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About this Manual

Audience

This manual is intended as a general reference and for use by engineers or technicians when installing professional automation computers.

Measurement Standards

The following measurement standards are used in this manual:

- **Rack Unit (RU)** is an Imperial standard measurement for device height. (While also seen as U.) [1RU = 44.45mm = 1.75 inches]
- **19” Rack Standard** is an international standard for racking width. [19” Rackmount standard = 482.6mm]
- **Other measures** for in-document conversion: (1m = 3.281ft), (0.3048m = 1ft), (25.4mm = 1in), (1kg = 2.205lb)
- **Website for length & weight conversions**: http://www.convert-me.com/en/convert

Product Unpacking Notes

Thoroughly inspect all articles immediately upon receipt. Any damage discovered should be cause for a damage claim against the carrier.
Overview

The Device Controller automation computer is supported by all ADC™ and D-Series™ v4 and higher playout automation systems. Its job is to host the operating system, real-time Device Controller automation computers, and device drivers necessary for any Harris automation system, at the device control layer. It supports a variety of configuration options for serial cards, time code references and system software.

WEEE / RoHS Compliant

All hardware components are compliant with Electrical and Electronic Equipment (WEEE) and Restriction on Hazardous Substances (RoHS) (Combined WEEE/RoHS) requirements now mandated in Europe, and being adopted in other parts of the world.

- Restriction of Hazardous Substances Directive (RoHS) 2002/95/EC mandates: Recycling of devices at end of life and the elimination or reduction of a list of hazardous substances. This includes six key hazardous materials typically used in the manufacture of various types of electronic and electrical equipment: Lead, Mercury, Cadmium, Hexavalent chromium (chromium VI or Cr6+), Polybrominated biphenyls (PBB), and Polybrominated diphenyl ether (PBDE)

- Waste Electrical and Electronic Equipment Directive (WEEE Directive) 2002/96/EC sets collection, recycling and recovery targets for all types of electrical goods. The directive imposes the responsibility for the disposal of waste electrical and electronic equipment (WEEE) on the manufacturers of such equipment. The companies are compelled to use the collected waste in an ecological-friendly manner, either by ecological disposal or by reuse/refurbishment of the collected WEEE. Under WEEE "Users of electrical and electronic equipment from private households should have the possibility of returning WEEE at least free of charge"

Standard D-Series Device Controller Configuration

A standard D-Series Device Controller configuration includes the following hardware components.

D-Series-specific hardware components:
- 16-port Serial Cards
- Serial 16 Interface Panel
- SER4-LTC or Adrienne LTC Time Code card
- 2 NICs (standard)

For all Device Controller systems, the following are on-board and standard on the Single Board Computer (SBC):
- Two GigE NICs
- VGA output adapter
- USB connectors (2 on rear 1 on front)
- Serial and Parallel Com ports
- PS/2 port for keyboard & mouse split connector on rear board panel.

About Available Ports

In an D-Series™ playout automation system environment the Device Controller can support up to 216 ports.
- Currently, up to six PC slots can be fitted with D-Series 16-Port Serial cards, supporting up to 96 high speed serial ports.
- Up to 24 of these ports can be connected to a MUX card (i.e. the newer SMS6800+D card or the older MUX-800 card) in order to support up to (96-24) + (24*6) = 72+144 = 216 serial ports.

To allow for future expansion the system is typically configured with a greater number of serial ports than is required. Additional cards, up to the specified maximums, may be added at a later date.

If serial ports are available, control of additional devices may be configured. Contact Automation Technical Support for more information.

Processor seating

While precautions are taken to avoid slippage, it is possible for the processor card to become unseated during shipping. Therefore, when installing other peripheral cards during the chassis setup, it is advisable to ensure the processor card is seated properly. This avoids incidents of CPUs refusing to boot-up first time on site.

Device Controller 4RU: Standard Board Placement

The following information outlines the standard placement of boards in the current model iCHP and older model CHP 4RU Device Controller automation computer chassis.

Current model iCHP Chassis

There are 14 slots (0-13) on the iCHP model Device Controller chassis.
- 4 PCI slots (used for extra NICs.)
- 1 PCIex16 slot (used for SER4-LTC or Adrienne card)
- 1 blank slot (used for PS2 Connectors)
- 1 PCMG slot (used for the Single board computer)
- 4 PCI slots (used for serial 16 cards.)
- 3 PCIe x 1 slots (used for serial 24 cards and extra Nic cards.)

**Backplane view**

The following image illustrates the backplane layout and the standard placement of boards in the current model iCHP 4RU Device Controller automation computer chassis.

<table>
<thead>
<tr>
<th>Board</th>
<th>Slot Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>NICs (standard)</td>
<td>Slots 00 - 03</td>
</tr>
<tr>
<td>SER4-LTC: TimeCode/Video Sync x 2 Serial PCIe Card Or Adrienne Timecode /Video Sync Card</td>
<td>Slot 04</td>
</tr>
<tr>
<td>PS/2 connectors</td>
<td>Slot 05 (blank)</td>
</tr>
<tr>
<td>SBC Board (CPU/NICs/VGA/USB onboard)</td>
<td>Slot 06</td>
</tr>
<tr>
<td>Serial 16 PCI Boards</td>
<td>Slots 07 - 10</td>
</tr>
<tr>
<td>Serial 24 PCIe Boards</td>
<td>Slots 11 - 13</td>
</tr>
</tbody>
</table>

**Older model CHP Chassis:**

There are 14 slots (0-13) on the older model CHP Device Controller chassis.
- 1 PCM board (used for the Single board computer)
- 1 PCI slot (used for Timnecode/Sync card)
- 6 PCI slots (used for extra Nic cards.)
- 6 PCI slots (used for serial cards.)

The following image illustrates the backplane layout and the standard placement of boards in the older model CHP 4RU Device Controller automation computer chassis.
**Older model CHP Device Controller automation computers were typically shipped with the boards in the following slots:**

<table>
<thead>
<tr>
<th>Slot</th>
<th>Typical Load</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Time Code/Sync</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Network Card 3</td>
<td>The Single Board Computer (SBC) contains two onboard GigE Network Cards. As standard, a D-Series system supports up to four LANs.</td>
</tr>
<tr>
<td>2</td>
<td>Network Card 4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>NIC</td>
<td>Optional</td>
</tr>
<tr>
<td>4</td>
<td>NIC</td>
<td>Optional</td>
</tr>
<tr>
<td>5</td>
<td>NIC</td>
<td>Optional</td>
</tr>
<tr>
<td>6</td>
<td>NIC</td>
<td>Optional</td>
</tr>
<tr>
<td>7</td>
<td>Serial 16 A</td>
<td>Ports 1 to 16</td>
</tr>
<tr>
<td>8</td>
<td>Serial 16 B</td>
<td>Ports 17 to 32</td>
</tr>
<tr>
<td>9</td>
<td>Serial 16 C</td>
<td>Ports 33 to 48</td>
</tr>
<tr>
<td>10</td>
<td>Serial 16 D</td>
<td>Ports 49 to 64</td>
</tr>
<tr>
<td>11</td>
<td>Serial 16 E</td>
<td>Port 65 to 80</td>
</tr>
<tr>
<td>12</td>
<td>Serial 16 F</td>
<td>Port 81 to 96</td>
</tr>
</tbody>
</table>

**Device Controller 2RU: Standard Board Slot Locations**

Since a number of different combinations are equally viable, all the cards in slots 00 to 04 are "Optional". To provide a base standard of reference, when configured as an automation computer, D-Series Device Controller units are typically installed with boards in the following slots:
**WARNING:** Once installed and configured, changing any board, card, or connection from their designated position will result in improper functioning of the Device Controller computer.

### Slot and Component Locations

The following diagram illustrates standard board placement in the 2RU Device Controller automation computer chassis.

![Diagram of board placement](image)

<table>
<thead>
<tr>
<th>Board</th>
<th>Slot Location</th>
<th>Board</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Board Computer</td>
<td>Slot 00</td>
<td>Serial /Parallel Ports</td>
<td>Onboard SBC</td>
</tr>
<tr>
<td>(Optional) Time Code/Sync</td>
<td>Slot 01</td>
<td>CPU/NICs /VGA</td>
<td>Onboard SBC</td>
</tr>
<tr>
<td>(Optional) Network Cards</td>
<td>Slot 02-03</td>
<td>Keyboard / Mouse</td>
<td>Onboard SBC</td>
</tr>
<tr>
<td>(Optional) 16-Port Serial Boards</td>
<td>Slots 04-05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
About the 16-Port Serial Card

In addition to standard, fixed cards, D-Series automation systems also install custom 16-port serial cards in the Device Controller automation computer chassis.

The PCI 16xRS422-485 serial card has 16 serial ports. This Universal 32-bit PCI card enables D-Series Automation Systems to communicate with video servers, VTRs, routers, automation hardware panels, etc., via RS-422 or RS-485 protocol. When properly installed and configured this Serial-16 card operates like any other serial card.

Distribution of communication to devices is normally provided via a serial interface panel. This card connects to the Serial-16 Interface (IF) breakout panel via a high density VHDCI 68 connection. The Serial Interface panel splits the connection into sixteen RJ45 RS-422 / 485 connections. The number of boards installed is directly related to the number of devices that need to be controlled.

Note: This card is for use in PCI or PCI-X slots. It is not for use in PCI Express (PCIe) slots.

Specifications

The following table provides a brief list of specifications for the 16-Port Serial Card.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Height: 4.2 in (10.8 cm) Length: 5.7 in (14.5 cm)</td>
</tr>
<tr>
<td>Typical Location</td>
<td>PCI Slot in the Device Controller automation computer chassis</td>
</tr>
<tr>
<td>Mounting Requirements</td>
<td>Industry Standard. No special requirements</td>
</tr>
</tbody>
</table>

16-Port Serial Card Layout

The 16-Port Serial card is a PCI card that fits into the PCI Slots on the computer motherboard.

- A single 68-way connector (J1) links out to broadcast devices. This cable is available from Imagine Communications and comes in a variety of lengths to accommodate system installation requirements.
- Four banks of DIP Switches allow termination of serial lines. These are not used by D-Series playout automation as the system never needs to terminate serial lines.
Installing Serial-16 Cards in a Computer

Serial-16 cards may be installed in different PCI slots on the Device Controller automation computer motherboard. The number of cards installed depends on the number of devices controlled.

When installing cards it is recommended to always work from the top of the computer Chassis to the bottom. For example, if installing 6 serial cards: Card 1 is on the top, Card 6 is on the bottom and all the rest are in-between.

BE GROUNDED: SER cards are static-sensitive devices, so use a properly grounded static strap before touching them – especially if they are already resident in a computer.

Configuration

Since these are PCI cards, there is no special setup or configuration required.

About Card Dip Switch Settings

There are four banks of dip switches on the card. These dipswitches are used to terminate serial lines.
IMPORTANT: These dipswitches are not used by D-Series playout automation systems. DO NOT CHANGE THE DEFAULT SETTINGS.

The following table shows their default settings.

<table>
<thead>
<tr>
<th>Bank S1</th>
<th>Bank S2</th>
<th>Bank S3</th>
<th>Bank S4</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="closed.png" alt="Closed" /></td>
<td><img src="closed.png" alt="Closed" /></td>
<td><img src="closed.png" alt="Closed" /></td>
<td><img src="closed.png" alt="Closed" /></td>
</tr>
</tbody>
</table>

Cabling

For details on cabling options see Reference: V4 System Cabling at the end of this document.
About the 24-Port Serial Card

In addition to standard, fixed cards, D-Series automation systems also installs custom 24-port serial cards in the iCHP Device Controller automation computer chassis.

The 24xRS422-485 serial card has 24 serial ports; the board consists of a 16 port PCIe RS422 main card with an 8 port daughter board that piggy-backs on top of it. This Universal 32-bit PCIe card enables D-Series Automation Systems to communicate with video servers, VTRs, routers, automation hardware panels, etc., via RS-422 or RS-485 protocol. When properly installed and configured this Serial-24 card operates like any other serial card.

- The number of boards installed is directly related to the number of devices that need to be controlled.
- Distribution of communication to devices is normally provided via a Serial-24 Interface (IF) breakout panel. Each card connects to the panel via a high density VHDCI 68 connection. The Serial Interface panel splits the connection into twenty four RJ45 RS-422 / 485 connections.

Note: This card is for use in PCI Express (PCIe) slots. It is not for use in PCI or PCI-X slots.

Specifications

The following table provides a brief list of specifications for the 24-Port Serial Card.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Height: 4.2 in (10.8 cm) Length: 5.7 in (14.5 cm)</td>
</tr>
<tr>
<td>Typical Location</td>
<td>PCIe Slot in the iCHP Device Controller automation computer chassis</td>
</tr>
<tr>
<td>Mounting Requirements</td>
<td>Industry Standard. No special requirements</td>
</tr>
</tbody>
</table>

24-Port Serial Card Layout

The 24-Port Serial card is a PCIe card that fits into the PCIe Slots on the computer motherboard.

- A single 68-way connector (J1) links out to broadcast devices. This cable is available from Imagine Communications and comes in a variety of lengths to accommodate system installation requirements.
Four banks of DIP Switches on the Serial 16 board and two banks of DIP Switches on the 8Port daughter board allow termination of serial lines. These are typically not used by D-Series playout automation, but are available should the serial lines ever need to be terminated.

The Serial 24 PCIe card. Each card connects to a Serial Interface panel via a VHDCI 68-input connection.

Installating Serial-24 Cards in a Computer

Serial-24 cards may be installed in different PCIe slots on the Device Controller automation computer motherboard. The number of cards installed depends on the number of devices controlled.

When installing cards it is recommended to always work from left to right facing the back of the computer Chassis. For example, if installing 3 serial cards: working left to right Card 1 is on the farthest left, Card 2 is next and, Card 3 is last and farthest right.

BE GROUNDED: SER cards are static-sensitive devices, so use a properly grounded static strap before touching them – especially if they are already resident in a computer.

Configuration

Since these are PCIe cards, there is no special setup or configuration required.
About Card Dip Switch Settings

On-board DIP switches can be used to terminate RS422 serial lines. However, since D-Series has never yet experienced line lengths that need terminations, their default settings should not need changing, but are available should the serial lines ever need to be terminated.

IMPORTANT: DO NOT CHANGE THE DEFAULT SETTINGS.

Serial 16 card

The following table shows their default settings.

<table>
<thead>
<tr>
<th>Bank S1</th>
<th>Bank S2</th>
<th>Bank S3</th>
<th>Bank S4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed</td>
<td>Closed</td>
<td>Closed</td>
<td>Closed</td>
</tr>
</tbody>
</table>

8-Port Daughter Board

The following table shows their default settings.

<table>
<thead>
<tr>
<th>Bank S1</th>
<th>Bank S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed</td>
<td>Closed</td>
</tr>
</tbody>
</table>

Cabling

For details on cabling options see Reference: V4 System Cabling at the end of this document.
SER 24 Dual Interface Panel

Distribution of communication to devices is normally provided via a serial interface panel. 2x Serial 24 PCIe cards connect to the Dual Serial-24 Interface (IF) breakout panel via a high density VHDCI 68-input connection. The Serial Interface panel splits the connection into twenty four RJ45 RS-422 / 485 connections.
**SER-16 Interface Panel**

### About the Serial Interface Panel

The SER-16 Interface panel is a one RU height, 19" Rackmount standard width unit, designed for use with the Serial-16 card. Two versions of this panel are available, depending on the supported system hardware components:

- The SER-16_RJ-45 Interface panel is designed for use with Common Hardware Platform components. This panel would be used when installing a new D-Series V4 and higher system and all new components of the Common Hardware Platform.
- The SER-16_DB9 Interface panel is designed for use with older D-Series v3 hardware components. This panel would be typically used when upgrading an existing D-Series system to the new Common Hardware Platform, but keeping older V3-style hardware panels.

### The SER-16_RJ-45 Interface panel

The SER-16_RJ-45 Interface panel is a one RU height, 19" Rackmount standard width unit, designed for use with Common Hardware Platform components. This panel distributes two Serial-16 cards for device control via a high density VHDCI 68 68-way input for each card. Each card input is split out into a bank of sixteen RJ-45 output connectors from the panel.

### Example Panel layout

On the SER-16_RJ-45 Interface Panel:

- The two VHDCI 68 68-way inputs (one connection for each serial card) are located on the back of the unit.
- The two banks of 16 RJ-45 connectors (one bank for each card) are located on the front of the panel.

The following diagram illustrates the layout of connectors on the SER-16_RJ-45 Interface Panel. (Your panel may appear different.)

From this panel, the RJ-45 cables connect to the transfer card in the 6800+ Communications Hardware frame (FR6802).
Configuration

No special configuration is required for this panel.

Cabling

For details on cabling options see Reference: V4 System Cabling at the end of this document.

SER-16_DB9 Interface Panel

The SER-16_DB9 Interface panel is a one RU height, 19” Rackmount standard width unit is designed for use with older D-Series hardware components. It distributes a single Serial-16 card connection for device control via one high density VHDCI 68-way input for the card and sixteen DB-9 output connectors from the panel.

Example Panel layout

On the SER-16_DB9 Interface Panel, the VHDCI 68 68-way input and the DB-9 output connectors are located on the front of the panel. The following diagram illustrates the layout of connectors on the SER-16_RJ-45 Interface Panel.

From this panel, DB9 cables connect to the older D-Series CON-8 or MUX-800 panels.

Configuration

Each port on the SER-16 DB9 interface panel has a pair of RS-422/485 selection jumpers that need to be changed if the port is used to interface to an A7980 or VTR Next Event panel.

Panel Variants

There are two variants of the SER-16 DB9 interface panel:
Panel Variant 1: The first / original variant of the panel presented jumpers in a single line across the back of the board and the silk screen numbers for the jumpers displayed as 485/422 - (In reverse of their implementation.)

Panel Variant 2: The current variant of the panel presents jumpers in a double row across the back of the board and the silk screen numbers for the jumpers displayed as 422/485 - (Correct for their implementation.)

Panel Variant 1: Jumper Settings

Each link has the silkscreen legend 485/422 against it, but the link needs to be made to the opposite side for correct operation.

The following pictures show the jumper settings from two views (top front and rear) and explains the correct interpretation of the jumper settings when viewed from these two perspectives.

When Viewed from top front

The following top front view shows the jumper links set to the right. Viewed from this angle, they are correctly set for RS485 (though the silkscreen suggests they are set for RS422).

From this angle, set all jumpers to the left for RS422 or to the right for RS485.

When Viewed from the rear

The following rear view shows the jumper links set to the right. Viewed from this angle, they are correctly set for RS422 (though the silkscreen suggests they are set for RS485).

From this angle, set all jumpers to the right for RS422 or to the left for RS485.
Panel Variant 2: Jumper Settings

Each link has the silkscreen legend 422/485 against it. Set the link to the appropriate side for correct operation.

The following pictures show the jumper settings from two views (top front and rear) and explains the interpretation of the jumper settings when viewed from these two perspectives.

When Viewed from top front

The following top front view shows the jumper links set to the right. Viewed from this angle, they are correctly set for RS485. (The silkscreen shows they are set for RS485.)

From this angle, set all jumpers to the right for RS485 or to the left for RS422.

When Viewed from the rear

The following rear view shows the jumper links set to the left. Viewed from this angle, they are correctly set for RS485. (The silkscreen shows they are set for RS485.)

From this angle, set all jumpers to the left for RS485 or to the right for RS422.

Cabling

For details on cabling options see Reference: V4 System Cabling at the end of this document.
SER4-LTC Time Code / Sync Serial x 2 PCIe Card

About the SER4-LTC Card

Current model Device Controller (iCHP) automation computer chassis come with a custom SER4-LTC Time Code / Sync Serial card installed. The card supports the LTC timecode reader and has four RS422 serial ports.

The time code input provides a reference for synchronizing operations to a station’s house clock system.

- It is strongly recommended that no daylight savings time offset be applied to the time code, especially in environments where lists in multiple time zones are controlled. Set all LTC timecode feeds to UTC.
- In NTSC environments, it is essential that this be a drop frame source.
Low- and High-profile Brackets

This card comes with both low-profile and full height brackets.

- With the low profile bracket installed, the 2 lower RJ45 sockets provide the 4 RS422 ports, while the upper RJ45 can be used to connect SMPTE LTC.
- With the full height bracket installed there is an additional mini XLR at the top of the bracket for SMPTE timecode.
- Video sync reference is connected via the SMA socket at the bottom of the bracket.

Operation

The upper RJ45 for timecode has integral green and yellow LEDs. The presence on good incoming timecode is indicated by the yellow LED illuminating, while the green LED indicates the presence of video reference.

Installation and configuration

For D-Series v4 and higher automation systems, no additional configuration other than installing the DALinux timecode-config package is required in order to use AEC PCI-TC cards.
Setup

No card setup is required for the 25, 29.97 or 30 fps code; the card decodes all rates automatically.

Pinouts

1st RS422 port on both RJ45 connectors

The 1st RS422 port on both RJ45 connectors is wired in accordance with the current D-Series 'standard'......

<table>
<thead>
<tr>
<th>Pin</th>
<th>1st RS422 port on both RJ45 connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX+</td>
<td>1</td>
</tr>
<tr>
<td>TX-</td>
<td>2</td>
</tr>
<tr>
<td>RX+</td>
<td>3</td>
</tr>
<tr>
<td>RX-</td>
<td>6</td>
</tr>
</tbody>
</table>

......so that 2 ports only can be used with CAT5 cabling without the need for a breakout panel.

2nd RS422 port on both RJ45 connectors

The 2nd RS422 ports are wired as follows........

<table>
<thead>
<tr>
<th>Pin</th>
<th>2nd RS422 port on both RJ45 connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX+</td>
<td>8</td>
</tr>
<tr>
<td>TX-</td>
<td>7</td>
</tr>
<tr>
<td>RX+</td>
<td>5</td>
</tr>
<tr>
<td>RX-</td>
<td>4</td>
</tr>
</tbody>
</table>

.........so to gain access to all 4 serial ports it would be necessary to have some means of breakout; Dual SER4-LTC Interface breakout panel’.

XLR Connector

Any XLR connector pinout can be remembered by XLR (pin 1, pin 2, pin 3).

Where: X = 1 (gnd), L = 2 (line), and R = 3 (return).

All XLRs are connected this way, and the Adrienne, the Alpermann & Velte and the TC readers are all the same.

Dual SER4-LTC Interface breakout panel

A 1RU ‘Dual SER4-LTC Interface breakout panel’ connects to 2 SER4-LTC PCIe cards (i.e. from main and reserve device controllers) using 3x CAT5 cables from each card. The 4 RS422 ports are then broken out into their own RJ45 socket, and the timecode is taken to a Mini-XLR for ease of wiring.
Adrienne Time Code Card

About the Time Code Card

Older model CHP Device Controller automation computer chassis may have an Adrienne Time Code card installed. Adrienne Electronics Corporation (AEC) PCI-TC family of PCI bus plug-in boards supports the LTC timecode reader.

The time code input provides a reference for synchronizing operations to your house clock system.

- It is strongly recommended that no daylight savings time offset be applied to the time code, especially in environments where lists in multiple time zones are controlled. Set all LTC timecode feeds to UTC.
- In NTSC environments, it is essential that this be a drop frame source.

![Time Code Input Diagram]

Time code input

The time code input requires output HIGH and LOW from a SMPTE/EBU time code source.

- This is a balanced signal with a floating ground.
- The cable shield is not used.
• The TC reader card can accept an input signal from +1.4Vpp to +2.8Vpp.

**Installation and configuration**

For D-Series v4 and higher automation systems, no additional configuration other than installing the DALinux timecode-config package is required in order to use AEC PCI-TC cards.

**To Install the Mating Connector on the Time Code Cable**

The TC/Sync board has a Mini-XLR audio connector installed for the time code input, and one mating connector is supplied. The following steps explain how to properly install the mating connector on the time code cable:

**NOTE:** Although quite durable, once installed, this connector is easily damaged and care should be taken.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unscrew the black plastic hood from the back of the connector then slip it over the end of the audio cable you will be using. Make sure that the threaded end of the hood is closest to the end of the cable.</td>
</tr>
<tr>
<td>2</td>
<td>Pull the 4-fingered cable clamp assembly out of the Mini-XLR connector body then slip it over the end of the audio cable. Make sure that the black plastic end of the cable clamp assembly is closest to the end of the cable.</td>
</tr>
<tr>
<td>3</td>
<td>Gently tap or push the pin block out of the Mini-XLR connector shell then carefully fill each of the three solder cup pins with solder.</td>
</tr>
<tr>
<td>4</td>
<td>Being careful not to cut any of the soft copper conductors, prepare the end of your audio cable by cutting back the outer insulation and shield by 11mm (7/16&quot;). Then strip the end of each wire back by 3mm (1/8&quot;) and then thin the end of each wire. We recommend that the ground connection be insulated and left unattached.</td>
</tr>
<tr>
<td>5</td>
<td>Note the tiny pin numbers molded into the pin block face.</td>
</tr>
<tr>
<td>6</td>
<td>When making the ground connection, sweat solder your ground wire to the pin 1 solder cup. Note that this pin is recessed slightly with respect to the other two pins (will always make the ground connection first).</td>
</tr>
<tr>
<td>7</td>
<td>Sweat solder your &quot;LTC+&quot; wire to the pin 2 solder cup (this is the pin farthest away from the flat side of the pin block).</td>
</tr>
<tr>
<td>8</td>
<td>Sweat solder your &quot;LTC-&quot; wire to the pin 3 solder cup (the only one left).</td>
</tr>
<tr>
<td>9</td>
<td>Push the pin block back into the Mini-XLR connector shell, noting the alignment key that engages the slot in the shell then slide the cable clamp assembly firmly into place. Use pliers to clamp the four fingers around the cable (this keeps it from pulling out) then screw the black plastic hood onto the Mini-XLR connector.</td>
</tr>
</tbody>
</table>
Network Interface Cards

Optional PCI NICs

Optionally, to supplement the two on-board NICs, additional PCI GigE Ethernet cards can be added to the chassis as required. A standard network cable is used to connect the NIC to the network.

D-Series V4 and higher Automation Systems use a 1Gb network card supported by DALinux, such as a 100/1000 Mb/s network adapter: Intel Pro 1000 card.

IMPORTANT: The addition of extra PCI NICs will take up PCI slots in the Device Controller chassis and reducing the number of slots available to use for serial cards.

The Onboard GigE NICs

The Single Board Computer (SBC) contains onboard two GigE Network Cards. A standard network cable is used to connect the NIC to the network.

<table>
<thead>
<tr>
<th>ICHP Chassis (new Model)</th>
<th>CHP Chassis (old Model)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIC: (RJ45)</td>
<td>NIC: (RJ45)</td>
</tr>
<tr>
<td>NIC: (RJ45)</td>
<td>NIC: (RJ45)</td>
</tr>
<tr>
<td>Video Graphics (DB9)</td>
<td>Video Graphics (DB9)</td>
</tr>
<tr>
<td>USB Ports (Keyboard &amp; Mouse)</td>
<td>Keyboard &amp; Mouse (PS2 w/ splitter cable)</td>
</tr>
</tbody>
</table>
Cabling

For details on cabling options see Reference: V4 System Cabling at the end of this document.
Unit Replacement

Notice to the Original Purchaser

If this unit fails under normal use, and the unit is within the Standard Warranty period and/or is covered under a valid Support Contract with Imagine Communications, and Imagine Communications determines - in its sole discretion - that the product is defective, and provided that the purchaser returns the product, properly packaged and freight prepaid to Imagine Communications, Imagine Communications will - at its option - repair or replace the product.

No warranty is implied or expressed as to the suitability of this product for a particular usage and Imagine Communications is not liable for any special, indirect, or consequential damages, however caused.

To Return a Unit

Follow this procedure when returning a defective unit for replacement.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contact your Imagine Communications Representative to report the problem.</td>
</tr>
<tr>
<td>2</td>
<td>Get an RMA number (Return Materials Authorization) for the unit from Imagine Communications.</td>
</tr>
<tr>
<td>3</td>
<td>Request the proper “ship to” address:</td>
</tr>
<tr>
<td></td>
<td><strong>The Americas</strong></td>
</tr>
<tr>
<td></td>
<td>Imagine Communications Automation</td>
</tr>
<tr>
<td></td>
<td>9800 S. Meridian Blvd</td>
</tr>
<tr>
<td></td>
<td>Englewood, CO 80112 USA</td>
</tr>
<tr>
<td></td>
<td>Ph +1 303 476 5000</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Repackage the unit and Ship To: the Imagine Communications office designated in stage 3.</td>
</tr>
<tr>
<td>5</td>
<td>Imagine Communications will, at its option, repair or replace the product.</td>
</tr>
</tbody>
</table>
To Order a New or Replacement Unit

Contact your Automation representative to order boards for a D-Series Device Controller. When ordering specify the unit by its Product Code.

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Product Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial-16 Card (HW PCBA, SERIAL 16 P D-SERIES)</td>
<td>502039-00</td>
</tr>
<tr>
<td>Adrienne Time Code Card (HW PCBA, TIME CODE READER SYNC)</td>
<td>D50889</td>
</tr>
<tr>
<td>Intel Pro 1000: GigE Network Card (HW PCBA, NIC 10/100/1000BASE-T)</td>
<td>D50740</td>
</tr>
<tr>
<td>Serial-16_RJ-45 Interface Panel (HW, INT PNL, DUAL SER16 RJ-45)</td>
<td>502067-00</td>
</tr>
<tr>
<td>Serial-16_DB9 Interface Panel (HW, INT PNL, SINGLE SER16 9P D)</td>
<td>502068-00</td>
</tr>
<tr>
<td>USB/RS422 Communication Interface Cable (HW, CABLE COM INT SER4USBRS422)</td>
<td>502038-00</td>
</tr>
<tr>
<td>SER 4-LTC PCIe card Harris Time Code / Sync Serial card</td>
<td>502132-00</td>
</tr>
<tr>
<td>HW Automation, i7 SBC Upgrade Kit Single Board Computer (SBC) upgrade kit to convert CHP 2 or 4 RU chassis to i7 quad core SBC with needed cables and connectors.</td>
<td>5004432-00</td>
</tr>
</tbody>
</table>
Reference: V4 System Cabling

Serial-16 Adapters

D-Series V4 and higher systems can use new system hardware. The new SER-16 interface panels have RJ45 connectors. In addition, older MUX-800 and CON-8 cards are replaced with the SMS6800+ panel (incl. Serial Transfer cards, MUX cards, and GPI cards) with RJ45 connectors.

Note: Wire colors are subject to change.

**SER16 A-Type and SER16 B-Type adapters**

SER 6 A-Type and SER16 B-Type adapters are only used with legacy systems. These adapters are not the same as used with SER 12 hardware.

**SER 16 C-Type and SER16 H-Type adapters**

SER16 C-Type and SER16 H-Type adapters are used with new systems.
SER16 B-Type Adapter
SER16 C-Type Adapter
SER16 H-Type Adapter
Serial-16 Serial Cables

A standard straight-through CAT5 Cable connects a SER-16 card via the Interface Panel to a 6800 panel Serial Transfer Card or MUX card, then through an adapter to control a device.

Serial Cabling Detail

Serial 16 via IF Panel

[Diagram showing serial cabling connections]
Transfer Card and NEXIO Server

This modified CAT5 cable connects an SMS Transfer Card and a NEXIO Server.

Transfer Card and OMNEON Server

This modified CAT5 cable connects an SMS Transfer Card and an Omneon Server.

Workstation USB to DB9 Adapter

New D-Series Workstations are specified with USB ports only. To facilitate connection with broadcast devices and expansion panels, a custom USB to RS422 DB9 converter cable is provided. The DB9 connector at the control panel end is a type “B” and plugs directly into the unit.
The VCP Driver

A VCP driver is required to use this cable.

When this cable is used at a site, all VCP drivers necessary to use this cable are installed and configured by certified Imagine Communications engineers.

**IMPORTANT**: If the USB cable is unplugged, plug it back into the SAME USB port it was originally plugged into.

CAT 5 Ethernet Cables (Standard and Crossover)

The following diagrams illustrate standard and CrossOver CAT 5 Ethernet cables and wire color codes.

<table>
<thead>
<tr>
<th>Standard Cable</th>
<th>CrossOver Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Standard Cable Diagram]</td>
<td>![CrossOver Cable Diagram]</td>
</tr>
</tbody>
</table>

RJ45 Plugs viewed looking onto contacts. The latch is underneath.

RJ45 Plugs viewed looking onto contacts. The latch is underneath.