The Physical Interface Guide

Cisco Telepresence System Codec C90
What’s in this guide?

The top menu bar and the entries in the Table of Contents are all hyperlinks, just click on them to go to the topic.

We recommend you visit our web site regularly for updated versions of the user documentation. Go to: http://www.cisco.com/go/telepresence/docs - and navigate in the right pane to find the TelePresence product documentation.

Table of Contents

Introduction
- About this guide .................................................. 4
- User documentation ............................................. 4
- Software download .............................................. 4

Connecting to the codec
- Basic setup when connecting to Codec C90 ............ 6

The physical interface
- The front panel .................................................. 8
- Rear panel sockets overview ................................. 9
- The Video Input Matrix ......................................... 10
  - About the matrix ............................................ 10
  - Configure the video inputs ................................. 10
  - The Advanced configuration menu .................. 10
  - The API commands ........................................ 10
  - The default values ......................................... 10
- Video inputs .................................................... 11
  - Component 1-2 (Y-Pr-Pb) ................................. 11
  - HD-SDI 1-4 .................................................. 11
  - Composite 5 / S-Video (YC) 5 .......................... 11
  - HDMI 1-4 .................................................... 12
  - DVI-I 3 and 5 ............................................... 12
- Video input formats ............................................ 13
  - 4 x HDMI inputs, supported formats .................. 13
  - 4 x HD-SDI inputs, supported formats ............... 13
  - 2 x DVI-I inputs, supported formats ................. 13
  - 2 x YPbPr inputs, supported formats ............... 13
  - 1 x S-Video/Composite input, supported formats .... 13

Video outputs .................................................... 14
- HDMI 1 and 3 ................................................. 14
- DVI-I 2 and 4 ............................................... 14
- Composite 5 .................................................. 14
- Video output formats ........................................ 14
  - 2 x HDMI and 2 x DVI-I outputs, supported formats .. 14
  - 1 x Composite output, supported formats ........... 14
- Levels ......................................................... 14

Audio inputs ................................................. 15
- Microphone/Line In 1-8 (XLR) ........................... 15
- HDMI In 3, 4 .................................................. 15
- Line In 1-4 (RCA) .......................................... 16

Audio outputs .............................................. 17
- Line Out 5–6 (XLR) ......................................... 17
- HDMI Out 1, 3 ............................................. 17
- Line Out 1–4 (RCA) ...................................... 18

Audio signal levels tables ..................................... 19

Audio hardware information table ....................... 20

Volume control table ........................................ 20

Network connectors .......................................... 21
- Ethernet interface .......................................... 21

COM port and Camera Control port .................. 22
- COM port .................................................... 22
- Camera Control port .................................... 22

Power .......................................................... 23
- Power socket ............................................... 23
- Power switch ............................................. 23
- Chassis grounding ....................................... 23

GPIO and other connectors .............................. 24
- GPIO ......................................................... 24
- USB .......................................................... 24
- T Link ....................................................... 24
Chapter 1

Introduction
About this guide

The purpose of this document is to describe the physical interface for the Codec C Series listed below:

- Cisco TelePresence System Codec C90

User documentation

Go to: [http://www.cisco.com/go/telepresence/docs](http://www.cisco.com/go/telepresence/docs)

Software download

Chapter 2

Connecting to the codec
Basic setup when connecting to Codec C90

The illustration shows you the basic setup when connecting the monitor, PC, camera, microphone, loudspeakers (if applicable), LAN and line voltage to your codec.

1. First connect the cables, then turn the codec on.
2. Make sure the codec has been switched off and disconnected from the line voltage whenever connecting or disconnecting other equipment.

- **Power Switch**
- **Mains Power Cable**
- **LAN/Ethernet**
- **Microphone**
- **OPTIONAL: Video from PC**
- **OPTIONAL: Audio from PC**
- **OPTIONAL: Loudspeakers**
- **OPTIONAL: Main camera: Camera Control to PrecisionHD 1080p**
- **OPTIONAL: Main camera: Video from PrecisionHD 1080p**
- **OPTIONAL: Dual monitor setup**
  - Connect the second monitor to HDMI 3
  - Connect the second camera (extra camera not included).
  - Extra camera will require separate power supply and control cabling. Consult the documentation supplied with the extra camera for details.

The main connectors for basic setup are highlighted in orange.
Chapter 3

The physical interface
The front panel

There are four LED’s in the front of the Codec:

- **Power** - The POWER LED turns ON when power is connected, otherwise OFF
- **Call** - The CALL LED turns ON when there are active calls on the codec, otherwise OFF
- **Infrared** - The IR LED flashes when infrared signals are received
- **Alarm** - The ALARM LED turns ON when there is no connection to the network, otherwise OFF
Rear panel sockets overview

The Codec C90 provides great flexibility for the connection of audio and video equipment. The illustration below shows the rear panel of the Codec C90.

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Outputs</th>
<th>Basic Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>The main connectors for basic setup are highlighted in orange.</td>
</tr>
</tbody>
</table>

**Video sockets**

The video input sockets comprise:
- 4 x HDMI
- 4 x HD-SDI
- 2 x DVI-I
- 2 x Analog Component (Y-Pr-Pb)
- 1 x Composite or 1xS-Video(YC)

The video output sockets comprise:
- 2 x HDMI
- 2 x DVI-I
- 1 x Composite

**Audio sockets**

The audio input sockets comprise:
- 8 x XLR Female - Microphone/Line In
- 4 x RCA - Line In (1 Left, 2 Right, 3 Left, 4 Right)
- 2 x HDMI

The audio output sockets comprise:
- 2 x XLR Male - Line Out
- 4 x RCA - 1 Left (SPDIF), 2 Right, 3 Left (SPDIF), 4 Right
- 2 x HDMI

**Other sockets**

The other sockets comprise:
- Ethernet 1 and Ethernet 2
- COM - Serial data port
- Camera control, serial port
- Power socket
- Grounding - Chassis grounding
- Power On/Off switch
- GPIO-General purpose Input/Output
- USB Host*, USB Device*, T Link*

* For future use

The following pages give a detailed description of the rear panel sockets and connectors.
The Video Input Matrix

The video input matrix is found at the underside side of the codec. The matrix illustrates the combinations in which the video inputs can be connected.

About the matrix

Only one video input source from each row can be active at any time.

The numbers in the left column represents the Video Input Sources 1–5. The main connectors, which are used in basic setup, are marked in orange color on the codec.

Note that the Comp. 5 and S-Video (YC) 5 inputs uses the same physical connectors and can not be connected at the same time.

Configure the video inputs

You can configure the video input settings from the Advanced configuration menu or by running API commands.

The Advanced configuration menu

Go to the on screen menu to configure the video input sources.

- Navigate to: Settings > Advanced > Advanced Configuration > Video > Input > Source 1. Configure the video input connectors, quality and name. See the video input matrix. Only one video input source from each row in the matrix, can be active at any time.
- Navigate to: Settings > Advanced > Advanced Configuration > Video > MainVideoSource. Configure the main video source.
- Navigate to: Settings > Advanced > Advanced Configuration > Video > DefaultPresentationSource. Configure the default presentation source.

The API commands

Open a telnet or ssh session, to the codec, to issue the API commands.

Configure the video input connectors. See the video input matrix. Only one video input source from each row in the matrix, can be active at any time:

- xconfiguration video input source 1 connector: hdmi
- xconfiguration video input source 2 connector: hdmi
- xconfiguration video input source 3 connector: dvi
- xconfiguration video input source 4 connector: hdmi
- xconfiguration video input source 5 connector: dvi

Configure the video quality and define a name of the video inputs 1 to 5:

- xconfiguration video input source 1 quality: motion
- xconfiguration video input source 2 quality: motion
- xconfiguration video input source 3 quality: sharpness
- xconfiguration video input source 4 quality: motion
- xconfiguration video input source 5 quality: sharpness

Configure the main video source. Here, the main video source is the camera, connected to video input source 1:

- xconfiguration video mainvideosource: 1

Configure the default presentation source. Here, the default presentation source is a PC, and the PC is connected to video input source 3 connector:

- xconfiguration video defaultpresentationsource: 3

The default values

- Video Input Source 1 Connector: HDMI
- Video Input Source 2 Connector: HDMI
- Video Input Source 3 Connector: DVI
- Video Input Source 4 Connector: HDMI
- Video Input Source 5 Connector: DVI
- Video Input Source 1 Name: “Main Camera”
- Video Input Source 2 Name: “Secondary Camera”
- Video Input Source 3 Name: “PC”
- Video Input Source 4 Name: “DVD”
- Video Input Source 5 Name: “Document Camera”
- Video Input Source 1 Quality: Motion
- Video Input Source 2 Quality: Motion
- Video Input Source 3 Quality: Sharpness
- Video Input Source 4 Quality: Motion
- Video Input Source 5 Quality: Sharpness
- Video MainVideoSource: 1
- Video DefaultPresentationSource: 3
Video inputs
All video inputs can not be active at the same time. Please refer to the Video Input Matrix on the previous page to see an overview.

Component 1–2 (Y-Pr-Pb)
2 x 3 BNC sockets, analog video input 1, 2. There are three BNC connectors for each Component interface; Y (luma), Pr (red), Pb (blue).
Typical use: Camera, DVD and Content player.

HD-SDI 1–4
4 x BNC sockets, digital video input 1, 2, 3, 4. Typical use: Cameras.

Composite 5 / S-Video (YC) 5
2 x BNC sockets, analog video input 5. The S-Video (YC) and the composite inputs use the same physical connectors, and will not be able to be connected at the same time.
- S-Video 5 - Connect to the Y/Comp 5 (luma) and C 5 (chroma) connectors
- Composite 5 - Connect to Comp 5 connector
Typical use: Camera and DVD.

Levels
HD-SDI
- 0.8 Vpp, 75 Ω
- SMPTE 292M (1.485, 1.485/1.001 Gbps)
Y-Pb-Pr
- Y: 1V Vpp, 75 Ω
- Pb: 0.7 Vpp, 75 Ω
- Pr: 0.7 Vpp, 75 Ω
Composite, 1 Vpp, 75 Ω
S-Video (YC)
- Y: 1 Vpp, 75 Ω
- C (PAL): 0.3 Vpp, 75 Ω
- C (NTSC): 0.28 Vpp, 75 Ω

BNC pin-out
External view of socket
GND
Video inputs, continued...
All video inputs can not be active at the same time. Please refer to the Video Input Matrix (two pages back) to see an overview.

HDMI 1–4
4 x HDMI sockets, digital video input 1–4. Audio input on 3 and 4.
HDMI - High Definition Multimedia Interface (digital, sound & picture)
Typical use: Camera, DVD, PC.
Main connector. The HDMI 1 input is the main connector to the PrecisionHD 1080p camera.

DVI-I 3 and 5
2 x DVI-I sockets, digital/analog video input 3, 5.
- DVI-D
- DVI-A (Analog RGB/VGA)
- DVI-A Analog component/YPbPr
DVI-I - Digital Video Interface - Integrated (digital DVI-D and analog DVI-A)
Typical use: Two digital video inputs for PC presentations or used for the PrecisionHD camera.
Main connector. The DVI-I 3 is the main connector for PC input.

HDMI Pin-out

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T.M.D.S. Data 2+</td>
<td>11</td>
<td>T.M.D.S. Clock Shield</td>
</tr>
<tr>
<td>2</td>
<td>T.M.D.S. Data 2 Shield</td>
<td>12</td>
<td>T.M.D.S. Clock-</td>
</tr>
<tr>
<td>3</td>
<td>T.M.D.S. Data 2-</td>
<td>13</td>
<td>CEC</td>
</tr>
<tr>
<td>4</td>
<td>T.M.D.S. Data 1</td>
<td>14</td>
<td>Reserved (N.C. on device)</td>
</tr>
<tr>
<td>5</td>
<td>T.M.D.S. Data 1 Shield</td>
<td>15</td>
<td>SCL</td>
</tr>
<tr>
<td>6</td>
<td>T.M.D.S. Data 1-</td>
<td>16</td>
<td>SDA</td>
</tr>
<tr>
<td>7</td>
<td>T.M.D.S. Data 0</td>
<td>17</td>
<td>DDC/CEC Ground</td>
</tr>
<tr>
<td>8</td>
<td>T.M.D.S. Data 0 Shield</td>
<td>18</td>
<td>+5 V Power (max 50 mA)</td>
</tr>
<tr>
<td>9</td>
<td>T.M.D.S. Data 0-</td>
<td>19</td>
<td>Hot Plug Detect</td>
</tr>
<tr>
<td>10</td>
<td>T.M.D.S. Clock+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Video input formats

#### 4 x HDMI inputs, supported formats
- 1920 x 1080@60, 59.94 Hz (1080p60)
- 1920 x 1080@50 Hz (1080p50)
- 1920 x 1080@30, 29.97 Hz (1080p30)
- 1920 x 1080@25 Hz (1080p25)
- 1920 x 1080@24, 23.97 Hz (1080p24)
- 1920 x 1200@50 Hz (WUXGA)
- 1680 x 1050@60 Hz (WSXGA+)
- 1600 x 1200@50, 60 Hz (UXGA)
- 1440 X 900@60 Hz (WXGA+)
- 1400 x 1050@60, 75 Hz
- 1366 x 768@60 Hz
- 1360 x 768@60 Hz
- 1280 x 1024@60, 75, 85 Hz (SXGA)
- 1280 x 960@60, 85 Hz
- 1280 x 800@60 Hz (WXGA)
- 1280 x 768@60, 75, 85 Hz (WXGA)
- 1280 x 720@60, 59.94 Hz (720p60)
- 1280 x 720@50 Hz (720p50)
- 1152 x 864@75 Hz
- 1024 x 768@60, 70, 75, 85 Hz (XGA)
- 848 x 480@60 Hz
- 800 x 600@60, 60, 72, 75, 85 Hz (SVGA)
- 720 x 576@50 Hz (576p50)
- 720 x 480@60, 59.94 Hz (480p60)
- 640 x 480@60, 72, 75, 85 Hz (VGA)

#### 4 x HD-SDI inputs, supported formats

- 1920 x 1080@30 Hz (1080p30)
- 1920 x 1080@25 Hz (1080p25)
- 1280 x 720@60 Hz (720p60)
- 1280 x 720@50 Hz (720p50)
- 1280 x 720@30 Hz (720p30)
- 1280 x 720@25 Hz (720p25)

#### 2 x DVI-I inputs, supported formats

- Digital (DVI-D)
  - Same as HDMI inputs, ref. above.

- Analog RGB (DVI-A)
  - 1920 x 1080@60 Hz (1080p60)
  - 1920 x 1200@50 Hz (WXUWA)
  - 1680 x 1050@60 Hz (WSXGA+)
  - 1600 x 1200@60 Hz (UXGA)
  - 1440 x 900@60 Hz (WXGA+)
  - 1400 x 1050@60, 75 Hz
  - 1366 x 768@60 Hz
  - 1360 x 768@60 Hz
  - 1280 x 1024@60, 75, 85 Hz (SXGA)
  - 1280 x 960@60, 85 Hz
  - 1280 x 800@60 Hz (WXGA)
  - 1280 x 768@60, 75, 85 Hz (WXGA)
  - 1280 x 720@60, 59.94 Hz (720p60)
  - 1280 x 720@50 Hz (720p50)
  - 1152 x 864@75 Hz
  - 1024 x 768@60, 70, 75, 85 Hz (XGA)
  - 848 x 480@60 Hz
  - 800 x 600@60, 60, 72, 75, 85 Hz (SVGA)
  - 720 x 576@50 Hz (576p50)
  - 720 x 480@60, 59.94 Hz (480p60)
  - 640 x 480@60, 72, 75, 85 Hz (VGA)

- Analog YPbPr (DVI-A)
  - Same as YPbPr inputs, ref. below.

- Extended Display Identification Data (EDID)

#### 2 x YPbPr inputs, supported formats

- 1920 x 1080@60 Hz (1080p60)
- 1920 x 1080@50 Hz (1080p50)
- 1920 x 1080@30 Hz (1080p30)
- 1920 x 1080@25 Hz (1080p25)
- 1280 x 720@60 Hz (720p60)
- 1280 x 720@50 Hz (720p50)
- 1280 x 720@30 Hz (720p30)
- 1280 x 720@25 Hz (720p25)
- 720 x 576@50 Hz (576p50)
- 720 x 480@60 Hz (480p60)

#### 1 x S-Video/Composite input, supported formats

- PAL/NTSC
Video outputs

HDMI 1 and 3
2 x HDMI sockets, digital video and audio output 1, 3.
HDMI - High Definition Multimedia Interface
(digital, sound & picture).
Typical use: Monitor, recording device.
Main connector. The HDMI output 1 is the main connector to the monitor.
Dual monitor. Dual output is provided on HDMI output 3.

DVI-I 2 and 4
2 x DVI-I sockets, digital/analog video output 2, 4.
- DVI-D.
- DVI-A (Analog RGB / VGA).
Typical use: Monitors.

Composite 5
1 x BNC sockets, analog video output 5.
Typical use: Monitor.

Video output formats

2 x HDMI and 2 x DVI-I outputs, supported formats
- 1920 x 1080@60 Hz (1080p60)
- 1920 x 1200@60Hz (WUXGA)
- 1600 x 1200@60 Hz (UXGA)
- 1366 x 768@60 Hz
- 1360 x 768@60 Hz
- 1280 x 720@60 Hz (720p60)
- 1280 x 1024@60 Hz (SXGA)
- 1280 x 768@60 Hz (WXGA)
- 1024 x 768@60 Hz (XGA)
- 800 x 600@60 Hz (SVGA)
- 640 x 480@60 Hz (VGA)

VESA Monitor Power Management

1 x Composite output, supported formats
BNC Connector
- PAL/NTSC

Levels
Composite: 1 Vpp, 75 Ω
Audio inputs
Unused, but connected audio inputs must be set to Off to avoid unwanted audio/noise.

Microphone/Line In 1–8 (XLR)
8 x Balanced XLR sockets, audio input 1–8. Main connector. The Microphone/Line In 1 is the main connector for the microphone. All eight microphone inputs are for balanced electret microphones, 48V phantom powered via XLR connectors. The phantom powering of all eight XLR sockets can be individually switched off. The input will then be a balanced line level input. All Microphone/Line In 1–8 are equipped with acoustic echo canceller. Use Microphone/Line In 1–8 to connect to an external microphone amplifier or an external mixer. Default configuration. In default configuration, all Microphone/Line In inputs are enabled and configured as microphones.

HDMI In 3, 4
2 x HDMI connectors, audio input 3, 4. Typical use: Use HDMI In 3 or 4 (2–8 channels) to connect to external playback devices as DVD players. Each input support up to two channels at 48kHz sampling rate.

XLR pin-out
External view of socket
1. Pin 1: Gnd
2. Pin 2: Hot
3. Pin 3: Cold/neutral

HDMI pin-out
External view of socket
1. Pin 16
2. Pin 17
3. Pin 18
4. Pin 19

Please refer to previous page for pin-out scheme.
Audio inputs, continued...

Unused, but connected audio inputs must be set to Off to avoid unwanted audio/noise.

Line In 1–4 (RCA)

4 x RCA sockets, audio input 1–4
Audio Line In 1–4 are used when connecting to PC and to external playback devices, such as VCR's or DVD players.
Main connectors. The Line In 1 (left) and Line In 2 (right) are the main connectors to a PC.
Stereo. For systems with stereo I/O the audio inputs can be configured in stereo pairs:
- Connect the left channel to Line In 1 or 3
- Connect the right channel to Line In 2 or 4
Default configuration for Line In 1–2. In the default configuration Line In 1 and 2 are configured as stereo inputs for external playback devices, such as a PC.
Default configuration for Line In 3–4. In the default configuration Line In 3 and 4 are configured as stereo input pairs. The two inputs are paired with Line Out 3 and 4 respectively.
This pairing will avoid feedback situations that can arise when playback/recording devices are in stand-by mode (Loop suppression).
Line In 3 and 4 are used with external playback devices as VCR's and DVD players.
Audio outputs

Line Out 5–6 (XLR)
2 x Balanced XLR sockets, audio output 5–6. Audio Line Out 5–6 are balanced outputs, for connection to balanced speakers. Default configuration. In default configuration Line Out 5 is configured as Left speaker, and Line Out 6 is configured as right speaker.

HDMI Out 1, 3
2 x HDMI connectors, audio out 1, 3
Use HDMI Out 1 to connect to a flat screen with speakers. HDMI 1 will provide stereo audio speaker signals at 48kHz.
Use HDMI Out 3 to connect to a DVD recorder. HDMI will provide stereo line output signals at 48kHz. Includes local microphones.
Main connector. The HDMI output 1 is the main connector to the monitor.
HDMI 1. Audio from far end and PC.
HDMI 3. All audio mixed together for recordings.

What is a Line output
A Line output consists of all signals from the local side and all signals from the far end side.

What is a Speaker output
A Speaker output consists of all signals from the local side, except microphones, and all signals from the far end side.

Left channel
The Left channel consists of all the Left channel and Mono signals.

Right channel
The Right channel consists of all the Right channel and Mono signals.

XLR pin-out
External view of socket

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gnd</td>
</tr>
<tr>
<td>2</td>
<td>Hot</td>
</tr>
<tr>
<td>3</td>
<td>Cold/neutral</td>
</tr>
</tbody>
</table>

XLR - Electrical Connector (Cannon XL series with Rubber compound)
Audio outputs, *continued...*

**Line Out 1–4 (RCA)**

4xRCA sockets, audio output 1-4
Can be configured as two stereo pairs.
Main connectors. Line Out 1 (left) and Line Out 2 (right) are the main connectors to the local loudspeaker system.
The local loudspeaker system may or may not include the DNAM (Digital Natural Audio Module).
Default configuration Line Out 1-2. In default configuration, Line Out 1 and 2 are configured as stereo speakers.
if a DNAM is present or SPDIF is active on Line Out 1, then Line Out 1 provides a digital stereo speaker signal and Line Out 2 is not active.
Default configuration Line Out 3-4. In default configuration, Line Out 3 and 4 are configured as stereo line out for external recording devices as VCR’s or DVD recorders.
if a DNAM is present or SPDIF is active on Line Out 3, then Line Out 3 provides a digital stereo speaker signal and Line Out 4 is not active.

**SPDIF** - Sony/Philips Digital Interface, used by the Digital Natural Audio Module.

**Line Out 1-2**

Main connectors. Line Out 1 (left) and Line Out 2 (right) are the main connectors to the local loudspeaker system.

The local loudspeaker system may or may not include the DNAM (Digital Natural Audio Module).

Default configuration Line Out 1-2. In default configuration, Line Out 1 and 2 are configured as stereo speakers.

if a DNAM is present or SPDIF is active on Line Out 1, then Line Out 1 provides a digital stereo speaker signal and Line Out 2 is not active.

**Line Out 3-4**

Default configuration Line Out 3-4. In default configuration, Line Out 3 and 4 are configured as stereo line out for external recording devices as VCR’s or DVD recorders.

if a DNAM is present or SPDIF is active on Line Out 3, then Line Out 3 provides a digital stereo speaker signal and Line Out 4 is not active.

**SPDIF** - Sony/Philips Digital Interface, used by the Digital Natural Audio Module.

**RCA pin-out**

External view of socket

<table>
<thead>
<tr>
<th>Signal</th>
<th>GND</th>
</tr>
</thead>
</table>

**RCA** - Phono Plug (the Radio Corporation of America)

**What is a Line output**

A Line output consists of all signals from local side and all signals from far end side.

**What is a Speaker output**

A Speaker output consists of all signals from local side, except microphones, and all signals from far end side.

**Left channel**

The Left channel consists of all Left channel and Mono signals.

**Right channel**

The Right channel consists of all Right channel and Mono signals.
### Audio signal levels tables

#### Microphone Inputs 1 to 8

<table>
<thead>
<tr>
<th>Signal levels [dB]</th>
<th>Clipping level [mVpp]</th>
<th>Nominal level [dBu]</th>
<th>Level setting [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>275.0</td>
<td>-18.0</td>
<td>-36.0</td>
</tr>
<tr>
<td>1.0</td>
<td>245.1</td>
<td>-19.0</td>
<td>-37.0</td>
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<td>2.0</td>
<td>218.4</td>
<td>-20.0</td>
<td>-38.0</td>
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<td>3.0</td>
<td>194.7</td>
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<td>4.0</td>
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<td>16.0</td>
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<td>-40.0</td>
<td>-58.0</td>
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<td>23.0</td>
<td>19.5</td>
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<td>17.4</td>
<td>-42.0</td>
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</table>

#### Line Inputs 1 to 8

<table>
<thead>
<tr>
<th>Signal levels [dB]</th>
<th>Clipping level [Vpp]</th>
<th>Nominal level [dBu]</th>
<th>Level setting [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>34.7</td>
<td>24.0</td>
<td>6.0</td>
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<td>1.0</td>
<td>31.9</td>
<td>23.0</td>
<td>5.0</td>
</tr>
<tr>
<td>2.0</td>
<td>27.6</td>
<td>22.0</td>
<td>4.0</td>
</tr>
<tr>
<td>3.0</td>
<td>24.6</td>
<td>21.0</td>
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<td>4.0</td>
<td>21.9</td>
<td>20.0</td>
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<td>5.0</td>
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<td>8.0</td>
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<td>9.0</td>
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<td>-3.0</td>
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<tr>
<td>10.0</td>
<td>11.0</td>
<td>14.0</td>
<td>-4.0</td>
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<tr>
<td>11.0</td>
<td>9.8</td>
<td>13.0</td>
<td>-5.0</td>
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<td>-7.0</td>
</tr>
<tr>
<td>14.0</td>
<td>6.9</td>
<td>10.0</td>
<td>-8.0</td>
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<tr>
<td>15.0</td>
<td>6.2</td>
<td>9.0</td>
<td>-9.0</td>
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<tr>
<td>16.0</td>
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<td>-10.0</td>
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<td>17.0</td>
<td>4.9</td>
<td>7.0</td>
<td>-11.0</td>
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<td>18.0</td>
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<td>-12.0</td>
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<td>2.8</td>
<td>2.0</td>
<td>-16.0</td>
</tr>
<tr>
<td>23.0</td>
<td>2.5</td>
<td>1.0</td>
<td>-17.0</td>
</tr>
<tr>
<td>24.0</td>
<td>2.2</td>
<td>0.0</td>
<td>-18.0</td>
</tr>
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</table>

#### Line Outputs 5 to 6

<table>
<thead>
<tr>
<th>Signal levels [dB]</th>
<th>Clipping level [Vpp]</th>
<th>Nominal level [dBu]</th>
<th>Level setting [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td>-24.0</td>
<td>2.2</td>
<td>0.0</td>
<td>-18.0</td>
</tr>
<tr>
<td>-23.0</td>
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<td>1.0</td>
<td>-17.0</td>
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<tr>
<td>-22.0</td>
<td>2.8</td>
<td>2.0</td>
<td>-16.0</td>
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<tr>
<td>-21.9</td>
<td>3.1</td>
<td>3.0</td>
<td>-15.0</td>
</tr>
<tr>
<td>-20.0</td>
<td>3.5</td>
<td>4.0</td>
<td>-14.0</td>
</tr>
<tr>
<td>-19.9</td>
<td>3.9</td>
<td>5.0</td>
<td>-13.0</td>
</tr>
<tr>
<td>-18.0</td>
<td>4.4</td>
<td>6.0</td>
<td>-12.0</td>
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<tr>
<td>-17.9</td>
<td>4.9</td>
<td>7.0</td>
<td>-11.0</td>
</tr>
<tr>
<td>-16.0</td>
<td>5.5</td>
<td>8.0</td>
<td>-10.0</td>
</tr>
<tr>
<td>-15.0</td>
<td>6.2</td>
<td>9.0</td>
<td>-9.0</td>
</tr>
<tr>
<td>-14.0</td>
<td>6.9</td>
<td>10.0</td>
<td>-8.0</td>
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<tr>
<td>-13.0</td>
<td>7.8</td>
<td>11.0</td>
<td>-7.0</td>
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<td>-12.0</td>
<td>8.7</td>
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<td>-6.0</td>
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<tr>
<td>-11.0</td>
<td>9.8</td>
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<td>-5.0</td>
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<tr>
<td>-10.0</td>
<td>11.0</td>
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<td>-4.0</td>
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<tr>
<td>-9.9</td>
<td>12.4</td>
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<td>-3.0</td>
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<td>-8.8</td>
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<td>-2.0</td>
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<tr>
<td>-7.9</td>
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<td>-1.0</td>
</tr>
<tr>
<td>-6.0</td>
<td>17.5</td>
<td>18.0</td>
<td>0.0</td>
</tr>
<tr>
<td>-5.0</td>
<td>19.6</td>
<td>19.0</td>
<td>1.0</td>
</tr>
<tr>
<td>-4.0</td>
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<td>2.0</td>
</tr>
<tr>
<td>-3.0</td>
<td>24.7</td>
<td>21.0</td>
<td>3.0</td>
</tr>
<tr>
<td>-2.0</td>
<td>27.7</td>
<td>22.0</td>
<td>4.0</td>
</tr>
<tr>
<td>-1.0</td>
<td>31.0</td>
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<tr>
<td>0.0</td>
<td>34.8</td>
<td>24.0</td>
<td>6.0</td>
</tr>
</tbody>
</table>

This specification is valid for Mic 1–8 inputs if Microphone Level setting is selected.

This specification is valid for Line 1–8 inputs if Line Level setting is selected.

Notes:
1. Default levels are marked with white text on black.
2. For the dBu value for input clipping level and absolute max output level, a sine waveform is assumed.
3. If numbers in dBV are required, dBV value is 2.2 dB lower than the dBu value. Example: -10 dBu equals -12.2 dBV.
Audio signal levels, cont...

Audio hardware information table

<table>
<thead>
<tr>
<th>Hardware Information</th>
<th>Mic 1–8</th>
<th>Line in 1–8</th>
<th>Line out 5–6</th>
<th>Line in 1–4</th>
<th>Line out 1–4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal type</td>
<td>Balanced</td>
<td>Balanced</td>
<td>Balanced</td>
<td>Unbalanced</td>
<td>Unbalanced</td>
</tr>
<tr>
<td>Connector (codec)</td>
<td>XLR-F</td>
<td>XLR-F</td>
<td>XLR-M</td>
<td>Female RCA/phono</td>
<td>Female RCA/phono</td>
</tr>
<tr>
<td>Input impedance</td>
<td>8100 Ohm (pin 2–3)</td>
<td>10k Ohm (pin 2–3)</td>
<td>10k Ohm</td>
<td>10k Ohm</td>
<td></td>
</tr>
<tr>
<td>Output impedance</td>
<td>50 Ohm</td>
<td>100 Ohm</td>
<td>100 Ohm</td>
<td>100 Ohm</td>
<td>100 Ohm</td>
</tr>
<tr>
<td>Max input level when set to Min input level</td>
<td>-18dBu/275mVpp</td>
<td>24dBu/34.7Vpp</td>
<td>18dBu/17.4Vpp</td>
<td>18dBu/17.4Vpp</td>
<td></td>
</tr>
<tr>
<td>Max input level when set to Max input level</td>
<td>-42dBu/35mVpp</td>
<td>0dBu/4.4Vpp</td>
<td>-6dBu/2.2Vpp</td>
<td>-6dBu/2.2Vpp</td>
<td></td>
</tr>
<tr>
<td>Max output level when set to Min output level</td>
<td>0dBu/4.4Vpp</td>
<td>-6dBu/2.2Vpp</td>
<td>-6dBu/2.2Vpp</td>
<td>-6dBu/2.2Vpp</td>
<td></td>
</tr>
<tr>
<td>Max output level when set to Max output level</td>
<td>24dBu/34.8Vpp</td>
<td>18dBu/17.4Vpp</td>
<td>18dBu/17.4Vpp</td>
<td>18dBu/17.4Vpp</td>
<td></td>
</tr>
<tr>
<td>Gain range</td>
<td>&lt;-24dB (24 steps of 1dB) -&gt;</td>
<td>&lt;-24dB (24 steps of 1dB) -&gt;</td>
<td>&lt;-24dB (24 steps of 1dB) -&gt;</td>
<td>&lt;-24dB (24 steps of 1dB) -&gt;</td>
<td></td>
</tr>
<tr>
<td>Phantom power</td>
<td>48 Volt +/- 2%</td>
<td>6800 Ohm</td>
<td>6800 Ohm</td>
<td>6800 Ohm</td>
<td></td>
</tr>
<tr>
<td>Phantom power resistor pin 1</td>
<td>6800 Ohm</td>
<td>6800 Ohm</td>
<td>6800 Ohm</td>
<td>6800 Ohm</td>
<td></td>
</tr>
<tr>
<td>Phantom power resistor pin 2</td>
<td>14mA</td>
<td>14mA</td>
<td>14mA</td>
<td>14mA</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Default levels are marked with white text on black
2. For the dBu value for input clipping level and absolute max output level, a sine waveform is assumed
3. If numbers in dBV are required, dBV value is 2.2 dB lower than the dBu value.
   Example: -10 dBu equals -12.2 dBV

Volume control table

<table>
<thead>
<tr>
<th>Volume control</th>
<th>Audio gain value</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>-34.5 dB</td>
</tr>
<tr>
<td>70</td>
<td>0.0 dB</td>
</tr>
<tr>
<td>100</td>
<td>15.0 dB</td>
</tr>
</tbody>
</table>

* The ring tone volume, which is displayed on screen when using the TRC5 remote control, goes from 0 to 20.

* This specification is valid for Mic 1–8 inputs if Microphone Level setting is selected
** This specification is valid for Line 1–8 inputs if Line Level setting is selected
Network connectors

Ethernet interface
2 × Gigabit Ethernet LAN (RJ-45 Jack) interface (GbE).
Ethernet 1: Main connector for network connection
Ethernet 2: For direct pairing with the Cisco TelePresence Touch for C Series.
COM port and Camera Control port

COM port
1 x COM (RS-232) data port for codec control and configuration through API commands.

Camera Control port
1 x Camera Control (RS-232) port for power and camera control (pan, tilt, zoom) using the VISCA™ protocol.
Main connector. The main camera is connected to the Camera Control port.
Power. Pin No. 4 on the Camera Control port provides 12V DC/1 A to the main camera.
If more than one camera is connected, only the first camera is powered from the codec. The additional cameras must be daisy chained by using a serial cable, and each will need an external power supply.
Additional cameras. For information about additional cameras, see the PrecisionHD Camera User Guide which is found on our web site, go to: http://www.cisco.com/go/telepresence/docs

*VISCA™ is a trademark of Sony Corporation

RS232 9 pin D-SUB pin-out
External view of socket

Pin-out—COM Port

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal name</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Carrier detect, CD</td>
<td>From DCE</td>
</tr>
<tr>
<td>2</td>
<td>Receive data, RXD</td>
<td>From DCE</td>
</tr>
<tr>
<td>3</td>
<td>Transmit data, TXD</td>
<td>To DCE</td>
</tr>
<tr>
<td>4</td>
<td>12V/1A</td>
<td>To the main camera</td>
</tr>
<tr>
<td>5</td>
<td>Signal GND</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Data set ready, DSR</td>
<td>From DCE</td>
</tr>
<tr>
<td>7</td>
<td>Ready to send, RTS</td>
<td>To DCE</td>
</tr>
<tr>
<td>8</td>
<td>Clear to send, CTS</td>
<td>From DCE</td>
</tr>
<tr>
<td>9</td>
<td>Ring indicator, RI</td>
<td>From DCE</td>
</tr>
</tbody>
</table>

Pin-out—VISCA™ camera control

RJ11, 8 pins shielded modular jack

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal name</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>+12V (presence 2.8mA current source when connected in daisy chain)</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>TXD (out)</td>
</tr>
<tr>
<td>5</td>
<td>NC (no connect)</td>
</tr>
<tr>
<td>4</td>
<td>NC (no connect)</td>
</tr>
<tr>
<td>3</td>
<td>RXD (in)</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>1</td>
<td>+12V</td>
</tr>
</tbody>
</table>

Pin-out—Camera cable

<table>
<thead>
<tr>
<th>Signal name</th>
<th>RJ-45 pin</th>
<th>D-SUB pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>+12V DC</td>
<td>1</td>
<td>Twisted</td>
</tr>
<tr>
<td>GND</td>
<td>2</td>
<td>pair 5</td>
</tr>
<tr>
<td>RX</td>
<td>3</td>
<td>Twisted</td>
</tr>
<tr>
<td>TX</td>
<td>6</td>
<td>pair 3</td>
</tr>
<tr>
<td>NC</td>
<td>4</td>
<td>Twisted</td>
</tr>
<tr>
<td>NC</td>
<td>5</td>
<td>pair 6</td>
</tr>
<tr>
<td>GND</td>
<td>7</td>
<td>Twisted</td>
</tr>
<tr>
<td>+12V DC</td>
<td>8</td>
<td>pair 4</td>
</tr>
</tbody>
</table>
Power

**Power socket**
Power Cord Socket.
Accepts 100–240V, 50/60Hz, 2.8A max.
**CAUTION!** This equipment must be grounded.

**Power switch**
Power Switch (On/Off)

**Chassis grounding**
For grounding of the chassis
GPIO and other connectors

GPIO
1 × GPIO (General Purpose Input/Output)
6 pins Phoenix plug, having 4 ports for On/Off control, GND and +12V.
You can configure input/output integrations by using pre-defined behavior. Exposure of states and commands for external control requires external programming.
For information about the API commands, see the API Guide for the codec, go to: http://www.cisco.com/go/telepresence/docs

Usage information
- A contact closure between the GND and a GPIO port pin is detected as a low input signal.
- When used for voltage inputs, the GPIO port detects it as:
  - Low signal for voltages 0 - 1 VDC
  - High signal for voltages 2 - 12 VDC
- When used for outputs, the GPIO port acts as a switch to GND, and is rated for 500mA @ 48V DC. The +12V pin provides +12 VDC, and is capable of sourcing up to 500mA.
- The GND connector is a common ground for all pins in the GPIO port.

USB
1 × USB Host
1 × USB Device
For future use.

T Link
2 × T Link, RJ45 connector.
The cable for T Link out must be shielded.
For future use.
On our web site you will find an overview of the worldwide Cisco contacts.

Go to: http://www.cisco.com/web/siteassets/contacts

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