

User's Manual



RGB 118 & RGB 118 Plus Computer-Video Interfaces


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RGB 118 & RGB 118 PLUS
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Legend of Icons


The following icons may be used in this manual:

 — *Important information – for example, an action or a step that must be done before proceeding.*

 — *A Warning – possible damage could occur.*

 — *A Note, a Hint, or a Tip that may be helpful.*

 — *Possible Electrostatic Discharge (ESD) damage could result from touching electronic components.*

 — *Additional information may be referenced in another section, or in another document.*

*Extron's RGB 118 & RGB 118 PLUS
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Chapter One

Introduction to the RGB 118 & RGB 118 PLUS COMPUTER-VIDEO INTERFACES

Introduction

Features

Specifications

Introduction

About This Manual

This manual contains connection, operation and application information for the RGB 118 and RGB 118 PLUS universal interfaces.

RGB 118 & RGB 118 PLUS Facts and Features

The Extron RGB 118 and RGB 118 PLUS are Universal Computer-Video Interfaces compatible with computer monitor video signals such as CGA, EGA, VGA, MCGA, IBM PS/2, MAC II, Super VGA and more. Providing an RGB bandwidth range of 150 MHz (rise and fall time of 4 nS) and a horizontal frequency range of 15-100 kHz, the RGB 118 and RGB 118 PLUS allow any compatible computer to be connected via simple MBC or ICWK input cable change.

Features

- Universal compatibility
- 120 MHz RGB video bandwidth (-3db)
- LED power indicator
- Horizontal centering with ON/OFF switch
- Three position peaking/sharpness and gain control switch settings
- Variable gain controls (R,G,B)
- Serration pulse removal switch
- Sync on green switch for output
- Automatic sync stripping from RGB
- Blue enhancement (TTL only)
- MBC power output jack
- External control knobs
- Metal enclosure
- MBC interface cable required
- Simple installation and operation
- * LCD scan-rate display of horizontal and vertical frequencies
- * SRI – holding the RGB 118 PLUS up to the face of a computer's monitor will display the horizontal and vertical scan-rates on the LCD readout without any attached input cables.
- * Vertical centering with ON/OFF switch

* The bottom three features apply only to the RGB 118 PLUS

Specifications

RGB 118 and RGB 118 PLUS

Dimensions.. 4.63" W x 4.75" D x 1.75" H
.. 11.7cm W x 12cm D x 4.4cm H

Shipping Weight.. 4 lbs. (1.8 kg)

Power Supply.. 12 volt 800 mA (wall mount)

Warranty.. 2 years parts and labor
.. (See Appendix)

Input Signal

Video.. Analog: .5 to 1.2 volts p-p
.. ECL: .8 to 1.0 volts p-p
Sync.. TTL: .3 to 5.0 volts p-p
.. Separate Sync TTL (\pm)
.. Composite Sync TTL (\pm)

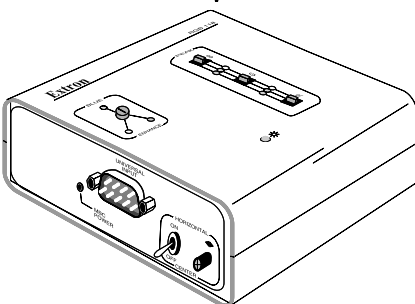
Frequency

Compatibility.. 15 to 100 kHz horizontal
.. 30 to 150 Hz vertical
RGB Bandwidth.. 120 MHz (-3db)
Video Amplifier Bandwidth
(VAB).. 200 MHz
Actual Bandwidth (AB).. 120 MHz (-3db)

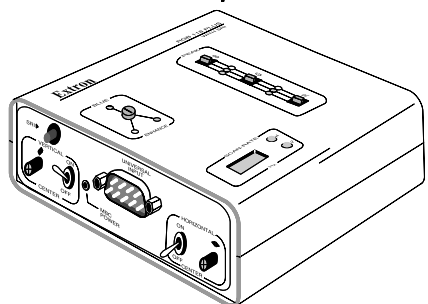
RGB 118 PLUS only

LCD Scan-Rate Range.. 10 to 125 kHz horizontal
.. 30 to 200 Hz vertical

RGB 118



RGB 118 PLUS



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A large, light gray number '2' is centered on the page, serving as a background for the chapter title.

Chapter Two

Operation of RGB 118 & RGB 118 PLUS

Front Panel

Top Panel

Internal DIP Switches

Using the SRI

Operation of RGB 118 and RGB 118 PLUS

Front Panel

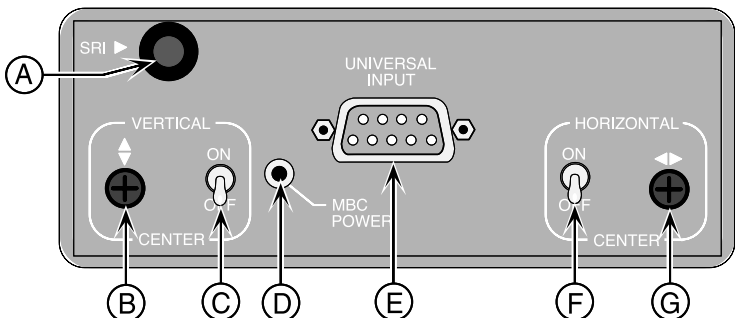
The following descriptions are keyed* to the RGB 118 PLUS drawings below and on the facing page.

- A SRI Pushbutton Switch (RGB 118 PLUS ONLY)
Push and hold this button in to enable the RGB 118 PLUS SCAN-RATE LCD to display the horizontal and/or the vertical scan rate frequency of a monitor (See Using the SRI on Page 2-5 for details).
- B Vertical Center Control (RGB 118 PLUS ONLY)
Turning this RGB 118 PLUS control shifts the displayed image up or down if the Vertical Center Switch is in the ON position.
- C Vertical Center Enable Switch (RGB 118 PLUS ONLY)
Enable/disable the RGB 118 PLUS Vertical Center Control – OFF position disables and ON position enables.
- D MBC Power Connector
Provides 12 VDC for Extron MBC Buffers.
- E Universal 9 Pin Input Connector
The RGB 118 and RGB 118 PLUS video input is supplied through this connector. Acceptable input types are TTL, Analog and ECL. Connector pin assignments follow:

Pin #	ANALOG	DIGITAL (TTL or ECL)
1	Ground	Ground
2	No Connection	Red Prime
3	Red	Red
4	Green/Sync on Green	Green
5	Blue	Blue
6	No Connection	Green Prime
7	No Connection	Blue Prime
8	Horizontal/Composite Sync	Horizontal Sync
9	Vertical Sync	Vertical Sync

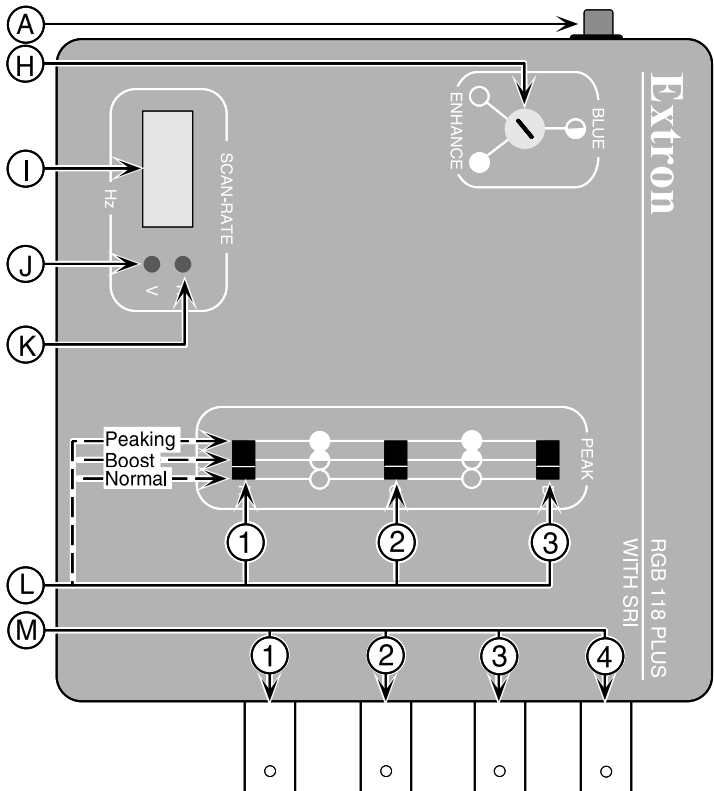
- F Horizontal Center Enable Switch
Enable/disable the Horizontal Center Control – Off position disables and ON position enables.
- G Horizontal Center Control
Turning this control shifts the displayed image to the left or right.

* – Letters next to the descriptions are keyed to the circled letters in the drawings on this and the next page.



Top Panel

- H Blue Enhance Control (Valid for TTL input only)
This control allows adjusting a blue text display to an easier to read blue-green color.
- I Scan Rate Indicator (SRI) LCD Panel (RGB 118 PLUS ONLY)
The LCD panel displays a monitor's horizontal or vertical scan rate frequency.
- J V = Vertical Scan Rate (RGB 118 PLUS ONLY)
Indicates vertical scan rate is currently being monitored.
- K H = Horizontal Scan Rate (RGB 118 PLUS ONLY)
Indicates Horizontal scan rate is currently being monitored.
- L Peak Switches (All three switches must be set to same position.)
 - Normal – Input to output signal = unity gain (gain = 1)
 - Boost (Long Line Level Peaking) – Boost and Peak all frequencies
 - High Frequency Peaking – Decreases “fuzziness” or “streaking” associated with interfacing high frequency computers.
- M Output BNC connectors (located on rear panel)
 - 1 = R = RED video output
 - 2 = G = GREEN video output
 - 3 = B = BLUE video output
 - 4 = S = Sync output



Internal DIP Switches

Internal DIP switch settings determine the operating mode of the RGB 118 and RGB 118 PLUS. Changing the switch settings requires removal of the top and bottom halves of the case as described below.

Opening the RGB 118 or RGB 118 PLUS Case

To open the RGB 118 or RGB 118 PLUS case, remove the screw from the bottom of the case (see Figure 1 on facing page). This enables removal of the top and bottom halves of the case as shown in Figure 2.

Changing a Switch Setting

The switches on the DIP switch module used in the RGB 118 and the RGB 118 PLUS are the slide type (see drawing, Figure 3 on facing page). To change the position of the slide switch, a small screw-driver is used to push (slide) the switch to the desired position (enable or disable).

Setting Internal DIP Switches

Internal DIP switches SW3-1,2, SW4-1, 2, 3 and SW5-1,2 affect RGB 118 and RGB 118 PLUS operation as follows:

SW3-1	SW3-2	Serration/LCD Switch
F ¹ OFF	OFF	Normal – Serration pulses remain w/output sync
OFF	ON	Serration pulses are removed from output sync ²

SW4-1	SW4-2	SW4-3	Analog Output Switch
F ¹ ON	OFF	OFF	Normal
ON	OFF	ON	Sync on Green ³
OFF	ON	ON	Sync on Mono ⁴

SW5-1	SW5-2	TTL Mode Switch
F ¹ OFF	OFF	Normal
ON	OFF	64 Colors < 18 KHz
X	ON	16 Colors > 18 KHz

Notes:

1. F = Factory setting
2. Required by some projectors
3. When setting the RGB 118 for Sync on Green, you must also disconnect the BNC cable from the external "Sync" output of the RGB 118 and RGB 118 PLUS. Otherwise, sync is output on both green and the composite sync output which may cause abnormal levels of green to appear on the presentation display.
4. Monochrome Composite – Use the Green output only.

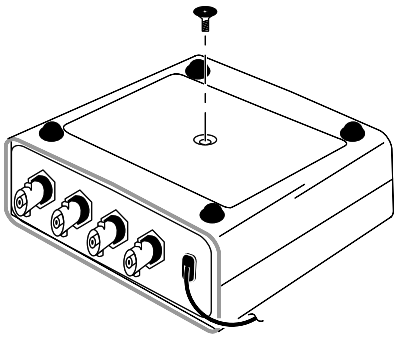


Figure 1

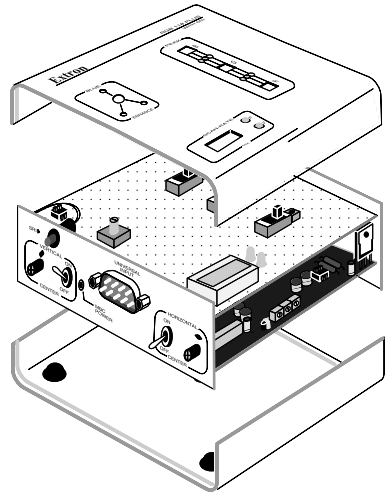


Figure 2

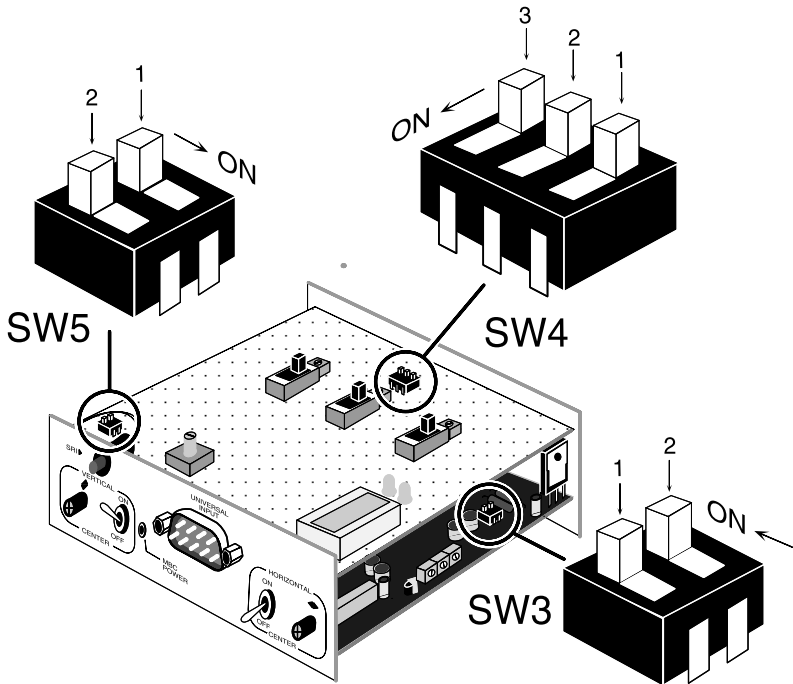


Figure 3

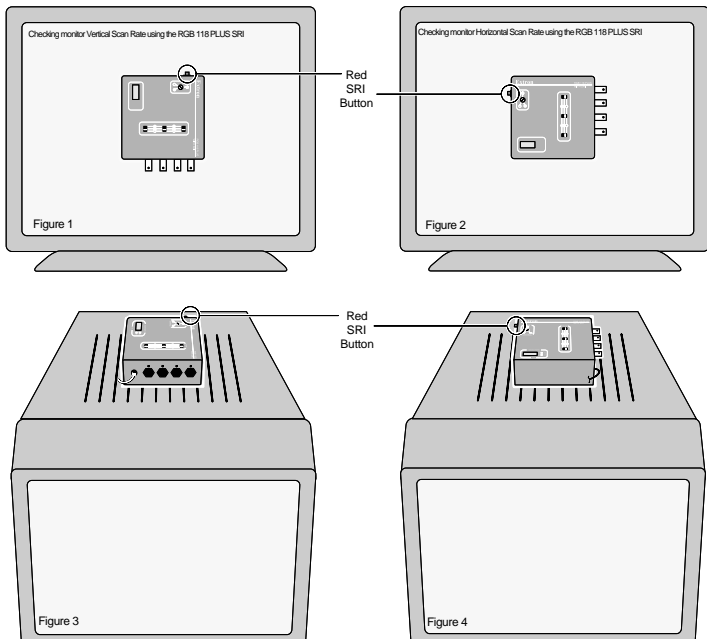
Using the SRI (RGB 118 PLUS only)

The SRI feature of the RGB 118 PLUS is used to determine the approximate horizontal and vertical scan frequencies of video and computer monitors. To use the SRI, hold the RGB 118 PLUS with the feet against the face of the monitor and near the center of the screen as shown in Figures 1 and 2 below.

To view the vertical scan frequency, hold the unit so the LCD readout is on a vertical plane (red SRI button is in the uppermost position) as shown in Figure 1. Wait until the green Vertical (V) LED turns on, then push and hold the red SRI button in until a readout is obtained.

To view the horizontal scan frequency, hold the RGB 118 PLUS so the LCD readout is on a horizontal plane (normal viewing) as shown in Figure 2. When the red Horizontal (H) LED turns on, push and hold the red SRI button in until a readout is obtained.

Anti-static, anti-glare or EMI coatings on the face of the CRT may prevent the RGB 118 PLUS SRI from displaying the monitor's scan frequencies properly. Should this occur, an alternate method to obtain a readout is to set the RGB 118 PLUS on top and toward the rear of the monitor as shown in Figures 3 and 4 below. To view the vertical scan frequency using this method, set the RGB 118 PLUS as shown in Figure 3 with the red SRI button toward the rear of the monitor. Press and hold the red SRI button in when the green Vertical (V) LED turns on. To view the horizontal scan frequency, set the RGB 118 PLUS on the monitor as shown in Figure 4. When the red Horizontal (H) LED turns on, press and hold the red SRI button until a readout is obtained.



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Chapter Three

**RGB 118 & RGB 118 PLUS
Applications**

Applications

Following are possible applications for the RGB 118 and/or the RGB 118 PLUS.

1. As a Sync Stripper

Using an MBC RGS cable¹, the RGB 118 can be used to strip Sync from Green and separate to Green and Composite Sync outputs.

- *Connect the RGB with sync on green signal to MBC RGS cable.*
- *Insert the MBC RGS cable into the 9 pin input of the RGB 118.*
- *Use the video and sync outputs of the interface as normal.*

2. Add Sync on Green

The RGB 118 can be used to add either composite or separate Horizontal and Vertical (HV) sync to the green video channel. Use the MBC RGS cable¹ to add composite sync or the MBC RGBHV cable² to add separate H&V sync.

- *Connect the RGS signal to the MBC RGS cable or the RGBHV signal to the MBC RGBHV cable.*
- *Insert either of the MBC cables into the 9 pin Universal input of the RGB 118.*
- *Use the instructions found on page 2-3 to add sync on green.*
- *Use only the RGB outputs of the interface.*

3. As a Sync Combiner

Using the MBC RGBHV cable² the RGB 118 can be used to combine separate horizontal and vertical sync to composite sync.

- *Connect the RGBHV signal to the MBC RGBHV cable.*
- *Insert the MBC RGBHV cable into the 9 pin Universal input of the RGB 118.*
- *Use the Sync output of the interface as a composite sync.*

4. Mono Composite

The RGB 118 can be used to convert any video signal to monochrome composite while maintaining resolution.

- *Connect any video signal to the MBC RGS cable¹.*
- *Insert the 9 pin of the MBC RGS cable into the Universal 9 pin input of the RGB 118.*
- *Use the instructions found on page 2-3 to convert the signal to monochrome composite.*

5. Frequency Indicator

The RGB 118 can be used as a Horizontal or Vertical frequency indicator of any monitor.

Simply hold the RGB 118 PLUS up to the face of the monitor glass and hold in the SRI button on the front panel of the interface. The Horizontal and Vertical scan frequencies will automatically be displayed on the LCD. Refer to page 2-5.

NOTES: 1. MBC RGS cable: 4 BNC to 9 pin, Part #26-213-01
2. MBC RGBHV cable: 5 BNC to 9 pin, Part #26-270-01

Application Diagrams

The application diagram below (Figure 1) demonstrates an RGB 118 Interface used to interface a PC Computer monitor to a large screen data monitor which could be located in the same room or in a different location up to 150' away.

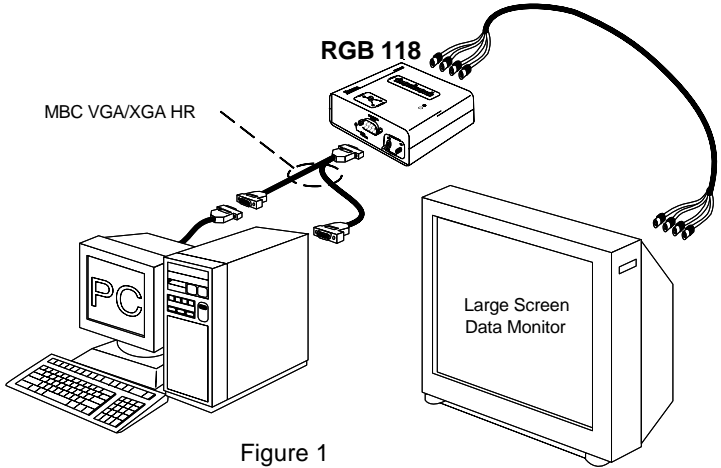


Figure 1

The application diagram below (Figure 2) demonstrates an RGB 118 PLUS combined with an MBC SPARC Buffer to interface a high resolution computer/monitor workstation to a large screen projector. The MBC SPARC Buffer is used to allow the higher resolution signals to be transmitted with minimum signal loss and no reflections or signal ghosting. The MBC SPARC Buffer gets its power from the RGB 118 PLUS through the MBC Power jack.

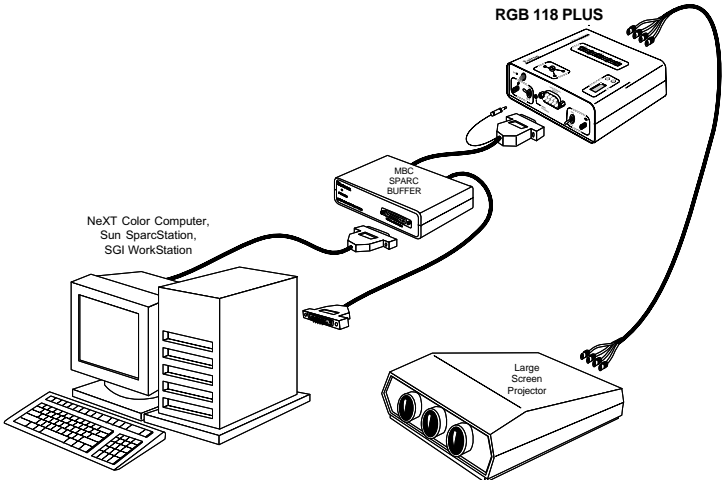


Figure 2

The application diagram below (Figure 1) demonstrates an RGB 118 PLUS combined with a Hi Res ECL Buffer and an MBC SUN/APOLLO MONO cable to interface a high resolution computer/monitor workstation to a large screen projector.

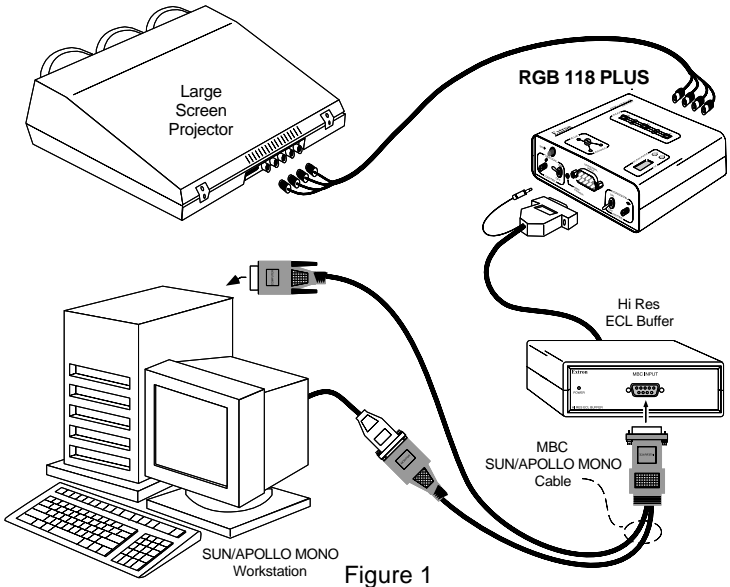


Figure 1

The application diagram below (Figure 2) consists of two computers with RGB 118 and RGB 118 PLUS interfaces with access to a projector through a switcher.

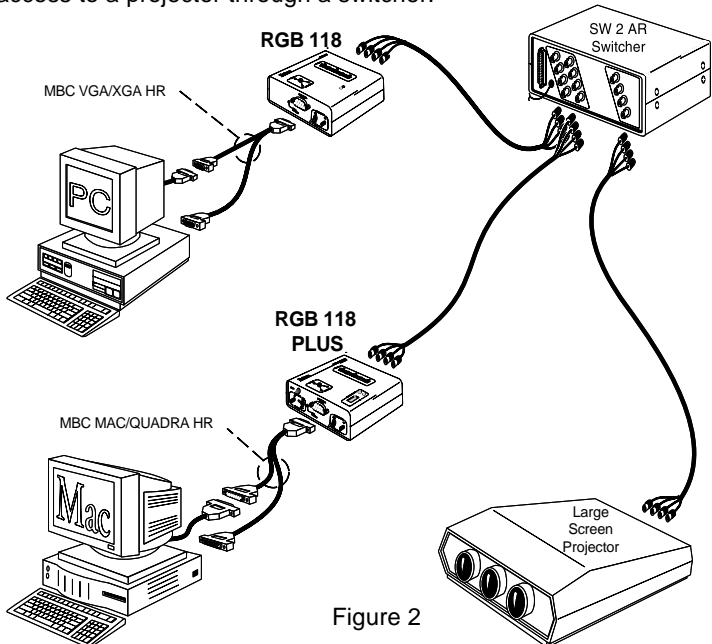
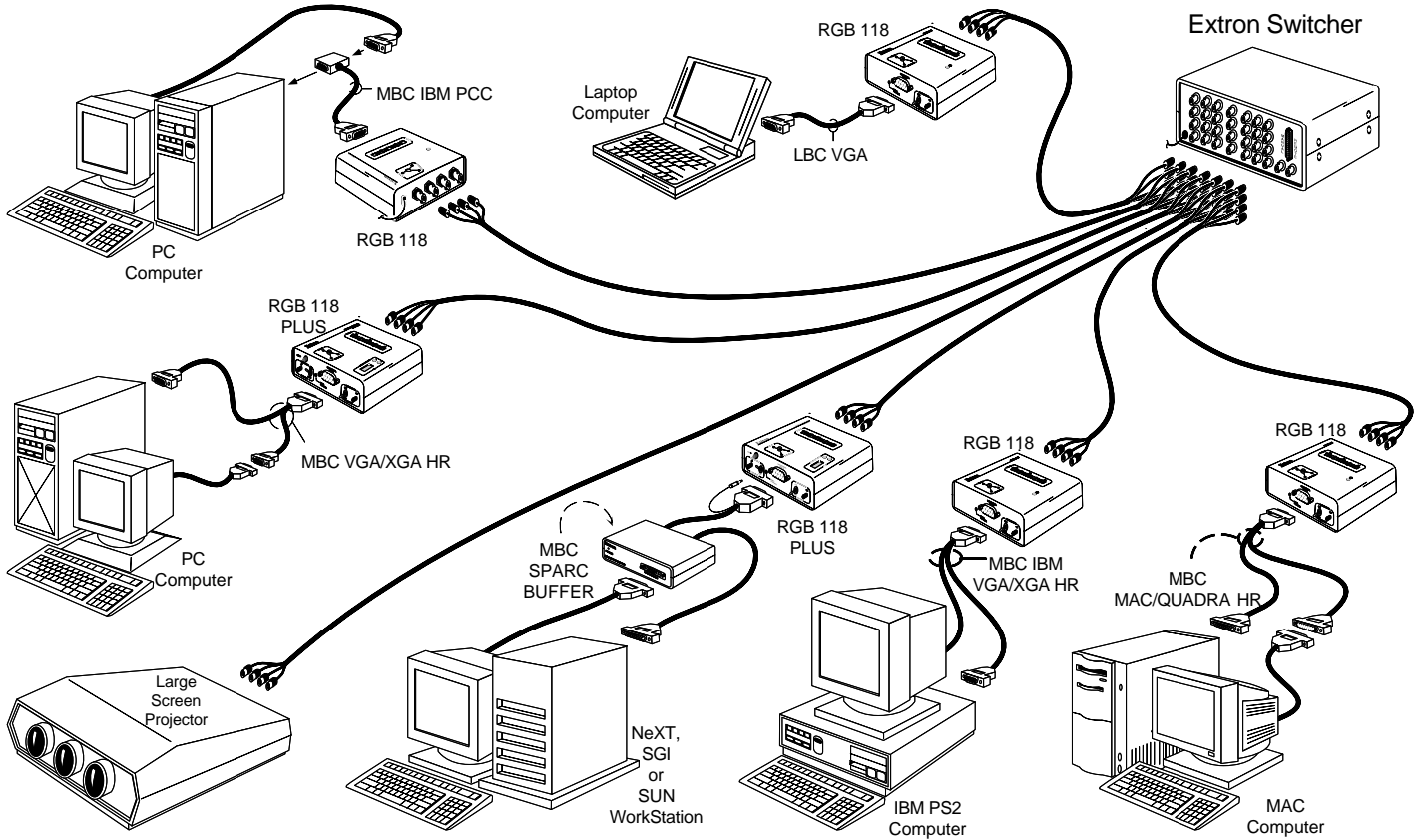
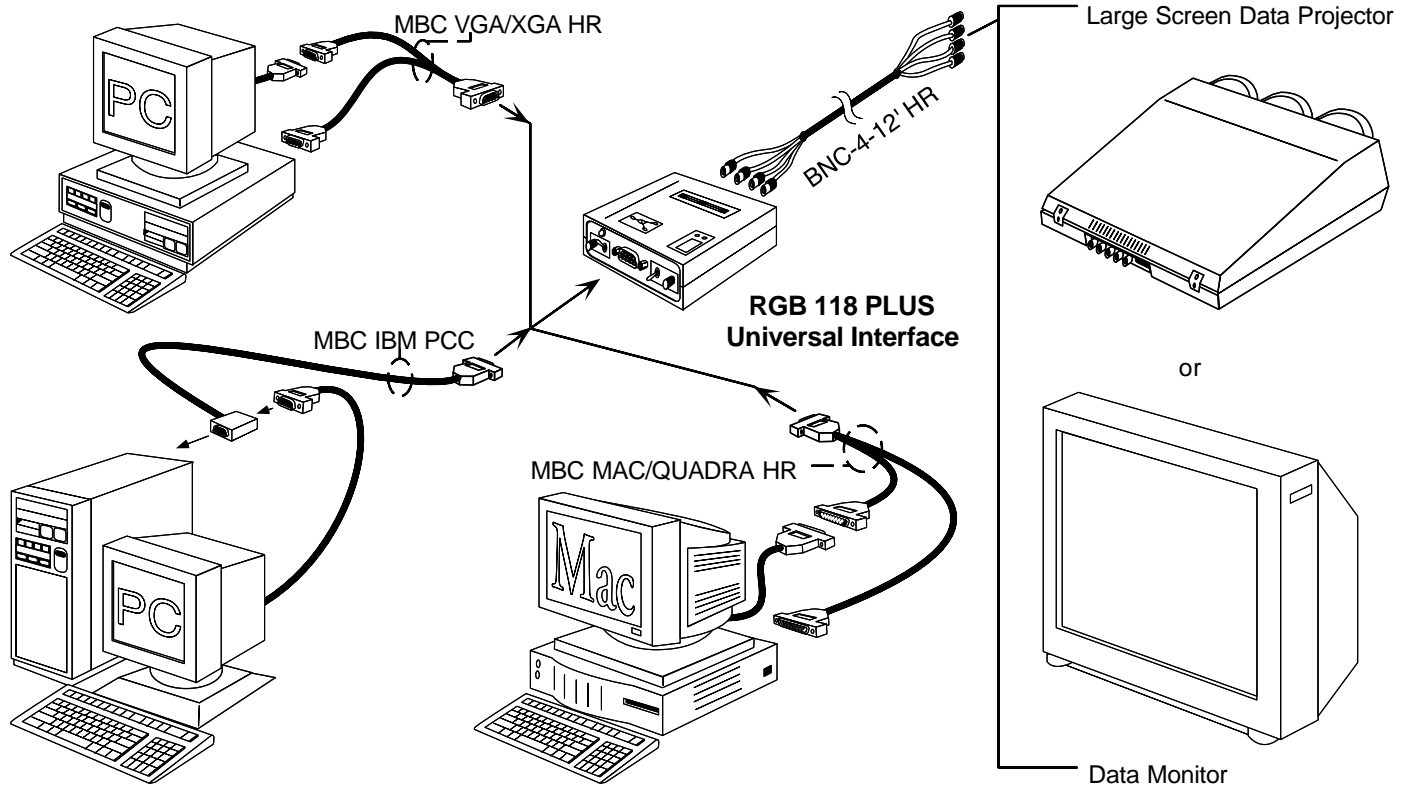


Figure 2



Six different computer systems with RGB 118 and RGB 118 PLUS interfaces all have access to a projector through an Extron switcher in this application.



The above diagram illustrates the versatility of Extron's 118 PLUS KIT (P/N in Appendix) which includes the following items: RGB 118 PLUS – MBC VGA/XGA HR – MBC MAC/QUADRA HR – MBC IBM PCC – T-VGA – MAC DFTA – BNC-4-12' HR

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Appendix A

Other Reference Material

Computer Compatibility and MBC Cables

Accessories and Part Numbers

Glossary

Limited Warranty

Compatible Computers	MBC Cable Required	Horz. kHz	Vert. Hz
Amiga 500,1000,2000	MBC Amiga 2000	15.7	60
Apple IIE/IIC	MBC Apple IIE	15.7	60
Apple IIGS	MBC Mac II HR	15.7	60
Apple Mac RGB (Internal Wiring Kit)	ICWK Mac RGB	22.3	60
Apple Mac SE RGB (Internal Wiring Kit)	ICWK Mac SE RGB	22.0	60
Apple Mac II Series (Standard Card)	MBC Mac II HR	35.5	67
Apple Mac II w/ SuperMac Card	MBC SuperMac	35-48	67
AT&T 6300/6310	MBC AT&T 6300	26.0	60
AT&T 630	MBC AT&T 630	54	60
Burroughs 25	MBC B-25	19.8	60
DEC 340	ICWK DEC 340	31.5	60
IBM 3161,3163,3191,3196 Mono	MBC 3161/63/91/96 Mono	27.6	65
IBM 3162 Mono	MBC IBM 3162	25.9	65
IBM 3164 Color	MBC IBM 3164	27.6	65
IBM 3179,3192,3197 Color	MBC 3179/92/97	23.0	60
IBM 3192D Color	MBC 3192D	23.0	60
IBM 3270 PC Color	MBC IBM 3270 PC	23.5	63
IBM 3270 PCG Color	MBC IBM 3270 PCG	24.0	63
IBM 3290 Color	MBC IBM 3290	29.6	73
IBM 3471/3476 Infowindow	ICWK 3471/3476	31.0	60
IBM 3472/3477 Terminals	MBC IBM INFOWINDOW	38.0	68
IBM 5291 M-2	MBC 5291 M-2	18.3	50
IBM PC or Compatible w/ CGA or EGA card	MBC IBM PCC	15.7/21.8	60
IBM PC,XT,AT & Compatible w/ MDA Card	MBC IBM PCM	18.4	50
IBM PC,XT,AT & Compatible w/ PGA Card	MBC IBM PGA HR	31.5	70
IBM PS/2 VGA	MBC IBM PS/2	31.5/35.5	60/70
IBM PS/2 w/ 8514/A Card	MBC IBM VGA HR	35.1	87/43
IBM VGA/Super VGA/XGA or VGA Plus	MBC IBM VGA HR	31.5-<50.0	60/80
Any Laptop w/ VGA output * (has no external monitor)	LBC VGA HR	31.5	60/70
NCR PC 6,8 Color	MBC NCR PC 6,8	23.6	55
NeXT Monochrome Computers	MBC NeXT Cable	62.0	68
NeXT Color Computers	MBC Sparc Buffer	63.0	68
Sigma 400 Color	MBC Sigma 400	31.4	60
Sun/Apollo Monochrome 9D Workstations	MBC SUN/APOLLO (also requires ECL Buffer)	63.8	66
Sun/Apollo Color Workstations or any Workstation w/RGB out on BNC Connectors.	MBC RGB BUFFER	64.0-<125.0	60
Sun Sparc Stations	MBC Sparc Buffer	64-89	60/70
Xerox 6085 and 1186 Computers	MBC XEROX 6085 (also requires Xerox Buffer)	28.0/37.0	76

*When using most laptops to display on large-screen projectors, the computer's internal LCD display is deactivated.

Extron Part	Part Number
RGB 118 (115 Volt)	60-080-01
RGB 118 (230 Volt)	60-080-02
RGB 118 PLUS (115 volt)	60-080-05
RGB 118 PLUS (230 volt)	60-080-06
118 PLUS Kit (115 volt)	42-018-01
118 PLUS Kit (230 volt)	42-018-02

Glossary

- Bandwidth** - For video amplifiers, bandwidth is a measure of the range of frequencies that make up the components of video character information within which a video amplifier will respond. The frequency range (passband) is usually measured between the half-power (3-dB) points on the video amplifier amplitude output response vs. frequency curve for a wide range of frequencies while maintaining a constant input signal amplitude for each frequency.
- CGA** - Color Graphics Adapter. Introduced in 1983, it was IBM's first product to display both color and graphics. An RCA jack above the 9 pin video output connector provides NTSC video. Signal type is TTL, non-interlaced, with Pixel x Line resolution of 640 x 200 and a color palette of 4/16. CGA has a horizontal scan frequency of 15.75 kHz and vertical frequency of 60 Hz.
- Data Monitor** - A monitor with horizontal scan capability between 15.75-36(42) kHz. Data monitors and projectors are commonly associated with NTSC video, IBM CGA through VGA and Apple/Macintosh computer input sources.
- ECL** - Emitter Coupled Logic. ECL signals are high speed digital logic and are mostly found in high resolution CAD/CAM computers and are usually monochrome or black and white. ECL operates in two level states and switches between these states in small increments of time. Bits are: Next/Most/Least Significant. Conversion to analog is required for proper interfacing.
- EGA** - Enhanced Graphics Adapter. Introduced by IBM in 1984, the EGA card may be configured with dip switch settings to provide an MDA or CGA output signal. Signal type is TTL, non-interlaced with a Pixel x Line resolution of 640 x 350 and a color palette of 16/64. EGA horizontal scan frequency is 21.8 kHz or 15.75 kHz in CGA mode. Vertical frequency is 60 Hz. The EGA card outputs to a 9 pin "D" type connector.
- Graphics Monitor** - A monitor with horizontal scan capability from 15.75-75 (80) kHz. Graphic monitors and projectors accept input from NTSC Video and CGA- VGA, as well as, high resolution computers and CAD/CAM workstations.
- ICWK "Internal Computer Wiring Kit"**- ICWK kits provide interfacing signals for computers and terminals with no external video display output. Internal video monitor signals are routed externally from the terminal, usually to a 9 pin connector. From the 9 pin connector, a short cable is included with the kit for signal transfer to the interface 9 pin connector input.
- MBC "Monitor Break-out Cable"** - A cable used to view a local monitor or terminal while simultaneously routing the computer signal to a new source, such as a data projector or monitor. The cable contains a male and female video connector, either piggy-backed to each other or provided as a Y type cable.

Peaking - Peaking compensates for mid and high frequency RGB Video Bandwidth response in data monitors and projectors and for signal losses due to cable capacitance. When using the Peak enhancements on the RGB 118 and RGB 118 PLUS interface, please use the following guidelines for proper output settings:



— Use with all computer frequencies between 15-125 kHz at any cable length.



— Use with high frequency computers of 36 kHz or higher with cable lengths 75 feet or greater.

Serration - A vertical synchronizing pulse divided into a number of small pulses, each acting for the duration of half a line in a television system. Serrations are used to keep the horizontal oscillator synchronized during the vertical sync pulse interval.

Sync - The synchronization signals or timing pulses which lock the electron beam in step, both horizontally and vertically, with the image signal. Also called Composite Sync, this signal is derived from a composite or combination of horizontal and vertical drives, with some slightly narrowed and delayed pulses, as well as, the addition of equalizing pulses. It is one of the more popular signals used in video systems today and when used is usually accompanied by subcarrier.

TERMINATOR - A resistor at the end of a coaxial cable or line used to match the impedance of the equipment being used. The resistor absorbs signal energy to prohibit signal reflections back to the source. This causes the source equipment to operate as if the line is connected to equipment of equal impedance.

TTL - Transistor to Transistor Logic. Digital type signal, usually 4-5 volts peak to peak. Distance limitation is 6-10 feet. Signal splitting is acceptable. TTL signals are either "ON" or "OFF" and is characteristic of low resolution computers (CGA).

VGA - Video Graphics Array. Introduced by IBM in 1987, VGA is an Analog signal with TTL level separate horizontal and vertical sync. The video outputs to a high density 15 pin 3 row "D" type connector and has a horizontal scan frequency of 31.5 kHz and vertical frequency of 70 Hz (Mode 1, 2) and 60 Hz (Mode 3). The signal is non-interlaced in modes 1, 2, 3 and interlaced when using the 8514/A card (35.5 kHz, 86 Hz) in mode 4. It has a Pixel x Line resolution of 640 x 480 with a color palette of 16/256,000.



— For a more complete understanding of Computer Interfacing ask about Extron's "Introduction to Computer Interfacing" videocassette. A training tool designed to provide the experienced or novice sales person with the most concise information on Computer Interfacing. Tape length 55 minutes.