

# ShowCase 3264

## Visual Presentation Controller

VERSION: 010905

## TABLE OF CONTENTS

INTRODUCTION .....	3
FCC RADIO FREQUENCY INTERFERENCE STATEMENT .....	3
WARRANTY STATEMENT.....	3
IMPORTANT NOTES:.....	3
OVERVIEW .....	3
PHYSICAL.....	3
INSTALLATION .....	3
SHOWCASE 3264 CONTROL SYSTEM.....	4
OPERATION.....	5
M/E MIX/EFFECTS OUTPUTS .....	5
AUX AUXILIARY OUTPUTS .....	5
KEYPAD.....	5
CHANNEL SELECTION .....	5
INPUT SELECTION .....	5
FREEZING INPUTS .....	6
TRANSITIONS .....	6
AUTOMATIC TRANSITION.....	6
AUTO TAKE.....	6
MANUAL TRANSITION.....	6
MIX AND WIPE .....	6
EFFECTS .....	7
1 = WINDOW (PICTURE-IN-PICTURE) .....	7
PAN & ZOOM.....	8
SEQUENCING (PRESETS).....	8
STORING A PRESET .....	8
RECALLING A PRESET .....	8
SETUP MODES.....	9
1 = SETUP INPUT RASTER (PST) .....	9
2 = SETUP INPUT RASTER (PGM) .....	9
1 = ONE-TIME AUTOSYNC LOCK-ON.....	9
4 = LEFT EDGE .....	9
6 = RIGHT EDGE .....	9
8 = UPPER EDGE.....	10
2, 0 = LOWER EDGE.....	10
5 = ASPECT RATIO.....	10
3 = LOCK-ON DELAY.....	10
6 = STORE SETUP DATA .....	10
7 = RECALL DEFAULT SETUP DATA.....	10
COLD BOOT .....	10
SPECIFICATIONS.....	11
SPECIFICATIONS (CONTINUED) .....	12

## INTRODUCTION

### FCC RADIO FREQUENCY INTERFERENCE STATEMENT

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

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 own expense.

Changes or modifications not expressly approved by BUF Technology could void the user's authority to operate this equipment. Shielded cables must be used with this equipment to maintain compliance with FCC regulations.

### WARRANTY STATEMENT

BUF Technology warrants that the equipment it manufactures is free from defects in materials and workmanship. Equipment that has been operated within its ratings and has not been subjected to mechanical or other abuse or modification and has failed because of such defects, will, at the option of BUF Technology, be repaired or replaced if it is returned, freight pre-paid, to BUF Technology within two years from the date of shipment. Equipment that fails under conditions other than described herein will be repaired at the price of parts and labor in effect at the time of repair.

This warranty is in lieu of all other warranties, express or implied, including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose. BUF Technology is not liable for any consequential damages.

### IMPORTANT NOTES:

This software version operates with Folsom VFC-2200 version 146.35.0 software. The VFC software version is shown on the VFC display during the power-up sequence. The correct version of software, along with instructions for loading it into the VFC are available on the Folsom web site [www.folsom.com](http://www.folsom.com).

## OVERVIEW

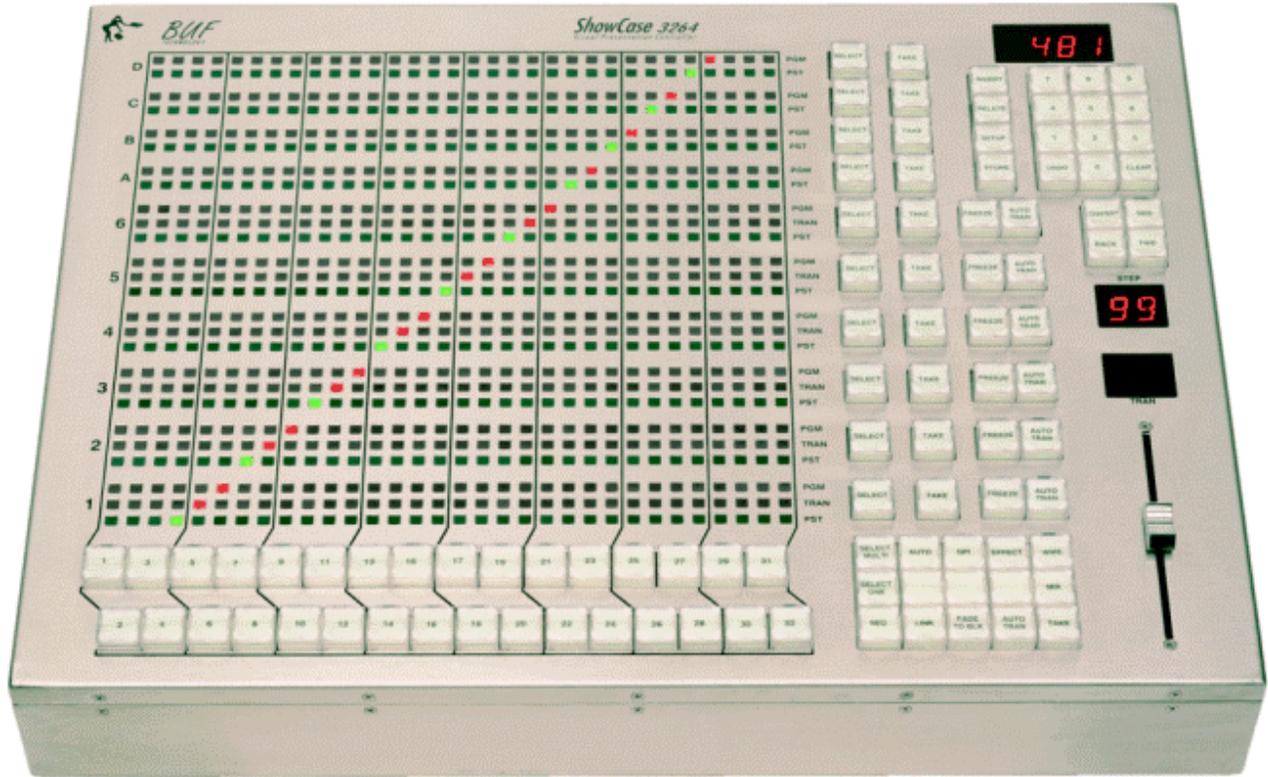
The ShowCase 3264 is the control system portion of an overall visual presentation system consisting of a wide band component video routing switcher and up to six transitioning dual video format converters. Up to 32 component video sources that can be any mix of virtually any formats including NTSC, PAL, 720p HDTV, 1080i HDTV, or almost any known computer video output. The ShowCase 3264 is designed to control Folsom Research, Inc. VFC-2200 Dual Video Format Converters and a Sierra Video Systems model 3216V5 32 input by 16 output 250MHz component video routing switcher. Modifications can be made in software to support other routing switchers and/or video format converters.

## PHYSICAL

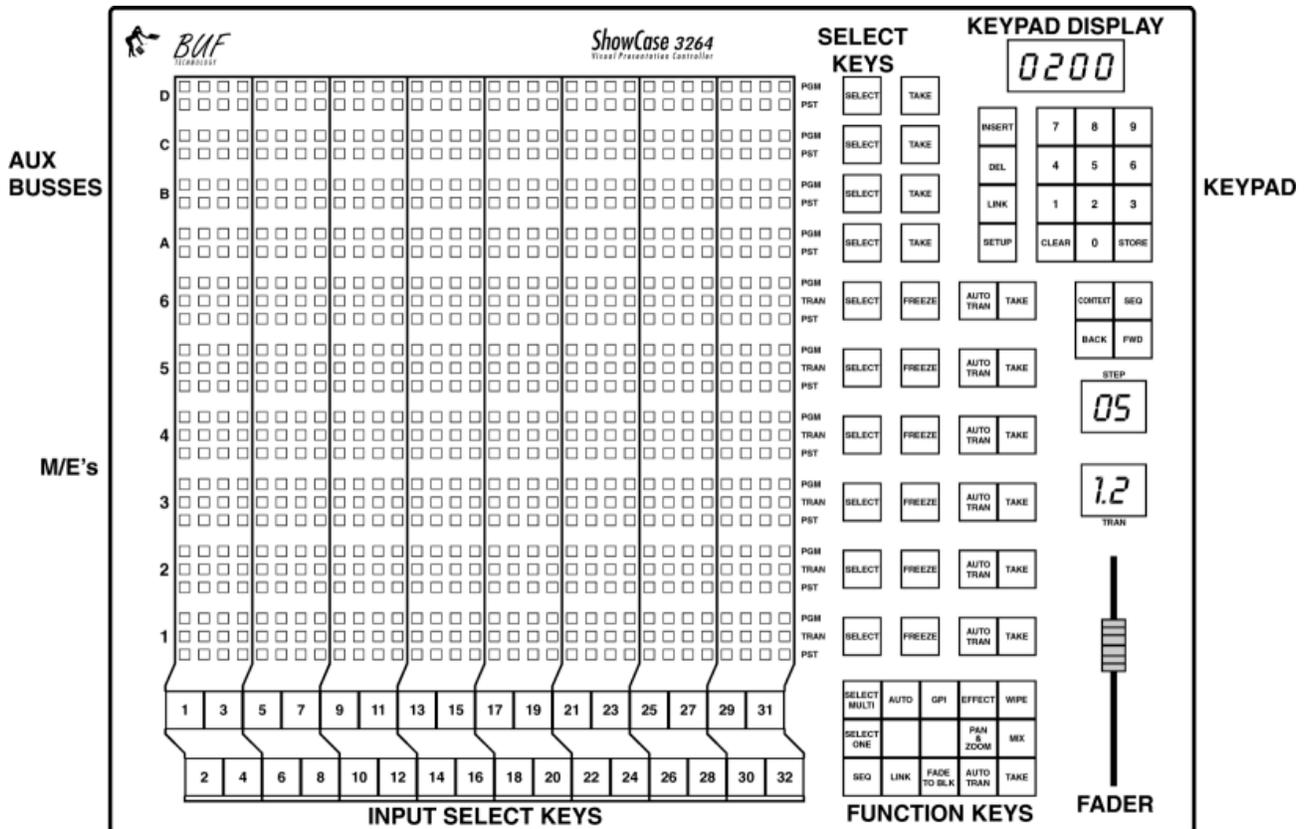
The ShowCase 3264 panel measures approximately 21 inches wide by 16 inches deep by 3-5/8 inches thick, and weighs approximately 25 pounds. User input consists of 99 magnetically operated reed type key switches with LED lamps, and a 4 inch travel motorized linear fader. One 4-digit LED display, two 2-digit LED displays, and a matrix of 26 rows by 32 columns (832) LEDs are used to indicate system status.

## INSTALLATION

The ShowCase 3264 panel should be placed on a firm surface in a location that does not restrict air flow from the bottom and sides of the panel and allows adequate room to make rear panel connections. See SPECIFICATIONS for connection and power requirement information.



SHOWCASE 3264 CONTROL SYSTEM



## OPERATION

### M/E MIX/EFFECTS OUTPUTS

In this manual, the Folsom VFC-2200 dual video format converters are referred to as Mix/Effects or M/E units. This is because they are capable of performing mixing and wiping between inputs, and because effects (resizing, positioning, etc.) can be used. The ShowCase system is capable of controlling up to 6 M/E output channels. These M/E channels are controlled and indicated by the rows of controls located to the right of the numbers 1-6 on the left side of the panel. The format converter video connections are as follows:

VIDEO IN A & B	FEED WITH ROUTER OUTPUTS (75 OHM SWITCH ON - DO NOT USE LOOP)
OUTPUT #1	M/E PROGRAM (PGM) OUTPUT
OUTPUT #3	M/E PRESET (PST) OUTPUT (CONFIGURE ON MENU: OUT #3 PREV <B/A>)

### AUX AUXILIARY OUTPUTS

The ShowCase system controls a 32 input by 16 output router. Each M/E channel uses 2 router outputs, totaling 12. The remaining 4 router outputs are called Auxiliary or AUX Busses. These outputs are controlled and indicated by the rows of controls located to the right of the letters A-D on the left side of the panel.

### KEYPAD

The numeric KEYPAD is used to set values into the various panel registers. When numbers are entered on the KEYPAD, they appear in the ones place on the KEYPAD DISPLAY and digits shift left. The STORE key lights when pressed, and numbers entered either beforehand or afterwards are entered into a register when any register type key is pressed, at which time the STORE key goes out. Pressing the STORE key a second time latches it on to allow rapid storing of the same or different values into registers without having to press the STORE key every time. The CLEAR key clears the display and resets the STORE key.

### CHANNEL SELECTION

Any or all of the 6 M/E and 4 AUX Busses can be selected for simultaneous control. The SELECT ONE function key allows only 1 output channel to be controlled at a time. Pressing the SELECT MULTI function key changes the channel SELECT keys to an alternate-action mode, allowing multiple channels to be selected at once. After pressing SELECT ONE, the next 4 presses of SELECT MULTI recall 4 different combinations of select keys that have previously been set. All selected output channels operate simultaneously when a global function is used such as MIX, WIPE, AUTO TRANS, EFFECT, PAN & ZOOM, etc. Settings applied to functions (such as AUTO TRANS duration) are stored in all selected channels where applicable. When SEQ is used to recall a preset, the channel selects that were in effect when the preset was stored are recalled into the last select multi register and that register is recalled. This allows subsequent global operations, such as TAKE, to act upon the preset channels. The SELECT ONE or SELECT MULTI buttons will then restore the selects that were in effect before the recall.

### INPUT SELECTION

The 32 video input sources are selected into a preset PST state using the 32 input select keys. Above each input key is a column of indicator LEDs that indicate the preset PST and program PGM state of each channel. M/E channels have an additional row of yellow TRANS LEDs that indicate a transition is ready to begin. When an input key is pressed, the green PST LEDs above that key light on all selected channels. The PST input is sent to the output of a channel when a TAKE is executed. When a take is completed, this input becomes the PGM input and its red PGM LED lights. The input key lamps light for all inputs that are currently PST on selected channels.

On each M/E channel, the PST input is automatically routed into the not-on-program input of the video format converter. If an AUTO TRANS or manual transition is in process, the PST input will not be routed until the transition is completed. When routing occurs, the converter's input configuration register matching the input key number is recalled, making the signal lock-on process as fast as possible. A short delay is then implemented to allow for the signal lock-on to complete before the TRANS LED is lit and transitioning is enabled. If an AUTO TRANS is requested during the lock-on delay or a previous AUTO TRANS is still in process, it will begin immediately after these processes complete.

## **FREEZING INPUTS**

Input video can be frozen in the format converter by pressing the FREEZE key. Normally, the PST video is frozen, but if an M/E SELECT key is held in while pressing its FREEZE key, the PGM video is frozen instead. While the PST video is frozen, the FREEZE lamp lights. Pressing the FREEZE key while enabled, returns to live video.

## **TRANSITIONS**

M/E channels can perform various different transitions from the program PGM to preset PST inputs, but the AUX channels can only perform cuts. Transitions can be automatic using the TAKE keys, or manual using the FADER. Normally, M/E TAKE keys light while a transition is in process, and go out when the transition completes (see AUTO TAKE). The TAKE function key lights while any selected M/E is in the process of a transition. When a transition completes, the PST and PGM LED indicators normally "flip/flop", meaning the old PST input becomes the new PGM while the old PGM input becomes the new PST. This allows switching between two inputs without having to make input selections. If a different PST input is selected during a transition, the old PST (TRAN) becomes the new PGM, but the PST remains unchanged.

### **AUTOMATIC TRANSITION**

An automatic transition begins on a channel when its TAKE key is pressed, or on all selected channels when the TAKE function key is pressed. For each M/E, if the AUTO TRANS key is not lit the transition is an instantaneous cut, where the PST input video synchronously replaces the PGM input video. If the AUTO TRANS key is lit, the transition occurs over a period from 0-5 seconds. The AUTO TRANS duration is set by entering a number representing tenths of seconds between 0-50 on the KEYPAD, pressing STORE, then pressing an AUTO TRANS key. If the AUTO TRANS function key is used, the duration is stored in the AUTO TRANS registers for all selected M/E channels. The TRAN display shows the AUTO TRANS rate if all selected M/E channels have the same AUTO TRANS rate in effect. Individual AUTO TRANS rates are displayed on the KEYPAD DISPLAY when channel AUTO TRANS keys are used.

### **AUTO TAKE**

Holding the SELECT key in on an M/E while pressing its TAKE key latches the M/E in the auto take mode. A subsequent press of the M/E take key unlatches the auto take status, and will not perform a take. The auto take mode is indicated by the TAKE key lamp being lit when no transition is in process and not lit while a transition is occurring, the reverse of its normal indication. When auto take is in effect on selected M/E's and an input key is pressed, as soon as the new input is locked-on, an AUTO TRANS is automatically executed. This allows a quick succession of inputs to be sent to the program output.

### **MANUAL TRANSITION**

Manual transitions can be performed on M/E channels using the FADER. If the FADER is not being used to make an effects or PAN & ZOOM adjustment, and a TAKE is possible on any selected M/E, then a manual transition will begin when the FADER is moved away from either end point, and continue until the FADER reaches either extreme. If the manual transition is ended by bringing the FADER to the opposite end from which it began, a "flip/flop" will occur as described in the AUTOMATIC TRANSITION section. If the FADER is brought back to its original position, the transition will complete but the flip/flop will not occur. Any new inputs that have been PST while a manual transition is in process will then be routed for subsequent transitioning. Some functions, including effects and setups, will terminate a manual transition by changing it to an automatic transition.

## **MIX AND WIPE**

Pressing the MIX key lights its lamp and sets all selected M/E's into the mix mode. When a transition occurs while in mix mode, the PST video replaces the PGM video using a dissolve. Pressing the WIPE key changes the transition mode to wipe. When a transition occurs while in wipe mode, the PST video replaces the PGM video using a wiping action. There are several wipe patterns. Entering a wipe pattern number on the KEYPAD, pressing the STORE key, then pressing the WIPE key stores that wipe pattern into all selected M/E's. Some wipes are normal/reverse type. Normal/reverse wipes operate in one direction on the first and every other subsequent take, and in the opposite direction on the second and every other subsequent take. The initial direction is restored each time the WIPE key is pressed. The available wipe patterns are:

- 1 = RIGHT/LEFT (normal/reverse)
- 2 = LEFT/RIGHT (normal/reverse)
- 3 = RIGHT
- 4 = LEFT
- 5 = DOWN/UP (normal/reverse)
- 6 = UP/DOWN (normal/reverse)
- 7 = DOWN
- 8 = UP
- 9 = CURTAIN OPEN/CLOSE (normal/reverse)
- 10 = CURTAIN CLOSE/OPEN (normal/reverse)
- 11 = CURTAIN OPEN
- 12 = CURTAIN CLOSE
- 13 = BOX OUT/IN (normal/reverse)
- 14 = BOX IN/OUT (normal/reverse)
- 15 = BOX OUT
- 16 = BOX IN
- 17 = GRID OUT/IN (normal/reverse)
- 18 = GRID IN/OUT (normal/reverse)
- 19 = GRID IN
- 20 = GRID CLOSE
- 21 = RANDOM SQUARES

## EFFECTS

The EFFECT key enables or disables the current effect mode on all selected M/Es. If the effect mode is already enabled on any selected M/E, all are disabled, otherwise all are enabled. When an effect mode is enabled on any selected M/E, the EFFECT key lights. An effect is changed by entering a new effect number on the KEYPAD, pressing STORE, and pressing the EFFECT key; the new effect is set on all selected M/Es. The available effect modes are:

- 1 = WINDOW (PICTURE-IN-PICTURE) allows PST video to be superimposed on PGM video in window form.

### 1 = WINDOW (PICTURE-IN-PICTURE)

When effect 1 is enabled, the picture on the preset monitor changes to a window. When disabled, the PST video changes back to full size. After effect 1 is enabled, and until it is disabled or the SETUP, CLEAR, or UNDO keys are used, the window can be sized and positioned using these KEYPAD keys:

- 5 = SIZE moving FADER adjusts the window size. Positioning is adjusted if required to achieve size.
- 0, 2, 8 = VERTICAL POSITION moving FADER moves window vertically.
- 1 = DIAGONAL POSITION moving FADER adjusts position diagonally from lower left to upper right.
- 3 = DIAGONAL POSITION moving FADER adjusts position diagonally from lower right to upper left.
- 4, 6 = HORIZONTAL POSITION moving FADER moves window horizontally.
- 7 = EQUIDISTANT moving FADER adjusts window to keep equal distance from lower right or upper left.
- 9 = EQUIDISTANT moving FADER adjusts window to keep equal distance from lower left or upper right.

When the window effect is selected, a subsequent transition superimposes the PST video over the PGM video in window form. When the effect transition is completed, the PST input flip/flops to become the PGM video, although both inputs actually contribute to the program output. If a new input is PST while a window is superimposed on the PGM output, it is not routed until the window is removed with another transition, at which time the route and input register recall is performed to ready for another transition. Pressing the EFFECT key while the window is visible on the PGM output performs an AUTO TRANS to remove the window, after which the input is changed back to full screen.

## PAN & ZOOM

The PAN & ZOOM key enables or disables PAN & ZOOM on all selected M/E's PST inputs. If PAN & ZOOM is already enabled on any selected M/E, all are disabled, otherwise all are enabled. When PAN & ZOOM is enabled on any selected M/E, the PAN & ZOOM key lights. After PAN & ZOOM is enabled, and until it is disabled or the SETUP, CLEAR, or UNDO keys are used, the PAN & ZOOM settings can be adjusted using these KEYPAD keys:

5 = ZOOM moving FADER adjusts the ZOOM amount from normal to about 700% normal size.

0, 2, 8 = VERTICAL POSITION moving FADER moves the visible area vertically.

1, 9 = DIAGONAL POSITION moving FADER moves the visible area diagonally from lower left to upper right.

3, 7 = DIAGONAL POSITION moving FADER moves the visible area diagonally from lower right to upper left.

4, 6 = HORIZONTAL POSITION moving FADER moves the visible area horizontally.

PAN & ZOOM adjustments are normally done on the PST monitor, but if a transition is made to the PGM output while adjustments are in effect, they are then made on the PGM monitor.

The PAN & ZOOM state and settings are stored independently for each input. When an input is PST on an M/E, the last used state (enabled/disabled) for that input is used. If disabled, pressing the PAN & ZOOM key enables PAN & ZOOM using the ZOOM and POSITION settings last used for each PST input on each selected M/E. If settings are adjusted while multiple M/E's are selected, the adjustments are made identically on all selected M/E's and their corresponding inputs.

## SEQUENCING (PRESETS)

At this time, the sequence function acts simply as a means to store and recall preset (PST) inputs, MIX/WIPE pattern modes, and AUTO TRANS durations for selected channels.

### STORING A PRESET

To store a preset, select one or more channels, set any desired combination of PST inputs, any combination of AUTO TRANS rates, and any combination of MIX/WIPE modes, use the KEYPAD to set a value of 0-99 into the KEYPAD DISPLAY, press and light STORE, and press the SEQ key (located under the KEYPAD). Each setting is stored independently for each M/E channel - different PST inputs, AUTO TRANS rates, and MIX/WIPE modes for each M/E can be stored in a single preset register. Presets are stored in nonvolatile memory in any of 100 registers. Stored presets remain saved even after power is removed for extended periods of time.

### RECALLING A PRESET

To recall a preset, set a corresponding number (0-99) on the KEYPAD and press SEQ (while the STORE lamp is off). The AUTO TRANS rate, MIX/WIPE pattern mode, and PST input are recalled into each channel that was selected when the preset was stored. Also, these channels are reselected for subsequent global operations (such as TAKE). The channels that were selected before the preset recall can be restored by pressing SELECT ONE or SELECT MULTI, depending on which one had been in effect. The channel selects that were recalled with the preset are stored in the fourth SELECT MULTI register, and can be recalled at any time by pressing SELECT ONE, then SELECT MULTI four times.

## SETUP MODES

The SETUP key is used to put the panel in one of several setup modes. Setup modes are used to adjust various system settings. Enter a setup mode number on the KEYPAD, press STORE, then press SETUP. While in a setup mode, the SETUP key lights and THE PANEL WILL NOT OPERATE NORMALLY! The setup mode must be exited by using either the SETUP or UNDO keys before any normal panel operation can be performed.

1 = SETUP INPUT RASTER (PST) sets up the format and raster of each of the 32 video inputs on the PST monitor.

2 = SETUP INPUT RASTER (PGM) same as 1, but uses the PGM monitor.

3 = LOCK-ON DELAY varies the time period allotted for signal lock-on.

6 = STORE SETUP DATA stores certain panel setting data in nonvolatile EEPROM memory.

7 = RECALL DEFAULT SETUP DATA resets certain panel setting data to the factory defaults.

### 1 = SETUP INPUT RASTER (PST)

While in setup mode 1, pressing KEYPAD keys allow various input raster adjustments. Adjustments are made on the input currently showing on the preset monitor of the lowest selected M/E. Adjustment can be cancelled at any time by using the UNDO key. When finished, use the SETUP key to save the input raster settings in the format converter's memory register corresponding to the input key. The saved register data is then automatically copied to the format converters of all other M/E's. Any time an input is PST on any M/E, the correct memory register for that input is recalled in the format converter.

If an input is being used on M/E's other than the one used for adjustment, the adjustments will not take effect on the other M/E's until another input is PST, then the adjusted input is again PST. If a format converter is replaced or added after input raster adjustments have already been made, they can be copied to the new converter as follows: Select an existing M/E, press 1 on the keypad, and press and light STORE. Then for each input, select the input, and press SETUP twice.

### 2 = SETUP INPUT RASTER (PGM)

Setup mode 2 is used to make the same adjustments, except using the PGM video on the program monitor.

#### INPUT RASTER ADJUSTMENTS:

1 = ONE-TIME AUTOSYNC LOCK-ON automatically locks-on to a new signal for a starting point.

4 = LEFT EDGE moving the FADER adjusts the left edge of the visible raster.

6 = RIGHT EDGE moving the FADER adjusts the right edge of the visible raster.

8 = UPPER EDGE moving the FADER adjusts the upper edge of the visible raster.

2, 0 = LOWER EDGE moving the FADER adjusts the lower edge of the visible raster.

5 = ASPECT RATIO moving the FADER adjusts the input aspect ratio.

### 1 = ONE-TIME AUTOSYNC LOCK-ON

Press the 1 key to perform a one-time AUTOSYNC lock-on of the current PST or PGM input. Use this feature to auto detect the format of a new video source, then use the other functions in this section to fine-tune the inputs.

### 4 = LEFT EDGE

Press the 4 key to use the FADER to adjust the left edge of the raster. Set the raster to the point where you lose a column of pixels on the left, then just get it back.

### 6 = RIGHT EDGE

Press the 6 key to use the FADER to adjust the right edge of the raster. Set the raster to the point where you lose a column of pixels on the right, then just get it back.

**8 = UPPER EDGE**

Press the 2 key to use the FADER to adjust the upper edge of the raster. Set the raster to the point where you lose a row of pixels on the top, then just get it back.

**2, 0 = LOWER EDGE**

Press the 8 or 0 key to use the FADER to adjust the lower edge of the raster. Set the raster to the point where you lose a row of pixels on the bottom, then just get it back.

**5 = ASPECT RATIO**

Press the 5 key to use the FADER to adjust the aspect ratio from 0.200(1:5) to 5.000(5:1). While adjusting, the aspect ratio is shown on the KEYPAD DISPLAY in decimal form. Mechanical détentés are felt on the FADER at the following aspect ratios: 1.000 (1:1), 1.333(4:3 NTSC, PAL), 1.778(16:9 HDTV), 2.000(2:1).

**3 = LOCK-ON DELAY**

Setup mode 3 is used to change the length of time allotted for M/E channels to lock-on to video input selections. When a new input is selected and a transition is not in process, the input is routed into the not-on-program input of the format converter. At the same time, the format converter configuration register for that input is recalled. An internal lock-on delay timer is then set which inhibits a TAKE from occurring until the delay has elapsed. Pressing KEYPAD keys 1-9 while in setup mode 3 changes the delay in increments of 50 milliseconds. Shorter lock-on delays allow quicker switching between inputs, but have a higher likelihood of allowing synching glitches to show up on the program output. The effects can be seen by setting up an auto take (see AUTO TAKE), and switching between different inputs. Switching back and forth between the same 2 inputs will not work because no routing or delay is used. When a delay is found that never shows any break-up on the program monitor with repeated testing between all different video input formats, it is a good idea to use one higher to provide a safety margin. The factory default for this setting is 5, or 250 milliseconds.

**6 = STORE SETUP DATA**

Setup mode 6 stores certain setup data in the EEPROM so it will be recalled whenever the ShowCase is powered-up. Data stored includes global and M/E AUTO TRANS values, effects window size and position data for each M/E, and PAN & ZOOM settings for each input.

**7 = RECALL DEFAULT SETUP DATA**

Setup mode 7 recalls factory default data into the same settings that are stored in the EEPROM in setup mode 6. Use this setup when you don't want, or are having problems with, the setup data that is recalled during power-up. If you want these default settings to be recalled during future power-ups, use setup 6 to store the default data in the EEPROM, otherwise the old stored data will be used next time the system is powered-up.

**COLD BOOT**

A "cold boot" is performed by applying power while holding in the SEQ and TAKE keys (the outer 2 keys in the lower row of the function key area). The word COLD shows on the KEYPAD DISPLAY. This causes the internal CPU to execute program instructions only from the boot PROM, and inhibits the normal loading of software from EEPROM memory. The SETUP key enters a self test mode that allows testing of all controls and indicators on the panel. The next time the unit is powered-up, the normal application software will be loaded and run.

EEPROM is memory that holds its data when power is off, but can be written by the CPU. This memory is used to store downloaded application software, certain setup data, and presets. Software updates are loaded into the EEPROM by a connected PC running Windows 95/98/2000/NT and running the ShowCase configuration software. If for some reason the unit will not run correctly due to corrupted data, and will not accept a software download from a PC ("No Communication" showing on the PC), use the cold boot procedure to reboot. PC communication and program download should always be possible following a cold boot.

**SPECIFICATIONS**

DIMENSIONS (APPROXIMATE)	H/W/D: 3.5 X 21 X 16 INCHES (9 X 54 X 41 CM)	
WEIGHT (APPROXIMATE)	25 lbs. (11.4 kgr.)	
POWER REQUIREMENTS 2 REDUNDANT INPUTS EITHER INPUT POWERS SYSTEM	85-264VAC @ 47-440HZ OR 110-370VDC LESS THAN 2.0A (TYPICALLY LESS THAN 50W) INRUSH CURRENT TYPICALLY 30A @ 200VAC COLD START	
ENVIRONMENTAL - OPERATING	0-40C (32-104F) 20-90% RELATIVE HUMIDITY (NON-CONDENSING)	
ENVIRONMENTAL - STORAGE	-10-50 DEGREES C (14-122 DEGREES F)	
KEY SWITCHES	MAGNETICALLY OPERATED REED SWITCH	
INDICATORS & DISPLAYS	LED, KEY SWITCHES USE 12V BI-PIN T1-3/4 LED LAMPS	
FADER	PENNY & GILES 12V MOTORIZED LINEAR FADER, 4 INCH TRAVEL	
COMPUTER - DB9F - RS-232 DTE 2 - TX 3 - RX 5 - GROUND NO HANDSHAKING	COMPUTER (PC) DB9 2 - RX 3 - TX 5 - GROUND	COMPUTER (PC) DB25 3 - RX 2 - RX 7 - GROUND
RS-232 - DB9F - RS-232 DCE 3 - TX 2 - RX 5 - GROUND NO HANDSHAKING	SIERRA VIDEO SYSTEMS RS-232 - DB9M 8 - RX 2 - TX 5 - GROUND	
RS-422-1 - DB9F - CONTROLLING DEVICE 3 - TX+ 8 - TX- 7 - RX+ 2 - RX- 4 - GROUND	FOLSOM VFC-2200 - DB25F (MENU SET FOR RS-485) 16 - RX+ 3 - RX- 14 - TX+ 2 - TX- 7 - GROUND	
RS-422-2 - DB9F - CONTROLLING DEVICE 3 - TX+ 8 - TX- 7 - RX+ 2 - RX- 4 - GROUND	SIERRA VIDEO SYSTEMS RS-422 - DB9M 3 - RX+ 8 - RX- 7 - TX+ 2 - TX- 4 - GROUND	
RS-422-3 - DB9F - CONTROLLED DEVICE 3 - RX+ 8 - RX- 7 - TX+ 2 - TX- 4 - GROUND	RESERVED FOR FUTURE USE	

**SPECIFICATIONS (CONTINUED)**

GPI/GPO - DB9F 1 - GPI9 2 - GPI10 3 - GPI11 4 - GPI12 5 - GPI13/GPO1 6 - GPI14/GPO2 7 - GPI15/GPO3 8 - GPI16/GPO4 9 - GROUND	RESERVED FOR FUTURE USE GPI INPUT IS PULLED TO +5VDC THROUGH 10K RESISTOR GPI9-GPI12 CAN TOLERATE SUSTAINED EXTERNALLY APPLIED VOLTAGES RANGING BETWEEN -48-48 VOLTS INPUT THRESHOLD IS 2.5V GPI13/GPO1-GPI16/GPO4 CAN TOLERATE SUSTAINED EXTERNALLY APPLIED VOLTAGES RANGING BETWEEN 0-03 VOLTS GPO OUTPUTS ARE OPEN COLLECTOR, ABLE TO SINK 16mA to 0.4 VOLTS OR 40mA to 0.7 VOLTS
TALLY 1-16,GPI1-4 - DB37F 1/20 - TALLY1 2/21 - TALLY2 3/22 - TALLY3 4/23 - TALLY4 5/24 - TALLY5 6/25 - TALLY6 7/26 - TALLY7 8/27 - TALLY8 9/28 - TALLY9 10/29 - TALLY10 11/30 - TALLY11 12/31 - TALLY12 13/32 - TALLY13 14/33 - TALLY14 15/34 - TALLY15 16/35 - TALLY16 17 - GPI1 36 - GPI2 18 - GPI3 37 - GPI4 19 - GROUND	TALLY OUTPUTS ARE RELAY CONTACTS THAT CLOSE WHEN THE MATCHING INPUT CONTRIBUTES TO AN M/E OUTPUT SWITCHING VOLTAGE: 200V MAX DC/PEAK AC RESISTIVE SWITCHING CURRENT: 0.5A MAX DC/PEAK AC RESISTIVE TYPICAL LIFE EXPECTANCY (1V @ 1mA): 10 <sup>7</sup> OPERATIONS TYPICAL CONTACT BOUNCE: 0.35 MILLISECOND DERATE AND USE DIODE OR R/C EMF SUPPRESSION WHEN SWITCHING INDUCTIVE LOADS TO AVOID CONTACT DAMAGE  GPI1-GPI4 ARE IDENTICAL TO GPI9-GPI12 ABOVE
TALLY 17-32,GPI5-8 - DB37F	IDENTICAL TO TALLY 1-16,GPI1-4 ABOVE
POWER INPUT - DUAL IEC	STANDARD IEC POWER CONNECTORS (2) DUAL REDUNDANT INPUTS, EITHER WILL POWER SYSTEM