The Physical Interface Guide

Cisco Telepresence System Codec C60
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.

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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 C60

User documentation
The user documentation for the Cisco TelePresence systems, running the TC software, have several guides suitable to various user groups:
- Video conference room primer
- Video conference room acoustics guidelines
- Installation guides for the TelePresence systems
- Software release notes for the TC software
- Getting started guide for the TelePresence systems
- User guide for the TelePresence systems
  - When using the Touch controller, ref. TC4.1 version of the user guide
  - When using the Remote Control, ref. TC4.0 version of the user guide
- Quick reference guides for the TelePresence systems
- Administrator guides for the TelePresence systems
- Camera user guide for the PrecisionHD cameras
- API reference guides for the Codec C Series
- TC Console user guide for the Codec C Series
- Physical interfaces guides for the Codec C Series
- Regulatory compliance and safety information guides
- Legal & license information for products using TC software

Download the user documentation
Go to: http://www.cisco.com/go/cseries-docs

Software download
Go to: http://www.cisco.com/cisco/software/navigator.html
Chapter 2

Connecting to the codec
Basic setup when connecting to Codec C60

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

Make sure the codec has been switched off and disconnected from the line voltage whenever connecting or disconnecting other equipment.
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 C60 provides great flexibility for the connection of audio and video equipment. The illustration below shows the rear panel of the Codec C60.

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Outputs</th>
<th>Basic Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>🔄</td>
<td>🔴</td>
<td></td>
</tr>
</tbody>
</table>

The main connectors for basic setup are highlighted in orange.

Video sockets
The video input sockets comprise:
- 2 x HDMI
- 2 x DVI-I
- 1 x Composite or 1 x S-Video(YC)

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

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

The audio output sockets comprise:
- 2 x RCA - 1 Left (SPDIF), 2 Right
- 1 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

Codec C60 Rear Panel

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

HDMI 1–2
2 x HDMI sockets, digital video input 1–2. There is audio input on HDMI 2 in.
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 2 and 3
2 x DVI-I sockets, digital/analog video input 2, 3.
- DVI-D
- DVI-A (Analog RGB / VGA)
- DVI-A Analogue 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.

Composite 3 / S-Video (YC) 3
2 BNC sockets, analog video input 3.
The S-Video (YC) and the composite inputs uses the same physical connectors, and will not be able to be connected at the same time.
- S-Video 3 - Connect to the Y/Comp 3 (luma) and C 3 (chroma) connectors
- Composite 3 - Connect to Comp 3 connector
Typical use: Camera and DVD.

Levels
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

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
<th>Pin</th>
<th>Assignment</th>
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<td>T.M.D.S. Clock-</td>
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<td>CEC</td>
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<td>Reserved (N.C. on device)</td>
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<td>6</td>
<td>T.M.D.S. Data 1-</td>
<td>16</td>
<td>SDA</td>
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<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>
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<td>9</td>
<td>T.M.D.S. Data 0-</td>
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<td>Hot Plug Detect</td>
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<tr>
<td>10</td>
<td>T.M.D.S. Clock+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Video input formats

#### 2 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 720@60 Hz (WXGA)
- 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@56, 60, 72, 75, 85 Hz (SVGA)
- 720 x 576@50 Hz
- 720 x 480@60, 59.94 Hz (480p60)
- 640 x 480@60, 72, 75, 85 Hz (VGA)

#### 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 (WUXGA)
  - 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 Hz (720p60)
  - 1152 x 864@75 Hz
  - 1024 x 768@60, 70, 75, 85 Hz (XGA)
  - 848 x 480@60 Hz
  - 800 x 600@56, 60, 72, 75, 85 Hz (SVGA)
  - 720 x 576@50 Hz
  - 720 x 480@60, 59.94 Hz (480p60)
  - 640 x 480@60, 72, 75, 85 Hz (VGA)

#### Analog YPbPr (DVI-A)
- 1920 x 1080@60 Hz (1080p60)
- 1920 x 1080@50 Hz (1080p50)
- 1920 x 1080@30 Hz (1080p30)
- 1920 x 1080@25 Hz (1080p25)
- 1920 x 1080@24 Hz (1080p24)
- 1280 x 720@60 Hz (720p60)
- 1280 x 720@50 Hz (720p50)
- 1280 x 720@30 Hz (720p30)
- 720 x 576@50 Hz (576p50)
- 720 x 480@60 Hz (480p60)

#### Extended Display Identification Data (EDID)
- PAL/NTSC

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

**HDMI 1**
1 x HDMI socket, digital video and audio output 1.
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.

**DVI-I 2**
1 x DVI-I socket, digital/analog video output 2.
- DVI-D.
- DVI-A (Analog RGB / VGA).
Typical use: Monitors.

**Composite 3**
1 x BNC sockets, analog video output 3.
Typical use: Monitor.

Video output formats

**1 x HDMI and 1 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@60Hz (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 should be set to Off to avoid unwanted audio/noise.

Microphone/Line In 1–4 (XLR)
4 x Balanced XLR sockets, audio input 1–4.
Main connector: The Microphone/Line In 1 is the main connector for the microphone.
All four microphone inputs are for balanced electret microphones, 48V phantom powered via XLR connectors.
The phantom powering of all four XLR sockets can be individually switched off. The input will then be a balanced line level input.
All Microphone/Line In 1–4 are equipped with acoustic echo canceller.
Use Microphone/Line In 1–4 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.

Line In 1–2 (RCA)
2 x RCA sockets, audio input 1–2
Audio Line In 1–2 are used when connecting to PC and to external playback devices, such as VCR's or DVD players.
Main connectors: The Line In 1 is the main connector 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
- Connect the right channel to Line In 2
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.
Audio outputs

Line Out 1-2 (RCA)
2 x RCA sockets, audio output 1-2
Can be configured as two stereo pairs.

**Main connector:** 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.

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

HDMI In 2
1 x HDMI connector with audio input.
Typical use: Use HDMI In 2 (2–8 channels) to connect to external playback devices as DVD players. Each input support up to two channels at 48kHz sampling rate.
Unused, but connected audio inputs should be set to Off to avoid unwanted audio/noise.

HDMI Out 1
1 x HDMI connector, audio out 1
Use HDMI Out 1 to connect to a flat screen with speakers. HDMI 1 will provide stereo audio speaker signals at 48kHz.
Main connector: The HDMI output 1 is the main connector to the monitor.
HDMI 1: Audio from far end and PC.

HDMI pin-out
External view of socket

Please refer to previous pages for pin-out scheme.
### Audio signal levels tables

#### Microphone Inputs 1 to 4

<table>
<thead>
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<th>Signal levels [dB]</th>
<th>Clipping level [mVpp]</th>
<th>[dBu]</th>
<th>[dBu]</th>
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#### Line Inputs 1 to 4

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<th>Signal levels [dB]</th>
<th>Clipping level [Vpp]</th>
<th>[dBu]</th>
<th>[dBu]</th>
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<td>-24.0</td>
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</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.

---

This specification is valid for Mic 1–4 inputs if Microphone Level setting is selected.

This specification is valid for Line 1–4 inputs if Line Level setting is selected.
Audio hardware information table

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

* This specification is valid for Mic 1–4 inputs if Microphone Level setting is selected
** This specification is valid for Line 1–4 inputs if Line Level setting is selected

Volume control table

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

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

RJ-45 Connector pin-out

Wiring diagram standard cable:
- 1 ———— 1
- 2 ———— 2
- 3 ———— 3
- 6 ———— 6

2 x Ethernet
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](http://www.cisco.com/go/telepresence/docs)

*VISCA™ is a trademark of Sony Corporation

---

### 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/1 A</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>

**RS232 9 pin D-SUB pin-out**

External view of socket

---

### 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 pair</td>
</tr>
<tr>
<td>GND</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>RX</td>
<td>3</td>
<td>Twisted pair</td>
</tr>
<tr>
<td>TX</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>NC</td>
<td>4</td>
<td>Twisted pair</td>
</tr>
<tr>
<td>NC</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>GND</td>
<td>7</td>
<td>Twisted pair</td>
</tr>
<tr>
<td>+12V DC</td>
<td>8</td>
<td></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, defined by API commands. 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/cseries-docs](http://www.cisco.com/go/cseries-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 @ 12V 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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Cisco Systems, Inc.
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