

# Annotation Pro & Annotation Pro Plus

AN C5 / AN C5 P

USER MANUAL



## Table of Contents

---

Safety Warnings and Instructions .....	6
Maintenance and Recycling Instructions .....	7
Overview .....	8
Introduction .....	8
This Manual.....	8
Save, Print, and Share Images.....	8
Annotation.....	8
Features.....	9
General Installation .....	10
The Back Panel.....	10
Connecting the Video Source and Outputs .....	10
Connecting Devices .....	10
Power On .....	11
Controllers/Markers Overview.....	12
Toolbar.....	13
Clear All Marking.....	13
Erase Tool .....	13
Drawing Tools .....	13
Line Color .....	13
White Board.....	13
HDMI.....	13
USB Camera.....	13
Record.....	13
Save Image.....	13
Annotation Pro Menu System.....	14
Overview .....	14
Using the Annotation Pro Menu System.....	14
Menu Basics .....	14
Menu Conventions.....	14
Making menu selections.....	15

System Information .....	15
System Info .....	15
Scheduling Restarts .....	16
Detecting and Assigning Devices.....	16
Serial Port Settings.....	16
Manual Serial Port Assignment.....	17
Viewing a USB Device Type .....	18
Manually Assigning a USB Device.....	20
Integrating the Annotation Pro with Other Systems.....	20
Setting COMM Port Parameters.....	20
Preparing Video Sources and Outputs .....	21
Setting Video Output.....	21
EDID .....	21
Video Source Options.....	22
Default Video Source.....	22
Picture-In-Picture (PIP) Setup .....	23
Networking (TCP/IP, TFTP, SMB).....	24
Network Setup.....	24
Configure TFTP Settings .....	25
Configure Windows Share (SMB) Settings .....	25
Calibrating and Configuring Touch Screens .....	26
Calibrating Annotation Pro Touch Screen Controllers.....	26
Touch Screen Command Areas .....	27
Customizing Markers and Pointers.....	29
Customizing the Color Palette.....	29
Selecting Colors for a Presentation.....	29
Selecting a Brightness Level .....	30
Zap Icon Toggle.....	31
Using Markers.....	31
Overview .....	31
Assigning Marker Colors .....	31
Entering the Marking Mode.....	32

Drawing.....	32
Selecting Pointers.....	33
Creating a Pointer.....	34
Turning the Active Pointer On/Off.....	34
Typing Text Labels .....	35
Displaying the Date/Time .....	35
Clearing All Markers.....	35
Undoing a Marker.....	36
Erasing Markers .....	36
Using The Chalkboard.....	37
Saving and Storing Images and Video .....	37
Overview .....	37
Capture Options.....	37
Freezing Video.....	38
Setting the Destination for Saved Files.....	39
Setting the Verify Option.....	39
Saving Images .....	39
Retrieving Images.....	40
Printing Images.....	41
Printer Setup .....	41
Print an image.....	42
Verifying Saved or Printed Images.....	42

Updating the Annotation Pro.....	42
Annotation Control App (AN C5 P Only) .....	43
Glossary .....	44
Troubleshooting Guide.....	45
Appendix .....	47
Quick Reference for Keyboard.....	47
Quick Reference for Touch Screens .....	48
RS-232 (COMM Port) Pinout and Commands.....	49
Outside copyright information for Software.....	49
Specifications.....	55
Regulatory Statements.....	55
United States - FCC .....	55
Canada IC.....	55
Limited Warranty .....	56

## Safety Warnings and Instructions

---

**WARNING!** TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

**CAUTION!** TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

**POWER CORD NOTICE FOR INTERNATIONAL OPERATION** - Please call Williams AV Customer Service at 800.328.6190 to order the appropriate power cord for the country of use.

**Important Safety Instructions:**

1. Read these instructions
2. Keep these instructions
3. Heed all warnings
4. Follow all instructions
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. Refer all servicing to qualified service personnel.
14. The apparatus shall not be exposed to liquids.
15. Carts and Stands - The appliance should be used only with a cart or stand that is recommended by the manufacturer. An appliance and cart combination should be moved with care. Quick stops, excessive force and uneven surfaces may cause the appliance and cart combination to overturn.
16. Power Sources - The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
17. Object and Liquid Entry - Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through the openings.
18. Servicing - The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

**Precautions:**

1. Power – WARNING, BEFORE TURNING ON THE POWER FOR THE FIRST TIME, READ THE FOLLOWING SECTION CAREFULLY. The unit is designed for use only with the line cord of the region in which it will be operated.
2. Voltage Label (Rear Panel) – A label located at the rear panel power connection indicates the DC power input for the unit. The label will read 19VDC. Note: use the Williams AV TFP 060 power supply for this unit.
3. Do Not Plug in the HDMI input, output, Comm 1, Comm 2, Ethernet, or USB connections while the power switch is switched to the ON position.
4. Do Not Touch any part of the Annotation Pro with wet hands. Do not handle any part of system, including the power cord, when your hands are wet or damp. If water or any other liquid enters the Annotation Pro or Annotation Pro's location, take the device to qualified service personnel for inspection.
5. Place all components of the Annotation Pro in a well ventilated location. Take special care to provide plenty of ventilation on all sides of the system components, especially when it is placed in a small location, such as a rack. If ventilation is blocked, the system may over heat and malfunction.
6. Do not expose the Annotation Pro to direct sun light or heating units as the system's internal components temperature may rise and shorten the life of the components. Avoid damp and dusty places.
7. Care – From time to time you should wipe off the front and side panels and the cabinet with a soft cloth. Do not use rough material, thinners, alcohol or other chemical solvents or cloths since this may damage the finish or remove the panel graphics.

## Maintenance and Recycling Instructions

---



Help Williams AV protect the environment. Please take the time to dispose of your equipment properly.

**Product Recycling:**

Please do NOT dispose of your equipment in the household trash. Take the equipment to a electronics recycling center.

### **Servicing or attempting to service this device will void the warranty**

Refer servicing to qualified personnel. Servicing is required when the system has been damaged in any way: if liquid has been spilled or objects have fallen into the unit, if the unit has been exposed to moisture, if the unit does not operate normally, or if the unit has been dropped.

Do not block any ventilation openings. Install in accordance with manufacturer's instructions.

Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produces heat.

Use only attachments/accessories specified by the manufacturer.

Unplug the transmitter during lightning storms or when unused for long periods of time.

Be advised that different operating voltages require the use of different types of line cord and attachment plugs. Check the voltage in your area and use the correct type.

Use only the power supply provided by Williams AV. Other power supplies may have similar specifications, but may not be equivalent in emissions ratings, in-rush current, etc. Use of an unapproved power supply may leave the device partially or completely inoperable, and will void the warranty.

This apparatus has been designed with class-1 construction and must be connected to a main socket outlet with a protective ground connection (the third grounding prong).

Protect the power cord from being walked on or pinched, particularly at plugs, receptacles, and near the power jack on the transmitter.

The MAINS plug or an appliance coupler is used as the disconnect device, so the disconnect device should remain readily operable.

# Overview

## Introduction

The Annotation Pro (AN C5) is a professional, hardware-based video processor, designed so that users can display content from multiple video and computer sources connected directly to the Annotation Pro. Users can write annotations and markers directly on the video content to help explain any content.

### Note on HDCP

HDCP functions are only available on the Annotation Pro Plus (AN C5 P).

## This Manual

This manual provides instructions for configuring your Annotation Pro, using the built in system menu, creating annotations, providing video sources, and connecting and using physical controllers (such as a keyboard or mouse).

The Annotation Pro offers many control options to create powerful presentations with a touch screen. You can also use an HDMI cable to manually connect to the Annotation Pro, or a USB video input.

It is also possible to control Annotation Pro with Crestron, or AMX type room control system. For instructions on configuring RS-232 devices to send commands to the Annotation Pro, follow the instructions in this manual for proper wiring and configuration. Once your RS-232 device is properly wired, please see the **RS-232 (COMM Port) Pinout and Commands** section, and reference the Programmer's Guide. The Programmer's Guide has a list of detailed commands that can be sent to the Annotation Pro.

## Save, Print, and Share Images

The Annotation Pro gives the user the ability to save, print, and share annotated images. An annotated image can be saved to a USB storage device, such as a flash drive. Users can also print annotated images to a printer. Images can be shared over a TCP/IP network through Windows Share.

## Annotation

The user has a variety of options for drawing lines and markers during a presentation. The Annotation Pro is compatible with most touch screens, smartphones, keyboards and mouse devices.

	B	C	D	E	F	G	H	I	J	K	L
1	J	F	M	A	M	J	J	A	S	Total	Projected
2	8.25	26.50	78.75	36.50	23.25	19.75	32.25	0.50	0.00	221.75	544.00
3	29.50	16.00	0.50	27.25	33.25	21.25	3.00	44.75	0.00	172.50	332.00
4	26.75	50.00	12.75	19.50	0.00	2.00	0.50	26.50	0.00	140.00	212.00
5	19.50	8.00	11.00	19.75	26.50	22.75	3.00	20.25	0.00	130.75	303.00
6	2.25	0.50	1.50	1.00	0.50	9.00	4.50	0.00	0.00	22.25	40.00
7	17.50	14.00	2.00	25.00	18.25	0.50	2.50	13.00	0.00	104.25	260.00
8	7.00	6.75	3.00	1.00	23.75	14.75	2.50	5.75	0.00	73.00	62.00
9	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	1.50	40.00
10	1.00	0.00	2.50	3.00	7.75	5.50	13.00	7.50	0.00	38.25	86.00
11	5.00	10.75	2.75	19.50	13.25	2.50	11.50	4.25	0.00	59.50	80.00
12	33.00	15.75	28.75	14.50	13.75	19.50	56.75	36.00	0.00	218.00	351.00
13	0.00	1.00	0.00	3.25	0.00	11.00	27.25	4.00	0.00	56.50	1.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50	0.00	2.50	1.00
15	1.75	4.50	0.75	4.50	0.75	12.50	1.50	2.75	0.00	29.00	15.00
16	12.00	0.00	3.50	3.00	3.75	3.00	2.50	2.00	0.00	29.75	14.00
17	163.50	157.75	151.50	174.00	163.75	155.50	157.75	175.75	0.00	1299.50	2341.00
18											

Marking example over an image of a spreadsheet

Video is annotated using several simple-to-use graphics called markers. There are two types of markers: pointers (such as an arrow) and freehand drawing. Pointers and drawings may be used in combination to annotate. Markers are easily erased either one at a time until the screen is clear, or all at once.

When a keyboard is attached, text, a date/time stamp, and straight line drawing are available. With the various marker selections available, users can choose the best option to increase contrast over the image or video displayed in the monitor.

Users may also display a white background on the screen and use it like a Chalkboard on which to “draw out” your point.

## Features

- Two marking tools.
  - 2 pointers with 8 arrows of various angles, plus 2 dots and 2 cross hairs in a small or large size.
  - Freehand draw in 7 solid line colors, 4 different line thicknesses (with or without drop shadows).
- Four additional marking tools with keyboard connected.
  - Straight line drawing mode allows underscoring, mapping or otherwise drawing a straight line.
  - Text can be typed on the video image in one of 6 different fonts, each available in one or more sizes. A text background may be added to further highlight the text on the video image.
  - An active date/time label (sometimes called a date/time stamp) can be placed on the video image to time an event. This label is very useful for record keeping when saving or printing images because it is embedded in the image.
- The ability to position and anchor a combination of several markers and drawings on the screen at once.
- Easily save, print, and share annotated images.
- Options for clearing lines and pointers from an overlay all at once or one at a time, beginning with the most recently anchored marker.
- Ability to assign a unique marker color (up to 7) to each marking device and switch between colors during a presentation.
- A drop shadow effect may be selected to further optimize the display of annotated lines over the background.
- Compatibility with HDMI equipment.
- A solid white chalkboard can be selected for drawing when the video image is no longer needed.
- Sync generation allows the Annotation Pro to automatically select the sync if no live video is desired. In the event that sync from a poor video source is lost, the Annotation Pro will automatically switch to chalkboard mode if auto-chalkboard is enabled.
- Keyboard control provides a quick way to select many of the Menu System options without having to go to the Menu System. Instead, function keys provide choices for pointer type, background, marker colors, brightness levels, video source selection, and more.
- Brightness adjustment gives you the opportunity to set the brightness of the Annotation Pro markers to coincide with the brightness level of the video signal, so that the markers are displayed optimally for standard video or for professional broadcasting.
- AV programmable so that AV control systems can control the Annotation Pro using programmable commands.
- Two RS-232 ports allow the simultaneous use of two RS-232 communications devices, such as touchscreens.
- Five USB 3.0 ports allow the simultaneous use USB touch screens, or other USB control devices. The use of USB hubs increases the device limit to more USB control devices.
- Record the entire presentation as an MP4 to archive or replay.
- Easily switch between content, sources, and presentation materials.
- Annotate regions of interest to focus your audience’s attention.
- Shows 4K video, allowing for the most eye catching images and critical details to be clearly examined.

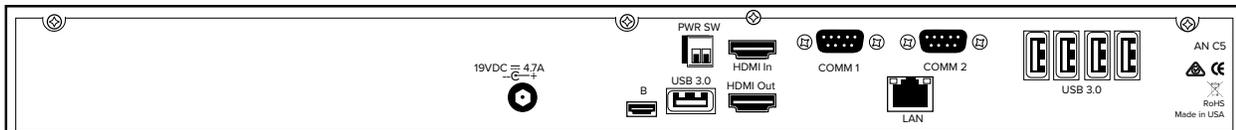
## General Installation

### The Back Panel

Most wired devices will connect via one of the ports on the back panel. There are numerous ports to connect to, including USB, HDMI, COMM ports and a Phoenix-Style connector.



Back Panel



Back Panel Diagram

### Connecting the Video Source and Outputs

#### HDMI Connectors

To connect HDMI video:

**HDMI Input into Annotation Pro:** Using HDMI video cable, connect the cable to the HDMI In port on the back panel of the Annotation Pro.

**HDMI Output from Annotation Pro:** Using HDMI video cable, connect the cable to the HDMI Out port on the back of the Annotation Pro to HDMI In on a HDMI display.

**Note on HDCP:** HDCP functions are only available on the Annotation Pro Plus (AN C5 P).

### Connecting Devices

Here are some guidelines for setting up these devices.

**IMPORTANT:** Be sure to power down the Annotation Pro before connecting or disconnecting any controllers. The Annotation Pro will automatically detect installed controllers upon turning the power on. If you change controllers or add a new controller, you need to turn power off, install the new controller(s), then turn the power on.

#### Connecting USB Devices

Connect the device(s) to any USB port on the Annotation Pro. The system supports up to 5 USB 3.0 devices and 1 USB B device.

#### Connecting the Phoenix Connector

Connect the wires from your power controller (or other device) to the Annotation Pro's Phoenix-style connector (labeled on the back of the device as PWR SW). When the relay is thrown, the Annotation Pro will power on or off, as a toggle.

#### Connecting Touch Screens

The Annotation Pro is compatible with many types of touch screens (call Williams AV for compatibility), and each device will have it's own method of connection. Use the instructions for your touch screen for help connecting to the Annotation Pro.

Annotation Pro is compatible with HID devices.

### **Connecting a 3rd Party Controller - COMM Port Wiring Issues**

Customers sometimes encounter issues with the wiring of controllers. The following information may be helpful in resolving any issues.

- Annotation Pro's COMM ports sometimes use pin 9 to supply power to the RS-232 line drivers. Pin 9 was selected because its specification is seldom used. If you are connecting a device other than a line driver to a COMM port, the voltage may cause unexpected issues with the device.
- COMM 2 is set up as the default control port.
- COMM 1 and COMM 2 have jumpers for power on pin 9, and are set to OFF when shipped from the factory. If you require power from either or both of these COMM ports, please contact technical support.

### **Connecting USB Devices**

1. Make video connections as indicated earlier in this section, and install the touch screen to the monitor as directed by your touch screen manufacturer.
2. Connect a USB cable and extension to the USB port on the Annotation Pro.

### **Power On**

To power on the Annotation Pro:

1. Plug the power cord into the back of the Annotation Pro and then into any grounded outlet.
2. Plug the power cords from any video source(s), controller(s), and display(s) into any grounded outlet.
3. Turn on each of the connected units, and then press the power button on the front panel of the Annotation Pro.

**NOTE:** In order for the Annotation Pro to properly sync with the video signals, the sources should be turned on first.

After a moment, a Annotation Pro splash screen will appear, followed by the initializing of the ports, and ending with a copyright message.

After the startup process, the default input source will be shown.

If this process is different for you, recheck your installation and power on again. Call Williams AV for support if it is still unsuccessful.

**NOTE:** To bypass port initialization, press ESC during startup.

## Controllers/Markers Overview

---

The following categories of controllers can be used with the Annotation Pro via cables:

- Touch Screens
- Keyboard
- Mouse devices

The Annotation Pro can support most of the common devices you might use. The Annotation Pro supports up to two RS-232 devices and up to 5 USB devices. With the addition of a powered USB hub, more devices can be used.

### Keyboard

With a keyboard, you can select, type, position, save, and erase the markers on the overlay. You also use the keyboard to access the menu system and change the appearance of markers. More details on each key's functions can be found in the Appendix under Quick Reference for Keyboard.

#### Keyboard Controller Functions

The keyboard functions can display markers or affect their appearance. The keyboard can also control operations of the unit, such as changing to a different marker overlay or switching to a different video source.

#### Marker and Cursor Movement

When operating the Annotation Pro with the keyboard controller, you can position active markers using the arrow keys. For fine movement, press the CTRL key along with one of the arrow keys.

Within menus, you can move cursors among the options by using the arrow keys.

### Touch Screens

The Annotation Pro is engineered for use with many touch screens sold by other manufacturers. **Contact Williams AV for compatibility information.**

In general, you use the touch screen to draw, position arrows and pointers, or make menu selections.

Calibrating the touch screen enhances the intuitive feel of drawing on the display. It's essential to do a calibration the first time you start the unit after connecting the touch screen for accurate control.

#### Function Areas

Function areas are regions on the touch screen that activate a function when tapped. Function areas can be found in the lower left and upper left of the touch screen.

Upon initial set-up, the Menu can be accessed from the upper center touch screen function area. Once initial set-up is completed, a user can assign desired functions to the touch screen areas.

If you are drawing and move across one of these areas, the function is not activated. Only tapping will trigger the function area.

Details on touch screen functions can be found in "Quick Reference for Touch Screens" on page 48.

#### Marker and Cursor Movement

When operating the Annotation Pro with a touch screen, you position arrows or pointers anytime you tap the screen. You cannot reposition an anchored arrow or pointer; however, you can clear or erase a pointer and begin again.

### Mouse Devices

The Annotation Pro can also be used with a variety of PC-compatible mouse with two buttons.

#### Left Button

The Left Button on a mouse allows you to draw when pressed, or anchor an arrow or pointer when clicked.

#### Right Button

The Right Button on a mouse allows you to undo or clear a marker.

#### Marker and Cursor Movement

When operating the Annotation Pro with a mouse, you can move the cursor or active pointer anywhere on the screen by moving the mouse's positioning. The active pointer or cursor will move respectively.

## Toolbar

When using the touchscreen, a toolbar is available to switch between sources and to quickly annotate. More features are available using the full menu system documented in this manual. Buttons in white are selected.



### Clear All Marking



Clear all of the current annotations.

### Erase Tool



Remove specific areas of your annotation

### Drawing Tools



Edit the appearance of your on-screen annotations.

### Line Color



Select the color you want to draw with.

### White Board



Display a white board.

### HDMI



Display the HDMI source.

### USB Camera



Display the USB/Document camera.

### Record



Record the presentation to a USB flash drive.

### Save Image



Saves a screen shot of the what is currently displayed. See “Saving and Storing Images and Video” on page 37.

# Annotation Pro Menu System

---

## Overview

There are two Annotation Pro menus. One is a series of icons that runs along the bottom of the screen with commands a presenter would use frequently, such as changing marker color or video source. This menu is available by activating the hamburger icon at the bottom of the screen.

The other menu is a large, hidden main menu system mostly used for setup and configuration. This menu will need to be accessed to get your device connected to the network or calibrated properly.

## Using the Annotation Pro Menu System

This section describes how to access the menu system and make selections from it.

## Menu Basics

If the keyboard is installed, it is the only way you can enter the menu system. If the keyboard is not installed, you can access the menu system from one of the other control devices.

The Main Menu appears over the video image.



**Main Menu**

## Activating the Menu

**Keyboard:** Press Setup Menu (Print Screen) key.

**NOTE:** Press the tip button soon after the barrel button, or the Annotation Pro may interpret the barrel button press as a clear command.

**Touch Screen:** Tap upper center function area (or whatever function area you assigned for Menu access). This works only if no keyboard is connected.

## Menu Conventions

Once the menu system is displayed, you can make selections from it to navigate to the option(s) you wish to change. Each menu selection has the appearance of a rounded-corner button.

**Not Selected:** If a button is not selected, it has a black background.

**Selected:** When a button is selected, it changes to a blue background.

**Hovering:** As you move the selection arrow over a button (hovering), it will either

- Display blue behind the button text.
- Turn the text in the menu to white.

**Submenus:** A selection from the Main Menu causes a submenu to appear alongside it. A selection from the submenu sometimes displays a second submenu of choices based on the selection you make.

**Outline Format:** The entire menu system is an outline format that allows you to drill down to the specific option you wish to change. Whenever the Main Menu is visible, you can select directly from it to activate a different branch of submenus.

## Making menu selections

**Keyboard:** Use arrow to move to your selection and press the Enter key.

**Touch Screen or App:** Tap the screen over the option you want to select.

**Mouse Devices:** Click Left Button on your selection.



Sample Submenu

## Exiting Menus

Exit a submenu by selecting any option in the Main Menu. Exit the menu system by selecting **Exit**.

## System Information

Certain menu items are used to view and update information about your Annotation Pro.

### System Info

This selection presents a readout of relevant information concerning your unit. This information can be useful in troubleshooting, especially if you are contacting technical support.

1. Activate the menu system. The Main Menu appears.
2. Select **Display**. The Display menu appears.

3. Select **System Info**.

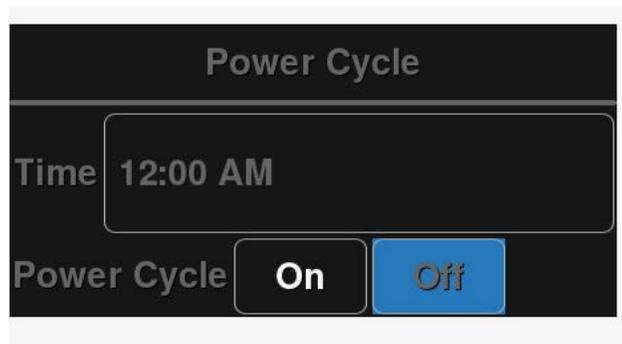


Example of System Information dialog

NOTE: Your numbers will be different than those of the menu above. Please write down all numbers when contacting technical support.

### Scheduling Restarts

The Annotation Pro can be set to cycle the power at a set time of day. This will force the device to re-establish the connection with any controllers or screens connected to it. The time to power cycle can be set from this menu, as well as disabling or enabling the daily power cycling.



The Power Cycle Menu

## Detecting and Assigning Devices

Devices connected to any ports will often be autodetected by the Annotation Pro. However, sometimes these devices will need to be manually added or need additional configuration.

### Serial Port Settings

Serial ports are used for connecting controller/marker devices and used for connecting to other systems. The Serial Port dialog also allows you to assign a priority system to control users if multiple controller/markers are connected.

### Initialization of Controller/Marker Device Types

Serial ports are initialized when the Annotation Pro is powered on. During this process, the Annotation Pro attempts to determine what device type is connected to each port. This procedure can be lengthy since the Annotation Pro accommodates a wide range of devices, and in its default autodetect mode, it will run through the entire list of possibilities for each port.

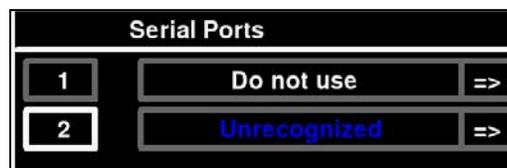
NOTE: The Annotation Pro can only automatically detect controller/marker device types; other devices will need to be set up manually.

It is possible to limit the initialization process for a designated port by permanently assigning the device type. The Annotation Pro will look for only the permanently assigned device type. This speeds up the initialization process considerably. The next time the Annotation Pro is powered up, the autodetect procedure will skip the permanently assigned port. If the assigned device needs to be initialized at startup, it will be initialized according to the device type listed.

### Viewing a Serial Device Type

1. Activate the menu system. The Main Menu appears.
2. Select **Devices**. The Devices menu appears.
3. Select **Serial Ports**. The Serial Ports menu appears.

**NOTE:** All the serial ports installed on your Annotation Pro are listed by port number, with the device type displayed to the right of each number. If the device type is in blue, it has been assigned through the autodetect procedure at startup.



Example of Serial Ports menu

If the device appears to be assigned incorrectly and is not functioning, contact Tech Blue, Williams AV's technical support for assistance in getting your device working.

### Manual Serial Port Assignment

**WARNING:** The following process should only be performed when your Williams AV rep has directed you to do so. Doing so without guidance can corrupt your Annotation Pro system and may require repair.

The Annotation Pro can also attempt to manually assign a device. This depends on the system having the correct driver installed on it; having the wrong driver may corrupt your system. **Do not do this process without the guidance of Tech Blue, Williams AV Tech Support.**

1. Select the device type you wish to have permanently assigned. If the device type can be permanently assigned (some types cannot), the color changes from blue to black.
2. Select the arrow to the right of the device type you wish to change. The Device Select menu appears. This dialog presents a scrolling list of all device types currently supported by the Annotation Pro in alphabetical order. The Page Up and Page Down buttons allow you to quickly scroll through the names until you find the device type you desire.

When you locate and select the name you wish to assign, it will move to the center of the list, where it will be highlighted. The new device type is now assigned. Device types which cannot be selected are in white.



Device Select menu

When a ? button is selected, a screen with further information about that device type will be displayed.

If a device type that is used for communicating with other systems is selected, an arrow button will replace the ? button. Selecting that arrow button will activate the control port's submenu.

You can return to the Serial Ports menu to make further changes by selecting the Return button, or by selecting Input Devices and then selecting Serial Ports.

3. (Optional) Select the device type name you wish to change. **This method is only recommended for those with more extensive experience in assigning device types.**

When the device type name, instead of the arrow to its right, is activated, the device type will change without having to display the submenu. Each time the name is selected, it causes a different device type to appear. The list of devices available using this method is an abbreviated version of the list in the Device Select dialog.

A click on the right side of the name moves forward one device. A click on the left side of the name moves backward one device. Keep clicking until the device type you desire is displayed. It will be assigned permanently when the Annotation Pro is rebooted.

If you are using the keyboard to select, it moves backward through the list only.

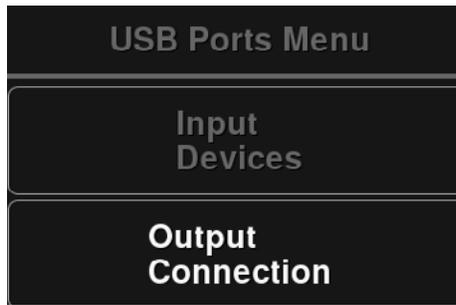
**NOTE:** If you are designating a port for use with another system, you will need to set COMM Port parameters before exiting the menu system. See the Setting COMM Port Parameters section.

4. Exit the menu system and recycle the power on the Annotation Pro.
5. The Annotation Pro must either be rebooted for the new device type assignments to be made permanent, **or** you can return to the Serial Ports dialog and select the numbered red box next to the new assignment to activate the device immediately.

## Viewing a USB Device Type

1. Activate the menu system. The Main Menu appears.
2. Select **Devices**. The Devices menu appears.

3. Select **USB Ports**. The USB Devices menu appears.



**USB Devices menu**

4. Select **Input Devices**. The USB Devices menu appears. 5 USB devices can be connected, and more could be added through the use of additional hubs.

NOTE: All the USB devices installed on your Annotation Pro are listed by port number, with the device type displayed to the right of each number. If the device type is in blue, it has been assigned through the autodetect procedure at startup.

NOTE: When the ? button is selected, the system displays the vendor and product ID in the Device Select menu.



**Example of USB Devices menu**

If the device appears to be assigned incorrectly and is not functioning, contact Tech Blue, Williams AV's technical support for assistance in getting your device working.

## Manually Assigning a USB Device

**WARNING:** The following process should only be performed when your Williams AV rep has directed you to do so. Doing so without guidance can corrupt your Annotation Pro system and may require repair.

The Annotation Pro can also attempt to manually assign a device. This depends on the system having the correct driver installed on it; having the wrong driver may corrupt your system. **Do not do this process without the guidance of Tech Blue, Williams AV Tech Support.**

1. Select the device type you wish to have permanently assigned. The text color then changes from blue to black.

For USB Devices, autodetect immediately detects and recognizes devices, even when their position on the hub changes. You might want to permanently assign a device type to a port if the device was marketed after your Annotation Pro system was manufactured, or if the system misidentifies the device.

2. (optional) To manually change the device type, select the arrow to the right of the device type you wish to change. The Device Select menu appears.

This menu shows a scrolling list of all device types currently supported by the Annotation Pro in alphabetical order. The Page Up and Page Down buttons allow you to quickly scroll through the names until you find the device type you desire. When you locate and select the name you wish to assign, it will move to the center of the list, where it will be highlighted. The new device type is now assigned.

When a ? button is selected, a screen with further information about that device type will be displayed.

3. Select the **Return** button to view the Device Select dialog.

## Integrating the Annotation Pro with Other Systems

Since only controller/marker device types are able to be recognized during the initialization process, all other devices must be set up manually. The Annotation Pro allows you to manually adjust communication settings for either of its ports. This allows the Annotation Pro to be integrated with

- an AV system as a control command station where it can both control AV devices and mark over any images presented.
- a control system which can send commands to the Annotation Pro, controlling its various functions, like AMX/Crestron device.

## Setting COMM Port Parameters

If you are assigning a port for communicating with another system, you must select either **Control Port** or **PVI to PVI** as your device type. The Annotation Pro supports assigning only one port for each type.

**Control Port:** Choose this option if the Annotation Pro is being used as an AV remote control command station, if it is being controlled remotely using RS-232 commands, or if it is being connected to a PC.

**PVI-to-PVI:** Use this selection if the Annotation Pro is being used in a videoconferencing system.

1. Select the appropriate device type in the Device Select menu for the port where you are connecting the other system. Where a question mark is usually found, you will instead see an arrow.

**NOTE:** Only one of the two COMM ports may be set to Control Port. Either COMM port may be set to Control Port, but only one at a time may be assigned as Control Port. If the device type you desire for connecting to other systems is unavailable, check to see if it is assigned to another port.

2. Activate the arrow next to the device type to set its communication parameters. The corresponding submenu appears. Select the desired baud rate, parity, and stop bits.

**NOTE:** Factory settings are 9600 baud, no parity, 1 stop bit. Data bits, which cannot be manually set, are 8 data bits.

3. Exit the menu system and cycle the power on the Annotation Pro. The Annotation Pro implements the new settings.

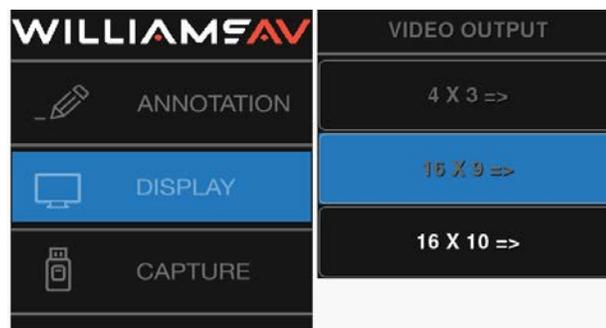
## Preparing Video Sources and Outputs

**Note on HDCP:** HDCP functions are only available on the Annotation Pro Plus (AN C5 P).

### Setting Video Output

The Annotation Pro gives you a wide range of video parameters for fine tuning your video output.

1. Activate the menu system. The Main Menu appears.
2. Select **Display**. The Display menu appears.
3. Select **Video Output**. The Video Output dialog appears next to the Main Menu.
4. Select an **output ratio**. The associated Video Output Aspect Formats dialog appears next to the Main Menu.



**Video Output Formats Dialog for 16 x 9 Ratio**

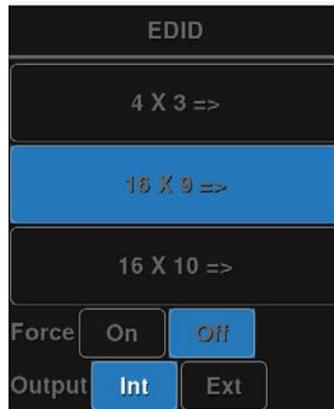
5. Select a **format**. The Annotation Pro will immediately switch to the output format selected.
6. Exit the menu system.

### EDID

This dialog allows you to set the Annotation Pro's preferred EDID resolution which tells the video source what resolution to send.

1. Activate the menu system. The Main Menu appears.
2. Select **Display**. The Display menu appears.
3. Select **EDID**. The EDID menu appears.
4. Turn **Force On or Off**. When off, the Annotation Pro will not try to set the incoming source resolution. When on, select your desired resolution and the Annotation Pro will force your device to output the set resolution.

5. Select an **EDID format**. The associated EDID Format submenu appears.



**EDID Submenu**

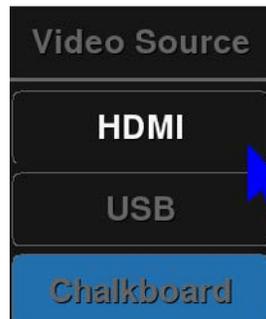
6. Set Output to Int (for Internal) to broadcast in 1080p video. If the Annotation Pro cannot send a 1080p signal, it will send s 1024 x 768 resolution video instead. Set Output to Ext (For External) to use the optimal resolution for connected, external devices.
7. Select a resolution.
8. Exit the menu system.

## Video Source Options

The Video Source menu allows you to select between your current Source Video or the Chalkboard background.

### From the Touch Screen:

1. Activate the menu system. The Main Menu appears.
2. Select **Display**. The Display menu appears.
3. Select **Video Source**.

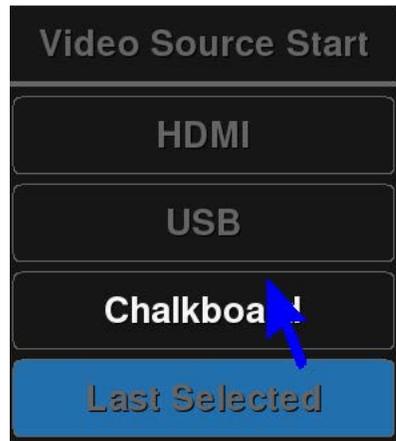


**Video Source Menu**

4. Choose from your desired video source.
5. Exit the menu system.

## Default Video Source

Each time the Annotation Pro starts, a specific video source can be selected as the default source to show. If the video source changes often, the last selected source used may be the desired default.



The Video Source Start menu

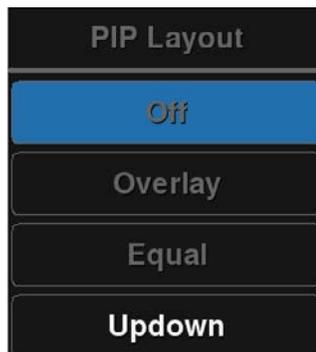
### Picture-In-Picture (PIP) Setup

Picture-in-Picture mode allows two images or videos to be shown at once.



The PIP Source Menu

The Picture-in-Picture image or video can be provided via the HDMI or the USB. The chalkboard cannot be used as a source for Picture-in-Picture.



The PIP Layout Menu

The PIP Layout setting selects where the Picture-in-Picture will appear on the screen:

- Overlay will appear in the upper right
- Equal will split the screen, with both images/videos appearing side by side.
- Updown will appear in the top center

## Networking (TCP/IP, TFTP, SMB)

The networking capabilities built into the Annotation Pro support various functions on a TCP/IP network. You can print to a printer, or send the Annotation Pro remote commands.

### Network Setup

1. Activate the menu system. The Main Menu appears. Select the **Network** option. The Network Menu appears.



Network menu

2. Select **Network Setup**.



Example of Network Setup menu

The Network Setup menu appears. This dialog prepares the Annotation Pro for communicating on your network.

3. Select DHCP or STATIC.

- If **DHCP** is selected, IP Address, Netmask, Gateway and Nameserver are assigned automatically.
- If **STATIC** is selected, you must make entries for IP Address, Netmask, Gateway and Nameserver. (*This is the default setting.*)

Consult with your IT administrator if you need help with these entries.

4. Select **Apply Settings** to finish the network configuration.

5. Exit the menu system.

## Configure TFTP Settings

The Annotation Pro TFTP feature gives you the ability to save and retrieve images using the TFTP protocol. To save a file using TFTP, you must first install a TFTP server on the computer which will receive the file(s). You will need the IP address of the computer where TFTP is installed. Make sure your firewall does not block access to your TFTP server.

The following steps are required to allow the Annotation Pro to communicate with the TFTP server.

1. Activate the menu system. The Main Menu appears.
2. Select the **Network** option. The Network Menu appears.
3. Select the **TFTP** option. The TFTP menu appears.



TFTP menu

4. Enter the **IP address** of the TFTP server. Check with your IT administrator if you do not know the IP address.
5. Enter the **Port number**. This is usually port 69. Check with your IT administrator if you are unsure.
6. Exit this dialog by selecting Previous Menu.

## Configure Windows Share (SMB) Settings

The Annotation Pro Windows Share (SMB) feature gives you the ability to save and retrieve images using the SMB protocol. To save a file using SMB, you must first activate a Share on a server with the SMB protocol running.

The setup dialog requires a Server and Share name. If the Share is password protected, you will need the username and password. Make sure your firewall does not block access to your SMB share.

The following steps are required to allow the Annotation Pro to communicate with SMB share.

1. Activate the menu system. The Main Menu appears.
2. Select the **Network** option. The Network menu appears.

3. Select the **Windows Share** option.



**Example of Windows Share menu**

4. Enter the **Server name** where your share is located. Check with your IT administrator if you do not know the name.
5. Enter the **Share name**. This is the name assigned to the location on the server. Check with your IT administrator if you do not know the name.
6. Enter the **Username and Password**, if any. Check with your IT administrator if you do not know this information.
7. Select the **Connect Share** button to connect the Annotation Pro to the Windows Share. The Annotation Pro will indicate if it is able to connect to your Share. If it fails, check your settings.
8. Exit this dialog by selecting Previous Menu.

## Calibrating and Configuring Touch Screens

---

### Calibrating Annotation Pro Touch Screen Controllers

Touch screens need to be calibrated on their first installation. Calibration ensures an intuitive and precise feel to drawing.

Calibrations are automatically saved for each video port. If you have a touch screen display with multiple video inputs, you should calibrate the touch screen for each input.

If you move a touch screen to a different port, run the calibration again.

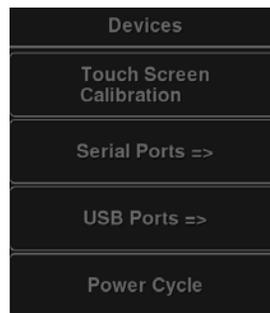
All calibrations are stored in battery backed-up memory. The most recent calibration will be recalled any time power is cycled off and on.

### Calibration

#### From the Menu System

1. Activate the menu system. The Main Menu appears.

2. Select **Devices**. The Devices menu appears



**Devices menu**

3. Select **Touch Screen Calibration**. The Calibration Menu appears.



**Example of calibration screen**

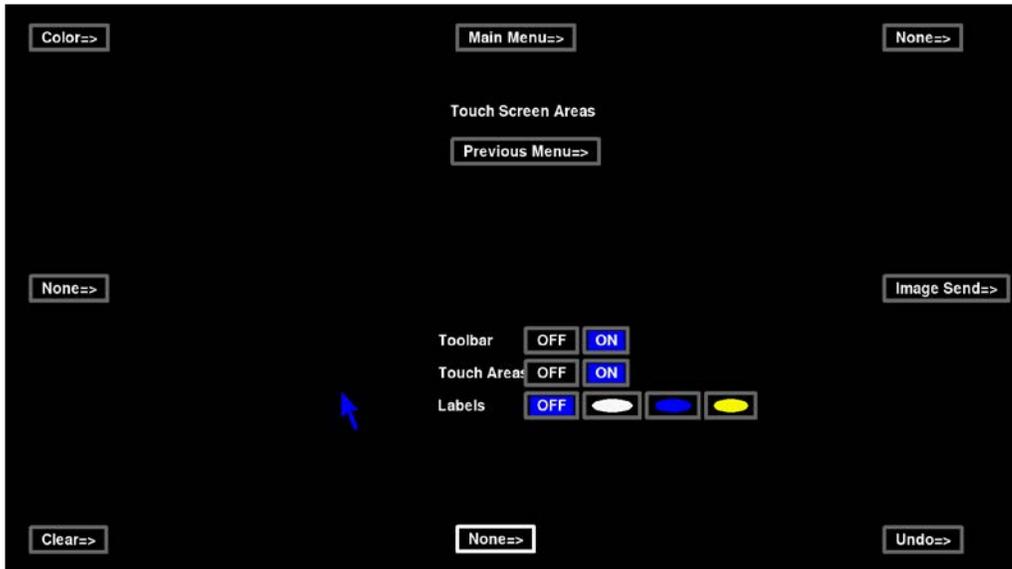
4. Follow the calibration instructions displayed on-screen. As you touch the target, it will disappear and the next target will appear. Repeat until all 12 targets have been calibrated. After you perform final calibration procedures, the Calibration dialog automatically disappears, and you return to the menu system.
5. Exit the menu system. Repeat this process for each video input on your touch screen display.

### **Touch Screen Command Areas**

This dialog allows you to assign touch screen commands to the various areas of your touch screen. Touching the screen in that area (after exiting the menu) will activate the command. Areas assigned to None are inactive.

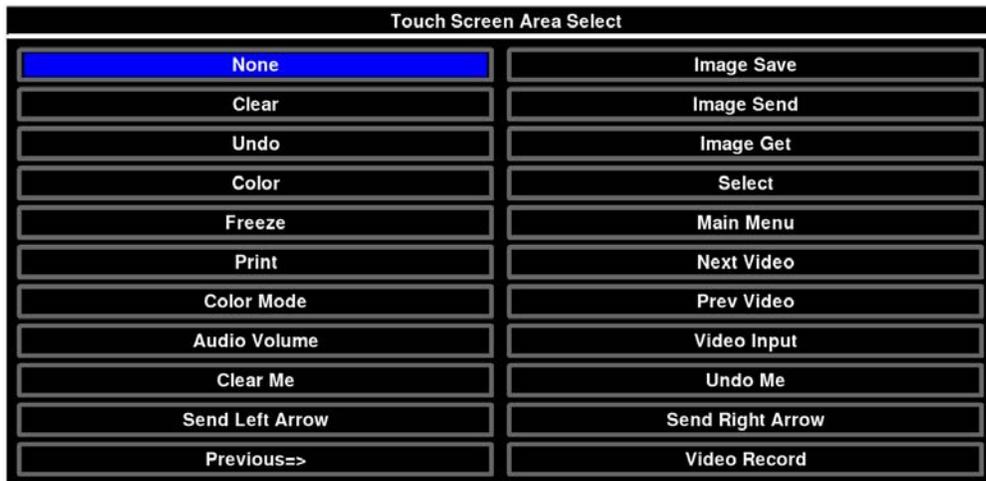
1. Activate the menu system. The Main Menu appears.
2. Select **Display**. The Display menu appears.
3. Select **Touch Areas**. The Touch Areas menu appears.

4. Select **Touch Screen Areas**.



**Touch Areas menu**

5. Select one of the areas. The Touch Screen Area Select menu appears. Select the command you wish to assign.



**The list of touch screen areas.**

6. Select **Previous**. The Touch Areas menu reappears
7. Repeat steps 4, 5, and 6 until you are finished assigning touch areas.
8. If you desire, you can turn off touch corner labels, or change their color to contrast with the video image using the menu in the middle of the screen.
9. When finished, select **Previous Menu** and exit the menu system.

## Customizing Markers and Pointers

This section covers the menu system functions that are usually set before making a presentation. Once set, the Annotation Pro will save them in memory, even when powered down. Some of the functions can also be accessed directly through the keyboard.

The options commonly used during a presentation are covered in Using Markers.

### Customizing the Color Palette

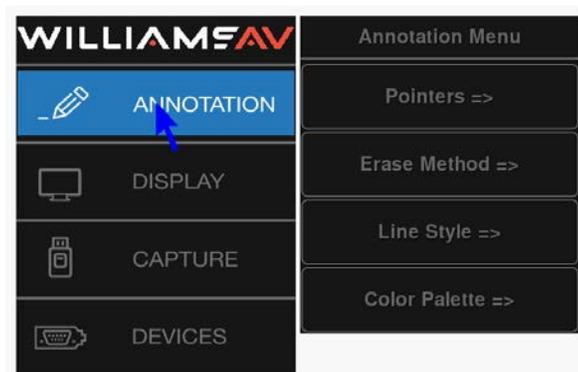
During a presentation, all controllers allow you to select a marking color by cycling through each of the seven available colors. To streamline color selection, the Color Palette allows you to pre-select which of the Annotation Pro's seven marking colors you wish to use during a presentation.

When the Color Palette command is activated, the seven colors appear over whatever video input signal is currently selected. This allows you to see how well the colors contrast with the image, making it easy to select colors that work well with the images you are presenting.

### Selecting Colors for a Presentation

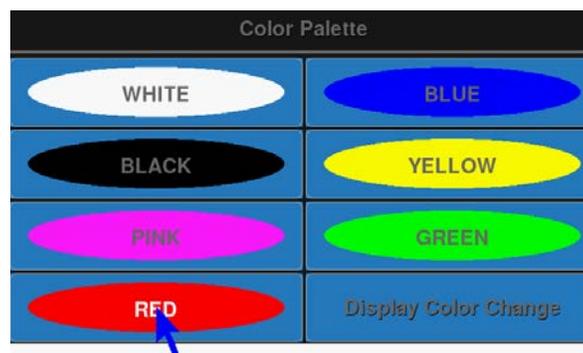
#### From the Menu System

1. Activate the menu system. The Main Menu appears.
2. Select **Annotation**. The Annotation Menu appears.



Annotation Menu

3. Select **Color Palette**. The Color Palette Menu next to the Main Menu.



Color Palette with all colors selected.

4. Select the color or colors that you would like to have available during the presentation.

**NOTE:** These selections toggle on and off. Selected colors are surrounded by a solid white fill.

You must select a minimum of one color. If you select only one color, you will not be able to deselect that color until you select a second color in the menu.

5. Activate or disable the **Display Color Change** option.

If Activated, during presentations, a small block of color appears briefly in the lower-right of your display each time you activate the Change Color command. Normally, the active pointer will indicate the current color, but if the pointer is turned off, this small color block will show the current color instead.

**NOTE:** When enabled, this option will be surrounded by a white fill. If disabled, no color block will appear when the Change Color command is activated. Broadcasters and certain other presenters may desire this setting.

6. Exit the Color Palette Menu.

#### **From the Touch Screen**

1. Tap the pencil icon.

2. A bar will open at the top of the screen. You may select line thickness and color from here.

### **Selecting a Brightness Level**

You can select a brightness level for all of the markers on the overlay. Adjusting the brightness can improve the contrast between annotations and the video image. Brightness is best controlled from the keyboard, but you can also adjust brightness with other devices.

Selections to the left decrease the brightness, while selections to the right increase the brightness.

**NOTE:** If the brightness is set too high for the display, the markers will smear across the image.

#### **From the Keyboard:**

1. Activate the Change Brightness command (press F10). The Set Brightness dialog window appears featuring a transparent background that allows you to adjust brightness in accordance with your image.

2. Select the level of brightness you desire by sliding the indicator across the scale.

3. Select the **OK** button to exit the menu.

**Note:** the marker brightness does not change until you close the window.

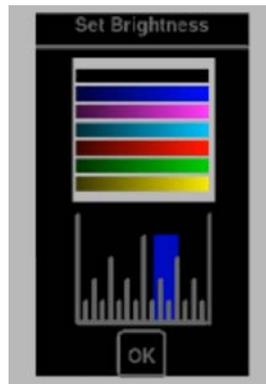
If needed, redo these steps until the markers display the desired brightness level.

#### **From the Main Menu:**

1. Activate the menu system. The Main Menu appears.

2. Select **Annotation**. The Annotation Menu appears.

3. Select **Brightness**. The Set Brightness dialog appears in place of the Main Menu, featuring a transparent background that allows you to adjust brightness in accordance with your image. Use your stylus or mouse to click or tap on the desired level of brightness.



**Set Brightness Dialog**

4. Select the level of brightness you desire.
5. Click the **OK** button to exit the menu.

### Zap Icon Toggle

This feature is currently disabled on all systems, but may be returning in the future. If your software is displaying this menu option, no changes are occurring based on your choice.

## Using Markers

### Overview

The Annotation Pro features a variety of graphics, called markers, which you place over a video image to draw attention to or explain details of the image. The markers available include freehand drawing and a variety of pointers. With the keyboard installed, you can type text, draw straight lines, and anchor a date/time label. You can place any combination of these markers on the screen, in any combination of available colors. Such a combination of markers is called a marker overlay. Marker overlays cannot be saved, and once closed cannot be restored.

This section covers marking procedures to follow while making a presentation. It is assumed that you have made set-up selections sometime before your presentation.

### Assigning Marker Colors

The color that the active marker displays is the color that the marker will be anchored in. You can anchor markers of different colors on the overlay.

The colors available during a presentation are based on those activated in the Color Palette menu.

If the color of the markers does not change from black, the brightness level is too low and must be increased before selecting the color.

#### From Any Controller

Activate the Change Color command from your control device.

All markers anchored from this point on will appear in the newly selected color.

**NOTE:** If the pointer has been disengaged, and the Display Color Change option in the Color Palette Menu has been activated, a small block of color will briefly appear in the lower right of the screen to help you identify the new marker color.

## Assigning Line Styles

You can change line style directly from the keyboard. You can also change the line style from other devices by accessing the menu system. When the keyboard is installed, you can only access the menu system from the keyboard.

When a line style is selected from a marking device, the Annotation Pro keeps track of the style and the device. The device will draw with that style until a different style is selected. This allows each marking device to have its own line style. You can have drawn lines of different styles on the overlay. Once you draw the line, or anchor a straight line, you cannot change that line style. However, you can erase or undo the drawing and begin again.

### From the Keyboard

1. Activate the Line Style command. A small sample of the active line style will appear briefly in the lower-right hand corner of the screen.
2. Repeatedly activate the Line Style command until the desired line style appears in the on screen sample. You can scroll backwards through the line options, by activating the Reverse Toggle command.
3. All lines drawn from this point on will appear in the newly selected line width and style.

### From the Menu System

1. Activate the menu system. The Main Menu appears.
2. Select the **Annotation** option. The Annotation menu appears.
3. Select the **Line Style** option. The Line Style Menu appears.



Line Style Menu

4. Select the desired **line thickness**, with or without a drop shadow.

NOTE: Drop shadows are always black, therefore, black lines do not have drop shadows.

5. Exit the menu system. All lines drawn from this point on will appear in the newly selected line width and style.

## Entering the Marking Mode

The Annotation Pro is in the marking mode by default. The only time it is not in marking mode is when a menu is displayed. In the Marking mode, the image from the video source is displayed along with any stored markers. An active pointer is also displayed, unless it was disabled during setup.

## Drawing

You can draw on the Annotation Pro's overlay simply by beginning to draw. The drawing feature allows you to circle important parts of the image, write on the image, or underscore particular parts of text. You can draw freehand curves or straight lines.

To draw, you can use your finger on a touch screen. You can also use other mouse devices to draw. You cannot freehand draw using the keyboard, but you can use it for straight line drawing.

Before drawing, you may change the drawing line color or the width and style of the drawing line.

### Drawing Freehand

1. Position the active pointer (if one is displayed) anywhere on the video image where the drawing is to begin.
2. Activate the Draw command from your particular drawing device.
3. Reposition the active marker (if one is displayed) and repeat the above procedures for another drawn line.

### Straight Line Drawing

NOTE: This feature works only using the keyboard.

1. Activate the Straight Draw command from the keyboard. A cursor appears representing the first endpoint of the straight line.
2. Position the cursor anywhere on the screen where the line is to begin, and anchor it. A second cursor appears, joined by a line to the first endpoint.
3. Position the second cursor where the line is to end and anchor it. The line segment is complete.
4. If desired, draw another straight line by positioning the new active cursor and anchoring it.

### Selecting Pointers

You select a pointer type while the pointer is active, or positionable. After you anchor the pointer, you cannot change that pointer's type. However, you can erase or undo the anchored pointer and begin again.

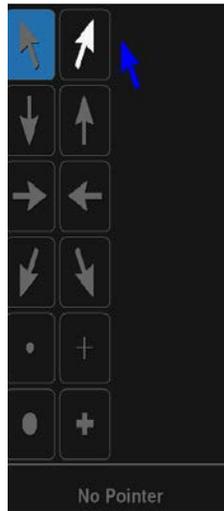
#### From the Keyboard

Repeatedly activate the **Pointers** command until the desired pointer type appears on screen. You can scroll backwards through the pointer options, by activating the Reverse Toggle command. The pointer you selected appears on screen, ready for positioning.

#### From the Menu System

1. Activate the menu system. The Main Menu appears.
2. Select the **Annotation** option. The Annotation menu appears.

3. Select the **Pointers** option. The Pointers dialog appears.



**Pointers dialog**

4. Select a pointer type. The active option displays a white fill. Selecting **No Pointer** turns the pointer off.
5. Exit the menu system.

### Creating a Pointer

You can move the pointer around the screen, using it to direct the viewer's attention without anchoring it. You can also position and anchor several pointers on the overlay, giving you the opportunity to point in a more lasting manner on several areas of the image.

Before using or anchoring a pointer, you may want to select a new pointer type. Or you may change the pointer color.

#### From Any Controller

1. Position the pointer anywhere on the video image to direct attention to an image detail.
2. If desired, reposition the same active pointer anywhere on the image to make your second point, and continue as often as desired.
3. If desired, anchor the active pointer. A new active pointer appear on screen, identical to the first.

**NOTE:** Active pointers are not displayed for touch screens, only anchored markers.

4. Repeat any of these steps as often as desired.

### Turning the Active Pointer On/Off

Sometimes a presenter chooses not to have the pointer showing during a presentation. This command allows you to turn the visibility of the pointer off or on. When the active pointer is turned off, you can still anchor pointers.

**NOTE:** Since touch screens do not display active pointers, you do not need to use the Pointer On/Off command with those devices.

#### From the Keyboard

Activate the Pointer On/Off command. The pointer disappears.

To make the pointer reappear, repeat the procedure.

**NOTE:** To turn off all active markers, use the keyboard Active Marker On/Off command.

### From the Menu System

Pointers are turned off in the same dialog where they are selected.

### Typing Text Labels

Anytime you press an alphanumeric key on the keyboard, a text label begins. Before you anchor a line of text, you can choose to display it in one of six fonts, each of which offers various sizes. These fonts are: TI Roman (4 sizes); Helvetica (4 sizes); TI Dom Casual (4 sizes); Fargo (3 sizes); Symbol (1 size); and Map (1 size). The Symbol and Map fonts are documented in the Appendices.

1. Position the active marker anywhere on the image.
2. Create a line of text by pressing the desired text keys.

**NOTE:** Do not anchor this line of text yet, since only an active line of text will display the font options.

3. Select the desired font by repeatedly activating the Fonts command until the font appears on screen. You can scroll backwards through the font options, by activating the Reverse Toggle command.
4. Select a font size by repeatedly activating the Font Size command until the correct size appears on screen. You can scroll backwards through the size options, by activating the Reverse Toggle command.
5. Turn the text background on or off by activating the Text Background On/Off command.

**NOTE:** The color of the background is always blue.

6. Position the active label anywhere on the video image, then anchor the label. The line of text is anchored. You can anchor a new line of text immediately below the previously anchored text line by not moving the cursor. Or you can position the second line of text anywhere on the screen.

**NOTE:** To create a paragraph of several lines of text, remember that text does not wrap, so press *Enter* or *Drop* at the end of each line.

7. Exit text typing mode by pressing any other function key.

### Displaying the Date/Time

**NOTE:** This feature works only using the keyboard.

You can place the current date and/or time on the overlay, depending on which display mode you selected in the Set Date/Time Menu.

While active, the date/time is represented by an icon. The numerical date and/or time will appear as soon as you anchor the icon. You can anchor only one Date/Time icon on the overlay.

To reposition an icon, activate the command again. The old icon disappears and the new icon appears, ready for positioning.

1. Activate the **Show Date/Time** command. A date/time icon appears.
2. **Position** the date/time icon anywhere on the video image.
3. To select a solid or transparent label background, activate the **Text Background On/Off** command.
4. Anchor the date/time icon. The current date/time icon appears.
5. A cursor appears on screen, ready for the next action.

### Clearing All Markers

Follow these instructions to clear the entire screen of markers. If you need to temporarily remove the marker overlay, then use the Marker Overlay On/Off command.

Activate the **Clear** command for your particular controller. All markers disappear. An active pointer remains on screen unless the pointer has been disengaged.

## Undoing a Marker

To undo a marker, beginning with the most recently anchored marker or line segment. You can repeat this command as often as needed until the screen is clear of markers.

When you are in Undo Mode, you cannot erase markers.

Activate the Undo command for your particular controller. The most recently anchored marker disappears. An active pointer remains on screen unless the pointer has been disengaged.

## Erasing Markers

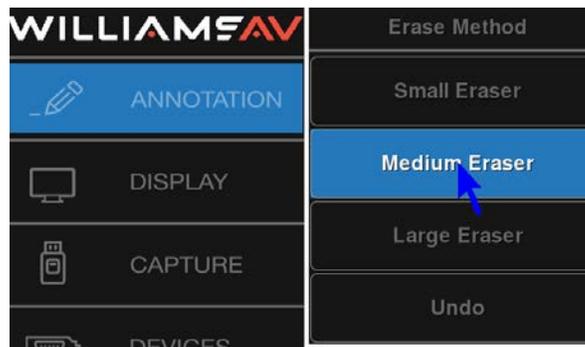
Follow these instructions to erase markers from the overlay, wiping them clear like a traditional eraser. You activate Erase mode from the menu system, but you erase the markers using your drawing device.

When you are in Erase mode, you can no longer undo markers.

## Activating Erase Mode

### From the Main Menu

1. Activate the menu system. The Main Menu appears.
2. Select the **Annotation** option. The Annotation menu appears.
3. Select **Erase Method**. The Erase Method menu appears.



Erase Method Menu

4. Select an **eraser size**: Small, Medium, or Large.

**NOTE:** The larger the eraser size, the more area you can clear in a single motion. If you do not select an eraser size, the Annotation Pro will default to Medium.

5. Exit the menu system.

## Erasing

Be sure you are in Erase mode before following these steps. See Activating Erase Mode for instructions.

1. After marking, activate the **Undo/Erase** command for your particular controller. A square eraser appears on screen, ready for positioning.
2. Activate the **Draw** command, and drag the eraser over the markers. The markers disappear as you wipe. When you lift the drawing device, the Annotation Pro closes the eraser function, and enters Marking Mode. If you need to erase again, repeat these steps.

## Using The Chalkboard

You can mark on a solid background, or chalkboard, instead of the video image. When turned on, the chalkboard will continue to be displayed. The chalkboard will remain on screen until you turn it off. The chalkboard is most easily selected from the menu system or keyboard.

### Activating the Chalkboard

Use these procedures to turn on the chalkboard.

#### From the Keyboard

Activate the **Chalkboard On/Off** command. The chalkboard appears, along with any markers you may have already anchored.

To close the chalkboard, press the **Chalkboard On/Off** command again. The video source returns, along with any markers you may have anchored on the chalkboard.

#### From the Menu System

1. Activate the menu system. The Main Menu appears.
2. Select the **Display** option. The display menu appears.
3. Select the **Video Source** option. The Video Source menu appears.
4. Turn the **Chalkboard** option On.
5. Exit the **menu system**. The chalkboard appears, along with any markers you may have already anchored.
6. To exit the Chalkboard, repeat these steps, but turn the Chalkboard option **Off**.
7. The video source returns, along with any markers you may have anchored on the chalkboard.

## Saving and Storing Images and Video

---

### Overview

The Annotation Pro makes it easy to access annotated or captured images, giving you newfound flexibility in the creation and sharing of your presentations.

It is now easy to capture images, with or without annotations, by either saving or printing them. Previously saved images can be retrieved from the storage device at will. You can also retrieve an image created on computer, as long as it conforms to the file specifications.

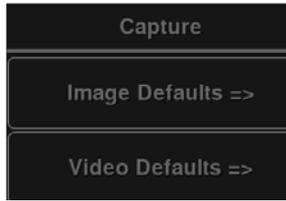
### Capture Options

A captured frame or field can be saved as an image to a USB memory device, to a computer running TFTP, or an SMB share. Files can be saved in the bitmap format (bmp) or as jpg. The captured frame will be the size of the screen resolution.

The File Defaults menu selection allows you to set the default settings for how the images are saved. It includes the directory, name and sequence numbering. This allows for fast saving with no dialog boxes involved.

1. Activate the menu system. The Main Menu appears.

2. Select **Capture**. The Capture menu appears.



Capture menu

3. Select **Image** or **Video Defaults**. The selected menu appears.



Image File menu and Video File menu

4. In the **Dir** field, enter the directory name where you wish to save the file. It must be 8 alphanumeric characters or less, no spaces and no subdirectories. A default is entered automatically.
5. In the **Prefix** field, enter whatever letters you want each filename to begin with. The prefix must be 5 alphanumeric characters or less, no spaces. The default is entered automatically.
6. In the **Index** field, enter the number to start numbering from. Each time an image is saved, the number will increment. The default is 1. The numbering is remembered by the Annotation Pro, even through cycling of power. An example filename is img1.bmp. The next images would be img2.bmp, img3.bmp, and so on.
7. For images, select if the **Destination** to save is a USB, TFTP Location, or SMB location. Select if the image **Format** should be a BMP or JPG. Turn **Verify** on if you want to be prompted that the image has saved.
8. For video, select the **Bitrate** of the output. Turn the **Timer** on to display a timer on screen and on the recorded footage.
9. Exit by selecting the **Previous Menu** button.
10. Exit the menu system.

### Freezing Video

If video files are being shown as part of a presentation, the Annotation Pro can freeze it at any point so you can draw attention to a particular frame's contents.

1. Activate the Freeze command in one of the following ways:

- **Touch screen:** Touch the **Top-Right** command area.
- **Keyboard:** Type **ALT+F1**.

The current video frame will be frozen on the screen. This command does not actually stop the video from playing. You will need to activate the **Pause or Stop** button on your video playback unit to do that.

2. You can now annotate the frozen image.

3. You can **Save or Print** the image at any time.

4. Activate the **Freeze** command again to toggle the command off. The running video will be displayed again.

## Setting the Destination for Saved Files

After setting up the file defaults for saving images, you will want to select the destination for your saved files. Files can be saved to USB memory devices, a computer running TFTP, or an SMB share.

1. Activate the menu system. The Main Menu appears.

2. Select **Capture**. The Capture menu appears.

3. Select the **Destination** as USB, TFTP or SMB. The Annotation Pro will use your selection whenever you activate the Save command from the touch screen, or keyboard.

4. Exit the menu system.

## Setting the Verify Option

In circumstances where it is important to know that a file has been successfully saved or printed, this setting allows you to verify the end result. If you turn Verify on, a dialog will appear after each save or print command, asking you to verify that the image was successfully saved or printed.

1. Activate the menu system. The Main Menu appears.

2. Select **Capture**. The Capture menu appears.

3. Set **Verify** On or Off.

4. Exit the menu system.

## Saving Images

The Annotation Pro can save displayed images in the following ways:

- moving images can first be frozen and then saved.
- a single frame of a moving image can be captured “on-the-fly” as it goes by on the screen.
- any still image can be saved.

The image can be saved to a USB memory device or to another computer using TFTP or SMB (Windows Share).

The image is saved based on the settings you’ve chosen. Files are saved in bitmap format, 24 bit true color with the extension .bmp., or saved as .jpg. The captured frame will be the size of the screen resolution.

**NOTE:** Images can be saved at .jpg, but the Annotation Pro cannot retrieve these images. .jpg should only be used if the Annotation Pro does not need to be able to use the image again. Save the file as a .bmp for retrieval to work.

The USB memory device must be a single device, like a memory stick. It cannot be connected through a multiple port memory card reader. It must also be formatted as FAT16 or FAT 32.

## To save an image file to a USB device

1. Save the image file in one of the following ways:

- **Touch Screen:** Touch the **Image Save** command area (center-left).

**NOTE:** Be sure the **Capture File Defaults** has been set to **USB**. If you want to use touch screen commands, be sure to set the Destination to USB first.

- **Keyboard:** Type **ALT+F2**. The ALT+F2 keyboard command is programmed to save to the USB device. The other two commands are dependent on the Destination setting in the Capture dialog.
2. The image is saved to the USB memory device. A counter appears at the lower-right portion of the screen, indicating the percentage of the image saved to the USB storage device. When the counter reaches 100, it disappears. The system is then ready to save another image. The name of the file is determined by the settings in the File Defaults dialog.

### To save an image file using TFTP

To save a file using TFTP, you must first install a TFTP server on the computer which will receive the file(s). See **Configure TFTP Settings**.

The name of the file is determined by the settings in the **File Defaults** dialog.

1. Save the image file in one of the following ways. If you want to use touch screen commands, be sure to set the Destination to USB first.
  - **Touch Screen:** Touch the **Image Save Command** area (center-left). Be sure that Capture File Defaults has been set to TFTP.
  - **Keyboard:** Type **ALT+F6**. The ALT+F6 keyboard command is programmed to save to the Computer where TFTP is installed. The other two commands are dependent on the Destination setting in the Capture dialog.
2. The image is saved to the computer you have designated. A counter appears at the lower-right portion of the screen, indicating the percentage of the image saved to the TFTP server. When the counter reaches 100, it disappears. The system is then ready to save another image.

**NOTE:** Operation of the Annotation Pro will slow down during the saving process.

### To save an image file using Windows Share (SMB)

To save a file using SMB, you must first install and setup Windows Share on the computer. See **Configure Windows Share (SMB) Settings**.

The name of the file is determined by the settings in the File Defaults dialog.

3. Save the image file in one of the following ways:
  - **Touch Screen:** Touch the **Image Save Command** area (default is center-left). Be sure that Capture File Defaults has been set to SMB.
  - **Keyboard:** Type **ALT+F8**. The image is saved to the computer you have designated. A counter appears at the lower-right portion of the screen, indicating the percentage of the image saved to the computer. When the counter reaches 100, it disappears. The system is then ready to save another image.

**NOTE:** Operation of the Annotation Pro will slow down during the saving process.

## Retrieving Images

**NOTE:** Images being retrieved must be saved as a .bmp filetype.

### To retrieve a .bmp image file from USB

1. Retrieve a .bmp image in one of the following ways:
  - **Touch Screen:** Touch the appropriate area if you assigned this command.
  - **Keyboard:** Type **ALT+F3**.

- The **Get Image** dialog appears. Select the image you wish to retrieve from the list that is presented. The image is displayed on the screen.

### To retrieve a .bmp image file using TFTP

- Type **ALT+F7** on your keyboard or touch the area on your touch screen if you assigned this command. The Get Image dialog appears.
- Enter the image index number for the image you wish to retrieve and select OK.

Only the number is to be entered. The prefix of the file is determined by the settings in the Image File dialog. If you have changed the prefix setting in order to help group files for a particular purpose, make sure the prefix in the Image File dialog matches the prefix of the file you are attempting to retrieve. **The file extension must be .bmp.**

The image is displayed on the screen.

### To retrieve an image using Windows Share (SMB)

- Retrieve a .bmp image in one of the following ways:
  - Touch Screen:** Touch the appropriate area if you assigned this command.
  - Keyboard:** Type **ALT+F3**.

The Get Image dialog appears.

- Select the image you wish to retrieve from the list that is presented. The image is displayed on the screen.

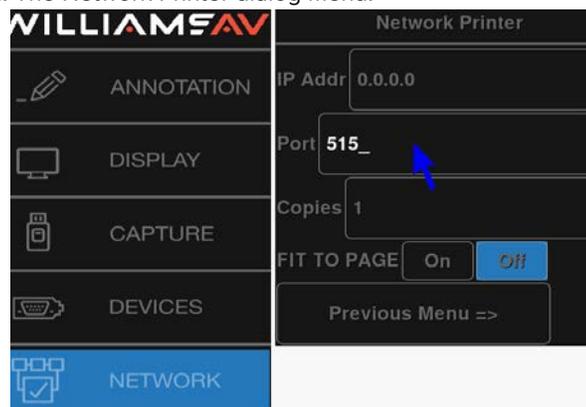
## Printing Images

The Annotation Pro allows you to print to a printer either directly or over a TCP/IP network. If you print directly, the configuration requires a USB to Centronics cable. To print over a TCP/IP network requires an Ethernet cable and the address of the printer.

### Printer Setup

The Annotation Pro can print to a printer over a TCP/IP network. This section shows you how to set it up.

- Activate the menu system. The Main Menu appears.
- Select the **Network** option. The Network Menu appears.
- Select the **Printer** option. The Network Printer dialog menu.



Network Printer menu

- Enter the **IP address of the printer**. Check with your IT administrator if you don't know this address.
- Enter the **Port number**. This is usually 515.
- Enter the **number of copies** to be printed each time you give the Print command.

7. Exit this dialog by selecting **Previous Menu**. The next time you give the Print command, it will use these settings.

## Print an image

1. Print an image in one of the following ways:
  - **Touch Screen:** Touch the appropriate area if you assigned this command.
  - **Keyboard:** Type **ALT+F4**.
2. The image is sent to the printer. A counter appears at the lower-right portion of the screen, indicating the percentage of the image sent to the printer. When the counter reaches 100, it disappears. The system is then ready to print another image.

## Verifying Saved or Printed Images

In circumstances where it is important to know that a file has been successfully saved or printed, you will want to activate the **Verify** setting. Once it is active, each time you print or save a file, a dialog will appear, asking you to verify that the image was successfully saved or printed.

## Updating the Annotation Pro

---

The Annotation Pro firmware can be updated through USB or TFTP to provide new features, improve functionality or bug fixes.

**NOTE:** The Annotation Pro must be connected to the internet to update, even when updating from a USB device.

Before activating the Update command, the update file must be copied into a directory on the flash drive or TFTP location called **BIIUPG**. Create this directory directly under the main (Root) directory. It cannot be inside any other folder. Ensure there is an internet connection to the Annotation Pro before starting the update.

1. Before activating the Update command, the update file must be copied into a directory on a USB flash drive or in TFTP location named BIIUPG. You must **create the BIIUPG directory in the root directory**.
2. Activate the menu system. The Main Menu appears.
3. Select **Update**. The Update dialog appears.



Update dialog

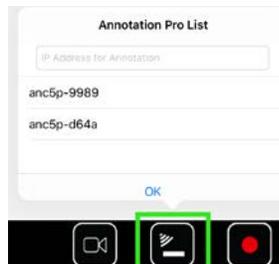
4. Select **USB, Windows Share or TFTP**, depending on where you have placed the update file. The screen will display various information as the update takes place. Then it will request that you cycle the power.

**NOTE:** Do not shut off the device, remove the update file, or restrict access to the update file until the update is finished.

5. Turn the Annotation Pro off, then turn it back on. The system will start up using the new firmware.

## Annotation Control App (AN C5 P Only)

The Annotation Control app allows you to annotate from your iPad or iPhone. The app is available for download on the Apple App Store and is not available for Android devices. The app may only be used with the Annotation Pro Plus.



### Connect

The Apple device being used must be on the same Wi-Fi network as the Annotation Pro system. Open the app and select the Connect icon. Find your Annotation Pro system in the list of available systems and select it. Once connected, draw with your fingers to make any desired annotations.

If the app is moved to the background (when checking notifications or using other apps), the connection to the Annotation Pro system will be lost. When the app is resumed from the background, the app will attempt to reconnect with permission. If the app takes too long to reconnect or is unable to connect, try to connect by pressing the Available Connections button.

### Video Sources

Three video sources are available. The board icon is for Chalkboard mode. The monitor icon is for HDMI input. The camera icon is for USB or Document camera. Switching the video source will clear the annotations on screen.



The Chalkboard, HDMI, and USB Camera icons.

Video streams will appear in the app as long as the video content is not HDCP encrypted. For instance, a video streamed directly from Netflix is likely HDCP encrypted and cannot be viewed within the app, even if the video is working on a touch screen.



### Drawing Tool

Select the drawing tool to select the size and color of your annotations. Several colors and sizes are available for annotation.



### Clearing the Screen

To clear an annotation, press the X icon in the toolbar. The eraser tool is not available in the app.



### Recording Sessions

When starting a recording sessions, text will appear showing the recording has started, and a timer will appear in the lower right corner. When stopping a session, text will appear showing the recording has stopped.

### Annotating

Press your finger on the screen to draw, circle, write or otherwise annotate. Your annotations will appear on any other display devices being used. Annotations made using a touch screen or other device will appear on your screen.

**Note:** Depending on the size of your devices, it is possible to annotate outside of what may show up on other devices. For instance, an iPad does not have the same display ratio as some touch screens. Annotations made outside of the displayed area may not show correctly.

## Glossary

---

### **ACTIVE MARKER**

-- the pointer, text label or date/time label which is positionable. Often used as a marker, but also used to position the starting point of a drawing line. When the active marker is anchored, another identical active marker appears on-screen. One active marker is always displayed, unless the marker has been turned off.

### **ANCHORED MARKER**

-- the opposite of an active marker. An anchored marker has been placed in a fixed position on the Annotation Pro overlay and cannot be moved again. However, anchored markers may be erased or cleared.

### **BACKGROUND**

-- text background refers to the area immediately surrounding a line of text or a text label. For video background, see **Chalkboard**.

### **BLOOM**

-- markers or text which enlarge or blur on the monitor due to excessive brightness.

### **CHALKBOARD**

-- the solid area behind the Annotation Pro markers when in the Chalkboard mode. Presenters may choose a source background or a solid background.

### **CLEAR**

-- removing the overlay of all markers at once. A single active marker will remain on-screen unless the marker has been disabled.

### **CLICK**

-- quickly depressing and releasing a button on the Annotation Pro auxiliary controller, as opposed to a press of the button.

### **COLOR PALETTE**

-- a user-defined group of colors which may be attributed to each active marker before anchored. From 1 to 7 colors are available.

### **COMM PORT**

-- a serial port used for communications. Serial devices that connect to these ports (such as a mouse or touch screen), send and receive data in single bits of information one after the other, thus the term serial.

### **CONNECTOR**

-- hardware installed on cable ends to provide cable attachment to an input or output device. Input and output device ports which mate with this hardware are also called connectors.

### **CONTROLLER**

-- a device that controls the selection, positioning, anchoring and clearing of markers on the Annotation Pro overlay. Some other compatible controllers are most touch screens and certain mouse devices.

### **DRAW**

-- freehand drawing or writing over a video or computer image.

### **DROP SHADOW**

-- a shadow on drawing lines, or straight lines for the purpose of creating a line that stands out from the video image. Most colors have a black drop shadow. Black has no drop shadow.

### **ERASE**

-- remove markers from the overlay, rather than undo them using an on screen eraser. Erasing has the same effect as erasing with a pencil or chalkboard eraser; only the markers you touch (or parts of them) will erase.

### **FONT**

-- a particular style of text such as Helvetica or Times Roman. The fonts installed in the Annotation Pro are available in one or more sizes.

**MARKERS**

-- pointers (arrows, cross hairs, dots), date/time labels, freehand drawings and straight lines which can be placed and anchored on the marker overlay.

**OVERLAY**

-- a combination of one or more markers placed on the screen using the capabilities of the Annotation Pro. These markers overlay a chosen video image. While the markers are visible, the actual overlay is invisible, allowing you to mark directly on top of a video image (or solid background if selected in the menu system).

**POINTERS**

-- the different arrows, cross hairs and dot pointers which may be selected and placed on the overlay, in any number and in combination with other markers. Pointers are considered markers. However, not all markers are pointers.

**PRESS**

-- on the keyboard, the action of pressing then releasing the function key. On auxiliary controllers, a press is often the action of depressing and not releasing a button until the desired effect takes place on the screen (as opposed to a click of the button).

**UNDO**

-- remove anchored markers on the overlay one at a time, beginning with the most recently anchored marker.

**VIDEO SOURCE**

-- a device from which the Annotation Pro receives a video image, incorporates the graphic overlay capabilities, then outputs to the corresponding display. Examples of video sources include DVD players, cameras, VGA computers, standard television sets, teleconference equipment, slide-to-video converters, visual presenters and more. The source can be from HDMI or USB.

## Troubleshooting Guide

The following table describes common problems and their solutions. If, after referring to this table, a problem still exists, call Williams AV and ask for technical assistance.

There are no user serviceable parts in the Annotation Pro. Do not open the cabinet.

The Annotation Pro can be soft booted/power cycled by pressing CTRL + ALT + DEL. Factory default settings are restored by pressing CTRL + ALT + END.

**WARNING:** executing a factory reset will erase all user settings including calibrations, COMM port settings, etc.

SYMPTOMS	POSSIBLE SOLUTIONS
The green indicator light on the front of the Annotation Pro does not light up.	Check that the Annotation Pro is plugged into a live outlet.
Monitor does not light up.	Check that the monitor is plugged into a live outlet. Check that the monitor is switched on. Check that the monitor brightness and contrast controls are properly adjusted.
HDMI audio is missing.	Reboot the Annotation Pro using CTRL + ALT + DEL.
The Annotation Pro markers appear to bloom.	Adjust system parameters on the video output device, monitor, or camera (if in use) such as contrast, gain, brightness, color, light, and intensity. Decrease brightness of Annotation Pro markers or use a different marker color.

SYMPTOMS	POSSIBLE SOLUTIONS
<p>Monitor lights up but does not display a picture.</p>	<p>Check that the video source and Annotation Pro are plugged into a live outlet.                      Check that the video source and Annotation Pro are both switched on.                      Check that the proper cables are connected to the proper connectors on the video source, the Annotation Pro, and the monitor. Some sources and monitors have multiple output and input connectors. Consult your video or computer manuals for correct connection information.                      Bypass the Annotation Pro by connecting the monitor directly to the video source. If the video image still does not appear, have the video source and monitor checked.</p>
<p>Monitor automatically adjusts brightness so that video image is dull while markers are bright.</p>	<p>Monitor is automatically adjusting for the overall brightness level of the markers and the video image. On the Annotation Pro, activate the Change Brightness command. Tone down the brightness level of the markers. The monitor will adjust accordingly.</p>
<p>Monitor displays a scrambled picture.</p>	<p>Check the horizontal hold control on the video monitor for proper adjustment.                      Check that the Dual Voltage Switch (110V/220V) located on the back panel of the Annotation Pro is properly set.                      Monitor is not compatible with video source. Use compatible system.                      Check to be sure that the video in and out connectors on the Annotation Pro are secure.</p>
<p>Mouse device will not operate properly.</p>	<p>Refer to the specific section in this manual that describes installation of your controller.</p>
<p>Touch screen will not operate properly.</p>	<p>For touch screens, you may need to calibrate settings. Refer to Calibrating Annotation Pro Touch Screen Controllers in this full user manual.</p>

SYMPTOMS	POSSIBLE SOLUTIONS
PC display scrolls.	<p>You may need to adjust your computer's Display or Monitor Type setting for a video scan rate compatible with the Annotation Pro.</p> <p><b>For display utilities that permit the user to change the horizontal scan rate or vertical refresh rate:</b>            Select a resolution, maximum horizontal scan rate, and a maximum vertical scan rate that are compatible with the computer hardware, the Annotation Pro, and the display monitor/projector. You will need to restart the computer before changes can be activated.</p> <p><b>For Windows 7/8/10 Display Settings that permit a change in monitor type:</b>            If an independent display utility or video driver was not installed, you may want to change the display type by using the settings commands in Windows 7/8/10.</p> <ol style="list-style-type: none"> <li>1. Go to the Display settings for your system.</li> <li>2. In the Display window find the Screen Resolution listing.</li> <li>3. Select the desired resolution.</li> <li>4. With some operating systems you may need to click <b>Apply</b> for the change in resolution to take effect. Some operating systems update automatically.</li> </ol>

## Appendix

### Quick Reference for Keyboard

The commands in these tables are for a keyboard when used with the Annotation Pro.

MARKING COMMAND	KEY
Date/Time Display	F8
Date/Time Setup	CTRL + F8
Font Selection for Text Labels (typed text)	F6
Font Size for Text Labels (typed text)	CTRL + F6
Line Style Selection	F2
Straight Line Draw	F5
Text Labels (typed text)	AlphaNumeric Keys
Text Background On/Off	F7

ACTION (OPS) COMMAND	KEY
Anchor Marker	Insert
Change Brightness	F10
Chalkboard On/Off	F11
Clear All Markers	End
Color Change of Active Marker	F9
Delete a Marker (undo)	Delete
Freeze Video Image	ALT + F1
Get Image	ALT + F3
Overlay of Markers On/Off	F12
Positioning Marker or Cursor	Arrow Keys

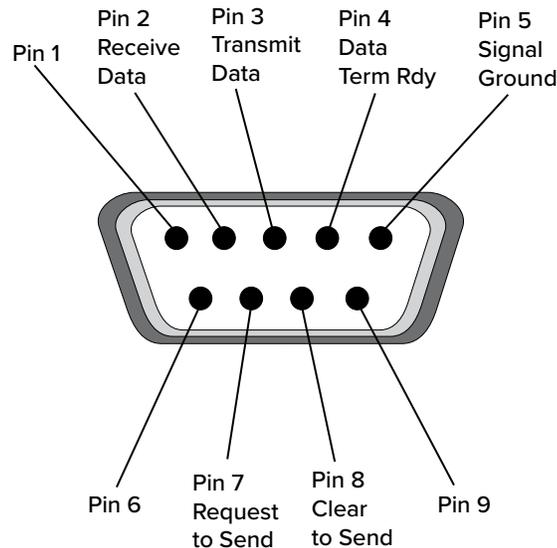
ACTION (OPS) COMMAND	KEY
Positioning Marker, Fine Control	CTRL + Arrow Key
Print Image	ALT + F4
Recall Settings (at copyright screen)	CTRL + ALT + Page Down(on Num Pad)
Reverse Toggle Order	Shift + Function Key
Save Image	ALT + F2
Save Settings (at copyright screen)	CTRL + ALT + Enter(on Num Pad)
Select	Enter
Send Image	ALT + F5
Menu System	Print Screen
Video In Composite	CTRL + F11
Video In Y/C	CTRL + F12

### Quick Reference for Touch Screens

The commands in this table are for a compatible touch screen, when used with the Annotation Pro. If a function you want is not listed in this table, then you must select that function in the menu system.

MARKING COMMAND	KEY
Anchor a Marker	Quickly tap screen where you want the marker anchored.
Clear Markers	Tap lower left corner. All markers are cleared from the screen.
Color, Change	Tap top left corner. The marker color is changed to the next color activated in the Color Palette.
Draw	Press and drag finger.
Freeze Video	Tap top-right corner. A frame of running video is grabbed and displayed. Tap same spot again to return to video.
Point	Lightly drag finger across the drawable area to position pointer. To keep pointer positionable, do not tap or press.
Print Screen Image	Tap the right-center area on the screen. The current image is sent to the printer.
Save Screen Image	Tap the left-center area on the screen. The current image is saved to the USB storage device.
Send Screen Image	Tap the bottom-center area on the screen. The current image is sent to the printer.
Undo/Erase Marker	Tap upper right corner. Activates either undo or erase command, depending on which mode has been chosen in the menu system.
Menu System, Access	Tap top center area. The menu system is activated. (Operational only when keyboard not installed.)

## RS-232 (COMM Port) Pinout and Commands



**RS-232 COMM Port Pinout**

The Annotation Pro accept commands from third-party devices via the RS-232 port. For a list of these commands, please read the Programmer's Guide, available on the Williams AV website.

## Outside copyright information for Software

(1) University of California, Berkeley

[1a]

Copyright (c) 1990 The Regents of the University of California.

All rights reserved.

Redistribution and use in source and binary forms are permitted provided that the above copyright notice and this paragraph are duplicated in all such forms and that any documentation, and other materials related to such distribution and use acknowledge that the software was developed by the University of California, Berkeley. The name of the University may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

[1b]

Copyright (c) 1990 The Regents of the University of California.

All rights reserved.

Redistribution and use in source and binary forms are permitted provided that the above copyright notice and this paragraph are duplicated in all such forms and that any documentation, advertising materials, and other materials related to such distribution and use acknowledge that the software was developed by the University of California, Berkeley. The name of the University may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

[1c]

Copyright (c) 1981, 1983, 1986, 1988, 1989, 1991, 1992, 1993, 1994

The Regents of the University of California.

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

3. Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

[1d]

Copyright (c) 1988, 1990, 1993 Regents of the University of California.

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

[1e]

Copyright (c) 1982, 1986, 1989, 1991, 1993, 1994

The Regents of the University of California. All rights reserved.

(c) UNIX System Laboratories, Inc.

All or some portions of this file are derived from material licensed to the University of California by American Telephone and Telegraph Co. or Unix System Laboratories, Inc. and are reproduced herein with the permission of UNIX System Laboratories, Inc. Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

[1f]

Copyright (c) 1987, 1988, 2000 Regents of the University of California.

All rights reserved.

Redistribution and use in source and binary forms are permitted provided that: (1) source distributions retain this entire copyright notice and comment, and (2) distributions including binaries display the following acknowledgement: "This product includes software developed by the University of California, Berkeley and its contributors" in the documentation or other materials provided with the distribution.

Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

(3) David M. Gay at AT&T

The author of this software is David M. Gay.

Copyright (c) 1991 by AT&T.

Permission to use, copy, modify, and distribute this software for any purpose without fee is hereby granted, provided that this entire notice is included in all copies of any software which is or includes a copy or modification of this software and in all copies of the supporting documentation for such software.

THIS SOFTWARE IS BEING PROVIDED "AS IS", WITHOUT ANY EXPRESS OR IMPLIED WARRANTY. IN PARTICULAR, NEITHER THE AUTHOR NOR AT&T MAKES ANY REPRESENTATION OR WARRANTY OF ANY KIND CONCERNING THE MERCHANTABILITY OF THIS SOFTWARE OR ITS FITNESS FOR ANY PARTICULAR PURPOSE.

(11) Christopher G. Demetriou

Copyright (c) 2001 Christopher G. Demetriou  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

(13) Royal Institute of Technology

Copyright (c) 1999 Kungliga Tekniska Högskolan  
(Royal Institute of Technology, Stockholm, Sweden).  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. Neither the name of KTH nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY KTH AND ITS CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL KTH OR ITS CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

(14) Alexey Zelkin

Copyright (c) 2000, 2001 Alexey Zelkin <phantom@FreeBSD.org>  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

(15) Andrey A. Chernov

Copyright (C) 1997 by Andrey A. Chernov, Moscow, Russia.  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

(16) FreeBSD

Copyright (c) 1997-2002 FreeBSD Project.  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

(17) S. L. Moshier

Author: S. L. Moshier.

Copyright (c) 1984,2000 S.L. Moshier

Permission to use, copy, modify, and distribute this software for any purpose without fee is hereby granted, provided that this entire notice is included in all copies of any software which is or includes a copy or modification of this software and in all copies of the supporting documentation for such software.

THIS SOFTWARE IS BEING PROVIDED "AS IS", WITHOUT ANY EXPRESS OR IMPLIED WARRANTY. IN PARTICULAR, THE AUTHOR MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND CONCERNING THE MERCHANTABILITY OF THIS SOFTWARE OR ITS FITNESS FOR ANY PARTICULAR PURPOSE.

(18) Citrus Project

Copyright (c)1999 Citrus Project,

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

(19) Todd C. Miller

Copyright (c) 1998 Todd C. Miller <Todd.Miller@courtesan.com>  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

(26) Mike Barcroft

Copyright (c) 2001 Mike Barcroft <mike@FreeBSD.org>  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

(28) Red Hat Incorporated

Unless otherwise stated in each remaining newlib file, the remaining files in the newlib subdirectory default to the following copyright.

It should be noted that Red Hat Incorporated now owns copyrights belonging to Cygnus Solutions and Cygnus Support.

Copyright (c) 1994, 1997, 2001, 2002, 2003, 2004 Red Hat Incorporated.  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

The name of Red Hat Incorporated may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL RED HAT INCORPORATED BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Copyright (c) 2001, 2002 Swedish Institute of Computer Science.  
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

This file is part of the lwIP TCP/IP stack.

Author: Adam Dunkels <adam@sics.se>

## Specifications

### Annotation Pro

<b>Dimensions</b>	1 RU - 19" (W) x 1.75" (H) x 7.625" (D) (48.26 cm x 4.45 cm x 19.37 cm)
<b>Weight</b>	5 lbs. (2.3 kg)
<b>Video Input</b>	HDMI up to 3840 x 2160 @ 24/25/30 fps
<b>Video Output</b>	HDMI up to 3840 x 2160 @ 60 fps
<b>USB</b>	5 USB 3.0 ports, plus one USB B-Micro port
<b>Network</b>	LAN port for printing and saving images and third-party remote control
<b>Remote Power</b>	2-pole Phoenix-style connector (Euroblock)
<b>Power Supply</b>	TFP 060 VP1 – 100-240VAC 50/60Hz Input
<b>Power Source</b>	19VDC 4.7A (center positive)
<b>Power Indicator</b>	Green LED
<b>Operating Temperature</b>	Approximately 32° F to 131° F (0° C to 55° C)
<b>Remote Input</b>	Annotation Control app available on IOS only. Only for the Annotation Pro Plus (AN C5 P).
<b>HDCP Support</b>	Only for the Annotation Pro Plus (AN C5 P). Not available on App.
<b>Warranty</b>	Two (2) year, parts and labor
<b>Approvals</b>	CE, FCC, Industry Canada, WEEE, RoHS, CB Scheme, RCM, PSE

## Regulatory Statements



Caution: Unauthorized modifications or changes not expressly approved by Williams AV could void compliance with regulatory rules, and thereby your authority to use this equipment.

### United States - FCC

*This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

### Canada IC

*This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

## Limited Warranty

---

Williams AV products are engineered, designed, and manufactured under carefully controlled conditions to provide many years of reliable service. Williams AV warrants the Annotation Pro against defects in materials and workmanship for two (2) years. During the first two years from the purchase date, we will promptly repair or replace the Annotation Pro system.

Microphones, earphones, headphones, batteries, chargers, cables, carry cases, and all other accessory products carry a 90-day warranty.

WILLIAMS AV HAS NO CONTROL OVER THE CONDITIONS UNDER WHICH THIS PRODUCT IS USED. WILLIAMS AV, THEREFORE, DISCLAIMS ALL WARRANTIES NOT SET FORTH ABOVE, BOTH EXPRESS AND IMPLIED, WITH RESPECT TO THE Annotation Pro SYSTEM, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WILLIAMS AV SHALL NOT BE LIABLE TO ANY PERSON OR ENTITY FOR ANY MEDICAL EXPENSES OR ANY DIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES CAUSED BY ANY USE, DEFECT, FAILURE OR MALFUNCTIONING OF THE PRODUCT, WHETHER A CLAIM FOR SUCH DAMAGES IS BASED UPON WARRANTY, CONTRACT, TORT OR OTHERWISE, THE SOLE REMEDY FOR ANY DEFECT, FAILURE OR MALFUNCTION OF THE PRODUCTS REPLACEMENT OF THE PRODUCT. NO PERSON HAS ANY AUTHORITY TO BIND WILLIAMS AV TO ANY REPRESENTATION OR WARRANTY WITH RESPECT TO THE Annotation Pro SYSTEM. UNAUTHORIZED REPAIRS OR MODIFICATIONS WILL VOID THE WARRANTY.

The exclusions and limitations set out above are not intended to, and should not be construed so as to contravene mandatory provisions of applicable law. If any part or term of this Disclaimer of Warranty is held to be illegal, unenforceable, or in conflict with applicable law by a court of competent jurisdiction, the validity of the remaining portions of this Disclaimer of Warranty shall not be affected, and all rights and obligations shall be construed and enforced as if this Limited Warranty did not contain the particular part or term held to be invalid.

If you experience difficulty with your system, call toll-free for customer assistance: **1-800-843-3544 (U.S.A.)** or **+1 952 943 2252** (outside the U.S.A.)

If it is necessary to return the system for service, your Customer Service Representative will give you a Return Authorization Number (RA) and shipping instructions.

Pack the system carefully and send it to:

**Williams AV**

**Attn: Repair Dept.**

**10300 Valley View Road**

**Eden Prairie, MN 55344 USA**

Your warranty becomes effective the date you purchase your system. If your sales receipt is not available, the date code on the product will determine your warranty status.

**This page is intentionally blank.**

**WILLIAMS AV**

[info@williamsav.com](mailto:info@williamsav.com) / [www.williamsav.com](http://www.williamsav.com)  
800-843-3544 / INTL: +1-952-943-2252