range SFP28 or QSFP28 transceivers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MPO (Multi-Fibre Push-on Pull-off)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector used on fibre optic patch cables to plug into QSFP+, SFP28 and QSFP28 transceivers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>QSA</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical adapter to allow single-channel SFP style cables to plug into quad-channel QSFP ports.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>QSFP+ to 4x SFP+</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakout cable to connect 10GbE NIC ports to a 40GbE switch port.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>QSFP28 to 4x SFP28</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakout cable to connect 25GbE NIC ports to a 100GbE switch port. Not all switches support breakout cables. Verify switch specifications.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>PSM4 (Parallel Single-Mode 4 fiber)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Mode cable that utilized four fibers in each direction.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CWDM (Coarse Wavelength Division Multiplexing)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable that utilizes one fiber in each direction. Transmits multiple optical signals through the same fiber at different wavelengths. Reduces the number of fibers in the cable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>AOC (Active Optical Cable)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber Optic cable with permenantly attached transceivers. Can be used in place of a removeable transceiver with a fiber optic patch cable. Best practice is to use AOC for cable lengths up to 30m.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Transceiver with Patch cable or AOC?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Either option works great. Removeable transceivers with patch cables offer more flexibility over Active optical cables. It is more cost effective to repase a single transceiver or a patch cable instead of the entire AOC upon a failure. Most ATTO products ship with removeable transceivers.</td>
</tr>
</tbody>
</table>