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CD-1 (OP-47/WST)

Closed Captioning Video Monitor
Adaptor

User Guide

Part Number 821015, Revision C

panorama®

the video division of  Wohler

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CD-1 User Guide

Introduction

Overview

The CD-1 displays open captions on most video monitors and includes a video test signal generator. It consists of a small, externally-powered unit that translates a 3G/HD/SD-SDI input containing closed captioning signaling into a burned-in 3G/HD/SD-SDI or DVI signal with open captions added to the picture.

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Safety Instructions

1. Read, keep, and follow all of these instructions; heed all warnings.
2. Do not use this equipment near water.
3. Use only a dry cloth to clean the equipment.
4. Do not block any ventilation openings. Install only in accordance with the instructions in the section entitled, “[Installation](#)” on [page 3](#).
5. Do not install near any heat source such as a radiator, heat register, amplifier, or stove.
6. Do not expose the equipment to rain or moisture.
7. Do not attempt to plug the unit into a two-blade outlet (with only two prongs of equal width).
8. Protect the power cord from being walked on or pinched, particularly at plug’s source on the equipment and at the socket.
9. Use only the attachments/accessories specified by the manufacturer.
10. Unplug the equipment during lightning storms or when unused for long periods of time.
11. Refer all servicing to qualified service personnel. Servicing will be required under all of the following conditions:
 - The equipment has been damaged in any way, such as when the power-supply cord or plug is damaged.
 - Liquid had been spilled or objects have fallen onto the equipment.
 - The equipment has been exposed to rain or moisture.
 - The equipment does not operate normally.
 - The equipment has been dropped.

Installation

Configuration

The unit is designed to be used as a table-top stand alone device or permanently mounted to a wall, shelf for frame. Two will fit side by side on a standard 19" rack shelf.

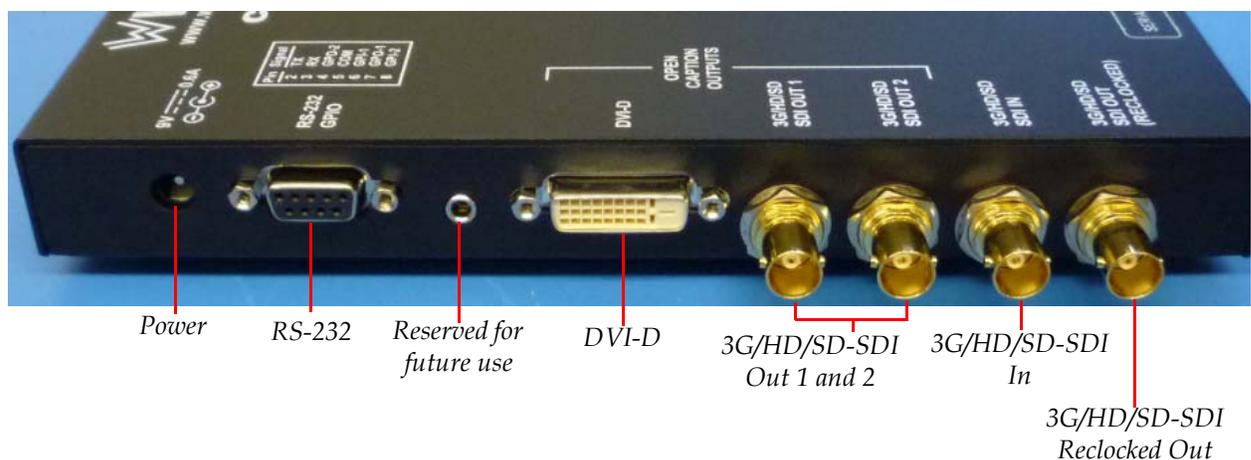
Power

The unit comes with a standard 9 VDC/1.5 A external power supply and connects to AC mains power source (15W, 100 to 240 VAC, 50/60Hz).

Cabling

1. Attach the power supply as described in [Power](#) above. Verify the **Power** LED is lit.
2. Connect a 3G/HD/SD-SDI signal to the **SDI In** (BNC) port.
3. Connect a DVI cable to the DVI connector to supply VGA, HDMI, or DVI-I monitors as shown in [Figure 1-1](#) below, or connect a cable from the **SDI Out 1** or **SDI Out 2** BNC to an SDI monitor input connector.

Figure 1-1 CD-1 Connectors



Important: VGA or HDMI monitors require adaptors not provided.

4. (Optional) Connect a cable from the SDI Out (Re-Clocked) to downstream equipment.

Operation

Displaying Open Captions

1. Turn on the video monitor and verify the monitor is receiving the video input.
2. Press the **Subtitles On/Off** button to send open captions to the video monitor.

Decoding Captions

1. Connect a serial cable between the RS-232 port and the serial port of a PC or laptop.
2. Launch a terminal emulation program such as Hyperterminal.
3. Set the COM port to 38400 baud, no parity, 8 data bits, and 1 stop bit.

Note: Caption data is not human-readable.

Displaying the Engineering Menu

To modify the register settings, you need to access the engineering menu. Refer to [Advanced Configuration on page 12](#) for details.

Displaying Test Single Patterns

1. Press the **TSG** button.

2. Press either the **Pattern +** or **Pattern —** buttons to cycle through the test signal patterns.
3. Press the **TSG** button again to change video modes. After all video modes have been displayed, pressing the **TSG** button again returns the unit to normal operating mode.

Features

- 3G/HD/SD-SDI multi-rate input
- Re-clocked 3G/HD/SD-SDI output
- Automatic detection and decode of WST or OP-47 subtitles
- Two identical, open caption 3G/HD/SD-SDI outputs
- DVI open caption output
- RS-232 output of decoded captions
- Seven video test signals
- One control input to enable/disable captions and one control output to indicate when captions are present. (Accessed from spare pins on the RS-232 connector.)

Accessories

- **Power Supply:** The CD-1 comes with an external power supply for use with 100 to 240 VAC +/-10% 50/60 Hz power with country-specific power plugs.
- **Mounting Hardware:** The CD-1 comes with both of the following:
 - Wall mount brackets to install the CD-1 on a wall
 - Rubber feet for table top use

Specifications

Physical and Technical Specifications

Table 1-1 lists the specifications for the CD-1.

Table 1-1 Monitor Specifications

Specifications	Value/Domain
Power	9 V DC external power supply, 100 to 240 V AC 50/60 Hz (included)
Power Requirements	9 V DC, 0.6 amps
Power Consumption	Approximately 5 W
Maximum PS Rating	9V, 60W
Dimensions (Without Peripherals)	8.5" x 4.5" x 1" (215.0 mm x 114.0 mm x 25.4 mm)
Shipping Weight	2 lbs. (.91 kg)
Inputs	<ul style="list-style-type: none"> • 1 3G/ HD/SD-SDI (BNC) • 1 Control Input (DB-9) • 1 RS-232 (DB-9)
Outputs	<ul style="list-style-type: none"> • 2 3G/HD/SD-SDI (BNC) • 1 3G/HD/SD-SDI (BNC) re-clocked loop-through • 1 DVI (burned-in captions) • 1 Control Output (DB-9)
Indicators	Power Test Screen Generation (TSG) Protocol (OP-47/WST)
Supplied Accessories	AC external power unit
Operating Temperature	32° F to 122° F (0° C to 50° C)
Screen Test Patterns	7

Video Compatibility Specifications

IMPORTANT: The DVI interface is only intended to function with the following formats shown in Table 1-2 below.

The DVI output enables video from either the SDI input or the internal test signal generator (TSG) to be displayed on a DVI-D equipped monitor.

Table 1-2 Compatibility

Video Mode	SDI Compatibility	DVI Compatibility
1080p50	Yes	Yes
1080p60	Yes	Yes
1035i	Yes	No
1080i50	Yes	Yes
1080i60	Yes	Yes
1080p30	Yes	Yes
1080p24	Yes	Yes
1080psf30, 1080psf25, 1080p25, 1080psf24	Yes	No
720p25	Yes	No
720p30	Yes	No
720p50	Yes	Yes
720p60	Yes	Yes
525i59.94Hz	Yes	No
625i50Hz	Yes	No

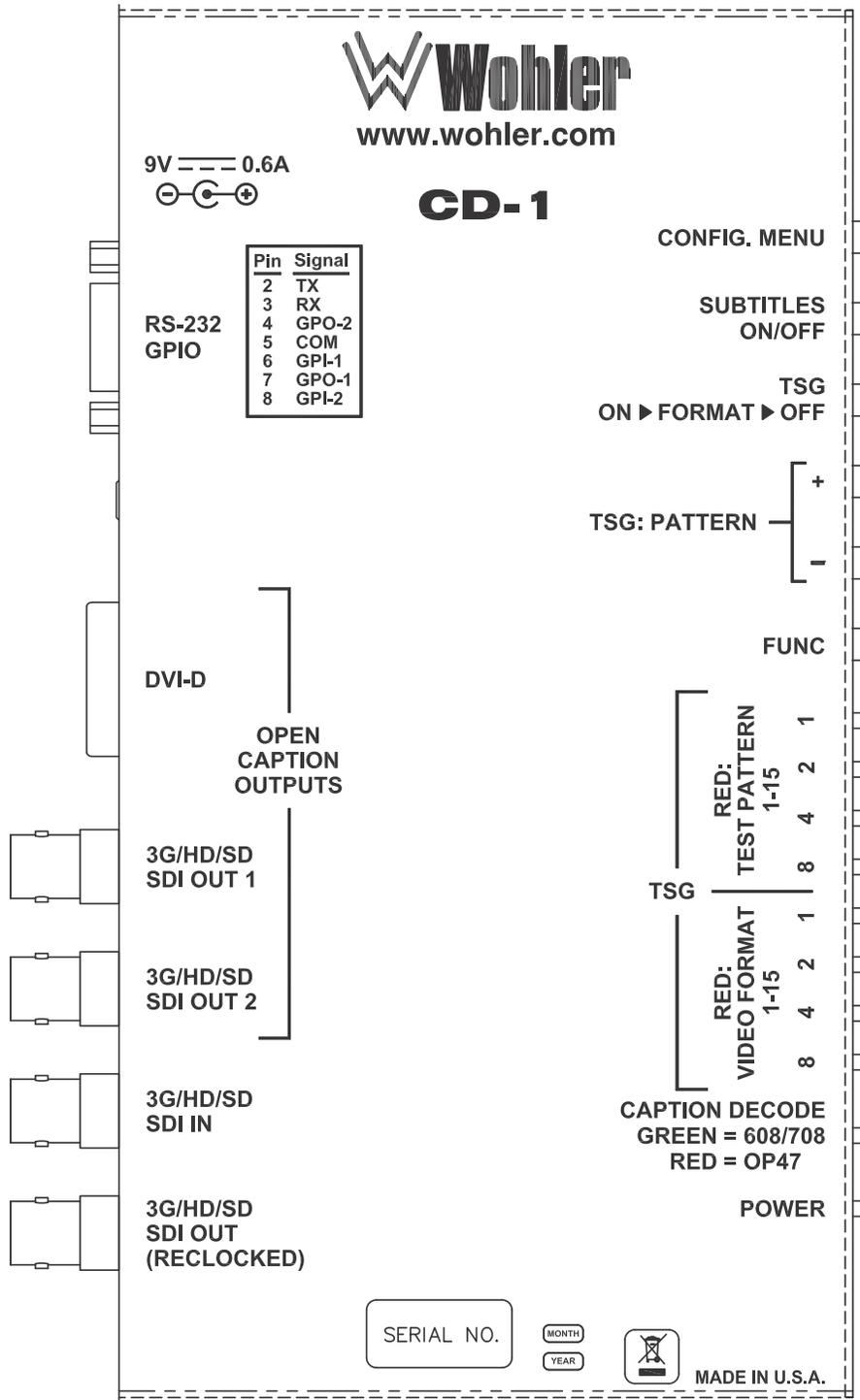
These are the formats provided by the test signal generator. Other formats provided at the SDI input *may* work, but are not guaranteed to.

IMPORTANT: The monitor connected to the DVI-D interface **MUST** be capable of displaying the video format output from the connector. Unlike a computer, which can scale the output to fit the size and shape of the monitor, the CD-1 outputs video directly without scaling. It is imperative that the user makes certain the monitor is capable of displaying the format of interest.

Front Panel Features

Figure 1-2 illustrates the front panel of the CD-1.

Figure 1-2 CD-1 Front Panel



Buttons

- **Config Menu:** Pressing and holding this button for 1.5 seconds will toggle the serial port interface between the CD-1's configuration menu and decoded caption data. When the configuration menu is active, the eight **TSG** LEDs display a green oscillating pattern.
- **Subtitles On/Off:** Toggles “burned-in” captions on and off (the **Caption Decode** LED will go off if the **Off** state has been selected).
- **TSG:** When the unit is first powered on, the TSG (test signal generator) is not active (video to SDI output and DVI is from the SDI input). Pressing this button will activate the **TSG**; pressing it again will change the video format being displayed by the **TSG**. When all of the video modes have been cycle through, a final push of this button will turn the **TSG** off again. While the **TSG** is active, the eight **TSG** LEDs indicate the video format being displayed and the active test pattern.
- **TSG: Pattern + and –:** When the **TSG** is active, pressing these buttons cycles forward and backward through the available test patterns.
- **Func:** This button is reserved for future use.

LED Indicators

- **Power:** Illuminated green when power is applied.
- **Caption Decode:** Off when subtitles have been turned off (see **Subtitles On/Off** button), yellow when subtitles on but no captions are being received, and red when OP-47 captions have been received. (The output driving this LED has a few seconds of delay, so the LED may be illuminated for a few seconds longer than the OP-47 captions are present.)
- **TSG LEDs:** When all are off (and power is applied), the CD-1 is passing video from the SDI input to the SDI and DVI outputs. When all display an oscillating green pattern, the CD-1 is in configuration mode (see **Config. Menu** button). When TSG is active (see TSG

button), some/all of the LEDs will be illuminated in red as listed below in [Table 1-3](#):

Table 1-3 TSG Video Formats (1 thru 15)

LED State				Format
8	4	2	1	
Off	Off	Off	On	1080i/60Hz
Off	Off	On	Off	1080i/50Hz
Off	Off	On	On	1080p/30Hz
Off	On	Off	Off	1080p/24Hz
Off	On	Off	On	720p/60Hz
Off	On	On	Off	720p/50Hz
On	On	On	Off	1080p/60Hz
On	On	On	On	1080p/50Hz

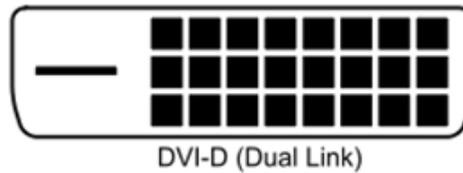
Table 1-4 TSG Test Pattern Formats (1 thru 15)

LED State				Pattern
8	4	2	1	
Off	Off	On	Off	Color Bars
Off	Off	On	On	Color Bars 75%
Off	On	Off	Off	Color Bars: Lower Third Red
Off	On	Off	On	Red
Off	On	On	Off	Green
Of	On	On	On	Blue
On	Off	Off	Off	Black

Connectors

- **DC (+9 V):** Connect the included standard power supply.
- **RS-232 (GPI/O):** This DB-9 connector is the interface to the user menu through which you can modify the functionality of the unit.
- **DVI-D:** Output jack connects to a DVI montior and requires an adaptor for monitors that have VGA or HDMI inputs. Refer to [Figure 1-3](#) below.

Figure 1–3 DVI-D Pin Configuration



- **SDI Out 1 and 2:** HD/SD-SDI output signal on BNC connectors.
- **SDI In:** HD/SD-SDI input signal on a BNC connector.
- **SDI Re-Clocked Out:** Re-clocked HD/SD-SDI output signal on a BNC connector.
- **RS-232 (DB-9 F):** This connector is used to configure the CD-1 and to retrieve caption data. Refer to [Table 1–5](#) below and [Figure 1–4](#) on page 11.

Table 1–5 RS-232 Pin-Out

Pin	Function
1	NC
2	RS-232 Tx Data
3	RS-232 Rx Data
4	Control Output 2 (not used)
5	GND
6	Control Input 1: Suppresses Captions
7	Control Output 1: Captions Present
8	Control Input 2: Control Input (not used)
9	NC

**Figure 1–4 RS-232 Pin Configuration
DB9 Connector Pin-Out**

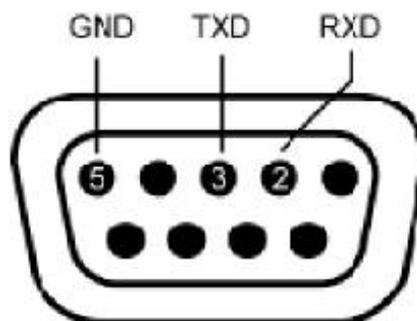


Table 1–6 CD-1 to PC (RS-232)

CD-1	DB9-F to PC DB9-M
2	Pin 2
3	Pin 3
5	Pin 5
1,4, 6 thru 9	NC

Important: Cables connecting the CD-1 to a PC should NOT connect any pins on the PC side other than 2, 3, and 5.

Advanced Configuration

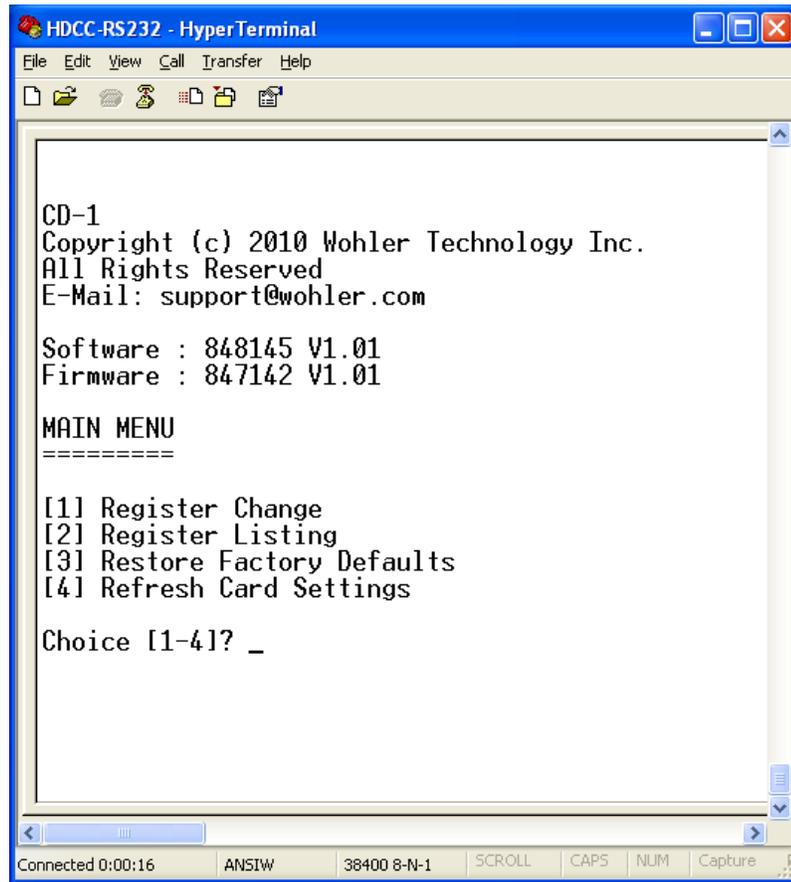
The CD-1 has a number of registers that allow you to configure various parameters (accessed from the RS-232 interface). You can make these changes from the engineering menu. To access the engineering **Main Menu**, follow the instructions below.

1. Connect a serial cable between the RS-232 port and the serial port of a PC or laptop.
2. Launch a terminal emulation program such as Hyperterminal.
3. Set the COM port to 38400, n, 8, 1.
4. Press and hold the **Config Menu** button for 1 to 2 seconds. The LEDs on the front panel will oscillate.
5. Press the Enter key to display the engineering menu shown in [Figure 1-5 on page 13](#).

Important: Please do not change the value of any register whose description reads, *Reserved for future use*. Modifying any of these values could cause the CD-1 to behave in unpredictable ways.

Note: All registers and register values are in hexadecimal unless otherwise indicated.

Figure 1–5 Main Menu



- Selecting **[1] Register Change** allows you to change the register values.
- Selecting **[2] Register Listing** from the **Main Menu** displays the register table. [Table 1–7 on page 13](#) provides descriptions for each register.

Table 1–7 Register Settings 00h to 0Fh

Register (Hex)	Description	Default (Hex)
00	OP-47 Line HD Field 1 Sets the actual Field-1 line number from which the OP-47 data will be decoded.	0C
01	OP-47 Line HD Field 2 Sets the actual Field-2 line number from which the OP-47 data will be decoded.	0C

Table 1–7 Register Settings 00h to 0Fh (Continued)

Register (Hex)	Description	Default (Hex)
02	WST Line SD Field 1 Sets the actual Field-1 line number line number from which the OP-47 data will be decoded. The WST Subtitle line complies with EBU ETS-300-706 Level 1 specifications.	15
03	WST Line SD Field 2 Sets the actual Field-2 line number from which the OP-47 data will be decoded. The WST Subtitle line complies with EBU ETS-300-706 Level 1 specifications.	15
04	Not Used	—
05	Not Used	—
06	Decoder Newfor Magazine Number Sets the magazine number that will be used by the monitoring subtitle decoder when decoding subtitles from either a HD or SD video stream.	15
07	Decoder Newfor Page Number Sets the page number that will be used by the monitoring subtitle decoder when decoding subtitles from either a HD or SD video stream.	01
08	Reserved for future Use	—
09	Reserved for future Use	—
0A	Reserved for future Use	—
0B	Reserved for future Use	—

- Selecting **[3] Restore Register Defaults** resets the CD-1 to its original factory settings.
- Selecting **[4] Refresh Card Settings** updates the registers in the hardware with the current register settings.

6. Repeat Step 4 on page 12 to return the serial port to decoding output.
7. To return to normal operation mode, press and hold the **Config Menu** button until the LEDs stop flashing.

Troubleshooting

If you cannot see the picture on an SDI output:

1. Verify the **Power** LED on the front panel of the CD-1 is lit.
2. Disconnect and then reconnect the video cables to and from the CD-1.
3. Verify the CD-1 is receiving a video signal on SDI or is in TSG mode.

If you can see the picture, but not the open captions:

1. Press the **Subtitles On/Off** switch once or twice to verify that the monitor is receiving open captions from the CD-1.
2. Try disconnecting the cable from the output and connecting it to the other output (not re-clocked) connector.

If you do not see output on the DVI-D display:

1. Verify the unit is connected to the monitor.
2. Verify the unit is not in TSG mode. If the unit is not in TSG mode, verify a signal is present on the SDI input. If so, verify the mode is supported by the monitor.
3. If the unit is in TSG mode, verify that the mode is supported by the monitor.

IMPORTANT: The monitor connected to the DVI-D interface **MUST** be capable of displaying the video format output from the connector. Unlike a computer, which can scale the output to fit the size and shape of the monitor, the CD-1 outputs video directly without scaling. It is imperative that the user makes certain the monitor is capable of displaying the format of interest.

Technical Functional Overview

Figure 1-6 on page 16 illustrates the overall functionality of the CD-1.

Figure 1-6 CD-1 Block Diagram

