



VGA-EXT-0302C

VGA/component, Audio & RS-232 over CAT5 Extender with RGB Delay Control & IR Pass-through

User Manual



WUXGA
x1920
x1200

CAT-5e/6/7
SINGLE
Remote Control
IR
Pass-through



Made in Taiwan



Safety and Notice

The **VGA-EXT-0302C VGA/component, Audio & RS-232 over CAT5 Extender with RGB Delay Control & IR Pass-through** has been tested for conformance to safety regulations and requirements, and has been certified for international use. However, like all electronic equipments, the VGA-EXT-0302C should be used with care. Please read and follow the safety instructions to protect yourself from possible injury and to minimize the risk of damage to the unit.

- Follow all instructions and warnings marked on this unit.
- Do not attempt to service this unit yourself, except where explained in this manual.
- Provide proper ventilation and air circulation and do not use near water.
- Keep objects that might damage the device and assure that the placement of this unit is on a stable surface.
- Use only the power adapter and power cords and connection cables designed for this unit.
- Do not use liquid or aerosol cleaners to clean this unit. Always unplug the power to the device before cleaning.



Introduction

With only one cost effective Cat-5/5e/6 cable, the VGA-EXT-0302C lets you extend VGA (at WUXGA) or 720p component video, bi-directional IR control and half-duplex serial RS-232 at the same time to cover the distance up to 330m (1,000ft). The VGA-EXT-0302C comes in a set of a transmitter and a receiver. The transmitting unit VGA-EXT-0302C[Tx] is installed near the signal source, and the receiving unit VGA-EXT-0302C[Rx] is placed near the desired VGA display. With the built-in equalization and signal gain control, the transmission path can be adjusted to adapt the cable quality and video bandwidth. Furthermore, the VGA RGB delay control [de-skew] function provides the compensation in arrival time among red, green and blue signal channels due to long transmission via normal Cat-5/5e/6 cable. With commonly obtainable VGA-component breakout cables connected to the VGA ports, the extender can support to transmit the component video for 330m (1,000ft) as well.

Features

- Supports up to WUXGA [1920x1200@60] or UXGA [1600x1200@60] to 330m (1,000ft)
- Supports 720p component video signal to 330m (1,000ft)
- Supports RS-232 half-duplex & bi-directional IR pass-through
- Supports analog stereo audio and digital S/PDIF stereo audio
- Video and audio local out on transmitting unit for easy monitoring
- Adjustable equalization and gain control on receiving unit for signal tuning
- De-skew compensation available for RGB delay control
- Wall mounting case & interlocked power jack for better fixedness

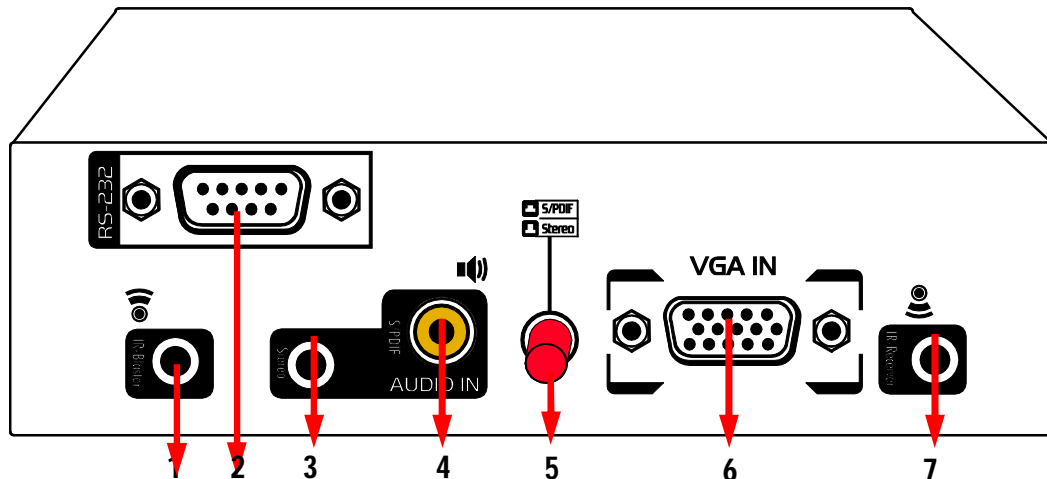
VGA over Single CAT5 Series Lineup

	VGA-EXT-0301C	VGA-EXT-0302C
VGA/component video	●	●
Stereo analog audio	●	●
RS-232 signals		●
IR pass-through		●
Equalization	●	●
Gain control	●	●
RGB delay control	●	●
Transmission length	330m [1,000ft] at WUXGA [1920x1200@60], UXGA [1600x1200@60] or 720p	

Specifications & Package Contents

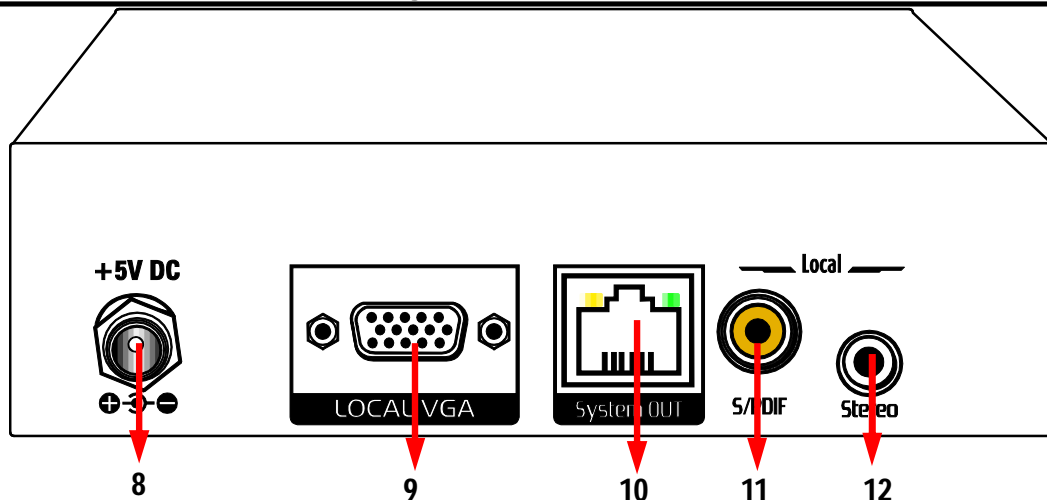
Technical		VGA-EXT-0302C	
Role of usage	Transmitter [TX]	Receiver [RX]	
Video bandwidth	350MHz		
Video support	VESA		
Video Transmission	WUXGA [1920x1200] / 720p — 330m (1,000ft) [CAT5e]		
Audio support	Stereo		
RS-232 signal type	Half-duplex		
Input video signal	1.2 Volts [peak-to-peak]		
Equalization	Continuous analog control		
RGB delay control	Yes		
Loop-out	1 VGA local-out + 1 audio local-out at TX		
ESD protection	[1] Human body model — ±19kV [air-gap discharge] & ±12kV [contact discharge] [2] Core chipset — ±8kV		
Input	1x VGA 1x RS-232 2x 3.5mm 1x RCA 1x RS-232	1x 3.5mm 1xRJ-45	
Output	1x RJ-45 1x VGA 2x 3.5mm 1x RCA	1x VGA 1x RS-232 1x RCA 1x 3.5mm	
VGA connector	HD-15 [15-pin D-sub female]		
RJ-45 connector	WE/SS 8P8C with 2 LED indicators		
RS-232 connector	DE-9 [9-pin D-sub female]		
RCA connector	S/PDIF digital audio		
3.5mm connector	Earphone jack for analog stereo audio or IR cable		
Mechanical		VGA-EXT-0302C	
Housing	Metal enclosure		
Dimensions [L x W x H]	Model	[TX/RX] – 123 x 95 x 25mm [4.8"x3.7"x1"]	
	Package	330 x 200 x 95mm [1'1"x7.9"x3.7"]	
	Carton	495 x 440 x 380mm [1'7.5"x1'5.3"x1'3"]	
Weight	Model	[TX]– 390g [14oz] / [RX]– 380g [13oz]	
	Package	1250g [2.8 lbs]	
Fixedness	Wall-mounting case with screws		
Power supply	Inter-locked 5V 2A DC		
Power consumption	6 Watts [max]		
Operation temperature	0~40°C [32~104°F]		
Storage temperature	-20~60°C [-4~140°F]		
Relative humidity	20~90% RH [no condensation]		
Package Contents	1x VGA-EXT-0302C [TX&RX] 2x 5V power supply unit 1x User Manual 1~3x VGA-component breakout cable [optional accessory]		

Front Panel — Transmitting unit VGA-EXT-0302C[Tx]



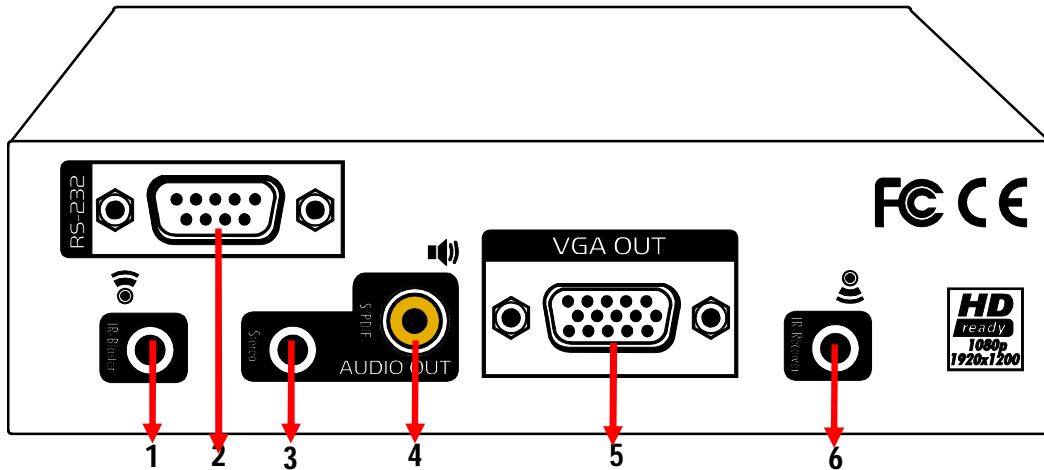
1. **IR-Blaster**: connect to IR blaster for IR pass-through from RX to TX
2. **RS-232**: connect to a RS-232 signal source or receiver
3. **Stereo IN**: connect to analog audio source
4. **S/PDIF IN**: connect to digital audio source
5. Push-in button: select between S/PDIF and analog stereo audio [button down-S/PDIF, button up-Stereo]
6. **VGA IN**: connect to a VGA input source or a component video source via a VGA-component break cable
7. **IR-Receiver**: connect to IR receiver for IR pass-through from TX to RX

Rear Panel — Transmitting unit VGA-EXT-0302C[Tx]



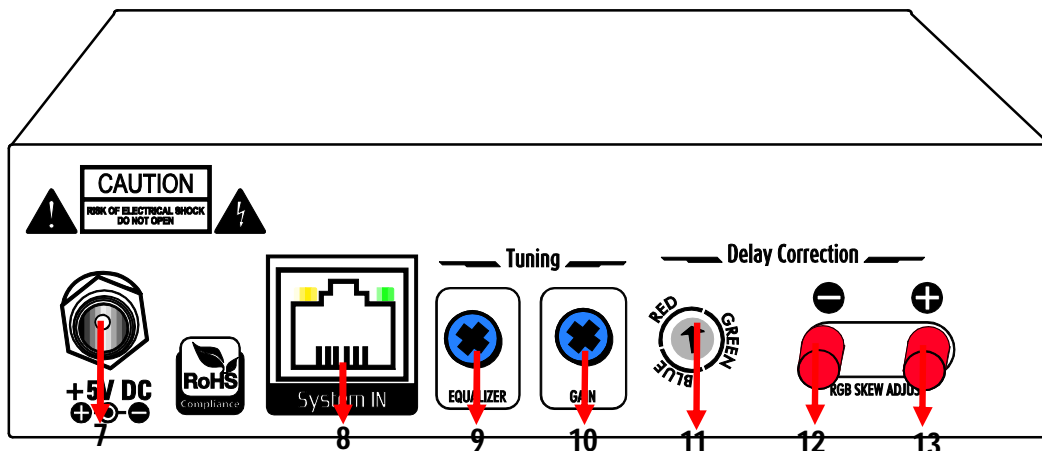
8. **+5V DC**: inter-locked power jack to connect to 5V DC power supply unit
9. **Local VGA**: VGA loop-out to a local VGA display or component video display via a VGA-component breakout cable
10. **System OUT**: plug in a Cat-5/5e/6 cable that needs to be linked to the RJ-45 connector of the receiving unit VGA-EXT-0302C[Rx]
11. **Local S/PDIF**: digital stereo audio loop-out
12. **Local Stereo**: analog stereo audio loop-out

Front Panel — Receiving unit VGA-EXT-0302C[Rx]



1. **IR Receiver**: connect to the IR receiver
2. **RS-232**: connect to a RS-232 device
3. **Audio OUT**: connect to analog audio output
4. **S/PDIF OUT**: connect to digital audio output
5. **VGA OUT**: VGA output to a VGA display or component video display via a VGA-component breakout cable
6. **IR Blaster**: connect to the IR blaster

Rear Panel — Receiving unit VGA-EXT-0302C[Rx]



7. **+5V DC** power jack: connect to 5V DC power supply unit
8. **System IN**: Plug in a Cat-5/5e/6 cable here to be linked to **System OUT** of the transmitting unit VGA-EXT-0302C[Tx]
9. **EQUALIZER**: Rotary control for signal equalization, i.e., equalizing the waveform of video signal, to the chosen RGB channel
10. **GAIN**: Rotary control for gain control, i.e., adjusting the amplitude of video signal, to the chosen RGB channel
11. **RGB selector** for selecting the respective R/G/B color channel for de-skew correction of VGA/component signal
12. **RGB SKEW ADJUST "—"**: Push-in button in step-by-step 2ns decreasing order for delay control on respective R/G/B color channel that is chosen by the RGB selector
13. **RGB SKEW ADJUST "+"**: Push-in button in step-by-step 2ns increasing order for delay control on respective R/G/B color channel that is chosen by the RGB selector

Bottom Panel — Receiving unit VGA-EXT-0302C[RX]

DIP Switch Position				Description
Pin#1	Pin#2	Pin#3	Pin#4	
ON [▲]	OFF [▼]	ON [▲]	OFF [▼]	TX&RX Extender Mode – TxD ¹ of VGA-EXT-0302C[Tx] is connected to TxD of VGA-EXT-0302C[Rx] RxD ² of VGA-EXT-0302C[Tx] is connected to RxD of VGA-EXT-0302C[Rx]
OFF [▼]	ON [▲]	OFF [▼]	ON [▲]	Master to Slave Mode – TxD of VGA-EXT-0302C[Tx] is connected to RxD of VGA-EXT-0302C[Rx] RxD of VGA-EXT-0302C[Tx] is connected to TxD of VGA-EXT-0302C[Rx]



1. **TxD: The 3rd pin of RS-232, which is in charge of sending data**
2. **RxD: The 2nd pin of RS-232, which is in charge of receiving data**

1. Connect your VGA source, audio source, infrared and RS-232 devices to the transmitting unit VGA-EXT-0302C[Tx]. If you want to connect to a component video source, please find a VGA-component breakout cable and link it between the video source and the transmitting unit of VGA-EXT-0302C.
2. Connect your VGA display, audio speaker, infrared and RS-232 devices to the receiving unit VGA-EXT-0302C[Rx]. If you want to connect to a component video display, please find a VGA-component breakout cable and link it between the video display and the receiving unit of VGA-EXT-0302C.
3. Connect a Cat-5/5e/6 cable between the transmitting and receiving units.
4. Make sure this Cat-5/5e/6 cable is tightly connected and not loose.
5. Plug in 5V DC power supply unit to the power jack of the receiving unit VGA-EXT-0302C[Rx].
6. Plug in 5V DC power supply unit to the power jack of the transmitting unit VGA-EXT-0302C[Tx].
7. **If you see the monitor is displaying blurred video or even worse, not displaying at all, please adjust the EQ and Gain rotary controls to improve the cable skew. GAIN rotary control is to adjust the gain to an appropriate level for a range of input signal levels (brightness), and EQ rotary control is to equalize the wave form of the receiving video signal (sharpness). It is suggested to begin with adjusting the rotary control of EQ to get the input video displayed first, and then the rotary control of GAIN according to the video you see on the screen.**
8. **RGB delay control [De-skew] offers the flexible functionality to allow skew compensation in arrival time among the red, green, and blue color channels of the VGA signal due to long distance transmission or via low quality cable. By dialing the rotary arrow to choose RED, GREEN, or BLUE color channel at first, then using the push-in buttons to increase or decrease the delay correction of the corresponding color channel. There are 31 steps in total. Each step represents 2-nanosecond time difference for adjusting the delay between each color individually. It is recommended to adjust RGB channels back and forth until the optimal visual quality is reached.**

IR Extenders

IR Blaster



IR Receiver



IR Sockets

VGA-EXT-0302C[Tx]

IR Blaster: Plug in an IR blaster here to emit all IR command signals received from the IR receiver on VGA-EXT-0302C[Rx] to control the associated devices with built-in IR sensor

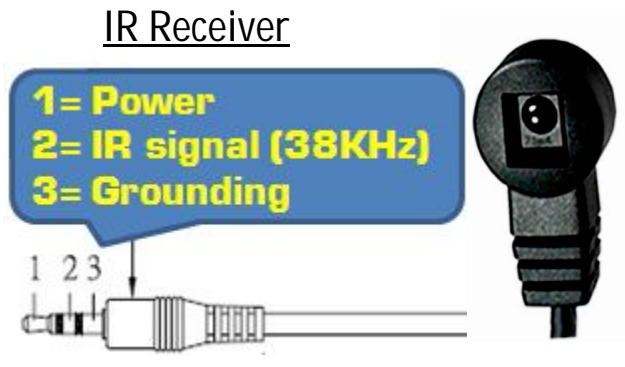
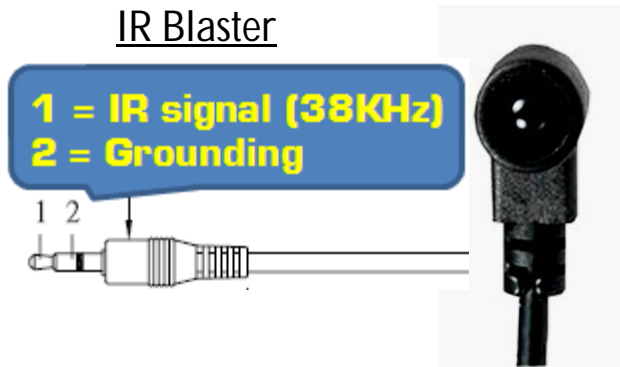
IR Receiver: Plug in an IR receiver here to receive all IR command signals from the IR remote controls of the associated devices

VGA-EXT-0302C[Rx]

IR Blaster: Plug in an IR blaster here to emit all IR command signals received from the IR receiver on VGA-EXT-0302C[Tx] to control the associated devices with built-in IR sensor

IR Receiver: Plug in an IR receiver here to receive all IR command signals from the IR remote control of the IR source device.

Definition of IR Earphone Jack





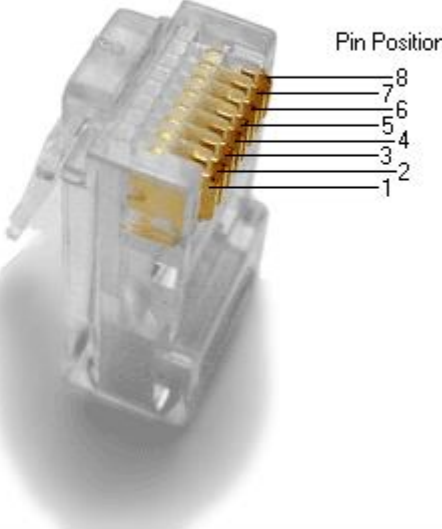










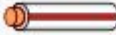



You can buy any IR extension cables in the market that are compatible to the definition of the IR sockets for the matrix if necessary for replacement use. However, IR cables longer than 2m (6-ft) may not work.

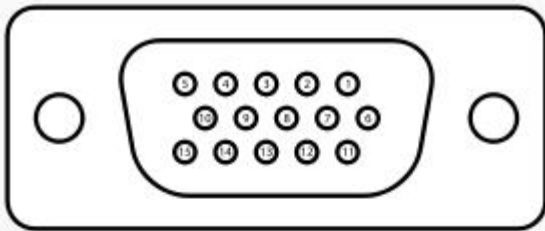
Supported IR Data Format

Data Format	Suitable	Not Recommended
NEC	✓	
RC5	✓	
TOSHIBA MICOM CODE	✓	
GRUNDIG CODE	✓	
SONY 12 BIT CODE	✓	
SONY 15 BIT CODE	✓	
SONY 20 BIT CODE	✓	
RCA CODE		✓
RCM CODE		✓
MATSUSHITA CODE		✓
MITSUBISHI CODE	✓	
ZENITH CODE	✓	
JVC CODE	✓	
M50560-001P	✓	
MN6125H	✓	
MN6125L	✓	
MN6014_C5D7	✓	
MN6014-C6D6	✓	
MC14457P	✓	
LC7464(AHEA)	✓	
GEMINI_CM	✓	

Pin Definition

T568A and T568B Wiring

Pin	T568A Pair	T568B Pair	Wire	T568A Color	T568B Color	Pins on plug face (socket is reversed)
1	3	2	tip	 white/green stripe	 white/orange stripe	
2	3	2	ring	 green solid	 orange solid	
3	2	3	tip	 white/orange stripe	 white/green stripe	
4	1	1	ring	 blue solid	 blue solid	
5	1	1	tip	 white/blue stripe	 white/blue stripe	
6	2	3	ring	 orange solid	 green solid	
7	4	4	tip	 white/brown stripe	 white/brown stripe	
8	4	4	ring	 brown solid	 brown solid	



A female DE15 socket (videocard side).

Pin 1	RED	Red video
Pin 2	GREEN	Green video
Pin 3	BLUE	Blue video
Pin 4	N/C	Not connected
Pin 5	GND	Ground (HSync)
Pin 6	RED_RTN	Red return
Pin 7	GREEN_RTN	Green return
Pin 8	BLUE_RTN	Blue return
Pin 9	SENSE	+5 V DC from gfx adapter
Pin 10	GND	Ground (VSync, DDC)
Pin 11	N/C	Monitor ID
Pin 12	SDA	I ² C data
Pin 13	HSync	Horizontal sync
Pin 14	VSync	Vertical sync
Pin 15	SCL	I ² C clock

Pair of Cat-5/5e/6 Cable	Associated Definition
Green	Audio
Blue	RED channel of VGA
Orange	GREEN channel of VGA
Brown	BLUE channel of VGA

1. All transmission distances are measured using Belden 1583A CAT5e 125MHz Solid UTP cable and ASTRODESIGN Video Signal Generator VG-859C. The transmission distance is defined as the distance between the video source and the VGA display.
2. The transmission length is largely affected by the type of CAT5/6 cables, the type of VGA sources, and the type of VGA display. The testing result shows solid UTP cables (usually in the form of 300m or 1,000ft bulk cables) can transmit a lot longer signals than stranded UTP cables (usually in the form of fixed length patch cords). Shielded STP cables are better suited than unshielded UTP cables. A solid UTP CAT5e cable shows longer transmission range than stranded STP CAT6 cable. For long extension users, solid UTP/STP cables are the only viable choice.
3. To reduce the interference among the unshielded twisted pairs of wires in UTP cable, you can use shielded STP cables to improve EMI problems, which is worsen in long transmission.
4. Because the quality of the CAT5/6 cables has the major effect on how long the transmission limit can achieve and how good is the received picture quality, the actual transmission range is subject to one's choice of CAT5/6 cables. For desired resolutions greater than 1080i or 1280x1024, a Cat-6 cable is recommended.



Performance Guide for Video over CAT5/6 Cable Transmission

Performance rating		Type of CAT5/6 cable		
Wiring	Shielding	CAT5	CAT5e	CAT6
Solid	Unshielded (UTP)	★★★	★★★★	★★★★★
	Shielded (STP)	★★★	★★★	★★★★
Stranded	Unshielded (UTP)	★	★★	★★
	Shielded (STP)	★	★	★★
Termination		Please use EIA/TIA-568-B termination (T568B) at any time		

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