

QSP-660

Owner's Manual

and

Operating Instructions

Instructions for basic operation and installation

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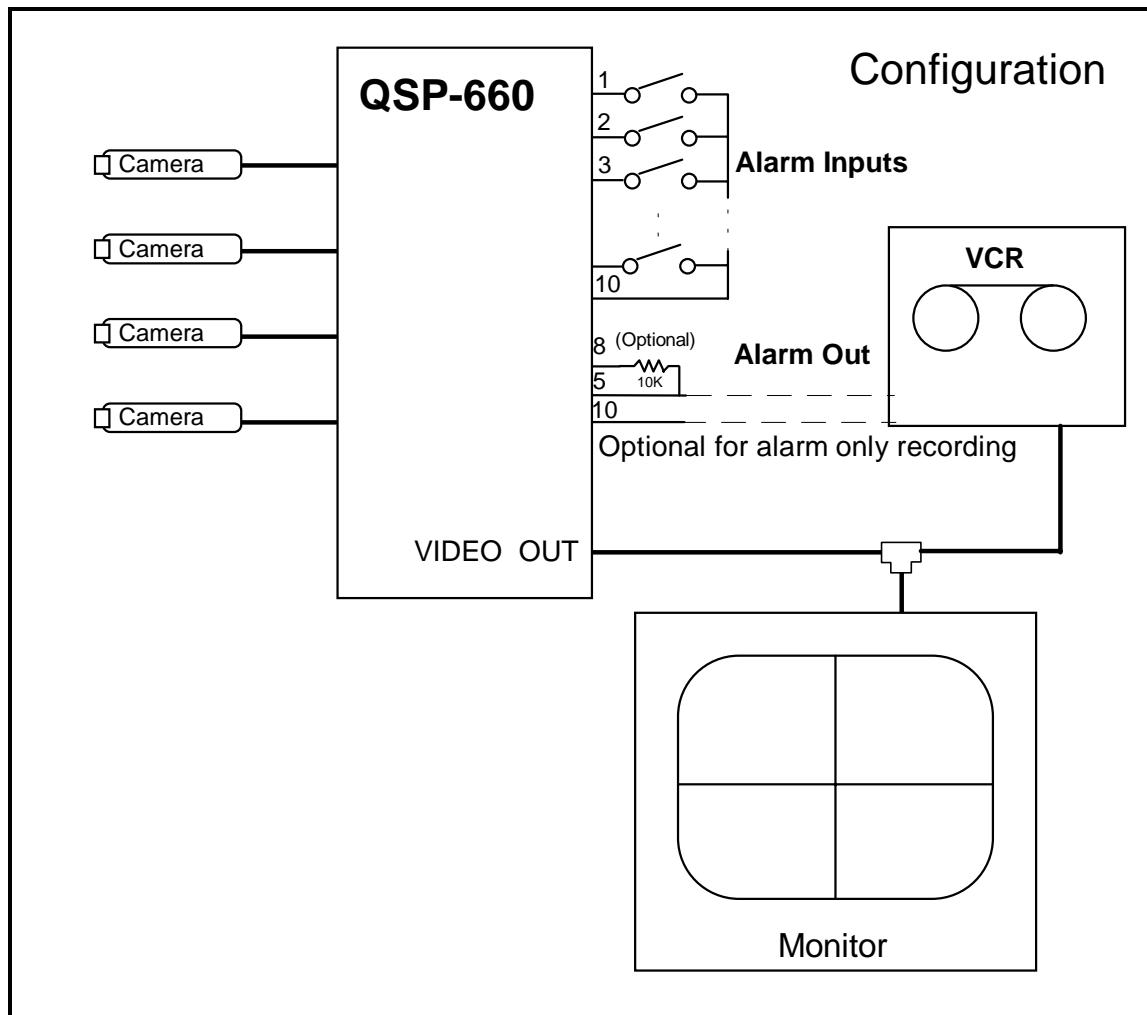
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EQUIPMENT REQUIREMENTS

The QSP-660 is designed to be compatible with all EIA and CCIR compatible equipment. Two versions of the product are available to make best use of these two standards. The EIA version (indicated by serial numbers) will only be compatible with EIA installations. The CCIR version (indicated by serial numbers) will be compatible with both EIA and CCIR installations. For installations requiring a mixture of CCIR and EIA cameras, it is recommended that the CCIR version be used on input #1.

The QSP-660 will accept 2:1 interlace cameras in either a "line-locked" or "free running" (internal reference) modes. One camera type that can cause problems is the "random interlace" camera which will not work well with digital video equipment such as the QSP-660. These cameras lock the vertical sync signals to the power line but not the horizontal sync signals. These cameras were designed to interface to analog camera sequencers and locking the vertical sync to the power line prevents picture "rolling". Since the QSP-660 does not require line locked cameras for "roll free" sequencing, the simple solution is to turn off the line lock on random interlace cameras. Many random interlace cameras contain a switch though it is frequently found as a small PCB switch inside the camera which will require removing the camera chassis cover. The switch will sometimes be labeled "LL" or "line lock" in one position and "Internal" or "Int" in the other position.

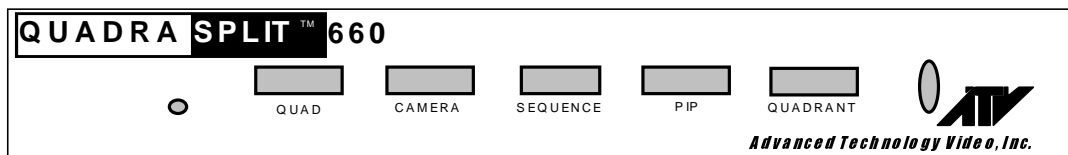


INTRODUCTION

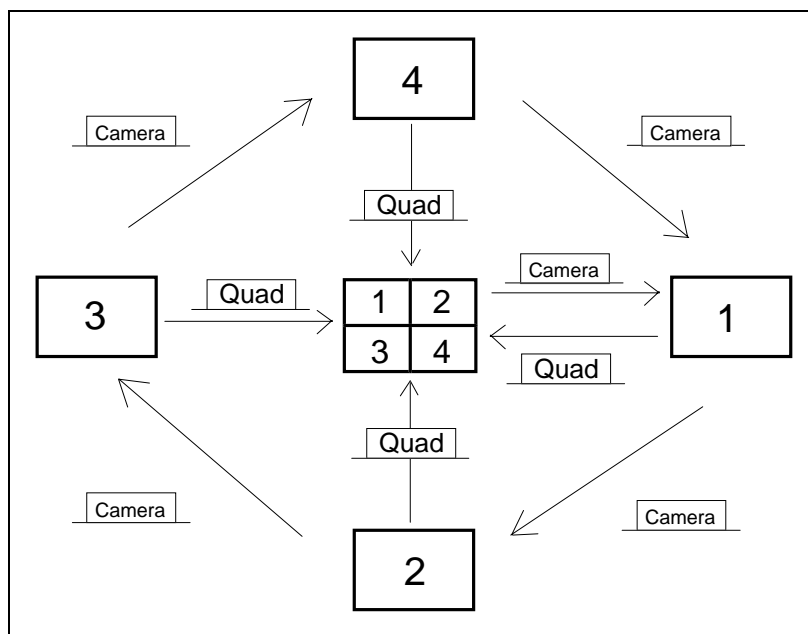
Thank you for purchasing our Quadra Split™ 660 (QSP-660), which is one of the world's most advanced "Quad" splitters. This instruction manual will describe in simple step-by-step detail the powerful features of this product for basic and advanced operation. It will also cover the various installation modes that will allow quick and easy integration into your security system.

BASIC OPERATIONS

Though a few moments of experimenting are all it takes to learn most of the QSP-660's operations, we will present a simple but thorough description of the QSP-660's rich set of features.

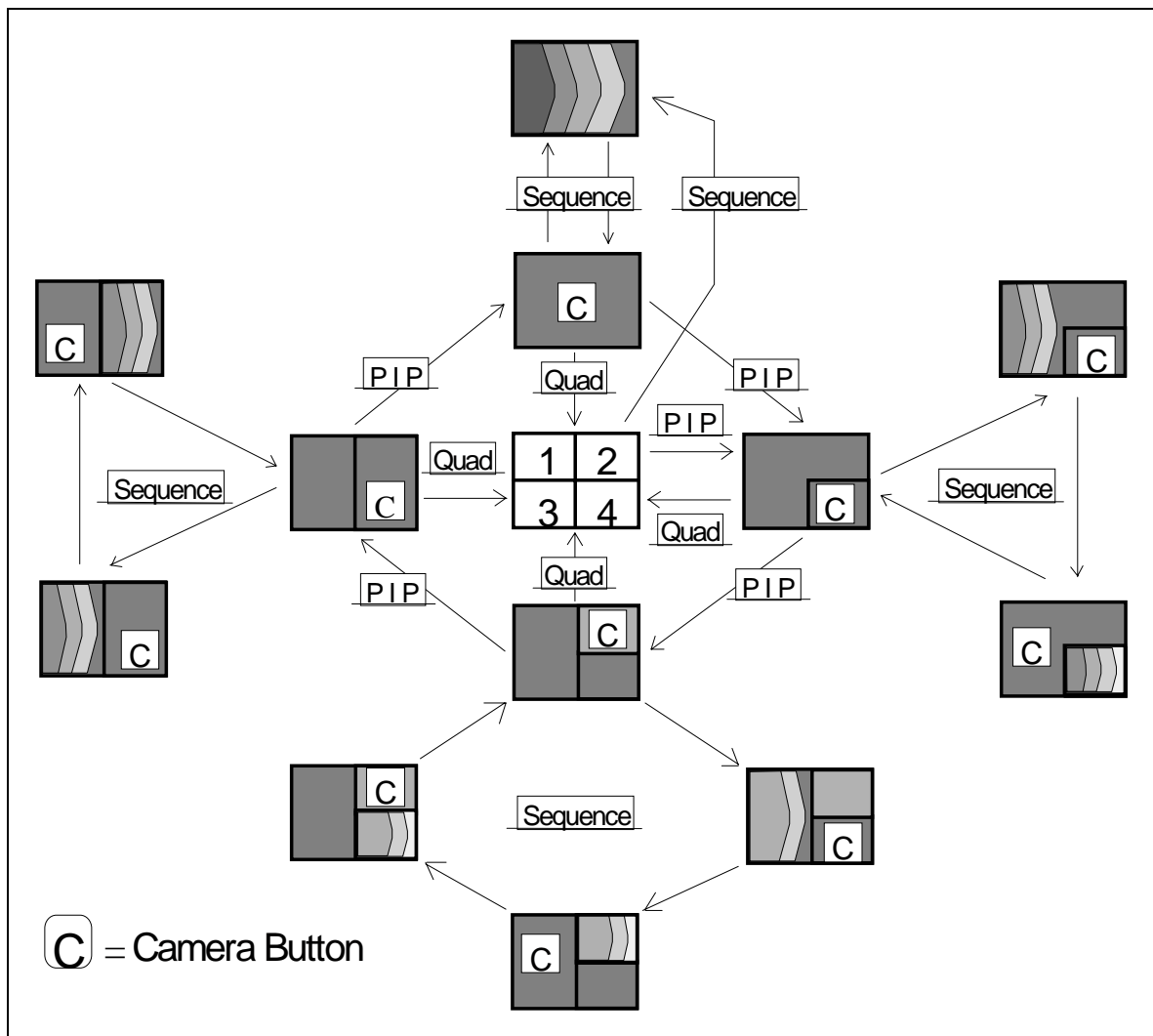


Your QSP-660 has five control buttons which allow easy access to your favorite modes of operation. Here is a summary of their operation.



Quad Returns the unit to Quad mode regardless of present mode of operation.

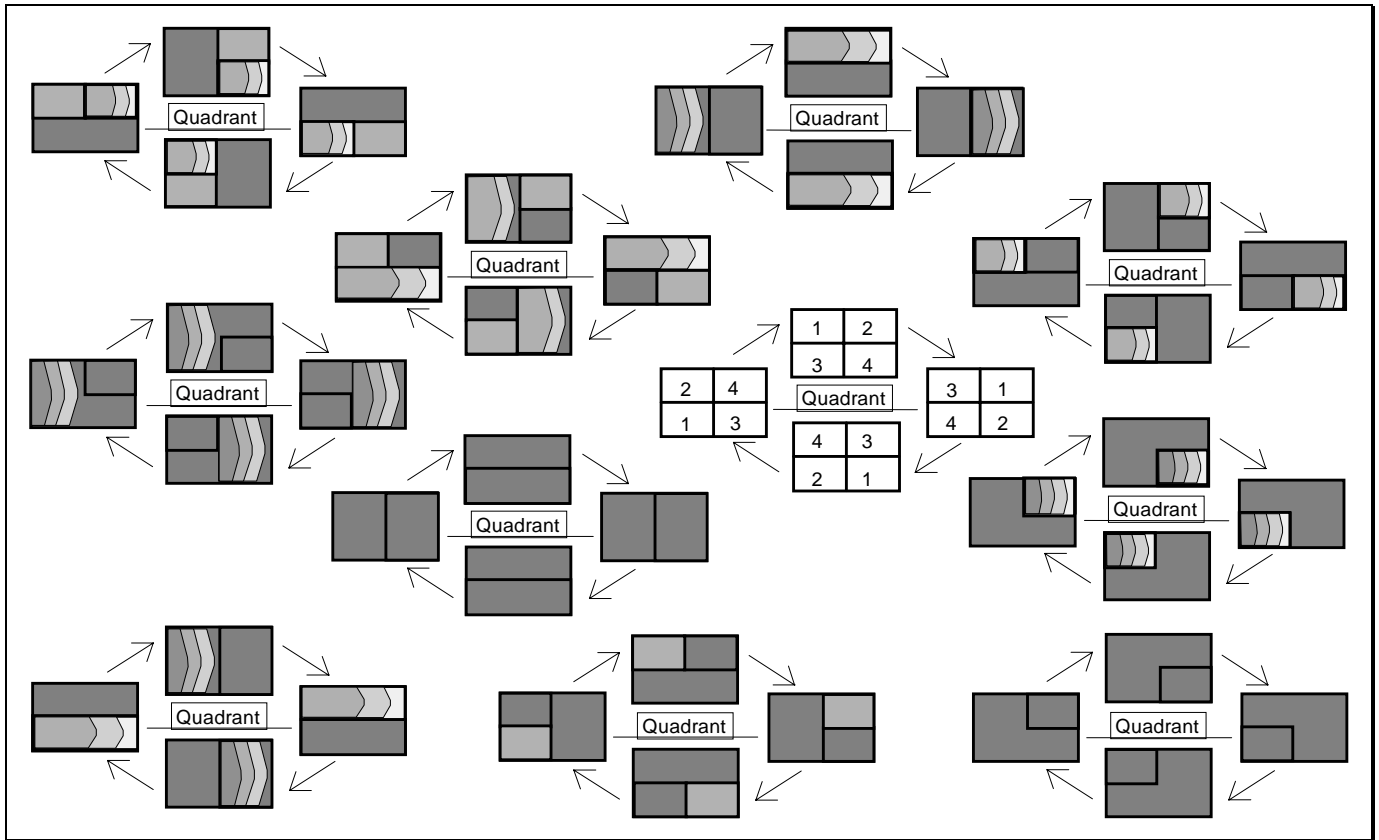
Camera When starting in the Quad mode, pressing this button causes the unit to switch to "Full Frame" mode. In "Full Frame" or any of the PIP (Picture-In-Picture) modes this button will cause the appropriate display area to switch among the available cameras. This switching will skip over camera inputs without a live camera, or inputs that are already displayed in another area of the screen.



Sequence When starting in the Quad mode, pressing this button causes the unit to switch to "Full Frame Sequencing" mode. Once in this mode, pressing the button toggles the unit back and forth between "Full Frame" and "Full Frame Sequencing" modes. In both single and dual PIP modes and in split screen, pressing this button will enable camera sequencing to switch from one display area of the screen to another.

PIP When starting in the Quad mode, pressing this button will cause the unit to switch to the "Single PIP" mode. Additional presses will cycle the unit through "Dual PIP", "Split Screen", "Full Frame" and back to "Single PIP" modes.

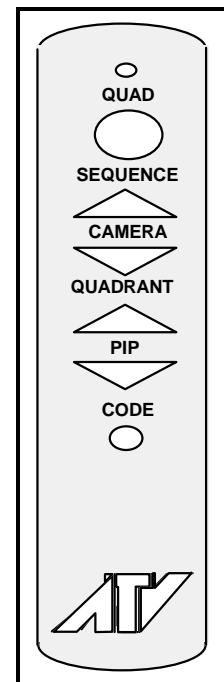
Note: All of the display modes shown in these diagrams are possible. However, there are a few restrictions in the Dual PIP mode only. Some camera combinations in Dual PIP are not allowed since performance would otherwise be degraded. The Dual PIP display orientation shown in the above diagram is the most flexible and supports all camera selections and scanning modes.



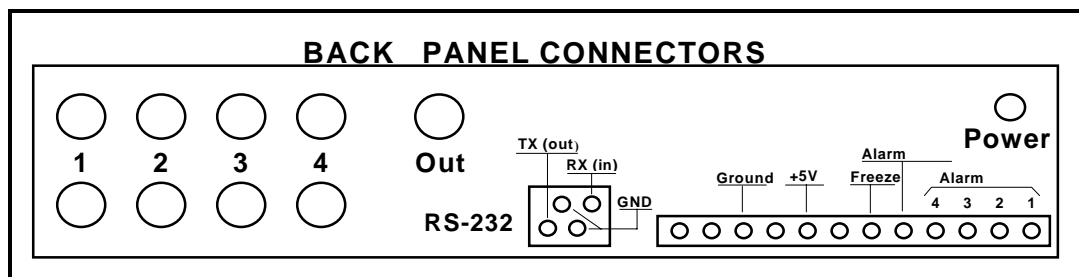
Quadrant In any mode with multiple cameras displayed, this button will cause the cameras viewed to rotate clockwise on the screen. This allows the placement of one or two inserts in desired screen locations.

HAND HELD IR REMOTE CONTROL

A simple, yet powerful, hand held remote control allows easy remote operation of your QSP-660. This IR (Infra-Red) based remote control duplicates the front panel buttons as shown in the diagram.



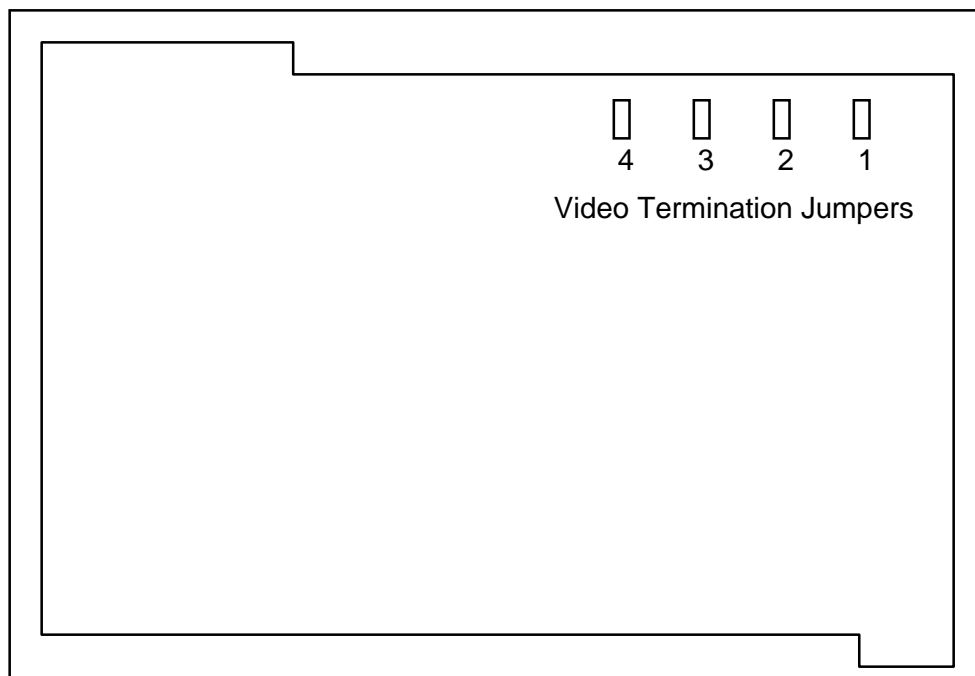
ALARM CONNECTIONS



Alarm inputs may be driven by any normal switch contact that connects the alarm input to ground or +5V. The factory default operation is that the alarm inputs are connected to ground to generate an alarm condition. If the installation requires "normally closed" switch contact for the non-alarm state or some other non-default alarm condition, one should refer to the "Alarm Activation Mode" section of this manual's installation modes. Revision "D" of the QSP-660 incorporated an alarm "latch" feature which is always active. A brief alarm input is latched such that the minimum alarm time is set by the "Alarm Dwell" which has a factory default of 3 seconds but can be set from 1 to 60 seconds by the customer. Earlier versions will only show the alarm camera for the exact duration of the alarm input.

The alarm output is a low current (less than 50 mA) digital output which switches to ground when an alarm condition occurs. This output is active if any of the alarm inputs become active. Pressing the Quad button deactivates this output. If this is intended to drive a high power alarm (high current or 110 VAC for example), a DC relay is recommended to switch the alarm and the alarm output to control the external relay.

VIDEO LINE TERMINATION JUMPERS



The video line termination jumpers for each camera input are located in the rear of the unit and are accessed by removing the top cover. Jumpers should be removed if camera loop-through is used to forward a camera input to another video switcher or splitter.

INSTALLATION MODES

Your QSP-660 has been pre-programmed at the factory with the most popular settings of the quad's programmable options. All of the available options are programmable from the front panel buttons.

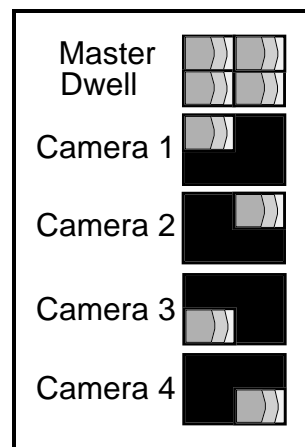
The QSP-660 uses display action since it has no indicators on the front panel or on the display screen to indicate the installation options. In the following descriptions, the installation mode is indicated by the action of the display and it is assumed that four "live" cameras are attached and each supplying a picture.

Installation mode is entered by simultaneously pressing the "quad" and "quadrant" buttons. The change to installation mode will be indicated by the display entering "quad" mode with the insert borders changing from gray to black. The first installation mode sets the sequencing dwell. Each push of the "quad" button advances the unit to the next installation mode until the unit returns to operational mode which is indicated by the insert borders changing from black to gray. Any change programmed into any of the installation modes does not take effect until the "quad" button is pushed taking the unit out of that mode.

#1) Dwell Adjustment

This mode is the "Master Dwell" selection and is indicated by all four quadrants sequencing at the master dwell rate (factory default is 3 Seconds). The "Master" and individual dwell can be programmed from 1 to 60 seconds. Individual dwell can be set to 0 (zero) seconds which stipulates that any sequencing mode will skip that camera. This 0 dwell setting is indicated by the insert being black. Front panel buttons have the following definitions:

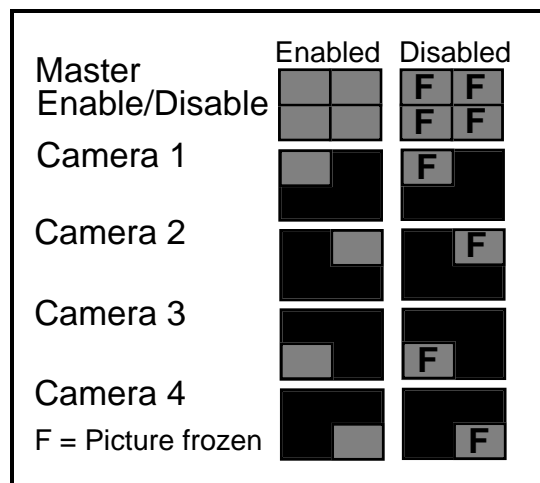
- Camera** Cycles the unit from "Master" to individual camera dwell adjustments as indicated in the diagram.
- Sequence** Decreases dwell by one second.
- PIP** Increases dwell by one second.
- Quadrant** The first press halts the sequencing, the second press resumes sequencing. The time interval between presses sets the dwell.



#2) Alarm Input Enable

This installation mode allows the enabling or disabling of an alarm input. The front panel buttons have the following definitions:

- Camera** Cycles the unit from "Master" to individual alarm enables as indicated in the diagram.
- Sequence** Disables alarm.
- PIP** Enables alarm.



#3) Alarm Action

This determines what will happen if an alarm input occurs. Front panel buttons have the following definitions:






Camera Cycles the unit through all of the alarm action modes.

Sequence Decreases the alarm dwell time by 1 second.

PIP Increases the alarm dwell time by 1 second.




Quadrant The first press halts the sequencing, the second press resumes sequencing. The time interval between presses sets the alarm dwell time.

The available alarm action modes are:

1. Full frame live action of alarm camera until the alarm ceases (factory default). If more than one alarm, the full frame picture alternately switches at the alarm dwell rate. When the alarms cease the unit returns to the previous display mode. 
2. Full frame live action of alarm camera until the alarm ceases. If more than one alarm then the unit is switched to quad mode. When the alarms cease the unit returns to the previous display mode. 
- * 3. Full frame live action of alarm camera. The unit returns to previous display mode after the alarm dwell time. If more than one alarm, full frame pictures are shown in the order of the alarm inputs for the alarm dwell time each before returning to the previous display mode. This alarm action mode is only useful with Alarm Activation Type #3 described in the next section. 
4. Return to quad mode and stay there until the alarm ceases, then return to previous mode. 
5. Full frame of alarm input and the picture is frozen. When the alarm ceases the unit returns to the previous display mode. If more than one alarm, only the first one is displayed. 

#4) Alarm Activation Type

This determines which type of alarm contact open/closure, creates the alarm condition. A contact "closure" is defined as connecting the alarm input to either ground or +5V (which is available at the alarm connector). The "Camera" button selects that alarm activation mode. These modes are:

1. Contact closure activates the alarm (factory default). 
2. Contact open activates the alarm. 
- * 3. A contact open or closure activates the alarm. This is only useful with Alarm Action Mode #3 described in the previous section where the alarm activation causes the camera to go to full screen for alarm dwell time. 
- * May not be functional in early revisions.

#5) Loss of Camera Alarm

This feature is normally disabled and allows for an alarm to be generated with the loss of a video signal from a camera. Signal loss is defined as camera failure due to power loss or cable disconnect. If the display is not in Quad mode when a camera loss is detected, the display will switch to Quad mode with blanked inserts to indicate which cameras were lost. A blank signal (white or black) due to a camera lens being covered is not detectable by this unit. This alarm mode is enabled or disabled on all cameras and there is no individual camera setting. Front panel buttons have the following definitions:

Sequence Disables alarm

PIP Enables alarm



#6) Single PIP Default Mode

This is a "customer preference" feature to allow you to specify the camera combination and orientation for the single PIP display mode when entering it from the Quad mode or full frame sequencing mode. The factory default mode displays an insert in the lower right hand corner containing camera #2 with camera #1 in the background. When the single PIP display mode is entered from full frame non-sequencing mode, the insert is in the lower right hand corner and the insert camera displays the next camera. Front panel buttons have the following definitions:

Camera Selects the camera to be used in the background.

PIP Selects the camera to be used in the insert.

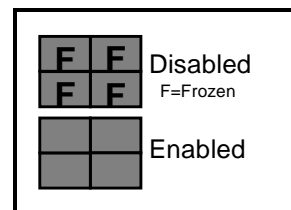
Quadrant Selects which quadrant will contain the insert.

#7) Button Security

This installation mode allows the selection of the QSP-660 front panel buttons security lock out feature. Usually buttons are disabled with a pre-determined "power up" state and to secure the unit from tampering by the casual random passers-by. Changes to this mode WILL NOT take effect until installation mode has been exited and the power on the unit turned off. With buttons disabled, after the next application of power, the unit will be locked into the power up state and will not respond to normal operational button commands or the remote control. Button control can be returned by pressing "Quad", "Sequence", and "Quadrant" buttons simultaneously. Please note that the button depression must occur precisely simultaneously. Front panel buttons have the following definitions:

Sequence Buttons Enabled

PIP Buttons Disabled



#8) Power Up State

This mode sets the display state of the QSP-660 when power is first applied to the unit. The factory default is Quad. The complete definition of a display would normally require all five operational buttons. Since the "Quad" button is used to select the installation mode, the "Camera" button operates a little differently from the normal operational mode. When this installation mode is first entered the power up state is shown on the display. The factory default is for the unit to power up in whatever state it was in when the power was removed. This is indicated by the unit being in the Quad mode with the picture processing frozen. Front panel buttons have the following definitions:

Camera If the unit is in any of the PIP, Split Screen or Sequencing modes, this button is the same function as in normal operational mode. In Quad, frozen Quad or Full Frame modes, this button cycles the unit through:

1. Frozen Quad (indicates power up is last mode at power off)
2. Live Quad
3. Camera #1
4. Camera #2
5. Camera #3
6. Camera #4

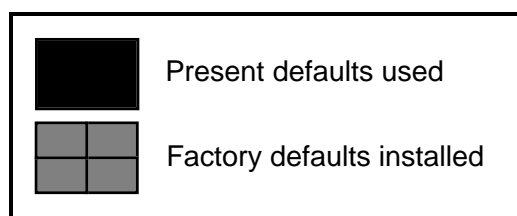
Sequence Same as operational mode

PIP Same as operational mode

Quadrant Same as operational mode

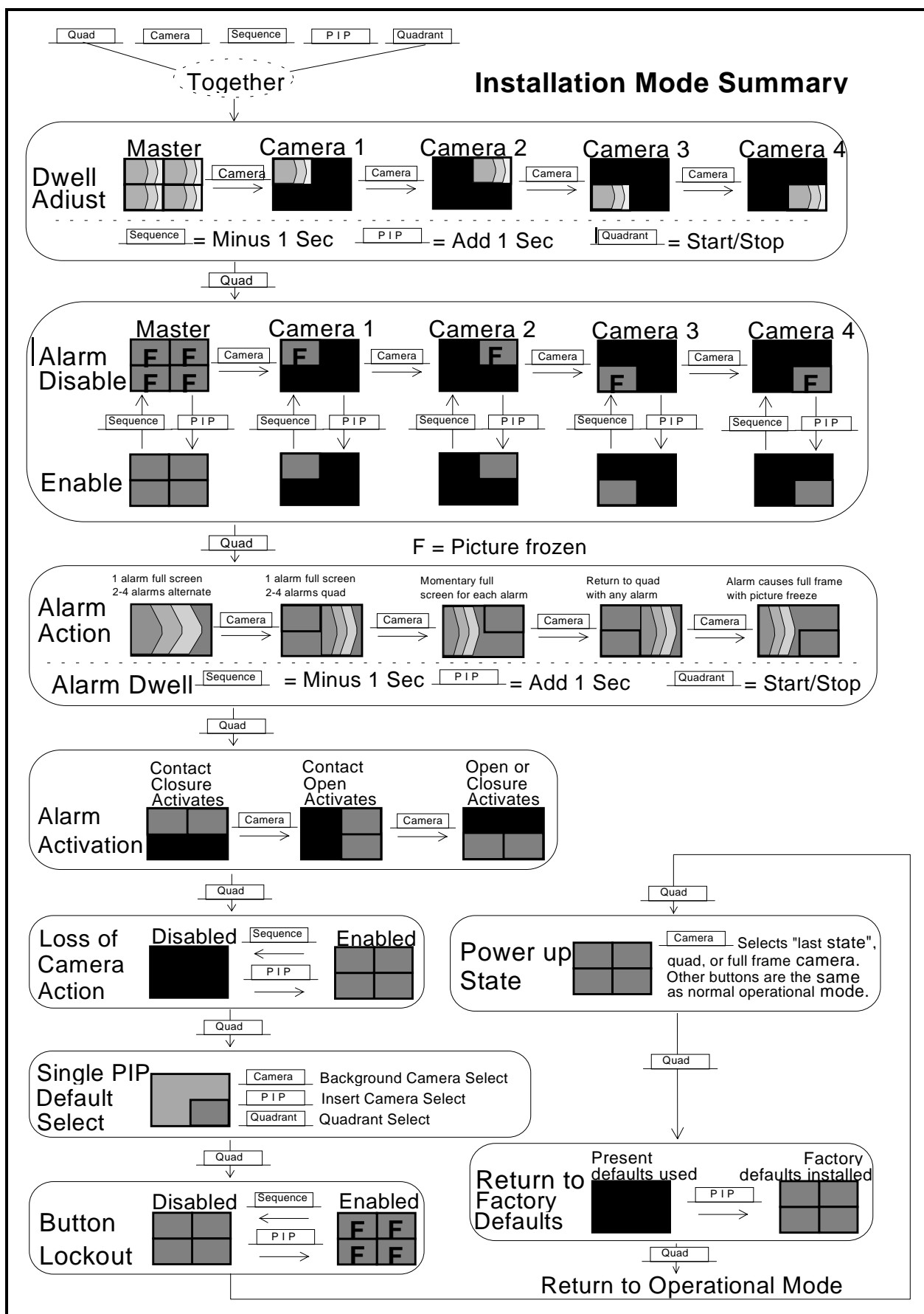
#9) Return to Factory Defaults

As an added convenience, your QSP-660 has an installation mode which can reset the unit to the factory defaults. In this mode only the PIP button works to enable the return to factory defaults.



RESTORE FACTORY SETTINGS

The QSP-660 can also be reset to the factory defaults by removing power to the unit, pressing and holding the QUAD button, while applying power to the unit. Continue to hold the QUAD button until a normal picture appears (normally within 1 second).



RS232 FUNCTIONS

The RS232 functions are to be in ASCII since this has been known to be "user friendly" to software developers who will often test these interfaces with simple ASCII terminals. The basic syntax of a command is:

:nn argument argument argument ... <CR>

The leading delimiter is a colon (":"), followed immediately with one or two digits of ASCII characters which are decoded as the command to be executed. Some commands may require one or more arguments. These arguments, if needed, are separated from the command by a space. The command is terminated by a carriage return ASCII character (shown in the rest of the document as <CR>). Any characters received between the carriage return and the next colon are ignored.

Supported commands are:

Button equivalent commands.

:Q<CR> Return to Quad mode.
:S<CR> Sequence Button.
:P<CR> PIP Button.
:C<CR> Camera Select button.
:QD<CR> Quadrant Select button.

Somewhat higher level mode functions

Note that the arguments "n", "b", "i" and "f" are ASCII digits in the range of "1" through "9"

:F1 n<CR> Full Frame camera #n.
:S1<CR> Full Frame sequencing.
:Q1 n b i f<CR> Quad mode with cameras #n, #b, #i and #f in the upper left, upper right, lower left and lower right quadrants respectively.
:P1 n b i<CR> Static single PIP with insert in quadrant #n. Background is camera #b and insert is camera #i.
:P2 n b i f<CR> Static Dual PIP with first insert in quadrant #n. Camera in background is camera #b. Camera in the first insert is camera #i. Camera in the second insert is camera #f.
:P3 n b i<CR> Split screen. If n=1, split is horizontal with camera #b on top and camera #i on bottom. If n=2, split is vertical with camera #b on right, camera #i on left. If n=3, split is horizontal with camera #b on bottom and camera #i on top. If n=4, split is vertical with camera #b on left and camera #i on right.
:S2 n i<CR> Sequencing single PIP with insert in quadrant #n. Background is sequencing. Camera in insert is camera #i.
:S3 n b<CR> Sequencing single PIP with insert in quadrant #n. Insert is sequencing. Camera in background is camera #b.
:S4 n i f<CR> Sequencing dual PIP with insert in quadrant #n. Background is sequencing. Camera in the first insert is camera #i. Camera in the second insert is camera #f.
:S5 n b i<CR> Sequencing dual PIP with insert in quadrant #n. Insert #1 is sequencing. Background is camera #b and insert #2 is camera #i.
:S6 n b i<CR> Sequencing dual PIP with insert in quadrant #n. Insert #2 is sequencing. Background is camera #b and insert #1 is camera #i.
:D n<CR> Set dwell to "n" seconds (n= 1 to 60).
:DA n<CR> Set alarm dwell to "n" seconds.
:AE n<CR> Enable alarm on camera "n".
:AD n<CR> Disable alarm on camera "n".
:AM n<CR> Set alarm mode to mode "n" (see Alarm Action section for mode number).
:AA n<CR> Set alarm activation mode to "n" (see Alarm Activation section for mode number).
:LD<CR> Disable locked power up mode.
:LP<CR> Use present mode as locked power up mode.
:UD<CR> Disable locked power up mode. This enables "Last mode" feature (factory default).
:UP<CR> Use present mode as unlocked power up mode.
:FD<CR> Set to factory defaults.

Picture Freezing

The camera numbers normally used with the above commands are in the range of "1" through "4". To freeze a camera image, the previous screen format command would be repeated with the value "4" added to the desired camera number. For example, if the previous command where ":P3 2 3 4" (Vertical Split screen with live cameras #3 and #4) and it is desired to "freeze" camera #3, the command needed is ":P3 2 7 4". Camera numbers from "5" to "9" will always shut off camera input for cameras "1" through "4" respectively. If the mode changes (i.e. going from a :P2 command to a :P3 command, or changing insert quadrant) a video "blanking" will occur and instead of a picture freeze, the selected insert will be blank instead of frozen. To be consistent with other Quad functions, camera numbers are sometimes maintained as one switches from one display mode to another (including numbers "5" though "9"). If a display mode is changed by RS232 command, front panel buttons or IR remote control after cameras are frozen, the screen locations associated with the frozen camera will be displayed blank. A frozen quad insert, for example, cannot be called up to full screen without generating a full blank screen. If some event requires a freeze and mode change, the mode should be changed first followed by a picture freeze. One must also remember to re-enable the camera when returning back to or changing to some new mode.

Supported responses are:

0<CR>	Command accepted without errors.
1<CR>	Command syntax error.
2<CR>	Parameter 1 error.
3<CR>	Parameter 2 error.
4<CR>	Parameter 3 error.
5<CR>	Parameter 4 error.
6<CR>	Camera 1 is dead error.
7<CR>	Camera 2 is dead error.
8<CR>	Camera 3 is dead error.
9<CR>	Camera 4 is dead error.
A<CR>	Not enough cameras error.
B<CR>	Same insert/background camera error.
C<CR>	Illegal display mode.

RS-232 PORT CONNECTION

The RS-232 port is purely a command and status port and does not transmit or receive video data. The connection is made via a RJ-11C phone jack connector. The table below describes the pin numbers, signal names, and corresponding conductor color for typical phone wire.

Pin #	Signal	Color
1	TX (OUT)	Yellow
2	GND	Green
3	GND	Red
4	RX (IN)	Black

PROGRAMMING YOUR ATV QSP-660 REMOTE CONTROL

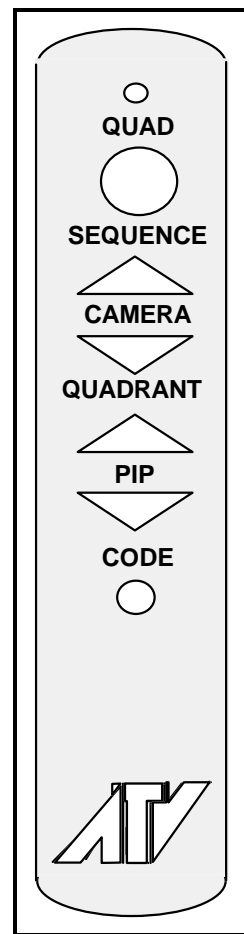
When first installing or when changing the batteries in your QSP-660 Remote Control, it may be necessary to re-program it for use with the **QuadraSplit™ 660**. If your remote control does not appear to work for any reason, please perform the following steps before contacting the factory.

To program the remote control to work with the **QSP-660**:

- a. Turn on the **QSP-660** and verify at least one camera is active.
- b. On the **QSP-660**, press the **QUAD** button to return to **QUAD** mode. Then press the **CAMERA** button to call up a full screen picture.
- c. Ensure that batteries are installed in the QSP-660 Remote Control.
- d. On the remote control, hold down the **CODE** button first, then **QUAD**. Hold both buttons together until the indicator lights up.
- e. Enter your five-digit code. The LED will now blink twice and the remote control is set. For example, to enter the code for a QSP-660 (code 11313) press the following:

SEQUENCE	2 TIMES
QUADRANT	1 TIME
SEQUENCE	1 TIME
QUADRANT	1 TIME

- f. Press the QUAD button on the remote control for quad display on the QSP-660.



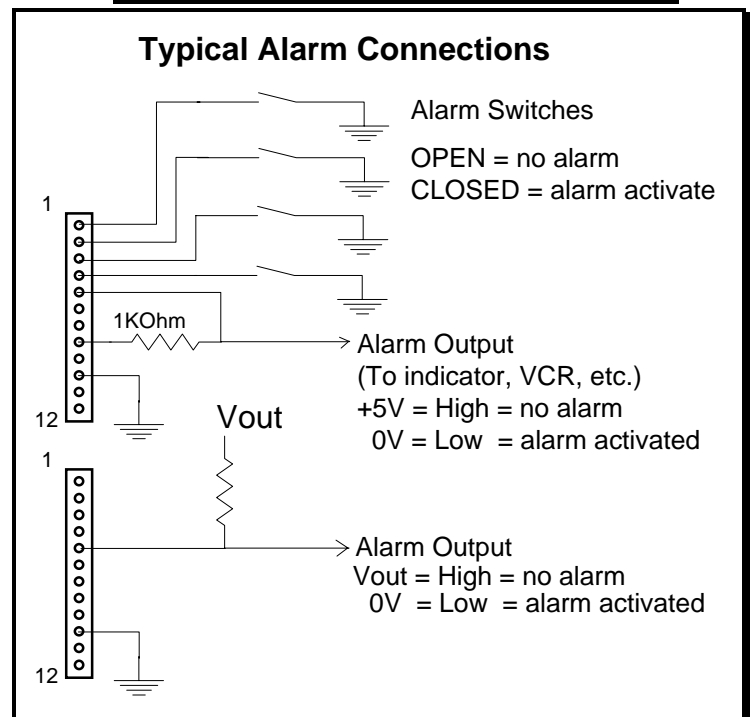
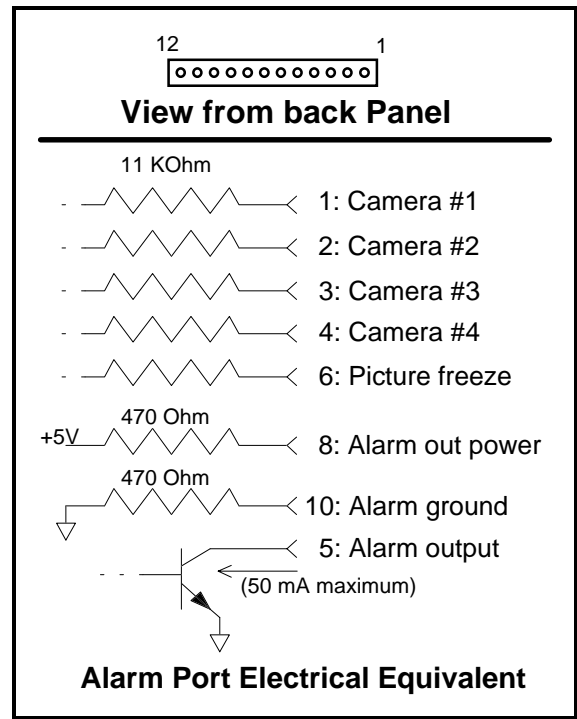
APPLICATION NOTE: ALARM INTERCONNECTION ON QSP-660

The back panel connector allows five control signals to affect the behavior of the unit in the manner described fully in the owner's operating instruction manual. These inputs are normally from a switch located at a door, window or other point in the installation where a camera is monitoring activity. Most of our customers make use of a "normally open" switch which requires a switch "closure" to activate the alarm. In addition to the quad's normal alarm video processing, the alarm output is "forwarded" to the "alarm output" pin on the same back panel connector. In addition to the alarm inputs, a "picture freeze" input is also provided. When activated any present video information is retained on the output and new video is suspended. A picture freeze does not trigger the alarm output.

Camera inputs contain series resistors for ESD and lightning damage protection, and the outputs also contain series resistors to limit output current to prevent damage to the quad in the occurrence of "shorting out" the output pin. When connecting the inputs and outputs up to other equipment, one must be aware of the limitations introduced by these current limiting resistors.

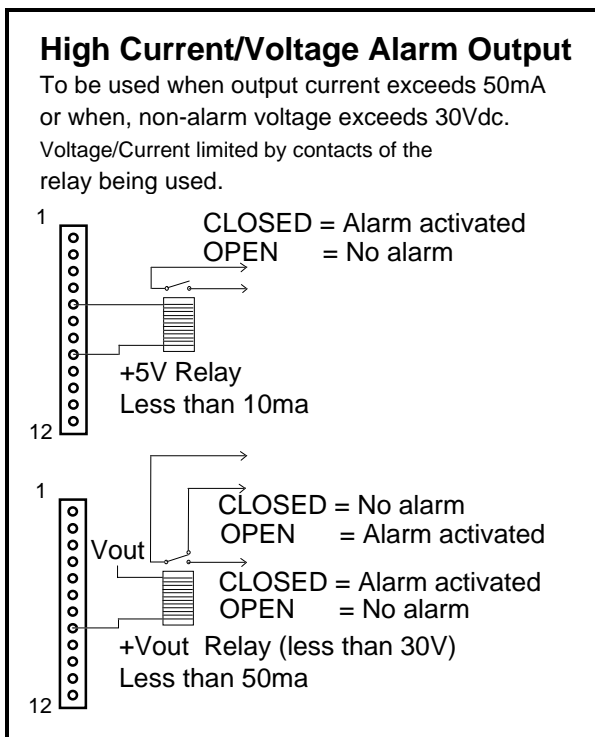
The simplest alarm connection is shown to the right with simple switches connected directly to the alarm inputs, and a single output to some signaling device or a controlled piece of equipment. An external resistor is required to pull the output up to +5V (High) indicating a non alarm condition. This resistor was made external to allow connection to higher voltage systems such as a 12 Vdc automobile system. In this application, the pull-up resistor is not tied to the quads +5V pin but to the higher voltage system. Voltages greater than +5V must not exceed 30Vdc and the current through the output pin must not exceed 50mA.

Failure to remain within the 30 Vdc and 50 mA restriction could damage either the quad unit, the output signaling device, or both. Operation close to these limits may also generate unexpected behavior.



In some installations, the alarm output is used to activate or deactivate high voltage and/or high current circuitry (110 VAC lights, siren, etc.) which cannot be controlled directly by the quad. In other cases, the alarm output needs to control multiple circuits of different types (mixed DC and AC equipment) or the “sense” of the control logic is different (alarm needs to be “high” instead of “low”).

The easiest method to address the above is to use a relay which has the number and rating on its contacts sufficient for the alarm output. Shown on the right is a simple relay using a single normally open contact to control some device. The series 460 Ohm resistor in the +5V supply will limit the usable relay current to something less than 10mA (depending on the coil impedance). If a higher voltage, or higher current relay is used. Then an external supply must be used. Under these conditions the open circuit voltage (no alarm) on pin 5 must not exceed 30Vdc and the closed circuit current (alarm active) into pin 5 must be less than 50mA.



SPECIFICATIONS

Physical

Dimensions	7 7/8" w X 8 5/8" d X 1 7/8" h
.....	(200 mm X 220 mm X 48 mm)
Weight (quad)	3.75 lbs (1.70 kg), power supply: 0.25 lbs (0.80 kg)
Operating Temp	32°F - 150°F (0°C - 70°C)

Video

Signal Format	EIA/CCIR Compatible Monochrome
Camera Inputs	0.6 to 1.2 Vp-p 75 Ohm Termination
Monitor Output	1.2 Vp-p into 75 Ohms
Digital Sampling	512H x 512V x 6 Bits (64 Gray Levels)
Refresh Rate	60 Fields Per Second all quadrants

Electrical

Power	9 V DC @ 1.2 Amp
Safety	UL Listed and CSA Certified
EMI	European (VDE Approved) Power Supplies Available
.....	FCC Part 15, Class A

Connectors

Video In	BNC, 1 per camera, terminating, or Hi Z (4 total)
Loop Thru	BNC, 1 per camera
Video Out	BNC
Serial Port	RJ-11C
Alarm	Cantilever Crimp Housing
9 VDC	Power Jack, 0.080" pin diameter

Controls

QUAD	Return to Quad display
CAMERA	Calls up cameras full screen
SEQUENCE	Calls up selected sequence mode
PIP	Calls up next PIP mode
QUADRANT	Rotates Quadrant
IR Remote	Echos front panel controls
Termination Jumpers	Selects 75 Ohm or Hi-Z termination for 4 video inputs

Warranty Information

Thank you for purchasing this Advanced Technology Video, Inc., hereinafter "ATV", product. We have manufactured this product in accordance with high quality standards and when it is used in the manner intended, it has a **limited warranty against defects in material and workmanship for a period of five (5) years from the date of shipment from ATV**. During the warranty period ATV's entire liability and your exclusive remedy shall be, at ATV's option, upon receipt of proof of purchase, repair or replacement of products that prove to be defective. Repair of a defective product is contingent upon availability of replacement parts from their manufacturer. Should ATV be unable to obtain replacement parts, ATV will, at its option, pro rate the value of the defective product and offer this amount toward the purchase of any new ATV product.

For warranty service or repair, this product must be returned to a service facility designated by ATV. Within the United States, you must obtain a return authorization (RMA) number by calling (888) 288-7644. Outside of the United States, contact your sales representative or the ATV factory at 425-885-7000 (email: tech@atvideo.com). For ATV factory service after obtaining an RMA number, send the product, shipping charges and applicable duties and taxes paid, with a copy of your sales receipt or other proof of purchase and date of purchase to the ATV factory address.

LIMITATION OF WARRANTY

This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, accident, misuse, neglect, voltage fluctuations, lightning, water damage (or other acts of God), faulty installation or adjustment of controls, interfacing with non-standard or custom equipment, or improper maintenance.

EXCEPT AS HEREIN EXPRESSLY SET FORTH AND TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, ATV OR ANY OF ITS EMPLOYEES SHALL NOT, UNDER ANY CIRCUMSTANCES, BE RESPONSIBLE FOR ANY DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, DAMAGE TO THE EQUIPMENT. ATV MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND NON-INFRINGEMENT. REMOVAL OR ALTERATION OF THE SERIAL NUMBER WILL VOID THIS WARRANTY.

Advanced Technology Video, Inc. Return Policy

Our return policy is 90 days from proof of purchase by customer, or if proof of purchase is not available, 90 days from the date of the original sale to distributor. We will accept returns within 90 days for full credit. After 90 days, and up to one year, we will charge a 20% restocking fee for any returned units. After one year, returned units will be covered under either warranty or non-warranty repair.