

Manually specify xCONNECT link network routing

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To route messages across the xCONNECT Link network, the routing ID and routing table of each node on the network must be configured. In most cases the tools will configure the network automatically based on the network topology described in the XN file, but if the tools cannot automatically route the network you can specify the network configuration manually. See [XM-000948-PC](#) for a list of which topologies that can be automatically routed by the tools.

1 Add a network configuration to a XN file

The XN file format lets you optionally specify the network configuration to use with the target device. If the target device has a network topology that can't be automatically routed by the xTIMEcomposer tools you must specify the network configuration in the XN file. You can add the network configuration as follows:

1. Add the `RoutingId` attribute to each `Node` element:

```
<Node Id="0" InPackageId="0" Type="XS1-L8A-64" SystemFrequency="500MHz"
  ↪ RoutingId="1">
```

2. Add a `RoutingTable` element to each `Node` element:

```
<RoutingTable>
  <Bits>
    <Bit number="0" direction="1"/>
  </Bits>
  <Links>
    <Link name="XLB" direction="1"/>
  </Links>
</RoutingTable>
```

The tools use this information to generate code that sets up the following control registers before your application runs:

- ▶ Switch node identifier
- ▶ Direction registers
- ▶ Link direction field of the link status, direction, and network control register

See [XM-004347-PC](#) for a description of the xCONNECT interconnect.

When an XN file containing a network configuration is passed to the xTIMEcomposer tools, they check the network configuration is fully routable, i.e. they check it is possible to route a packet between every pair of nodes on the network. Routing problems are reported as errors.

2 Use xntools to annotate a XN file with routing information

If no network configuration is present in the XN file the xTIMEcomposer tools automatically choose a suitable set routing IDs and routing tables based on the network topology. To inspect this network configuration you can use the command line utility `xntools` to write it to the XN file.

1. Start the command-line tools (see [XM-000950-PC](#))
2. Run the following command:

```
▶ xntools --add-routing target.xn
```

3 Example XN (Two XS1-L8-64 devices).

See [Figure 1](#) for an example XN file for a network of two XS1-L8-64 devices.

```

<?xml version="1.0" encoding="UTF-8"?>
<Network xmlns="http://www.xmos.com" xmlns:xsi="http://www.w3.org/2001/
↳ XMLSchema-instance" xsi:schemaLocation="http://www.xmos.com">
  <Declarations>
    <Declaration>tileref tile[2]</Declaration>
  </Declarations>
  <Packages>
    <Package id="0" Type="XS1-LnA-64-TQ128">
      <Nodes>
        <Node Id="0" InPackageId="0" Type="XS1-L8A-64" SystemFrequency="500
↳ MHz" RoutingId="1">
          <Tile Number="0" Reference="tile[0]" />
          <RoutingTable>
            <Bits>
              <Bit number="0" direction="1" />
            </Bits>
            <Links>
              <Link name="XLB" direction="1" />
            </Links>
          </RoutingTable>
        </Node>
      </Nodes>
    </Package>
    <Package id="1" Type="XS1-LnA-64-TQ128">
      <Nodes>
        <Node Id="1" InPackageId="0" Type="XS1-L8A-64" SystemFrequency="500
↳ MHz" RoutingId="0">
          <Tile Number="0" Reference="tile[1]" />
          <RoutingTable>
            <Bits>
              <Bit number="0" direction="0" />
            </Bits>
            <Links>
              <Link name="XLB" direction="0" />
            </Links>
          </RoutingTable>
        </Node>
      </Nodes>
    </Package>
  </Packages>
  <Links>
    <Link Encoding="5wire" Delays="0,1">
      <LinkEndpoint NodeId="0" Link="XLB" />
      <LinkEndpoint NodeId="1" Link="XLB" />
    </Link>
  </Links>
  <JTAGChain>
    <JTAGDevice NodeId="0" />
    <JTAGDevice NodeId="1" />
  </JTAGChain>
</Network>

```

Figure 1:
Example XN
with custom
routing
information.



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