TECHNICAL MANUAL

UCI-2000-CPULink

Routing Switcher

Protocol Converter

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1. Description

QuStream's PESA UCI-2000-CPULINK protocol converter is designed to provide an interface between the P2 Generation of PESA Routing System Controllers and PESA's legacy PRC-based Routing Control systems. This interface allows legacy PRC-based, or RM5000-based, routers to be operated under control of a new Ethernet-based PESA P2 Routing System. It also allows current generation P2-based routers to be added to an existing PRC-based 3500 Series Routing System.

Figure 1 depicts a typical system block diagram where the UCI-2000 is used to control legacy RM5000 Routers from a PESA PERC2000 Routing System Controller.

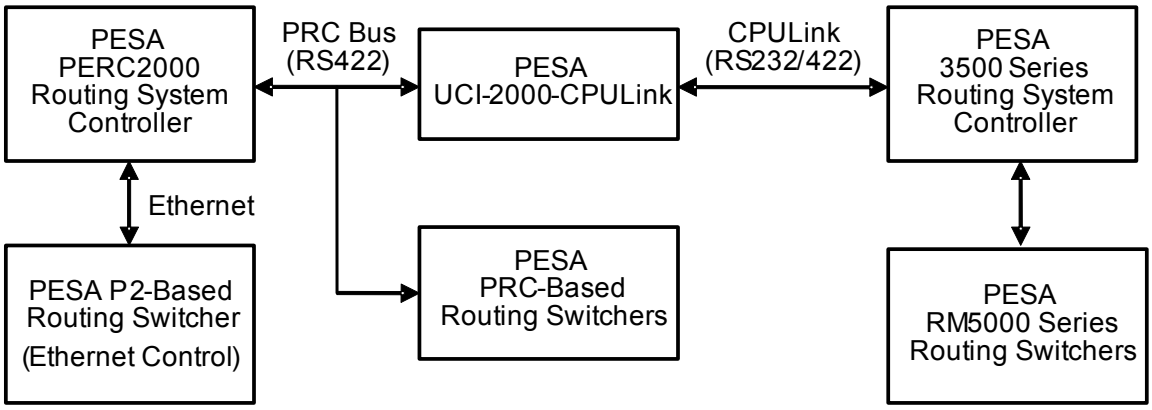

Figure 1 – System Block Diagram

Using UCI-2000-CPULINK allows the Master PESA Routing System Controller to control up to four routing levels on the Slave PESA Routing System Controller. Each of these four Slave routing levels can support a matrix size of 512 x 512 inputs and outputs. Slave routing levels must occupy a consecutive block within the level space of the Master's Control System and cannot share a level with a router that is controlled directly by the Master system.

The UCI-2000-CPULINK receives commands from the Master PESA controller through the Master's PRC Control Bus. These commands are translated into PESA P1E Protocol (CPULink) by the UCI-2000-CPULINK and sent to the Slave PESA system controller.

2. Hardware Configuration

2.1 Setting the Operating Mode

DIP switch S1 on the UCI-2000-CPULINK PC board is used to set the card's operating mode. Available operating modes for the UCI-2000-CPULINK are listed in Table 1.

Operating Mode	S1-8	S1-7	S1-6	S1-5	S1-4	S1-3	S1-2	S1-1
Normal Operating Mode	Off	Off	Off	Off	Off	Off	Off	**On**
Factory Test Mode	**On**	**On**	**On**	**On**	**On**	**On**	**On**	Off
Board Reset	**On**	**On**	**On**	**On**	**On**	**On**	**On**	**On**
All other settings are Reserved								

Table 1 – UCI-2000-CPULink Operating Modes

2.2 Setting the PRC Base Strobe (Control Level) and Number of Controlled Levels

Switches 1 – 4 of DIP switch S6 set the starting (base) strobe number of the controlled slave matrices using a binary representation according to Table 2 below. Valid level numbers are 1 – 15. (ON is to the right when viewed from above and rear connectors are oriented to the top of the board)

Starting Level #	S6-4	S6-3	S6-2	S6-1
Level 1	Off	Off	Off	**On**
Level 2	Off	Off	**On**	Off
Level 3	Off	Off	**On**	**On**
Level 4	Off	**On**	Off	Off
Level 5	Off	**On**	Off	**On**
Level 6	Off	**On**	**On**	Off
Level 7	Off	**On**	**On**	**On**
Level 8	**On**	Off	Off	Off
Level 9	**On**	Off	Off	**On**
Level 10	**On**	Off	**On**	Off
Level 11	**On**	Off	**On**	**On**
Level 12	**On**	**On**	Off	Off
Level 13	**On**	**On**	Off	**On**
Level 14	**On**	**On**	**On**	Off
Level 15	**On**	**On**	**On**	**On**

Table 2– Base Control Level Of Controlled Routers

Switches 5, 6 and 7 of S6 set the number of controlled slave matrices according to Table 3:

S6-5	S6-6	S6-7	Function
Off	Off	Off	UCI Controls 4 Levels
On	Off	Off	UCI Controls 1 Levels
Off	**On**	Off	UCI Controls 2 Levels
On	**On**	Off	UCI Controls 3 Levels

Table 3 – Number of Controlled Levels

2.3 Setting Operation of the COM1 and COM2 Serial Ports

Switches 1 and 2 of DIP switch S4 are used to set the functionality of the COM1&2 serial ports on the back of the UCI-2000-CPULINK chassis. Switches 3 and 4 of S4 are used to select between RS232 and RS422 operation for the COM1 and COM 2 serial ports respectively; off = RS422, on = RS232.

On the rear of the UCI-2000 chassis, serial port COM2 is used to communicate with the slave PESA Routing System Controller. COM2 can be set for either RS232 or RS422 operation. Table 4 below illustrates these settings. COM1 is not used in this application.

S4-1	S4-2	S4-3	S4-4	Function
Off	Off	Off	Off	Normal Mode, COM2 RS422
Off	Off	Off	**On**	Normal Mode, COM2 RS232

Table 4 – DIP Switch S4 Settings

3. Software Configuration

To enable the slave routers in the system, they must be added to the configurations in both the Master and Slave PESA control systems.

3.1 Slave Controller Configuration:

The configuration in the Slave routing system controller is used to provide a "1 to 1" mapping of the inputs and outputs back to the Master routing system controller. This is the most basic of configurations and will not have to be maintained once it is created and downloaded to the (slave) controller.

Create a Level and Component for each of the Slave routing switchers. Strobe numbers for these routing switchers begin at "1" in the Slave controller's configuration even if they are configured to use different strobe numbers in the Master controller's configuration. The UCI-2000 automatically translates the Strobe numbers specified in the Master controller's configuration down to start at Strobe #1.

Create as many Destinations as there are physical outputs in the largest of the Slave routing switchers. For example, if there are two slave routers with sizes of 48x48 and 64x96, create 96 Destinations.

For simplicity, give each Destination the name of the physical output. Out1, Out2, Out3, …, for example. For each component of the Destination, enter the corresponding physical output #.

Create Sources in a similar fashion. If a particular Component is smaller than the highest I/O number, enter a physical I/O for the Source/Destination anyway.

A sample configuration can be provided. Please contact Customer Service for assistance.

3.2 Master Controller Configuration:

Add Control Levels, Components, Sources, Destinations, Salvos, etc… for the slave routing levels to the configuration in the Master routing system controller just as if they were connected directly to the Master controller. Note the Strobe number(s) that have been set on the UCI-2000's DIP switch for the Slave routers and enter these numbers in the configuration page for the respective Component.

Please refer to the Win3500 or PERC2000 Series Instruction Manual for more information about configuring a routing system.

4. Redundant Operation

The UCI-2000-CPULINK is capable of fully redundant operation when two cards are installed in the dual controller chassis. The front panel toggle switch is used to select one of three redundancy modes: Active, Standby and Automatic.

Figure 2 – UCI-2000-CPULink Card

In the automatic mode, one card operates in the active mode and the other card operates in standby. If a failure is detected on the active card by the standby, the standby card will automatically disable the active card and assume the active role. The standby card receives and processes the same data from the controller and the routers as the active card, so that in the event of a failure on the active card it can take over instantly and transparently. To enable the automatic mode, set the toggle switch on both cards to the Auto position. The Active light on the front of the card is used to indicate which of the cards is currently operating in the active state.

For the system to operate in manual mode, one card must be set to the active mode and the other to the standby mode. If the toggle switch settings on the cards are invalid, the Status light will continuously flash three times.

Currently, fully automatic operation is supported when communication between the UCI-2000's and the slave system controller is using RS422. Manual mode, one card set to active and the other to standby, must be used when connecting via RS232.

5. Cable Connections

COM1: Not Used
COM2: PESA CPULink (P1E) connection. RS232 or RS422. Connect to PESA Slave Controller (3500 or PERC2000). Pin as required: RS232 = Null-Modem Cable; RS422 = Rx/Tx Swap Cable.
COM3: PRC - Connect to PESA Master Controller (3500 or PERC2000)
SYSTEM V CONTROL (37-pin): Not Used

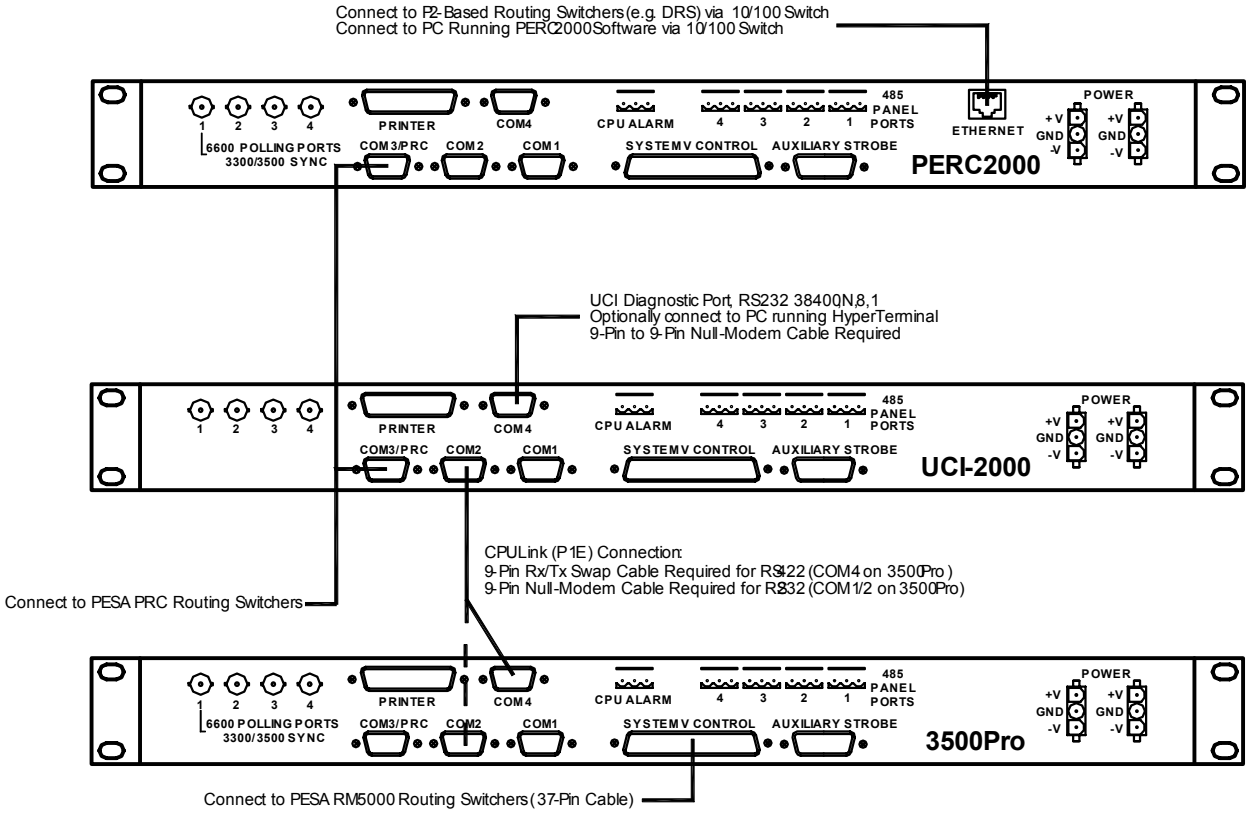

Figure 3 – Control Cable Connections

Connect the PESA Master System Controller to the UCI-2000 using a standard 9-pin PESA PRC cable (pin-to pin) between COM3 on both units.

Connect the COM2 of the PESA UCI-2000 to an available COM port (COM1/COM2/COM4) on the PESA Salve System Controller using either a 9-pin Null-Modem cable (RS232) or an Rx/Tx Swap cable (RS422).

If you are constructing your own cables, please refer to the UCI-2000 COM2 connector pin-out and PESA System Controller Instruction Manuals for information on how to construct these cables.

6. Rear Connector Pin-outs

6.1 COM1, COM2:

Pin	RS232 Fn	RS422 Fn
1	CD	Ground
2	RXD (in)	RX+ (in)
3	TXD (out)	TX- (out)
4	DTR	Ground
5	Ground	Ground
6	DSR	Ground
7	RTS	RX- (in)
8	CTS	TX+ (out)
9	NC	Ground

Table 5 – COM1, COM2 Connector Pin-outs

6.2 COM4– Diagnostics Connection:

Pin	RS232 Fn
1	CD
2	RXD (in)
3	TXD (out)
4	DTR
5	Ground
6	DSR
7	RTS
8	CTS
9	NC

Table 6 – COM4 Connector Pin-out

Typically a Null-Modem cable is used between the UCI-2000 COM4 and a PC type COM port. Communication settings for the diagnostic port are 38400, N,8,1.

6.3 COM3 – PESA PRC Bus Connection:

Pin	RS422 Fn
1	Ground
2	TX+ (out)
3	RX- (in)
4	Ground
5	Ground
6	Ground
7	TX- (in)
8	RX+ (out)
9	Ground

Table 7 – COM3 PRC Matrix Connector Pin-out

7. Installation and Initialization Procedure

The following steps describe the installation procedure for commissioning a new UCI-2000-CPULINK protocol conversion board. This procedure is performed with the UCI-2000-CPULINK powered up and connected to both PESA System Controllers with the appropriate cables. If your system contains redundant UCI-2000-CPULINK controller cards, this procedure must be performed on each card separately.

1. Remove ***all*** UCI-2000-CPULINK boards from the controller chassis.

2. Set the PRC base strobe (level) and number of controlled levels using DIP switch S6 as follows:

- Switches 1 – 4 of DIP switch S6 set the starting (base) strobe number of the controlled matrices on the slave controller using a binary representation according to the following table. Valid level numbers are 1 – 15. (ON is to the right when viewing from above and the rear connectors are at the top of the board).

Starting Level #	S6-4	S6-3	S6-2	S6-1
Level 1	Off	Off	Off	**On**
Level 2	Off	Off	**On**	Off
Level 3	Off	Off	**On**	**On**
Level 4	Off	**On**	Off	Off
Level 5	Off	**On**	Off	**On**
Level 6	Off	**On**	**On**	Off
Level 7	Off	**On**	**On**	**On**
Level 8	**On**	Off	Off	Off
Level 9	**On**	Off	Off	**On**
Level 10	**On**	Off	**On**	Off
Level 11	**On**	Off	**On**	**On**
Level 12	**On**	**On**	Off	Off
Level 13	**On**	**On**	Off	**On**
Level 14	**On**	**On**	**On**	Off
Level 15	**On**	**On**	**On**	**On**

Table 8 – Base Control Level of BTS/Philips Routers

- Switches 5, 6 and 7 of S6 set the number of controlled matrices according to the following table:

S6-5	S6-6	S6-7	Function
Off	Off	Off	UCI Controls 4 Levels
On	Off	Off	UCI Controls 1 Levels
Off	**On**	Off	UCI Controls 2 Levels
On	**On**	Off	UCI Controls 3 Levels

Table 9 – Number of Controlled BTS/Philips Levels

3. Turn ON ***all*** switches on DIP switch S1 to re-initialize the board's internal memory to factory defaults.

4. Set the front panel toggle switch to the AUTO or ACTIVE setting.

5. Turn OFF ***all*** switches on DIP switch S4 if COM2 is RS422, otherwise turn on only S4-4.

6. Install the UCI-2000-CPULINK card in the chassis and apply power (if necessary). Verify that the Power led is illuminated.

7. Press and hold the front panel Reset Button for about 1 second, then release.

8. The board will now initialize its data. The Active and Status leds will illuminate during this process. When the process is finished, all front panel leds will turn off (except for the power led). This process should take only a few seconds complete.

9. Remove the UCI-2000-CPULINK card from the chassis.

10. Set the front panel toggle switch to the AUTO setting.

11. Turn OFF all switches on DIP switch S1 ***except*** for switch # 1. This will set the normal mode of operation for the system. Available operating modes for the UCI-2000-CPULINK are listed in Table 10.

Operating Mode	S1-8	S1-7	S1-6	S1-5	S1-4	S1-3	S1-2	S1-1
Normal Operating Mode	Off	Off	Off	Off	Off	Off	Off	**On**
Factory Test Mode	**On**	**On**	**On**	**On**	**On**	**On**	**On**	Off
Board Reset	**On**	**On**	**On**	**On**	**On**	**On**	**On**	**On**
All other settings are Reserved								

Table 10 – UCI-2000-CPULink Operating Modes

12. Repeat steps 1-11 for the redundant UCI-2000-CPULINK card (if equipped).

13. Re-install the UCI-2000-CPULINK card(s) in the chassis.


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