DH485 Router/B

KEPServer to SLC setup

Technical Application Note

A-DH485R

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1. PREFACE

1.1. PURPOSE OF THIS DOCUMENT

This document will assist the user to setup the DH485 Router/B (referred to as DH485 Router in this document) to allow a KEPServer application to communicate to an SLC device's DH485 port via PCCC Ethernet.

1.2. ADDITIONAL INFORMATION

The following resources contain additional information that can assist the user with the module installation and operation.

| Resource | Link | | | | |
|----------------------------|---|--|--|--|--|
| Slate Installation | http://www.aparian.com/software/slate | | | | |
| DH485 Router/B User Manual | | | | | |
| DH485 Router/B Datasheet | https://www.aparian.com/products/dh49Eroutarh | | | | |
| Application Notes | nitps://www.apanan.com/products/dn485routerb | | | | |
| Example Code & UDTs | | | | | |
| Ethornot wiring standard | www.cisco.com/c/en/us/td/docs/video/cds/cde/cde205_220_420/installa | | | | |
| | tion/guide/cde205_220_420_hig/Connectors.html | | | | |
| CIP Routing | The CIP Networks Library, Volume 1, Appendix C:Data Management | | | | |

1.3. SUPPORT

Technical support will be provided via the Web (in the form of user manuals, FAQ, datasheets etc.) to assist with installation, operation, and diagnostics.

For additional support the user can use either of the following:

| Contact Us web link | https://www.prosoft-technology.com/Services-Support/Customer- |
|---------------------|---|
| | Support |
| Support email | support@prosoft-technology.com |

2. APPLICATION DESCRIPTION

The Aparian DH485 Router can be used to enable multiple modern Ethernet devices to communicate to legacy SLC5/03 via their DH485 serial ports. In the application example below, two KEPServer applications can read and write data to an SLC500.



FIGURE 2.1. - EXAMPLE OF A TYPICAL NETWORK SETUP

3. SETUP

The following sections will describe the installation and configuration of all the required devices to assist the user with the initial setup.

3.1. MODULE LAYOUT

The module has two ports at the bottom and two ethernet ports on the front of the enclosure as shown in the figure below. The ports are used for Ethernet, RS232 or RS485 serial, and power. The power port uses a three-way connector which is used for the DC power supply positive and negative (or ground) voltage as well as the earth connection.

The Ethernet cable must be wired according to industry standards which can be found in the additional information section of this document.



FIGURE 3.1. - DH485 ROUTER/B SIDE AND FRONT VIEW

3.2. SERIAL CABLE WIRING

The serial cable pinout is shown in the figure below:



SLC 5/03









FIGURE 3.4. – SERIAL CABLE PINOUT – MICROLOGIX 1100

All RS485 networks need to be terminated at the extremities (start and end point) of the communication conductor. The termination is done by placing a resistor between the positive and negative communication conductor. The value of the resistor will depend on the characteristic impedance of the cable chosen, but generally ranges from 100 Ohm to 150 Ohm.

The DH485 Ground Bridge should be enabled and the user can also enable the DH485 Router internal RS485 terminator in the module configuration in Slate (see below):

| S DH485Router - Config | uration | | | | |
|------------------------|------------------|-------------------------|--------------------------|----------|------------------|
| General Serial - DH485 | Transparent PCCC | Reactive Tag (Disabled) | Scheduled Tag (Disabled) | Advanced | |
| Physical Port | DH485 - Star | ndard (RS485) 🗸 🗸 | | | |
| Node Address | 0 | ~ | Retry Limit | 3 | [0-10] |
| Max Scan Addres | s 31 | \checkmark | Message Timeout | 20 | [1-100] (x 50ms) |
| BAUD Rate | 19200 | ~ | Response Timeout | 5 | [1-100] (ms) |
| Parity | Even | \sim | Reply Msg Wait | 5 | [1-100] (ms) |
| | 🗸 Terminat | e DH485 | | | |
| | 🔽 DH485 G | round Bridge | | | |
| | | | | | |
| | | | | | |
| | | Ok Apply | Cancel | Help | |

FIGURE 3.5. – INTERNAL RS485 TERMINATION

3.3. DH485 ROUTER SETUP

The DH485 Router must be configured in Transparent PCCC mode, as shown below.

| DH485Router - Configuration | | | | | | | |
|---|--|--|--|--|--|--|--|
| General Serial - DH485 Transparent PCCC | Reactive Tag (Disabled) Scheduled Tag (Disabled) Advanced | | | | | | |
| Instance Name DH485Router | | | | | | | |
| Description | | | | | | | |
| IP Address 192 . 168 | . 1 . 184 Major Revision 2 ~ | | | | | | |
| ENIP Retry Limit 5 [0-5 | 5] | | | | | | |
| ENIP TimeOut 1000 ms | | | | | | | |
| Mapping Mode | | | | | | | |
| Transparent - PCCC Ma | aps device initiated DH485 PCCC to Logix PLC 2,3,5 mapping. Supports remote programming. | | | | | | |
| C Reactive Tag Ma | aps device initiated DH485 PCCC to Logix Tag. | | | | | | |
| O Scheduled Tag D | DH485 Router initiated scheduled transfer between device and Logix. | | | | | | |
| O Unscheduled Ro | Routes Logix Msg to DH485 Device. | | | | | | |
| O AIC Tr | anslates DH485 to RS232 | | | | | | |
| | | | | | | | |
| | Ok Apply Cancel Help | | | | | | |

FIGURE 3.6. – DH485 GENERAL CONFIGURATION

In the Serial-DH485 settings, the BAUD Rate must match that of the SLC device (as configured using RSLogix 500).

| DH485Router - Config | uration | | | |
|------------------------|--|---------------------------------------|---------------|---------|
| General Serial - DH485 | Transparent PCCC Reactive Ta | g (Disabled) Scheduled Tag (Disabled) | Advanced | |
| Physical Port | DH485 - Standard (RS485 |) ~ | | |
| Node Address | 0 ~ | Retry Limit | 3 [0-10] | |
| Max Scan Addres | s 31 ~ | Message Timeout | 20 [1-100] (> | < 50ms) |
| BAUD Rate | 19200 ~ | Response Timeout | 5 [1-100] (r | ms) |
| Parity | Even ~ | Reply Msg Wait | 5 [1-100] (r | ms) |
| | Terminate DH485 DH485 Ground Bridge | 9 | | |
| | Ok | Apply Cancel | Help | |

FIGURE 3.7. – DH485 SERIAL CONFIGURATION



NOTE: At least one transparent mapped item must be added for the SLC500 communication to work over DH485. If the DH485 Router is used purely for communicating to the KEPServer, then the user can, as an example, add a DH485 Node of 1 (which **must be unique** on the DH485 network) with an IP address of the DH485 Router. The reason for this is because the DH485 Router requires a node on the DH485 network.

| General | Serial - DH485 | Trans | parent PCCC | Reactive | Tag (Di | sabled) | Schedul | ed Tag (Disabled) Adv | anced | |
|---------|-----------------|----------|--------------|--------------|---------|---------|-----------|-----------------------|--------|--------|
| | Enable PCCC | Direct | | | | | | General | | |
| Mε | Map Node F | | | PCCC IP | Addres | s | | DCCC Node | 1 . | |
| 1 | 2 | \sim | 192 . | 168 . | 1 | . 227 | | PCCC Node | | |
| 2 | 2 | ~ | 0. | 0 | 0 | . 0 | | | | |
| 3 | 3 | ~ | 0 | 0 | 0 | . 0 | | Logix Connection | Class3 | ~ |
| DH48 | 5 / Ethernet Co | ontrolle | r Mapping (m | ax. of 20 it | ems.) | | | | | |
| | DH485 Nod | е | | | | Contro | ller Path | 1 | | Browse |
| | 1 | \sim | 192.168.1. | 184 | | | | | | |
|) we | | \sim | | | | | | | | |

FIGURE 3.8. – TRANSPARENT PCCC CONFIGURATION

The KEPServer application will use PCCC (AB-ETH) to communicate with the DH485 Router. To enable this on the DH485 Router, the user will need to set the *Enable PCCC Direct* in the Transparent PCCC tab, set the DH485 node of the SLC, and set the IP address that will be used for the PCCC communicate (i.e., the IP address the DH485 Router will emulate).



NOTE: The IP address selected in the PCCC Direct mapping **must not** match the DH485 Router main IP address configured in the General tab.

| | | Direct | <u> </u> | | | | General | |
|----------|-------------|-----------|------------|--------------|----------------|--------------|-------------------------|--------|
| Map 1 | Node 2 | • ~ | 192 . | PCCC IP | Address 1 . | 227 | PCCC Node 1 | \sim |
| 2 | 2 | ~ | 0 | 0. | 0. | 0 | 4 | |
| 3 | 3 | \sim | 0 | 0_ | 0. | 0 | Logix Connection Class3 | |
| | | | | | | | | |
| DH485 / | Ethernet Co | ontroller | Mapping (m | ax. of 20 it | tems.) | Osatasllas D |)_at_ | D |

FIGURE 3.9. – PCCC DIRECT CONFIGURATION

3.4. RSLOGIX 500 SETUP

Using RSLogix500, the DH485 port must be configured to match that of the DH485 Router's serial port settings with respect to BAUD rate. The DH485 node address of the SLC must also match the Node set in the PCCC Direct Map.

| RSLogix 500 Pro - UNTITLED | |
|--|--|
| File Edit View Search Comms Tools Window Help | |
| | Channel Configuration |
| DFFLINE No Forces No E dits Forces Disabled Driver: (unknown) Node : 1d Image: Controller Properties Image: Controller Properties Image: Controller Properties Image: Controller Properties </td <td>General Chan. 1 - System Chan. 0 - System Chan. 0 - User Driver DH485 Baud 19200</td> | General Chan. 1 - System Chan. 0 - System Chan. 0 - User Driver DH485 Baud 19200 |
| General Serial - DH485 Transparent F | PCCC Reactive Tag (Disabled) Schedu |
| Enable PCCC Direct Map Node 1 2 1 | PCCC IP Address 92 . 168 . 1 . 227 |
| | |
| FIGURE 3.10. – RS | LOGIX 500 CONFIGURATION |

3.5. KEPSERVER SETUP

Follow the steps below to connect KEPware Server to a SLC503 via the DH485 Router/B.

• Select the *Allen-Bradley Ethernet* driver and enter the required details (in the example below, it is called *AB_ETH*).



FIGURE 3.11. - KEPSERVER - DRIVER SELECT

• Next, create a new device under the *Allen-Bradley Ethernet* driver (in the below example, it is called *SLC503*).



FIGURE 3.12. – KEPSERVER – DRIVER NAME

• Select the *SLC 5/05* as the device.

| Add Device Wiz | zard |
|--------------------------|--|
| | |
| Select the specific type | e of device associated with this ID. Options depend on the type of |
| communications in use | в. |
| Model: | |
| SLC 5/05 Open | ~ @ |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

FIGURE 3.13. - KEPSERVER - DEVICE SELECT

In Slate, the DH485 Router module must be set to Transparent mode. Select the *Enable PCCC Direct* and enter a *PCCC IP Address* that is different from the main module IP address (in the example below, the module IP address is 192.168.1.184 and the PCCC IP Address is 192.168.1.227). This will allow the DH485 Router/B to emulate the SLC503 over PCCC at IP 192.168.1.227. Enter the IP address into the *ID*: section of the device in KEPware.

| | × | S DH | 1485Rout | er - Conf | iguratio | n | | | | | | | |
|---|---|------|-----------|-----------|----------|--------|-------|-------------|---------------|----------|---------|--------|----------------|
| ← Add Device Wizard | | Ger | eral Seri | al - DH48 | 5 Trans | parent | PCCC | Reactiv | e Tag | (Disable | ed) Sch | nedule | d Tag (Disable |
| | | | 🔽 Ena | able PCC | C Direct | | | | | | | | General |
| Specify the device's driver-specific station or node. | | | Map 1 | Noc 2 | le ~ | | 192 . | PCCC 168 | P Addı . 1 | ress | 227 | | PCCC Nor |
| 埠92.168.1.227 | | | 2 | 2 | ~ | | 0. | 0 | . 0 |). | 0 | | |
| | | | 3 | 3 | \sim | | 0. | 0 | . 0 |). | 0 | | Logix Con |

FIGURE 3.14. - KEPSERVER - IP ADDRESS CONFIGURATION

• The DH485 node address in the PCCC Direct Map will need to be set to the destination SLC503 address as shown below.



NOTE: Due to the KEPware driver implementation, a maximum of three SLCs per DH485 Router can be used when communicating with a KEPServer application.

| RSWho - 1 Autobrowse Betrach Re Not Browsing | General Serial - DH485 Transparent PCCC Reactive Tag (Disabled) Sch |
|---|---|
| 192.168.1.175, Modbus Router/B, Modbus Router/B 192.168.1.177, PLX51-PBM, PLX51-PBM 192.168.1.178, Unrecognized Device, Time Sync 192.168.1.179, Unrecognized Device, PA Link/B | Enable PCCC Direct |
| 192.168.1.184, DH485 Router/B, DH485 Router/B | Map Node PCCC IP Address |
| C 2, SLC-5/03, UNTITLED | 1 2 ~ 192 . 168 . 1 . 227 |
| | |
| | 2 2 ~ 0.0.0.0 |
| 192.168.1.210, Unrecognized Device, DNP3 Router 192.168.1.211, Unrecognized Device, DNP3 Router 192.168.1.212, Unrecognized Device, DNP3 Router | 3 3 ~ 0 . 0 . 0 |

FIGURE 3.15. – KEPSERVER – DH485 NODE SELECT

• Add a tag and select the appropriate SLC503 file address. (In the example below, N9:2 is used)

| ag Name | / Address | Data Type | Scan Rate | Scaling | | | | |
|-------------------|--------------------------------|--------------------------|--------------|---------|--|--|--|--|
| Click to add a st | tatic tag. Tags are not requir | ed, but are browsable by | OPC clients. | | | | | |
| 🔯 Property Ec | ditor - AB-ETH.SLC503 | | | × | | | | |
| Property Groups | B Identification | n | <i>1</i> . | | | | | |
| General | Name | | TestFileN9 | | | | | |
| Scaling | Description | | | | | | | |
| Carlo Prote 3 C | Data Prope | Data Properties | | | | | | |
| | Address | | N9:2 | (3) | | | | |
| | Data Type | | Default | | | | | |
| | Client Access | S | Read/Write | | | | | |
| | Scan Rate (n | ns) | 100 | | | | | |
| | | | | | | | | |
| | | | | | | | | |

FIGURE 3.16. - KEPSERVER - TAG CONFIGURATION

• To verify the communication is operational, open up the *Quick Client* and see the data being updated from the SLC503 via the DH485 Router/B.

| ile Edit View Tools Help | | | | | | | | | | | | | |
|------------------------------------|-------------------------------|------------------------|--------|-----|-----------------|--------------|-----|---------------|--------|-------|--------------|---------------|---|
|) 🖻 🔒 🐋 💣 💕 😭 👗 🛍 🖻 🗙 | | | | | | | _ | | | | | | |
| : iii Kepware.KEPServerEX.V6 | Item ID / | | | 7 D | Data Type Val | Value Time | | stamp Quality | | ity | Update Count | | |
| - 🛅 _DataLogger | AB-ETH.SLC503.TestFileN9 Word | | | ord | 103 | 10:43:36.764 | | | Good 2 | | | | |
| — 🛅 _System | | | | | | _ | _ | | | | | | |
| - AB-ETHCommunicationSerialization | | SIC 5/02: Data File NO | | | | | | | | - n x | | | |
| - AB-ETHStatistics | | SLC=5/05. Data File N9 | | | | | | | | | | | |
| AB-ETHSystem | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | ^ |
| - AB-ETH.SLC503 | | N9:0 | -31744 | 11 | 103 | 11 | 137 | 0 | 0 | 100 | 3 | 134 | |
| — AB-ETH.SLC503Statistics | | N9:10 | 0 | 206 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 134 | |
| AB-ETH.SLC503System | | N9:20 | 4103 | 5 | 10 | 8 | 138 | 0 | 0 | 224 | 3 | | |
| | | N9:30 | 0 | 40 | 2048 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | N9:40 | 4103 | 24 | 64 | 3 | 133 | 0 | 0 | 160 | 3 | 134 0 0 | |
| | | N9:50 | 0 | 128 | 2048 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | | N9:60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | | N9:70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | ~ |
| | | < | | | | | | | | > | | | |
| | | Status: Active | | | Selection: N9:0 | | | | | | | | |

FIGURE 3.17. – KEPSERVER – LIVE VALUES