



**HDMI to VGA Converter with Scaler
VC812
User Manual**



EMC Information

FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE STATEMENT:
 This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

CE Warning: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

RoHS

This product is RoHS compliant.

SJ/T 11364-2006

The following contains information that relates to China.

部件名称	有毒有害物质或元素					
	铅	汞	镉	六价铬	多溴联苯	多溴二苯醚
电器部件	●	○	○	○	○	○
机构部件	○	○	○	○	○	○

- : 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T 11363-2006规定的限量要求之下。
- : 表示符合欧盟的豁免条款, 但该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T 11363-2006的限量要求。
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User Information

Online Registration

Be sure to register your product at our online support center:

International	http://eservice.aten.com
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Telephone Support

For telephone support, call this number:

International	886-2-8692-6959
China	86-400-810-0-810
Japan	81-3-5615-5811
Korea	82-2-467-6789
North America	1-888-999-ATEN ext 4988
United Kingdom	44-8-4481-58923

User Notice

All information, documentation, and specifications contained in this manual are subject to change without prior notification by the manufacturer. The manufacturer makes no representations or warranties, either expressed or implied, with respect to the contents hereof and specifically disclaims any warranties as to merchantability or fitness for any particular purpose. Any of the manufacturer's software described in this manual is sold or licensed *as is*. Should the programs prove defective following their purchase, the buyer (and not the manufacturer, its distributor, or its dealer), assumes the entire cost of all necessary servicing, repair and any incidental or consequential damages resulting from any defect in the software.

The manufacturer of this system is not responsible for any radio and/or TV interference caused by unauthorized modifications to this device. It is the responsibility of the user to correct such interference.

The manufacturer is not responsible for any damage incurred in the operation of this system if the correct operational voltage setting was not selected prior to operation. **PLEASE VERIFY THAT THE VOLTAGE SETTING IS CORRECT BEFORE USE.**

Package Contents

The VC812 HDMI to VGA Converter with Scaler package consists of:

- ◆ 1 VC812 HDMI to VGA Converter with Scaler
- ◆ 1 Software CD
- ◆ 1 Power Adapter
- ◆ 1 User Instructions*

Check to make sure that all the components are present and that nothing got damaged in shipping. If you encounter a problem, contact your dealer.

Read this manual thoroughly and follow the installation and operation procedures carefully to prevent any damage to the unit, and/or any of the devices connected to it.

* Features may have been added to the VC812 since this manual was published. Please visit our website to download the most up-to-date version.

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About this Manual

This User Manual is provided to help you get the most from your VC812 system. It covers all aspects of installation, configuration and operation. An overview of the information found in the manual is provided below.

Introduction, introduces you to the VC812 system. Its purpose, features and benefits are presented, and its front and back panel components are described.


Hardware Setup, describes how to set up your VC812 installation. The necessary steps are provided.

Operation, explains the fundamental concepts involved in operating the VC812 via the front panel pushbuttons.

An Appendix, provides specifications and other technical information regarding the VC812.

Conventions

This manual uses the following conventions:

- Monospaced Indicates text that you should key in.
- [] Indicates keys you should press. For example, [Enter] means to press the **Enter** key. If keys need to be chorded, they appear together in the same bracket with a plus sign between them: [Ctrl+Alt].
1. Numbered lists represent procedures with sequential steps.
- ◆ Bullet lists provide information, but do not involve sequential steps.
- Indicates selecting the option (on a menu or dialog box, for example), that comes next. For example, Start → Run means to open the *Start* menu, and then select *Run*.
-  Indicates critical information.

Product Information

For information about all ATEN products and how they can help you connect without limits, visit ATEN on the Web or contact an ATEN Authorized Reseller. Visit ATEN on the Web for a list of locations and telephone numbers:

International	http://www.aten.com
North America	http://www.aten-usa.com

Chapter 1

Introduction

Overview

The VC812 HDMI to VGA converter with Scaler offers an easy and convenient way of converting HDMI input signals into analog video (VGA). The VC812 enables you to use a non-HDMI display to access HDMI content. It supports input resolutions 480p, 720p, 1080p, 1080i, and up to 1900 x 1200 PC input resolution. It has both analog and digital audio outputs, as well as one stereo audio output.

You can operate the VC812 via the built-in On-Screen Display (OSD), which can be controlled through accessible front panel pushbuttons. In addition, the VC812 comes with a Utility Tool, which can be installed on a computer connected to the VC812's mini USB port. The OSD and Utility Tool enable you to configure the screen resolution, color space setting, picture quality and multiple other functions for optimizing the display.

Features

- ◆ Converts HDMI signals to VGA output
- ◆ Supports analog/stereo audio
- ◆ Superior video quality – up to 1080p; 1920 x 1200
- ◆ Scaler – a premium scaling engine that converts various video input resolutions into the display's native resolution, while adjusting the picture ratio automatically for maximum viewing comfort.
- ◆ 3D Deinterlacing – increases image clarity for the ultimate display quality by processing and scanning digital video signals
- ◆ Features a built in high-performance scaler function for best image quality
- ◆ Features a superior de-interlacer function for smooth video playback quality
- ◆ Built-in OSD function for video and system settings configuration
- ◆ Integrated superior video noise reduction
- ◆ Integrated next generation color engine – automatic picture quality/color adjustment and enhancement
- ◆ Automatically detects video input signals
- ◆ LED indication of power status and source device
- ◆ No software required – eliminates incompatibility and installation issues
- ◆ Device configuration using a utility tool via mini USB port
- ◆ Supports 16:9 and 4:3 video aspect ratios
- ◆ Multiple selectable video resolutions

Requirements

The following equipment is required for a complete VC812 installation:

Source Device(s)

The source device should have the following:

- ◆ HDMI Type A connector
- ◆ PC or laptop with Mini USB port (for configuration via VC812 Utility Tool)

Display Device

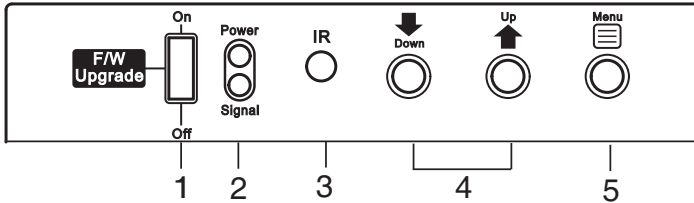
- ◆ VGA based video device with HDB
- ◆ HDB-15 male connector

Cables

- ◆ HDMI Type A cable
- ◆ HDB-15 cable (for VGA based video display device)
- ◆ RCA audio cable (for Coaxial audio device)
- ◆ 3.5mm stereo cable (for Stereo audio device)
- ◆ USB-to-Mini USB cable (for configuration via VC812 Utility Tool)

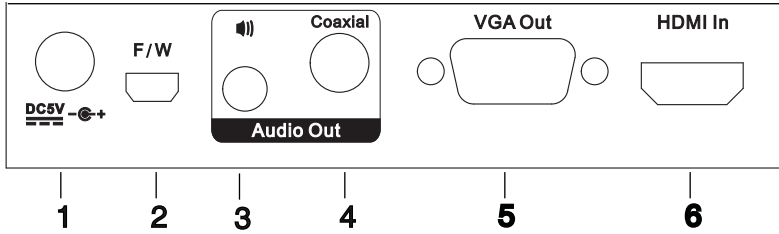
Components

Front View



No.	Component	Description
1	F/W Upgrade switch	Set this to Off to operate the VC812 in Normal Mode. Note: In case the firmware needs to be upgraded, turn the switch On to have the VC812 enter Firmware Upgrade mode. Contact your product dealer for more details.
2	LED Status	The Power LED lights red to indicate that the VC812 is receiving power. The Signal LED lights green to indicate that an HDMI input source is active.
3	IR Receiver	This sensor receives signals from the IR remote control (optional). Note: Contact your dealer for more information.
4	Up / Down pushbuttons	Pressing the Up / Down pushbuttons moves the selection to the corresponding fields shown in the built-in On-Screen Display (OSD).
5	Menu pushbutton	Press this button to open the OSD menu and/or select an option.

Rear View



No.	Component	Description
1	Power Jack	Plug in the provided power adapter to this power jack to power on the VC812.
2	Firmware Upgrade Port	For device configuration via the utility tool, connect this port to a PC or laptop using a USB to mini USB cable.
3	Stereo Audio Port	Connect your analog stereo audio device to this port.
4	Digital Audio Port	Connect the coaxial audio cable of your audio device to this port.
5	VGA Out	Connect your VGA display device to this port.
6	HDMI In	Connect your HDMI source device to this port.

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Chapter 2

Hardware Setup



1. Important safety information regarding the placement of this device is provided on page 21. Please review it before proceeding.
2. Make sure that the power to all devices connected to the installation are turned off.
3. Make sure that all devices you will be installing are properly grounded.

Mounting

For convenience and flexibility, the VC812 can be mounted on the wall or a rack. To mount a unit, screw the built-in brackets into any convenient location on the wall or a rack.

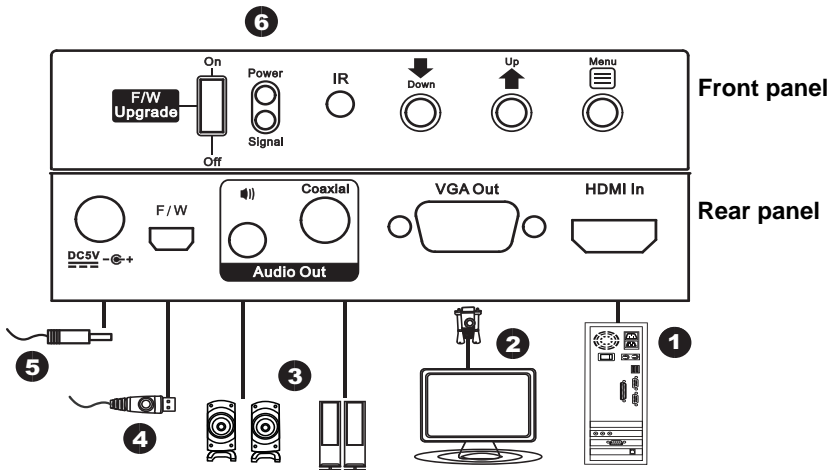


Installation

Installation of the VC812 is simply a matter of plugging in the appropriate cables.

To install the VC812, refer to the installation diagram as you perform the following steps:

1. Use an HDMI cable to connect the HDMI output port on the video source device to the **HDMI In** port on the VC812.
2. Use an HDB-15 cable to connect the VGA display device to the **VGA Out** port on the VC812.
3. Connect your audio output device (such as speakers or AVRs) to the Stereo Audio Port or Digital Audio Port.
4. (Optional) To manage the VC812 using the utility tool, connect your computer via the **Mini USB** port.
5. Plug the provided power adapter into an appropriate power source; plug the power adapter cable into the **Power** jack on the VC812.
6. Check that the **Power** LED lights red and the **Signal** LED lights green to indicate that the VC812 is receiving power and ready to operate.



Chapter 3

Operation

Overview

The VC812 HDMI to VGA converter with Scaler offers easy and flexible operation through its built-in On-Screen Display (OSD) and the Utility Tool, which can be installed on a computer connected to the VC812's mini USB port.

On-Screen Display (OSD)

The built-in OSD can be configured using the VC812 front panel pushbuttons, as follows:

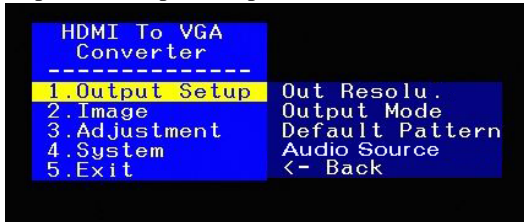
- ◆ **Menu** pushbutton – opens the OSD and selects menu options
- ◆ **Up / Down** pushbuttons – navigates the OSD menu and lists of options

You can cycle through the Menu options in the order shown in the table below.

OSD Menu	
Output Setup	Output Resolution
	Output Mode
	Default Pattern
	Audio Source
Image	Contrast
	Brightness
	Saturation
	Hue
	B/W Extension
	Color Tone
	Edge Enhance
	Sharpness
Adjustment	Under/Over Scan
	Aspect Ratio
	H-Mirror
	V-Mirror
	H-Shift
	V-Shift
System	Input Resolution Info
	F/W Version
	Factory Reset

Output Setup

In the OSD Menu screen, highlight *1. Output Setup* and press the **Menu** pushbutton to open the Output Setup submenu, as follows:



Select the submenu option you want to configure – each option is further discussed in the preceding sections.

Output Resolution

You can manually select the screen resolution for the display. Highlight the resolution you want to use and press **Menu**.

Some of the available options are as follows:

SD (480p) 60	1360 x 768 p60
HD (720p) 60	1366 x 768 p60
HD (1080p) 60	1400 x 1050 p60
640 x 480 p60	1600 x 1200 p60
640 x 480 p75	1440 x 900 p60
800 x 600 p60	1440 x 900 p75
800 x 600 p75	1680 x 1050 p60
1024 x 768 p60	1680 x 1050 pRB
1024 x 768 p75	1920 x 1080 pRB
1280 x 1024 p60	1920 x 1200 pRB
1280 x 1024 p75	

Output Mode

Select the color space setting for the display. The selection includes **RGB** and **YCbCr422**.

Default Pattern

Select the color component for the display. Available options are as follows:

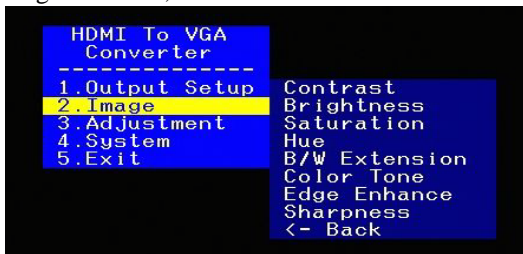
Disable	Color	W-HRamp
White	Gray	W-VRamp
Cross	Windows	Diagonal
Hatch	H-Ramp	

Audio Source

Select the EDID audio channel you want the VC812 to use. The selection includes **2ch** and **7.1ch**.

Image

In the OSD Menu screen, navigate to **2. Image** and press the **Menu** pushbutton to open the Image submenu, as follows:



Adjust the picture quality of the display by setting the values for contrast, brightness, sharpness, saturation, hue and sharpness. You can also configure the black and white extension, color tone and edge enhance of your video.

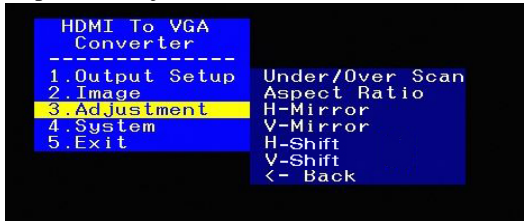
- ◆ For the following options, use the **Up** and **Down** buttons to increase or decrease the level.

Setting	Value
Contrast	0-255 (default is 128)
Brightness	0-255 (default is 128)
Saturation	0-255 (default is 128)
Hue	0-255 (default is 128)
Sharpness	0-127 (default is 0)

- ◆ **B/W extension:** Turn the black and white extension **On** or **Off**. This is set to Off by default.
- ◆ **Color Tone:** Select the color tone for the display. Options are **Off** (default), **Skin** or **Green**.
- ◆ **Edge Enhance:** Select the degree of display image edge enhancements – you can choose: **Typ** (typical), **Mid** (middle), **Max** (maximum) or **Off**. This is set to Typ by default.

Adjustment

In the OSD Menu screen, navigate to *3. Adjustment* and press the **Menu** pushbutton to open the Adjustment submenu, as follows:



Adjust the picture position on the screen by setting the under/over scan percentage, selecting the aspect ratio and configuring the horizontal and vertical adjustment values.

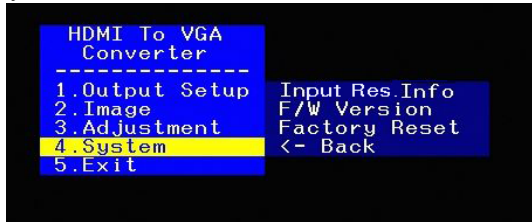
- ◆ For the following options, use the **Up** and **Down** buttons to increase or decrease the value. This either increases or decreases the empty space around the picture (**Under/Over Scan**), or effectively moves the picture area either to the left or right (for **H-Shift** and **V-Shift**) of the screen.

Setting	Value
Under/Over Scan	-50% to +50% (default is 0 or off)
H-Shift	-100 to 100 (default is 0)
V-Shift	-50 to 50 (default is 0)

- ◆ **Aspect Ratio:** Select the aspect ratio for the display. Options are **4:3** (default) or **16:9**.
- ◆ For **H-Mirror** and **V-Mirror**, select whether the function is **On** or **Off**.
- ◆ Click the **Apply** button(s) to use the values entered.

System

In the OSD Menu screen, navigate to *4. System* and press the **Menu** pushbutton to open the System submenu, as follows:



View the current input resolution and firmware version, as well as reset the VC812 to its factory default settings.

- ◆ **Input Res. Info:** This shows the current input resolution used by the device.
- ◆ **F/W Version:** This shows the current firmware version.
- ◆ **Factory Reset:** Select this if you want to reset the device back to the factory default settings.

Exit

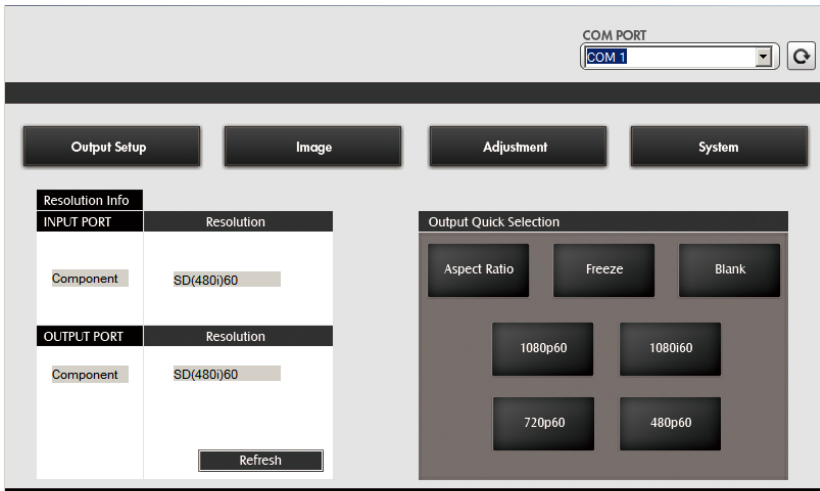
In the OSD Menu screen, navigate to *5. Exit* and press the **Menu** pushbutton to close the OSD.

Utility Tool

The VC812 HDMI to VGA converter with Scaler comes with a software CD that contains the VC812 Utility Tool for quick and easy configuration of the device.

To manage the VC812 using the utility tool, connect your computer to the installation via the **Mini USB** port. Insert the software CD into the computer's optical disk drive, and double-click on the application file contained within to run it. You can also copy this file into your computer's local drive.

Upon execution of the Utility Tool, the Main Screen displays:



In the **Main Screen**, you can do the following actions:

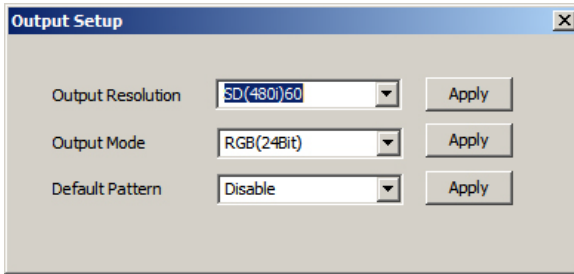
- ◆ Select the **COM PORT** you want to use. Click the refresh button (🔄) to check the com port connection and refresh the selection.
- ◆ View the **Resolution Info** of the HDMI input source, as well as the VGA display device. Click **Refresh** to have the VC812 check the input/output source and display the latest information.
- ◆ Select the **Output Quick Resolution**, which enables you to manipulate the display's *Aspect Ratio*, as well as *Freeze* or *Blank* the screen. You can also quickly select the output resolution you want to use. Options are: *1080p60*, *1080i60*, *720p60* and *480p60*.

You can cycle through the Menu options in the order shown in the table below.

Menu Page	Sub-Menu Page(s)		
Main screen	Com Port		
	Resolution Info	Input Port / Output Port	Resolution
	Out Quick Selection	Aspect Ratio / Freeze / Blank	
		1080p60 / 1080i60 / 720p60 / 480p60	
	Output Setup	Output Resolution	
		Output Mode	
		Default Pattern	
	Image	Contrast	
		Brightness	
		Saturation	
		Hue	
		B/W Extension	
		Color Tone	
		Edge Enhance	
		Sharpness	
	Adjustment	Under/Over Scan	
		Aspect Ratio	
		H-Mirror	
		V-Mirror	
		Input H Adj	
		Input V Adj	
	System	In-Sync Info	
		F/W Version	
Factory Reset			
Firmware Update			

Output Setup

Select the *Output Resolution*, *Output Mode* and *Default Pattern* that you want the VC812 to use.



Output Resolution

From the drop down menu, select the screen resolution that you want to use for your display. Some of the available options are as follows:

SD (480p) 60	1360 x 768 p60
HD (720p) 60	1366 x 768 p60
HD (1080p) 60	1400 x 1050 p60
640 x 480 p60	1600 x 1200 p60
640 x 480 p75	1440 x 900 p60
800 x 600 p60	1440 x 900 p75
800 x 600 p75	1680 x 1050 p60
1024 x 768 p60	1680 x 1050 pRB
1024 x 768 p75	1920 x 1080 pRB
1280 x 1024 p60	1920 x 1200 pRB
1280 x 1024 p75	

Click the **Apply** button to use the value entered.

Output Mode

From the drop down menu, select the color space setting for your display. Choices include **RGB**, **YC444** and **YC422**. Click the **Apply** button to use the value entered.

Default Pattern

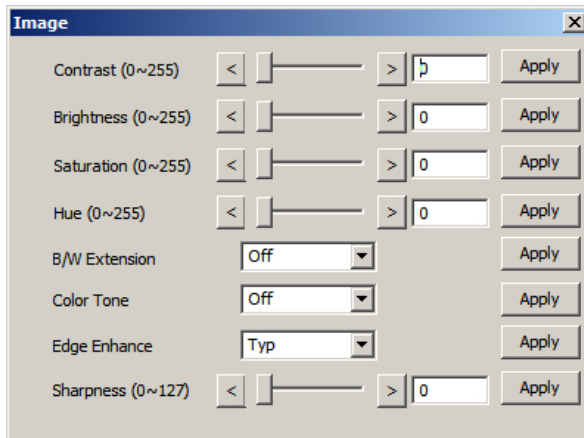
From the drop down menu, select the color component for your display. Available options are as follows:



Disable	Window
H-Color	V-Color
H-Ramp	V-Ramp
H-Gray	V-Gray

Click the **Apply** button to use the value entered.

Image

Adjust the picture quality of your display by setting the values for contrast, brightness, sharpness, saturation, hue and sharpness. You can also configure the black and white extension, color tone and edge enhance of your video.



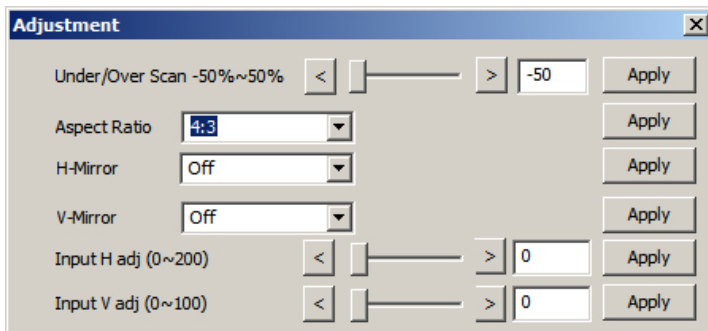
- ◆ For the following options, use the left  and right  screen buttons to increase or decrease the value.

Setting	Value
Contrast	0-255 (default is 128)
Brightness	0-255 (default is 128)
Saturation	0-255 (default is 128)
Hue	0-255 (default is 128)
Sharpness	0-127 (default is 0)

- ◆ **B/W extension:** Turn the black and white extension **On** or **Off**. This is set to Off by default.
- ◆ **Color Tone:** Select the color tone for the display. Options are **Off** (default), **Skin** or **Green**.
- ◆ **Edge Enhance:** Select the degree of display image edge enhancements – you can choose: **Typ** (typical), **Mid** (middle), **Max** (maximum) or **Off**. This is set to Typ by default.
- ◆ Click the **Apply** button(s) to use the values entered.



Adjustment

Adjust the picture position on screen by setting the under/over scan percentage, selecting the aspect ratio and configuring the horizontal and vertical adjustment values.



- ◆ **Aspect Ratio:** Select the aspect ratio for the display. Options are **4:3** (default) or **16:9**.
- ◆ For **H-Mirror** and **V-Mirror**, select whether the function is **On** or **Off**.
- ◆ Click the **Apply** button(s) to use the values entered.

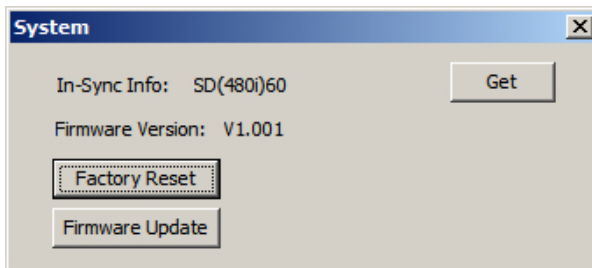
(Continues on next page.)

- ◆ For the other options, use the left  and right  screen buttons to increase or decrease the value. This either increases or decreases the empty space around the picture (**Under/Over Scan**), or effectively moves the picture area either to the left or right (for **Input H Adj** and **Input V Adj**) of the screen.

Setting	Value
Under/Over Scan	-50% to +50% (default is 0 or off)
Input H Adj	0-200 (default is 0)
Input V Adj	0-200 (default is 0)

System

View the current input resolution and firmware version, as well as reset the VC812 to its factory default settings.



- ◆ Click the **Get** button to have the VC812. display the latest values in use.
- ◆ **In-Sync Info:** This shows the current input resolution used by the device.
- ◆ **F/W Version:** This shows the current firmware version.
- ◆ **Factory Reset:** Click this and click **OK** if you want to reset the device back to the factory default settings.
- ◆ **Firmware Update:** This button is for upgrading the firmware of the device. Contact your product dealer for more details.

Powering Off and Restarting

If you power off the VC812, follows these steps before powering it on again:

1. Power off the attached devices.
2. Unplug the power adapter cable from the VC812.
3. Wait 10 seconds, and then plug the power adapter cable back in.
4. After the VC812 is powered on, power on the attached devices.

Safety Instructions

General

- ◆ Read all of these instructions. Save them for future reference.
- ◆ Follow all warnings and instructions marked on the device.
- ◆ This product is for indoor use only.
- ◆ Do not place the device on any unstable surface (cart, stand, table, etc.). If the device falls, serious damage will result.
- ◆ Do not use the device near water.
- ◆ Do not place the device near, or over, radiators or heat registers.
- ◆ The device cabinet is provided with slots and openings to allow for adequate ventilation. To ensure reliable operation, and to protect against overheating, these openings must never be blocked or covered.
- ◆ The device should never be placed on a soft surface (bed, sofa, rug, etc.) as this will block its ventilation openings. Likewise, the device should not be placed in a built in enclosure unless adequate ventilation has been provided.
- ◆ Never spill liquid of any kind on the device.
- ◆ Unplug the device from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
- ◆ The device should be operated from the type of power source indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
- ◆ The device is designed for IT power distribution systems with 230V phase-to-phase voltage.
- ◆ To prevent damage to your installation it is important that all devices are properly grounded.
- ◆ The device is equipped with a DC adapter. This is a safety feature.
- ◆ To help protect your system from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or un-interruptible power supply (UPS).
- ◆ Position system cables and power cables carefully; Be sure that nothing rests on any cables.

- ◆ Never push objects of any kind into or through cabinet slots. They may touch dangerous voltage points or short out parts resulting in a risk of fire or electrical shock.
- ◆ Do not attempt to service the device yourself. Refer all servicing to qualified service personnel.
- ◆ If the following conditions occur, unplug the device from the wall outlet and bring it to qualified service personnel for repair.
 - ◆ Liquid has been spilled into the device.
 - ◆ The device has been exposed to rain or water.
 - ◆ The device has been dropped, or the cabinet has been damaged.
 - ◆ The device exhibits a distinct change in performance, indicating a need for service.
 - ◆ The device does not operate normally when the operating instructions are followed.
- ◆ Only adjust those controls that are covered in the operating instructions. Improper adjustment of other controls may result in damage that will require extensive work by a qualified technician to repair.

Technical Support

International

- ◆ For online technical support – including troubleshooting, documentation, and software updates: <http://eservice.aten.com>
- ◆ For telephone support, see *Telephone Support*, page iii:

North America

Email Support		support@aten-usa.com
Online Technical Support	Troubleshooting Documentation Software Updates	http://www.aten-usa.com/support
Telephone Support		1-888-999-ATEN ext 4988

When you contact us, please have the following information ready beforehand:

- ◆ Product model number, serial number, and date of purchase.
- ◆ Your computer configuration, including operating system, revision level, expansion cards, and software.
- ◆ Any error messages displayed at the time the error occurred.
- ◆ The sequence of operations that led up to the error.
- ◆ Any other information you feel may be of help.

Specifications

VC812	
Video Input	
Interface	1 x HDMI Type A Female (Black)
Impedance	100 Ω
Video Output	
Interface	1 x HDB-15 Female (Black)
Impedance	75 Ω
Video	
Max. Pixel Clock	165 MHz
Max. Resolution	Up to 1920 x 1200
Scaler Resolutions	480p; 480i; 576p; 576i; 800x600; 1024x768; 1280x720; 1280x1024; 1360x768; 1440x900; 1400x1050; 1600x1200; 1680x1050; 1080i; 1080p; 1920x1200
Audio	
Output	Analog: 1 x Mini Stereo Jack Female (Black) Digital: 1 x RCA (Yellow)
Power	
Connectors	1 x DC Jack
Consumption	5 VDC, 10W
Environmental	
Operating Temperature	0 - 40°C
Storage Temperature	-20°C - 60°C
Humidity	20 – 90% RH, Non-condensing
Physical Properties	
Housing	Metal
Weight	0.29 kg (0.64 lb)
Dimensions (L x W x H)	11.00 x 8.30 x 2.80 cm (4.33 x 3.27 x 1.1 in.)
Carton Lot	5 pcs

Limited Warranty

IN NO EVENT SHALL THE DIRECT VENDOR'S LIABILITY EXCEED THE PRICE PAID FOR THE PRODUCT FROM DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT, DISK, OR ITS DOCUMENTATION.

The direct vendor makes no warranty or representation, expressed, implied, or statutory with respect to the contents or use of this documentation, and especially disclaims its quality, performance, merchantability, or fitness for any particular purpose.

The direct vendor also reserves the right to revise or update the device or documentation without obligation to notify any individual or entity of such revisions, or update. For further inquiries, please contact your direct vendor.