

Y/C & Composite Video Isolator/Converter (NTSC or PAL) Rev C

Part Number
89-200-100-A

Video Accessory Corporation
1243 Sherman Drive, Suite 8
Longmont, Colorado 80501
303-443-1319
www.vac-brick.com

Two Year Limited Warranty

All Video Accessory Corporation (VAC) products have a full two year limited warranty. Exclusions to the warranty include but are not limited to damage to external components, power LED failure where the product continues to function, and electrical damage due to lightning. The warranty shall be void if any alteration or repair of a VAC product is attempted by anyone not authorized by VAC. This warranty is expressly in lieu of all other warranties express or implied, including warranties of merchantability and fitness for use, and of all other obligations or liabilities on the part of VAC, and it neither assumes nor authorizes any other person to assume for it any liability in connection with the sale of this product. This warranty shall not apply to the product or any part thereof subjected to accident, negligence, alteration, abuse, or misuse. No warranty whatsoever is made with respect to accessories or parts supplied by anyone other than VAC, and this warranty shall extend only to the original purchaser of this product. The warranty provided in this article is exclusive and in lieu of, and buyer hereby waives, all other remedies, express or implied, arising by law or otherwise, including consequential damages, whether or not occasioned by negligence of VAC. This warranty shall not be extended, altered or varied except by written instrument signed by VAC and buyer, and shall only apply within the boundaries of the continental United States. Liability of VAC is limited to repair or replacement at the option of VAC. Warranty work is to be sent to VAC. Freight charges will be the responsibility of the purchaser.

Table of Contents

1	Overview	1
2	Basic Functions	1
3	Power Requirements	2
4	Universal Serial Bus (USB) Maintenance Interface	2
5	Control Modes	3
5.1	Option 11 – Composite Isolator, NTSC format.	3
5.2	Option 12 – Y/C Isolator, NTSC format.	4
5.3	Option 21 – Composite to Y/C Converter/Isolator, NTSC format.....	4
5.4	Option 22 – Y/C to Composite Converter/Isolator, NTSC format.....	4
5.5	Option 31 – Composite Isolator, PAL format.	4
5.6	Option 32 – Y/C Isolator, PAL format.	4
5.7	Option 41 – Composite to Y/C Converter/Isolator, PAL format.....	4
5.8	Option 42 – Y/C to Composite Converter/Isolator, PAL format.....	5
6	Maintenance Mode Commands	6
6.1	HELP: “HELP<CR>”	6
6.2	REBOOT: “REBOOT<CR>”	6
6.3	CRC “CRC<CR>”	6
6.4	INFO: “INFO<CR>”	6
6.5	RUN: “RUN<CR>”	6
6.6	OPTION: “OPTION<CR>”	7
6.7	BARS ON “BARS ON<CR>”	7
6.8	BARS OFF “BARS OFF<CR>”	7
6.9	LOAD NEW CODE “LOAD NEW CODE<CR>”	7
7	Overall Specifications	8
8	Package.....	9

Copyright © 2013 Video Accessory Corporation (VAC)

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law. For permission requests, write or email us, addressed “Attention: Permissions Coordinator,” at the address below.

Video Accessory Corporation (VAC)

1243 Sherman Drive, Suite 8

Longmont, Colorado 80501

303-443-1319

www.vac-brick.com

Document History

<u>Rev:</u>	<u>Date:</u>	<u>Action:</u>
A	May 31, 2012	Original Release
B	June 22, 2012	Improved Power description section
C	June 22, 2012	Addition of PAL format and options. Additional Maintenance Commands.

1 Overview

The 89-200-100-A internal power supply, Input signals, and output signals are fully isolated. This empowers the user to control ground loops in standard NTSC & PAL composite and Y/C video formatted applications. Video output signals (Y/C and Composite) are DC restored. In addition to isolation, when desired the unit is capable of converting from Y/C to Composite or Composite to Y/C.

- Isolation: Composite to Composite (J1 → J5)
- Isolation + Composite to Y/C conversion (J1 → J5/Y, J6/C)
- Isolation: Y/C to YC (J1/Y, J2/C → J5/Y, J6/C)
- Isolation + Y/C to Composite conversion (J1/Y, J2/C → J5)

Isolation is achieved between the video decoder and encoder at the digital interface. The unit automatically generates a “Blue Screen” output upon Loss of Signal. The unit permits the user to output a Color Bar test pattern via the USB/Maintenance interface.

A multi-color LED provides power status, indication of the selected option during power-up, and input video detection status.

Unit configuration and operation is based upon the user specified option number. It is recommended customers specify the desired default control option when ordering. This eliminates the need for the user to connect each unit to a laptop in order to set the desired default power up option before use. If another option is required, the default Option number may be changed via the USB port and the change stored in FLASH memory as the new power up default value.

All video connectors are BNC. Power connector has an integrated threaded/screw flange for shock and high vibration environments.

2 Basic Functions

The Y/C and Composite inputs consist of two BNC's with internal 75 Ohm termination. The internal isolated power supply eliminates ground loops between the power supply ground and the video grounds. Isolation of video input and output signals is achieved between the decoder and encoder at the digital interface. Isolation eliminates ground loops between the video input and output grounds. All BNC's (Signal, Shield, inputs, and outputs) have secondary ESD protection provided. The unit will operate correctly on 12-24 VAC or 10-34 VDC.

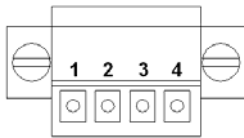
The unit operates as a Composite isolator, Y/C isolator, Composite to Y/C converter/isolator, or Y/C to Composite converter/isolator. Default power-up configuration and operation is based upon the option number that was specified when unit was ordered. If desired, a new option number may be selected as the power-up default using the USB port Maintenance interface.

The unit automatically detects video input timing for NTSC or PAL and generates the correct Composite or Y/C video output. When input video is detected video, the status LED turns green. If no video (Loss of Signal) is detected the LED turns yellow and the unit will output a solid blue screen. The default video output format on loss of signal “LOS” (NTSC or PAL) of the blue screen and Color Bar generator are based on the default power-on option.

Maintenance mode permits the user to output color bars, change the default Option mode, and download new code.

3 Power Requirements

These units have an internal switching supply that isolates supply power from the internal power and I/O. Units will operate correctly when powered by 12-24 VAC or 10-34 VDC. Units are equipped with full wave rectification, so power may be applied between Pins 1 & 2 using either polarity.



Pin 1	PWR+ (10-34V Supply Connection +V)
Pin 2	PWR- (10-34V Return Connection -V/GND)
Pin 3	AGND/Circuit Ground (Same as Input BNC/USB Shields)
Pin 4	CGND/Chassis Ground (ESD Protection Ground)

Internal Circuit ground (AGND/Pin-3) is the ground reference for the internal circuits and input BNC shields (J1-J2). It is NOT the input voltage return path of pins 1 and 2. The user has the option of floating internal circuits, with respect to any system ground, by not connecting to this pin. The user also has the option to connect the circuit ground to the chassis ground or the input power ground (or both). This power connector pin-out permits the user to define the grounding environment the unit is used in.

Chassis ground (CGND/Pin-4) is connected to internal ESD protection devices. The chassis ground does not need to be connected for proper operation. Secondary ESD protection connections exist between the input and output video signals and internal circuit ground.

The power connector (J7) is a 4 pin 3.5mm center header (Phoenix Contact #1897267) and mating power plug (Phoenix Contact #1847071) with screw flanges for vibration and shock resistance.

The unit has a multi-color LED (green/orange/yellow) to indicate power is connected and the internal uP is running.

4 Universal Serial Bus (USB) Maintenance Interface

The Universal Serial Bus (USB) port provides a basic terminal interface connection into the unit for maintenance functions. This permits the user to change the control mode, set configuration parameters, display status, and perform debug/maintenance. **Maintenance commands and functions are described at greater detail in Section 6.** Configuration and parameter values are saved in non-volatile FLASH memory so the unit enters the correct configuration at power-up.

The mini-USB port connects through a Silicon Labs CP2102 USB-UART (RS232) bridge IC to communicate with the processor. Software drivers for the CP2102 may be downloaded from the Silicon Labs web site. Once the laptop connection is established with the CP2102 a virtual serial communication port is created. HyperTerminal¹ may then be started and communication parameters configured as follows:

¹ HyperTerminal is no longer a software component of post Windows-XP operating systems. Alternate terminal programs such as Hercules Setup may be considered.

8 data bits
9600 baud
1 stop bit
No parity
XON/OFF flow control enabled

The XON/XOFF flow control is used during the download of new code so the data transfer can be stopped while the processor internal FLASH memory is loaded.

NOTE: USB shield is referenced to internal Circuit Ground. It is therefore possible for a ground "Sneak Path" to be created through the connected laptop computer. This will typically occur when the laptop or peripherals are connected to an external power source.

5 Control Modes

The control mode and/or operating configuration is selected by an Option number. Customers should specify the desired Option number when ordering these units. Unit part number, Firmware revision, and factory default Option information are included on the label.

The default power up Option may be configured, to one other than the factory default, using the USB interface and a terminal program such as HyperTerminal.

At power-up, the unit will display the Option number by using the bi-color LED. The green LED is used to show the most significant digit of the Option number by flashing the corresponding number of times to the most significant Option number digit. The yellow LED will flash the corresponding number of times to the least significant Option number digit. This provides a way for the user to know the Option number for the control mode at unit power up.

The following sections provide details on each of the option modes:

Option 11 – Composite Video Isolator (NTSC)
Option 12 – Y/C Video Isolator (NTSC)
Option 21 – Composite to Y/C Isolator/Converter (NTSC)
Option 22 – Y/C to Composite Isolator/Converter (NTSC)

Option 31 – Composite Video Isolator (PAL)
Option 32 – Y/C Video Isolator (PAL)
Option 41 – Composite to Y/C Isolator/Converter (PAL)
Option 42 – Y/C to Composite Isolator/Converter (PAL)

5.1 Option 11 – Composite Isolator, NTSC format.

Configures the unit for isolation of a composite video input to composite video output. NTSC format is used when generating Color Bars and Loss of Video Input signal "Blue Screen".

- Composite Video Source is connected to the "Y/Comp" input BNC
- Isolated Composite video is available at the "Y/Comp" output BNC
- The "C" input and output BNCs are left unconnected for this configuration.

5.2 Option 12 – Y/C Isolator, NTSC format.

Configures the unit for isolation of a Y/C video input to Y/C video output. NTSC format is used when generating Color Bars and Loss of Video Input signal “Blue Screen”.

- Y/C Video Source is connected to the respective “Y/Comp” and “C” input BNCs
- Isolated Y/C video is available at the respective “Y/Comp” and “C” output BNCs

5.3 Option 21 – Composite to Y/C Converter/Isolator, NTSC format.

Configures the unit for isolation and conversion of a composite video input to a Y/C video output. NTSC format is used when generating Color Bars and Loss of Video Input signal “Blue Screen”.

- Composite Video Source is connected to the “Y/Comp” input BNC
- Isolated Y/C video is available at the respective “Y/Comp” and “C” output BNCs
- The “C” input BNC is left unconnected for this configuration.

5.4 Option 22 – Y/C to Composite Converter/Isolator, NTSC format.

Option 41 configures the unit for isolation and conversion of a Y/C video input to a Composite video output. NTSC format is used when generating Color Bars and Loss of Video Input signal “Blue Screen”.

- Y/C Video Source is connected to the “Y/Comp” and “C” input BNCs
- Isolated Composite video is available at the “Y/Comp” output BNC
- The “C” output BNC is left unconnected for this configuration.

5.5 Option 31 – Composite Isolator, PAL format.

Configures the unit for isolation of a composite video input to composite video output. PAL format is used when generating Color Bars and Loss of Video Input signal “Blue Screen”.

- Composite Video Source is connected to the “Y/Comp” input BNC
- Isolated Composite video is available at the “Y/Comp” output BNC
- The “C” input and output BNCs are left unconnected for this configuration.

5.6 Option 32 – Y/C Isolator, PAL format.

Configures the unit for isolation of a Y/C video input to Y/C video output. PAL format is used when generating Color Bars and Loss of Video Input signal “Blue Screen”.

- Y/C Video Source is connected to the respective “Y/Comp” and “C” input BNCs
- Isolated Y/C video is available at the respective “Y/Comp” and “C” output BNCs

5.7 Option 41 – Composite to Y/C Converter/Isolator, PAL format.

Configures the unit for isolation and conversion of a composite video input to a Y/C video output. PAL format is used when generating Color Bars and Loss of Video Input signal “Blue Screen”.

- Composite Video Source is connected to the “Y/Comp” input BNC
- Isolated Y/C video is available at the respective “Y/Comp” and “C” output BNCs
- The “C” input BNC is left unconnected for this configuration.

5.8 Option 42 – Y/C to Composite Converter/Isolator, PAL format.

Configures the unit for isolation and conversion of a Y/C video input to a Composite video output. PAL format is used when generating Color Bars and Loss of Video Input signal “Blue Screen”.

- Y/C Video Source is connected to the “Y/Comp” and “C” input BNCs
- Isolated Composite video is available at the “Y/Comp” output BNC
- The “C” output BNC is left unconnected for this configuration.

6 Maintenance Mode Commands

These units have a Universal Serial Bus (USB) port to permit the user to; retrieve information, change parameters, and perform other specific commands for system debug. The intended use of this port is for temporary connection of a laptop computer, and HyperTerminal application, to communicate with the internal processor.

As unit powers up the user may enter the Maintenance Mode, during the boot sequence, by entering “NO” when prompted. When the unit is up and running; entry of any character will signal the code that the user wants to enter Maintenance Mode. Entry of Two <CR> characters is required to enter Maintenance Mode. If the two <CR> characters are not received within 30 sec., the unit will time out and return to the RUN mode.

While in the Maintenance Mode the video output is set to the Blue Screen by default. If no key activity is detected for 30 sec., code will automatically exit Maintenance mode and return to RUN mode. Automatic exit from Maintenance mode also occurs if the physical USB connection is removed.

The following shows the different commands available in Maintenance Mode. The commands are not case sensitive.

6.1 HELP: “HELP<CR>”

The Help command provides a list of the valid Maintenance Mode Commands.

6.2 REBOOT: “REBOOT<CR>”

The Reboot command is the software equivalent of pressing a reset button. This command is used when the user wishes to initiate the boot sequence as if power was just applied.

6.3 CRC “CRC<CR>”

CRC is a diagnostic command used to calculate and display checksums for: Boot, Application, and configuration memories.

6.4 INFO: “INFO<CR>”

The INFO command provides the user with unit information like part number, serial number, code revision level, default Option number, default Timer number, and code CRC values.

6.5 RUN: “RUN<CR>”

The RUN command causes the code to jump to the main application and exit the Maintenance Mode.

6.6 OPTION: “OPTION<CR>”

The OPTION command permits the user to change the default Option Mode number. Units are shipped from the factory with the default Option number set to the customer's request (part of the original order to VAC). When the Option number is changed, it is changed in the internal FLASH as the new power up Option default. After the Option command is entered the user must enter a valid Option number (two numbers followed by <CR>) as defined in the product manual. The Option number is confirmed by printing out the new default number.

6.7 BARS ON “BARS ON<CR>”

This maintenance command is used to enable or Turn Color Bars ON as the output signal.

6.8 BARS OFF “BARS OFF<CR>”

This maintenance command is used to enable or Turn Color Bars OFF as the output signal.

6.9 LOAD NEW CODE “LOAD NEW CODE<CR>”

The LOAD NEW CODE command permits the user to load a new revision of processor code. The user **must** contact the factory for changes to the code and receive the required TXT file.

NOTE: Care must be taken when loading new code. If the user answers YES to both questions during the boot sequence, thus starting the download process, the application FLASH is erased, new code must be loaded.

It is the responsibility of the user to contact the factory before attempting to load new code.

7 Overall Specifications

Video Formats:	NTSC or PAL
Video Connectors:	BNC, High Precision 75 Ω
Termination:	Input: 75 Ohms, DC coupled Output: 75 Ω (series), DC coupled
USB Interface (ASCII data):	8 bit 9600 baud 1 stop No parity XON/OFF flow control
Power LED:	Green (Indicates uP is running)
Operating Temperature Range:	-40C to +85C
Power:	12-24V AC, 10-34V DC (either polarity on PWR connector)
Supply Current:	260mA @ 12 VDC 125mA @ 28 VDC
Power Connector:	3.5mm 4 pin terminal block (Phoenix Contact #1843813) Mating plug (Phoenix Contact #1847071)
Dimensions:	4.4" x 2.2" x 0.65" (<i>Figure 1</i>)
Mounting:	Two 6-32 threaded inserts
Weight:	7 oz (one layer)
Package:	Epoxy/Encapsulation UL 94 V-O & UL 94 5VA rated.

8 Package

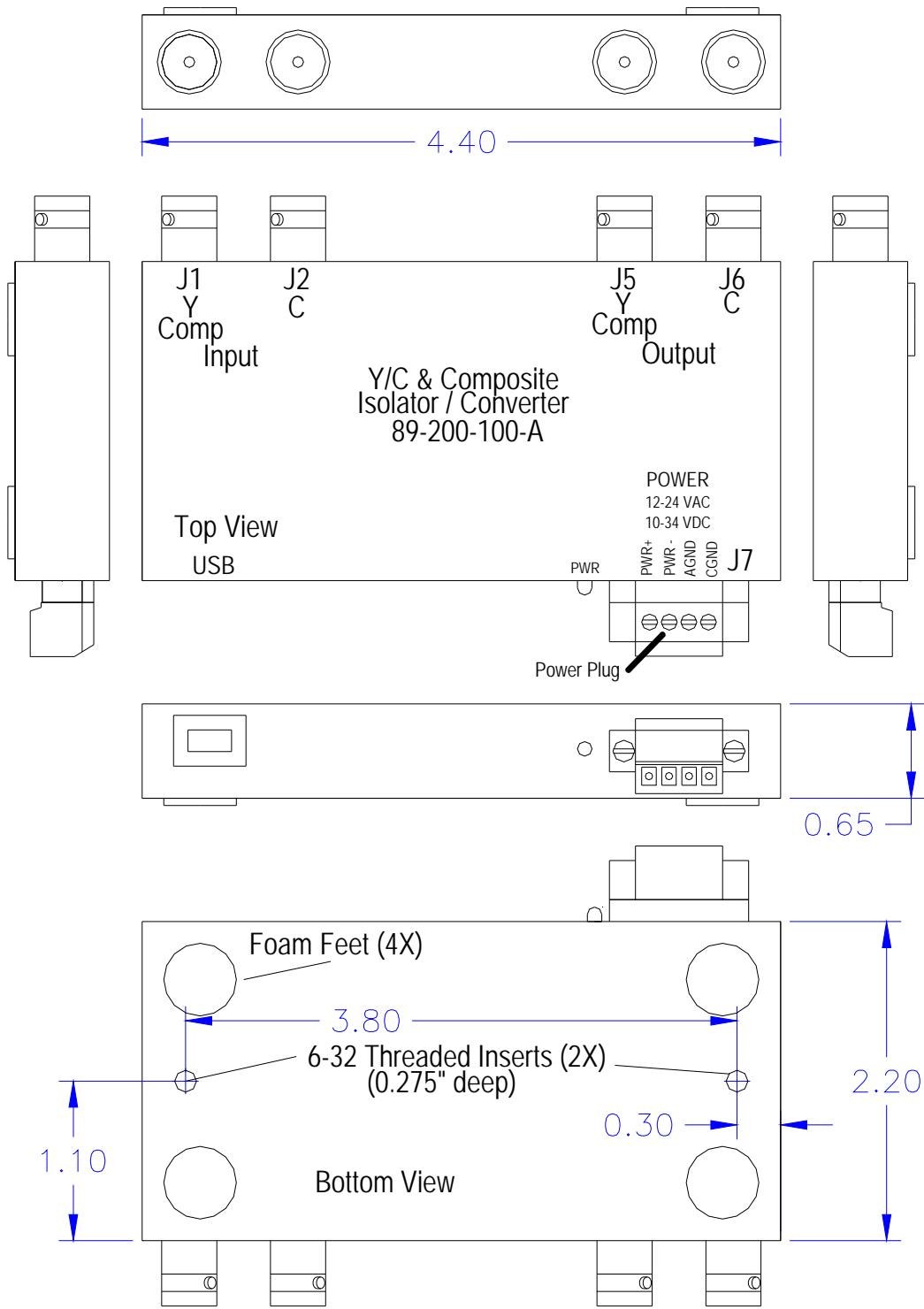


Figure 1: Y/C & Composite Isolator/Converter