

SPX16m

Owner's Manual

and

Operating Instructions

Instructions for basic operation and installation

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INTRODUCTION

Thank you for purchasing Advanced Technology Video's SPX16m sixteen camera monochrome multiplexer. This instruction manual describes the powerful features of this product for basic and advanced operation. It also covers the installation steps that will allow quick and easy integration into your security system.

The following section provides an overview of the operational features of the SPX16m. If you are familiar with the SPX16m, you should proceed to the **Getting Started** section on page 6 for step-by-step installation instructions.

OPERATIONAL FEATURES DESCRIPTION

Live Camera Displays

The SPX16m is initially in the Live Camera Display mode whenever power is applied to the unit. Live cameras can be displayed in full frame and full frame sequence formats. Any display can be frozen using a front panel button, the IR remote control, or external signal input. In live mode only, the unit can be programmed to sequence one or more cameras with a programmable dwell time.

The SPX16m's advanced video processing capability provides a Motion Detection function for each camera's input. Activity processing, for each camera, can be programmed in 240 regions (cells) and in conjunction with the Motion Detection feature, may be selectively enabled to provide an "alarm" condition for the multiplexer. Several types of motion can be detected and used to generate an alarm condition including combinations of, left to right, right to left and up and down, including all motion and various combinations of horizontal and vertical movement. See **Activity Multiplexing and Motion Detection Operation** on page 10 for further information regarding the configuration and use of this feature.

Multiplexer Recording/Playback

The SPX16m records each camera individually onto a single video frame of the VCR tape at a rate compatible with the VCR recording speed (record hours mode). Proper VCR playback operation requires that the SPX16m be set up to multiplex at the rate compatible with your VCR recording speed. See **VCR Set Up** on page 12. During multiplexing, a single frame from each camera is alternately output to the VCR. Dead or unconnected camera inputs will not be recorded. In order to optimize recording for your security situation, the frequency with which individual camera inputs are sampled for multiplexing may be configured using either Activity Multiplexing or the Customplexing™ multiplexing priority function. When Activity Multiplexing is enabled, the default multiplexing rate of a camera is automatically increased when activity is detected in the camera's image. Cameras with activity will be sampled more often than cameras with little or no activity. When Activity Multiplexing is disabled, the Customplexing™ feature is automatically enabled and up to four levels of multiplexing priority can be set for each camera using the **Multiplexing Priority Menu** on page 13. Alarm events will automatically raise the recording priority of the alarming camera to the highest level during the alarm condition. It is also possible to set the SPX16m so that only the alarming camera(s) is output to the VCR during an alarm. While multiplex recording is active, the live display mode can be set to full screen or full screen sequence without affecting the multiplex recording function.

In VCR playback mode, cameras can be displayed in 4x4, center insert, split quad, 3x3, quad, PIP, dual PIP, split screen, squish screen, or full frame formats. In addition, any display may be frozen. VCR playback incorporates digital decoding of the camera number from the tape so that screen images on the monitor may be updated at the rate that images appear on the tape. The default refresh rate of the playback monitor is the playback rate divided by the number of cameras being multiplexed. This will change when alarmed cameras or dead cameras are present or camera priorities have been changed.

DigiLock™ and Playback

In VCR playback mode, digital information is used to compensate for the poor vertical synchronization signals frequently encountered with time lapse VCRs.

The SPX16m DigiLock™ decoding reconstructs the timing so successfully decoded frames are displayed with minimal jumping, tearing or other side effects of poor synchronization.

VCR Bypass

Many VCRs have on-screen programming menus that require a monitor for programming the VCR. The SPX16m includes a “VCR Bypass” feature which facilitates VCR programming by allowing the SPX16m VCR input (VCR’s video output) to be routed directly to the display monitor. The “VCR Bypass” mode can also be used to directly view the VCR’s output for adjusting tracking or verifying proper VCR connections to the SPX16m.

Call Monitor

An additional, separate monitor function is provided to allow simultaneous viewing of full screen camera displays and full screen alarm or sequenced cameras. The Call Monitor output is always a full screen call up of any input camera. The camera to be viewed can be selected manually or may be selected automatically as the alarming camera. In addition, this output can be set to sequence through all selected cameras. (The default mode is sequencing). See **Call Monitor Operation** on page 9 for instructions on the operation of the Call Monitor.

Advanced Alarm System with Alarm Scheduling

The SPX16m contains the most advanced and flexible Alarm System available in a video multiplexer. The SPX16m Advanced Alarm System supports several programmable alarm types including external input, Motion Alarms, and Video Loss Alarms. In addition, the SPX16m alarm system can be enabled and disabled through a 7-day Alarm Schedule and/or a user programmable external Master Enable signal.

The SPX16m has sixteen alarm channels associated with the sixteen camera inputs. Each alarm channel includes a programmable external input, Video Motion Alarm, and Video Loss Alarm. External alarm inputs are individually selectable for contact closure or opening as well as logic levels (+5V, 0V). Each alarm channel may also be individually selected for enable/disable through the SPX16m Alarm Schedule. The Alarm Schedule is a 7-day timer schedule with a single ON and OFF time associated with each day of the week. The SPX16m also has an external input signal that can be selected between Picture Freeze and Alarm Master Enable. The Alarm Master Enable signal can be used in conjunction with your burglar alarm control panel so that the alarm control panel can enable or disable the SPX16m alarm system. For further information on **Alarm Scheduling** see page 19.

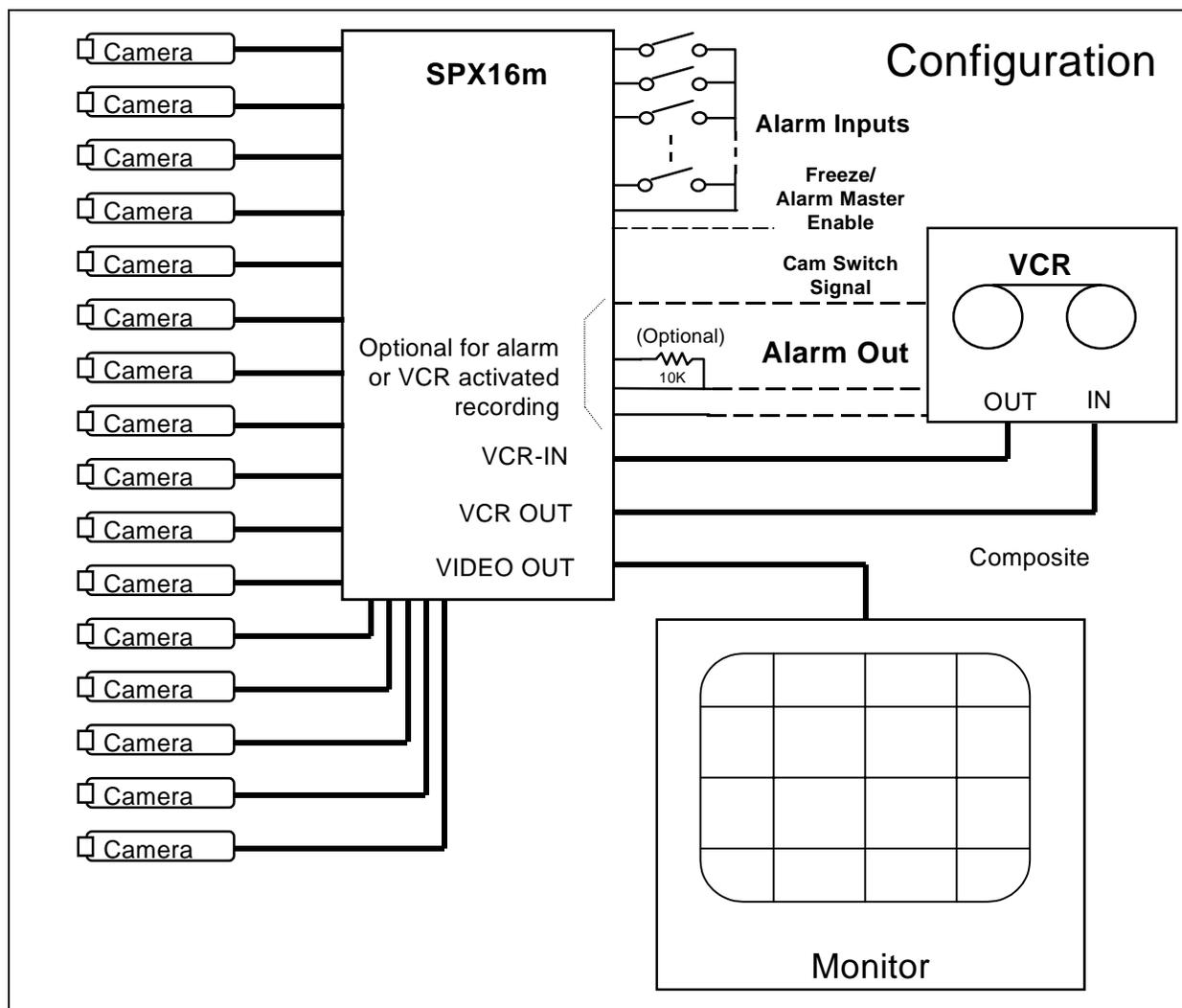
Alarm Log and Printing

The SPX16m has an internal Alarm Log that provides storage for up to 100 alarm events. In addition, its text can be transmitted to the serial port for printing or storage on a host computer. The Alarm Log is a circular storage buffer so that the most recent alarm events are always stored. In addition to the Alarm Log, alarm event text can also be sent directly to the serial port, when an event occurs, for immediate printing or external processing. Alarm events, which may be printed and stored in the Alarm Log, include any enabled External Alarms, Motion Alarms, or Video Loss Alarms. See **Alarm Log** on page 23 for instructions on the use of the SPX16m alarm log and printing features.

Variable Zoom

The SPX16m has an easy to use variable magnification and adjustable position Zoom capability up to 4x. The front panel buttons marked with arrow symbols are used to adjust the position of the Zoom window. The Zoom button and VCR buttons are used to zoom in and zoom out. Zoom is available in VCR playback mode only.

GETTING STARTED



The above diagram shows the typical 16-camera installation for the SPX16m. Up to sixteen cameras can be connected to the multiplexer using the back panel connectors.

Note: The VCR and monitor connections must be as shown above for proper operation.

Installation Steps

The following steps should be followed to ensure proper connection and set up of your SPX16m. A diagram showing the overall connection configuration of the SPX16m is shown above.

The installation steps are:

1. Connect your cameras, monitor, and VCR to the SPX16m as shown above. Refer to the **Rear Panel Connections** and **Video Termination Switches** sections on page 7 for proper connections and switch settings for your particular installation. Plug in the SPX16m to power up (there is no on/off switch) and enter the SPX16m **Set Up Menu** by pressing and holding the **DISPLAY** button for approximately 3 seconds. Refer to the "Set Up Menus" section of the manual starting on page 11.
2. Set the current time, date, and day of the week in the SPX16m using the "Set Time/Date" menu.

3. Determine the record speed (record hours format) you will use with your VCR and set up the SPX16m to work with your VCR using the "VCR Set up" and "VCR Selection" menus (see page 12).
4. Exit the SPX16m menus by pressing the DISPLAY button to exit each submenu and finally the main menu system.
5. If your VCR has internal on-screen menus for its set up, use the "VCR Bypass" feature of the SPX16m (see the "VCR Bypass Operation" description on page 9 to view the VCR's on-screen menus on the display monitor).
6. At this point, the basic configuration of your SPX16m is complete. You may now proceed to set more advanced functions as required for your installation (alarms, camera labels, multiplexing options, etc.). (Refer to the **Advanced Function Menus** starting on page 13).

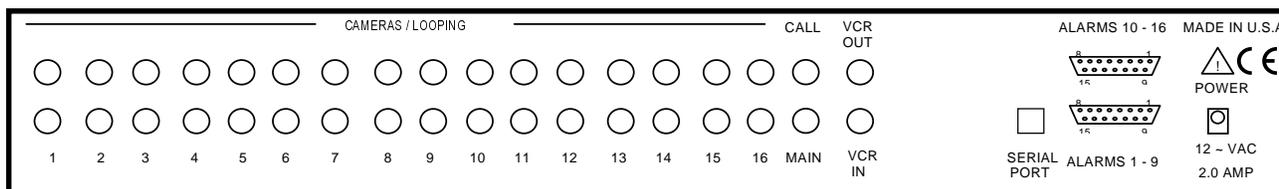
REAR PANEL CONNECTIONS

The sixteen camera input BNC connectors each have a looping output and the factory default configuration of each 75 Ohm termination is ON. Eight DIP switches inside the unit (see section "Video Line Termination Switches" below) determine whether the termination is ON or OFF for each camera input.

The SPX16m has 75 ohm BNC video outputs for the main and call monitors. Connect a 75 ohm coax cable between the "Main" monitor output and your primary monitor input. Connection of a separate monitor to the "Call" monitor output is optional.

Connect a 75 ohm coax cable from the "VCR IN" BNC to the video output of the VCR and a 75 ohm coax cable from the "VCR OUT" BNC to the video input of the VCR.

The two alarm connectors are a standard DB-15 type that will mate with the alarm wire adapter board or a standard computer-type cable. See page 22 for further alarm connection information.



REAR PANEL

TOP COVER REMOVAL

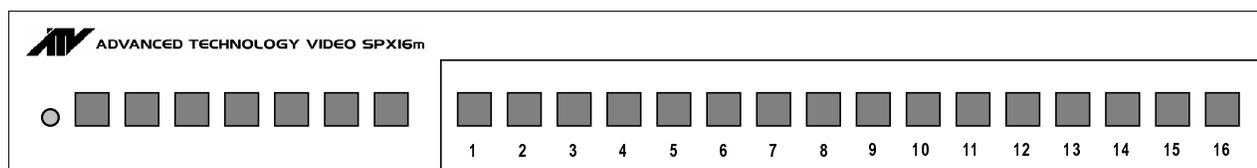
The top cover of the SPX16m should only be removed if it is necessary to adjust input termination settings, or RS-232 port settings. To remove the top cover, remove the 4 screws on each side. Gently slide the top cover back until the cover disengages from the plastic front panel bezel and then lift the cover off the chassis. **DO NOT ATTEMPT TO PULL THE COVER DIRECTLY UPWARD WITHOUT DISENGAGING IT FROM THE FRONT BEZEL.**

VIDEO LINE TERMINATION SWITCHES

Removing the top cover accesses the video line termination switches for each camera input. The switches are located in pairs near the back panel on the main circuit board. Each switch pair is marked on the circuit board and the 75 ohm termination is enabled when the switch is in the "ON" position. (The factory default setting for each input is 75 ohm termination "ON").

Note: There is an additional termination switch for the VCR input.

OPERATION



Your SPX16m has seven mode control buttons and sixteen numbered camera buttons which allow easy access to all modes of operation. The seven mode buttons on the left are used to control monitor display operations and VCR playback. An LED below each button will light when the unit is in the mode corresponding to that button. Following is a summary of each button's function and the SPX16m operating modes.

DISPLAY

During the VCR playback mode, this button cycles the monitor display through the 4x4, center insert, split quad, 3x3, and quad displays. In addition, it will return the unit to the 4x4 mode from any other display mode. A push and hold of this button for approximately 3 seconds will bring up the SPX16m Set Up Main Menu.

Note: *Live camera full frame display mode **does not** affect multiplex recording.*

FREEZE

A press of this button will freeze the camera image(s) on the monitor display. Another push of this button will deactivate the freeze mode. This button is also used to pan left in Zoom mode.

SEQUENCE

A button press will activate the camera sequencing for the present mode (except Zoom) and another push of this button will deactivate the sequencing mode. The default camera sequencing time is 3 seconds. A button press during "VCR Playback" mode will cause a multicamera display to switch to the next set of cameras. This button is also used to pan right in Zoom mode.

PIP

When starting in the 4x4, center insert, split quad, 3x3, quad, or full screen camera display in VCR playback mode, 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", "Squish Screen", "Full Frame" and back to "Single PIP" displays. How cameras will appear in these displays is programmable (See "Sequence Set Up" on page 17). This button is also used to pan up in Zoom mode.

QUADRANT

This button rotates the orientation of the cameras clockwise on the screen into the desired positions in PIP, Dual PIP, Split Screen, and Squish Screen display for VCR playback mode. This button is also used to pan down in Zoom mode.

ZOOM

The ZOOM function will expand the selected portion of a full frame camera image in playback only. A button press will cause a box to appear on the screen that indicates the image area that will be expanded. Successive button presses will increase the magnification factor from 2X to 4X.

VCR

Pressing this button will switch monitor display from the live camera display mode to the **VCR Playback** mode. The LED indicator will light to show that VCR playback is now possible. The display will initially be in 4x4 mode and the monitor screen will show the message "VCR Playback". To see non-multiplexer images (VCR setup menus for example) or to troubleshoot VCR tracking or other problems, the **VCR Bypass** function is used. See the following description for the VCR Bypass function. When the SPX16m is in Zoom mode, this button will cause the image to zoom out to the next lower magnification factor and eventually back to full screen.

VCR Bypass Function Operation

An approximately 3 second long press of the VCR button activates the VCR Bypass function. The VCR LED will flash while the unit is in VCR Bypass mode. While in this mode, the SPX16m will pass the VCR output directly to the main display monitor. A single push of the VCR button will return the unit to normal VCR playback mode and/or back to live display mode. The VCR output is also available on the Call Monitor.

CAMERA Buttons (1 Through 16)

The individual camera buttons 1 through 16 are used to select which camera is to be used for display purposes during Live Display or VCR Playback modes. In addition, Camera buttons 1 through 16 are used in the SPX16m set up menus.

Call Monitor Operation

The Call Monitor output is always active and is independent of the main display monitor. The camera that is being viewed on the Call Monitor may be selected by pressing the FREEZE button (except while in Zoom mode) and holding it for approximately 3 seconds. When the SPX16m is in Call Monitor mode the FREEZE LED will flash on and off. At this time, any camera that is "alive" may be selected by pressing the CAMERA button. In addition, the Call Monitor output may be set to sequence through a programmed set of "alive" cameras by pressing the SEQUENCE button. The SEQUENCE LED will light and the Call Monitor output will sequence through the programmed set of cameras (See **Sequence Set Up** on page 17). The Call Monitor output defaults to sequencing mode and will automatically display any alarming camera. It is also possible to view the VCR IN and VCR OUT signals using the Call Monitor. When in "Call Monitor" mode, a single press of the VCR button will display VCR IN on the Call Monitor. A second press of the VCR button will display VCR OUT.

Remote Control Operation

The IR remote control provided with your SPX16m has a limited set of buttons and operations. The remote control is different than the SPX16m front panel. The remote control has a single CAMERA button for selecting cameras and successive button presses will rotate through the available cameras. Sequencing is initiated by pressing and holding the remote control's FREEZE button for approximately 3 seconds. Pressing and holding the remote control's PIP button for approximately 3 seconds accesses the Call Monitor mode. Pressing and holding the QUADRANT button for approximately 3 seconds accesses the ZOOM function in Playback.

***Note:** The menus are not available through the remote control. It also must be programmed any time the batteries are removed. "See Programming Your ATV SPX16m Remote Control on page 26".*

Activity Multiplexing and Motion Detection Operation

The Activity Multiplexing feature of the SPX16m can be used to control camera multiplexing. The Motion Detection feature can be used to generate alarm conditions. Activity Multiplexing does not need to be enabled for Motion Detection to generate alarms. Activity/Motion processing, when enabled, will be active on every “live” camera input and can be individually customized for each camera. Activity/Motion processing control and set up is found in the **Camera Set Up Menu** on page 13.

Note: *Camera multiplexing priority is determined by either Activity Multiplexing or Customplexing™, but not both simultaneously.*

When Activity Multiplexing is enabled, Customplexing™ camera priority settings are **not** used to determine camera multiplexing priority. Similarly, when Activity Multiplexing is disabled, Customplexing™ camera priority settings, and not Activity Multiplexing, are used to determine Multiplexing Priority. Alarming camera(s) will always have a high priority.

There are four programmable settings possible for each camera under the **Motion Detection Menu** on page 14; “Activity Thresholds”, “Enable/Disable Activity Zones”, “Motion Type” and “Motion Size”. The “Activity Threshold” is a relative sensitivity level for activity within the entire camera image. Higher numbers represent a higher threshold value and therefore a lower sensitivity to activity. In order to allow areas of an image to be enabled or disabled for activity/motion detection, each camera’s image is divided into 240 regions (15 columns by 16 rows). The “Enable/Disable Activity Zones” option in the “Motion Detection” menu is used for programming of these regions for each camera. To facilitate the identification of areas of an image with activity, an “auto detection” mode for “Activity Zones” programming is provided. The on-screen instructions allow efficient configuration of each camera’s Activity/Motion Detection settings.

“Enable/Disable Activity Zones” and “Activity Threshold” settings for each camera are used to determine the motion input for the Motion Detection modes. When activity is detected in a camera image, the SPX16m does further processing using the other Motion Detection settings to determine if valid motion is present in the image. The “Motion Type” settings include, activity, all motion, horizontal only, vertical only, left to right only, right to left only, top to bottom only and bottom to top only. In conjunction with “Motion Type”, there are programmable height and width size settings that are used in determining if valid motion has occurred in the image. These size settings can be used to filter out small objects in motion that may not be valid for generation of a motion alarm. A size setting of height=1 and width=1 equals one of the 240 zones on the image.

SET UP MENUS

The SPX16m Set Up is accomplished through its on-screen menus. To enter the menu system, push and hold the **DISPLAY** button for approximately 3 seconds. The display will then show the main menu. Selection of any menu item is done with the camera select keys on the front panel. Selecting **DISPLAY** will exit the present menu level.

Note: *Since SPX16m operating modes are affected by menu settings, **the SPX16m will not operate as desired until the menu system is exited**, and will return the SPX16m to its normal operating mode.*

Main Menu

Selecting:

1. Enters "Set Time/Date" menu to program the internal clock and select time and date display options.
2. Enters "VCR Set Up" menu to select VCR type and recording format (Hours).
3. Enters "Camera Set Up" menu to program camera labels, set recording priorities and set activity/motion settings.
4. Enters display "Sequence Set Up" menu to set the sequence cameras will be displayed in.
5. Enters "Alarm Set Up" menu to enable/disable alarms and program alarm action.
6. Enters the "Other Options" menu where you can select remote control code, program a security code for locking out the menus and the front panel buttons, change text color and background, or reset unit to factory defaults.
7. Selects the language used for SPX16m menus and messages.

Time/Date Setting

Time and date for the on-screen calendar and clock is set from this menu.

Selecting:

1. Edits the hour of the day. In 24-hour mode, 0 through 23 is accepted as entered.
2. Edits the minutes' field. Only values 0 through 59 are accepted.
3. Edits the seconds' field. Only values 0 through 59 are accepted.
4. Edits the day of the month. Only valid values for the month selected will be accepted.
5. Advances the month with each press.
6. Edits the year.
7. Advances the Day of Week field with each press.
8. Toggles the format between AM / PM / 24-Hr.
9. Enters the time and date "Display Options" menu to position the display on the screen.

Advanced Technology Video SPX16m v2.1	
<ol style="list-style-type: none"> 1: Set Time/Date . . . 2: VCR Set Up . . . 3: Camera Set Up . . . 4: Sequence Set Up . . . 5: Alarm Set Up . . . 6: Other Options . . . 7: Language 	<p>Camera: Select DISPLAY: Exit Menu System</p>

Set Time/Date	
<p>06:30:00</p> <ol style="list-style-type: none"> 1: Edit Hours 2: Edit Minutes 3: Edit Seconds 7: Edit Day of Week 8: Time Format AM/PM/24hr 9: Other Display Options . . . 	<p>23 MAR 98 MON</p> <ol style="list-style-type: none"> 4: Edit Day 5: Edit Month 6: Edit Year <p>Camera buttons 1-7 to select field Camera button 8 to select format Camera button 9 for other options DISPLAY: Accept and Return</p>

Other Display Options	
<ol style="list-style-type: none"> 1: Location Lower Right 2: Display On 3: VCR On <p>Camera: Select Location is fixed in Multicamera Displays DISPLAY: Accept and Return</p>	

The times shown in this menu come directly from the internal clock. 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" field last. The current time and date are preserved if a new entry is not accepted or completed.

Other Display Options

This menu determines the display behavior of the date and time information for both the VCR and monitor camera displays.

Selecting:

1. Toggles the time and date display location through any one of the display quadrants for live camera displays.
2. Toggles the time and date for the monitor display ON/OFF.
3. Toggles the time and date for the VCR display ON/OFF.

VCR Set Up

Selecting:

1. Enters the "VCR Selection" menu for setting of a particular make and model of VCR.
2. Toggles the VCR record time format through up to 8 possible settings plus "Cam Sw Input" for the selected VCR. (The factory default is "24-Hour" format).

VCR Set up

Current VCR: Standard 12Hr steps

1: VCR Selection . . .

2: VCR Format: 24 Hr

3: VCR Alarm Format: 2 Hr

4: Advanced VCR options . . .

PIP: Restore Default Settings

Camera: Select

DISPLAY: Accept and Return

Note: If the "Cam Sw Input" is used, it will automatically follow both the VCR and Alarm recording formats.

3. Toggles the VCR record time format as in #2 above for an alarm condition. If the value chosen is different from the "VCR Format", the VCR must be wired to the multiplexer's alarm output so that it changes to the recording rate selected under an alarm condition. (The factory default is "2-Hour format").
4. Enters "Advanced VCR options" menu for customization of the delay table, video format, and playback discriminator functions. For more information on **Advanced VCR options** see page 25.

VCR Selection

Current VCR: Standard 12Hr steps

1: Standard 12Hr steps

2: Standard 24Hr steps

3: Custom Delay Table

4: Atsutsa TL VCR251

5: Atsutsa TL VCR964

6: Burle LTC 3930

7: Burle LTC 3960

8: Burle LTC 3961 Long

9: Burle LTC 3961 Short

Camera 1-9: Select VCR

PIP: Next Page

DISPLAY: Previous Menu

VCR Selection

Selecting:

- 1 - 9** Selects a particular VCR from the displayed list.

The first two entries are for standard 12 and 24-hour steps which will accommodate most VCRs. (The factory default is "Standard 12 Hr steps")

PIP Pages the list forward for more selections. The display will cycle back to the first page after the last page is reached.

If your VCR is not on the list, use a "Standard steps" selection. For time settings which are a multiple of 12 hours (2, 12, 24, etc.), use the Standard 12-Hour steps. If time settings are a multiple of 24 hours (2, 24, 48, etc.), use the Standard 24 Hour steps. If your VCR settings do not correspond with the either the 12 or 24-Hour Standard steps, refer to the section "What to do if your VCR is not on the supported list" on page 27.

ADVANCED FUNCTION MENUS

This section describes the use of the advanced functions of the SPX16m. The following features allow you to customize the operation of your SPX16m as necessary to complete your installation.

Camera Set Up

This menu determines the display behavior of the camera labels and allows access to menus for entering/changing labels, setting up camera record priority, disabling of a camera in the live display, or to set up Motion Detection. Like time and date, both the VCR and monitor displays can be independently enabled/disabled.

Selecting:

1. Toggles the camera labels ON/OFF for the monitor display.
2. Toggles the camera labels ON/OFF for the VCR display.
3. Toggles Activity Multiplexing ON/OFF for all cameras.
4. Enters "Change Labels" menu to review, enter, or change camera labels.
5. Enters the "Multiplexing Priority" menu (CUSTOMPLEXING™ function).
6. Enters the "Monitor Disable" menu to allow a camera to be turned off in the live display.
7. Enters "Motion Detection" menu to program Activity/Motion options on each camera input.

Camera Label Changing

This menu is used for adding/changing labels that are associated with each of the sixteen cameras.

Selecting:

- 1 - 9** Selects the camera for editing and exposes the legend at the right hand side of the screen. After pressing a Camera **1-9** button, the display will appear as shown.

Since we have a limited set of front panel buttons, the **PIP** button is used to input characters. Using the legend, any character can be entered in the present character location. The **SEQUENCE** button is used to move to the next location.

**CUSTOMPLEXING™
(Multiplexing Priority)**

Selecting:

- 1 - 16** Toggles the camera between Alarm Only, High, Medium or Low Priority. (The factory default is "High Priority").

When the Activity Multiplexing feature is OFF, the camera priorities affect how frequently a camera's image is stored. The factory default in all cameras is set to "High Priority". Using the factory defaults, the camera multiplexing ordering is: 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,1,2,3,4,5,6,

Camera Set Up	
1: Labels on Display:	On
2: Labels on VCR:	On
3: Activity Multiplexing:	On
4: Change Labels...	
5: Multiplexing Priority...	
6: Monitor Disable...	
7: Motion Detection . . .	
PIP: Restore Default Settings	
Camera: Select	
DISPLAY: Accept and Return	

Change Labels	Characters
	PIP: Space 0
1: C	1: ABC1
2: CAM 2	2: DEF2
3: CAM 3	3: GHI3
4: CAM 4	4: JKL4
5: CAM 5	5: MNO5
6: CAM 6	6: PQR6
7: CAM 7	7: STU7
8: CAM 8	8: VWX8
9: CAM 9	9: YZ9
SEQUENCE: Next Character	
DISPLAY: Accept Label	

Multiplexing Priority	
Activity Multiplexing Enabled	
1: High	9: Low
2: High	10: Low
3: High	11: Low
4: High	12: Low
5: Medium	13: Ext Alarm Only
6: Medium	14: Ext Alarm Only
7: Medium	15: Ext Alarm Only
8: Medium	16: Ext Alarm Only
Camera: Select	
DISPLAY: Accept and Return	

The SPX16m priority method gives medium priority cameras twice as many frames as low priority cameras. Similarly, high priority cameras get twice as many frames as medium priority cameras. "Alarm Only" cameras are not recorded unless their alarm inputs are stimulated and there is a live video signal present. "Alarm Only" cameras, under alarm conditions, will be multiplexed like any other alarm camera. Dead or non-existent cameras will not be recorded.

Cameras under alarm conditions have a higher priority than "High Priority" cameras and will be given twice as many frames. Even under multiple alarm conditions, all cameras are guaranteed some VCR frames. It is not possible to disable multiplexing of alarmed cameras without disabling the alarm input itself (which will prevent both monitor and VCR alarm activity).

Camera Monitor Disable

This menu allows an individual camera to be eliminated from the monitor live mode display and the Call Monitor while the camera continues to be recorded (multiplexed). A "Record Only" camera is replaced by the "dark grey background" in live display. A "Record Only" camera's video is still multiplexed.

Selecting:

- 1 - 16** Toggles the camera's live display from "Display" (on Main Monitor) to "Record Only". The default is "Display" (on Main Monitor).

In the example shown, Camera 16 is set to "Record Only" and its image will be replaced by the "dark grey background" in live displays.

Note: *The presence of the camera signal is still detected on any camera set to "Record Only". The "No Video" indication will be given on the live display along with the "dark grey background" if the camera's signal is not present.*

Monitor Disable	
1: Display	9: Display
2: Display	10: Display
3: Display	11: Display
4: Display	12: Display
5: Display	13: Display
6: Display	14: Display
7: Display	15: Display
8: Display	16: Record Only
Camera: Select	
DISPLAY: Accept and Return	

Motion Detection Set Up

This menu is used to access and program Activity Thresholds, Enable and Disable Activity Zones, set Motion Type and Motion Size for each individual camera input. The camera's Activity Threshold determines the sensitivity to change within an image that will trigger Motion Detection by the SPX16m activity processing. Activity Zones are the regions within an image where detected activity information is acquired and processed. A camera image is divided into 240 "activity zones" (15 columns x 16 rows), each of which may be enabled or disabled for activity processing.

See **Activity Multiplexing and Motion Detection Operation** on page 10 for further information.

Selecting:

- 1. Enters "Activity Thresholds" menu to select camera and set thresholds.
- 2. Enters "Enable/Disable Activity Zones" menu to select camera and program activity detection regions.
- 3. Enters "Motion Type" menu to set the type of motion to be detected for each camera.
- 4. Enters "Motion Size" menu to set vertical (Height) and horizontal (Width) size factors for motion detection on each camera.

Motion Detection	
1: Activity Thresholds . . .	
2: Enable/Disable Activity Zones . . .	
3: Motion Type . . .	
4: Motion Size . . .	
Camera: Select	
DISPLAY: Accept and Return	

Activity Thresholds

Selecting:

- 1 - 16** Select a camera to set Activity Thresholds.

After selecting a camera to set Activity Thresholds, the camera's image will appear on the monitor and the display will show a pattern of "A's" for any cell in which activity is being detected. Use the "Up" (PIP) and "Down" (QUADRANT) buttons to change the threshold for the camera. Higher numbers reflect a higher threshold, which means lower sensitivity to activity changes. Correspondingly, lower threshold numbers reflect a lower threshold and greater sensitivity to activity change. Also, "Motion" is displayed when the Motion criteria are met.

Activity Zones

Selecting:

- 1 - 16** Select a camera enable or disable Activity Zones.

After selecting a camera, the camera's image will appear on the monitor and the display will show a blinking cursor indicating the activity detection cell that can be modified. Use the on-screen text instructions to enable/disable a cell, row of cells, column of cells, set/clear activity detection cells, or enter the "Auto Detect" mode. When a cell has been disabled, a pattern of "X's" will appear. The "Auto Detect" mode allows motion existing in the image to automatically disable the cell in which activity is being detected. This speeds set-up by disabling areas of the image where there is constant change, such as an outside road with cars moving through it, where you do not want to detect activity or motion.

Motion Type

This menu is used to select the type of motion to be detected with each camera. There are 8 types of motion that can be detected as shown in the example.

Selecting:

- 1 - 16** Toggles the selected camera alarm between "Activity", "All Motion", "Horizontal Only", "Vertical Only", "Left to Right Only", "Right to Left Only", "Top to Bottom Only", and "Bottom to Top Only". (The factory default is "Activity").

Motion Type	
1:	All Motion
2:	Horizontal Only
3:	Vertical Only
4:	Left to Right Only
5:	Right to Left Only
6:	Top to Bottom Only
7:	Bottom to Top Only
8:	Activity
9:	Activity
10:	Activity
11:	Activity
12:	Activity
13:	Activity
14:	Activity
15:	Activity
16:	Activity
Camera: Select	
DISPLAY: Accept and Return	

Motion Sizes

This menu is used to set up the number of vertical (height) and horizontal (width) cells that must have activity to detect motion. (Horizontal motion requires at least the number of cells specified in the height parameter. Vertical motion requires at least the number of cells specified in the width parameter). Activity or all motion requires either the height or width parameters to be met.

Selecting:

1 - 16 Selects the camera to modify Motion Size.

When a camera is selected, you can enter a value representing the number of vertical (Height) and horizontal (Width) cells which must show activity before motion is detected. The minimum value is 1 for both height and width and the maximum value is 16 for height and 15 for width, which corresponds to all cells in a column or row, respectively.

Motion Size			
	Height	Width	
1:	2	2	1x1 <input type="checkbox"/>
2:	2	2	
3:	2	2	1x2
4:	2	2	<input type="checkbox"/>
5:	2	2	
6:	2	2	2x2
7:	2	2	
8:	2	2	<input type="checkbox"/>
9:	2	2	
10:	2	2	
11:	2	2	
12:	2	2	
13:	2	2	
14:	2	2	
15:	2	2	
16:	2	2	

Camera: Select
 DISPLAY: Accept and Return

Sequence Set Up

The SPX16m has a programmable display sequence format for display modes that support sequencing. The image hold (dwell) time is also programmable.

A unique feature of the SPX16m is the option to customize the display sequence format to suit your application. You can program a specific selection of cameras for sequencing.

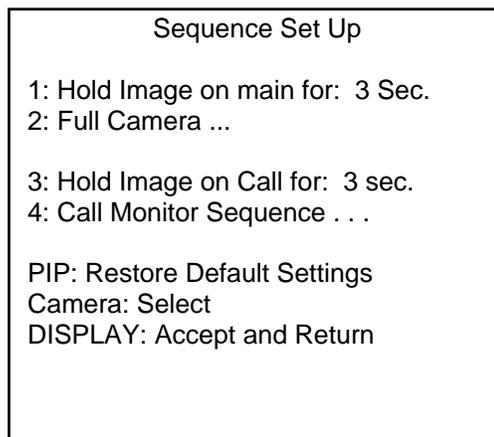
Selecting:

1. Enters edit mode for main monitor dwell time.
2. Enters "Full Camera" format menu.
3. Selects the Call Monitor dwell time for edit.
4. Enters the "Call Monitor" format menu.

Note: *Any changed camera display sequence will not be applied until the display sequencing mode is activated by the front panel button.*

While editing:

- 1 - 9** Used to enter digits "1" through "9".
- PIP** Used for "0" entry.
- DISPLAY** Completes the entry if less than 3 digits and returns to the previous value if no digits are entered.



Sequencing Format Screens

The first of the SPX16m Sequencing Format Screens are shown below.

Note: Each display insert position is shown as the factory default.

All cameras selected for a particular insert position will be sequenced in order when displayed in that position. **At least one camera must be selected for each position.** The SPX16m will not allow the last remaining entry to be deleted.

<p>Full Camera Display Sequence</p> <p>1: Cameras: 12345678910111213141516</p> <p>Enter Cameras you want displayed in the sequence</p> <p>Camera: Select DISPLAY: Accept and Return</p>

<p>Call Monitor Display Sequence</p> <p>1: Cameras: 12345678910111213141516</p> <p>Enter Cameras you want displayed in the sequence</p> <p>Camera: Select DISPLAY: Accept and Return</p>
--

The above screens show the factory default values. For any particular camera display, cameras are sequenced in ascending numerical order and cannot be repeated.

Alarm Set Up

Selecting:

1. Enters individual camera "External Alarms" enable/disable menu.
2. Enters individual camera "Motion Alarms" enable/disable menu.
3. Enters individual camera "Video Loss Alarms" enable/disable menu.
4. Enters "Set Alarm Enable Schedule" menu.
5. Enters "Enable Scheduled Alarms" menu.
6. Enters "Alarm Control Options" menu.
7. Enters "Alarm Log" menu.
8. Toggles options for displaying an alarming camera display among the following: "Main + Call" monitors, "Call Only", "Main Only", or "No Display". (The factory default is "Main + Call").
9. Toggles Serial Alarm Output between "On" and "Off". (The factory default is "Off"). When Serial Alarm Output is "On", alarm event text will be sent directly to the serial port (printer) as well as the Alarm Log. The Serial Alarm Output does not need to be "On" in order to output (print) the Alarm Log.

<p>Alarm Set Up</p> <p>1: External Alarms . . .</p> <p>2: Motion Alarms . . .</p> <p>3: Video Loss Alarms . . .</p> <p>4: Set Alarm Enable Schedule . . .</p> <p>5: Enable Scheduled Alarms . . .</p> <p>6: Alarm Control Options . . .</p> <p>7: Alarm Log . . .</p> <p>8: Display Alarm on: Main + Call</p> <p>9: Serial Alarm Output: Off</p> <p>PIP: Restore Default Settings</p> <p>Camera: Select DISPLAY: Accept and Return</p>
--

External Alarms

Selecting:

- 1 - 16** Toggles the selected camera external alarm between "On" and "Off".

Camera alarms can come from the external alarm input. When an alarm event occurs on the alarm input enabled with this menu, an alarm output will be generated if the alarming camera input is enabled through the "Enable Scheduled Alarms" menu (See "Alarm Scheduling" below). If the event is allowed to occur, the alarming camera(s) will be displayed, and the alarming camera(s) will have an increased multiplexing rate. When an alarm is disabled (Off), an alarm input will not affect any aspect of the VCR multiplexing, the live camera display or the Call Monitor display. Alarms that are turned off will not generate an alarm output.

External Alarms	
1: On	9: Off
2: On	10: Off
3: On	11: Off
4: On	12: Off
5: On	13: Off
6: On	14: Off
7: On	15: Off
8: On	16: Off
Camera: Select	
DISPLAY: Accept and Return	

Motion Alarms

Selecting:

- 1 - 16** Toggles the selected camera Motion alarm between "Off" and "On". (The factory default is "Off").

An alarm can be generated with the detection of motion. When a Motion Alarm occurs, an alarm output will be generated and multiplexing will occur as described in External Alarms above. Alarms that are turned off will not generate an alarm output or affect multiplexing.

Motion Alarms	
1: Off	9: On
2: Off	10: On
3: Off	11: Off
4: Off	12: Off
5: Off	13: Off
6: Off	14: Off
7: Off	15: Off
8: Off	16: Off
Camera: Select	
DISPLAY: Accept and Return	

Video Loss Alarms

Selecting:

- 1 - 16** Toggles the selected camera Video Loss alarm between "On" and "Off" (The factory default is "Off").

An alarm (and alarm output) will be generated upon loss of video input on any camera with the Video Loss Alarm enabled. The "No Video" message will be displayed when a camera video input is lost, regardless of the alarm settings.

Video Loss Alarms	
1: On	9: Off
2: On	10: Off
3: On	11: Off
4: On	12: Off
5: On	13: Off
6: On	14: Off
7: On	15: Off
8: On	16: Off
Camera: Select	
DISPLAY: Accept and Return	

Alarm Scheduling

The SPX16m contains a very flexible and advanced alarming system designed to provide an optimum solution for any installation. Along with the ability to enable various types of alarm inputs, a built in 7-day timer may also be used to individually enable and disable each alarm. The following menus are used to set the timer and select which alarms the timer will control.

Set Alarm Enable Schedule

Selecting:

- 1 - 7** Selects a day of the week to modify “On” and “Off” times.
- 8** Copies the “On” and “Off” times of Monday to all the other weekdays (Tuesday – Friday).
- 9** Copies the “On and “Off” times of Saturday to Sunday.

When a day of the week is selected for scheduling (1-7), the display will change to reflect the time you are editing and additional button functions will be displayed. When editing times for a selected day, the **QUADRANT** button will set the alarm system to be “On All Day”. Similarly, the **ZOOM** button will set the alarm system to be “Off All Day”. When editing a time field, Camera buttons are used to enter digits 1 through 9 and the **PIP** button is used to enter 0. The **SEQUENCE** button will move to the next editable field then up through the last editable field where it will accept the line and return the display to the non-edit mode as shown. The **DISPLAY** button will accept the current entry and move to the next editable field up through the last editable field where it will accept the line and return the display to the non-edit mode as shown.

Set Alarm Enable Schedule		
	On Time	Off Time
1: Monday	6:00PM	6:00AM
2: Tuesday	6:00PM	6:00AM
3: Wednesday	6:00PM	6:00AM
4: Thursday	6:00PM	6:00AM
5: Friday	6:00PM	6:00AM
6: Saturday	Off All Day	
7: Sunday	On All Day	
8: Copy Monday to Tuesday – Friday		
9: Copy Saturday to Sunday		
Camera: Select		
DISPLAY: Accept and Return		

Note: The setting of the hour’s format in the “Time and Date” menu will determine the hour format displayed in this menu. When the system is in 12-hour time mode, the AM/PM field must also be edited. The menu display will change to reflect this when an AM/PM field is being edited. (The factory default “On” and “Off” times for each day of the week are “ON at 18:00 (6:00PM) and OFF at 06:00” (6:00AM).

Enable Scheduled Alarms

Selecting:

- 1 - 16 Toggles the selected camera alarm between “Normal” and “Scheduled”. (The factory default is “Normal”).

When “Normal” enable mode is selected, camera alarm event types selected through the **Alarm Activation Type menu** (see page 22) will generate an alarm. Similarly, when “Scheduled” enable mode is selected, the same camera alarm event will only generate an alarm if the current time and day of the week fall within the “On” and “Off” times specified in the “Set Alarm Enable Schedule” menu (see page 20). Camera alarm events occurring outside of the “On” and “Off” times specified will be ignored when the “Scheduled” enable mode is selected.

Alarm Control Options

Selecting:

- 1. Enters the “Set Alarm Hold Times” menu.
- 2. Enters the “Set Alarm Activation Type” menu.
- 3. Toggles the “External Control Input” between picture “Freeze” and alarm “Master Enable”. (The factory default is “Freeze”).
- 4. Toggles the alarm “Master Enable Input Type” between “Logic Low” and “Logic High”. (The factory default is “Logic Low”).

When the “External Control Input” is selected to be picture “Freeze”, a single pulse on the input will freeze the current picture on the main display. Another single pulse will return the display to its normal updating mode. When the alarm “Master Enable” mode is selected, the entire SPX16m alarm system will be enabled or disabled by this input according to the logic level specified by the “Master Enable Input Type” setting. This input can be used to control the SPX16m alarm system from a burglar alarm system, or other external control system.

Note: *Video Loss Alarms, when enabled, are not affected by the “Master Enable” input or the “Alarm Schedule”.*

Enable Scheduled Alarms	
1: Normal	9: Normal
2: Normal	10: Normal
3: Normal	11: Normal
4: Normal	12: Normal
5: Normal	13: Normal
6: Normal	14: Normal
7: Normal	15: Normal
8: Normal	16: Scheduled
Camera: Select	
DISPLAY: Accept and Return	

Alarm Control Options	
1: Set Alarm Hold Times . . .	
2: Set Alarm Activation Type . . .	
3: External Control Input: Freeze. .	
4: Master Enable Input Type: Logic Low	
Camera: Select	
DISPLAY: Accept and Return	

Alarm Dwell Adjustment

Selecting:

1. Allows changing the alarm ACTIVATION HOLD time.
2. Allows setting of a MAXIMUM time for an alarm to be displayed.
3. 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 "Hold Detected Alarms" time is the amount of time that the alarm event will be held so that the alarm camera image can be kept on the display screen and multiplexed at a high frame rate to the VCR.

The maximum time for holding an alarm display set in the "Disable Detected Alarms after" option will determine how long a continuous alarm camera will be displayed. This can be adjusted so that a continuous alarm will not consume all of the VCR's record time. A value of zero will result in no time limit for an alarm display. (The factory default is "0").

The "Hold Alarmed Images" time determines the image display hold time. When multiple alarms occur simultaneously, the monitor display will sequence between all cameras with alarms using this dwell time. Every alarming camera will be multiplexed to the VCR at a high priority "alarm" frame rate.

Both delay times are adjustable from 1 to 255 seconds though the default is 3 seconds for the activation hold and 3 seconds for the sequence dwell time. Camera buttons are used to enter digits 1 through 9 and the **PIP** button is used to enter 0. The **DISPLAY** button stops the editing of a delay value.

Set Alarm Hold Times

1: Hold Detected Alarms
for: 3 Sec.

2: Disable Detected Alarms
after: 0 Sec.

3: Hold Alarmed Images
for: 3 Sec.

Camera: Select
DISPLAY: Accept and Return

Alarm Activation Type

Selecting:

- 1 - 16** Toggles the selected camera between "Contact Closure", "Contact Open", "Logic Low", or "Logic High" triggering the alarm.

In many applications the switch contact connection is between the alarm input pin and the chassis or signal ground. In the SPX16m 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" (Logic Low) the input as a normal condition or as an alarm condition. The four activation modes are provided to simplify connection to most alarm sources. See "Alarm Interconnection on the SPX16m" on page 29. (The default Alarm Activation Type is "Contact Closure").

The SPX16m alarm activation is defined as follows:

- Contact Closure: The alarm pin is connected to a current source (either +5V or ground).
- Contact Open: The alarm pin is not connected to any current source (unconnected pin).
- Logic Low: A logic "low" level less than 0.8V (ground) is present at the alarm pin.
- Logic High: A logic "high" level greater than 2.4V (+5V) is present at the alarm pin.

Set Alarm Activation Type

1: Contact Closure 9: Contact Closure
2: Logic Low 10: Contact Closure
3: Logic High 11: Contact Closure
4: Contact Open 12: Contact Closure
5: Contact Closure 13: Contact Closure
6: Contact Closure 14: Contact Closure
7: Contact Closure 15: Contact Closure
8: Contact Closure 16: Contact Closure

Camera: Select
DISPLAY: Accept and Return

Alarm Log

The Alarm Log menu is used to view the current contents of the internal Alarm Log and to clear the log or transmit the log contents to the serial port for printing. The Alarm Log contains the time, date, camera number, and type of alarm for each alarm event that has been stored. The Alarm Log can store up to 100 alarm events at which point new alarm events continue to be stored and replace the oldest event in the buffer. An "Overflow" message is displayed in the upper left corner of the Alarm Log menu if more than 100 events have occurred indicating older alarm events have been displaced. The Alarm Log is a very useful tool for reviewing the VCR recording allowing rapid location and review of recorded video time periods of interest.

The Alarm Log may be printed on a serial interface printer that is connected to the SPX16m Serial Port. The log may also be sent to a host computer for storage or processing rather than a printer.

Pressing the ZOOM button can clear the Alarm Log.

Alarm Log		Page 1/5	
Time	Date	Cam	Type
09:49:27AM	15AUG97	1	VidLoss
10:40:28AM	16AUG97	2	Motion
11:49:27PM	16AUG97	16	Ext
11:52:00AM	16AUG97	11	Motion
12:02:57AM	16AUG97	10	Motion
01:20:15AM	16AUG97	16	EXT
06:01:37AM	16AUG97	16	EXT
06:02:15AM	16AUG97	11	Motion

Up Arrow: Next VCR:Print Log
Down Arrow: Prev Zoom:Clear Log
DISPLAY: Return

Other Options

The "Other Options" menu provides access to the advanced SPX16m systems options.

Selecting:

1. Toggles the "IR Remote Control" code setting between Code 1, Code 2, and remote OFF. (See "Hand Held IR Remote Control" on page 26.)
2. Enters the "Security Set Up" menu for establishing a security lockout code.
3. Toggles On-screen text color between "White", "Light Grey" and "Dark Grey".
4. Toggles the black "Text Background" ON and OFF.
5. Toggles the internal Chroma Filter between "Enabled" and "Disabled". The Chroma Filter must be enabled if any color cameras are connected to the SPX16m. (The factory default is "Enabled").

Security Set Up

Security lockout is a means to disable the SPX16m menus so that casual or inadvertent tampering can be prevented. It is not intended as a hard security measure and can be bypassed by removing the SPX16m power followed by applying power and **simultaneously** pressing and holding the **DISPLAY** button for 3 seconds until "Restoring Factory Defaults" appears. This is not the preferred method of bypassing security since this step also returns all internal parameters and options to their factory defaults.

The security feature requires that a security code ("password") of 1 to 9 digits be entered and verified. The security lockout does not become active until the menus have been exited. "Button Lock", when "On", will disable all front panel operations. A long press of the **DISPLAY** button will still enable menus. "Security IR Lock" and "Serial Lock", when "On", will disable all IR remote control buttons and serial interface operations respectively.

Other Options

1: Remote Control: Code 2
2: Security Set Up . . .
3: Text Color: White
4: Text Background: Off
5: Chroma Filter: Enabled

PIP: Restore ALL Settings to Factory Defaults
Camera: Select
DISPLAY: Accept and Return

Security Set Up

Menus are Unlocked

1: Lock Menus
2: Unlock Menus
3: Button Lock: Off
4: Security IR Lock: Off
5: Serial Lock: Off

Camera: Select
DISPLAY: Accept and Return

Advanced VCR Options

The Advanced VCR Options menu is intended for use by knowledgeable users. The programmable settings in this menu must be properly set for correct performance of your SPX16m.

Note: *Important! Do not change these settings unless it is necessary for your installation.*

Selecting:

1. Enters the "Edit Delay Table" menu for customizing delays for your VCR. See "Programming a Custom Delay Table" on page 27.
2. Toggles the VCR output mode during an alarm between "Multiplex" and "Alarm Only". In "Multiplex" mode, all cameras continue to be multiplexed during an alarm with the alarming camera(s) having priority. In "Alarm Only" mode, only the alarming camera(s) are output to the VCR during an alarm. (The factory default is "Multiplex").
3. Toggles Camera Switch Input pulse polarity between "Negative" and "Positive". (The factory default is "Negative").
4. Allows changing the number of fields output to the VCR on each occurrence of the "Camera Switch Input" pulse. (The factory default is "2").
5. Toggles the VCR Playback Discriminator On/Off. The playback discriminator should be left "On" unless you wish to view all recorded frames of an alarm camera.
6. Toggles VCR Video Format between "Field" and "Frame". (The factory default is "Field"). **The video format must be the same for record and playback.**

Advanced VCR Options	
Record	
1. Edit Delay Table . . .	
2. Output on Alarm:	Multiplex
Camera Switch Input	
3. Pulse Polarity:	Negative
4. Fields per pulse:	2
Playback	
5. Discriminator:	On
Record/Playback	
6. Video Format:	Field
Camera: Select	
DISPLAY: Accept and Return	

Note: *With "Alarm Only" VCR output mode selected, motion alarms will not occur for the duration of an alarm. A short alarm hold time is recommended when using "Alarm Only" VCR output mode.*

Camera Switch Input

For most applications, the VCR delay table setting will provide the simplest setup and operation for multiplex recording. For advanced applications, such as time-of-day dependent VCR record speed settings, an external signal can be used to control the SPX16m. The Camera Switch Input (also referred to as the "head switch" input) allows the SPX16m to use an external signal from the VCR to control multiplexing. The SPX16m can be set to use the Camera Switch Input signal through the "VCR Format" selection (see "VCR Set Up" on page 12). When the Camera Switch Input signal is used, the SPX16m will switch to the next camera on the falling (Negative) edge, or the rising (Positive) edge of the signal based on the "Pulse Polarity" setting in the "Advanced VCR Options" menu.

Note: *If the "Cam Sw Input" format is selected, a Camera Switch Input signal must be provided to the SPX16m for proper VCR multiplexing to occur.*

HAND HELD IR REMOTE CONTROL

The hand held remote control allows easy remote operation of your SPX16m 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 this case, the first press of the "Camera" button will cause the SPX16m to display camera 1. Additional button presses will cycle the selection through each available camera and back to camera 1.

Note: "FREEZE" and "SEQUENCE" share the same button. Press and hold the "Freeze" button to activate the "Sequencing" mode on the SPX16m. "QUADRANT" and "ZOOM" share the same button. Press and hold the "Quadrant" button to access the "Zoom" feature.

The remote control may not work properly in the presence of strong sun light.

Programming Your ATV SPX16m Remote Control

When first installing or when changing the batteries in your SPX16m Remote Control, it may be necessary to re-program it for use with the SPX16m. **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 SPX16m:

1. Ensure that batteries are properly installed in the SPX16m Remote Control.
2. Turn on the SPX16m.
3. Press any of the **1-16** camera buttons to call up a full screen picture.
4. On the remote control, press and hold the **VCR** button first, and then **DISPLAY**. Hold both buttons together until the indicator lights up and blinks twice.
6. Enter your five-digit code. The SPX16m code set #1 equates to remote code 11414, and code set #2 equates to code set 11344. Your SPX16m is factory set for Code set #2. See Page 24 to change the SPX16m Code set. The red 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, and PIP**). For example, to enter the default code for a SPX16m (code 11344) press the following:

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

Press the **CAMERA** button on the remote control for the next live camera on the SPX16m to appear.

Note: After replacing the battery, you must reprogram the remote.



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

The delay tables contained in SPX16m software should give you satisfactory performance for any of the VCRs listed. If your VCR is not on the list, the process to set up the SPX16m to support your VCR is very straightforward.

Most non-real-time time lapse VCRs are of the formula A or B type described below. It is usually possible to determine what type of VCR you have from the VCR's manual. The manual should contain video delay times for the VCR's supported hourly formats. The "rule of thumb" for NTSC systems is that you take a published delay time (in seconds) and multiply by 60 (50 for PAL). The result should be a number, which is, close to either 1/2 the record hourly rate (Formula A) or 1/3 the record hourly rate (Formula B). For example:

1. Your manual states that in 24 Hr mode the picture delay time is 0.21 seconds.
2. $0.21 \times 60 = 12.6$ ($0.21 \times 50 = 10.5$ for PAL)
3. 12.6 is closer to 12, the 24-hour record rate divided by 2, than to 8, the 24-hour record rate divided by 3.
4. This means that your VCR is a Formula A type, so you should use the STANDARD 24 HR STEPS or STANDARD 12 HR STEPS setting (see VCR Selection on page 12).

If your VCR is real-time, High Density, not a Formula A or B type or if the VCR does not have 12 or 24 hour standard steps, you will need to construct a Custom Delay Table as described in the next section.

PROGRAMMING A CUSTOM DELAY TABLE (ADVANCED OPTION)

The SPX16m has a means of creating and/or modifying a delay table to match your particular VCR. Satisfactory performance can be obtained by setting up the one or two formats you actually plan to use according to the following basic guidelines.

What is the "Delay Table"?

The delay table is a list of pairs of numbers that control the SPX16m's multiplex output field or frame rate being sent to the VCR during recording. The first column (Hour) is the format number that you would see in the VCR Set Up menu. The second column (Delay) is the number of video field times the SPX16m waits before putting out the next camera image.

The delay table allows you to program up to 8 individual hourly format settings. If your VCR has more than 8 settings you will need to pick the set of 8 choices that you are most likely to use in 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 example here is for a VCR which only has three settings; 2, 12, and 24 hours.

Edit Delay Table		
Format	Hour	Delay:Custom
1:	2	3
2:	12	6
3:	24	12
4:	2	3
5:	12	6
6:	24	12
7:	2	3
8:	12	6
QUADRANT: Delay Formula		
Camera: Select/Change		
DISPLAY: Previous Menu		

DETERMINING DELAY VALUES

For a Real Time VCR, the delay value for 24 hour or less recording is the minimum delay value (1). sss

For a Time Lapse VCR, depending on your make and model of VCR, the delay table value for NTSC systems is normally one half (most time lapse VCRs are 1/2) or one third (1/3) of the hour number. For example, if the selected hourly format is 48 hours, the delay value for the VCR is either 24 (1/2 of 48) or 16 (1/3 of 48). The SPX16m has a built in calculation capability to facilitate set up of the delay table for these standard formulas.

The following formulas are supported:

- Formula A DELAY = HOUR/ 2
- Formula B DELAY = HOUR/ 3
- Formula C DELAY = HOUR
- Custom, where the HOUR and DELAY can be independently entered.

Your time-lapse VCR manual should list delay times (in seconds) for each record hour setting. If you have these values, use the following formula to determine the delay value:

$$\text{DELAY VALUE} = (\text{Delay Time}) \times 60 \text{ for NTSC} \quad \text{DELAY VALUE} = (\text{Delay Time}) \times 50 \text{ for PAL}$$

For example, if the 24 hour delay time is 0.22 seconds, DELAY = 0.22 x 60 = 13.2

The number will often be a fraction (such as 13.2), so “round” the number to the next nearest whole integer (which would be 13). To set up the SPX16m delay entry for this case, you would enter “24” in the “Hours” column and “13” in the “Delay” column.

Edit Delay Table

The delay table is used to set the field delay value needed for any selected VCR so that the multiplexing rate of the SPX16m matches the recording rate of the VCR. The custom delay table allows the SPX16m multiplexing rate to be programmed to match a VCR not in the standard table. For further information regarding delay table values, refer to the previous section “Programming a Custom Delay Table”. The default custom table is the same as “STANDARD 12 HR STEPS”.

Note: When any delay table is modified, it becomes the new custom delay table. This allows you to set up and test other VCR formats without losing a custom version. You can return to a previously customized table by making the selection here, as long as the custom table has not been re-edited.

To edit the delay table and create a custom delay table, select the “VCR Set Up” menu (option 2) from the “Main Menu”. Then select “Advanced VCR Options” (option 5). Select “Edit Delay Table” (option 1) and the menu shown here will appear.

Note: Before you edit the delay table, you should select the delay formula you will be using. In addition, when using Formulas A, B, or C, you will only be allowed to enter the “Hour” portion of the delay table. The delay will automatically be calculated based on your “Hour” entry. The Custom delay option allows the “Hour” and “Delay” values to be entered independently.

- Selecting:
- 1 - 8** Chooses one of the eight hourly formats to modify.
 - QUADRANT** Toggles the Delay Formula between Custom, A, B, and C.
- While Editing:
- SEQUENCE** Advances editing to the next field.
 - 1 - 9** Used to enter digits “1” through “9”.
 - PIP** Used for a “0” entry.
 - DISPLAY** Completes the entry if less than 3 digits entered or returns to the previous value if no digits are entered.

Edit Delay Table		
Format	Hour	Delay: Custom
1:		3
2:	12	6
3:	24	12
4:	36	18
5:	48	24
6:	60	30
7:	72	36
8:	84	42
QUADRANT: Delay Formula		
Camera: Select/Change		
DISPLAY: Previous Menu		

How do I verify the correct “Values”?

Once your SPX16m basic installation is complete, you can make a recording to ensure that the SPX16m is multiplexing properly with your VCR. If the SPX16m is multiplexing faster than the VCR during recording, cameras will be dropped during playback. If the SPX16m is multiplexing slower than the VCR during recording, then cameras will be repeated in several recorded frames during playback. The closer the rates are the fewer occurrences there will be of dropping or repeating cameras. When performing these tests, be sure that all camera priorities are set to the default value (High Priority), alarms are off, and Activity Multiplexing is off.

ALARM INTERCONNECTION ON THE SPX16m

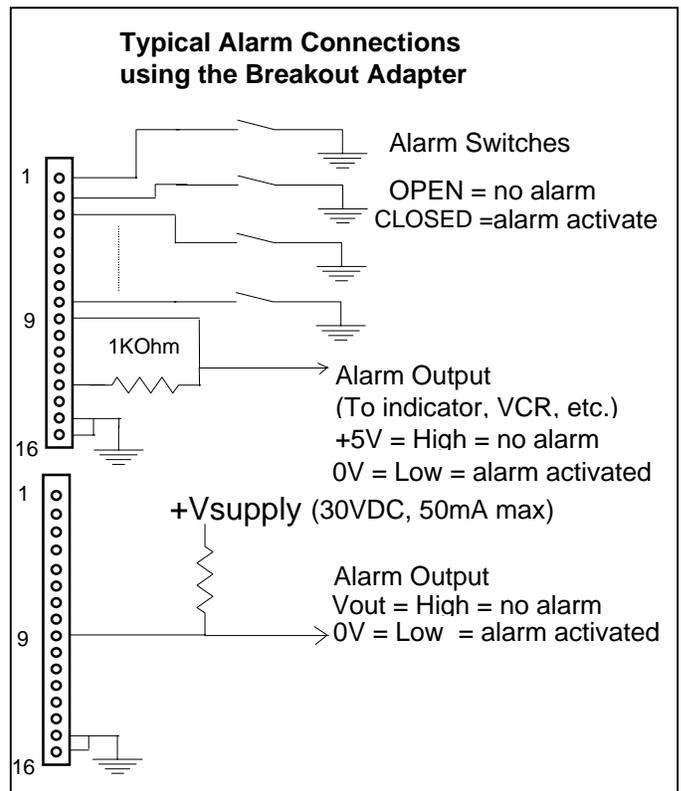
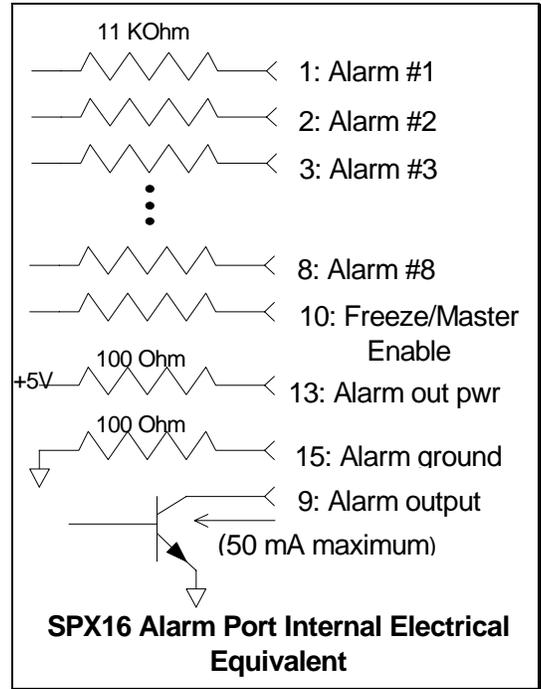
Each alarm connector on the back panel allows input of eight external control signals to affect the behavior of the multiplexer under alarm conditions. Alarm inputs are provided for each camera. A picture "Freeze" input is also provided to allow the picture to be frozen. These inputs are normally generated by a switch located at a door, window or other point in the installation where a camera is monitoring activity. Many installations use a normally open switch, which requires a switch closure to activate the alarm. As part of the SPX16m's normal alarm video processing, an "alarm output" is generated on the same back panel connector. In addition to the alarm inputs, a picture "Freeze" input is also provided. While picture "Freeze" is activated, any present camera image is retained on the display and new video information is ignored. A picture freeze does not trigger the alarm output.

Camera inputs contain series resistors for ESD (Electrostatic Discharge) and lightning damage protection, and the outputs also contain series resistors to limit output current to prevent damage to the SPX16m in the occurrence of shorting out the output pin. When connecting the inputs and outputs to other equipment, consideration should be given to the limitations introduced by these current limiting resistors.

The alarm connectors on the SPX16m are DB-15, 15 pin connectors. For ease of installation, a "breakout" adapter is provided with the 16th terminal connected to chassis ground. A simple alarm connection is shown to the right using the SPX16m "alarm breakout" adapter. In this example, switches are connected directly to the alarm inputs, and a single output is connected to some signaling device or to a controlled piece of equipment. In this case, an external resistor is required to pull the output up to +5V (High) indicating a non-alarm condition.

The external resistor makes connection to higher voltage systems possible, such as a 12 VDC system. In this application, the pull-up resistor is not tied to the SPX16m +5V pin, but to the higher voltage system. Voltages greater than +5V must not exceed 30 VDC and the current through the output pin must not exceed 50 mA.

Failure to remain within the 30 VDC and 50 mA restriction could damage either the SPX16m, the output signaling device, or both.

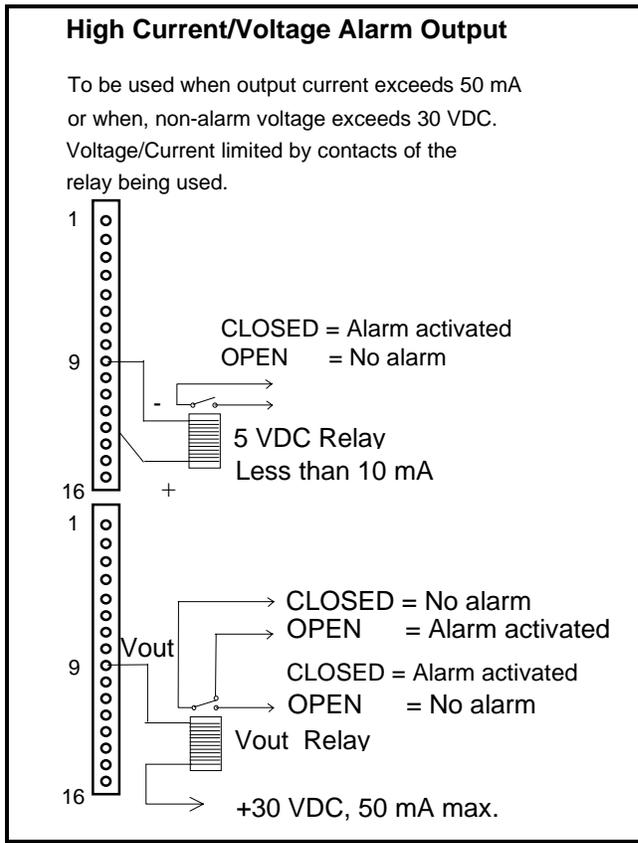


In some installations, the alarm output is used to activate or deactivate high voltage and/or high current circuitry (110 VAC lights, siren, etc.) which cannot be controlled directly by the SPX16m. In other cases, the alarm output needs to control multiple circuits of different types (mixed DC and AC 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 cases is to use a relay that has the number of contacts and rating sufficient for the alarm output. Shown below are two methods to control a high current or high voltage device using a relay with a single, normally open contact. An internal, current limiting resistor for the pin 9 +5V supply will limit the usable relay current to something less than 10 mA (depending on the coil impedance). If a higher voltage, or higher current relay is used, an external supply is required. Under these conditions the open circuit voltage (no alarm) on pin 9 must not exceed 30 VDC and the closed circuit current (alarm active) into pin 9 must be less than 50 mA.

The breakout adapter board is numbered compatibly with the DB-15 connector so the following table is applicable to either.

Note: Pin 16 is only present on the Breakout Adapter and is connected to chassis ground.



ALARM CONNECTOR PINS (1-9)			
1	Alarm 1	9	Alarm Out (< 50 mA)
2	Alarm 2	10	Freeze/Master Enable
3	Alarm 3	11	Alarm 9
4	Alarm 4	12	Camera Switch Input
5	Alarm 5	13	+5V (< 10 mA)
6	Alarm 6	14	RESERVED
7	Alarm 7	15	Signal ground (< 10 mA)
8	Alarm 8	16	Chassis ground

ALARM CONNECTOR PINS (9-16)			
1	Alarm 9	9	Alarm Out (< 50 mA)
2	Alarm 10	10	Freeze/Master Enable
3	Alarm 11	11	Not Used
4	Alarm 12	12	Camera Switch Input
5	Alarm 13	13	+5V (< 10 mA)
6	Alarm 14	14	(reserved for future use)
7	Alarm 15	15	Signal ground (< 10 mA)
8	Alarm 16	16	Chassis ground

RS-232 REMOTE CONTROL INTERFACE

The SPX16m has a built in RS-232 serial interface, which supports remote control of the SPX16m through simple ASCII commands. These commands provide access to the front panel button operations just as the IR Remote Control does.

The SPX16m serial interface is fixed at 9600 baud, 8 bits, 1 stop bit, and no parity. The command format is:
 <command> <return>

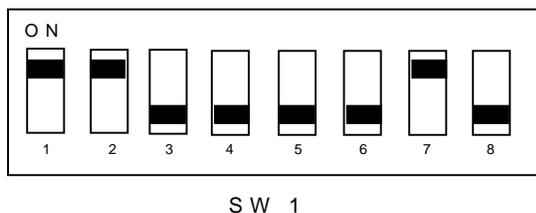
The command is 2 characters or 2 characters plus parameter and must be followed by a "carriage return". The SPX16m will respond with:

- > if the command was recognized, or
- ? if the command was not recognized or is invalid

The following commands are supported by the SPX16m serial interface:

- BD **Display** Button
- BF **Freeze** Button - will cause the SPX16m to freeze current display video
- BS **Sequence** Button - will cause SPX16m to begin sequencing
- BP **PIP** Button
- BQ **Quadrant** Button
- BZ **Zoom** Button - will cause the SPX16m to enter Zoom mode.
- BV **VCR** Button - will cause the SPX16m to enter or exit VCR playback mode or "zoom out"
- BB VCR Bypass - will cause the SPX16m to enter or exit the VCR bypass mode
- BCn **Camera** Button - n is a number 1 through 16 corresponding to the camera number. There must be no "space" or "tab" entered between the command and the number.
- BL n Button Lock - n=0 sets front panel button lock OFF, and n=1 sets button lock ON.
- CM Call Monitor - will cause the SPX16m to toggle between "Normal" and "Call Monitor" modes. When in "Call Monitor" mode, button commands will control Call Monitor functions.
- DM m,c,c,c,...,q
 Set Display Mode - will cause the SPX16m to enter the selected display mode with selected cameras in the display inserts where m=display mode, c=camera number, q=quadrant. Display modes are as follows: 0=Full screen, 1=2x2, 2=3x3, 3=4x4, 4=PIP, 5=Dual PIP, 6=Split screen, 7=Squish screen, 8=Center Insert, 9=Split Quad.
 Quadrants are: 0=lower right, 1=lower left, 2=upper left, 3=upper right
- EC n Echo characters - n=0, echo OFF; n=1, echo ON (The factory default is "ON").
- HELP Help command - will display a list of commands.
- MD Move Down - in Zoom mode, will cause the SPX16m display to move down.
- ML Move Left - in Zoom mode, will cause the SPX16m display to move left.
- MR Move Right - in Zoom mode, will cause the SPX16m display to move right.
- MU Move Up - in Zoom mode, will cause the SPX16m display to move up.
- VER Version - will cause the SPX16m to output the current software version number.

For proper RS-232 operation, the 8 position DIP switch, SW 1, located next to the RJ-45 RS-232 interface connector within the SPX16m must be set to the factory default positions as indicated below. The RJ-45 connector pin-out corresponds to a standard EIA-561 8-pin DCE (modem) device.



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

SUPPORTED VCRs

NTSC/EIA Compatible:

Atsutsa TL VCR251	Mitsubishi MS3600	Sanyo SRT-600
Atsutsa TL VCR964	Mitsubishi HS480	Sony EVT-801
Burle LTC 3930	Mitsubishi HS5424	Sony SVT-100
Burle LTC 3960	Mitsubishi HS5300	Sony SVT-124
Burle LTC 3961 long	Mitsubishi BV-1300	Sony SVT-150
Burle LTC 3961 short	Mitsubishi HS5440UA	Sony SVT-3000/5000
Burle LTC 3991 long	Mitsubishi HS-S5600U (short, long)	Sony SVT-3050
Burle LTC 3991 short	NEC TL50	Sony SVT-5050 (short, long)
Chugai CTR-024NC	Panasonic 6010	Sony SVT-S3100
Gyyr 1400	Panasonic 6024	Sony SVT-L200
Gyyr 1550x	Panasonic 6040 (short, long)	Sony SVT-L400
Gyyr 2051x (short, long)	Panasonic 6730 (short, long)	Sony SVT-LC300
Gyyr TLC1800R (short, long)	Panasonic 6720	Sony WatchCorder
Gyyr TLC2100 (short, long)	Panasonic 6740P (short, long)	Toshiba KV5168A
Gyyr TLC2100SHD (short, long)	Panasonic 6740PHD	Toshiba KV6200A (short, long)
Gyyr TLC2130HD	Panasonic 6750	Toshiba KV7024
Gyyr TLC2196	Panasonic 8050/8051	Toshiba KV7168A (short, long)
Gyyr TLC2196HD	Panasonic RT600	Toshiba KV7960A (short, long)
Hitachi VTL30 (field & frame)	Panasonic TL500 (short, long)	Toshiba KV8168A
Hitachi VTL2000	RCA TC3931	Toshiba KV8168AHD
JVC BR9060 (field & frame)	Sanyo SRT-768 (short, long)	Toshiba KV8960A
JVC BR S920/S925	Sanyo TLS900	Toshiba KV8960AHD
JVC BR 9050U	Sanyo TLS972	Ultrak KR5440U
JVC BR SRL 900U	Sanyo SRT-672 (short, long)	Ultrak KR7496U
JVC BR SRL 901U	Sanyo TLS1000	Vicon VCR400
JVC SR 9070U (short, long)	Sanyo TLS2000	Vicon VCR401/410
JVC SRL910U	Sanyo SRT-500	Vicon VCR424

SUPPORTED VCRs CONTINUED:

PAL/CCIR Compatible:

Atsutsa TL VCR251	Mitsubishi MS3600	Philips RT24A
Burle 3910	Mitsubishi HS480E	Philips TL24A
Burle TC3961X	Mitsubishi HS5424E	Philips TL960A (short, long)
Burle 3931X (Field & Frame)	Mitsubishi HS7424E	Sanyo TLS900P
Gyyr 2051X	Mitsubishi HS7496E	Sanyo TLS1000P
Gyyr TLC1600X (Field & Frame)	Mitsubishi HSS5300E	Sony SVT-S3000P
Gyyr TLC2100X (short, long)	Mitsubishi HSS5600E	Sony SVT-5000P (short, long)
Hitachi VTL30 (Field & Frame)	Mitsubishi HS5440	Sony WatchCorder
Hitachi VTL1000	Panasonic 6010	Vicon VCR400
Hitachi VTL2000	Panasonic 6024	Vicon VCR401
Ikegami TVR 625 (Field & Frame)	Panasonic 6720	Vicon VCR410S
JVC 9060E (Field & Frame)	Panasonic 8050/8051	Vicon VCR424

To accommodate any remaining VCR models, a custom delay table is provided which can be tuned for optimal performance with any VCR hourly format (see page 27). Using this table, the multiplexing rate of the SPX16m can be programmed to be compatible with the recording rate of the VCR.

EQUIPMENT REQUIREMENTS

The SPX16m is designed to be compatible with all NTSC and PAL compatible equipment. The SPX16m will accept 2:1 interlace cameras in either a "line-locked" or "free running" (internal reference) modes. The use of "random interlace" camera is not recommended unless the line lock is turned off.

SPECIFICATIONS

Physical

Dimensions	16.720" w X 8.250" d X 2.250" h (425 mm X 210 mm X 57 mm)
Weight	7.8 lbs. (3.51 kg), Power Supply: 1.0 lbs. (0.45 kg)
Operating Temp	32°F - 104°F (0°C - 40°C)

Video

Signal Format.....	NTSC/PAL Compatible Color or Monochrome NTSC: 525 lines, 60 Fields / sec. PAL: 625 lines, 50 Fields / sec.
Camera Inputs.....	0.6 to 1.2 Vp-p 75 Ohm Termination
Monitor Output	1.2 Vp-p into 75 Ohms (Composite)
VCR Output.....	1.2 Vp-p into 75 Ohms (Composite)
Digital Sampling	720 X 480 NTSC, 720 X 576 PAL 4:2:2 (256 Gray Levels, 16 Million Colors)
Refresh Rate	30 Frames Per Second (NTSC) 25 Frames Per Second (PAL)

Electrical

Power	12 V AC @ 2 Amp
Safety	110V, 60Hz Power Supply: UL Listed and CSA Certified 220V, 50Hz Power Supply: CE Mark and VDE approved
EMI.....	FCC Part 15, Class A CE Certified EN50081-1 (emissions), EN50082-1 (immunity)

Connectors

Video In	BNC, 1 Per Camera, Terminating, or Hi-Z
Loop Through.....	BNC, 1 Per Camera
Monitor Video Out	BNC
VCR Video In	BNC
VCR Video Out.....	BNC
Serial Port	RJ45, EIA 561
Alarm	2 DB15 With Screw On Adapter Board
12 VAC, or 12 VDC	Power Jack, 0.080" Pin Diameter

Controls

DISPLAY	Return to 4x4 Display in Playback
SEQUENCE	Calls Up Selected Sequence Mode
FREEZE	Freeze current display image
PIP	Calls Up Next PIP Mode in Playback
QUADRANT	Rotates Quadrant
ZOOM	Activates Variable Zoom
VCR	Enables/Disables VCR Input for Recorder Playback
SIXTEEN CAMERA BUTTONS (1-16)	Calls Up Individual Cameras Full Screen
IR Remote	Duplicates Front Panel Controls
Termination Switches	Selects 75 Ohm or Hi-Z Termination for 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 with shipping charges and applicable duties and taxes paid, along with a copy of your sales receipt or other proof of purchase and date of purchase to the ATV factory address.

YEAR 2000 CONFORMANCE

All ATV products containing a date and time function meet Year 2000 Conformity Requirements as specified in BSI DISC PD2000-1 (described below). Year 2000 requirements do not apply to ATV products without a date and time function. ATV products' date format is "Day – Month – Year" where "Year" is a two digit representation of the year. Conformity is defined as follows:

1. No value for the current date will cause any interruption in operation of the product.
2. Date-based functionality within the product behaves consistently for dates prior to, during and after year 2000.
3. The 2 digit date within the product is implicitly assumed to be greater than 1990.
4. Year 2000 is recognized as a leap year.

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.

FCC STATEMENT

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his expense.