

MultiScopeCompact

Video Measurement and Calibration Tools

Users Guide

RHMG Software Tools Library

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1.0 Introduction

The **RHMG MultiScopeCompact** video software application provides a fast and accurate way to measure, interpret, calibrate and display video signals from a variety of 3rd party video capture sources in real-time. It's easy to install, configure and use immediately.

'*MSCompact*' has been designed with flexibility and economy in mind, all packed into a small LCD screen footprint. A major design feature is the adaptation of a plug-in model. This simply means the user can select from any of our many A/V scopes mounted within the *MSCompact* interface that have been purchased and unlocked.

Though the user interface supports only two visible scope spots (or sockets), the user can access and enable any available unlocked scopes needed for the immediate job at hand.

See *Figure 1.0* below to view the *MSCompact* user interface and the many possible plug-ins and plug-in combinations that can be enabled within *MSCompact*.

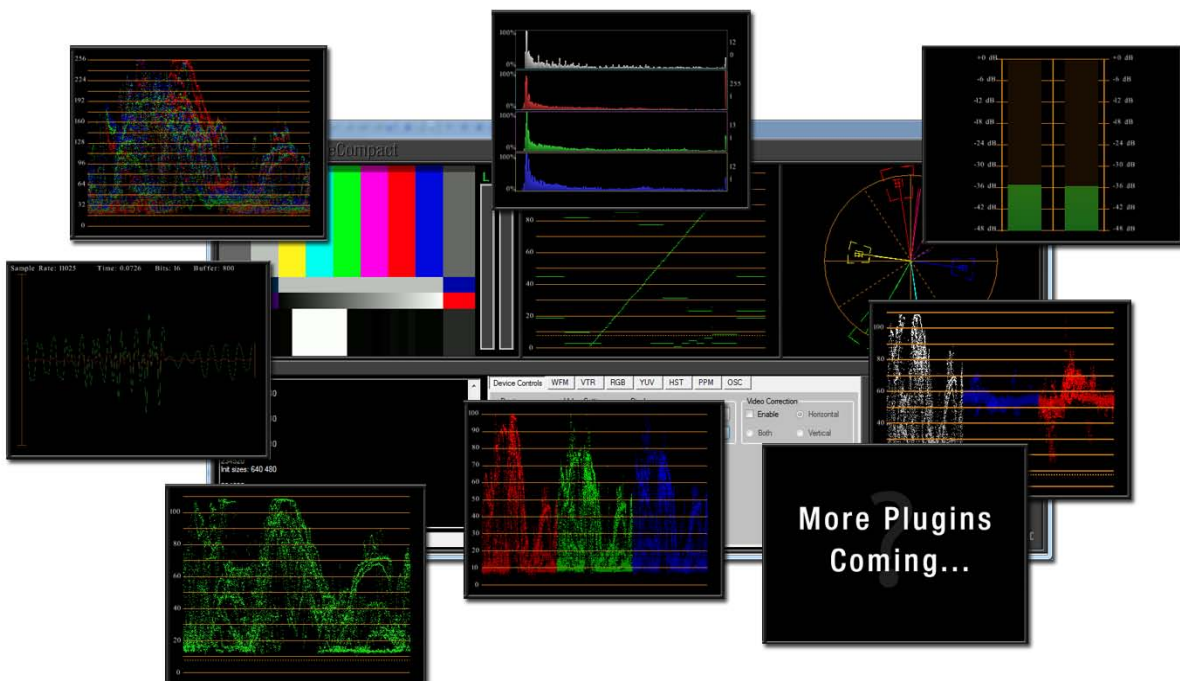


Figure 1.0 Compact User Interface and Plug in Library

The video software application supports both Standard Definition (SD) and High Definition (HD) video that can be sourced from a good number of consumer and professional capture cards and devices including PCI(e) based cards; Thunderbolt, BlackMagic Decklink devices, USB camera devices and Firewire cards in both 400 and 800 specifications. Ethernet cameras require a separate Hosting Unit and are not supported in the standard hosting interface.

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This video software program is an ideal toolset for testing, troubleshooting, calibrating and monitoring live real time audio-video streams.

For engineering projects involved with digital video R&D and integration we offer a comprehensive video API library with the same video and audio scope libraries we used to build *MultiScopeCompact*. See our web site <http://www.rumblehouse.com/products/> for the latest SDK products available. Video sources can be either analog (composite, S-video, YPrPb component) or digital (SDI, HDMI, Firewire 1394A or B, USB or Ethernet*, Thunderbolt).

The *MSCompact* main user interface hosts an integrated high resolution video monitor configurable in 4:3 or 16:9 aspect and up to two audio or video scope plug-ins that can be arranged in the order you like. Right now there are a total of 7 plug-in style scopes in which to choose, of which only two can be enabled at any one time in the base or 'hosting' unit.

- 1 Waveform Monitor
- 2 Vectorscope
- 3 RGB Parade, multi function
- 4 YUV YCrCb Parade
- 5 Histogram
- 6 PPM Audio Meter
- 7 Audio Phase Meter (not yet available)
- 8 Audio Analog dual channel Waveform scope
- 9 Classic VU audio meter (not yet available)
- 10 FFT displays scope (not yet available)

There are no compound scopes yet available where two scope functions are used within one plug-in. We are considering those combinations for future releases. Let us know what may work for you if this is important.

***IMPORTANT**

1 The LCD display monitor must be set to a minimum resolution of 1280 x 720, or parts of the user interface may be truncated on the right with no possible access to the controls.

2 There are two hosting interfaces available for use. One type of host for USB, PCI, Firewire type video sources and the second type of host for supporting Ethernet cameras. Make sure you purchase the right hosting unit for your video application.

This user guide contains a user interface description, software installation, software setup and recommended system configuration to ensure successful use of this software product.

Explanations of the operating principles these various video and audio instruments is not part of this user guide. Users of this software interface should already be aware and be informed regarding the purpose and theory of these classic audio-video industrial tools.

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***Note:** *if important, the LCD monitor used to view this application must be setup properly for brightness, contrast, hue and gamma for accurate video monitor representation. Calibration of the computer LCD monitor must be done to ensure this. There are two options. Either, follow the manufacturer's guide for the display card you are using or use a product called Spyder by DataColor to get accurate results.*

Note: *MultiscopeCompact only supports 8 bits per pixel video streams. Attempting to use 10bpp video will only cause the system to fail, by either hanging or crashing the application.*

2.0 Hosting or Base Interface Unit Description

MSCompact video product is made up of a plug-in hosting unit and compatible A\V scope plug-ins. The basic hosting unit supports a high resolution video monitor, a set of built-in stereo PPM meters, a system reporting display, scope configuration\setup screens and a dual socket for any one or more video or audio scopes. Figure 2.0 shown below shows the basic hosting interface.

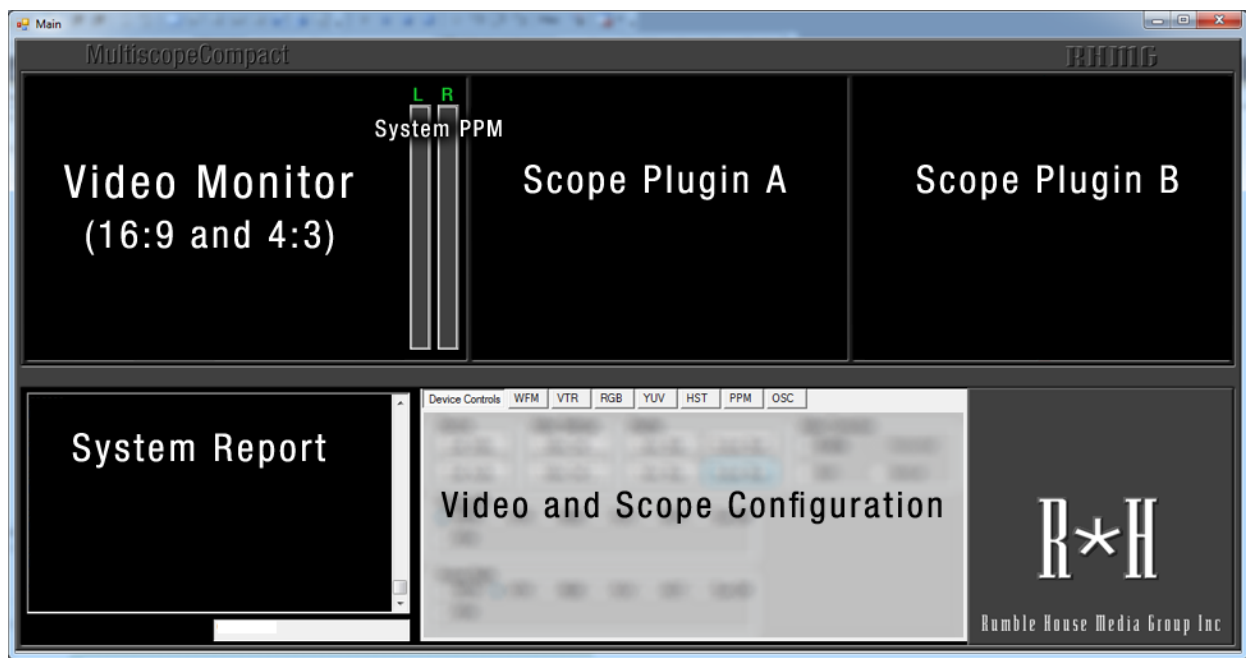


Figure 2.0 MSCompact Basic Hosting Interface

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2.1 Tabbed Scope Setups

In the lower center of the base unit interface there are a series of tabbed setup and configuration dialogs (*IP Cam tab is not available for standard hosting unit*).

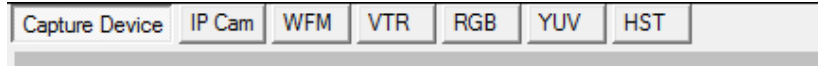


Figure 3.0 Scope Configuration Tabs

Each tab shown, serves to setup or configure a video source or set scope operation properties. The first tab, labeled '*Devices*' comes up by default when the application is first launched.

2.2 Video Monitor

The integrated video monitor, located in the upper left of the hosting interface can be set for either 4:3 or a 16:9 video frame format depending on the aspect ratio of the source video being streamed. Video in a 16:9 aspect will frame the video with black bars on the top and bottom of the video box. Full 4:3 aspect will fill the video box with no bars in any orientation.

The video box will display any supported video resolution of the source up to 2048x1536 pixels from what we have tested to date. Lower resolution videos may show up stretched to fill the video box or may show its smaller native size.

2.3 System Reporting Interface

We have included a small DOS type box in the lower left of the hosting interface. It is used to report the status of the interface while *MSCompact* is running. It will be useful to use when reporting any issues with the software if you were to report problems to us. The interface can capture many types of operational errors and flags them here.

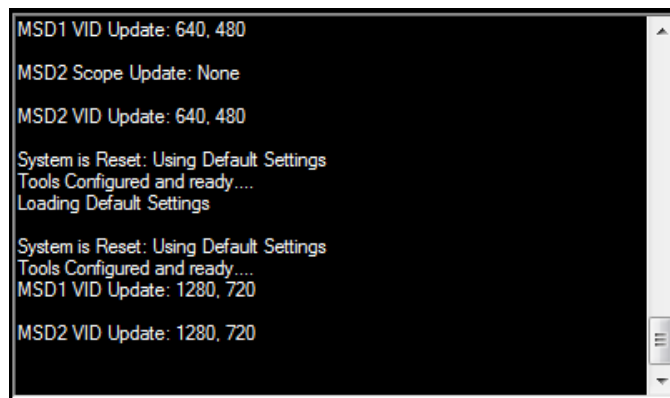


Figure 4.0 DOS style Status System Reporting Screen

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When discovering an error in operation or the system has crashed you can capture any error messages by simply doing a PRINT SCREEN and save the DOS box as a JPEG. Append it to your email message when talking to us if this is applicable to your message to us.

***Note:** The following is the procedure to clear registration information from the operating system that was entered during the application install procedure. To allow fresh installs or new releases with no residual files present, run this code sequence.*

Using the console window in the application (DOS look alike) you will clear the application registry so that a fresh install is possible with no errors.

Steps:

1 - At the prompt type : `rm config` <return>
<app will report config files has been deleted.>

then....

2- At the prompt type : `rm registry` <return>
<the DOS like window will then report the registry has been successfully deleted.
Then the console will report : "Registry codes required to continue program operation">

At this point a Windows dialog box will appear over top the application itself and will ask for new registration codes, which means the MultiScopeCompact application is looking to be re-registered.

Exit the application and uninstall the application via Windows as usual. This process ensures that any re-installation of the application again or a newer version will be error free.

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2.4 Scope Plug-in Screens: A and B

We have supplied two spaces (or sockets) in the main interface for your choice of A/V scopes we offer as plug-ins. The *Device* tab provides the selection and enabling of the scopes you want to run. If you have more scopes that have been purchased and unlocked, the interface button(s) shown below (*Figure 5.0*) will be enabled for you to select them if needed (corresponding *Radio Button* will be highlighted active). You can place any scope in any of the two positions available. Even run the same scope in both locations if you want.



Figure 5.0 Scope Selection Interface

2.5 Ancillary Controls

Depending on video sources connected there may appear to be initial video orientation inversions. The user frame labeled '*Video Orientation*', is there to correct video that appears to be incorrectly positioned. Check the '*Enable*' check box first to change orientation.

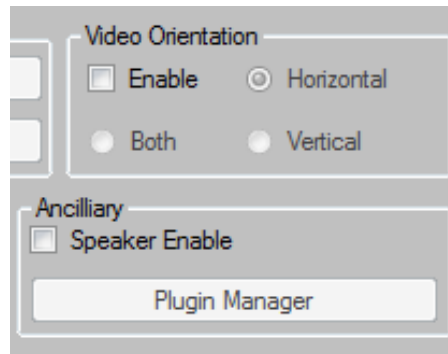


Figure 6.0 Ancillary System Functions

The '*Speaker Enable*' check box is to connect or disconnect the system speaker when audio is being captured. Depending on speaker loudness and sensitivity of any microphone attached while streaming real-time A/V, there may be enough sound level to cause feedback or due to delays in processing cause the audio to repeat itself in a doubling or delayed fashion.

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The *Plugin Manager* button enables the registration and activation of any plug-ins you may have purchased so you can begin to use them. To register plug-ins, see *Section 6.0*.

3.0 General Scope Plugin Descriptions

The *MultiscopeCompact* interface can enable any of several scopes within our scope library but can present only two at any one time. Many of our A/V scopes support a common configuration mode of operation as described in the next sub section.

3.1 Video Scope Setups – Common Controls

All of the video scopes, excluding the Vectorscope, share a common set of ‘Luma’ color space selection, layout controls and LOD (Level of Detail) controls.

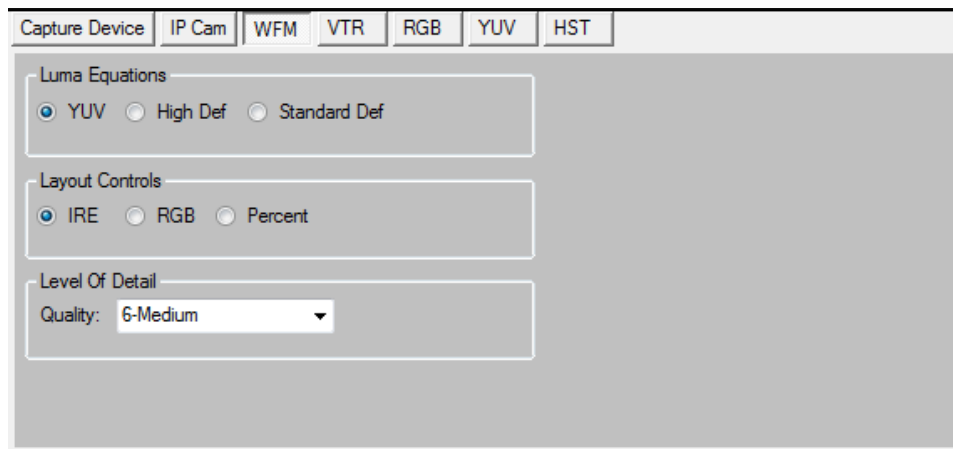


Figure 7.0 Common Scope Configuration screen

Colour Space Equations

There are three color spaces we offer; Standard YUV, Standard Definition (601) and High Definition (709), with the associated equations listed in *Appendix A*.

Changing the LUMA equations affects the color space processed for the video source being input. Each colour space presents different characteristics or levels of operation depending on the video source being handled. The colour space selected must match that of the video source processed to get accurate readings.

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Layout Controls

The Layout Controls or *graticule scaling* section of the interface determines the scaling for the displayed data as some scopes display specific video presentations. The selection radio buttons control which measurement scale is used. The processed data can be displayed in classical IRE, raw RGB (or bits from 0 to 255) or in percent (0% to 100%).

It should be noted that the processed data itself is not scaled or changed in any way to fit the selected scale. The data presented remains the same, just the scaling reticle changes.

Level of Detail Control

The *Level of Detail* setting or LOD, is to control the quality of the scope output render vs the display update speed. The higher the detailed rendering the more processing time (thus lower frame rate) will be required to render the data to the scope display. The settings go from *Perfect* (all vertical lines are processed) to *Very Low* (heavily decimated or skipped lines). The *Perfect* setting will give the most detailed rendering of the data in the scope, but at the same time requires more time to render and thus may be slower in frame rate. The *Very Low* Setting will run the fastest even on the very large frame resolutions, but will have the poorest representation on the data being displayed.

3.2 *RGB Parade – Special*

The RGB Parade scope has additional features that warrant a separate look at its controls.

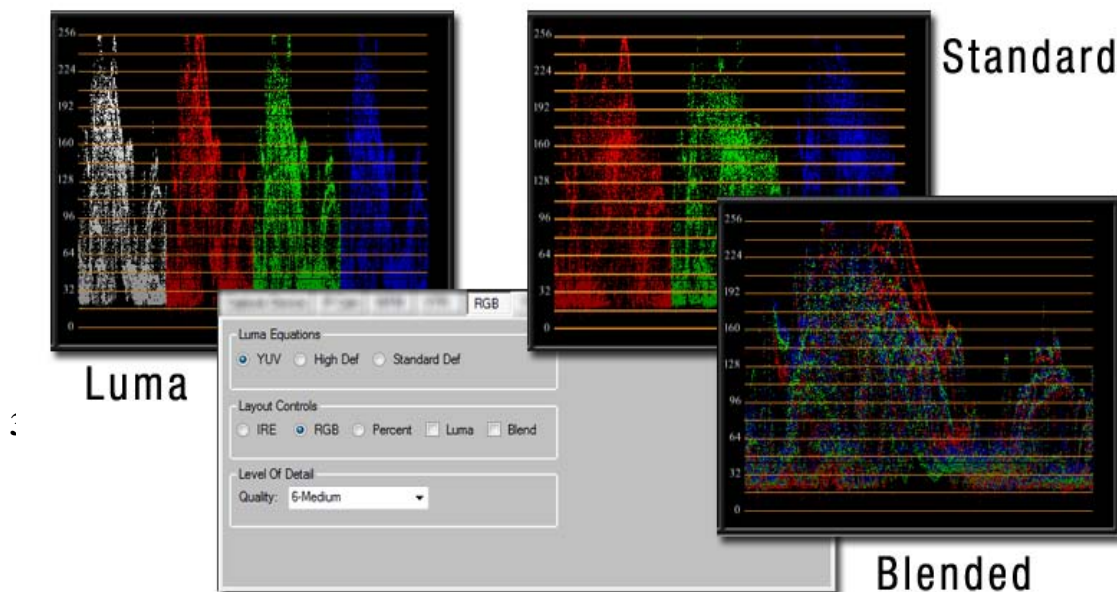


Figure 8.0 RGB Parade Special Features

When choosing to run the RGB parade scope, there are several special modes of operation that are available for use (See Figure 8.0 above). Operating in the *Standard*

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triple RGB scope mode, the **Luma** and **Blend** check boxes must be left unchecked. If a fourth channel, *Luma*, is required, check the **Luma** checkbox. For an RGB overlay of each colour is required, then check the **Blend** check box. The **Luma** checkbox will have no meaning when running in blended mode.

Running in *Blended mode* shows each colour channel is over laid on each other. If aligned perfectly in gain, pedestal and gamma, a grey scale trace should result, showing a properly balanced picture.

3.4 Vectorscope Configuration

The Vectorscope does not require scaling features like IRE, percent etc., and are not available on the configuration interface. The scope provides targets at the 100% saturation point for both HD and SD colour spaces. There are no 75% targets.

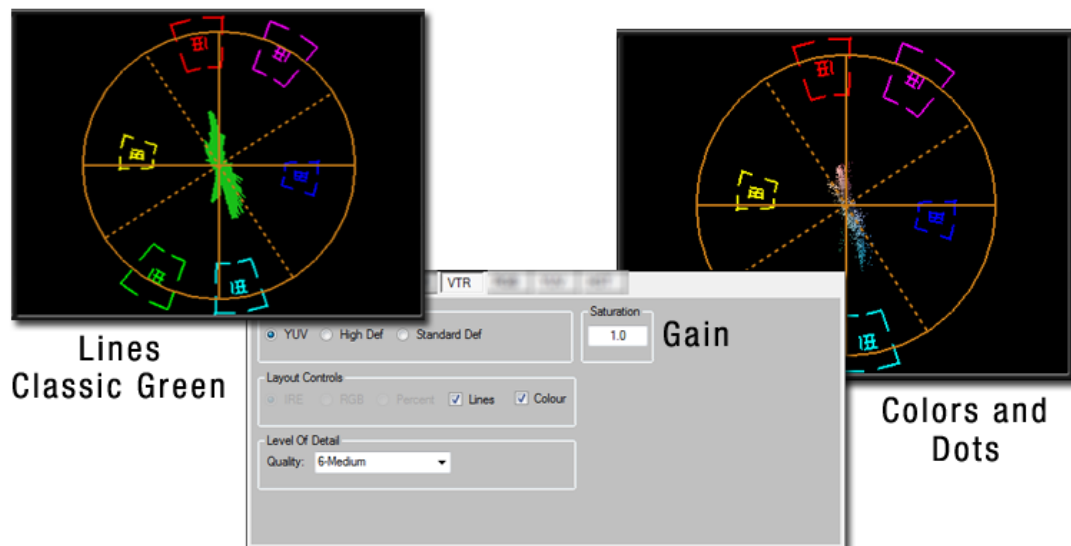


Figure 9.0 Vectorscope operational settings

Processed data can be presented in either dots or lines, in full relational hue/colour or classic scope green as shown in *Figure 9.0* above.

This scope also offers full quadrant I/Q lines denoted by either dotted or solid lines at the standard 33 degree offset angle.

The I/Q angle drawn in the positive left side of the vectorscope face is the angle that can be used as a means to *align flesh tones* for any post production work.

A **Gain** or *Saturation* control is available for video systems using calibration charts. Gain settings can be adjusted from unity (1.0) to 4.0x and down to .5, in 1/10 steps.

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3.5 Audio Scope Setups

Generally, audio scopes have no user interface as of this version of design. The scopes are fixed in operation with no user controls at this time. Look for updates in the audio product line as we continue to add and improve *MSCompact*.

3.6 Audio Scopes

Our audio scope library currently consists of two plug-ins; a PPM and an oscilloscope.

Supported audio properties:

Quantization	Sampling rate	Mode
8 bit, 16bit	11, 22, 44.1, 48kbits/sec	Stereo and mono

3.6.1 Peak Programme Meter or PPM

Our PPM is calibrated in 6db steps from 0dbFS to -48dbFS (*Figure 10.0*). A full range of -96db is processed but only a range of -48dbFS is displayed. The audio streams processed are those associated with the input video stream; though an independent microphone output with no associated video will also work.

An audio buffer is read for its peak value (then converted to db) and is output to the display. Peaks greater than the last output get updated as a new peak. Lower peaks detected are ignored for a set time. Slow or no peak responses are removed from the display by a fixed decremented value until new peaks are detected and output. No signal for a period of time will see the PPM indicator fall to minimum output.

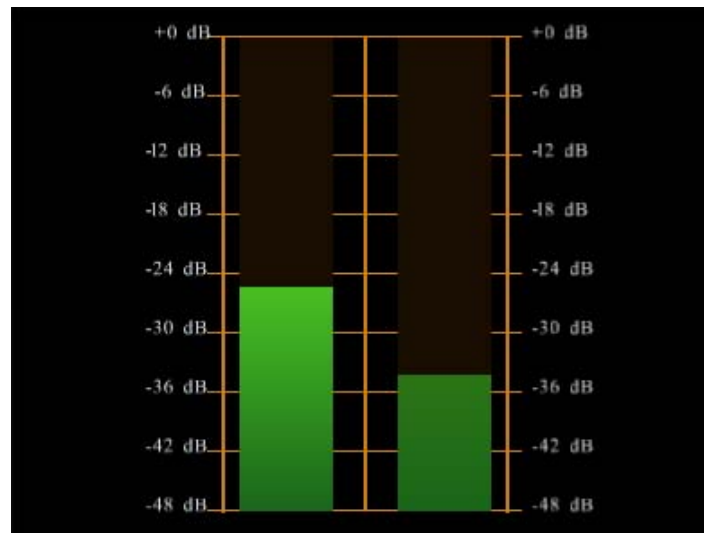


Figure 10.0 Peak Programme Meter

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3.6.2 Audio Waveform Scope

The audio oscilloscope plug-in provides for stereo output as shown in *Figure 11.0* with the colours green and orange representing left and right channels. The display shows a fixed audio buffer size.

Annotations for the detected audio sample rate, buffer time span, bit quantization and audio buffer size are shown just below on the top of the scope frame.

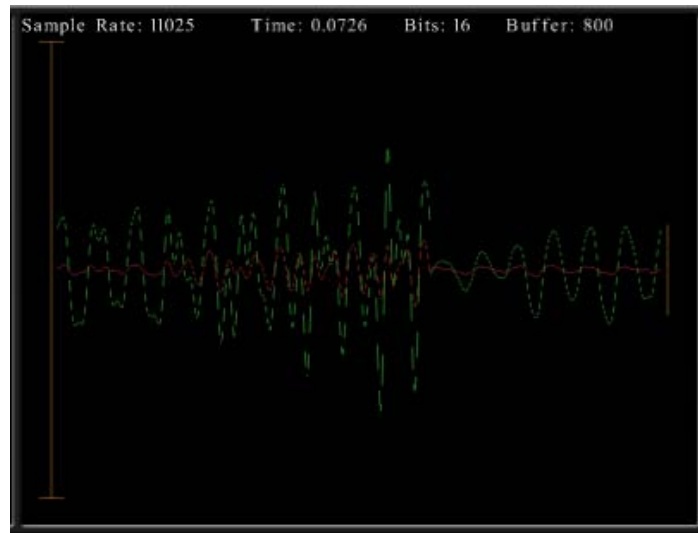


Figure 11.0. Stereo waveform Oscilloscope

Meters in development:

- Phase Meters
- Classic VU Meters
- Audio Spectragram

Dual function or compound scopes will be considered but will need your feedback as to what would be useful.

3.7 Ethernet Cameras (*different hosting interface than this standard interface*)

If a network camera is to be attached to *MSCompact*, it is assumed the camera has already been operationally setup via its own configuration interface enacted via its IP address to a standard browser like Firefox or MS Explorer. Video frame size, compression standard, bit rate and network protocols etc., have already been defined, setup and confirmed off-line as operational. *MSCompact* can support H.264 and MJPEG video streams.

MSCompact can only operate Ethernet cameras that support RTSP over TCP for now. Video frame sizes can exceed the 1920 horizontal size. Maximum frame resolution has not been fully tested.

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We do not yet support the more custom GigE cameras.

Operating the IP camera in either a LAN, WAN or internet environment will work with *MSCompact*. Make sure you have the IP specific hosting unit. Standard host does not support IP cameras.

As a POE camera, ensure a compatible DC supply is attached and the camera shows some life it is ready for use. Configure the camera using the supplied IP address, and password by the manufacturer. Camera Authorization should be disabled and be reflected in the URI string. Connect the network camera using a standard Ethernet CAT5 cable either directly from a network switch that may be close by or remotely before your router. If in the latter case ensure the router and ports have been setup properly.

Once connected, open *MSCompact* application and go to the IP Camera tab. Enter in the camera IP URI. *MSCompact* will connect itself to the camera. A recognized URI must be used to access the camera by *MSCompact*. See the manufacturers Users Guide or their software development documentation for this string and syntax.

As an example: `rtsp://admin:password@192.168.x.x:554/h264/channel/101`
**admin:password syntax may not be required

4.0 Trial Software and Installation

Our trial software is provided free of charge for evaluation purposes. The trial *Compact* host interface supports two fully functional and feature enabled scopes; a *Waveform Monitor* and a *Histogram*. Figure 12.0. Access to any other scopes and features, are not available for use in this **Trial** version.

Caution: There will be pop up ‘nag’ screens that will appear randomly while the **Trial** software is running.

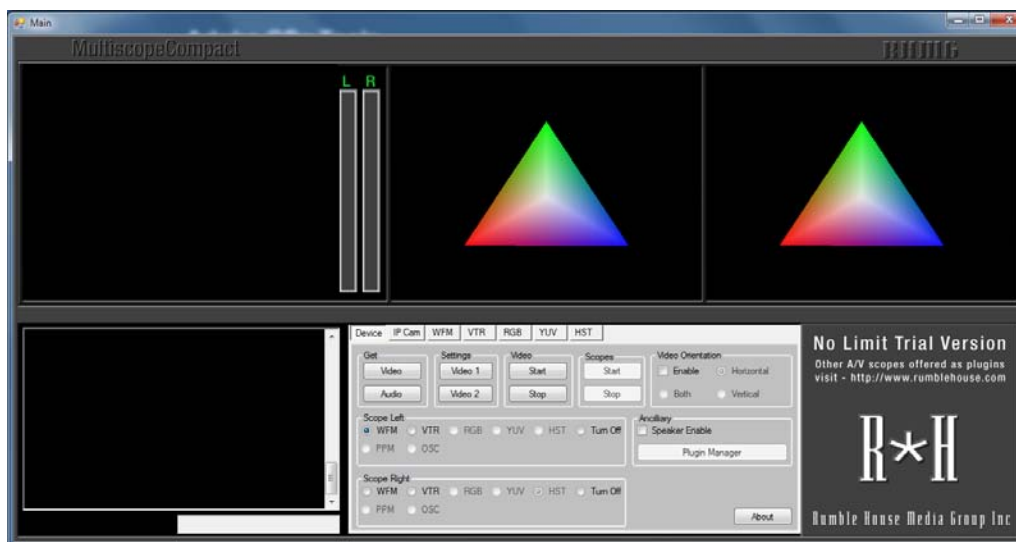


Figure 12.0 MSCompact Trial User Interface upon first launch

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The trial has no activation features to run in its limited operating mode and will run forever without an expiry date. To acquire a fully featured, plug-in accessible and non 'nag' version of *MSCompact*, a system package must be purchased, downloaded and be unlocked separately.

<http://www.rumblehouse.com/products/multiscopecompact/>

A hosting unit and at least one scope from our scope library is the minimum configuration for *MSCompact* to run as designed.

Trial Installation

Download the **Trial** software after filling out the short download form from our product web page. Use the shown download link from the pop up dialog to get the *MSCTrialxxxx.exe* (*.exe) file, where xxxx is the version number. Create a folder for the **Trial** if you wish on an available hard drive or use the default setup properties and dbl click on the install *.exe file. The software will be installed and a desktop icon showing the *Rumble House Logo (RH)* will appear on the desktop. Click on the icon and the application interface will appear in a few seconds depending on your system performance. Please be patient. There may be a number of Windows system alert screens appearing prior to and after actual install, skip them or answer them accordingly.

Once the **Trial** is running there is no requirement to register the software or unlock it in anyway. The hosting unit and the two default plug-ins will already be enabled for use. There is no timeout for this **Trial** version. It will always available for use, with the constant message screens indicating purchase options.

A purchased and fully licensed base unit and at least one licensed plug-in will provide uninterrupted fully programmable use in addition to accessing to any additional plug-ins if desired.

Once launched, the *MSCompact* **Trial** video application will begin to run right away with a default video source if it finds one. Audio capture functions that are associated with video capture devices can be enabled. See *Section 6.0* for details. The onboard PPM functions shown on the right of the video monitor are always enabled. There are no other audio meters available for use on the **Trial**.

If there are multiple video sources available on your computer, *MSCompact* will find them and list them if they meet Microsoft driver standards and be accessible for evaluation. Choose the one video source you want from the drop down list, click it and run it.

5.0 Release Software Purchasing Information

To purchase a fully functional hosting unit or any plug-ins, go to our product purchasing web page located at....

<http://www.rumblehouse.com/products/multiscopecompact>

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Note: *it is recommended to uninstall the Trial if you have used it previously on your computer before installing the full release version. See Section 2.3 to clear the registry before an error free fresh install can take place.*

Payment is made using Paypal ‘Add to Cart’ services. When reaching the Paypal page, whether you have an account already setup or a new user, select the proper choice for user payment and select the method of payment you wish. You can use a credit card, direct bank withdrawal or your Paypal cash account.

To start using *MSCompact* as a working tool, a hosting unit and at least one plug-in must be purchased, licensed and activated. After payment, license number(s) will be issued to you via email, so please have a real email address when registering your product. You will need these forwarded unlock numbers to activate the base unit and any one or more plug-ins you have purchased.

After purchase, a URL or link will be provided to download the base unit software. Copy the setup executable file that was downloaded to a folder location that works for you. There are no download links for the plug-in software, just product activation codes.

6.0 Installing, Configuring and Running *MSCompact* Release Software

(applies to standard and IP camera hosting units)

6.1 Preliminary Setups and Installation

Before installing the *MSCompact* software, ensure that the A\V capture devices\cards that are planned to be used, its associated drivers, *.Net Frameworks environments are all pre-installed. Test these video products using the OEM user software that comes with the hardware. This way you will know the devices and its functions are working prior to connection to *MSCompact*.

If the Microsoft .NET Framework version required is not already installed on your computer, the *MSCompact* installation process will do it for you automatically.

Should Frameworks not install, use these links and install manually:

<http://www.microsoft.com/en-us/download/details.aspx?id=21> for Framework 3.0

<http://www.microsoft.com/en-us/download/details.aspx?id=5007> for Framework 3.5 Client

These links are for version 3.5 as a minimum. Frameworks version 4.5 is not recommended.

Installs into Windows 10 may cause issues. Stay with Win7 or Win8 for now.

Now install the *MSCompact* software you received from the download link we sent you. The application installation executable will be noted as ‘*MSCFullxxx.exe*’ (or something like it), where xxx is the version number. Double click the .exe and run it. Use the install

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default drive and folder location as recommended. You may see Windows alerts as the install progresses, ignore these or answer them if applicable and continue with the install.

Once the install process is complete a large icon showing black and white **RH** letters will appear on your desktop. Double click the icon too startup the video application. Wait a few seconds for the program to activate. The interface shown is the Hosting Unit interface like that in *Figure 13.0* below.

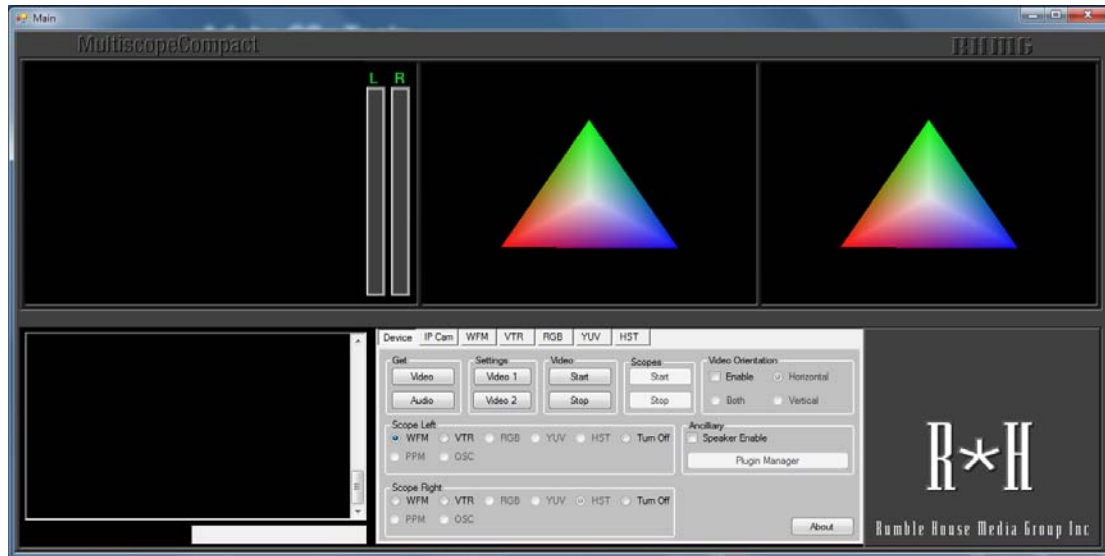


Figure 13.0 Basic Hosting Unit Interface

Initially the scope locations will be empty of any working scopes and will show colourful 3D triangles, indicating empty video scope socket(s) as shown in *Figure 13.0* above. If the application is running with just the video monitor screen and no scopes being enabled or activated, the triangles will rotate in motion. Default video capture may be running in the video monitor.

6.2 *Hosting Unit Activation*

Upon completion of purchase of your hosting unit, you would have received an email from us indicating acknowledgement of your purchase, a download link for the hosting unit and information outlining the install process. Of which I will summarize as follows.

Install the hosting unit on your PC and follow the default settings as indicated. There is no need to reboot your computer to run the hosting unit for the first time.

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Run the hosting unit by double clicking on the desk top RH icon created from the install process. A blank hosting unit interface (as shown in *Figure 13.0 above*) will appear along with a pop up dialog (*Figure 14.0*) requesting registration information.

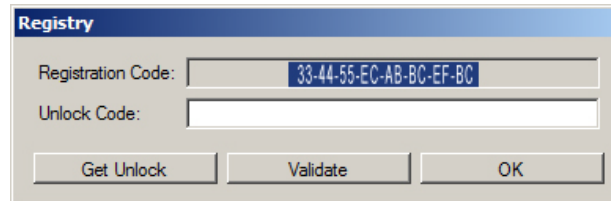
A screenshot of a Windows-style dialog box titled "Registry". It contains two text input fields. The first field, labeled "Registration Code:", contains the text "33-44-55-EC-AB-BC-EF-BC". The second field, labeled "Unlock Code:", is empty. At the bottom of the dialog, there are three buttons: "Get Unlock", "Validate", and "OK".

Figure 14.0

A registration key will have been generated shown in 'Registration' label field. The unlock field will be empty. There are three buttons on this interface, 'Get Unlock', 'Validate' and 'Ok'. You can use the *Ok* button to exit here if you wish and come back later to register the hosting unit.

To get your unlock code, first copy (CNTL C) the registration code to the clipboard and then click on the 'Get Unlock' button. This will take you to the *Rumblehouse Media Group Inc* product registration web page. Fill out the form and PASTE (CTNL V) the registration number into the *Registration* field on the form. Click on the 'Register' button when the form has been completed. You will receive an acknowledgement of registration and a message indicating we will be sending you an unlock code for the hosting unit to your email address shortly.

When you get the unlock code from us, run the hosting unit application again. The pop up will also appear again. Copy and paste the unlock code from our email into the 'unlock' field of the unlock dialog box and click 'Validate'. If successful, the unlock dialog will go away and you will get a validation message indicating successful activation of the hosting unit. Click 'ok' to complete the unlock process.

Future launches of the hosting unit will not show the unlock dialog again.

You will now have to register and unlock your plug-ins. See next Section.

6.3 Plug-in Activation

Unlocking your plug-ins is similar in process to registering and unlocking the host unit. In order to purchase and register your plug-ins successfully, you will need the system registration code you originally got when installing the host unit (not the unlock code). You will need this get to the plug-in purchase page.

You cannot order plug-ins without a hosting unit that you bought for your working computer platform.

Unlock codes are not transferrable.

After selecting your plug-ins and purchasing them through Paypal, you will get a return email from us acknowledging your purchase. Please make sure your email address is valid or your registration information will be lost.

In short order you will get back from us an email with your unlock codes for the number of scopes you purchased.

Run the *MSCompact* application again and click on the '*Plugin Manager*' button on the '*Device*' tab interface. A pop up dialog will appear similar to that seen during the host unit registration (*Figure 15.0*).

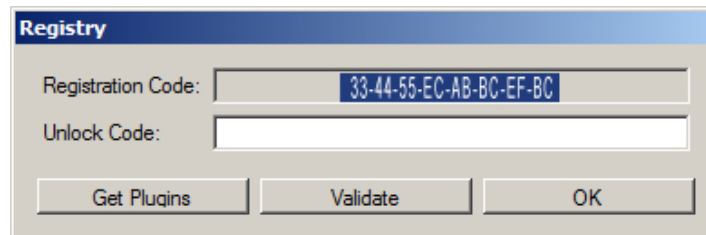


Figure 15.0 Plugin Manager Dialog

You will see your original registration code from the hosting unit in the Registration field and a blank unlock code field along with three buttons. Enter in the first unlock code you got from our email and click '*Validate*'. A message box will appear if validation is successful. Enter in the next unlock code and validate it. Carry on this process until all of your purchased plug-ins has been validated. When completing all of your entries, just click the 'ok' button to exit the unlocking dialog box. Now all of your plug-ins is ready for use. This is readily evident by looking at the respective Left/Right Scope control radio buttons are active.

If you plan on purchasing other plug-in(s) in the future, just follow this procedure again.

MSCompact is now ready for use.

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6.4 Video Device Control Tab

When the application software has been successfully installed and launched, an empty base unit interface will appear showing a tabbed setup and configuration screen as shown below in *Figure 16.0*.

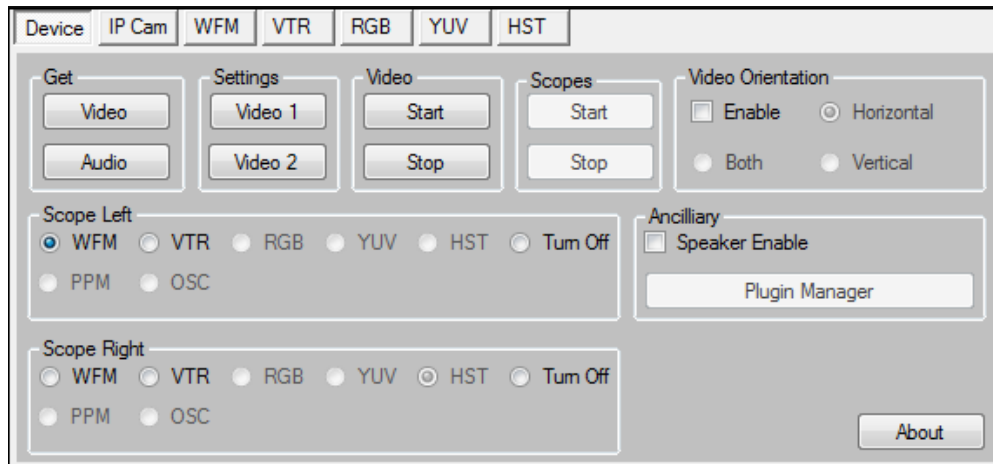


Figure 16.0 Video and scope setup screens

The prime tab for interface control is the ‘Device’ tab. It controls which video devices are selected, access to capture device functions, video display orientation, plug-in controls and A\V scope selection and activation.

1 Selecting an A\V Source

To choose an A\V source connected to your computer (*PCIx, USB, Thunderbolt, Firewire, etc*), click on the ‘Get Video’ button (upper left frame). Any video drivers seen by *MSCompact* will be listed here – *Figure 16.1* below. Select the one device you want and click OK.

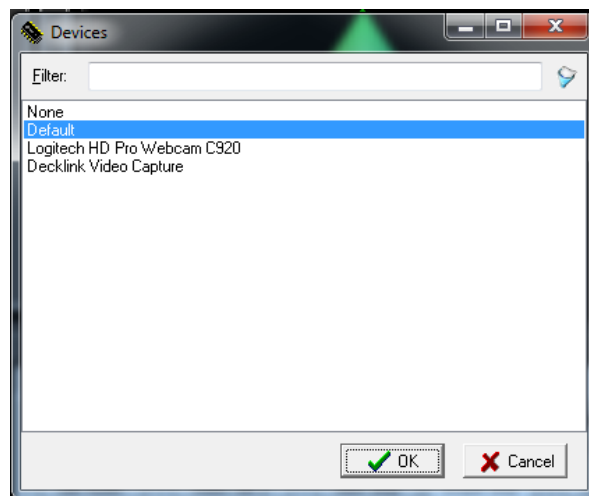


Figure 16.1 Typical Video Device Found Dialog

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Similarly for selecting audio sources, choose the ‘*Get Audio*’ button. Typically an audio source will be associated with a video source with the same name. If no audio is needed or you just want to turn it off, then just select ‘*None*’

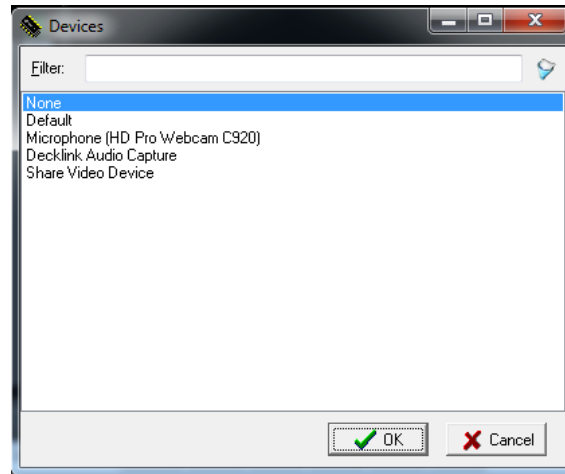


Figure 16.2 Audio Source Selection

2 *Configuring an A/V Source*

Once the video and audio sources have been selected, you must configure those sources. That means, setting the video resolution and frame rate of the video is to run. This will tell *MSCompact* what streaming information it needs to work. There are two buttons set aside for this action as shown in *Figure 16.3 ‘Settings Video1’* and ‘*Settings Video2*’.

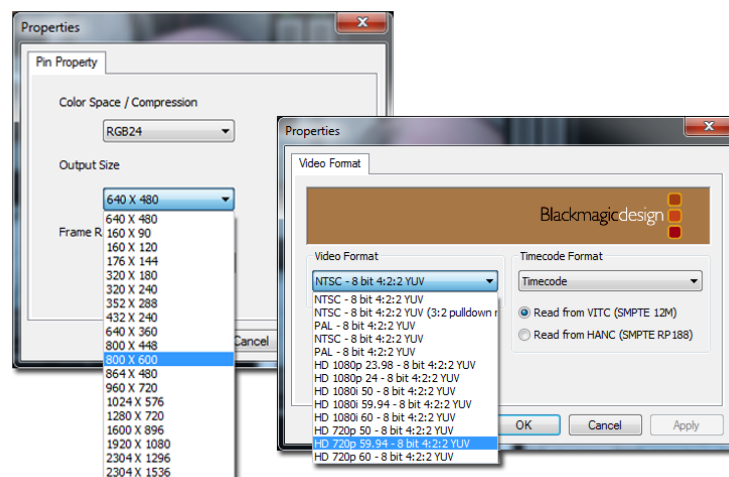


Figure 16.3 Video Source Configuration Dialogs

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There can be many forms of this video configuration dialog and is very manufacturer dependant. *Figure 16.3* above shows just two of what are many examples of a video setup. Select the video frame resolution and frame rate in which to operate and click OK.

Note: *just because the dialog shows many settings, it doesn't mean it supports them all. If you select a combination that doesn't seem to work, the application may hang or crash. You must shut down the application and start up again. Worst case, you may have to reboot the computer. Not all driver dialogs are accurate. Choosing standard known parameters are safe bets.*

Capture devices from BlackMagicDesigns for example, require an additional setup of the capture card\device itself through the operating system Control Panel. Set this up first before running MSCompact.

There is no rule as to which button (*Video Settings1* or *Video Settings2*) will activate the video configuration dialogs. The remaining button will usually open up a ProcAmp dialog, which sets up the camera for standard functions like brightness, contrast, gamma etc. ProcAmp functions are not always supplied by the capture hardware vendor and will not produce a setup dialog. Showing a working ProcAmp dialog is very driver dependant. *Figure 16.4*, below shows what a typical ProcAmp screens look like.

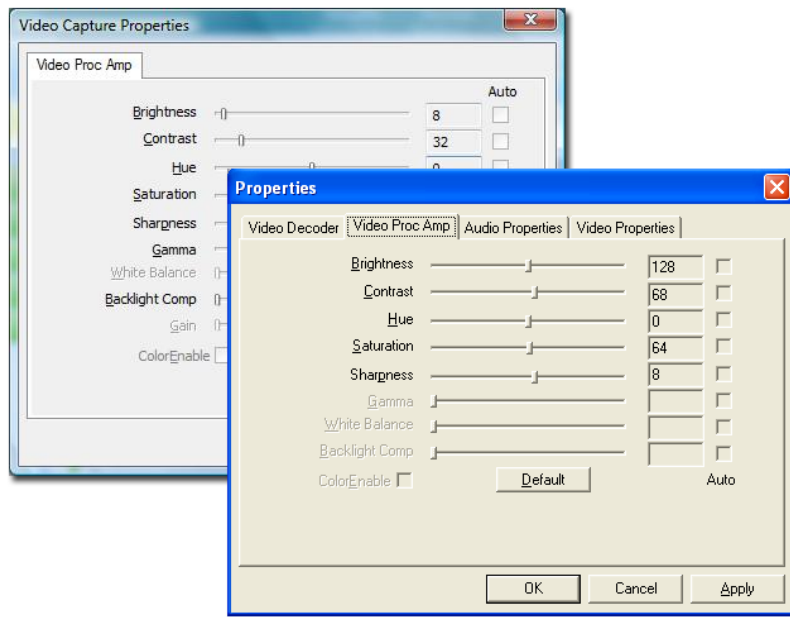


Figure 16.4 Typical ProcAmp setup screens

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3 Controlling Video operation

After the video and audio sources have been selected, clicking on the 'Video Start' button will activate *MSCompact* to begin the A\V capture process. The video monitor will resize itself to the video frame resolution selected and show live video from its camera source in addition to the built-in audio PPM meters responding to audio input. The scopes themselves will not be running at this point, just live A\V capture.

To stop the A\V stream, click on the 'Video Stop' button.

4 Controlling A\V Scopes

Activating the A\V scopes can only be possible if the A\V stream has been started and running. If you have selected a scope to operate in either one or both A\V sockets (via *Figure 16.5*) then just click on the 'Scope Start' button to activate the scopes selected.

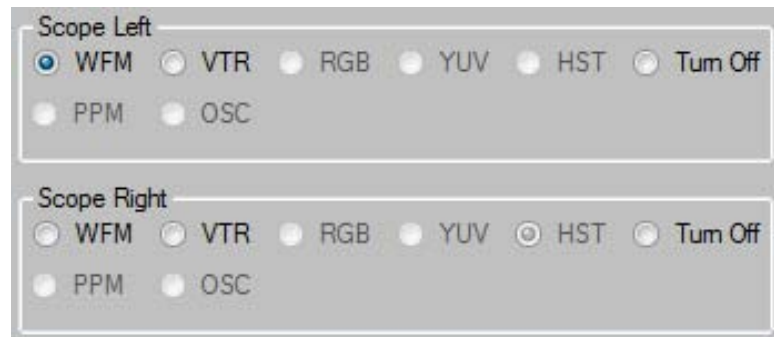


Figure 16.5 Scope selection interface

Assuming you have already setup the operating environment for the scopes in question, the scope will now run in real-time showing its respective video representation. Changing the video input signal like gain, brightness, contrast etc, will be reflected on the scopes display measuring those parameters.

To stop the scopes from operating, just click on the 'Scope Stop' button in the main 'Device' tab. You may have to click the Stop button twice to stop the scope processes.

Changing scopes will require you to stop the scopes and stop the video before selecting a new scope.

7.0 System Requirements

7.1 Minimum Configuration

- Windows 7, 32bit (do not use XP Pro 32bit)
- .NET Framework 3.5 and Framework 3.5 client must be installed**
- CPU: Pentium 4 multicore
- RAM: 8 GB, DVD ROM player
- LCD screen resolution: 1280 x 720 or better.

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7.2 *Recommended Configuration*

- Win7 or Win8, 32bit or 64 bit (avoid using Vista)
- .NET Framework 3.5 and Framework 3.5 Client must be installed**.
- CPU: Intel 3.0GHZ or better (faster machines will offer faster renders and higher details)
- RAM: 16 GB or more and DVD ROM player
- LCD screen resolution setting: 1280 x 720 or better.

8.0 **Support and Warranty**

We provide support for pre-sales questions. The **Trial** software is offered to confirm that the application software meets end users requirements in both hardware and software compatibilities prior to any purchasing considerations.

If the **Trial** does not meet expectations or your application requirements please do not purchase *MSCompact* as there will be **no refunds** after purchase.

Post sales support is also always available. We make every effort to answer your questions and to consider your feedback on issues relating to the software.

We can return answers using email, but it would be preferred to use the *Comments* section on the product page. Answers will be more forthcoming with the added benefit of sharing the discussion dialog for others in the MultiScope community.

Product upgrades will be offered at reduced or at no cost depending on degree of revision changes for current registered users of *MSCompact*.

***** **IMPORTANT** *****

The software is not returnable for refund under any circumstances.

Be sure the trial software you have downloaded has been fully assessed in meeting your project requirements prior to purchasing the fully operational software version.

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9.0 My Standard EULA License Terms

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‘nuff said

Appendix A

Colour space conversion equations used with *MultiScopeCompact*

Standard RGB to YUV colour space

$$\begin{aligned}Y &= (+0.257 * R) + (+0.504 * G) + (+0.098 * B) + 16; \\Cb (U) &= (-0.148 * R) + (-0.291 * G) + (+0.439 * B) + 128 \\Cr (V) &= (+0.439 * R) + (-0.368 * G) + (-0.071 * B) + 128\end{aligned}$$

Standard Definition colour space RGB to YUV - ITU-R BT.601

$$\begin{aligned}Y &= ((65.738/256) * R) + ((129.057/256) * G) + ((25.064/256) * B) + 16; \\U &= ((-37.945/256) * R) + ((-74.494/256) * G) + ((+112.439/256) * B) + 128 \\V &= ((+112.439/256) * R) + ((-94.154/256) * G) + ((-18.285/256) * B) + 128\end{aligned}$$

or Standard Definition (601) colour space RGB to YCbCr (YUV) - Errata*

$$\begin{aligned}Y &= ((76.245/256) * R) + ((149.685/256) * G) + ((29.07/256) * B) + 16; \\U &= ((-43.366/256) * R) + ((-85.136/256) * G) + ((+128.502/256) * B) + 128 \\V &= ((+128.502/256) * R) + ((-107.604/256) * G) + ((-20.898/256) * B) + 128\end{aligned}$$

High Definition (709) colour space RGB to YCrCb (YUV) – Errata*

$$\begin{aligned}Y &= ((46.742/256) * R) + ((157.243/256) * G) + ((15.874/256) * B) + 16; \\Cb &= ((-25.765/256) * R) + ((-86.674/256) * G) + ((+112.439/256) * B) + 128 \\Cr &= ((+112.439/256) * R) + ((-102.129/256) * G) + ((-10.310/256) * B) + 128\end{aligned}$$

References

Charles Poynton – Digital Video and HDTV Algorithms and Interfaces – Errata
FOURCC – RGB to YUV conversion <http://www.fourcc.org/fccyvrgb.php>