Installation and Operation

The Extron RGB 440 is a 300 MHz universal analog computer-video and audio interface designed to connect workstations and PCs to large screen display/audio systems. With an Extron MBC (monitor break-out cable) or an MBC buffer, the computer’s local monitor may be used while the RGB/BNC output goes to a local monitor may be used while the RGB/BNC output goes to a large screen. Analog input can be from VGA, Mac, XGA, XGA-2, Quadrus, Sun, SGI, or another source. Contact Extron for information regarding specific computer-cable needs.

The RGB 440 may be mounted under, or on the side of, a table or desk using the included Under Desk Mounting Kit, as shown in figure 1 and as detailed in the kit’s documentation (68-461-01). Drill four pilot holes: front-to-back, 2.5 apart, and side-to-side, 6.45 apart.

Descriptions of front and rear panel LEDs, controls and connectors follow. The letters to the left of the descriptions match the circled letters in figure 2 below.

A. Power LED - On a power and video sync pulses are present.
B. Audio input connector - 3.5 mm, stereo (tip = L, ring = R, sleeve = ground).
C. Analog video input connector - Input connector for MBC buffer, LBC, or MBC cable from computer.
D. MBC Power output connector - Provides power for MBC buffer if required.
E. Termination switch - Provides 75 ohm video input termination if no local monitor is used.
F. H-Shift control - Shifts the image horizontally on remote display device.
G. Sync processing DIP switches
   Serr = Serration pulses enabled when up.
   DDSPP - Digital Display Sync Processing enabled when up.
H. Power input connector - The input voltage range is 12 to 24 volts AC or DC.
I. RGB BNC output connectors
J. Sync BNC output connectors
K. Audio output connector

Cable Connections

Installation of the RGB 440 using an MBC cable or an MBC buffer

For the following steps, use the diagram in figure 5A or 5B, whichever applies to your installation.

1. Turn off the computer and its monitor.
2. If desired, attach mounting brackets (Extron part #70-077-01, under-desk, or 70-077-02, through-desk).
3. Disconnect the local monitor cable from the computer and connect it to "A".

Using an MBC cable.

4. Connect the 9-pin connector from the MBC/MBC buffer to "BNC Power" on the RGB 440 (B). For an MBC buffer, connect the small plug at the same end of the cable to "MBC Power" on the RGB 440.
5. Connect the remaining MBC/MBC buffer connector to the computer’s video output connector (C).
6. Connect the PC audio output cable to the RGB 440 Audio input connector (D).
7. Connect the RGB 440 video output to the output device (E).
8. Apply power to the RGB 440, the CPU and its monitor, and the output devices.

Using an MBC buffer.

9. Connect the MBC/MBC buffer to a computer using figure 5B (E).
10. Connect the RGB 440 video output to the output device (E).

Installation of the RGB 440 using a 9-pin MBC cable or buffer

11. Connect the 9-pin MBC cable/buffer to "BNC Power" on the RGB 440 (B). For an MBC buffer, connect the small plug at the same end of the cable to "MBC Power" on the RGB 440.
12. Connect the remaining MBC/MBC buffer connector to the computer’s video output connector (C).
13. Connect the PC audio output cable to the RGB 440 Audio input connector (D).
14. Connect the RGB 440 video output to the output device (E).
15. Apply power to the RGB 440, the CPU and its monitor, and the output devices.

Figure 1

Figure 2

Sync processing switches

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Figure 3

Figure 4A

Figure 4B

Figure 4C

Figure 5A

Figure 5B

Figure 6

Jumper position guidelines

0.7V - Short cable runs
0.8V - Long cable runs, signal gain & peaking for all frequencies
0.9V - Long cable runs & high frequency video signals
High frequency signal boost and peaking compensates for high frequency signal loss due to cable capacitance and bandwidth loss.

Using the captive screw audio output connector

The RGB 440 Interface has a single 3.5 mm, captive screw receptacle along the bottom right side of the rear panel (H) as shown in figure 2. The audio connector has five contacts, and is labeled for left (L), right (R), polarity (+/-), and ground.

A 3.5 mm captive screw connector (part number 10-319-10) is supplied with the RGB 440. The connector must be wired to the output audio cables using the captive screws inside the connectors (figure 4A). The audio connector is then plugged into the output connector on the rear panel. Figure 4C shows three methods of wiring the output connector.

When making connections for the RGB 440 Interface from existing audio cables, see figure 4B. The round audio connectors are shown with the top one (tip and sleeve only) for unbalanced audio and the bottom one (tip, ring, and sleeve) for balanced audio. The ring, tip and sleeve markings are also used on the captive screw connector diagrams in figure 4C. Use these examples as a guide for making audio cables.

DIP switches

Video projectors of different types or from different manufacturers may have slightly different sync pulse requirements. DIP switches on the RGB 440 front panel (J) enable the user to modify output sync by enabling or disabling vertical sync serration pulses and enabling or disabling Digital Display Sync Processing (DDSP). The Sync processing switch module contains two DIP switches labeled SERR (Serr switch) and DDSP (right switch). The Serr switch in the up position (enabled) will result in the removal of serration pulses from the output composite sync signal (does not affect SDG, for H or V outputs). The DDSP switch in the up position (enabled) provides Digital Display Sync Processing, which may be required for digital display devices which exhibit an unstable display. With DDSP enabled, the H Shift control (F) on the front panel is defeated.

Jumpers

RGB analog signals passing through crossover cables may experience signal loss depending on the quality and length of the cable. The signal loss occurs across all frequencies but primarily higher frequencies. Boosting the signal by adding capacitors to each end of the cable can help. Jumpers located inside the RGB 440 (figure 5) provide a way to compensate for these losses.

To open the RGB 440, remove the mounting brackets (if attached), remove six screws on the sides (if not removed with the mounting brackets), one screw on the bottom, and two connector nuts as shown in figure 3.

There is one jumper header for each of the RGB color signals, J6 = red, J7 = green and J10 = blue. Each header provides three possible jumper positions: unity gain (0.7V p-p), 0.8V p-p, and 0.9V p-p.

Cable length along with video signal frequencies will have a big impact on the jumper settings. Set up the jumpers just prior to securing the RGB 440 in place.

Figure 4B - Using an MBC cable.

Figure 4C - Using an MBC buffer.
**Shield connections**

If shielded, twist pair wire such as that in Extron's Plenum Installation Cable (figure 8) is being used with the RGB 440 captive screw connector, the shield should be connected to connector pin 3 (the center pin) as shown in figure 7. The wires that make up the braid shield (see figure 8) should be separated and twisted together forming a large multi-strand wire, which is then inserted into the receptacle side of the connector. Unshielded, twisted pair wire must be insulated and secured to prevent short circuits.

The coax within the Plenum Installation Cable also contains a braid and foil shield which are normally connected to ground through their individual connectors (BNC, RCA, etc.). Exposed cable shields (braid, foil, etc.) are potential short circuit. Trim back and/or insulate shields with electrical tape or heat shrink.

**Video input**

- **Number/signal type**: 1 analog RGBHV, RGBS, RGsB
- **Connectors**: 6 BNC female
- **Nominal level**: Analog 0.7V p-p, 0.8V p-p, or 0.9V p-p w/ peaking
- **Impedance**: 75 ohms or Hi Z, switchable
- **Return loss**: 30dB @ 5 MHz
- **Input type**: Auto select RGBHV, RGBS, RGsB (accepts RGsB but does not strip sync from video)
- **Output type**: RGBHV at all times, RGBS at all times, RGsB only when input is RGsB
- **Gain**: 21V p-p to 5.5V p-p w/ 0.2VDC offset max.
- **Output level**: 4V to 5V p-p
- **Input impedance**: 10 kohms
- **Output impedance**: 75 ohms
- **Max. propagation delay**: 50 nS
- **Max. rise/fall time**: 2.5 nS
- **Polarity**: Positive or negative

**Audio input**

- **Number/type**: 1 stereo, unbalanced; 1Vrms (+4dBu), 20 Hz to 20 kHz
- **Connectors**: 1 3.5 mm stereo jack (2 channel), unbalanced; tip (R), ring (L), sleeve (ground)
- **Gain**: 0dB unbalanced, 0.95V p-p with 3dB peaking (0.9V)
- **Output level**: 6dB peaking (0.9V)
- **Bandwidth**: 300 MHz (-3dB)
- **Nominal level(s)**: Analog — 0.2V to 1.45V p-p
- **Gain error**: ±0.1dB channel to channel

**Audio output**

- **Number/type**: 1 buffered, stereo (2 channel), balanced or unbalanced
- **Connectors**: 1 3.5 mm captive screw connector, 5 pole
- **Gain**: 0dB unbalanced, 0.95V p-p with 3dB peaking (0.9V)
- **Drive (600 ohm)**: > +14dBu, balanced at stated %THD+N
- **Impedance**: 50 ohms unbalanced, 100 ohms balanced
- **Output noise level**: 500uV RMS
- **Max. output**: > +14dBu, balanced at rated %THD+N

**General**

- **Power supply**: 12 to 24 volts AC or DC (100 mA max)
- **Frequency response**: ±0.05dB @ 20 Hz to 20 kHz
- **THD + Noise**: 0.03% @ 1 kHz, 0.3% @ 20 kHz at rated max. output
- **S/N**: >90dB, output 14dBu, balanced

**Audio input/output**

- **Frequency response**: ±0.05dB @ 20 Hz to 20 kHz
- **THD + Noise**: 0.03% @ 1 kHz, 0.3% @ 20 kHz at rated max. output
- **S/N**: >90dB, output 14dBu, balanced

**Video input/output**

- **Number/signal type**: 1 analog RGBHV, RGBS, RGsB
- **Connectors**: 1 9-pin male for MBC cable or buffer
- **Nominal level**: Analog 0.7V p-p, 0.8V p-p, or 0.9V p-p w/ peaking
- **Impedance**: 75 ohms or Hi Z, switchable
- **Return loss**: 30dB @ 5 MHz
- **Input type**: Auto select RGBHV, RGBS, RGsB (accepts RGsB but does not strip sync from video)
- **Output type**: RGBHV at all times, RGBS at all times, RGsB only when input is RGsB
- **Gain**: 0dB unbalanced, 0.95V p-p with 3dB peaking (0.9V)
- **Output level**: 6dB peaking (0.9V)
- **Bandwidth**: 300 MHz (-3dB)
- **Nominal level(s)**: Analog — 0.2V to 1.45V p-p
- **Gain error**: ±0.1dB channel to channel

**Sync input/output**

- **Input type**: Autodetect RGBHV, RGBS, RGsB (accepts RGsB but does not strip sync from video)
- **Output type**: RGBHV at all times, RGBS at all times, RGsB only when input is RGsB
- **Input level**: 2V p-p to 5.5V p-p with ±0.2VDC offset max.
- **Output level**: 4V to 5V p-p
- **Input impedance**: 10 kohms
- **Output impedance**: 75 ohms
- **Max. propagation delay**: 50 nS
- **Max. rise/fall time**: 2.5 nS
- **Polarity**: Positive or negative

**Power**

The RGB 440 requires an external voltage source of 12 to 24 volts AC or DC (100 mA max). Polarity is not an issue, even if the power source is a DC voltage. Simply insert the power plug into the connector labeled POWER (H on figure 2) on the rear panel of the RGB 440. An optional 12 VDC external power supply is available from Extron (Part #70-055-01). A power plug (included with RGB 440) must be soldered to the power source wires. The procedure follows:

1. Unscrew the black plastic cover from the plug.
2. Insert the wires from the power source through the tapered end of the black plastic cover.
3. Solder one wire to terminal 1, and the other wire to terminal 2.
4. Before plugging the power plug into the RGB 440, apply power to the voltage source and, using a voltmeter, verify that the voltage at the plug is in the range of 12 to 24 volts AC or DC.
5. Reinstall the plastic cover on the plug and insert the plug into the RGB 440 power connector.

**Specifications**

- **Video**:
  - Gain: Analog (0.7V), 15% with 3dB peaking (0.9V), 30% with 6dB peaking (0.9V)
  - Bandwidth: 300 MHz (-3dB)
  - Number/signal type: 1 analog RGBHV, RGBS, RGsB
  - Connectors: 1 9-pin male for MBC cable or buffer
  - Nominal level(s): Analog — 0.2V to 1.45V p-p
- **Video input**:
  - Bandwidth: 300 MHz (-3dB)
  - Number/signal type: 1 analog RGBHV, RGBS, RGsB
  - Connectors: 1 9-pin male for MBC cable or buffer
  - Nominal level(s): Analog — 0.2V to 1.45V p-p
- **Video output**:
  - Bandwidth: 300 MHz (-3dB)
  - Number/signal type: 1 analog RGBHV, RGBS, RGsB
  - Connectors: 1 9-pin male for MBC cable or buffer
  - Nominal level(s): Analog — 0.2V to 1.45V p-p
- **Sync input/output**:
  - Input type: Autodetect RGBHV, RGBS, RGsB (accepts RGsB but does not strip sync from video)
  - Output type: RGBHV at all times, RGBS at all times, RGsB only when input is RGsB
  - Input level: 2V p-p to 5.5V p-p with ±0.2VDC offset max.
  - Output level: 4V to 5V p-p
  - Input impedance: 10 kohms
  - Output impedance: 75 ohms
- **Audio input/output**:
  - Frequency response: ±0.05dB @ 20 Hz to 20 kHz
  - THD + Noise: 0.03% @ 1 kHz, 0.3% @ 20 kHz at rated max. output
  - S/N: >90dB, output 14dBu, balanced
- **Power supply**:
  - Voltage: 12 to 24VAC or VDC, 0.5 A, 5 watts, external (Order the power supply separately, part number 70-055-01.)
- **MBC power jack**: 9VDC, 0.15 A
- **Temperature/humidity (non condensing)**:
  - Storage: -40° to +158° F (-40° to +70° C) / 10% to 90%
  - Operating: +32° to +122° F (0° to +50° C) / 10% to 90%
- **Dimensions**:
  - Metal enclosure dimensions: 1.0” H x 5.7” W x 4.5” D (7” W with mounting brackets)
- **Weight**:
  - Shipping weight: 2 lbs. (0.9 kg)
- **Approvals**:
  - UL, CE, FCC Class A
- **Warranty**:
  - 2 years parts and labor

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