

Application Note

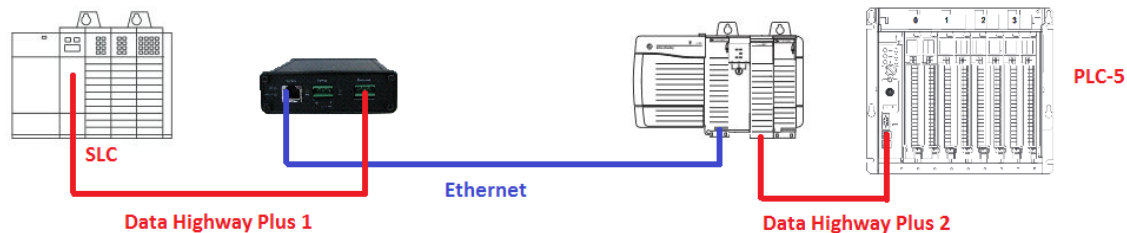


Using an AN-X2-DHP and a 1756-DHRIO to Bridge Between Two Data Highway Plus Networks

This application note describes how to use an AN-X module and a 1756-DHRIO to bridge between two Data Highway Plus networks, using the routing function on the AN-X2-DHP.

Routing requires version 4.7 or above of the AN-X2-DHP firmware.

An AN-X2-DHP emulates a 4 slot ControlLogix rack with a 1756-ENET in slot 0 and a 1756-DHRIO in slot 1. The emulated 1756-DHRIO has only channel A, since the AN-X has only one Data Highway Plus channel.



In this example, Data Highway Plus 1 consists of:

- a SLC-5/04 at station address 01
- an AN-X at station address 37 octal. The AN-X is at IP address 192.168.1.12.

Data Highway Plus 2 consists of:

- a PLC-5 at station address 00
- a 1756-DHRIO channel B at station address 77 octal

The 1756-DHRIO is located in slot 2 of a ControlLogix rack. A 1756-ENBT is located in slot 0 of the rack and has IP address 192.168.1.65.

To send remote messages between Data Highway Plus networks:

1. Configure the AN-X router
2. Use RSLinx to create a routing table for the 1756-DHRIO, from Data Highway Plus 2 back to the AN-X.
3. Create remote messages, in the SLC and in the PLC-5

AN-X Router Configuration

To bridge between Data Highway Plus networks, the router configuration for the AN-X must contain, at minimum:

- a local Link ID
- a path definition to route messages to the other network

To bridge through the 1756-DHRIO, path definitions to the other network are of the form:

```
Linkid Eth IPaddress Slot x DHA
```

Or

```
Linkid Eth IPaddress Slot x DHB
```

where:

- the LinkID is the link ID for the path
- the IPaddress is the address of the Ethernet module (for example, 1756-ENBT) in the rack that contains the 1756-DHRIO
- slot x is the slot number of the 1756-DHRIO
- DHA or DHB is the channel on the 1756-DHRIO that connects to the other Data Highway Plus network.

In this example, on Data Highway Plus 1, the AN-X will be assigned local Link ID 121.

We will create a routing definition using Link ID 1 for the SLC on Data Highway Plus 1 to use to send remote messages to the PLC-5 on Data Highway Plus 2. Link ID 1 is the Link ID assigned to channel B on the 1756-DHRIO (see below)

The AN-X router configuration file will then look like this:

```
LocalLinkID 121  
1 Eth 192.168.1.65 Slot 2 DHB
```

1756-DHRIO Routing Table

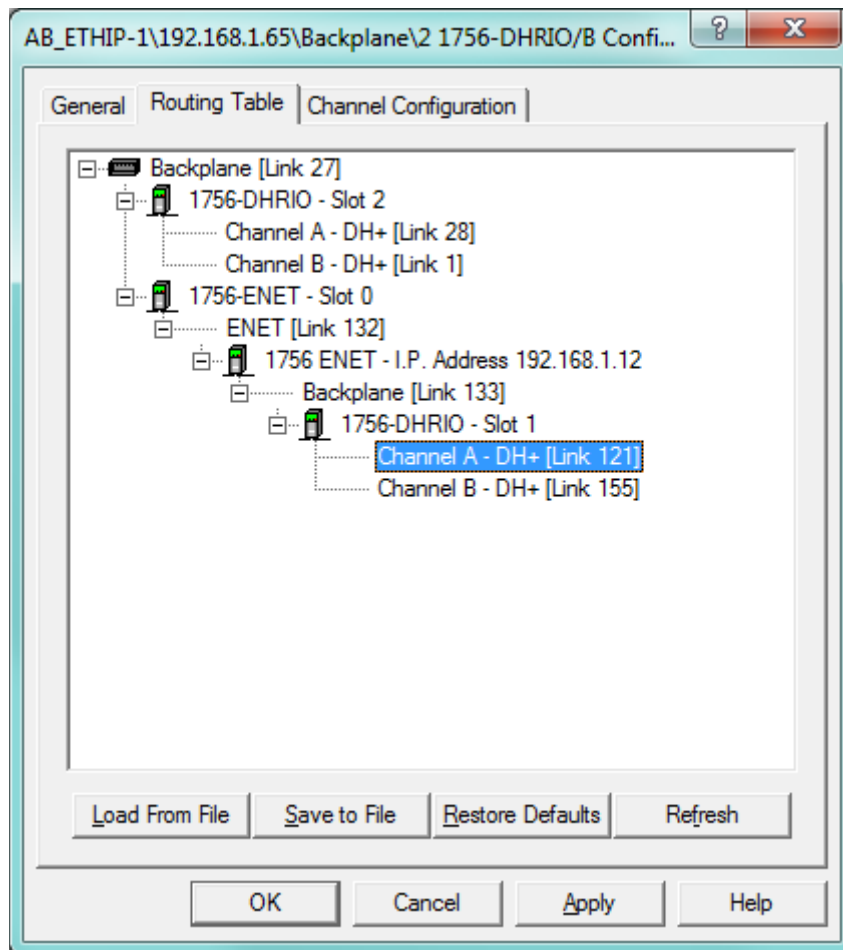
We must set up routing in the 1756-DHRIO to get replies back to the sender, in this case the AN-X on Data Highway Plus 1.

The link ID assigned to the DHRIO channel the message is using must match the link id in the AN-X routing table, in this case 1.

In RSLinx:

1. Right click on the 1756-DHRIO and select Module Configuration
2. Select the Routing Table tab

3. Set the Link ID for the channel that the AN-X is sending messages through to match the LinkID used by the AN-X in the Router configuration (the Link ID for the path to the DHRIO in the AN-X routing table), in this case 1.
4. Add a 1756-ENET to the backplane at the location of the 1756-ENBT the AN-X is connected to
5. Give the ENET a link ID (unused)
6. Add another ENET at the IP address of the AN-X
7. Give its backplane a Link ID (unused)
8. Add a 1756-DHRIO to slot 1 of that backplane. This is the 1756-DHRIO emulated by AN-X.
9. Give channel A of that DHRIO a link id that matches the LocalLinkID defined in the AN-X router configuration.



SLC Remote Messages

The Data Highway Plus channel on the SLC must be configured to accept replies to remote messages from the AN-X.

1. In the Project tree, right click on *Controller/Channel Configuration* and select *Open*. Select the *General* tab.
2. In the Channel 1 area, enter the AN-X Local Link ID (121) in the Passthru Link ID (dec) box.
3. Click OK

To send a message to the PLC-5 to read 10 integers from address N7:0:

1. Add a MSG instruction to the SLC program. You must be offline.
2. Set Read/Write to the appropriate value, in this case Read
3. Set the Target Device to the correct type, in this case, PLC5.
4. Set Local/Remote to Remote.
5. Assign an address for the Control Block
6. Double click on Setup Screen to configure the message.

In the *This Controller* area:

1. Select an appropriate Communication Command.
2. Set the Data Table Address on the SLC for the data we are sending or receiving
3. Set the Size in Elements. In this example, we are reading 10 integers.
4. Set the Port Number to match the Data Highway Plus channel.

In the *Target Device* area:

1. Set an appropriate timeout or accept the default.
2. Enter the Data Table Address in the destination device. In this example, the data starts at N7:0.
3. Set the Local Bridge Address to match the Data Highway Plus address of the AN-X that is routing the message, in this case, 37 octal or 31 decimal
4. Set the Remote Bridge Address to 0
5. Set the Remote Station address to be the Data Highway Plus address of the destination device. This is necessary only if the AN-X is routing the message to another Data Highway Plus network. In the example, it is 0, the address of the PLC-5 on the other Data Highway Plus network.
6. Set the Remote Bridge Link ID to be the Link ID of the routing table entry in the AN-X. In this case, Link ID 1 provides the path to Data Highway Plus 2.

The screenshot shows a software window titled "MSG - N10:0 : (14 Elements)". The window contains the following configuration sections:

- General:** A tabbed interface with the "General" tab selected.
- This Controller:**
 - Communication Command:
 - Data Table Address:
 - Size in Elements:
 - Channel:
- Target Device:**
 - Message Timeout:
 - Data Table Address:
 - Local Bridge Addr (dec): (octal):
 - Local / Remote:
 - Remote Bridge Addr (dec):
 - Remote Station Address (dec):
 - Remote Bridge Link ID:
- Control Bits:**
 - Ignore if timed out (TO):
 - To be retried (NR):
 - Awaiting Execution (E'W):
 - Continuous Run (CO):
 - Error (ER):
 - Message done (DN):
 - Message Transmitting (ST):
 - Message Enabled (EN):
 - Waiting for Queue Space:
- Error:**
 - Error Code(Hex):
- Error Description:**
 - No errors

PLC-5 Remote Messages

To send a message to the SLC to read 10 integers from file N7:0:

1. Add a MSG instruction to the PLC-5 program.
2. Set Read/Write to the appropriate value.
3. Set the Target Device to the correct type, in this case, PLC5.
4. Set Local/Remote to Remote.
5. Assign an address for the Control Block.
6. Double click on Setup Screen to configure the message.

In the *This Controller* area:

1. Select an appropriate Communication Command, in this case SLC Typed Logical Read
2. Set the Data Table Address for the data we are sending or receiving. In this example, the data will be stored at N17:0.
3. Set the Size in Elements. In this example, we are reading 10 integers.
4. Set the Port Number to match the Data Highway Plus channel on the PLC-5, in this case, port 1A

In the *Target Device* area:

1. Enter the Data Table Address in the destination device. In this example, the data is found at address N7:0.
2. Set the Local DH+ Node to match the Data Highway Plus address of the 1756-DHRIO channel that is routing the message, in this example, 77 octal
3. Set Local/Remote to Remote.
4. Set the Remote Link Type to Data Highway.
5. Set the Remote Station address to be the Data Highway Plus address of the destination device. This is necessary only if the AN-X is routing the message to a device on another Data Highway Plus network. In this example, set the address to 1, the address of the SLC on Data Highway Plus 1.
6. Set the Remote Bridge Link ID to be the Local Link ID of the AN-X, in this case 121.

The screenshot shows a configuration window titled "MSG - MG26:1 : (1 Elements)". The "General" tab is active, displaying the following settings:

- This PLC-5:**
 - Communication Command:
 - Data Table Address:
 - Size in Elements:
 - Port Number:
- Target Device:**
 - Data Table Address:
 - Local DH+ Node (Octal):
 - Local / Remote:
 - Remote Link Type:
 - Remote Station Address:
 - Remote Bridge Link ID:
- Control Bits:**
 - Ignore if timed out (TO):
 - To be retried (NR):
 - Awaiting Execution (EW):
 - Continuous Run (CO):
 - Error (ER):
 - Message done (DN):
 - Message Transmitting (ST):
 - Message Enabled (EN):
- Error:**
 - Error Code(Hex):
- Error Description:**
 - No errors



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