

# WeldWatch™

Software Help/Documentation

Version 6

May 2022



**Visible Welding**  
Wayland, MA 01778 USA  
[www.VisibleWelding.com](http://www.VisibleWelding.com)  
E-mail: 2022@visiblewelding.com

## Welcome!

The Visible Welding WeldWatch-HD Camera System is specially designed to handle the ultra-wide dynamic range of light given off by arc welding. The included WeldWatch software makes this camera easy to set up and use. It supports camera models from V2014-Z up to the current WeldWatch-HD.

By combining state-of-the-art computer digital signal processing with a high-functioning digital camera, the WeldWatch-HD captures and tames the arc light. Don't let the simple controls fool you; like a great athlete, the WeldWatch-HD makes this amazing photographic feat seem easy.

Since we are all-digital in both camera and processing, we will continue to add features to make your job easier. You can help; please tell us what features you'd like, what you don't like and what you'd like to see in future versions. Email us any time of the day or night at [2022@VisibleWelding.com](mailto:2022@VisibleWelding.com)



## Table of Contents

Welcome! .....	2
Fast Start.....	5
Complete Software and Hardware Installation .....	8
How to ... Use the controls .....	15
How to ... Create and Use an Enhanced Region .....	17
How to ... Flip or Mirror the Video .....	18
How to ... Record Video to Disk.....	19
How to ... Automatic Recording When an Arc is Active.....	20
How to ... Take a Video Snapshot .....	21
How to ... Correct Audio Delays when Recording MPEG4 Video.....	22
How to ... Save and Re-Use Software Setups.....	23
How to ... Make the Screen Buttons Auto-Hide .....	24
List of Keyboard Shortcuts.....	25
How to ... Eliminate Camera Errors .....	25
How to ... Connect to the Best Electrical Ground .....	26
How to ... Operate the Camera Closer (Macro Lenses) .....	27
How to ... Changing Spatter Shields.....	29
WeldWatch Controls Overview .....	32
Camera Settings.....	38
Picture.....	40
Main Image Controls .....	42
Enhanced Region Controls.....	44
Picture Settings.....	45
Enhanced Region Settings .....	48
Video Recording.....	51
Video Recording Settings.....	54
Play Video .....	57
Play Controls.....	60
Advanced Settings .....	61
Camera (Advanced Settings).....	62
Picture (Advanced Settings).....	65
Video Recording (Advanced Settings).....	67

Misc (Advanced Settings).....	68
Advanced Information .....	70
Show / Hide .....	71
Menu Overview .....	72
File Menu .....	73
View Menu.....	74
Picture Menu .....	75
Camera Menu .....	76
Settings .....	77
Record Menu .....	78
Help Menu .....	79
Sales and Support .....	80



## Fast Start

The system consists of a camera head connected to a Windows computer running the WeldWatch software. The latest WeldWatch software is now a 64-bit product requiring Windows 10 or Windows 11. If your computer is running an old 32-bit version of Windows, or one more than seven years old, the current version will not work. In this situation, you can download and use the WeldWatch version for Windows 8, which is available in the Downloads section of the Visible Welding website.

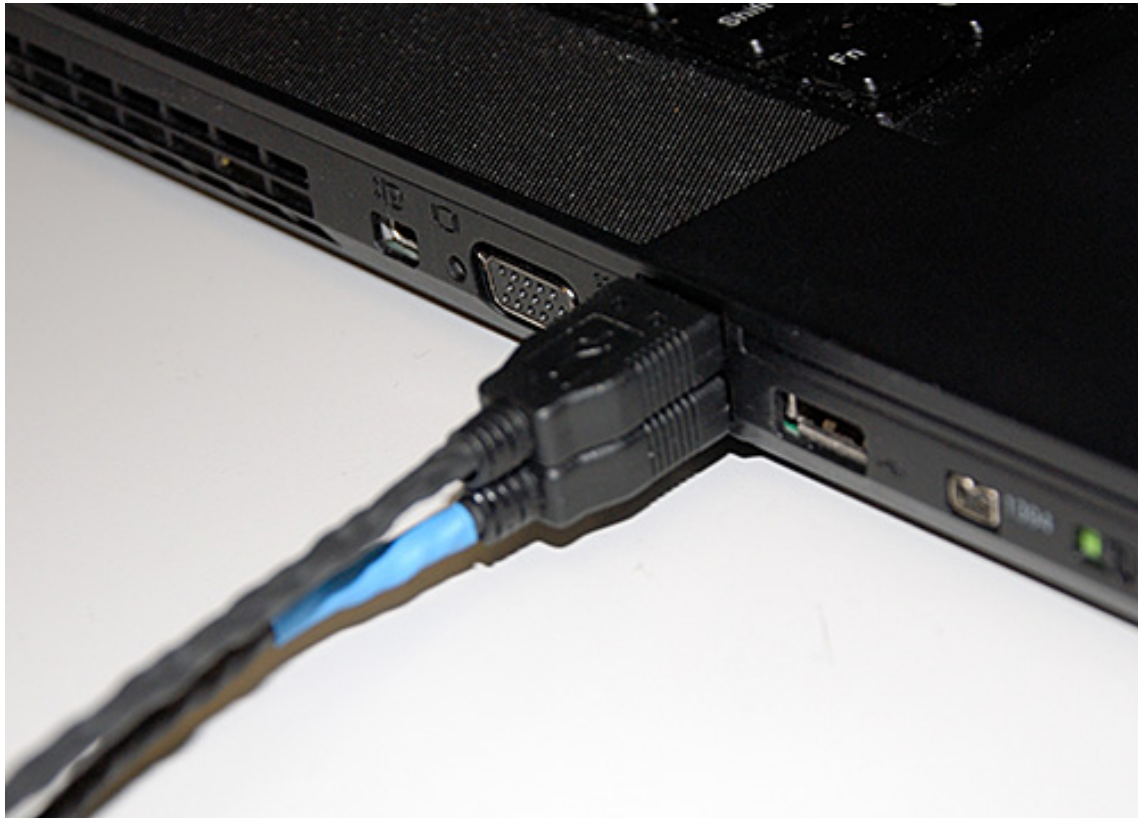
The following steps should get you up and running. A complete walk-through of the installation is after this Fast Start.

### 1. Install the software

Download the latest version of WeldWatch software from the Visible Welding web site (the Downloads menu at [www.visiblewelding.com](http://www.visiblewelding.com)). Simply run `setup.WeldWatch<release>.exe` to install WeldWatch and the camera USB drivers, where <release> is a version number (for example: `Setup.WeldWatch.ver-5.20.0923.Beta.exe`). Install the software before connecting the camera.

### 2. Connect the camera

Plug the USB cables into two free USB ports on the computer you installed WeldWatch on:



If your camera has a USB3 interface (V2020 or later), the camera cable will be blue. You must plug this cable into a USB-3 port, that (usually) has a blue component inside. The second USB cable is for the intelligent lens system. This second USB cable can be plugged into either a USB-2 or USB-3 port.

### 3. Start the software



Double-click the WeldWatch icon on your desktop or in the Program menu.

Once the software is running, you should see live camera video on the right side of your screen. If the camera is not active, you can choose the camera by clicking the Camera button on the left of the WeldWatch window:



If the buttons are not visible, press the SHOW button in the lower left corner:

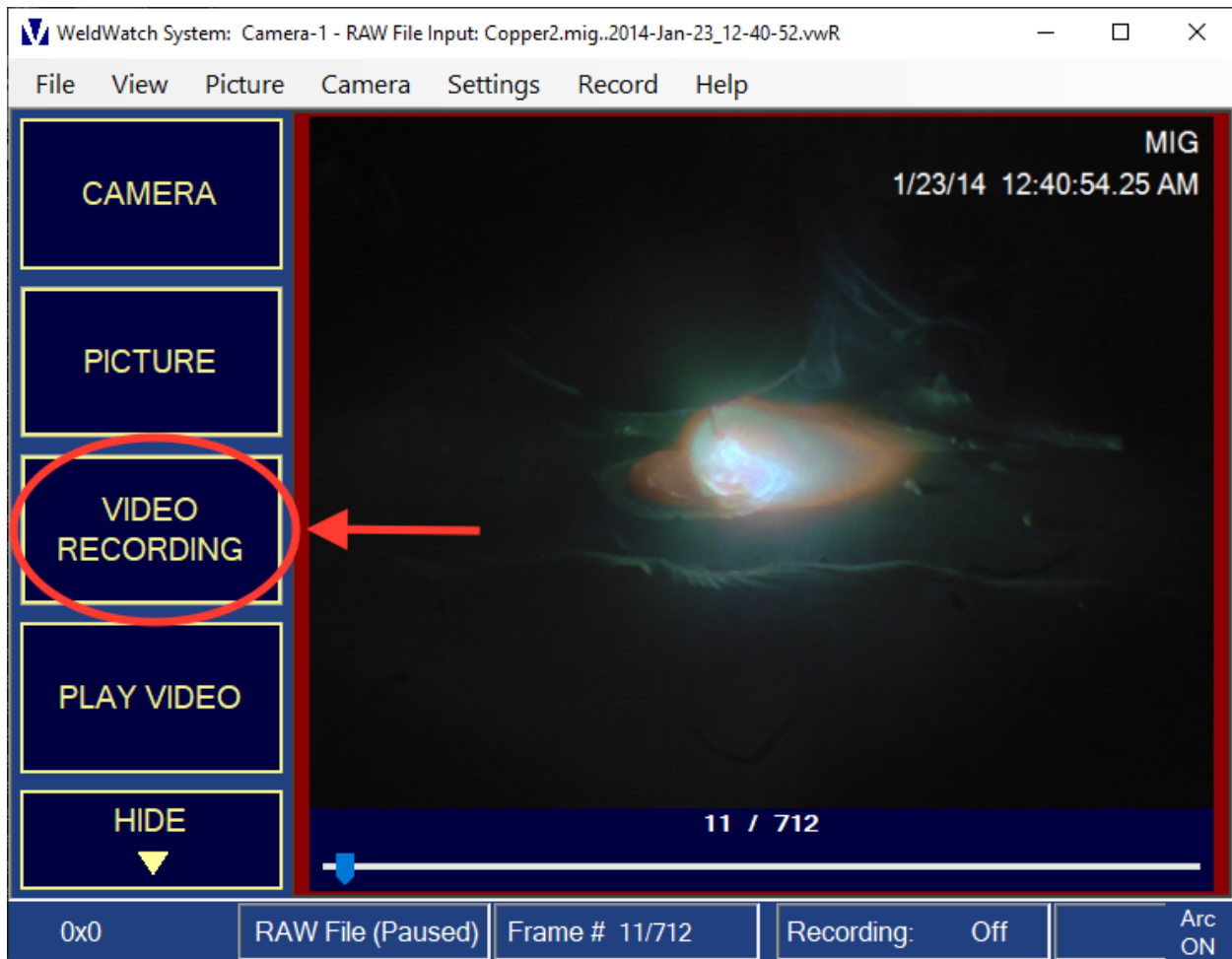


#### 4. Aim, focus, and zoom the camera image

Mount the camera on a tripod and point the camera towards your welding work area. You can change the amount of optical zoom and the lens focus using controls displayed by clicking the Camera button on the left side of the WeldWatch software window.

#### 5. Record video to disk

Use the Video Recording button to see buttons that start, stop, and pause recording of video to disk.



# Complete Software and Hardware Installation

The Visible Welding WeldWatch-HD camera system is shown below:





It includes the following items:



### **WeldWatch Camera and Accessories**

1. Camera body
  - a. Extra ground cord.
  - b. USB-3 plug for video (blue inside). This must be plugged in a USB-3 socket
  - c. USB-2 plug for lens and LED. This can be plugged in a USB-2 or USB-3 socket
2. USB-3 hub. This allows multiple USB devices for PCs with limited USB slots. The hub has its own power supply which is required to power the camera. Because models change, your USB hub may look different from the model shown.
3. Pouch with small accessories, filters and extra spatter-shield windows (details below).
4. Extra heat-shielding sleeve for the camera cable. Use this to protect the camera cable if it is moved near a hot surface or a sharp edge.

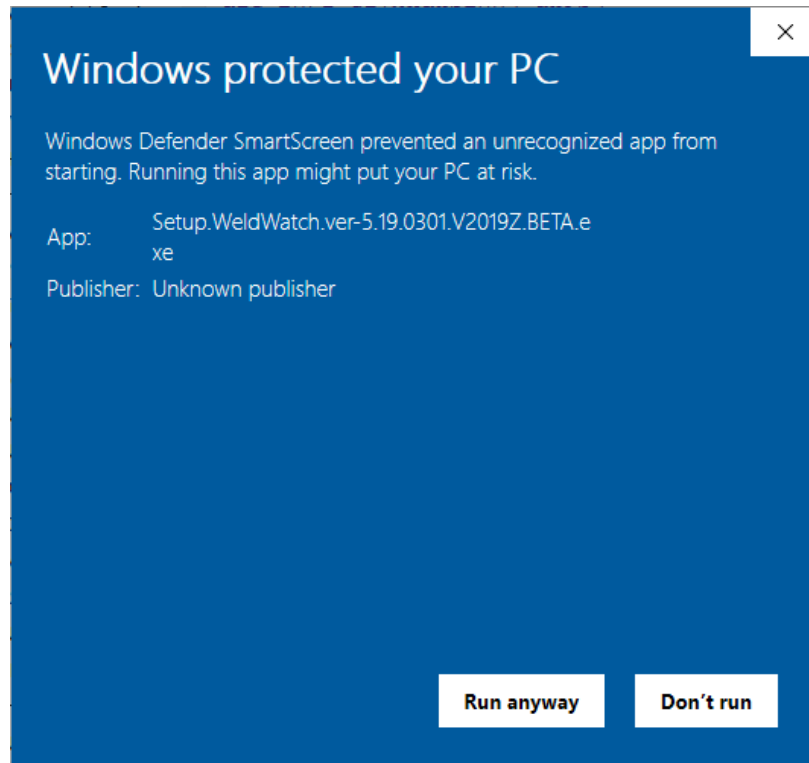
Before connecting the camera to your computer, install the software first.

Follow these steps to install the software and camera:

1. Download the latest WeldWatch software from the Visible Welding website, at <http://VisibleWelding.com/software-downloads/> The latest WeldWatch software is now a 64-bit product requiring Windows 10 or Windows 11. If your computer is running an old 32-bit version of Windows, or one more than seven years old, the current version will not work. In this situation, you can download and use

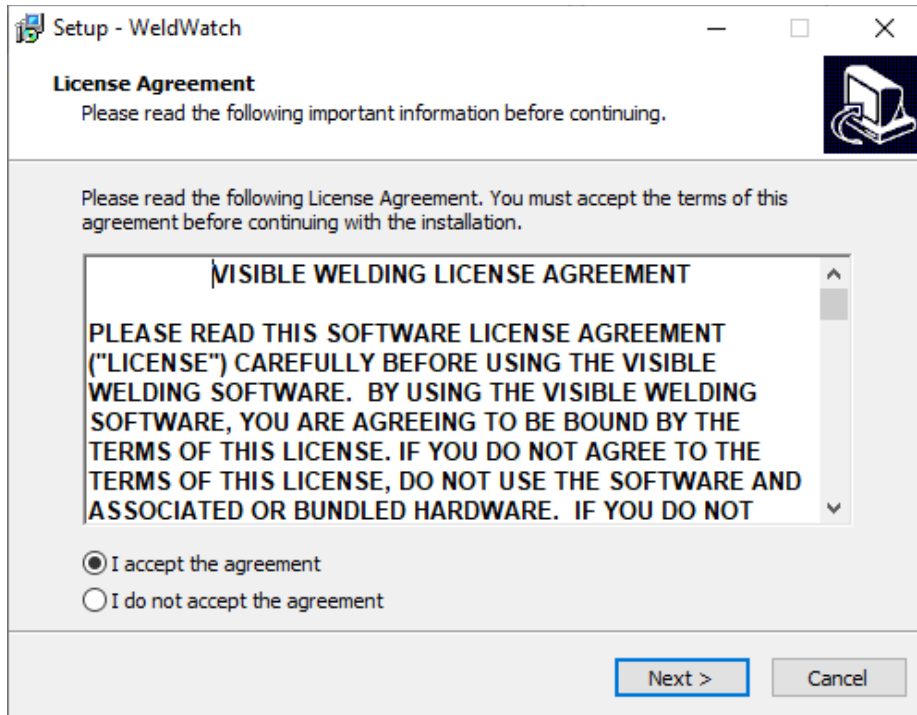
the WeldWatch version for Windows 8, which is also available on the Visible Welding website.

2. Run the run Setup.WeldWatch<release>.exe application, where <release> is the version number. An example filename is Setup.WeldWatch.22.ver\_6.22.04.25.exe Depending on the Windows security settings, you might get a warning from Windows Defender about an unknown publisher. An example is shown below:

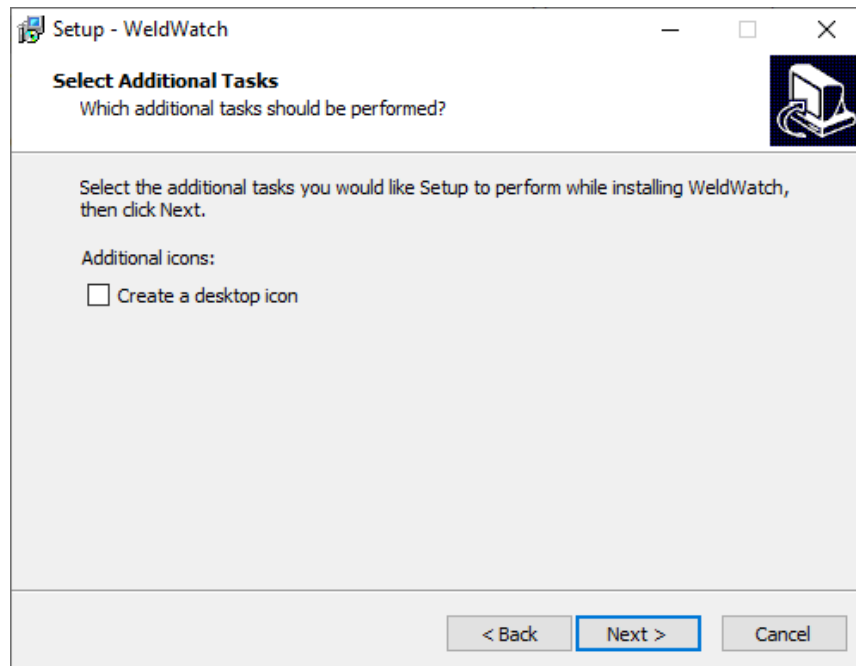


If this happens, to proceed with the installation you must click the "Run anyway" button.

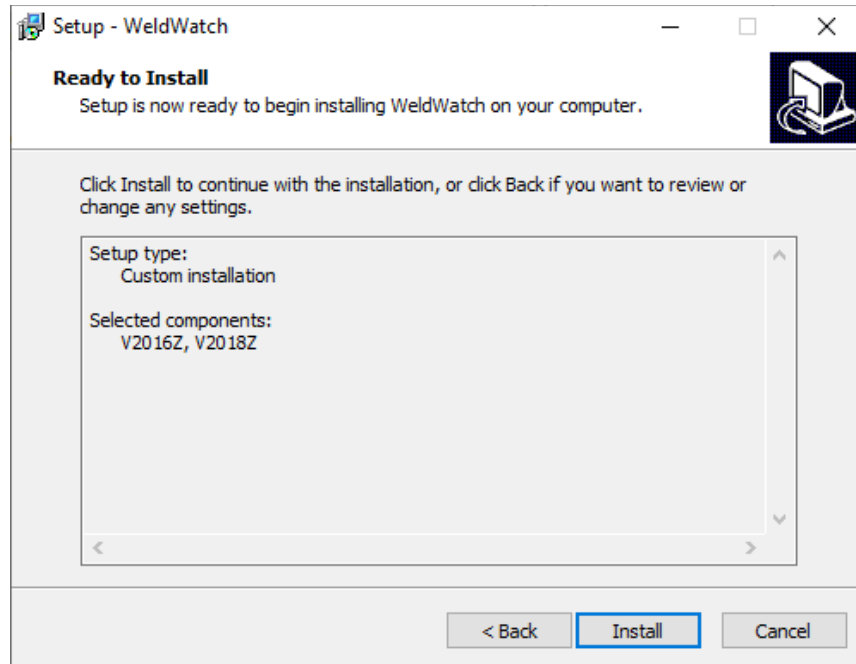
First you will see the WeldWatch License Agreement window. Read the agreement and if you agree select the "I accept the agreement" button and click Next. If you do not accept the agreement, the software installation will exit.



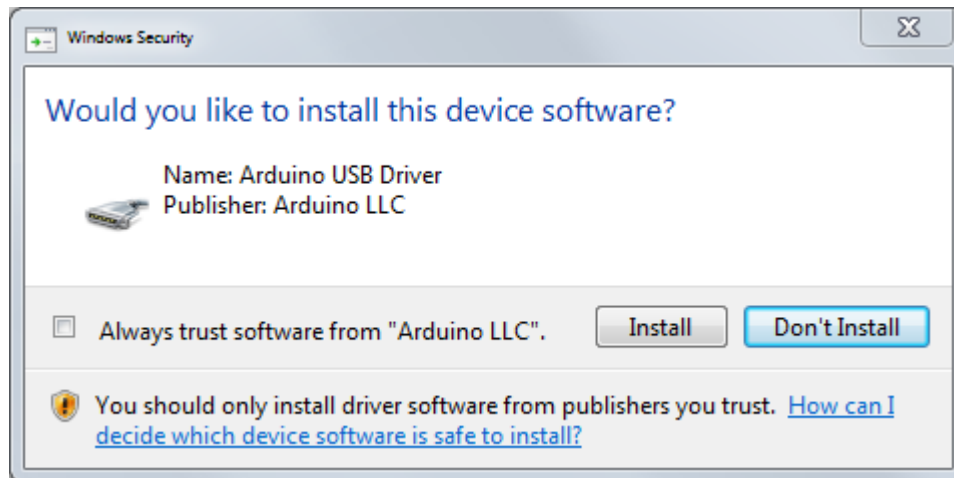
You then have the option of installing a desktop shortcut to WeldWatch. This provides quick access to the software and is recommended for a touch screen setup.



The setup program then summarizes your choices and gives you the option of continuing on into the install. Click Install to continue.

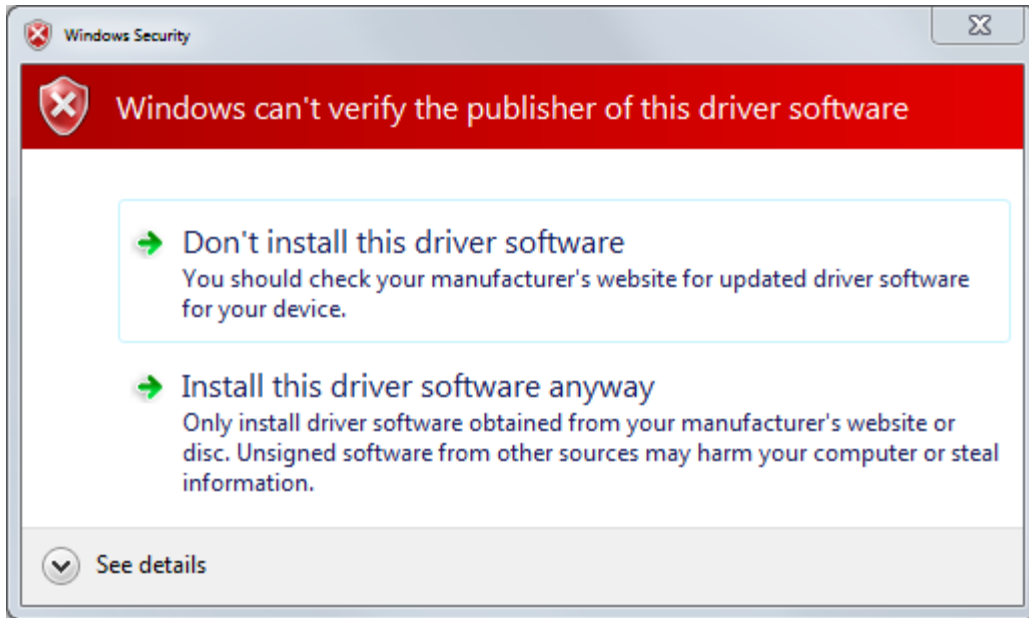


The software then installs itself and the camera USB driver onto your computer. You might be asked about installation of a "Arduino USB driver", as shown below:



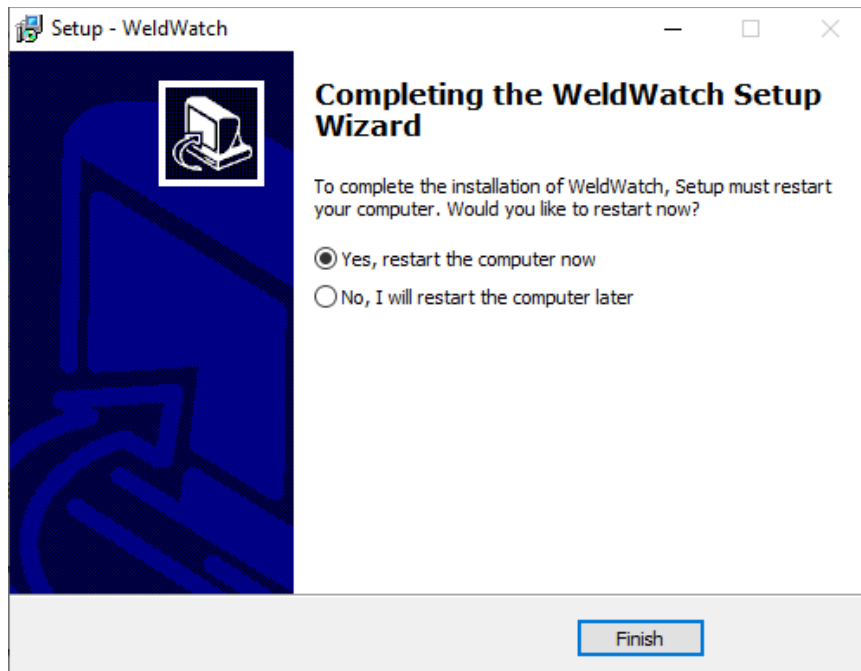
Click the Install button to proceed with this. As it installs, you might see two Windows warnings indicating that the publisher of the driver cannot be verified, as below:





This is because these USB drivers have not been signed through the formal Microsoft process. These drivers are still safe, so you can click on the "Install this driver software anyway" button both times.

The installation is complete when this dialog is displayed:



You should restart your computer after the install finishes, to ensure that the camera and other drivers will function properly.

3. After the computer reboots, plug the two USB cables into two available USB ports on your computer. The blue USB cable is the camera connection and must be plugged into a USB-3 port. The other black USB cable is the connection used for lens control and can use either a USB-2 or USB-3 port.

The green wire is for an optional connection to a solid earth ground. In some industrial environments, electrical noise can lead to intermittent camera operation and a good ground connection will solve this problem. See the discussion on the page *How to ... Use the best electrical ground* for considerations on choosing the best ground for WeldWatch.



The camera drivers will automatically install and the LED on the front of the camera will turn on:



4. At this point, you are ready to go. Start the WeldWatch software with the camera connected, and a live picture will be displayed in the software window.

# How to ... Use the controls

The easiest way to use WeldWatch is the column of buttons on the window left side.

Clicking or touching any of these buttons expands a panel with controls for relevant options. Below is an example displayed after the Play Video button is clicked:



The top of the panel has several types of inputs. Buttons are intended for clicking or touching. Buttons with a "sticky" setting that persists after they are touched are highlighted in yellow.

If keyboard shortcuts are available, the key combination is shown.

Yes-No options are selected with a paired check-mark and "X" buttons. They change color to indicate state.



Green "check" means "Enabled".



Red "X" means "Disabled".

The WeldWatch Picture screen contains slider controls for range adjustments:



A single slider control looks like this:



All slider controls can be adjusted in three ways:

1. Click or tap the slider and drag it left or right.
2. Click or tap the "+" and "-" buttons to step up or down in value. For touch screens, this is easier than dragging the slider.
3. Double-click the control name to return it to a default value.

The Zoom slider has an additional numeric input in the upper left where the zoom power can be entered directly.

At the bottom of each panel are Close and Settings buttons. Close hides the panel. Settings is a shortcut to matching controls within the Setups. In the lower example we are on the Picture panel, and clicking Settings takes us directly to the Picture Settings screen.

## How to ... Create and Use an Enhanced Region

WeldWatch software includes an option of defining a small section of the video display with different picture settings. This is called an enhanced region. It is most useful over the arc and surrounding area, but you can place it anywhere within the image. It can be circular or square, and can optionally follow the arc's location in the image.

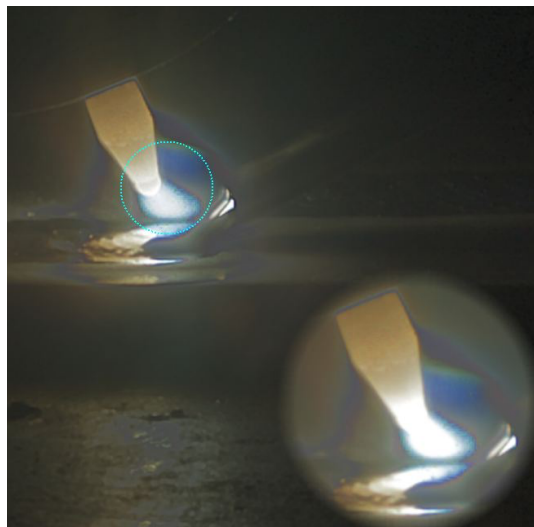
There are two locations important to the enhanced region: the part of the image it comes from (the "Source Area") and the place in the image where it is shown (the "Destination").

The enhanced region is set up using the Enhanced Region panel. The picture settings of the enhanced region can be set on the Picture Panel.

An example of an enhanced region directly overlaid onto the video is here:



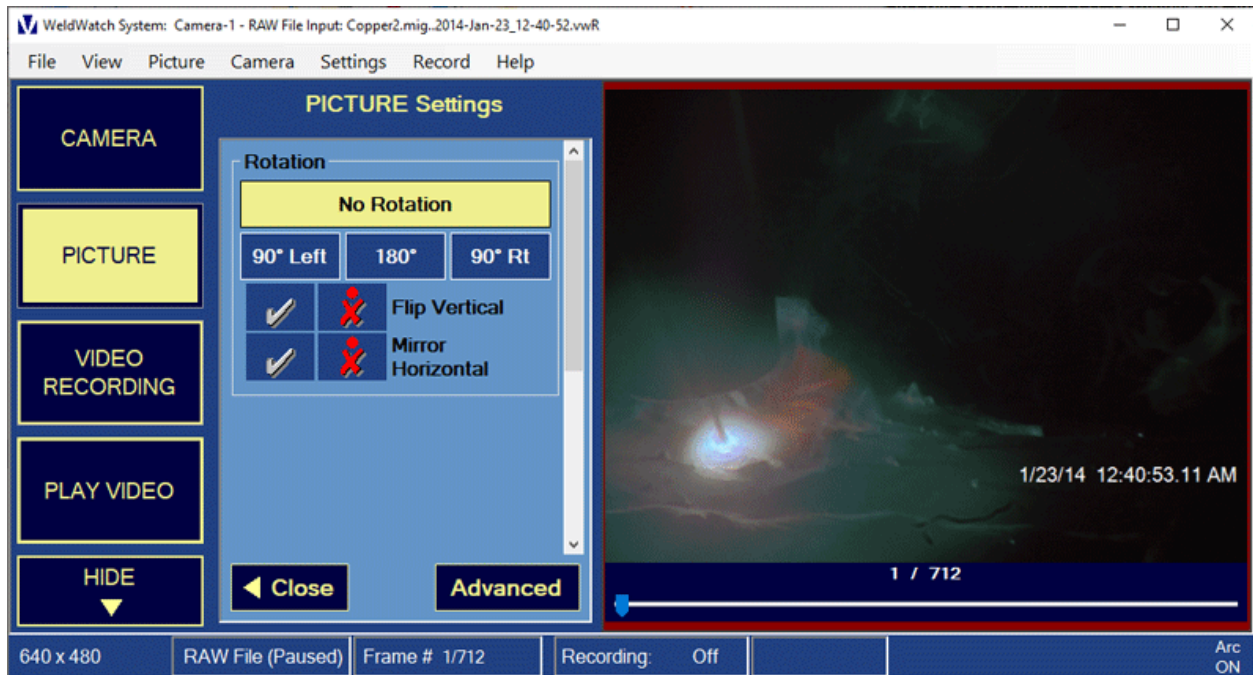
The enhanced region can also be moved off to any corner of the image, so the user can view both the regular and enhanced displays while working. This is similar to a "Picture in Picture" effect.





## How to ... Flip or Mirror the Video

Video can be flipped (left-to-right, or top-to-bottom) or rotated in 90 degree increments, using the Settings button on the Picture Panel. The rotation controls are shown in the upper half of the panel:



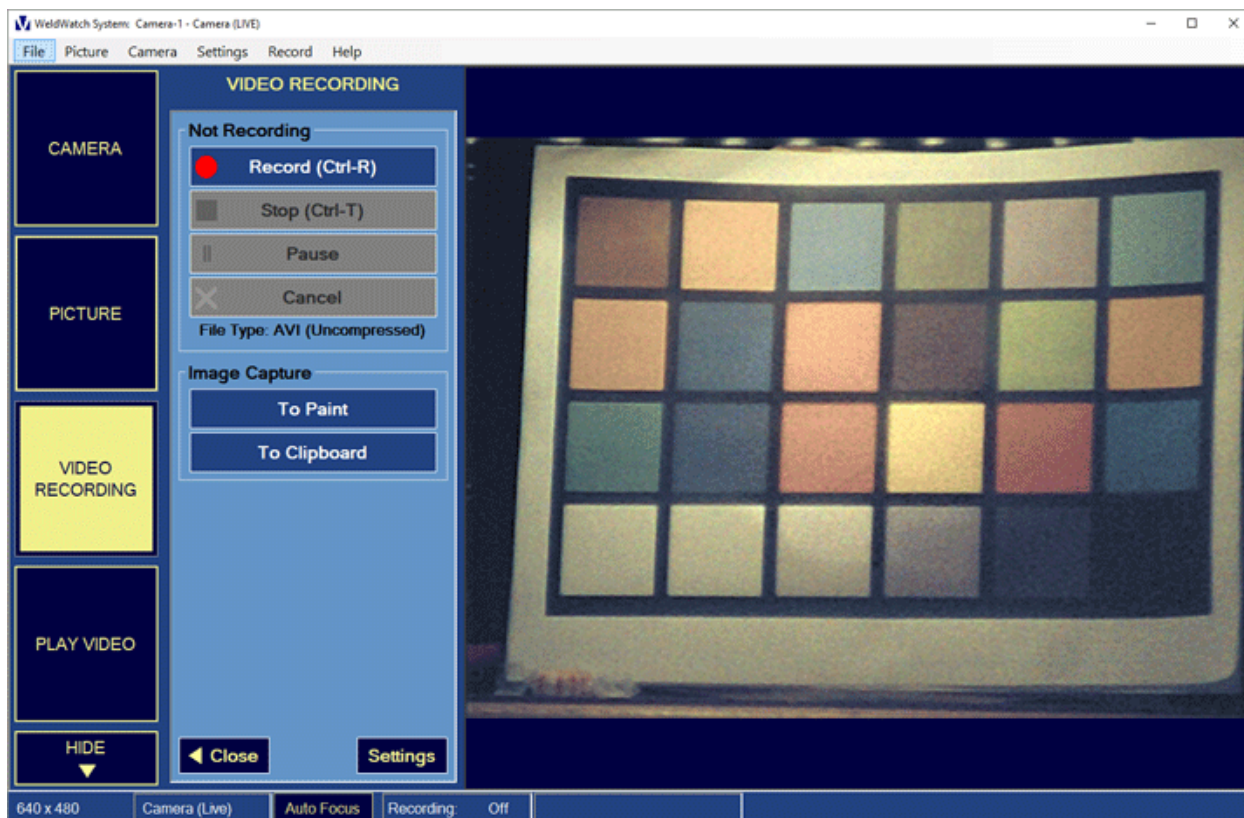
Flipping is useful if mirrors are used to direct the camera video onto the weld. The Rotation buttons are useful for situations where the camera is mounted at an unusual angle, leading to a confusing orientation of the welding video. Rotation can be combined with the image flip settings if needed.

## How to ... Record Video to Disk

WeldWatch can manually record or record automatically when an arc is detected. The automatic record options are set on the Recording Settings panel (see the next page, *Automatic Recording When An Arc Is Active*).

The latest version of WeldWatch switches from AVI compression to the MPEG format for recorded video, as MPEG4 preserves higher video quality and is a more generally supported file format than AVI. It also includes CD-quality sound recording, which is valuable in some welding applications.

Manual recording can be started with either the Record button on the left, or the Record menu item. Clicking on the Video Recording button shows the panel controls below; simply click Record to start:



From the Record menu, you can click on Begin Recording.

Alternatively, the keyboard shortcut Ctrl-R starts recording and this shortcut is always active. The keyboard shortcut to stop recording is Ctrl-T (always active).

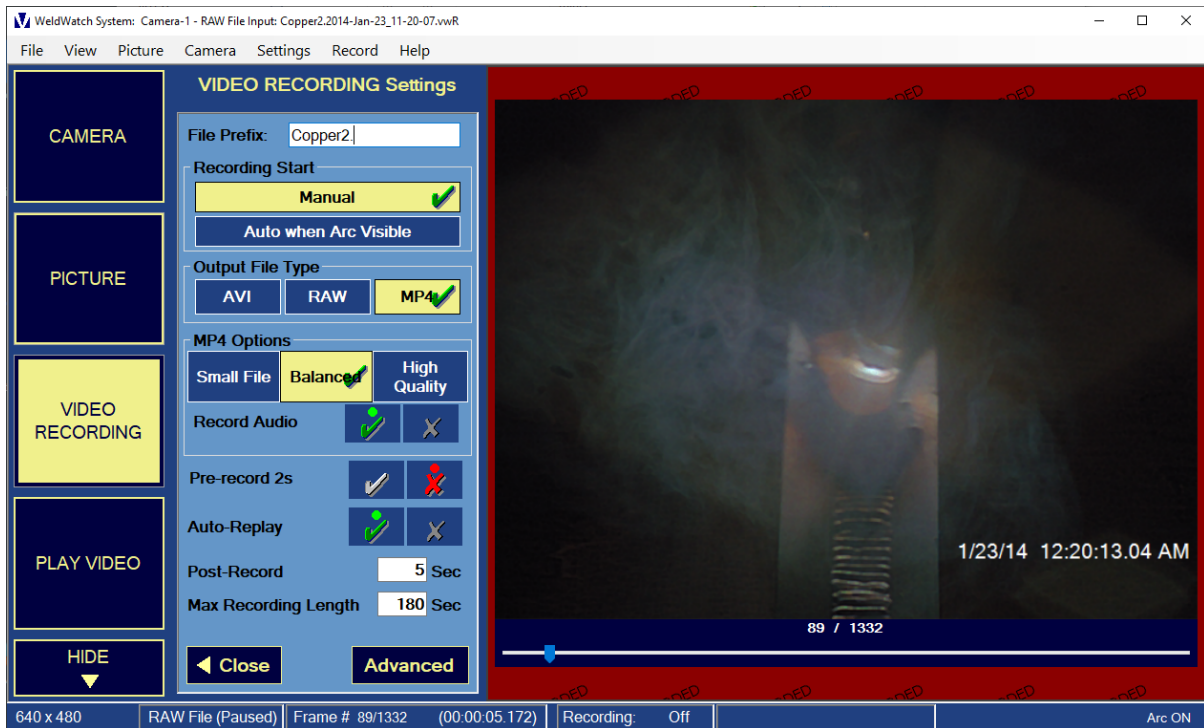
If you are using the MPEG4 file format for recording, audio will be recorded as well. Many computers have a built-in microphone which will be the default audio input. If you prefer a different microphone, you can plug one into the PC "Mic" jack. If your computer does not include a microphone input, you can also use a USB microphone, which are inexpensive and quite good. Simply use the Windows Sound Settings screen to select the default device to use for audio input.

## How to ... Automatic Recording When an Arc is Active

WeldWatch can be configured to automatically record camera video to disk whenever an active arc is detected. This can be a very convenient feature for hands-off recording, whenever an arc is active.

In cameras before 2021, the arc was detected in the video data, so must be visible to the camera (e.g. cannot be off-screen to the side). Starting with the “HD” model in 2021, a separate photo-detector is used to detect arc-on. This is more robust and will detect arcs close-by as well as in-frame.

Automatic recording is enabled using the Video Recording Settings panel. The relevant buttons are circled:



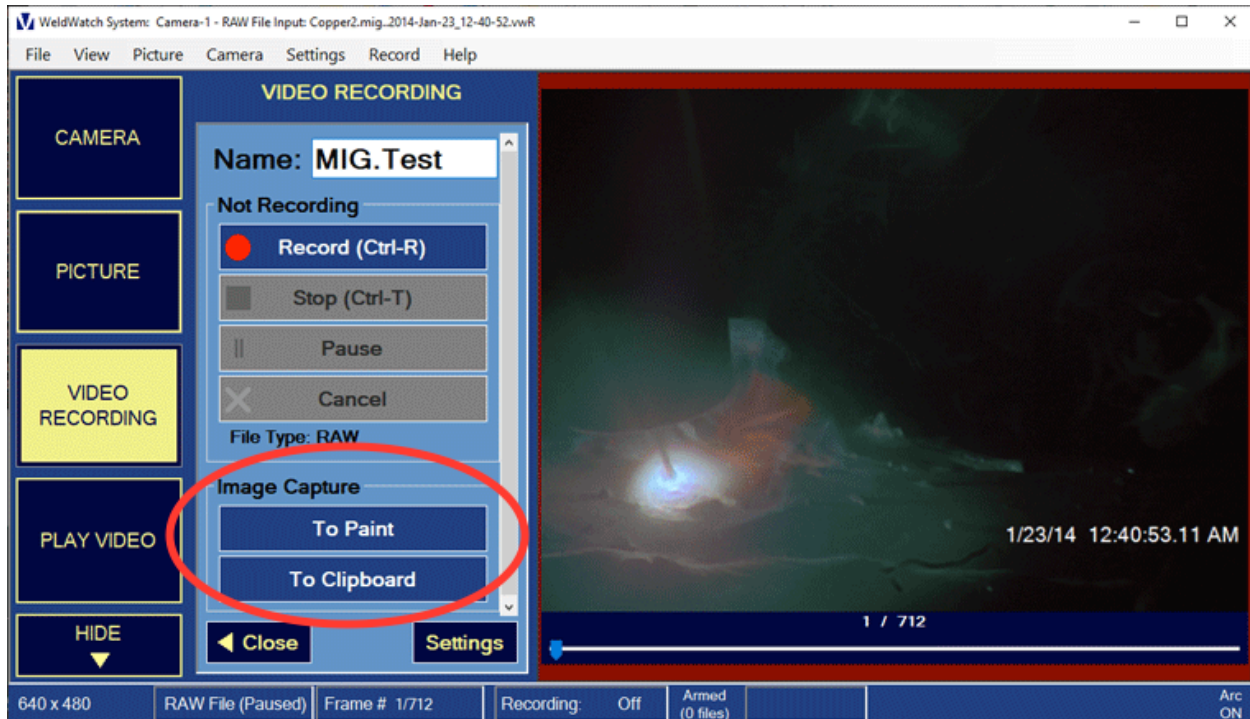
The sensitivity threshold used to trigger automatic recording can be adjusted on the Camera Settings panel.



## How to ... Take a Video Snapshot

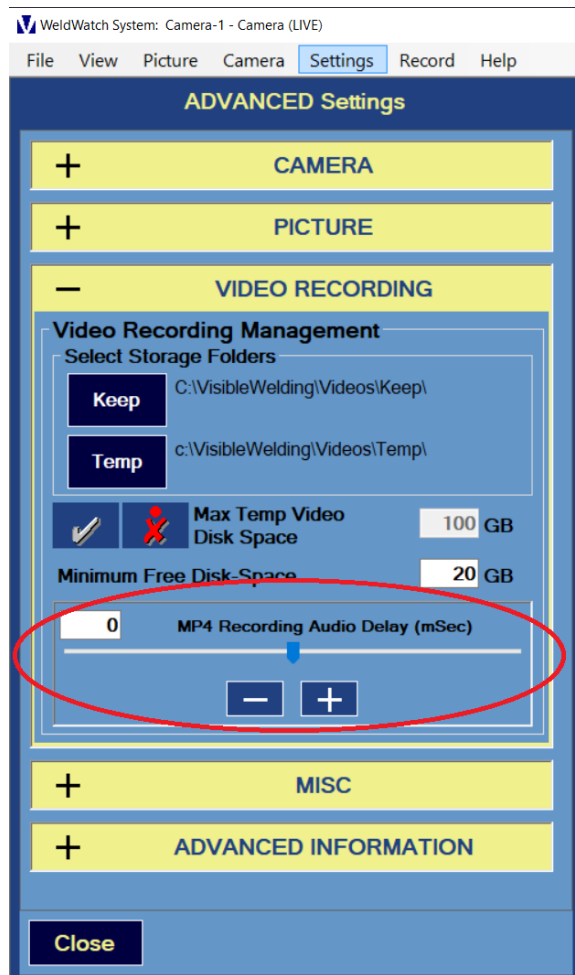
You can save a snapshot of the currently displayed video frame to the Windows clipboard or directly to Windows Paint.

To capture an image, use the Image Capture buttons displayed by the Video Recording Options-screen:



## How to ... Correct Audio Delays when Recording MPEG4 Video

When recording video using the MPEG format, high quality audio at full 44 kHz sampling rate is recorded as well. The sound and video are normally recorded in-sync, but on some PCs, internal delays may create a time-difference between them. To correct this delay and get perfect sound-sync, use the control on the Video Recording Advanced-Setting panel as shown below:



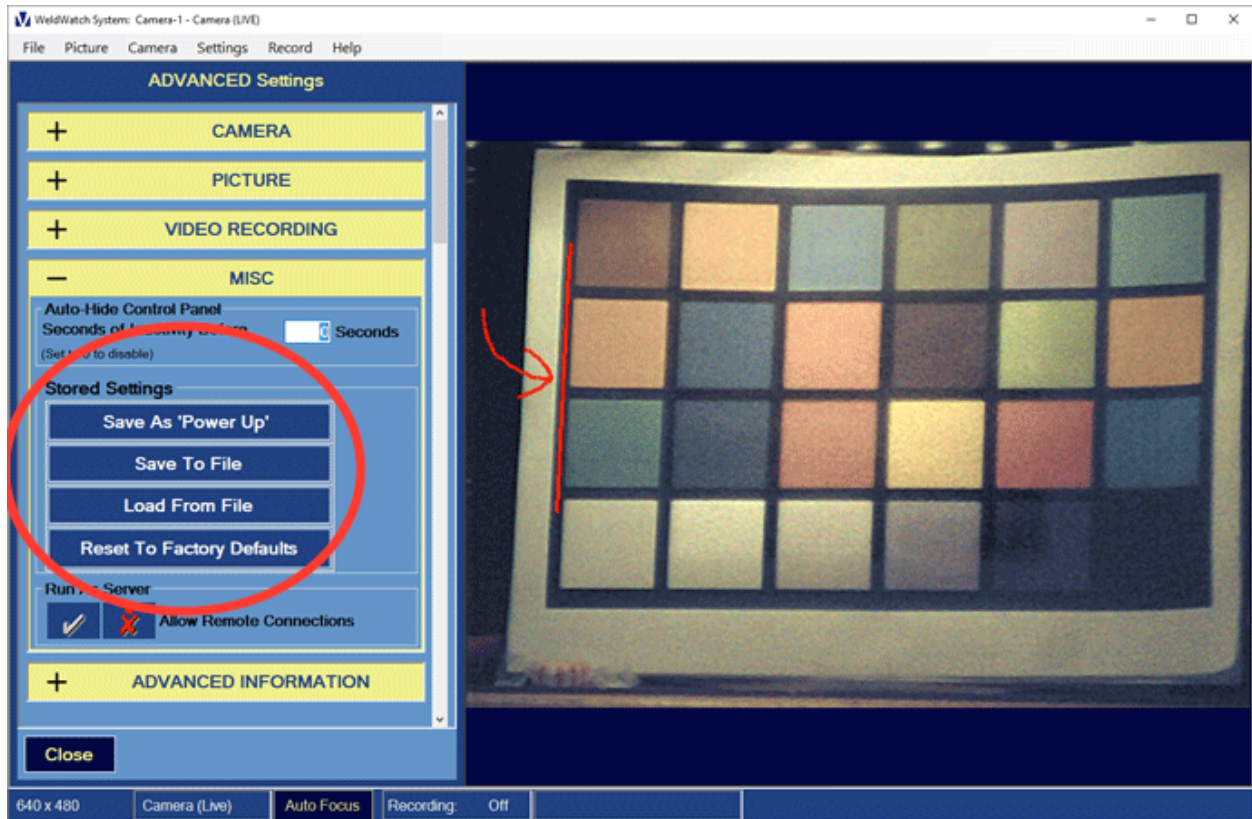
If the audio is ahead of the video move this slider to the right to **add** up to 1 second of **delay** to the audio (0 to +999 mSec). Likewise, if the audio is behind the video, slide to the left to **take away** up to 1 second of delay from the audio (-1 to -999 mSec).

To check synchronization, make a short test video with sound matching an action, for example as hands clapping or a person speaking. Then make a guess of the error and adjust the delay to get closer. It might take a few tries to narrow in down, but it is pretty easy to get it to where "it seems right".

Note that this delay is for adjusting the sound during MP4 recording and does not affect playback.

## How to ... Save and Re-Use Software Setups

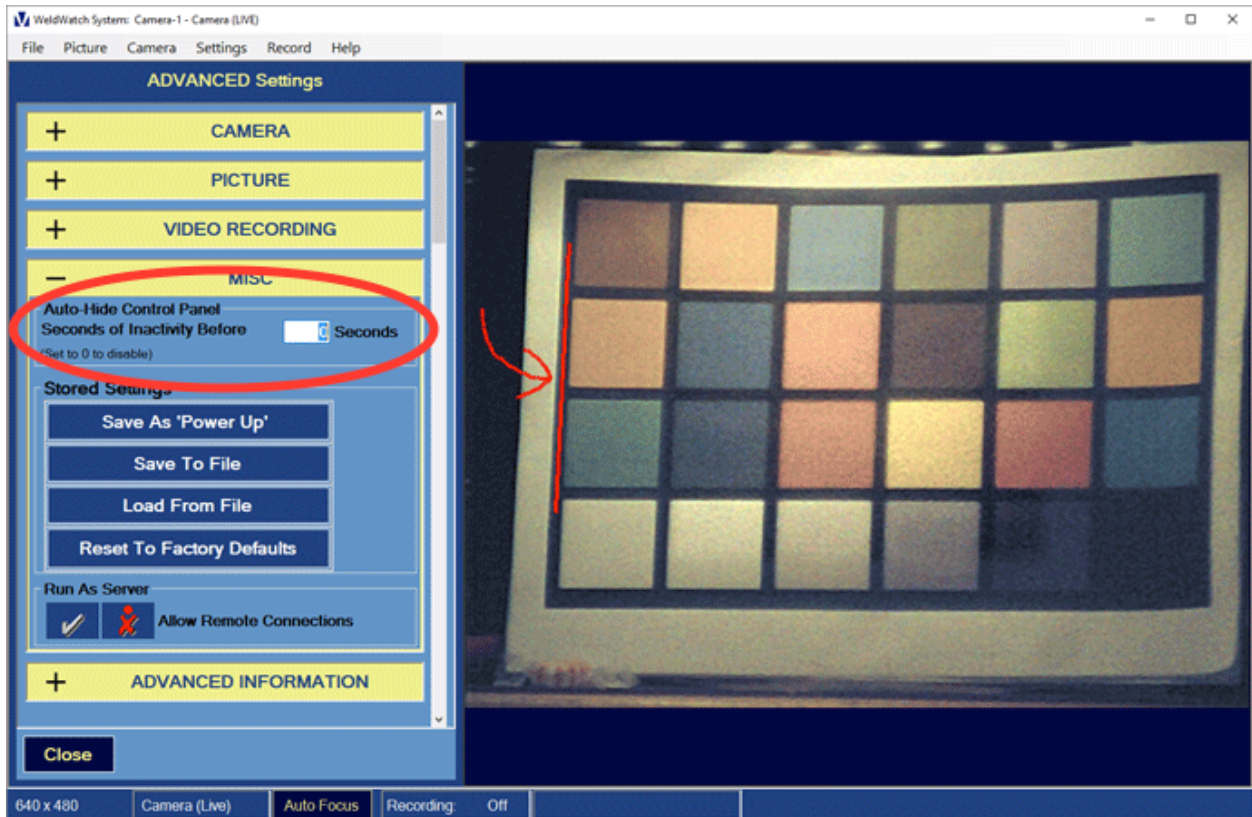
You can save and later recall most software settings, which is handy if you frequently change between several configurations or welding procedures. You can also save default settings to be loaded on power up. This option is found on the Advanced Settings Misc panel, which is displayed using the Advanced Settings-menu. This panel is shown below:



The same functions are directly available from the File menu.

## How to ... Make the Screen Buttons Auto-Hide

By default the buttons along the left side of the WeldWatch screen are displayed indefinitely, but an advanced setting can be used to minimize them after a period of inactivity. This makes the maximum screen area available for viewing camera video. If you want to change the time interval that triggers this feature, or disable it entirely, you can do this in the Advanced Settings Misc panel which is shown below:



The relevant control is in the Auto-Hide Control Panel. You can specify the number of seconds of inactivity that elapse before the buttons are hidden. The default value is 0, which disables auto-hide. Setting this input greater than 0 enables this feature.

## List of Keyboard Shortcuts

The following keyboard shortcuts are always active in WeldWatch:

- Ctrl-A Autofocus on the current autofocus region. By default this is the center but can be changed on the Camera Advanced Settings panel
- Ctrl-F Move lens focus nearer
- Ctrl-G Move lens focus further
- Ctrl-I Close lens iris for less light
- Ctrl-O Open lens iris for more light
- Ctrl-N Toggle auto-iris function on or off
- Ctrl-R Begin video recording to disk
- Ctrl-T Terminate video recording to disk
- Ctrl-Z Increase lens zoom (zoom-in for larger image details)
- Ctrl-X Decrease lens zoom (zoom-out for wider view)

## How to ... Eliminate Camera Errors

Visible Welding's newest cameras transmit image data over a standard USB 3.0 interface. Real-time video streaming pushes the data limits of the USB interface. With some computers the USB interface experiences errors that can reduce video frame rates - or even block the camera from working at all.

If you experience such issues, one technique that can help a system USB mismatch is to add a USB hub between the camera and computer. A powered USB-3 hub is included with the WeldWatch-HD camera package for this possibility.

In some industrial environments, electrical noise can interfere with camera functions. If camera intermittent operation is observed, improving the camera connection to ground usually helps. The internal camera shielding is separately grounded using the green wire. Finding the appropriate electrical ground can be challenging in industrial environments. See the following "How to" topic for a discussion of grounding, based on our experiences with WeldWatch over many years.



## How to ... Connect to the Best Electrical Ground

A weld shop is a harsh electrical environment with powerful equipment inducing electrical and magnetic fields in and around the weld table. These emanating fields can cause interference in near-by electronics and cables.

The strongest interference is typically from High-Frequency TIG starters. Reaching as many as 1 million volts, the HF-starting energy can easily scramble communication to the computer. This is usually not destructive, but will stop the video and may require re-booting the computer to clear the error.

To shield the internal electronics from electrical interference, the camera is enclosed in a thick aluminum case which forms a 'Faraday cage.' This case shields the camera electronics. The shielding is extended over the cables using a connected metal braid. At the end of the braid is the ground wire which serves both the cables and case.

When ungrounded, the case and braid provide some protection – usually enough for most installations. However, strong surges can induce enough voltage to penetrate the shield and interfere with the electronics inside. To protect the electronics in very strong fields, we must reinforce the shielding by anchoring it to an earth ground.

This is where the grounding cable comes in. Connecting this to a neutral ground, keeps the shield securely at zero volts, where it belongs. For the best results, the ground wire should be tied to the most solid ground available.

The most solid ground is a true earth ground (e.g. a stake deep into the earth or an I-beam of the building frame). A little worse, but still good is a grounded outlet, which will be tied to an earth ground somewhere in the electrical system. If you have a choice of grounded outlets, choose the one without heavy equipment plugged in.

Next choice, a little more noisy is the welder machine that is plugged into the grounded outlet that is indirectly hooked to the earth ground. As this is twice removed from the earth ground, and as a high-power weld unit, this will be a "noisy" ground – but better than no ground. But remember that weld power supplies create a lot of the electrical noise and can sometimes be the problem instead of a solution.

Even less desirable is the weld table. The weld table isn't usually grounded, technically. The "ground strap" to the welder is really a "return" connection through which all the weld current flows. This makes this "ground point" move with significant voltages when welding. True grounds do not carry any currents on purpose, they are there "in case" for safety and for shielding.

Similarly, grounding to the PC is not a good choice. The PC is often not grounded at all and is purposely isolated from the world using its battery and internal power supply. Even if the PC is grounded, channeling these troublesome ground-currents through the PC will visit these problems on the PC in addition to the camera. It's best to keep the PC isolated and safe.

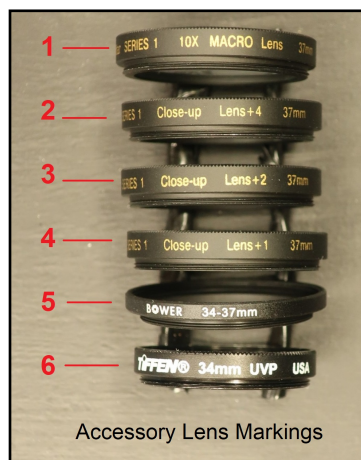
If the green ground cable is too short to reach a good ground location, you can extend it with more wire of a similar gauge. How long can the ground wire be extended? Every situation is different, but shorter is better because after some length, the ground wire becomes an antenna and may add more noise than it subtracts.

## How to ... Operate the Camera Closer (Macro Lenses)

The lens inside the WeldWatch-HD camera can focus at a fairly short distance, but for some installations a closer focus distance may be needed. Visible Welding includes a set of macro lenses in an accessory pouch. The contents of the accessory pouch are numbered in the two photos, below. The first shows all the parts while the second shows a closeup of the markings on items 1-6.



- 1) +10 Macro Lens (more on macro lenses below)
- 2) +4 Macro Lens
- 3) +2 Macro Lens
- 4) +1 Macro Lens
- 5) 34 to 37mm adapter – to attach the 37mm macro lenses to the 34mm camera threads
- 6) Extra spatter-shield / UV filter (this has 34mm threads which fit directly onto the camera)
- 7) Extra screws for the small, LED spatter-shields
- 8) Extra replacement glass for the small, LED spatter-shields



These macro lenses mount onto the front of the camera lens. The macro lenses are slightly larger than the spatter-shield (37mm instead of 34mm) so an adapter ring is included.

The macro lenses allow the camera to focus even when 'too close' to the subject. Depending somewhat on zoom settings, you may need to use a macro lens if you are 9 inches or less from the subject.

The macro lenses do not magnify the image; think of them as reading glasses for the camera. Their strengths range from mild (+1) to very strong (+10). As can be seen from the photo above, some are marked as "Close-up +X" and one is marked as 10x Macro. These are interchangeable terms and yours may be marked either way.

The macro lenses are double threaded so you can stack them. Using both a +1 and a +2 gives you the power of +3.

The best lens depends on your setup but we have found the 1x and 2x lenses to be the most useful. Using a macro lens pulls the camera focus in closer, for example, the minimum focus distance shifts in from about 9 inches to 6.

In practical usage, you can't put the camera too close to the weld so the +1 or +2 are usually enough. We include the whole set for any special cases with optics built into the weld station (e.g. microscopes or special periscopes).



## How to ... Changing Spatter Shields

Changing the spatter shields over either the lens, LED or photosensor is straightforward.

### Changing the lens shield

1. The lens is covered by a glass filter that is accessible from the front of the camera, as highlighted in the red arrow below:



The lens shield unscrews - it is usually only finger-tight.

2. It can be replaced by any glass filter with standard 34 mm threads. An example is the Tiffen model 34UVP, UV filter, available from any major photographic supply house.

### Changing a LED shield

The illumination LED and the photocell used for Auto-Recording on Arc are also covered by shields, highlighted by the green arrows in the figure above. The LED is on the left side in the photo, while the photocell is on the right. To change either:

1. Use a nut driver to remove the 4-40 x 1/4 hex head screw that holds the spatter shield mount over the LED:



2. Remove the holder and the old spatter shield:



3. Replace the spatter shield in the holder. Both are shown below:



4. Place the spatter shield holder back in its original position over the LED and screw in the 4-40 1/4 head screw to secure it to the camera case.



## How to ... Hook Up Camera Air-Cooling

If you want to take advantage of the air-cooled case on your WeldWatch-HD camera, this page provides information about air quality and pressure requirements, as well as instructions for hooking up your air supply.

The air-cooling connection hardware is not included in the standard package. The fittings required are available from Intertest: two units of Intertest part # EM68247 - Hose Barb 1/8NPT 1/4 Hose Brass.

The air supplied must be clean, oil free, and dry (dewpoint of 40° F or less). We recommend filtering the supply to block particles larger than 5 microns. The maximum pressure allowed is 120 PSI. At an air temperature of 72° F, the air flow ranges from 1.2 SCFM (standard cubic feet per minute) at 20 PSI to 2.5 SCFM at 90 PSI. Tests have shown that with 90 PSI of 70° F air, the camera can operate continuously in a 260° F convective oven.

### Installation instructions

1. Remove the plugs on the back of the case as shown below.



2. Screw in the hose fittings indicated above and then add 1/4" tubing that connects to your source for pressurized air: The fittings are available from Intertest: two units of Intertest part # EM68247



3. It does not matter which plug is used for input and for output, either connection works equally well. If you want to reduce the flow of air you can add a valve on the input line.

# WeldWatch Controls Overview

The WeldWatch home screen is shown below:



It has a large area for camera video and a column of 5 interface buttons on the left side. The menu along the top duplicates the button functions, while the status bar along the bottom provides useful information about the current video and recording state. The controls are bold, easy to read and large enough for easy touchscreen use. WeldWatch is designed to maximize display space for the welding video, especially on small industrial screens, and furthermore the buttons can be easily hidden using the bottom "Hide" button.

The button functions are:

## **CAMERA**

Adjust camera settings like "Focus" and "Zoom".

## **PICTURE**

Adjust the screen image with controls like "Brightness" and "Contrast".

## **VIDEO RECORDING**

Set up and record video to the hard drive.

## **PLAY VIDEO**

Play back recorded video files

## **HIDE**

Hide all buttons except "HIDE". When the other buttons are hidden, this one changes to "SHOW", so you can redisplay the buttons.

The Windows-menu functions, across the top, are:

**FILE**

Quick image capture and program exit

**VIEW**

Select camera for display.

**PICTURE**

Functions for the screen display.

**CAMERA**

Functions to control the camera.

**SETTINGS**

Save and recall program setting configurations.

**RECORD**

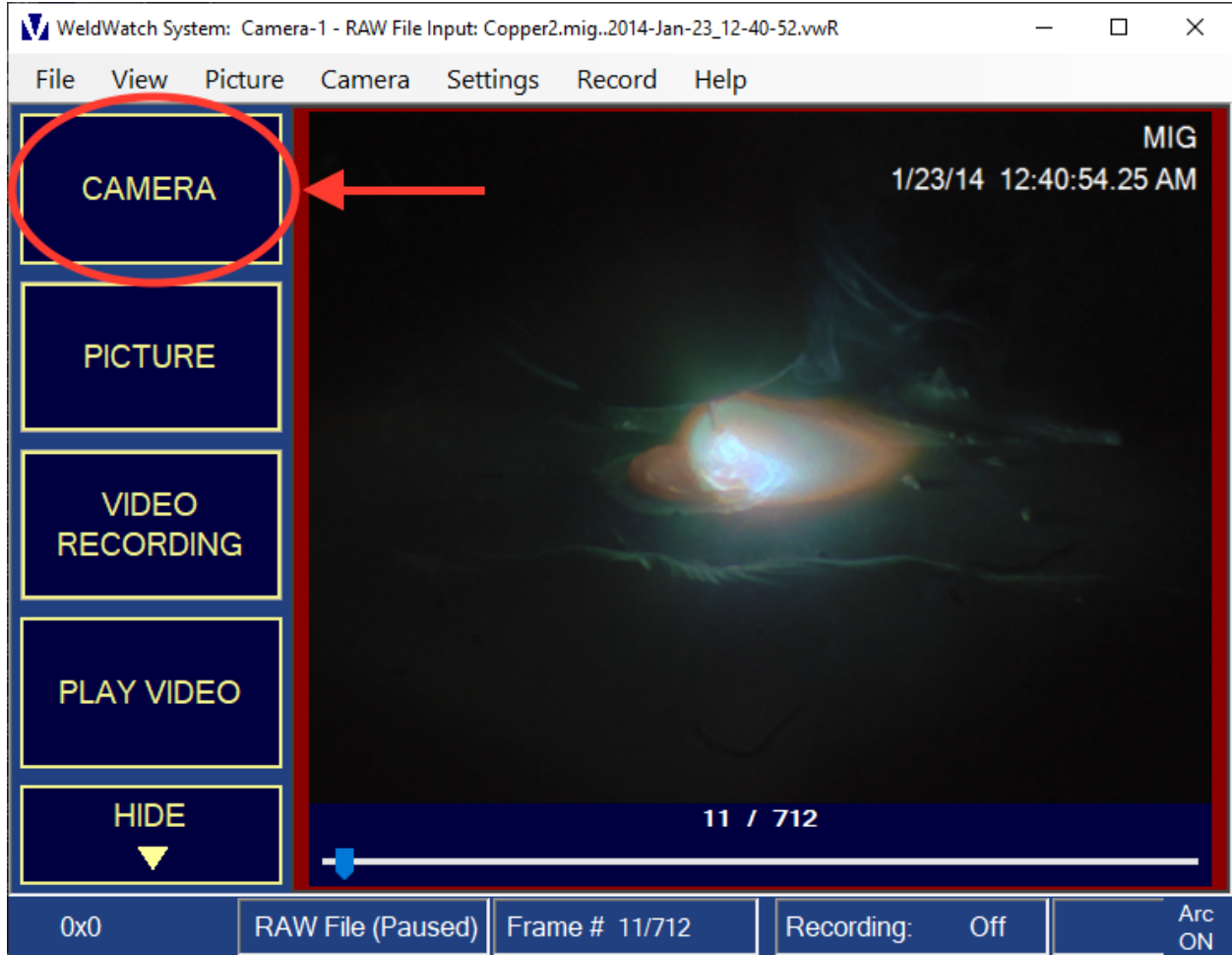
Functions to control recording

**HELP**

Help and About functions.

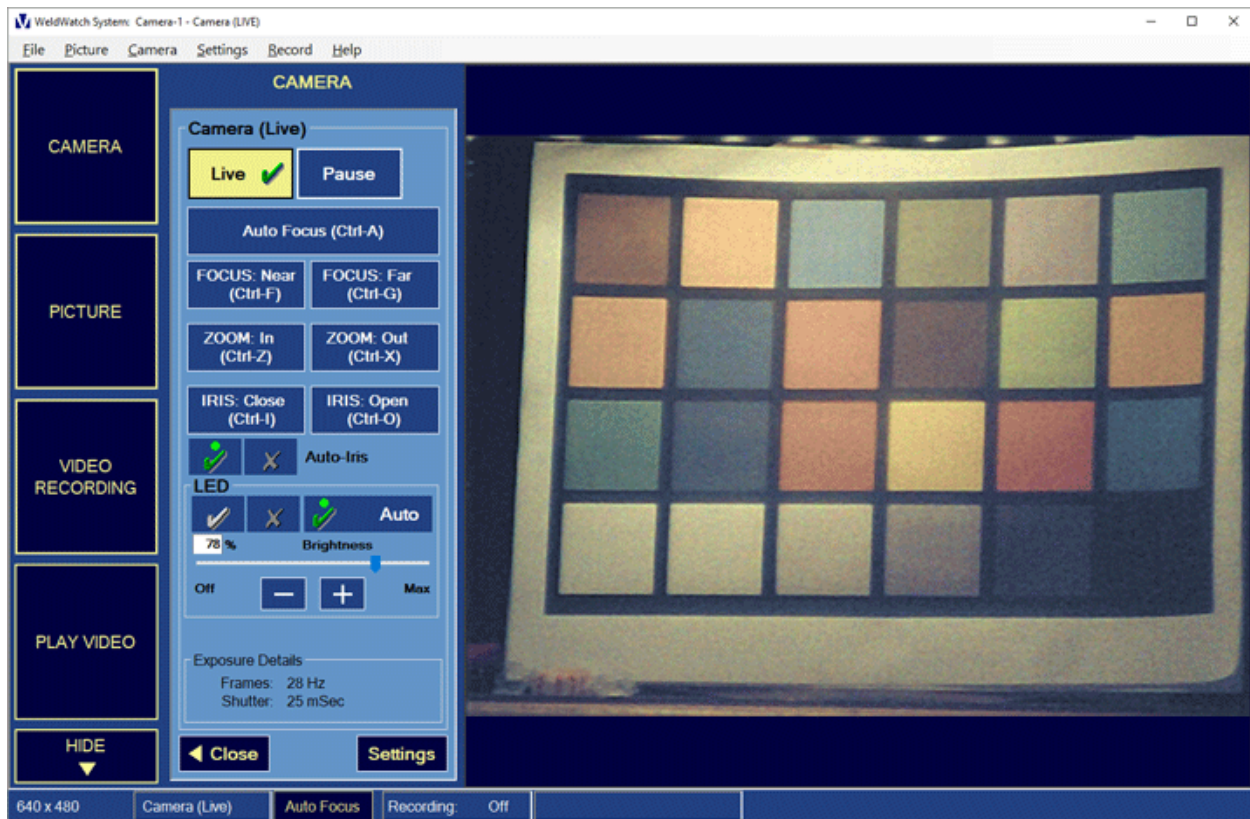
## Camera

The Camera button allows adjustment of the lens focus, zoom, and iris. It also provides some details about the video stream and access to the camera setup panel. The Camera button is circled below:





The panel displayed after clicking or touching the camera button is shown below:



The **Live button** at the top turns on and off the live video stream from the camera. The **Pause button** captures and displays a single frame from the camera. Each time it is clicked or touched, a fresh image is captured from the camera and displayed.

If your camera does not have a built-in lens, none of the controls below the Live and Pause buttons will be displayed. Visible Welding built-in lenses include motorized focus, zoom, and iris which are fully controlled from software.

With a Visible Welding lens:

The **Autofocus button** finds the best focus in the center of the current image. Although the autofocus is active, it is common for a flickering arc to confuse the auto-focus so we recommend focusing before the arc is struck.

The image region being used for focus is enclosed in a red rectangle, displayed while focus is being measured. This area can be changed on the Advanced Camera panel, allowing you to tell the system to focus on the area you consider the most important part of the scene. Depending on the contrast in the scene, autofocus can take up to several seconds. If the autofocus takes more than a second a progress bar is displayed, as shown:



If you are not satisfied with the Autofocus result, you can repeat the process or make further adjustments using the **Focus buttons**. Starting from a different point, or repeating after a small movement of the image, can improve the results. Autofocus works better with additional light, and also requires some scene texture in the focus area (it struggles on a blank area).

The focus, zoom, and iris buttons let you manually set these parameters for the best picture.

The **Focus buttons** move the focus when clicked or tapped. By default the button is active when clicked and the mouse button is held down while over the button. Touch screens can be used in the click and hold mode if your touch moves while you hold (gently rub the button, don't stay in one spot). The focus changes slowly at first and then quicker if the button is held for more than a second. The slow start allows fine focus adjustments when you are close to best focus.

Each button also has an associated keyboard shortcut. Type Ctrl-F and the lens will focus nearer. The focus will continue to adjust as long as the key is held down. Type Ctrl-G and the lens will focus further away. These keyboard shortcuts are always active.

The **Zoom buttons** work like the focus buttons: the button is active when clicked and the mouse button is held down while over the button. When active the optical zoom will increase or decrease. The zoom lens has a range of 1x to 3x. Touch screens can be used in the click and hold mode if your touch moves while you hold (gently rub the button, don't stay in one spot).

Lens zoom can also be controlled from a keyboard. Type Ctrl-Z and the zoom factor will increase (image detail grows larger). Type Ctrl-X and the zoom factor decreases (detail decreases as the total image coverage grows larger). As with focus, the changes continue as long as the key is held down, until the limit of the lens is reached. These shortcuts are always active.

The lens Iris controls the amount of light coming into the lens. The **Auto Iris** check mark allows either automatic or manual lens iris control. Automatic iris control is the best option for most setups. **Auto Iris** is disabled, whenever lens aperture is manually controlled using the **Close** and **Open** buttons, or their corresponding keyboard shortcuts (Ctrl-I and Ctrl-O). Each time the button is clicked, the lens iris changes by approximately 1 f-stop, which is a 2x change (increase or decrease) in scene brightness. The stock



camera lens has 8 iris stops available, so the iris can change the incoming light by a factor of 256. The effect on the video from iris changes is not always apparent because the camera image processing will partially, digitally, compensate for scene brightness changes, which is why the automatic iris is usually best.

The Settings button sends you to the panel where common camera settings can be viewed or changed.

## Camera Settings

Clicking the settings button on the camera panel displays a panel with commonly used camera settings:



The **Reset Camera** button disconnects and reconnects the camera; this is not needed in normal usage .

The **Arc Detect Level** setting controls the sensitivity of the algorithm used to detect a welding arc. The camera watches for arc-on and arc-off conditions to quickly adjust itself to provide the optimum image. This control sets the brightness threshold that triggers arc detection. A typical value is around 20-30. If the camera is not detecting your arc, make this number lower. If the camera is triggering off non-arc light (perhaps the reflections of other arcs from welding nearby), then increase this number.

The **AGC Adjust** input lets you modify the auto-iris balance point to change how bright the camera video is when viewing an arc using auto iris. Use the slider or + and - keys to adjust the camera AGC behavior to your preference. Adjustments to the right ("+") set the AGC target level to be lighter and the lens iris will auto-adjust to a balance-point more opened. This improves detail in the image shadows but may lead to

saturation in the brightest arc features. Adjustments to the left ("-") push the AGC target level to be darker so the iris will auto-adjust to a balance more closed. This improves view of the bright arc at the expense of some detail in the darker image regions.

**Camera Resolution** offers seven pre-set image sizes. 1280x1024, the largest, uses the complete sensor array. Lower resolutions are selecting smaller subsets of the sensor pixels from the center of the image.

Smaller image sizes increase the displayed frame rate and reduce the time lag, which can be useful for real-time adjustments or weld-by-goggle operation. If image display time lag is causing problems, try a lower camera resolution mode and, if necessary, increase the lens zoom to compensate.

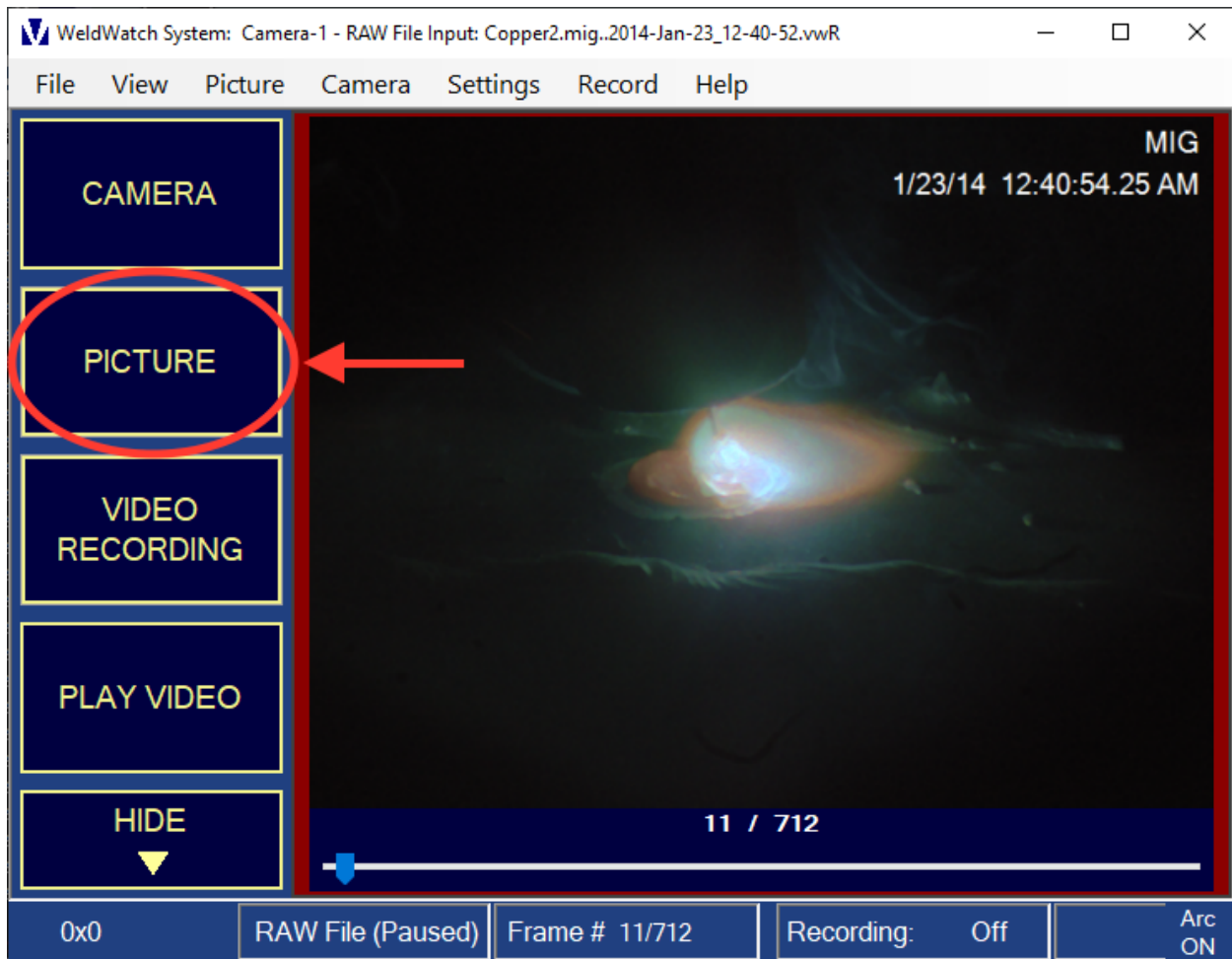
The two frame rate buttons at the bottom of the panel provide quick access to commonly used camera frame rates. The faster rate (30 FPS, or frames per second) provides smoother recorded video but the files are twice as large. Note that larger resolutions are limited by bandwidth of the connection and may not reach the target 30 fps. They will go as fast as possible.

The **Advanced** button on the bottom accesses less commonly changed camera settings, contained in the Camera Panel on Advanced Settings.

## Picture

The Picture button adjusts the image display. These adjustments only adjust the onscreen display; they do not affect the camera settings.

The Picture button is here:



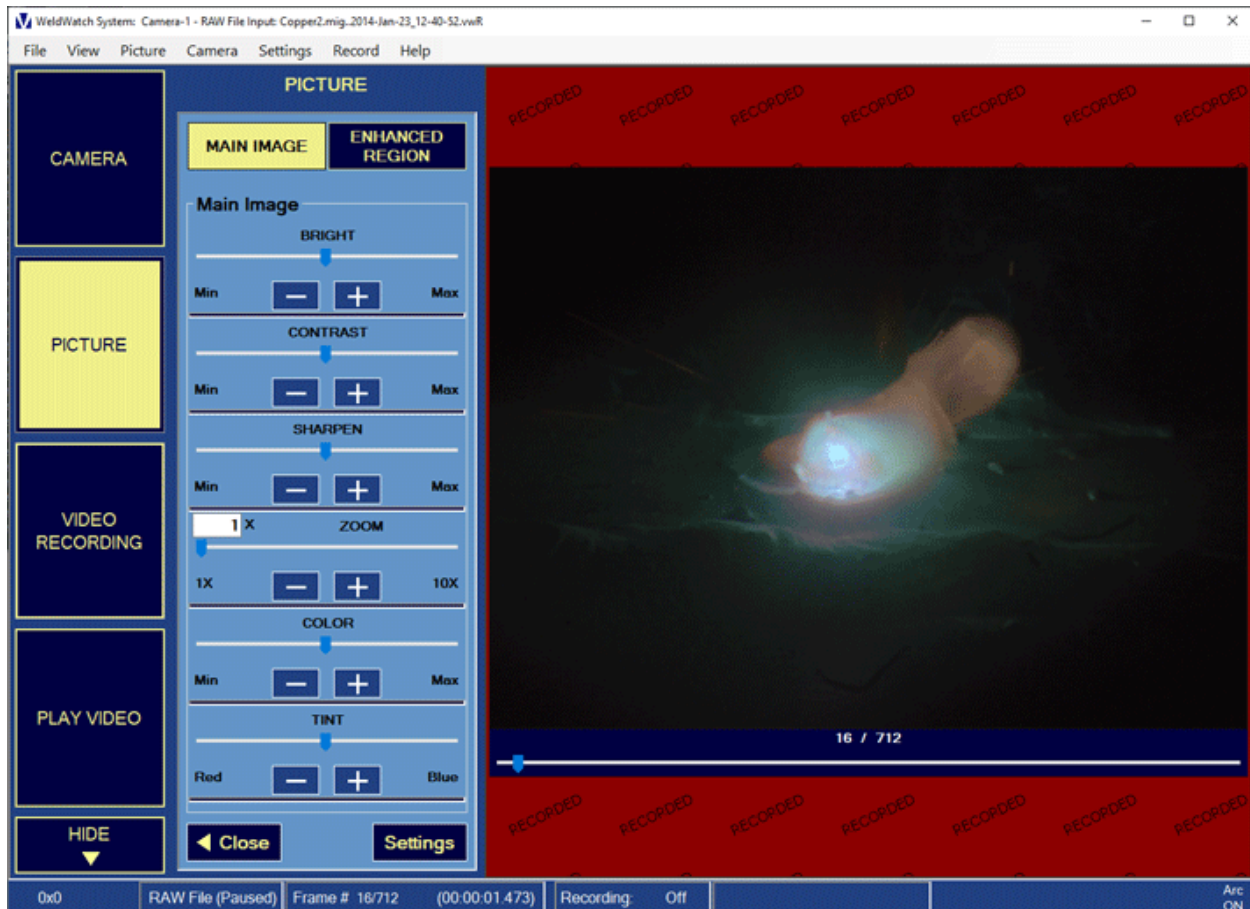
Once pressed, it turns yellow and displayed next to it is a panel of six sliders affecting different aspects of the image:



This panel of slider controls can either apply to the entire image or a special enhanced region. If the Main Image button above the panel is yellow, the control settings apply to the entire scene (the Default). If the Enhanced Region button above the panel is yellow, the displayed controls apply to the enhanced region only.

## Main Image Controls

The main image controls are shown below. Each control has a - and + key for discrete steps and a slider for continuous adjustment. These adjustments affect the entire image.



The slider lets you increase or decrease the image property affected by the control. Click (or tap) the slider control and drag it to the left or right to increase or decrease the effect. Alternately, click or tap on the "+" and "-" buttons to adjust the effect in fixed steps.

The six controls are:

### **BRIGHT**

Adjust overall picture brightness. This can improve the display when either the ambient lighting is low, or when the monitor itself is dim.

### **CONTRAST**

Change display contrast. Contrast is the display range between dark and light features.

### **SHARPEN**

Change image crispness. More sharpening can help pull out fine details in an image. Less sharpening can reduce image noise.



**ZOOM**

Add digital zoom to the image. Digital zoom can improve view of small features in the picture, but does not change the image resolution. Once the zoom is greater than one, you can use the mouse or your finger (on a touchscreen) to move the zoomed area on the video. This digital zoom is separate from and adds to the optical zoom on the camera lens, which is controlled on the Camera options panel.

**COLOR**

This adjusts the color saturation in the video. At minimum setting, the image has no color and is essentially a black-and-white image. At maximum setting, the colors will be gaudy and fluorescent. Adjusting this can help in pulling details out of a welding scene.

**TINT**

Shifts the color tint from red to blue, similar to the tint control on a TV or monitor.

These sliders control the whole screen. Another set can be enabled to separately adjust the Enhanced Region. When the Enhanced Region is enabled, a small area of the screen is given separate controls for Brightness, Contrast and Sharpen.

## Enhanced Region Controls

When the Enhanced Region display feature is enabled, the Picture control panel includes three controls that affect the enhanced region only, if enabled:



The slider lets you increase or decrease the image property affected by the control. Click (or tap) the slider control and drag it to the left or right to increase or decrease the effect. Alternately, click or tap on the "+" and "-" buttons to adjust the effect in fixed steps.

The three controls are:

### **BRIGHT**

Adjust Enhanced Region brightness. This can improve the display when either the ambient lighting is low, or when the monitor itself is dim.

### **CONTRAST**

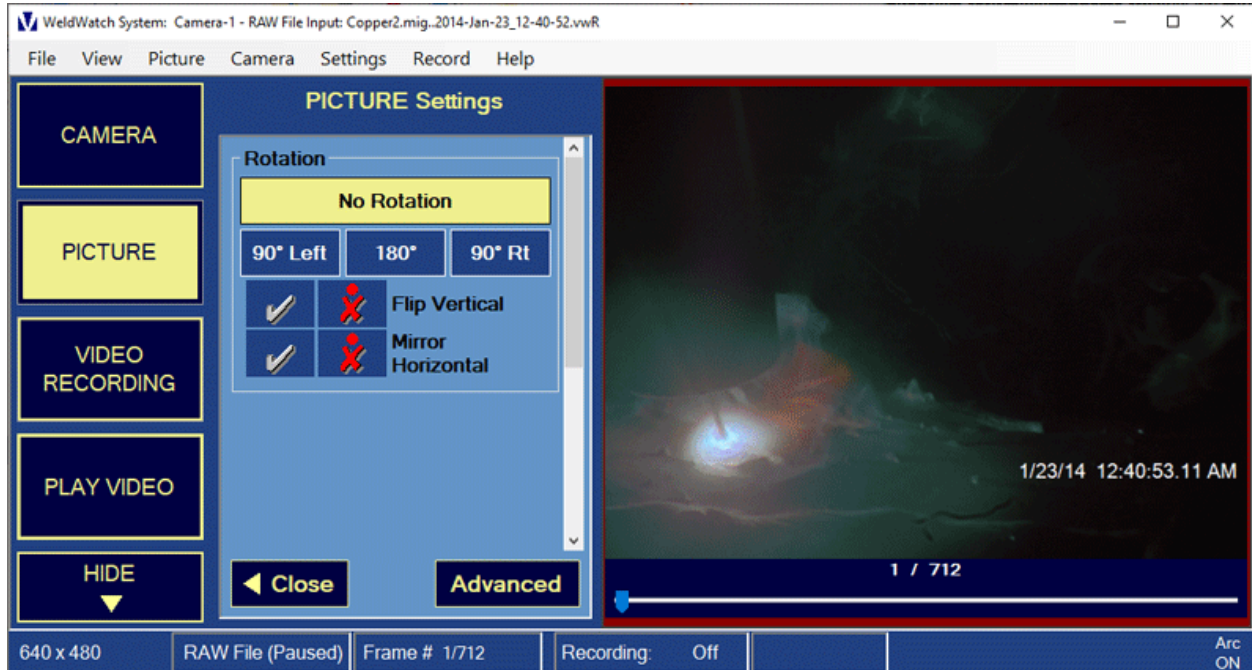
Change Enhanced Region contrast. Contrast is the display range between dark and light features.

### **SHARPEN**

Change Enhanced Region crispness. More sharpening can help pull out fine details in an image. Less sharpening can reduce image noise.

## Picture Settings

The Settings panel for the Picture button contains these commonly used settings:

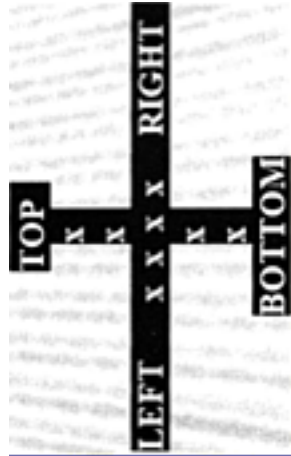


At the top are a series of controls for rotating and flipping the camera video display. This is useful for situations where the camera is mounted at an unusual angle, leading to a confusing orientation of the welding video. Rotation can be combined with the image flip settings. The rotation buttons apply 3 rotation settings:

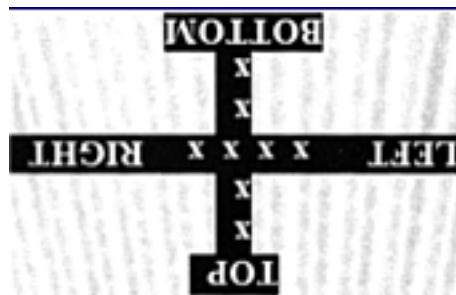
**No Rotation**



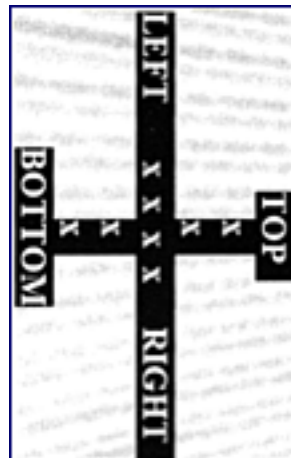
90 Left



180 Degrees

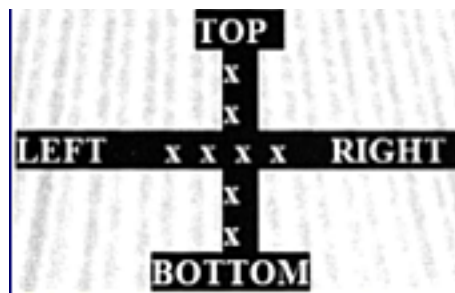


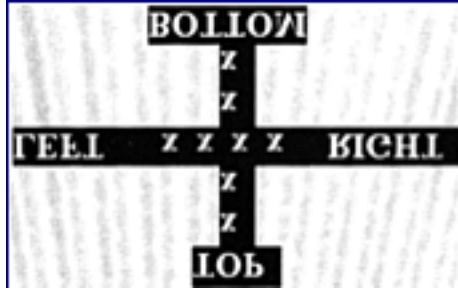
90 Right



The Flip Vertical and Mirror Horizontal inputs are useful for correcting image inversions caused by mirrors:

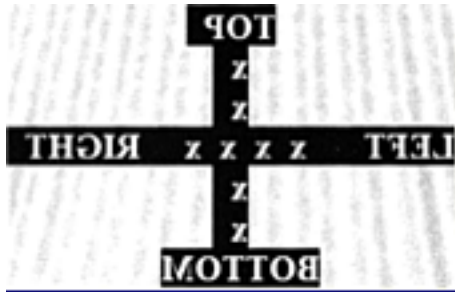
Example reference image





### Flip Vertical

This reverses bottom and top in the image, as if it was flipped over.



### Mirror Horizontal

This reverses left and right in an image, as if you were looking in a mirror.

The **Advanced** button at the bottom takes you to the Advanced Settings screen.

## Enhanced Region Settings

The Settings panel for the Enhanced Region is shown below.



The **Enabled** check box turns the enhanced region on and off.

**Circular edge:** this sets the shape of the enhanced region.



circular region



rectangular region

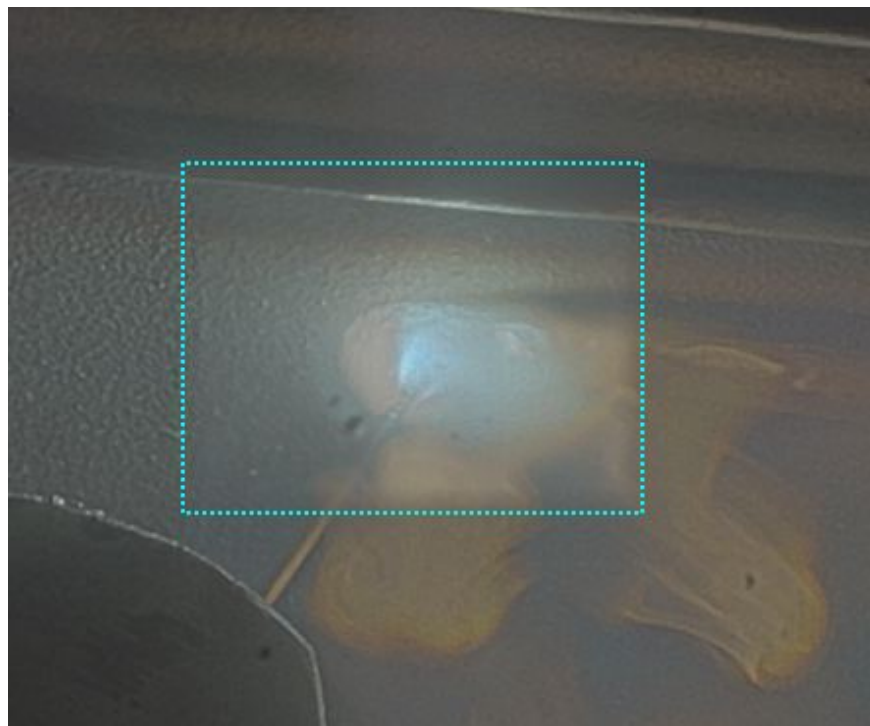
**Follow arc:** this option makes the enhanced region follow the arc as it moves.

The **Source Area** controls define the region of the image that will be enhanced. To specify the area for enhancement, click the draw button and then click and drag the area on the screen. Circular regions are drawn from the center point outwards. Below is an example of drawing a circular region:





Rectangular regions are drawn from corner to corner:

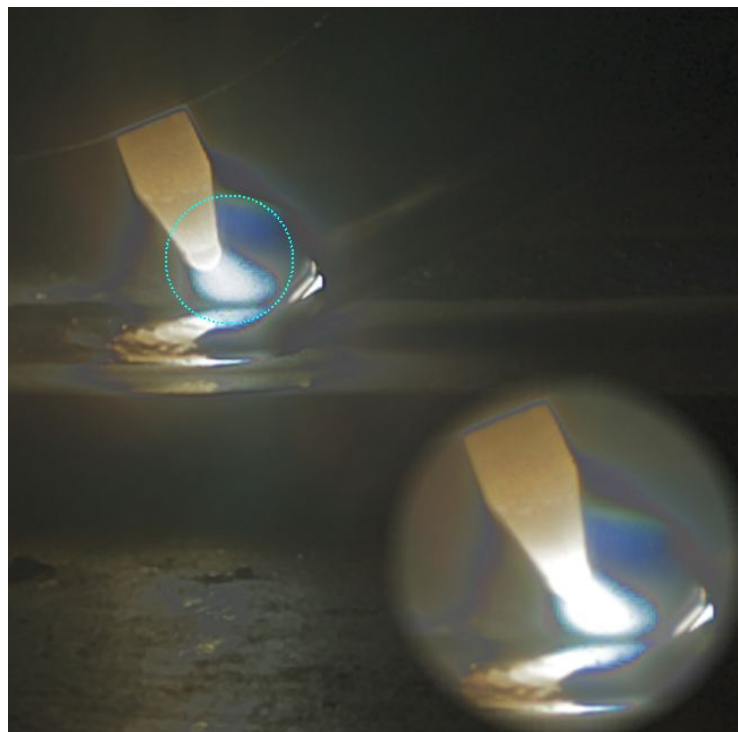


During drawing, the area will have a highlighted border to show the region, as shown in the two examples above. This border fades away after a few seconds. If you want to view the border after it fades out, click the **Hi-Lite** button.

The Destination box buttons control where the enhanced region will be added to the video. Overlay source places the enhanced region over the same image pixels being enhanced, as shown below:

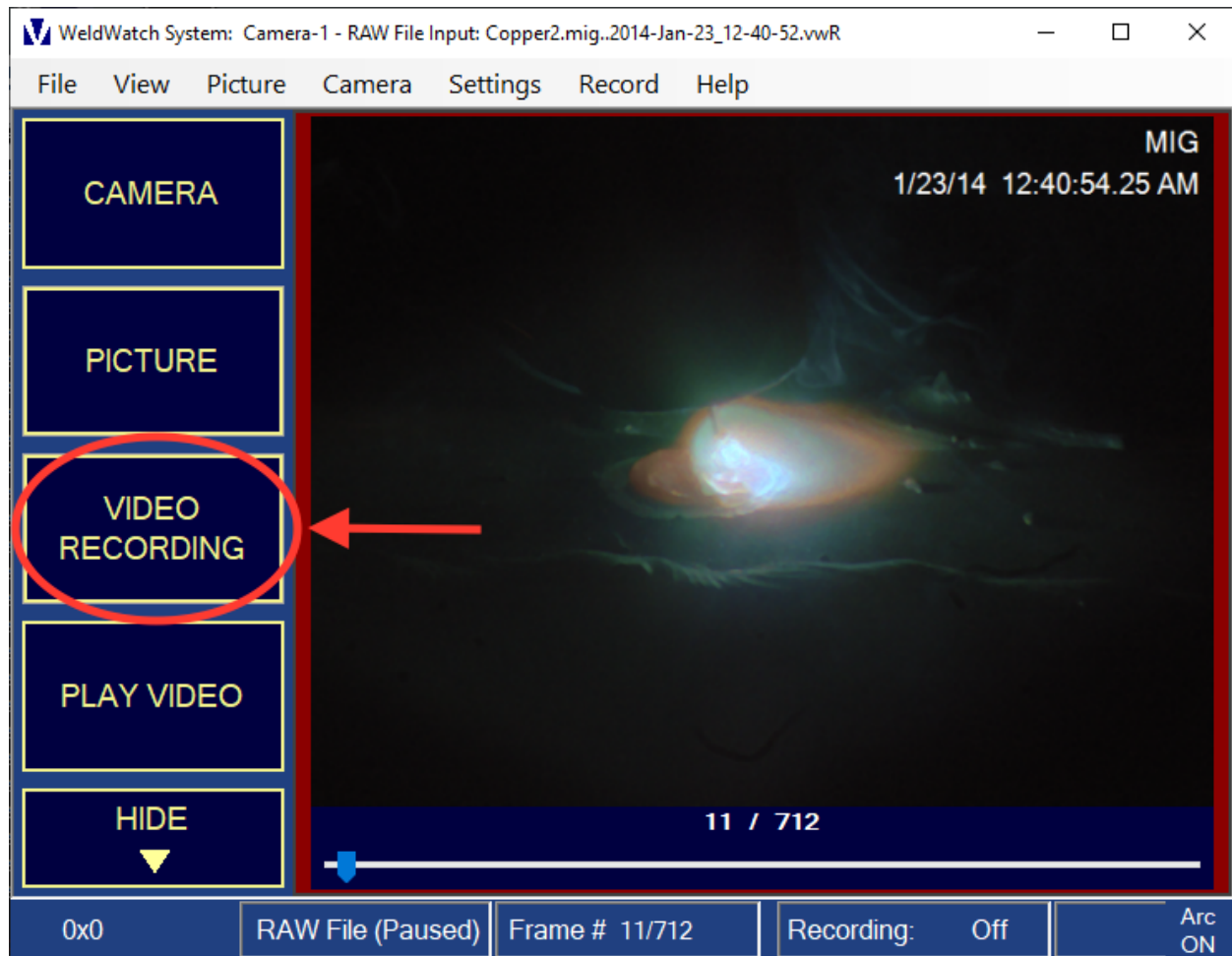


The other 4 buttons let you place the enhanced region display in any of the image corners for a picture-in-picture effect. Below is an example of the enhanced region displayed in the lower right corner:

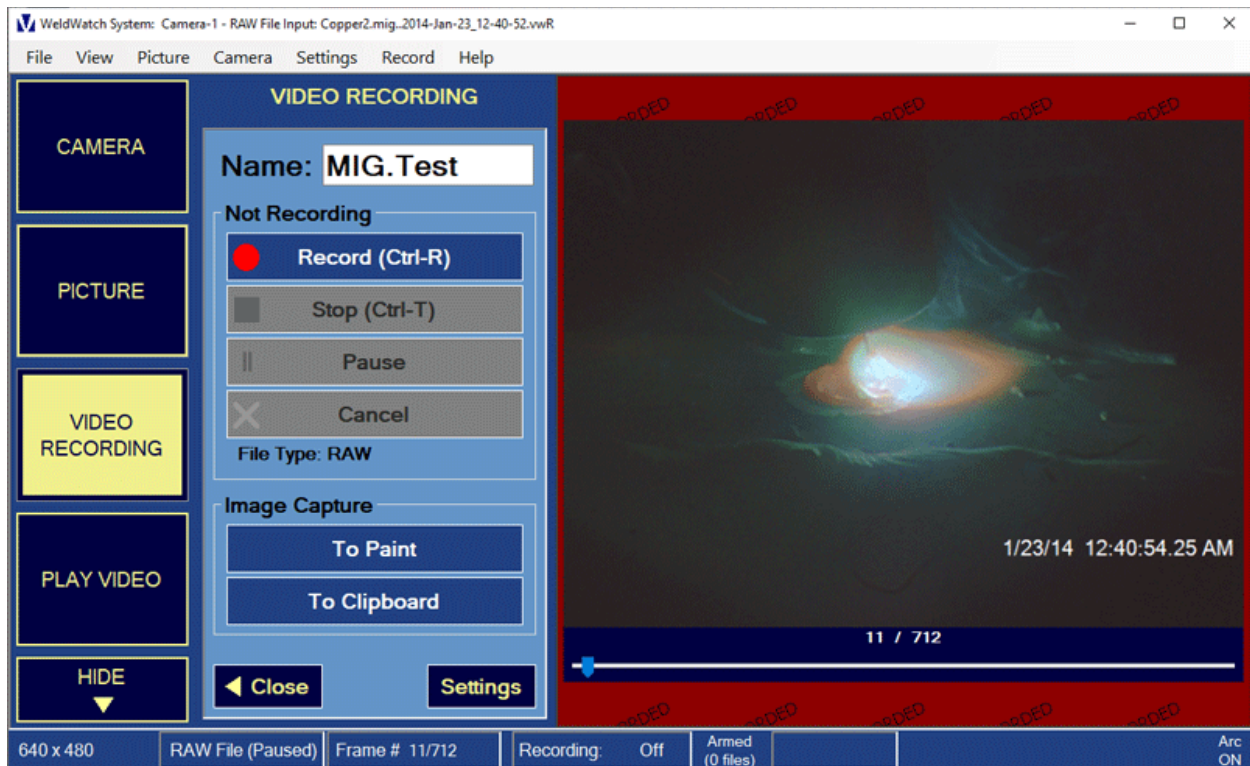


## Video Recording

The Record panel is displayed by clicking or touching the video recording button:



This panel lets you start, pause, and stop recording of the camera video to a disk file. The panel and its controls are shown below:



**Name:** Recorded video files are by default named using a long date-time string, which gives both a unique name for every file and also identifies the recording time at a glance. A typical default filename would be "2014-Jan-09\_13-20-17.vwR". This file prefix is added to the front of the filename and lets you identify welders, jobs, or specific tasks. In the example above, the Name is "MIG.Test", which could indicate, for example, a specific operation. This setting will add the prefix onto the filename so the filename might be "MIG.Test.2016-Jan-09\_13-20-17.vwR".

The four buttons that control manual disk recording are:

### Record

This starts recording video to disk. If the recording was paused, then clicking this button resumes the recording. The keyboard shortcut key is Ctrl-R. During recording information about the current recording (number of frames, file format, and arc detection) is displayed in the status bar along the bottom.

### Stop

Clicking this ends the recording. The file is saved into the current Temp directory. If auto-playback is enabled, WeldWatch immediately jumps to the Play Video screen and starts playing it back.

### Pause

This temporarily stops recording video, but keeps the file open for more recording to come. When paused, you can resume recording by clicking the RECORD button. You can also STOP or CANCEL the recording.

### Cancel

This stops the recording and deletes any temporary data from the hard drive.

Under Image Capture, there are two buttons that let you take a snapshot of the current video image.

### To Paint

This button takes the snapshot and opens it in the Windows Paint program. You can use the features of

Paint for annotations and edits to the image, then save it to a disk file for future use.

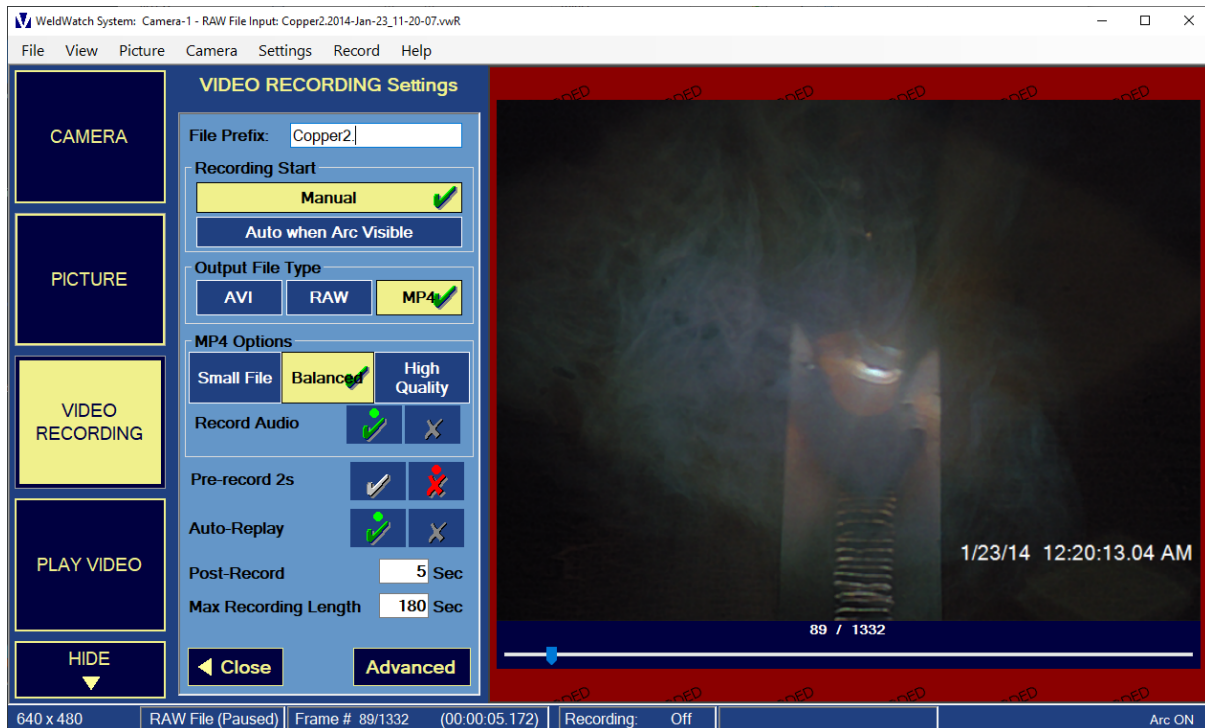
**To Clipboard**

This button stores the snapshot in the Windows clipboard. It can now be pasted into any Windows application that supports graphics.

The Settings button in the lower right of this panel provides access to additional Video Recording parameters.

## Video Recording Settings

The Video Recording Settings panel, displayed by clicking the Settings button in the lower right of the Video Recording panel, is shown below:



There are two ways to start recording video:

### Manual

This starts and stops disk recording using the buttons on the Video Recording options panel (or Shortcut Keys)

### Auto when Arc Visible

This starts recording when an arc is detected.

The automatic start option makes it easy to record whenever welding is taking place, without user intervention. The adjustment for the trigger-level for “Auto When Arc Visible” is on the Camera Settings panel.


The buttons in Output File Type select the file format for recorded video

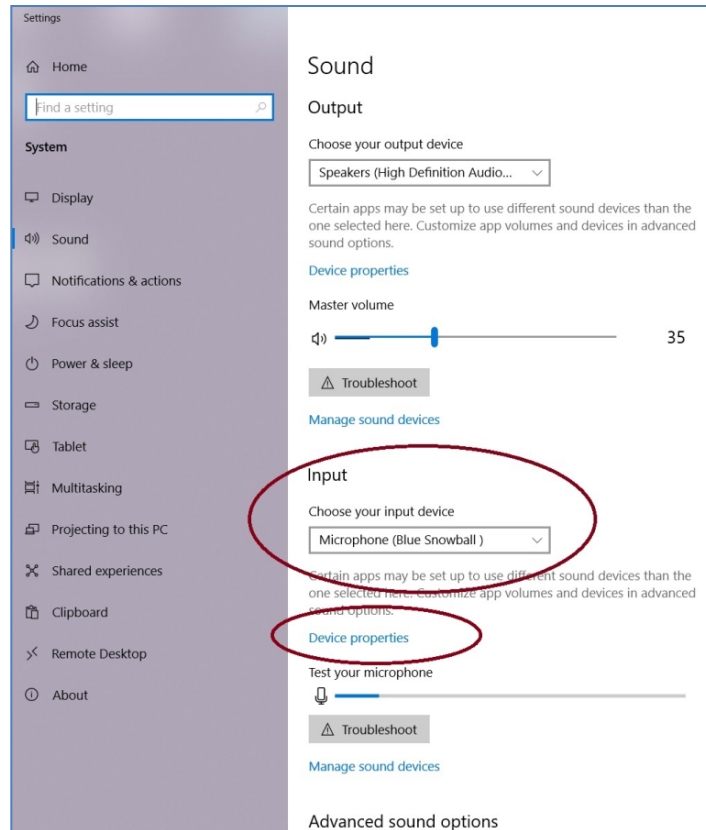
### MP4

This records video into standard MPEG-4 files at the camera resolution. The MP4 video reflects what is shown on screen, including all picture adjustments (such as brightness and contrast) and any annotations such as text or graphics. Three levels of MP4 file compression are available in the MP4 options to let you balance file size against recorded video quality:

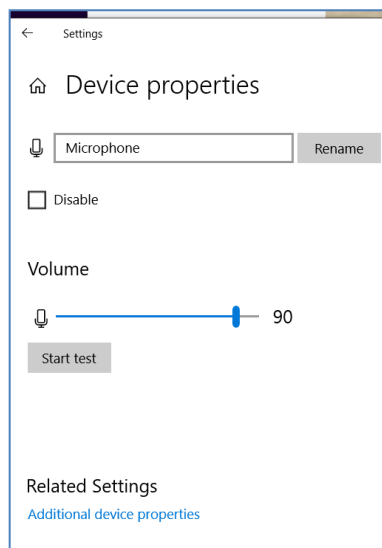
- **Small File** Use this to get the smallest possible output file, sacrificing some video quality
- **Balanced** Use a moderate level of compression, preserving more video quality
- **High Quality** Choose this when you want the best quality recording without concern for filesize



The MP4 video also records audio from the default Windows sound input if Record Audio in MP4 options is checked. The Windows sound input is selected on the Windows Sound Settings panel, shown below. You can quickly get to this screen using the windows key  and typing "SOUND":



To adjust the microphone sensitivity (the volume of the recorded audio), use the [Device Properties](#) on this panel (under the input device) to set the volume (sensitivity) of your microphone.



## **AVI**

This records video into standard Windows AVI files at screen resolution, with no compression. This results in a very large file. The AVI file includes exactly what is shown on screen, including all picture adjustments (such as brightness and contrast) and any annotations such as text or graphics. AVI videos are silent; no sound is recorded.

## **RAW**

This records video into a proprietary format which captures the original camera data at full resolution and full frame rate. In this format, these can be played back only with WeldWatch software, but can be easily played and recorded to MP4 at any time in the future. Raw videos are silent; no sound is recorded.

When the file type is set to AVI, additional option buttons are displayed.

**15 FPS and 30 FPS:** this sets the frames per second that will be recorded. 30 FPS saves the full 30 frames per second of camera video, which results in smoother motion but in files that are twice the size of 15 FPS.

Next are options that record additional video around the time that welding is detected:

### **Pre-record 2s**

When checked, this adds the 2 seconds of video prior to arc-detection to the recorded video.

### **Post-Record**

This adds the number of seconds specified of video to the end of a file, after welding is no longer detected. The default value shown is 2 seconds.

### **Max Recording Length**

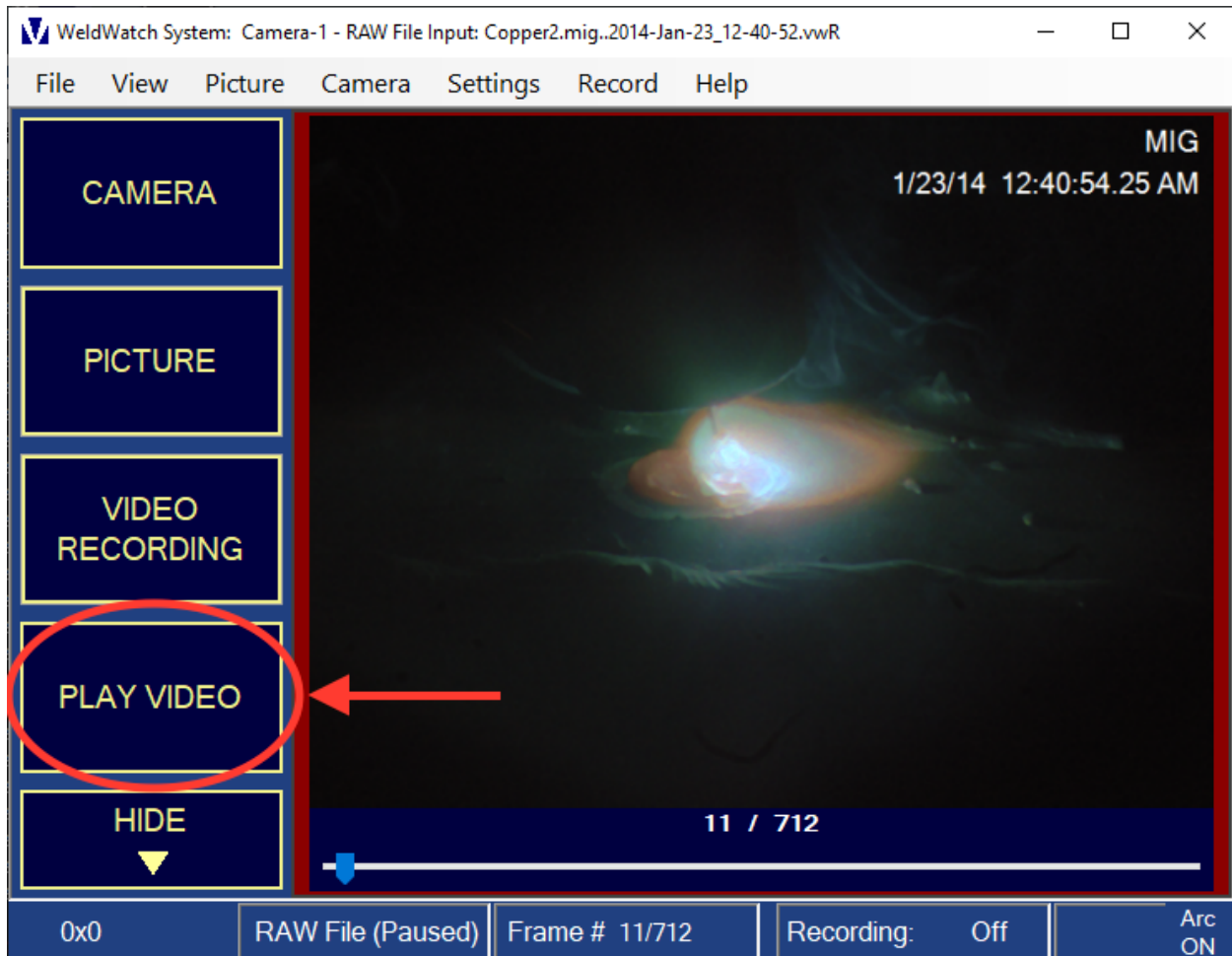
Limits the maximum recording time duration (in seconds) for any single video. This acts as a safety valve to prevent the accidental recording of endless video, which could fill your computer's disk.

### **Auto Replay**

If Enabled, a video will automatically play for review after an automatic recording.

## Play Video

Playback of recorded video is controlled through the Play Video panel. This is displayed by clicking or touching the Play Video button:



Compressed video is much higher quality using the MPEG4 format so the current WeldWatch software replaces the AVI compression sub-system with the MPEG4 compression system. This recording improvement, unfortunately, removes the ability to play compressed AVI files in WeldWatch – even those recorded with WeldWatch in the past.

These old AVI files are not lost. They can easily be played outside of WeldWatch, for example in Media Player. They can also be converted to MPEG or any other format with numerous free movie editing programs, such as Microsoft "Movie Maker".

The Play panel is shown below:



At the top, the name of the file being played is shown.

Next are a set of buttons controlling video playback.

### Repeat

If enabled, this will continuously loop through the video until you stop it.

### Export to AVI

This button is only seen if you have a file in raw format loaded. It takes the current raw file and exports it, with the current video and overlay settings, to an AVI file. This function plays through the entire raw file while exporting, so if the video file is long the export can take a while. The converted file is stored in the Keep directory, or another folder you can select.

**Browse** displays a standard Windows file dialog that lets you select an arbitrary file to play in WeldWatch, not just Temp or Keep files.

Next are controls for the **Temp** and **Keep** folders for stored videos. Temp and Keep point to two separate default locations for video on your computer. The file list displayed corresponds to the yellow Temp or Keep buttons. On the screen above, the **Temp** button has been clicked, so it is yellow and the Temp list of files is shown. If the **Keep** button is clicked, it turns yellow and the files in the Keep directory are displayed, as shown in the screenshot below:



The **Temp** and **Keep** scheme provides a convenient way to access videos just recorded (**Temp**), and then organizes them into a collection to preserve (the **Keep** directory). The file display of the **Temp** directory is sorted by time, while the file display of the **Keep** directory is alphabetical.

The disk location of these directories can be viewed, or changed on the Advanced Settings Video Recording panel. By default:

- Temp = C:\VisibleWelding\Videos\Temp
- Keep = C:\VisibleWelding\Videos\Keep

As videos are recorded, they are added to the **Temp** directory display and you can play any file simply by double-clicking it. WeldWatch monitors available disk space and will automatically delete the oldest videos in **Temp** when space is needed. The minimum free disk space limit and the locations of the "Temp" and "Keep" folders can be changed in Advanced Settings. Files from the **Keep** folder are never deleted by WeldWatch.

To move files from **Temp** to **Keep**, right click mouse or touch-screen press on the filename and hold until a submenu comes up. The submenu has three options: "Delete", "Move to Keep" and "Edit Name"

Choose "Delete" to delete the file.

Choose "Edit Name" and you can edit the name right in the name box

**Keep** has the same submenu except the Move is to **Temp**.

If you are familiar with Windows, you can use Windows File Explorer to copy, move rename or delete the video files in **Temp** and **Keep**. WeldWatch will discover and inventory them automatically when you restart the application.

The **Close** button at the bottom hides this panel, making more screen space available to view playback.

## Play Controls

Once a video is selected, you can change the playback using the following controls:



Play forward



Play in reverse



Pause playback



Step one frame forward (pauses playback)



Step one frame backward (pauses playback)

The following two buttons decrease or increase playback speed by a factor of 2. The available speeds are: 1/16, 1/8, 1/4, 1/2, 1, 2, 4, 8, and 16

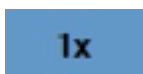


Play slower



Play faster

The number in the center indicates the current playback speed:



Current playback speed

**Auto Repeat** allows a video to be played over and over as a loop until stopped, either forward or backwards.



## Advanced Settings

Infrequently used software settings are controlled on a series of panels under Advanced Settings. You can get to this screen either from the menu entry Settings > Advanced or via the Settings buttons on some of the button option panels. This screen is shown below without any of the sub-panels opened:



Each yellow bar can be clicked to open a sub-panel of inputs or information prompts. Multiple panels can be open at once. If all the open panels do not fit on your screen a vertical scroll bar is displayed to the right so you can slide the entire panel up and down to view different panels as needed.

The program parameters covered by these 5 panels are summarized below:

### **CAMERA**

Less commonly used camera settings.

### **PICTURE**

Adjustments for the video displayed on-screen.

### **VIDEO RECORDING**

Settings for recording video.

### **MISC**

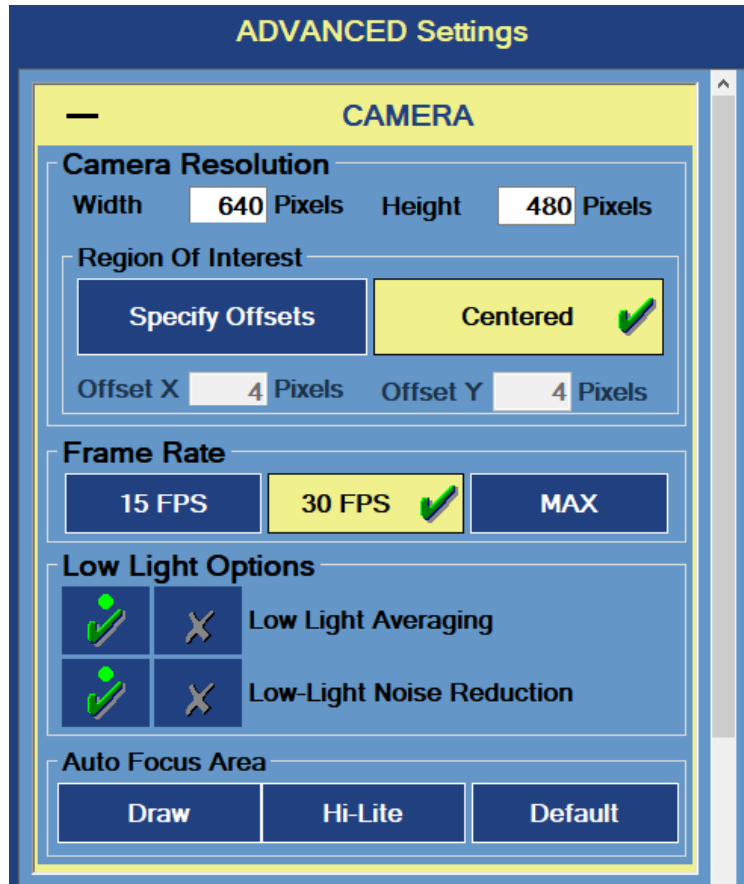
Auto-Hide interval and stored settings.

### **ADVANCED INFORMATION**

Shows detailed information about the camera.

## Camera (Advanced Settings)

The Camera panel on Advanced Settings is shown below:



In the **Camera Resolution** frame, the first inputs are the screen width and height in pixels. Smaller images allow higher video frame rates and create smaller video files. This feature lets you specify a custom image readout size, within the following restrictions:

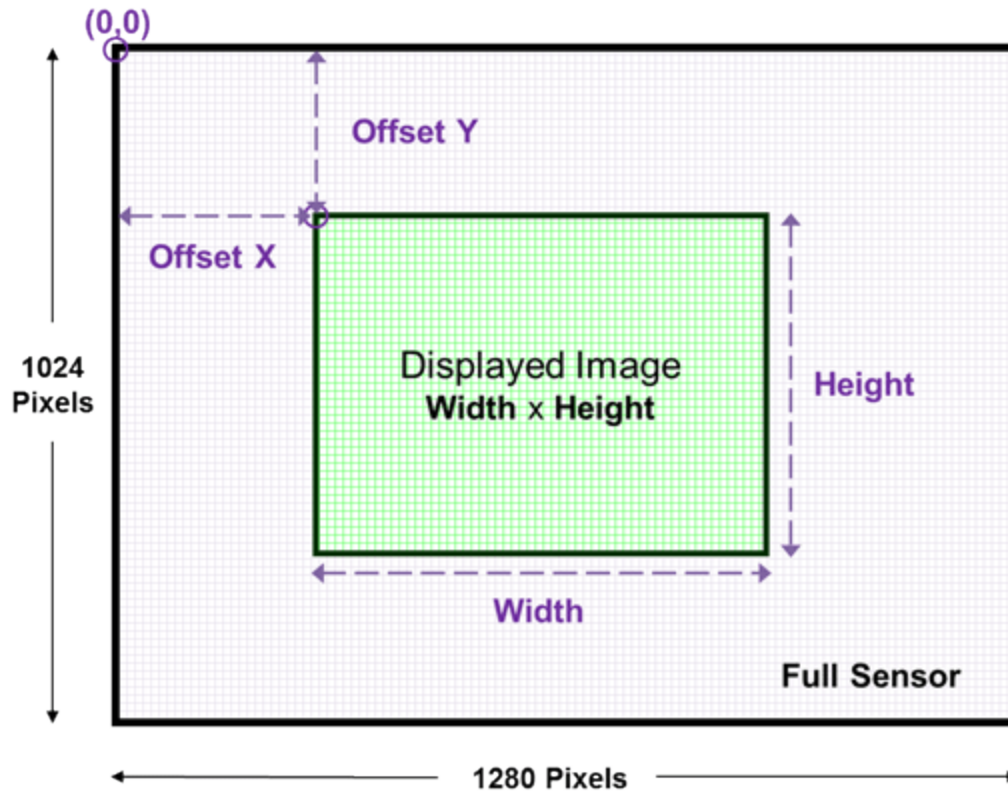
**Width** must be in the range 320 to 1280 and also a multiple of 32.

**Height** must be in the range 240 to 1024 and also a multiple of 8.

If the size is less than the full sensor you can select where the selected smaller image is within the whole sensor grid.

**Centered (default)** Selects the center of the sensor grid.

**Specify offsets** lets you apply a fixed offset to the image. If checked, the Offset X and Offset Y are specified in pixels immediately below the button. These values must be multiples of 4 for USB cameras and multiple of 10 for GigE. This is useful for industrial applications where the camera mounting may make it impossible to center the arc. WeldWatch displays a rectangular subset of all the pixels in the welding camera. The diagram below shows the physical meaning of the size and offset inputs:



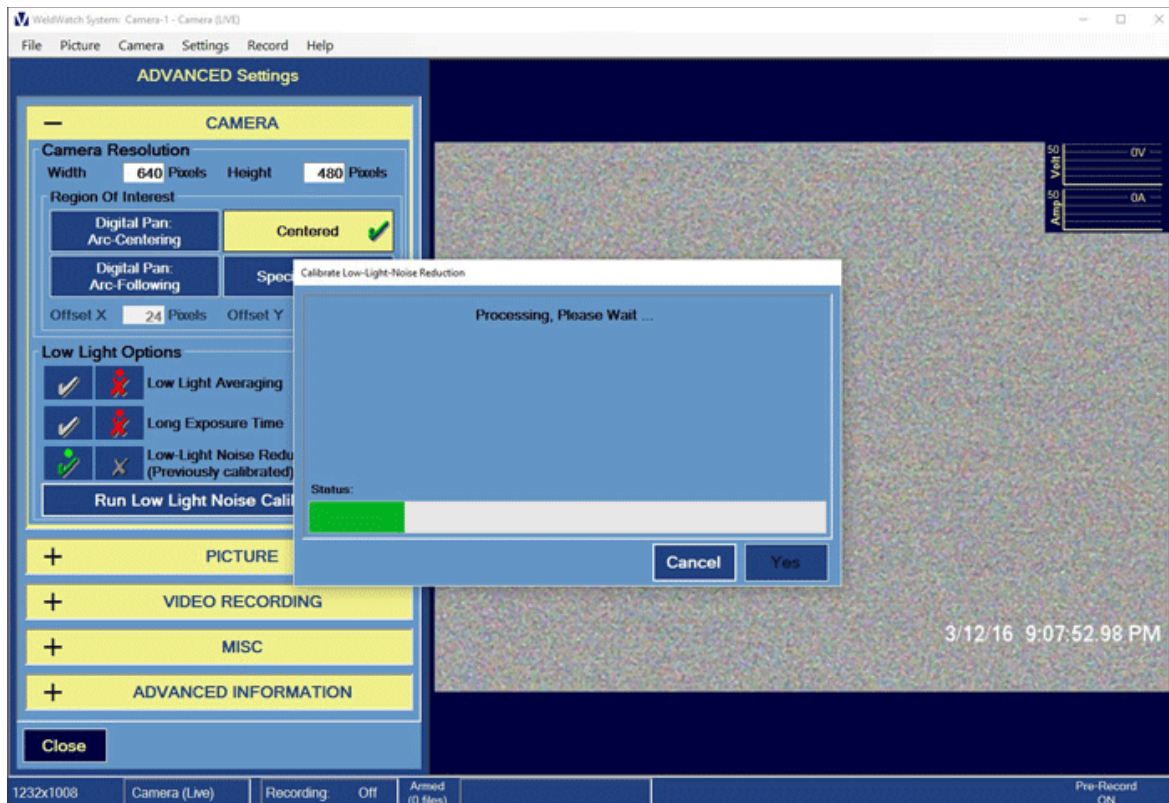
The full sensor has 1280 x 1024 pixels. The WeldWatch displayed image is represented by the smaller green rectangle. These inputs control the size of the green rectangle, its position on the full sensor, and options to move the window around the array without physically moving the camera. This is primarily useful for adjusting the image when the camera is mounted at an unusual angle in a tight space and the arc is away from the image center.

The **Frame Rate** buttons let you choose a specific frame rate (15 Hz or 30 Hz), or chose MAX, which selects the fastest frame rate that works well over the USB interface in your computer. If you are recording video, the 15 Hz option shrinks the size of the recorded file at the expense of including half of the possible frames. From a practical standpoint, both USB3 and GigE top out at approx 30 FPS for 1280x1024 resolution. Most real-life connections are a bit slower, in the 25 – 30 FPS range.

The **Low Light Options** controls provide options that change some camera defaults when an arc is not present.

**Low-Light Averaging** is an option that averages successive frames to reduce image noise. This leads to a cleaner image, but adds a bit of lag and ghosting with motion. If you don't mind the higher noise but the image lag is causing problems (while mounting and pointing a camera), you can disable the multiple frame averaging here.

**Low-Light Noise Reduction** enables a feature that subtracts fixed pattern noise from every image. When adding a new camera to a WeldWatch PC, it will need calibrating so the software learns the camera sensor. This is done using the **Run Low light Noise Calibration** button immediately below. If you click this, the camera closes its lens iris and compares many frames to determine the underlying noise pattern and level for "Black." Because the sensor changes a little as the camera warms up, for best results, the camera should be powered on for 15 minutes or more before calibrating. Calibration may be repeated at any time to replace the old calibration. During calibration a status bar is displayed as below:



After the new calibration file is created you can use this option to turn it on and off, to see if it worked well and improves the video appearance.

The **Auto Focus Area** buttons at the panel bottom provide additional control over camera autofocus.

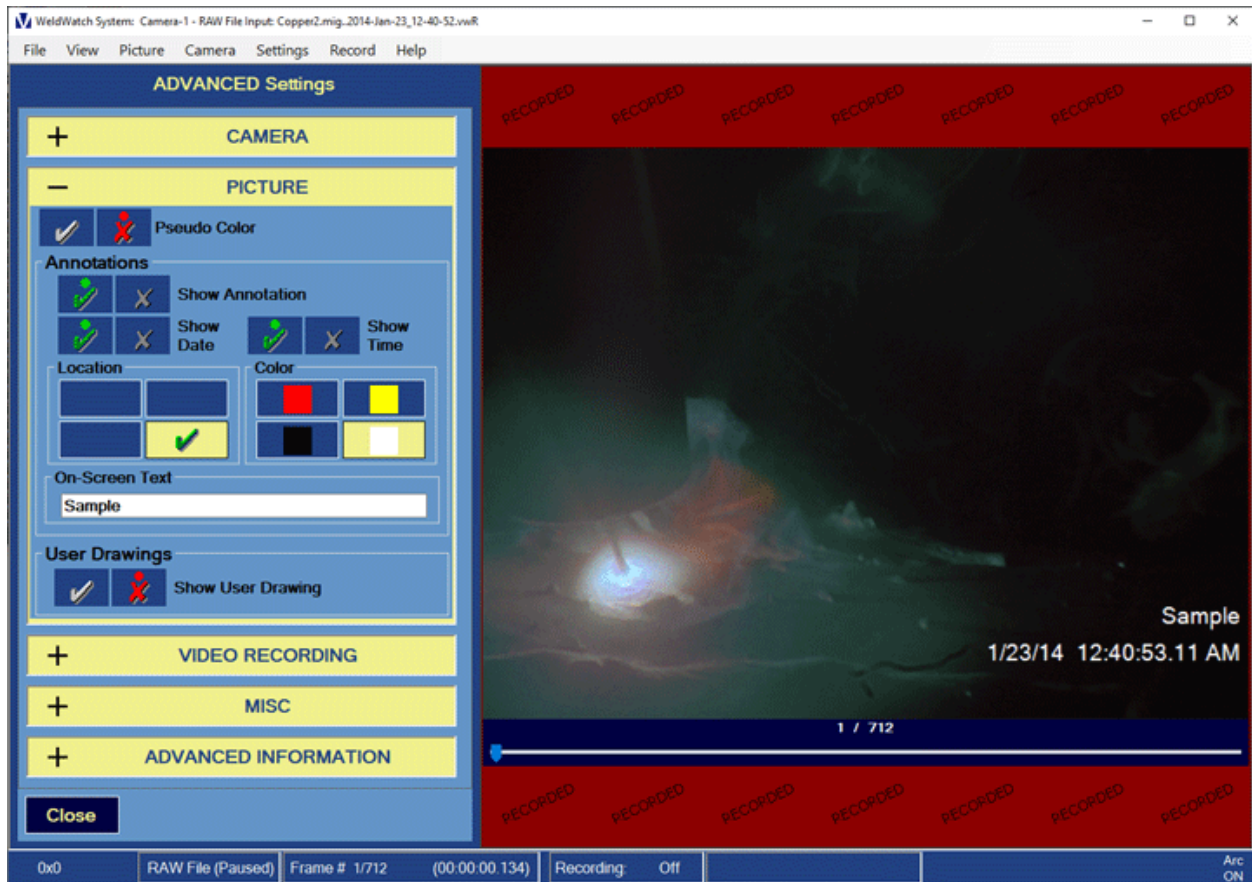
**Draw** lets you select the region to use for autofocus by drawing the boundaries on the video. This box defines the area of the image that the autofocus calculation considers when focusing. Pixels outside this box are ignored.

**Hi Lite** shows the region currently used for autofocus.

**Default** selects the normal autofocus mode, which is based on the center of the image.

## Picture (Advanced Settings)

The Picture panel on Advanced Settings allows adding text annotation and drawings as overlays on the video display. The panel's inputs are shown below:



**Pseudo Color** lets you override the camera true color output with a color palette that enhances the image contrast and can be easier to use in some situations.

**Show Annotations**, when checked, will enable all the annotations.

**Show Date** adds display of the current computer date (PC / Windows date)

**Show Time** adds display of the current computer time (PC / Windows time)

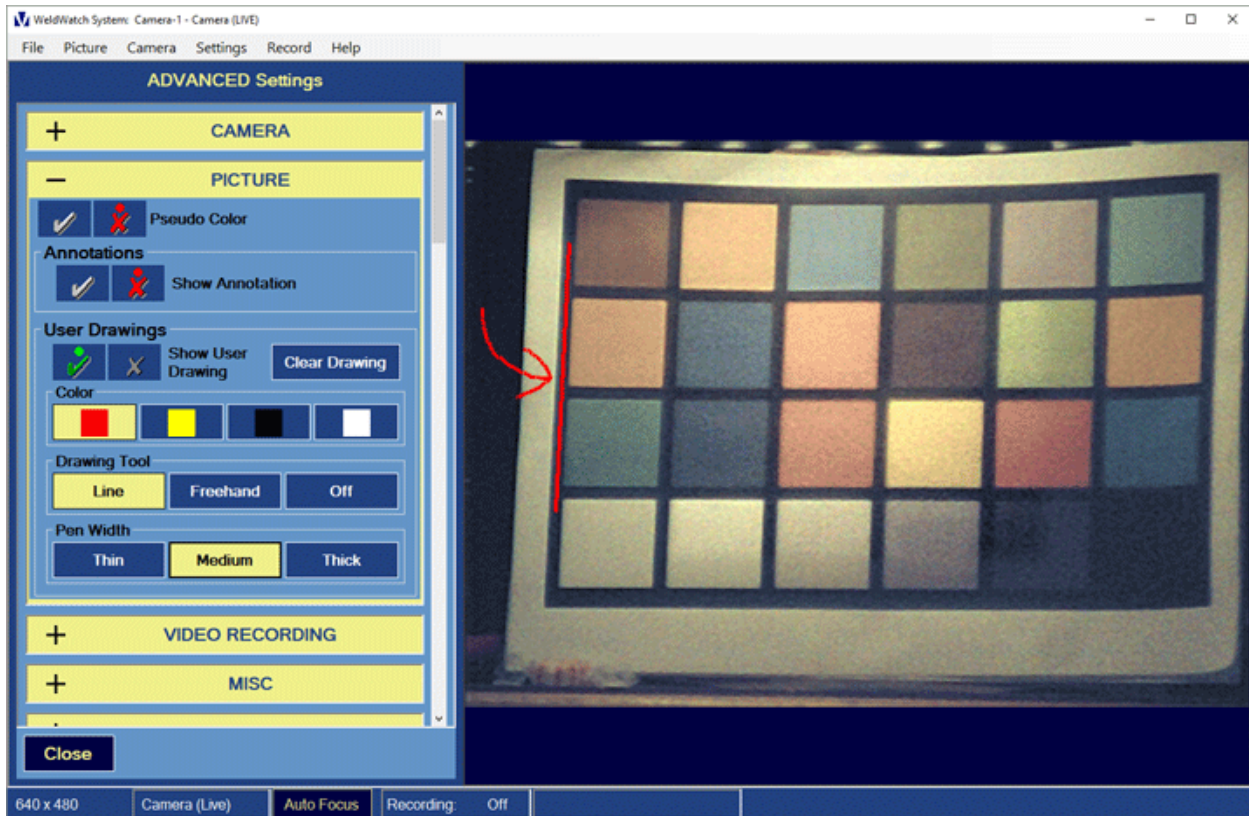
The **Location** box lets you choose which corner of the image to display the annotations in. In the example above, the annotations are added to the lower right.

The **Color** box lets you set one of 4 possible colors for the annotation display text.

**On-Screen Text** includes a box where you can type any text string (e.g. "Sample" in the screenshot). This can be used to note the welding machine in use or the job being performed.

The User Drawing inputs are shown below:





These controls let you add simple line markup to the video.

**Show User Drawing**, when checked, turns drawings on or off.

The **Clear Drawing** button erases all current drawings and lets you restart from scratch.

The **Color** box lets you select up to 4 colors for annotations.

The **Drawing Tool** box provides two methods of drawing:

**Line:** this draws straight lines. Click once to establish the start point, and click again to set the ending point. The example above uses a straight, red line added to mark the edge of the pattern.

**Freehand:** this tool provides free-hand drawing using the mouse or touch. In the example above, an arrow points to the edge line.

In addition, the **Off** button lets you temporarily disable drawing so you can move the mouse over the image without accidentally adding marks. This is useful for panning around in zoomed images.

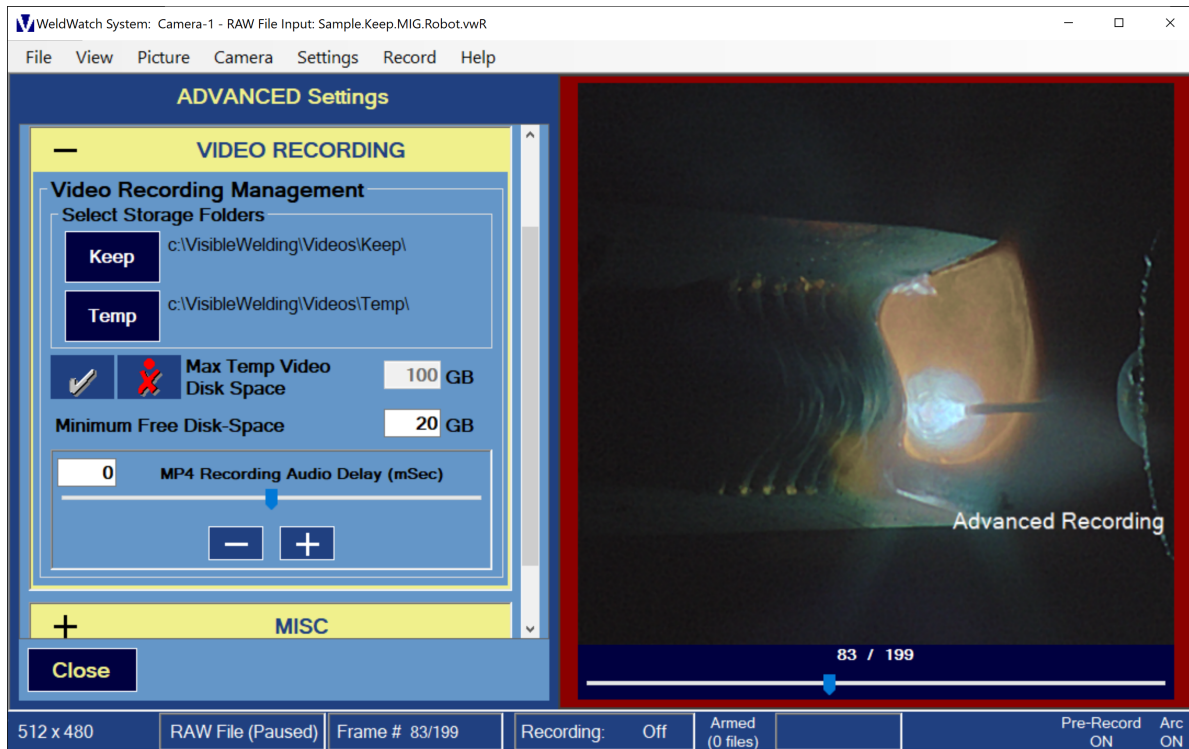
The **Pen Width** box gives 3 thicknesses of drawn lines, from thin to thick.

Both Color and Pen Width affect all of the lines drawn, including those already drawn onto the video. Thus all annotations are the same color and width.



## Video Recording (Advanced Settings)

The Video Recording panel of the Advanced Settings screen provides control over disk locations and space:



The buttons under Select Storage Folders let you change where the default Keep and Temp directories are located on your hard disk.

### Keep

This button allows you to change the disk directory to store files used in the Keep list on the Play control panel.

### Temp

This button allows you to change the disk directory to store recorded files to. These files are listed in the “Temp” list of the Play panel.

**The Max Temp Video Disk Space** is an option to limit the maximum space that the sum of Temp videos can use on your computer. This option is enabled by checking the green check, and then the value used as a maximum is specified on the input to the right of it.

**Minimum Free Disk-Space** specifies the minimum which must be available for disk recording. This option prevents the hard disk from getting completely filled with video. The default value for this parameter is 20 Gb. Set to 0 to disable this feature. When the minimum is reached, WeldWatch will delete the oldest “Temp” video to make room for the new recording.

**MP4 Recording Audio Delay (mSec)** specifies a delay added (or subtracted) from the audio as it is recorded so you can align the sound with the video. With a default of zero, the adjustment allows a delay from -999 to 999 milli-seconds (approx. +-1 second). This shifts audio only on new recordings and does not affect playback.

## Misc (Advanced Settings)

The Misc panel of the Advanced Settings screen contains user interface options and tools for loading/saving program settings. The panel is shown below:



The **Auto-Hide Control Panel** controls the time interval between the last screen activity and an automatic transition to the Hide mode, when the screen buttons are hidden to maximize the screen area available for video display. You can specify the number of seconds of inactivity that elapse before this event. The default value is 0 which means “no-timeout” and auto-hide is disabled.

The **Stored Settings** inputs let you preserve or reuse program settings. For example, once you optimize the WeldWatch software for a given camera installation, you may want to save the software settings away so that for future runs you can reuse the exact same settings without having to re-input each value. This is especially useful for multiple camera configurations or different welding setups.

Small configuration files can be created to set one or more settings without including the others. For example, a special brightness and contrast setting for day and night – leaving all other camera settings the same.

### Save as Power Up

This saves current software settings away as defaults to be automatically loaded every time WeldWatch is started.

### Save to File

Save current settings to an arbitrary file on disk.

### Load from File

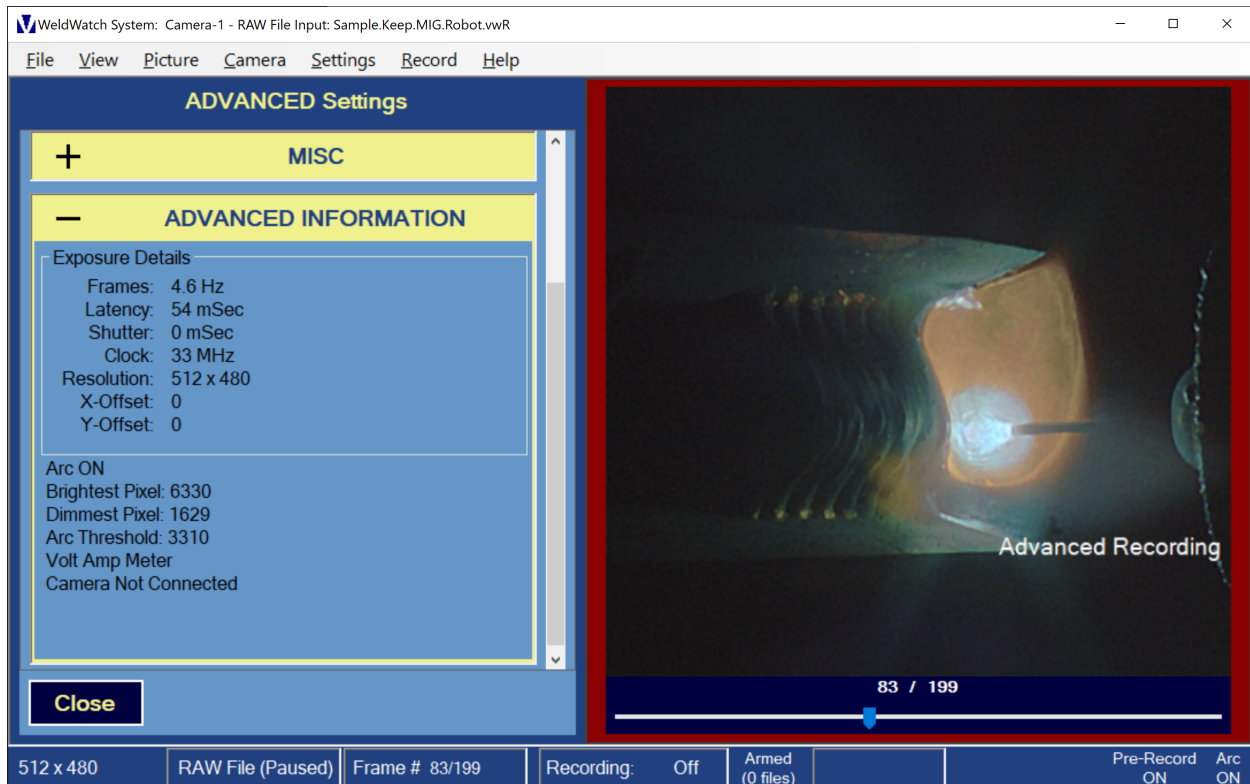
This button lets you load software settings from a file previously created using the Save to File button.

**Reset to Factory Defaults**

This button restores the initial default values shipped with each copy of WeldWatch.

## Advanced Information

The last panel on the Advanced Settings screen displays some additional information about the attached hardware:



The **Exposure Details** box provides some technical detail on how the camera is currently operating. The *Frames* parameter shows the number of frames per second being received and processed on the computer. *Latency* is the time between the image collected by the camera (reality) and its display on the screen. This is independent of the frame time spacing, as a very slow 1 Hz frame rate can also have a very short latency time. *Shutter* is the exposure time of each frame in milliseconds. *Clock* is the pixel clock or the rate at which image pixels are being output by the camera. *Resolution* is the current size of the video window. *X-Offset* and *Y-Offset* show the current offsets (in pixels) of the window from the upper left corner of the camera detector array (which is natively 1280 x 1024 pixels).

The status of hardware components is also displayed:

**Arc status** (on or off) indicates whether an arc is detected in the current video

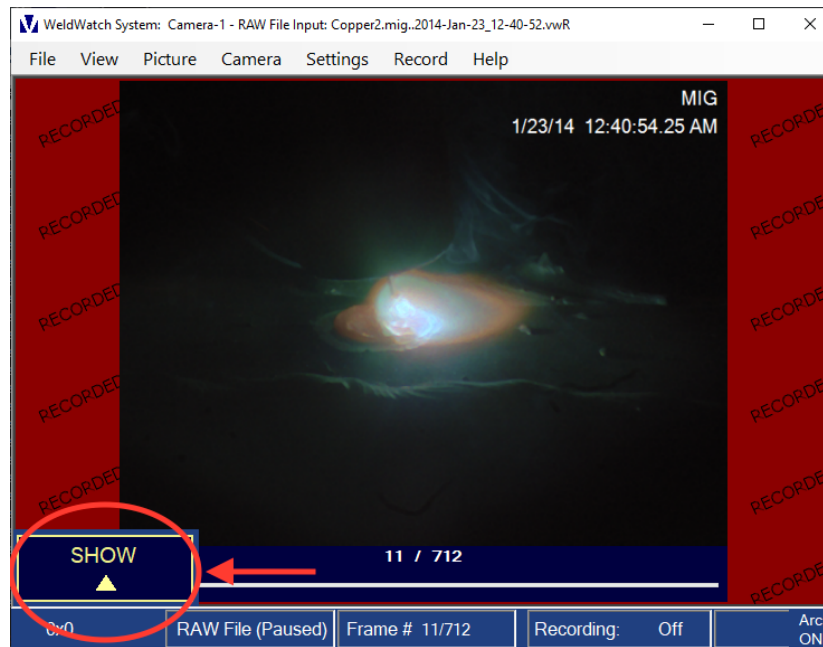
**Brightest Pixel** The raw value of the brightest pixel of the displayed image. (camera or RAW file)

**Dimmest Pixel** The raw value of the darkest pixel of the displayed image. (camera or RAW file)

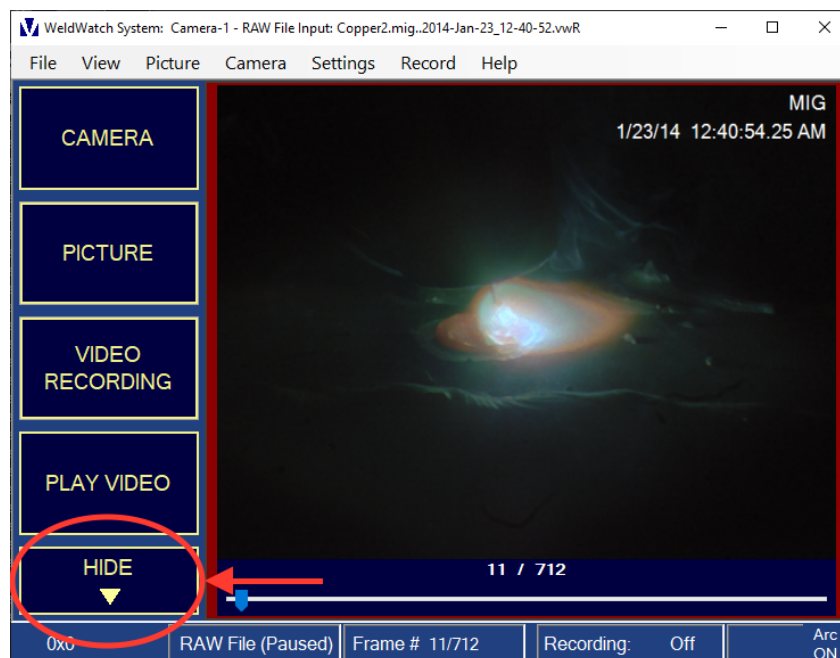
**Camera** (Paused, Live, or not connected) indicates if a supported Visible Welding camera is attached

## Show / Hide

The **Hide** button clears out all of the buttons on the left so that maximum screen area is available for video. The only button displayed in the video area is a small **Show** button in the lower left corner, which is used to reverse the effect:

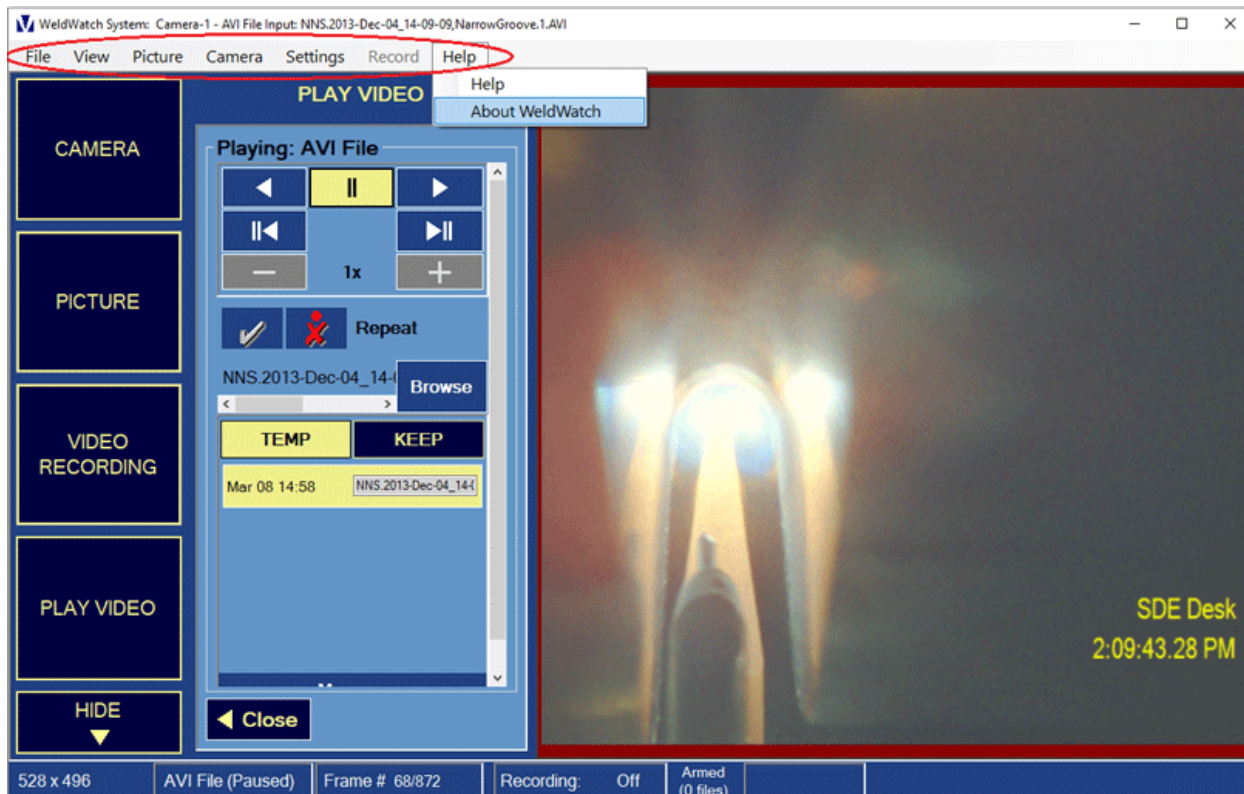


Click on this **Show** button and the buttons along the left are restored to view. The **Show** button becomes a **Hide** button, which you can click again to hide the buttons along the left.



## Menu Overview

All WeldWatch functions can also be reached through a traditional Windows menu system. The menu bar is circled below:



The menu functions are:

### FILE

Quick image capture and program exit

### VIEW

Select camera for display.

### PICTURE

Functions for the screen display.

### CAMERA

Functions to control the camera.

### SETTINGS

Save and recall program setting configurations.

### RECORD

Functions to control recording

### HELP

Help and About functions.



## File Menu

The File menu contains 8 items:

### **Play Video**

This lets you load an existing video file in and play it in WeldWatch. A Windows dialog is displayed and you can navigate to the file folder and select the file in a standard way. WeldWatch supports MPEG-4 (\*.mp4), raw files (\*.vvR) and un-compressed AVI files created in WeldWatch. The raw files contain additional information that enables more control over the picture display than MP4 or AVI file.

The next 3 menu items let you preserve or reuse program settings. For example, once you optimize the WeldWatch software for a given camera installation, you may want to save the software settings away so that for future runs you can reuse the exact same settings without having to re-input each value. This is especially useful for multiple camera configurations or different welding setups.

### **Load 'Settings' File**

This loads a file containing software settings previously created in WeldWatch.

### **Save 'Settings' File**

Save current settings to an arbitrary file on disk.

### **Save 'Power Up' Settings File**

This saves current software settings as defaults to be loaded every time WeldWatch is started.

### **Copy Image to Clipboard**

This feature allows you to save a snapshot the video and place it on the Windows clipboard. From there, you can Paste it into any Windows app.

### **Copy Image to Paint**

This saves a snapshot of the video and opens the Windows Paint program with the image already pasted in, ready to edit and save.

### **Copy Log Files**

This is for diagnosing camera or software problems. WeldWatch maintains three separate log files for the last 10 runs, and this option lets you easily collect and save these logs to a single folder for inspection or to provide to Visible Welding for support.

### **Exit WeldWatch**

This closes the WeldWatch application.

## View Menu

The View menu allows you to switch the video display between local and remote Visible Welding cameras. The remote camera is connected via a network interface. This option shows images from the remote camera but does not control its settings or operation.

Note1: The "remote" camera should be local on the same LAN and same Sub-Net of the LAN.

Note2: Firewalls must be open or "off" in both remote Server PC and local Client PC

### **View Local Camera**

Display video from camera on PC

### **View Remote Camera**

Display video from camera on another PC, connected via a LAN network interface.

## Picture Menu

The Picture menu contains the following items:

### **Enhanced Region**

This enables operation of the enhanced region option for display, and gives menu access to the enhanced region settings. There are 5 sub-menu entries under Enhanced Region.

### **Show Enhanced Region**

When checked, this adds the enhanced region to the current video display.

### **Circular Edge**

When checked, the enhanced region is circular. When not checked, the enhanced region is a rectangle. You can customize the size of the enhanced region using the Source Area controls on the Region Settings panel.

### **Follow Arc**

When checked, the enhanced region is continuously centered on the detected arc location in the video.

### **Destination Location**

This displays a further submenu that lets you position the enhanced region overlay either directly over the arc or in any of the 4 image corners.

The remaining three Picture menu items are:

### **Orientation**

This provides access to the image flip and rotation options.

### **Annotation**

This lets you enable video annotations and set all of their properties, with the exception of a user-defined string for annotation. These options are discussed in detail in the Picture-Advanced-Settings.

### **Pseudo Color**

This lets you override the camera true color output with a color palette that enhances the image contrast and can be easier to use in some situations.

## Camera Menu

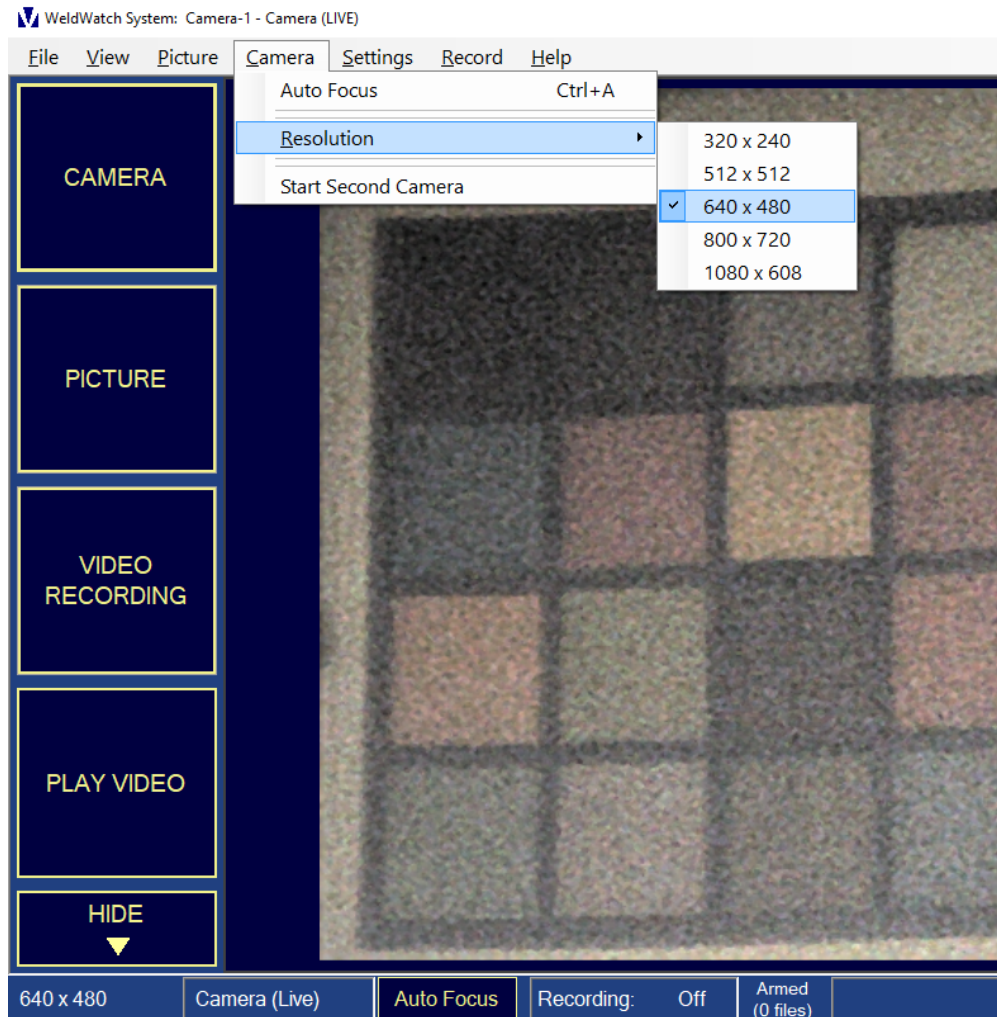
The camera menu has 3 items:

### Auto-Focus

This runs autofocus on the current scene. Autofocus is also available with the keyboard shortcut ctrl-A or as a live button in the WeldWatch status bar at the bottom of the window.

### Resolution

This lets you quickly select one of preset resolutions for camera video, as shown below:



### Start Second Camera

In two-camera systems, this launches a 2<sup>nd</sup> WeldWatch copy to activate and control the 2<sup>nd</sup> camera.

## Settings

The settings menu provides quick access to all the WeldWatch settings screens. It has 5 items:

### **Camera**

This displays the Camera Settings screen.

### **Picture**

This displays the Picture Settings screen.

### **Recording**

This displays the Video Recording Settings screen.

### **Advanced**

This displays the top level screen of Advanced Settings, which has several panels of input providing access to less frequently used parameters.

### **Enhanced Region**

This displays the Enhanced Region Settings screen.

## Record Menu

This menu contains 5 items that let you start and stop recording of camera video.

### **Begin Recording**

This starts recording video to disk. The keyboard shortcut key is Ctrl-R.

### **Pause Recording**

This temporarily stops recording video but keeps the file open for more recording to come. When paused, you can resume recording by clicking the RECORD button. You can also STOP or CANCEL the recording.

### **Resume Recording**

This resumes recording of video to disk.

### **Stop Recording**

Clicking this ends the recording. The keyboard shortcut is Ctrl-T. The recorded video is saved in the Temp directory.

### **Cancel Recording**

This stops the recording and deletes the partially recorded data from your hard drive.



## Help Menu

This menu has 2 items:

### **Help**

Displays this help file.

### **About WeldWatch**

Displays an “about” box with program version information.

The Details button in the version window can show additional information such as the serial numbers of attached camera components.

## Sales and Support

For further information, you can contact Visible Welding at:



Web site: [www.VisibleWelding.com](http://www.VisibleWelding.com)

Office: 508-358-5775

Hours: M - F, 9am to 5pm EST

E-mail: [2022@VisibleWelding.com](mailto:2022@VisibleWelding.com)

Visible Welding Cameras are distributed by:

InterTest Inc.

303 State Route 94

Columbia, NJ 07832

[www.intertest.com](http://www.intertest.com)

E-mail: [Sales@InterTest.com](mailto:Sales@InterTest.com)

Phone: 908-496-8008

Hours: M - F, 8am to 5pm EST

