QSP-860SPX

Owner's Manual

and

Operating Instructions

Instructions for basic operation and installation

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ATV *Advanced Technology Video, Inc.*

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ATV *Advanced Technology Video, Inc.*

INTRODUCTION

Thank you for purchasing Advanced Technology Video's QuadraSplit 860 (QSP-860SPX.)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.

GETTING STARTED
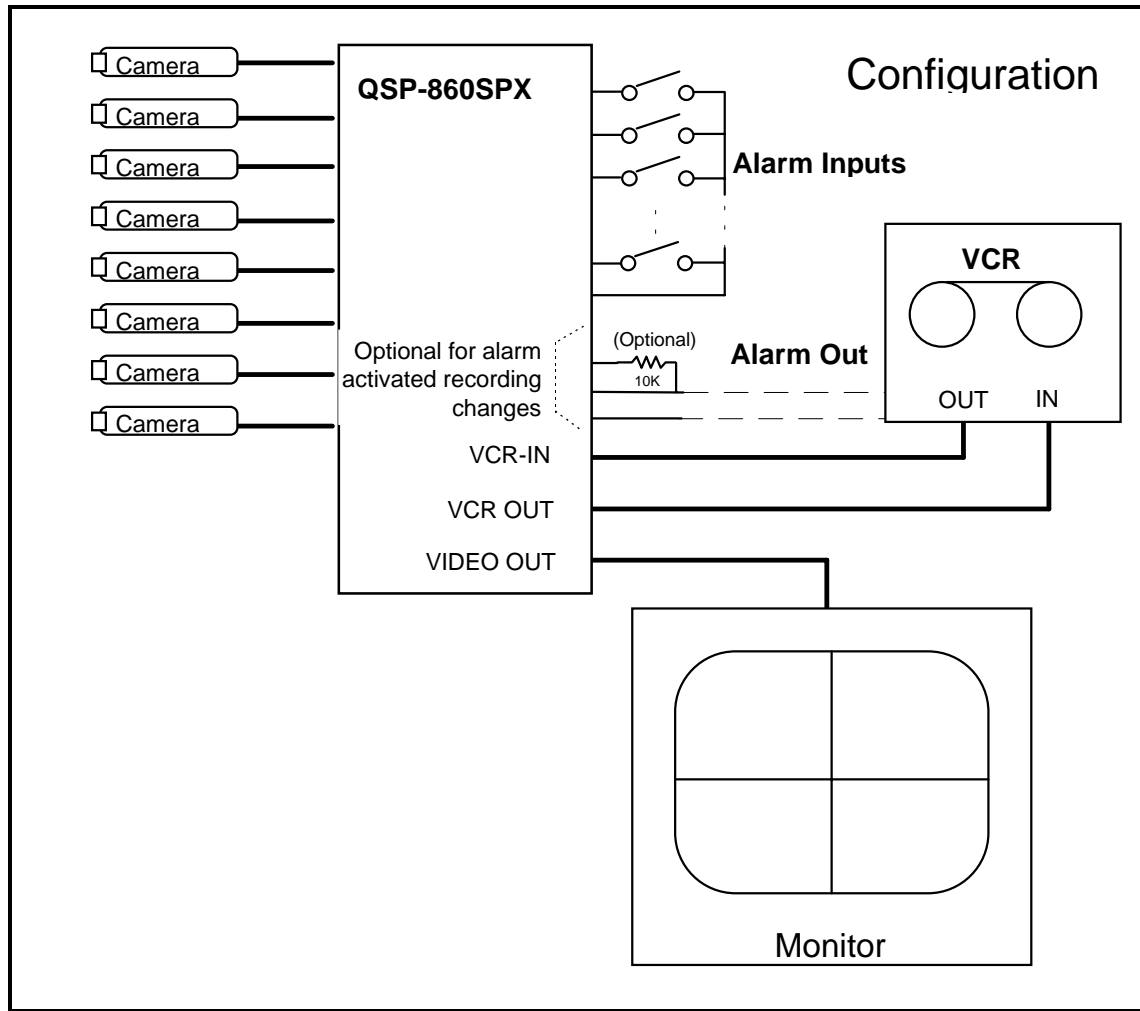
The above diagram shows the typical 8-camera installation for the QSP-860SPX. Up to eight cameras can be connected to the multiplexer/quad using the back panel connectors. The VCR and monitor connections must be as shown above for proper operation. A second direct connection from the VCR output to the monitor (if it has two inputs) or a connection to a separate monitor may be desirable at times to troubleshoot VCR playback problems (Tracking errors, tape dropout, tape motion errors, etc.).

FRONT PANEL DESCRIPTION

QUADRA SPLIT™ 860SPX

QUAD SEQUENCE   PIP QUADRANT VCR   1   2   3   4   5   6   7   8

DUAL   FREEZE

Advanced Technology Video, Inc.
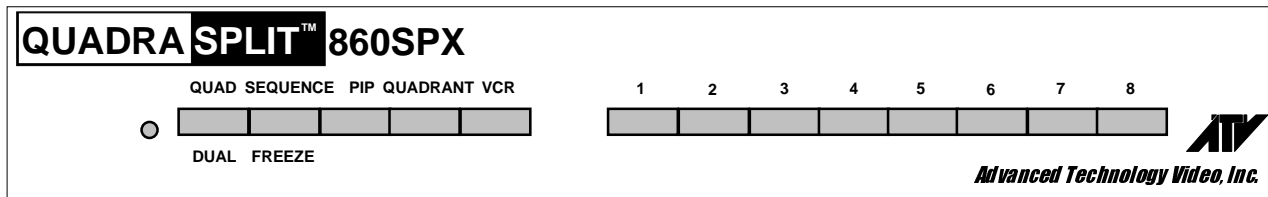
Your QSP-860SPX has five mode control buttons and eight "camera" buttons which allow easy access to your preferred modes of operation. The five mode buttons on the left are used to control monitor display operations and VCR playback. They do not affect mutiplex recording. Here is a summary:

Quad/Dual

During Recording: No function.
During VCR Playback: Returns the unit to Quad mode regardless of present mode of operation. While in any quad mode, this button alternately changes the display operation from page A (cameras 1 through 4), then page B (cameras 5 through 8), then page A and so forth.

Sequence/Freeze

During Recording: Pressing this button will activate camera sequencing on the monitor output.
During VCR Playback: In all modes of display operation, a momentary press on this button will freeze all camera processing to the monitor (the output to the VCR recording is still live).

PIP

During Recording: No function.
During VCR Playback: When starting in the Quad display, pressing the PIP (Picture-in-Picture) button will cause the unit to switch to the "Single PIP" display. Additional presses will cycle the unit through "Dual PIP", "Split Screen", "Full Frame" and back to "Single PIP" displays.

Quadrant

During Recording: No function.
During VCR Playback: For any multi-camera display mode, this button rotates the orientation of the cameras clockwise on the screen into the positions required by the customer.

VCR

Pressing this button will switch monitor processing from the camera inputs to the VCR. The right hand LED indicator will light to show that VCR playback is now possible. Initially this puts the display in quad mode though the screen will be blank until the VCR playback is started. The display will not show anything until tape playback contains camera images which have been previously recorded from any QSP-860SPX. To see non-multiplexer images (VCR setup menus for example) or to troubleshoot VCR tracking or other problems, DigiLock™ must be disabled from the QSP-860SPX setup menus.

Camera Buttons (1 Through 8)

The individual camera buttons 1 through 8 are used to select which camera is to be used for display purposes.

All of the buttons are used in the QSP-860SPX set up menus for a variety of purposes. Their description is covered in following sections.

BACK PANEL CONNECTIONS

The eight camera input BNC connectors are labeled "DUAL/LOOP" since they serve two purposes. The factory default configuration is "DUAL" and each BNC is an independent camera input. Four DIP switches inside the unit (described later) determine whether each pair of inputs are independent ("DUAL") or used as a loop-through ("LOOP"). In "loop-through" the QSP-860SPX is unable to recognize that the two loop-through inputs are the same camera image. For multiplexing to behave as expected, one of the two loop through inputs should be disabled using the on screen QSP-860SPX set up menu.

The alarm connector is a standard DB-15 which will mate with an alarm wire adapter board (included) or standard computer-type cable. The adapter board is numbered compatibly with the DB-15 connector so the following table is applicable to either (except for pin-16 on the adapter which represents a chassis ground connection).

The serial port contains connections to support RS-232, RS-422 and RS-485 standards in a DB-15 connector. The factory default is RS-232 as set by internal DIP switches (described later).

ALARM CONNECTOR PINS			
1	Alarm1	9	Alarm Out (< 50 ma)
2	Alarm2	10	Freeze
3	Alarm3	11	(reserved for future)
4	Alarm4	12	(reserved for future)
5	Alarm5	13	+5V (< 10 mA)
6	Alarm6	14	VCR HS input
7	Alarm7	15	Signal ground (< 10 mA)
8	Alarm8	16	Chassis ground

SERIAL CONNECTOR PINS	
1	Signal ground
2	TX+ (out) RS232 or 422, 485
3	RX+ (in) RS232 or 422, 485
4	Signal ground
5	Signal ground
6	Signal ground
7	TX- (out) RS422 or 485
8	RX- (in) RS422 or 485
9	Signal ground

BACK PANEL

ATV **Advanced Technology Video, Inc.**
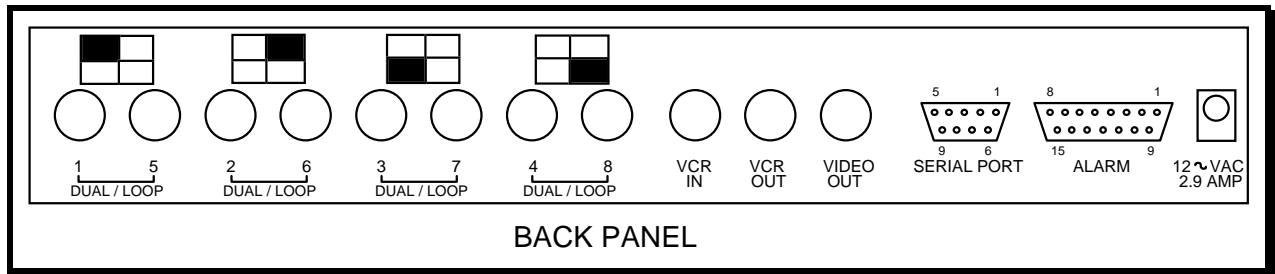
HAND HELD IR REMOTE CONTROL

The hand held remote control allows easy remote operation of your QSP-860MPX by duplicating the front panel buttons as shown in the diagram. One major difference between front panel and remote operation is that the individual camera buttons have been reduced to a single button. In any application, the first button press is assumed to be camera #1 and additional button presses will cycle the selection through each available camera and back to #1.

Please note that the remote control may not work properly in the presence of strong sun light. The sun is a strong Infra-Red light source and it interferes with the output from the remote control.

Programming your ATV QSP-860SPX Remote Control

When first installing or when changing the batteries in your QSP-860SPX Remote Control, it may be necessary to re-program it for use with the **QSP-860SPX**. If your remote control does not appear to work for any reason, please perform the following steps before contacting the factory

To program the *RCU101* to work with the **QSP-860SPX**:

1.   Turn on the **QSP-860SPX** and verify that at least one camera is active.

2.   On the **QSP-860SPX**, press the **QUAD** button to return to **QUAD** mode. Then press the any of the camera buttons (1 through 8) to call up a full screen picture.

3.   Ensure that batteries are installed in the QSP-860SPX Remote Control.

4.   On the remote control, press the **MUTE** button first, then **PWR.** Hold both buttons together until the indicator lights up and blinks twice.

5.   Enter your five-digit code. The **QSP-860SPX** code set #1 equates to remote code 11313, and code set #2 equates to code set 11344. The LED will now blink twice and the remote control is set.

The codes are entered by using the four buttons shown in the above diagram (Freeze, Camera, Quadrant, PIP). For example, to enter the code for a **QSP-860SPX** (code 11313) press the following:

Code set #1		Code set #2	
FREEZE	2 TIMES	FREEZE	2 TIMES
PIP	1 TIME	PIP	1 TIME
FREEZE	1 TIME	QUARDRANT	2 TIMES
PIP	1 TIME		

6.   Press **QUAD** button on the remote control for sequencing on the **QSP-860SPX**.
           (Your QSP-860SPX is factory set for code set #2)

Note: **For easiest operation of your remote control, depress buttons firmly but quickly. Depressing a button longer than is necessary may cause "skipping".**

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(Remote control diagram on right side showing buttons top to bottom: QUAD, FREEZE, CAMERA (1, 2), PIP (3), QUADRANT (4), VCR, ATV logo)

ATV *Advanced Technology Video, Inc.*
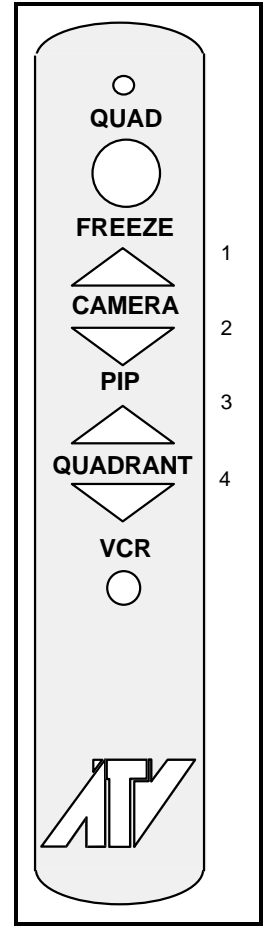
FUNCTIONAL DESCRIPTION

Basic Recording/Playback Operations

The QSP-860SPX is a "simplex" multiplexer which allows any input camera to be called up for full screen display on the monitor while multiplexing all full screen camera images to the VCR. The monitor output is an analog channel which can support color cameras. In a color camera installation the monitor will show color pictures while the VCR recording (and subsequent playback) will be in Black & White only. For best performance during camera sequencing, it is recommended that all camera's be line-locked.

CustomPlexing™ Multiplexer Recording/Playback

The QSP-860SPX records each camera individually onto a single frame of the VCR tape at a rate compatible with the tape recorder (see VCR menu selection). The factory default is set so that each live camera is given an equal number of frames on the tape. Dead cameras, or unconnected camera inputs will be skipped. The menu has three levels of priority and a disable feature. The three levels of priority allow a high, medium and low priority for each camera, giving more frames to high priority and less frames to low priority. The disable feature allows you to disable a camera. These features allow you to customize the multiplexing function to suit your needs. While recording, the unit can be set to display any individual camera or set to sequence one or more cameras with common or individually set camera dwell times.

In playback, cameras can be displayed in quad (dual page or selectable page), PIP, dual PIP, split screen or full frame formats. Camera images can be frozen in any of these formats. Playback incorporates digital decoding of the camera number from the tape and monitor screen images are updated at the rate that images are played off the tape. In most time lapse VCRs the update rate is approximately:

$$rate = (Number\ of\ cameras\ in\ system)\ x\ (Hourly\ format\ /\ 120)\ in\ seconds.$$

For example, in a 24 hour format recording of an 8 camera system, each camera will be updated at

$$rate = 8\ x\ (24\ /\ 120) = 1.6\ seconds.$$

DigiLock™ and Playback

Digital Information is used to compensate for the poor vertical synchronization signals frequently encountered with even the best of time lapse VCR's. The QSP-860SPX DigiLock™ encoding and decoding reconstructs the timing such that successfully decoded frames are read into the monitor display memory consistently without any "jumping", "tearing" or other side effects of poor synchronization.

SET UP MENUS

The QSP-860SPX set up is accomplished through it's on-screen menus which have been organized for the novice or advanced user and whether the unit is configured for multiplexer or real-time quad operation. To enter the menu system, push the "QUAD" and "VCR" buttons simultaneously which will show the top level menu. Selection of any menu item is done with the camera select keys on the front panel. Selecting "Quad" will exit the present menu level.

Main Menu

Selecting:

1. Toggles menus between BASIC options for the typical user or ADVANCED options for the more feature challenged user.

2. ENABLES (factory default) or DISABLES the DigiLock™ VCR playback decoding. Enabling is necessary for normal multiplexer playback and stabilizing the picture for both multiplexer or quad playback. Disabling is used to allow non-DigiLock™ screens to be shown on the monitor (such as VCR on screen menus) or for troubleshooting VCR playback problems (tracking, tape dropout, etc.).

```
VCR SET UP
              QSP-860SPX  REV 1.00
1. VCR SELECTION
2. VCR FORMAT     ADVANCED TECHNOLOGY 24 HR
3. VCR ALARM FORMAT  VIDEO, INC   2 HR
4. CAMERA PRIORITY
 1. OPTION SET:  BASIC
 2. DIGILOCK:    ENABLED
QUAD: EXIT CHANGE OPTIONS
 4. CHANGE SECURITY CODE

QUAD: EXIT
```

3. Descends into the next level of set up menus. The next menu depends on whether the unit is in the ADVANCED or BASIC option set.

4. Enters the security screen where you can select a security code for locking out the menus and the front panel buttons.
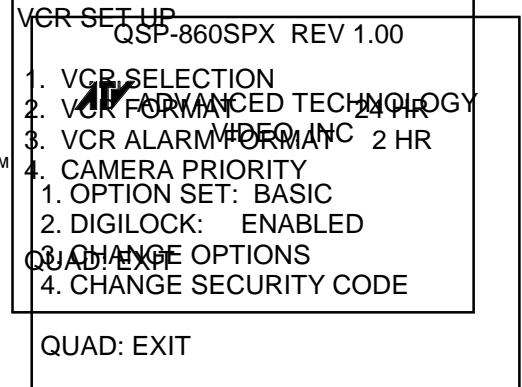
Security Lockout

Security lockout is a means to disable the front panel buttons such that casual or inadvertent tampering can be prevented. It is not intended as a hard security measure and can be easily bypassed by removing power followed by applying power and **simultaneously** pressing the "QUAD" button until the ATV name appears. This should not be the preferred method of bypassing security since this step also returns all internal parameters and options to their factory defaults.

The feature requires that a security code ("password") of 1 to 9 digits be entered and verified. The security lockout does not become active until one has exited the menus.

Basic Multiplexer Menus

Basic multiplexer options represent the most commonly used multiplexer features that the typical customer might need.

Multiplexer Options

Selecting:

1. Select the VCR and configuring the multiplexer for its operation.

2. To set alarm input conditions.

3. To set the time and date for the on-screen display to be recorded on the VCR. This cannot be displayed live but is being recorded for VCR playback.

4. This resets all options (except time and date) to factory values. This represents an easy method to get the multiplexer back to a known state.

```
      MULTIPLEXER OPTIONS

1. VCR SET UP
2. ALARM OPTIONS
3. DATE/TIME SETTING
4. SET FACTORY DEFAULTS


QUAD: EXIT
```
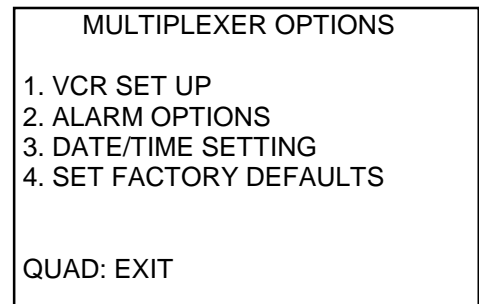
VCR Set Up

Selecting:

1. VCR selection of a particular make and model of presently supported VCRs.

2. Toggles the time format through up to 8 possible settings for the VCR selected. If the setting exists for the selected VCR, the default value is 24 Hour.

3. Same as #2 except it is only used during an alarm condition. If the value chosen Is different from #2 it is assumed that the VCR is wired to the alarms such that it changes to the rate selected here under an alarm condition.

4. For selecting the camera multiplexing priority, where higher priority cameras get more frames than lower priority cameras.

VCR Selection

Selecting:

```
┌─────────────────────────────────────┐
│ PRESENT SELECTION                    │
│   STANDARD 24 HR STEPS               │
│                                      │
│ 1. STANDARD 12 HR STEPS              │
│ 2. STANDARD 24 HR STEPS              │
│ 3. <Make & Model #1>                 │
│ 4. <Make & Model #2>                 │
│ 5. <Make & Model #3>                 │
│ 6. <Make & Model #4>                 │
│                                      │
│ QUAD: EXIT   PIP: NEXT PAGE          │
└─────────────────────────────────────┘
```

1 - 6   Picks a particular VCR from the present list. The first two entries are for standard 12 and 24 hour steps which will accommodate most VCRs that have a 2-to-1 hour to field delay rate (see section on custom delay tables). The Standard 24Hr steps is the factory default. **If your VCR is not in the list, refer to the application note "What to do if your VCR is not on the supported list" (page 14).**

PIP   Pages the list forward for more selections. When the last page is reached it resets back to the first page.

CustomPlexing™ Recording Camera Priority

Selecting:

```
┌─────────────────────────────────────┐
│ RECORDING CAMERA PRIORITY            │
│                                      │
│ 1. HIGH PRIORITY                     │
│ 2. HIGH PRIORITY                     │
│ 3. MEDIUM PRIORITY                   │
│ 4. MEDIUM PRIORITY                   │
│ 5. LOW PRIORITY                      │
│ 6. LOW PRIORITY                      │
│ 7. DISABLED                          │
│ 8. DISABLED                          │
│ QUAD: EXIT                           │
└─────────────────────────────────────┘
```

1 - 8   Toggles the camera between Medium (Factory Default), High, Low, and Disabled.

The camera priorities affect how frequently the cameras are stored. Using the factory defaults, the camera ordering is:

1,2,3,4,5,6,7,8,1,2,3,4,5,6,7,8,1,2,3,4.........

Using the example shown:

1,2,3,5,1,2,4,1,2,3,6,1,2,4,1,2,3,5,1,2,4,1,2,3,6....

The priority method gives medium priority cameras twice as many frames as low priority cameras. High priority cameras get twice as many frames as medium priority cameras. Disabled cameras are not recorded unless their alarm inputs are stimulated and there is a live video signal present. Disabled cameras, under alarm conditions, will be multiplexed like any other alarm camera.

Cameras under alarm conditions have a higher priority than "HIGH" and will be given twice as many frames as "HIGH". Even under multiple alarm conditions, all cameras are guaranteed some VCR frames. Multiplexing of alarmed cameras cannot be disabled without disabling the alarm input itself (which will prevent both monitor and VCR alarm activity). In the above example, if the alarm for disabled camera #8 were triggered, the multiplexing would be:

8,1,8,2,8,3,8,5,8,1,8,2,8,4,8,1,8,2,8,3,8,6,8,1,8,2,8,4,8,1,8,2,8,3,8,5,8,1,8,2,8,4,8,1,8,2,8,3,8,6....

Alarm Options

Selecting:

1. Goes to individual camera enable/disable menu.
2. Goes to alarm dwell adjustment menu.
3. Goes to alarm input contact activation type menu.
4. Sets all of the above to their factory defaults.

```
                            ALARM OPTIONS

1. ENABLE/DISABLE

2. DWELL ADJUSTMENT

3. ACTIVATION TYPE

4. SET FACTORY DEFAULTS

QUAD: EXIT
```

Alarm Enable

Selecting:

1 - 8   Toggles the selected camera between ENABLED and DISABLED.

Alarm disabling prevents an alarm input from affecting any aspect of the VCR multiplexing or the display. Disabled alarms are not forwarded to the alarm output.

Alarm Dwell Adjustment

Selecting:

```
                            ALARM ENABLE

1. ENABLED
2. ENABLED
3. ENABLED
4. ENABLED
5. ENABLED
6. DISABLED
7. ENABLED
8. DISABLED
QUAD: EXIT
```

1. Allows changing the alarm ACTIVATION HOLD time.
2. Allows changing the monitor alarm display SEQUENCE DWELL time.

Some alarming devices (such as some motion detectors) generate very brief alarms lasting only a fraction of a second. The "alarm input hold" time is the amount of time that the alarm event will be held so that the alarm camera image can be held on the display screen and mutiplexed at a high frame rate to the VCR.

The alarm sequence dwell time is only used for multi-camera alarms and specifies how much time should elapse in switching between alarming cameras. This dwell time has no effect on the multiplexing output to the VCR.

```
                        ALARM DWELL ADJUST


1. ACTIVATION HOLD   1 SEC

2. SEQUENCE DWELL    3 SEC



QUAD: EXIT
```

Both delay times are adjustable from 1 to 254 seconds though the default is 1 second for the activation hold and 3 seconds for the sequence dwell time. Camera buttons are used to enter digits 1 through 8 and PIP and QUADRANT buttons are used to enter 0 and 9 respectively. The QUAD button stops editing a delay value.

Alarm Activation Type

Selecting:

    1 - 8 Toggles the selected camera between CONTACT CLOSURE triggering the alarm and CONTACT OPEN triggering the alarm.

In many applications the switch contact connection is between the alarm input pin and the chassis or signal ground. In the QSP-860SPX the contact connection can be between either the ground (alarm connector pin 15) or the +5V (alarm connector pin 13). In some alarming devices this is not a metallic switch contact but rather a solid state device which "grounds" (CONTACT CLOSURE) the input as a normal condition or as an alarm condition.

```
ALARM ACTIVATION TYPE
       (TRIGGERS ALARM)
1. CONTACT CLOSURE
2. CONTACT CLOSURE
3. CONTACT OPEN
4. CONTACT CLOSURE
5. CONTACT CLOSURE
6. CONTACT OPEN
7. CONTACT CLOSURE
8. CONTACT CLOSURE
QUAD: EXIT
```

Regardless of the alarming device we define:

    CONTACT CLOSURE: alarm pin is electrically connected to either +5V or ground.

    CONTACT OPEN: alarm pin is not electrically connected to either +5V or ground.

Date/Time Setting

Date and time for the VCR output on-screen calendar and clock is set from this menu.
Selecting:

1. Edits the year.
2. Advances the month with each press.
3. Edits the day of the month. Only valid values for the month selected will be accepted.
4. Edits the hour of the day. In 24 hour mode, 1 through 24 is accepted as entered. In 12 hour mode, values above 12 are taken as PM times and 12 is subtracted from the entered value. The AM/PM indicator cannot be directly set.
5. Edits the minutes field. Only values 0 through 59 accepted.
6. Edits the seconds field. Only values 0 through 59 accepted.
7. Toggles the format between 12 hour and 24 hour.
8. Advances to the display options.

```
   DATE & TIME SETTING
1. YEAR          1995
2. MONTH         JANUARY
3. DAY           1
4. HOUR          11
5. MINUTES       15
6. SECONDS       30
7. FORMAT        12 HR
8. DISPLAY OPTIONS

QUAD:  EXIT
```

The times shown in this menu come directly from the clock circuits. Actual time is constantly changing while new values are entered. All the values shown on the screen are updated any time one of them is entered. To accurately set the clock to the desired time, edit the "SECONDS" entry last. The **incorrect** method would be to enter the "SECONDS" value by pushing "QUAD" at the top of the minute. Depending on whether the on board clock was ahead or behind real time, you may find that the minutes value will be correct or off by one. It may then need to be corrected.

Date & Time Display Options

This menu determines the display behavior of the date and time information for the VCR output.
Selecting:

1. Toggles the location through any one of the four display quadrants.
2. Toggles the enable/disable for the VCR display.

```
     DISPLAY OPTIONS



1. LOCATION    LOWER RIGHT

2. DISPLAY     ENABLED



QUAD:  EXIT
```

Advanced Multiplexer Menus

Everything seen in the "Basic" menus is included under the "Advanced" menus except the items described in this section. Please refer to the "Basic Multiplexer Menus" section of this manual for information not described here.

Multiplexer Options

Selecting:

```
┌─────────────────────────────────┐
│      MULTIPLEXER OPTIONS        │
│                                 │
│  1. VCR SET UP                  │
│  2. ALARM OPTIONS               │
│  3. DATE/TIME SETTING           │
│  4. DWELL ADJUSTMENT            │
│  5. SEQUENCE FORMAT             │
│  6. IR REMOTE: CODE 1           │
│  7. SET FACTORY DEFAULTS        │
│                                 │
│  QUAD: EXIT                     │
└─────────────────────────────────┘
```

1. Select the VCR and configuring the multiplexer for its operation.
2. To set alarm input conditions.
3. To set the time and date for the on-screen display to be recorded on the VCR. This cannot be display live but is being recorded for VCR playback.
4. To set sequencing dwell time for all of the display modes where sequencing is supported.
5. To edit the camera ordering and sequencing patterns for any of the display modes.
6. Toggles through the available remote control codes (two in revision 1.00) to allow independent control of more than one QSP-860SPX and "OFF" to defeat the remote control.
1. This resets all options (except time and date) to factory values. This represents an easy method to get the multiplexer back to a known state.

VCR Set Up

Selecting:

```
┌─────────────────────────────────┐
│  VCR SET UP                     │
│                                 │
│  1. VCR SELECTION               │
│  2. VCR FORMAT          24  HR  │
│  3. VCR ALARM FORMAT    2 HR    │
│  4. CAMERA PRIORITY             │
│  5. EDIT DELAY TABLE            │
│  6. RECORD FORMAT:    FIELD     │
│  7. PLAYBACK FORMAT:  FIELD     │
│                                 │
│  QUAD: EXIT                     │
└─────────────────────────────────┘
```

1. VCR selection to pick out the particular make and model of the presently supported VCRs
2. Toggles the time format through up to 8 possible settings for the VCR selected. If the setting exists for the selected VCR, the default value is 24 Hour.
3. Same as #2 except it is only used during an alarm condition. If the value chosen Is different from #2 it is assumed that the VCR is wired to the alarms such that it changes to the rate selected here under an alarm condition.
4. To select the camera multiplexing priority. Higher priority cameras get more frames than lower priority cameras.
5. To examine or modify the selected delay table.
6. Sets VCR Recording format. FIELD records only the even field (262 lines) which is the industry standard and the QSP860's factory default. FRAME records both fields (525 lines) which requires a compatible frame mode VCR.
7. Sets VCR Playback format. FIELD decodes for display only the even field (262) lines) which is the industry standard and the QSP860's factory default. This will decode fields even though the VCR recording is in FRAME mode. FRAME plays back both fields (525) lines.

Please note that for FRAME recording, shuttered cameras are recommended with a shutter rate of 30 frames per second. This is necessary to remove "motion artifacts" which will occure since non-shutterred cameras will capture moving objects at different positions in the odd and even fields.

VCR Selection

Selecting:

1 - 6	Picks a particular VCR from the present list. The first two entries are for standard 12 and 24 hour steps which will accommodate most VCR that have a 2-to-1 hour to field delay rate (see section on custom delay tables). The Standard 24Hr steps is the factory default. **If your VCR is not in the list, refer to the application note "What to do if your VCR is not on the supported list" (page 14).**
PIP	Pages the list forward for more selections. When the last page is reached it resets back to the first page.

```
PRESENT SELECTION
  STANDARD 24 HR STEPS

1.  STANDARD 12 HR STEPS
2.  STANDARD 24 HR STEPS
3.  CUSTOM DELAY TABLE
4.  <Make & Model #1>
5.  <Make & Model #2>
6.  <Make & Model #3>

QUAD: EXIT   PIP: NEXT PAGE
```

The CUSTOM DELAY TABLE entry is the only addition to this selection menu over the BASIC options version. The default custom table is the same as "STANDARD 12 HR STEPS" (shown below). When any delay table is modified, it becomes the new custom delay table. This allows you to test other multiplexer formats without necessarily loosing a custom version. You can return to a previous customized table by making the selection here, as long as no newer table was modified.

Edit Delay Table

Selecting:

1 - 8	Chooses one of the eight hourly formats to modify and place the editing in the HOUR field.

While Editing:

SEQUENCE	Advances editing to the next field.
1 - 8	Used to enter digits "1" through "8".
PIP	Used for a "0" entry.
QUADRANT	Used for a "9" entry.
QUAD	Completes the entry if less than 3 digits entered or returns to the previous value if no digits are entered.

```
FORMAT       HOUR       DELAY
1.            2           3
2.           12           4
3.           24          10
4.           36          16
5.           48          22
6.           60          28
7.           72          34
8.           84          40
PIP: 0           QUADRANT: 9
QUAD: EXIT    SEQUENCE: NEXT
```

The delay table is used to set the field delay value needed for any selected VCR so that the multiplexing rate of the QSP-860SPX matches the multiplexing rate of the VCR. For further information, refer to the application note "Programming a Custom Delay Table".

Dwell Adjustment

Selecting:

1 - 8	Selects an individual camera dwell to edit.
SEQUENCE	Selects the master dwell which will affect all cameras.

While editing:

1 - 8	Used to enter digits "1" through "8".
PIP	Used for a "0" entry.
QUADRANT	Used for a "9" entry.
QUAD	Completes the entry if less than 3 digits entered or returns to the previous value if no digits are entered.

```
        DWELL ADJUSTMENT

SEQUENCE MASTER.     3 SEC

  1.    3 SEC    5.    3 SEC
  2.    3 SEC    6.    3 SEC
  3.    3 SEC    7.    3 SEC
  4.    3 SEC    8.    3 SEC

  PIP:0      QUADRANT:9
QUAD:EXIT
```

If the master dwell is changed, the other eight fields will be updated to the master value after the entry of the master value is complete. It is most common to set all individual camera delays to the same value. If they are set to different values and sequence is in operation, each camera will have its individual value used and the master is ignored regardless of display mode (Full Screen, Quad, PIP, Dual PIP). Dwell rate in conjunction with display sequencing format can be used to provide multiple camera displays with fixed views, mixed with slow sequencing, and fast sequencing.

Sequencing Format Screen

This screen shows the factory default values indicating that all 8 cameras are available for the sequencing function. All of the "live" cameras shown here are sequenced in ascending numerical order and cameras are not repeated. For example, if the pattern "7,5,2,4,5,5,7" were entered, the software will translate this to ". 2 . 4 5 . 7 . ". Since the cameras can be programmed with individual dwell times, one can customize the setup such that high priority cameras can be shown on the monitor for a longer time.
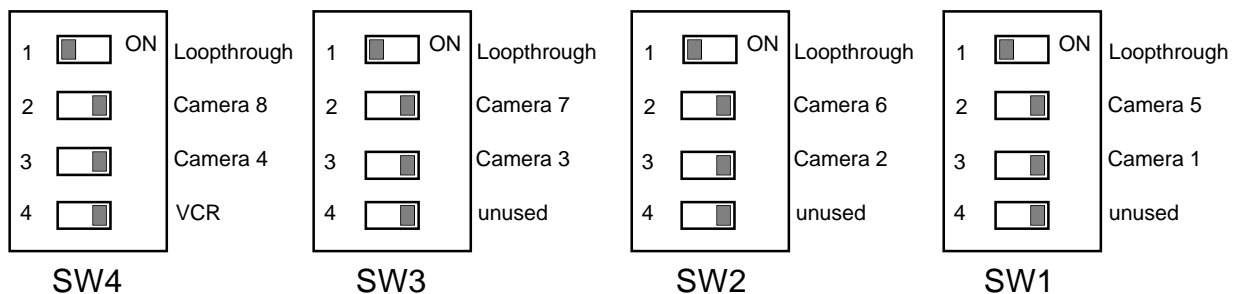
```
         FULL  CAMERA  FORMAT



  1. CAMERAS     12345678




  QUAD: EXIT
```

VIDEO LINE TERMINATION SWITCHES

	SW4	SW3	SW2	SW1
1	ON Loopthrough	ON Loopthrough	ON Loopthrough	ON Loopthrough
2	Camera 8	Camera 7	Camera 6	Camera 5
3	Camera 4	Camera 3	Camera 2	Camera 1
4	VCR	unused	unused	unused

The video line termination switches for each camera input are located in the rear of the unit and are accessed by removing the top cover. The switches are in the order shown above when looking toward the back panel. The above switches represent the factory default settings in which the camera loop-through is turned off. Camera loop-through, if turned on, connects together the camera inputs shown above on the same switch (i.e. the left-most loop-through switch connects camera 4 to camera 8).

Dip switch positions 2 and 3 on all four groups of switches (SW1 through SW4) control the application of the 75 Ohm termination impedance's. As shown, all eight camera inputs are terminated. Besides the cameras, the only other termination is for the VCR input which is on switch position 4 of SW 4.

APPLICATION NOTE: WHAT TO DO IF YOUR VCR IS NOT ON THE SUPPORTED LIST

The delay tables embedded with your QSP-860MPX software should give you satisfactory performance for any of the VCRs selected. It is certainly possible that some VCRs will not be on the list for a variety of reasons (such as being newer than the QSP-860MPX). Most non-real-time VCR's are of the formula 1 type described in the next application note which is why we provide the "STANDARD 24 HR STEPS" selection in the VCR set up menus. Sometimes it is possible for you to determine what type of VCR you have from the VCR's manual. They frequently publish picture delay times for their supported hourly formats. The "rule of thumb" is that if you take a published delay time and divide by 0.0166 which will give you a number which is close to either 1/2 the hourly rate (which is Formula 1) or 1/3 the hourly rate (which is Formula 2). For example:
1. Your manual states that in 24 Hr mode the picture delay time is 0.22 seconds.
2. 0.22 / 0.0166 = 13.25
3. 13.25 is closer to 12 =24/2, than to 8=24/3.
4. Your VCR is a Formula 1 type, so use STANDARD 24 HR STEPS or STANDARD 12 HR STEPS.

If your VCR is not a Formula 1 type, you will need to construct a Custom Delay Table described in the next section.

APPLICATION NOTE: PROGRAMMING A CUSTOM DELAY TABLE (ADVANCED OPTION)

The delay tables embedded with your QSP-860SPX software should give you satisfactory performance for any of the VCRs selected. It is certainly possible that some VCRs will not be on the list for a variety of reasons (such as being newer than the QSP-860SPX). For that reason, we have provided a means of creating and/or modifying a delay table to match your particular VCR. Getting the best performance for all of the available VCR formats is very tedious and usually not necessary. Satisfactory performance can usually be obtained by setting up the one or two formats actually used and following the basic guidelines.

What is the "Delay Table"?

The delay table is merely a list of pairs of numbers that control the QSP-860SPX 's frame rate that it sends to the VCR during recording. The first column ("Hour") is the format number that you would see in the VCR Set Up menu (see VCR Set Up section of this manual) under the choices for "VCR FORMAT" and "VCR ALARM FORMAT". The second column ("DELAY") is the number of video field times the QSP-860SPX waits before putting out the next camera image.

FORMAT	HOUR	DELAY
1.	8	3
2.	24	4
3.	8	3
4.	24	4
5.	8	3
6.	24	4
7.	8	3
8.	24	4

QUAD: EXIT   SEQUENCE: NEXT

The table allows you to program up to 8 hourly formats. If your VCR has more than eight settings you will need to pick the set of 8 choices that are most practical for your installation. If your VCR has fewer choices, or you want to restrict your choices to just a few settings, the whole table should be filled such that the choices are repeated . The first example here is for a 24 hour real-time VCR which only has two settings.

What "Values" should be used?

Real Time Programming

The value represents a minimum delay that the QSP-860SPX must use to be constantly multiplexing without delays. The above example has slightly different values for 8 and 24 hour mode since this recorder only slightly reduces it's frame recording rate at the much longer time format. The minimum value in this software release is 3 and the software will not allow the entry of a lesser number.

Time Lapse Programming

If your time-lapse VCR has published delay values for each hourly setting the best place to start is to use the formula:

$$DELAY = (Delay\ Time)/0.0166 - 2$$ For example: $11.25 = 0.22/0.0166 - 2$ for 24 Hr mode

The number will likely be a fraction (such as 11.25), so "round up" the number to the next whole integer (which would be 12).

Without published delay times the determination is somewhat more difficult, but here are some guidelines. Depending on your make and model of VCR, the frame recording rate is one half (most time lapse VCRs are 1/2) or one third of the hour number. For example, if the selected hourly format is 48 hours, the frame recording rate of the VCR is either 24 (1/2 of 48) or 16 (1/3 of 48) . To match this with the QSP-860SPX, we must take into account that it takes two field times for the QSP-860SPX to capture a camera image. Two fields must be subtracted from the delay which gives us 22 or 14 fields respectively. In general you would use either of the following formulas:

1. $DELAY = HOUR/2 - 2$

or

2. $DELAY = HOUR/3 - 2$

To determine which of the two formulas to use, the easiest approach involves using two monitors. You set up your VCR to record a single camera directly (without multiplexer) in a 2 hour format for a few minutes and have the camera viewing some live action. The live action is necessary so that during playback we know that each successive frame contains a different picture. Set up the multiplexer so that its VCR output is actually feeding one of the monitors and the VCR output of the VCR is feeding the other monitor. Set VCR selection on the QSP-860SPX to "STANDARD 24 STEPS" (refer to table shown here) and pick an hourly format of something greater than 24 hours. Select the same hourly format on the VCR and then playback the recording. If the frame switching rate is approximately the same on both, then use formula #1. If they are distinctly different, then use formula #2.

FORMAT	HOUR	DELAY
1.	2	3
2.	24	10
3.	48	22
4.	72	34
5.	96	46
6.	120	58
7.	144	70
8.	168	82
QUAD: EXIT	SEQUENCE: NEXT	

How do I verify the correct "Values"?

For any given hourly rate, if the QSP-860SPX is multiplexing faster than the VCR during recording, cameras will be dropped during playback. If the QSP-860SPX is multiplexing slower than the VCR during recording, then cameras will be repeated during playback. If the multiplexer and VCR are at distinctly different rates then it may be impossible to tell whether cameras are being repeated or dropped. The closer the rates are the fewer occurrences there will be of dropping or repeating cameras.

The following is an example which illustrates cameras being dropped and cameras being repeated:

Dropping:	1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8 1 2 3 4.....	During recording
	1 2 3 5 6 7 8 1 2 3 4 6 7 8 1 2 3 4	During playback
Repeating:	1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8 1 2 3 4....	During recording
	1 2 3 3 4 5 6 7 8 1 2 3 4 4 5 6 7 8 1 2 3 4....	During playback

If we can assume that the correct formula and verification from the previous section was used, then the multiplexer and VCR should be close to the same rate. The simplest method of "fine tuning" the delay value is to use only three or four cameras viewing distinctly different scenes (It might also help to draw camera numbers on pieces of paper in the view of each camera).

Be sure **ALL OF THE CAMERAS ARE BEING RECORDED WITH SAME PRIORITY**. Besides the priority set in the "CAMERA PRIORITY" menu, it is important that all cameras are not in an alarm condition (which gives then a HIGH priority) and are enabled.

Now, perform the following steps:

1. Make a recording for several minutes with the VCR and QSP-860SPX at the same hourly rate.
2. Playback the recording directly to a monitor at a rate slow enough to allow observing the camera ordering. You may want to do this with the VCR pause and stepping through the frames with the "Frame Advance" button.
3. If the behavior is:
   Too many cameras being dropped: Increase the delay by one.
   Too many cameras being repeated: Decrease the delay by one.
4. If the delay was changed, repeat the above steps.

It is recommended that the above playback be done directly to the monitor so that it can be verified that if a camera is dropped, it is because it was never recorded. It is possible that cameras might appear to be dropped on playback through the multiplexer since DigiLock™ decoding will block any camera that fails to decode (due to noise or lossy tape, tracking errors, tape motion errors, etc.). One can disable DigiLock™ which will allow all cameras to be shown, but the picture might be difficult to view (may be jumping up and down) since DigiLock™ also provides digital picture stabilization.

APPLICATION NOTE: ALARM INTERCONNECTION ON QSP-860SPX

The back panel connector allows eight control signals to affect the behavior of the unit in the manner described fully in the proceeding sections. 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.

```
11 KOhm
 -  /\/\/\/\  <  1:Camera #1
 -  /\/\/\/\  <  2: Camera #2
 -  /\/\/\/\  <  3: Camera #3
          .
          .
          .
 -  /\/\/\/\  <  8: Camera #8
 -  /\/\/\/\  < 10: Picture freeze
        100 Ohm
+5V  /\/\/\/\  < 13: Alarm out pwr
        100 Ohm
     /\/\/\/\  < 15: Alarm ground
              < 9: Alarm output
                 (50 mA
```
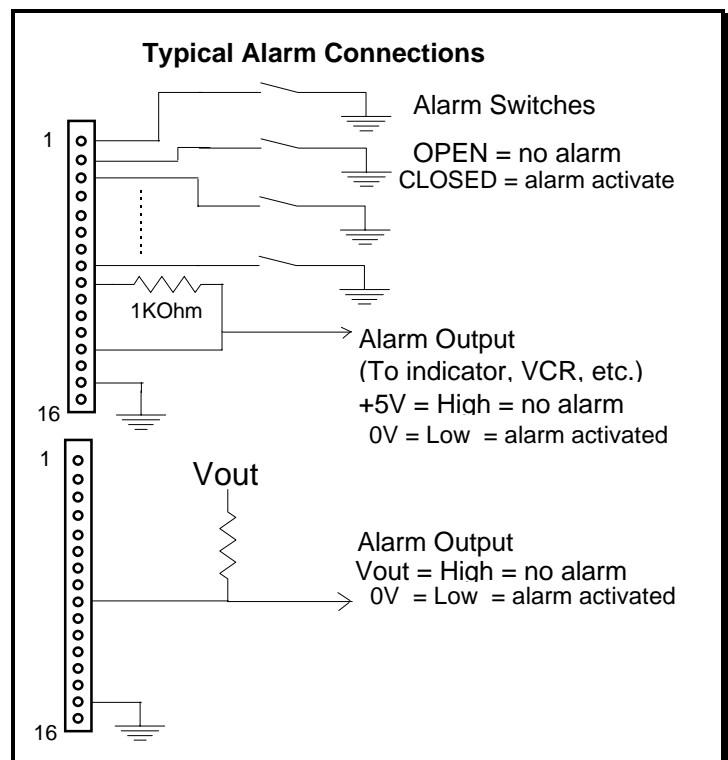
Alarm Port Electrical Equivalent
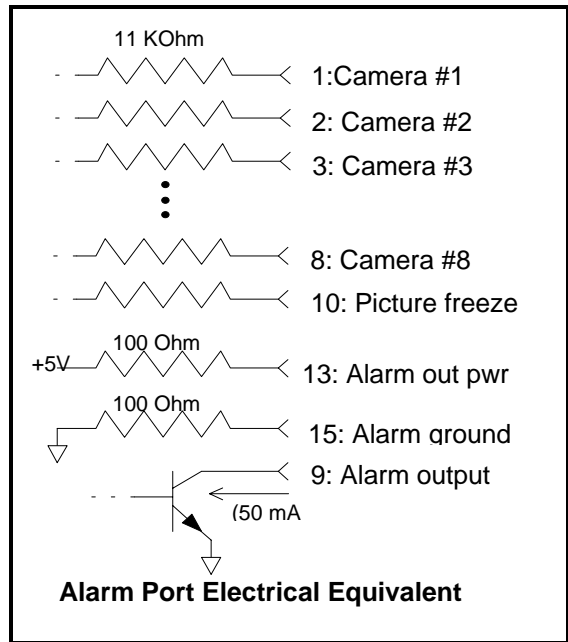
The simplest alarm connection is shown to the right with simple switches connected directly to the alarm inputs, and a single output to some signaling device or a controlled piece of equipment. An external resistor is required to pull the output up to +5V (High) indicating a non alarm condition. This 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.

Typical Alarm Connections

```
                        Alarm Switches
1                       OPEN = no alarm
                        CLOSED = alarm activate

      1KOhm
                        Alarm Output
                        (To indicator, VCR, etc.)
16                      +5V = High = no alarm
                         0V = Low  = alarm activated

1     Vout
                        Alarm Output
                        Vout = High = no alarm
                         0V  = Low  = alarm activated
16
```

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.

High Current/Voltage Alarm Output

To be used when output current exceeds 50mA or when, non-alarm voltage exceeds 30Vdc. Voltage/Current limited by contacts of the relay being used.

CLOSED = Alarm activated
OPEN = No alarm

+5V Relay
Less than 10ma

CLOSED = No alarm
OPEN = Alarm activated

CLOSED = Alarm activated
OPEN = No alarm

+Vout Relay (Less than 30V)
(Less than 50ma)

Vout

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VCR MANUFACTURERS

The 860 SPX can be configured for use with any of the following VCR's.

Atsutsa TL VCR251
Atsutsa TL VCR964
Gyyr 1550x
Gyyr 2051x
Gyyr 1800
Gyyr 1400
Hitachi VTL30
Hitachi VTL2000
JVC BR9060
JVC BR S920/S925
Mitsubishi MS3600
Mitsubishi HS480
Mitsubishi HS5424
Mitsubishi HS5300
Mitsubishi BV-1300
NEC TL50
Panasonic 6010
Panasonic 6024
Panasonic 6040/6730
Panasonic 6720
Panasonic 6750
Panasonic 8050/8051
RCA TC3931
Sanyo TLS900
Sanyo TLS1000
Sanyo TLS2000
Sanyo WatchCorder
Sanyo SRT-500
Sony EVT801
Sony SVT100
Sony SVT3000/5000
Vicon VCR400
Vicon VCR401/410
Vicon VCR424

For VCR's which are not listed above, the standard 12 hour or standard 24 hour settings may be used. We have found that about 80 to 90 percent of the 'other' VCR's will work with these standard settings.

To accommodate any remaining VCR models, we provide a custom delay table which can be tuned for optimal performance with any VCR hourly format. With this table, the multiplexing rate of the 860SPX can be matched up to the multiplexing rate of the VCR.

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EQUIPMENT REQUIREMENTS

The QSP-860SPX is designed to work with all EIA compatible equipment. The QSP-860SPX will accept 2:1 interlace cameras in either a "line locked" or "free running" (internal reference) modes. For "roll free" camera sequencing on the live picture, "line locked" cameras must be used and they must be phased correctly (refer to the camera phasing section of your camera installation manual). Camera phasing does not effect recording or playback, only the live picture in the sequence mode. Random interlace cameras are not recommended.

SPECIFICATIONS

Physical
Dimensions .... 11-7/16" w X 9-5/16" d X 1.7/8" h
 .... (291 mm X 237 mm X 48 mm)
Weight (quad) .... 6.5 lbs (2.95 kg), Power Supply: 1.0 lbs (0.45 kg)
Operating Temp .... 32°F - 104°F (0°C - 40°C)

Video
Signal Format .... EIA 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 8 Bits (256 Gray Levels)
Refresh Rate .... 60 Fields Per Second All Quadrants (QUAD Mode Only)

Electrical
Power .... 12 V AC @ 3 Amp
Safety .... UL Listed and CSA Certified
EMI .... FCC Part 15, Class A

Connectors
Video In .... BNC, 1 Per Camera, Terminating, or Hi Z (8 Total)
Loop Thru .... BNC, 1 Per Camera
Monitor Video Out .... BNC
VCR Video Out .... BNC
Serial Port DB9
Alarm .... DB25 With Screw On Adapter Board
12 VAC, or 12 VDC .... Power Jack, 0.080" Pin Diameter

Controls
QUAD .... Return to Quad Display (VCR Playback Only)
SEQUENCE .... Calls Up Sequence Mode, or Freeze (VCR Playback Only)
PIP .... Calls Up Next PIP Mode (VCR Playback Only)
QUADRANT .... Rotates Quadrant (VCR Playback Only)
VCR .... Enables/Disables VCR Input For Recorder Playback
EIGHT CAMERA BUTTONS (1-8) .... Calls Up Individual Cameras Full Screen
IR Remote .... Duplicates Front Panel Controls
Termination Switches .... Selects 75 Ohm or Hi-Z Termination for 8 Video Inputs

LIMITED WARRANTY STATEMENT

Advanced Technology Video, Inc. will, upon receipt of proof of purchase, repair or replace, at its option, in the event of a manufacturing defect, all parts and labor up to two (2) years from original purchase date.

This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, accident, misuse, neglect, faulty installation or adjustment of controls or improper maintenance.

Except as herein expressly set forth, Advanced Technology Video, Inc. shall not, under any circumstances, be responsible for any direct, indirect, incidental or consequential damages, including, but not limited to, damage to the equipment.

For warranty service you must obtain a return authorization number by calling (206) 885-7000 and send the product, postage paid, with a copy of your sales receipt or other proof of purchase and date of purchase to the factory address.
Thank you for purchasing Advanced Technology Video, Inc. If you have any questions about the referenced service of your ATV product, please call the factory at (206) 885-7000.