



**The MCP-2020
Master Control System**



Installation and Operations Guide

The MCP-2020 System Operations Guide

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Utah Scientific, Inc.

4750 Wiley Post Way, Suite 150
Salt Lake City, Utah 84116-2878 U.S.A.

We declare our sole responsibility that the Utah-400 Digital Routing Switcher is in conformance with the following standards:

Emission

- EN55022:1994+A1&A2

Immunity

- EN55024:1998
- EN61000-3-2
- EN61000-3-3

Safety

- IEC 60950-1:2001 /EN 60950-1:2001

Following the provisions of the Directive(s) of the Council of the European Union:

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- Low Voltage Electrical Directive 72/23/EEC

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Important Safeguards and Notices

This section provides important safety guidelines for the Operator and Service Personnel. Specific warnings and cautions are found throughout the guide where they apply, but may not appear here. Please read and follow the important safety information, specifically those instructions related to risk of fire, electric shock, or injury to persons.

Safety Symbols



- Hazardous Voltage symbol



- Caution symbol. The product is marked with this symbol when it is necessary to refer to the manual to prevent damage to the product.

Warnings

Please observe the following important warnings:



- Any instructions in this guide that require opening the chassis, changing a power supply, or removing a board, should be performed by qualified personnel only. To reduce the risk of electric shock, do not perform any service unless you are qualified to do so.
- Heed all warnings on the unit and in the operating instructions.
- Do not use this product in or near water. Disconnect AC power before installing any options or servicing the unit unless instructed to do so by this manual.
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- Route power cords and other cables so they won't be damaged.
- The AC receptacle (socket) should be located near the equipment and be easily accessible.
- Disconnect power before cleaning. Do not use any liquid or aerosol cleaner - use only a damp cloth.



- Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed conductors and components while power is on. Do not insert anything into either of the systems two-power supply cavities with power connected.
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- To avoid fire hazard when replacing fuses, use only the specified correct type, voltage and current rating as referenced in the appropriate parts list for this product. Always refer fuse replacement to qualified service personnel.
- Have qualified personnel perform safety checks after any service.

Cautions

Please observe the following important cautions:



- When installing this equipment do not install power cords to building surfaces. To prevent damage when replacing fuses, locate and correct the problem that caused the fuse to blow, before reconnecting power.
- Use only specified replacement parts

Notices

Please observe the following important notes:



- When the adjacent symbol is indicated on the chassis, please refer to the manual for additional information.
- For the HD-2020 Chassis and Master Control Panel, refer to “Connecting and Disconnecting Power” - Chapter 2 (Hardware Installation).

Company Information

Utah Scientific, Incorporated

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This Chapter contains the following:

- Introduction
- System Parts Listing
- Connections
- Initial Activation and Confirmation
- ***System Setup – Visual Guide***

Introduction

Utah Scientific master control switchers ship fully assembled and ready for immediate use. The only special equipment you will need are some carpentry and/or metalworking tools to create the desktop cutout for the control panel.

Setup consists of mounting the equipment in racks and making electrical connections. USI performs all critical timing adjustments and alignment before your system leaves the factory.

You can ensure a properly installed system by reading the following sections and performing all tasks in order.

- Provide adequate AC power sources and sufficient rack space.
- Do not exceed recommended cable lengths.
- Leave adequate space at the rear of each equipment rack and console for ventilation and signal connections.

Refer to vendor manuals to help identify input, output, sync and control connectors. The MC-2020 Guide (Part No. 82102-0020) provides other valuable data you will need to identify system inputs and outputs and machine control connections.

Receiving Inspection

Check your system carefully when it arrives. Locate the shipping invoice first. This document lists the items that Utah Scientific, Inc. sent to you. Check the invoice against the equipment you received and against your original order. If you cannot find a particular option, look in the mainframe chassis. If the option is a plug-in module, it is probably installed there. Figure 1-1 shows the location of all standard and optional mainframe modules.

If an item is missing or if your shipment is incorrect in any other way, please contact the factory at once.

Claims Against the Carrier

Make note of any obvious harm to the shipping containers before opening them. Look for damage from dropping, puncture, crushing, fire, fluids or other sources. Even if the containers appear to be dry, look for signs of water damage. If possible, make note of any damage when you sign for the shipment. It may help in some cases to take photographs you can use when you file a claim.

Ensure that all control panel switches and knobs move freely. Check each individual unit for scratched or dented metalwork, loose or missing hardware, cut or broken AC line cords, etc. As you unpack and install the equipment, carefully check for any damage to the system. Some damage may not be readily apparent, so please examine all equipment carefully. File all damage claims with the carrier expeditiously and contact Utah Scientific for further instructions.

Unpacking

Caution: This equipment contains components that are susceptible to damage from electrostatic discharge. Use static-safe workstations, tools and containers when handling or shipping individual circuit card assemblies or modules.

To avoid equipment damage during unpacking, place each container on a flat, level surface before opening. You should retain all shipping containers and packing materials for later use.

System Parts Listing

The system components you have received (or will already have) may include the following:

- Utah 200 or 400 Router
- Control Card, housed within the SC-3 or SC-4 system (external). The system is also compatible with the SC-200.
- “Y” type cable. This device is placed between the SC-4 (or SC-3) and the MCP-2020.
- MCP-2020 mainframe (processor)
- MCP-2020 panel
- Controller Terminators for the Router, SC-3, and SC-4.
- Ethernet Hub
- System Installation CD, with NFS Server License.
- CAT 5 to 9-pin serial adapter for diagnostic port
- MC-2020 Breakout Panel (optional)

Connections

The MCP-2020 mainframe and SC-3/SC-4 are connected via UNET cabling. The UNET cable is attached to its corresponding port on the back of the SC-3/SC-4 controller (see the next illustration). Since UNET must be terminated, the cable is passed through the “Y” type cable prior to being connected to the MCP-2020. The “Y” type cable is the necessary terminator. Termination is necessary since there is no loop through capability.

Ethernet Hub

The Ethernet hub is designed to accommodate a stand-alone operation when a house network is not available. The following devices connect to this central hub:

- SC-3/SC-4
- MC-2020
- MCP-2020
- Computer control (optional, for RMS and Telnet operations)

(see figure 1-1)

Initial Activation and Confirmation

Once all connections have been made and the system is powered up, the system will scan the network and locate the processor assigned to Channel 1, then make the necessary connections via the UNET cabling.

The MCP-2020 will complete its brief test cycle and allow you to complete takes from the panel.

The system uses an SD video signal for reference input and timing control (on HD systems use an HD video signal). This can consist of house black or color bars. Though the default system configuration is for one channel, the panel has the ability to control a minimum of eight different channels.

Channels not located will display as ‘pending’.

Default IP Configuration

The single-channel default (factory set) IP configuration is as follows:

| | |
|----------|--------------|
| MC-2020 | 192.168.5.7 |
| MCP-2020 | 192.168.5.11 |

Multiple chassis configurations will affect these addresses. Please contact customer service for more detail.

Power Requirements

The MCP2020 power requirement is 60W (Power requirements – .5A @ 120V = 60Watts).

System Set-up - Visual Guide

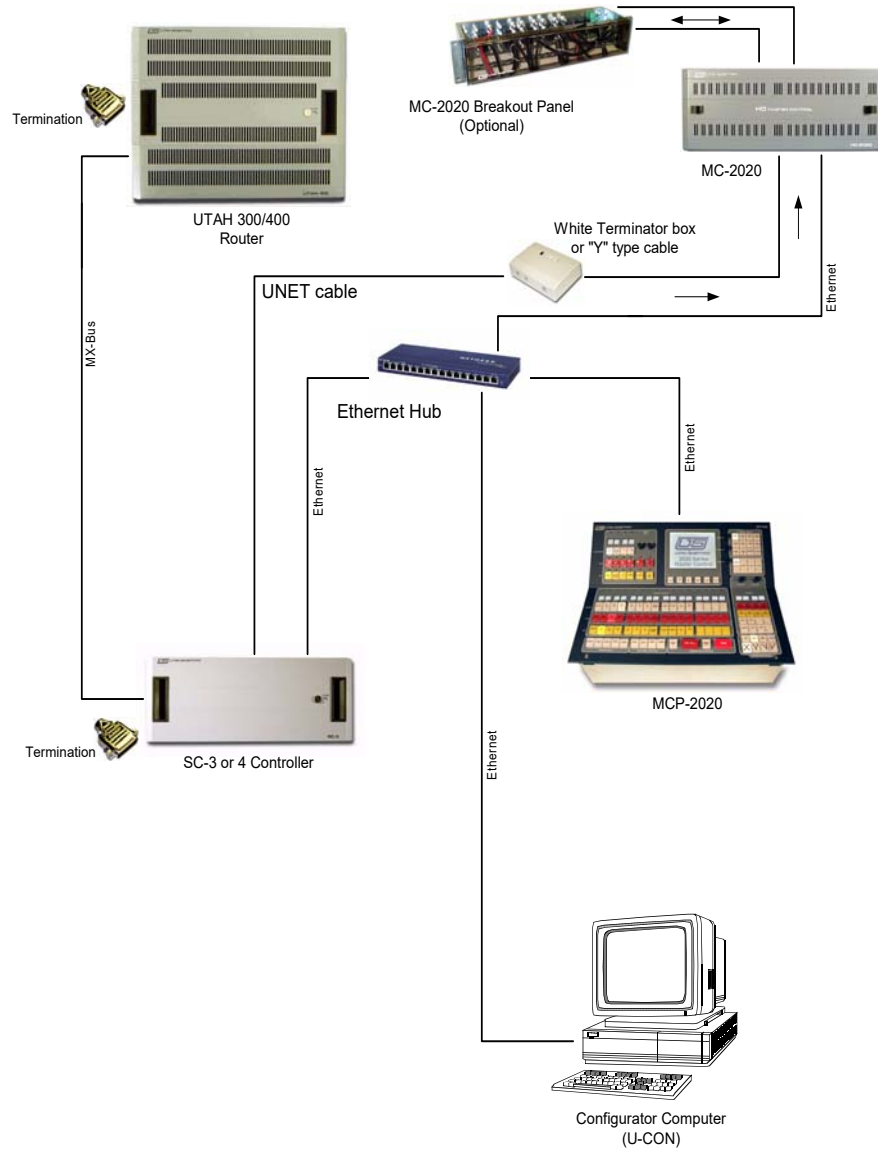


FIGURE 1-1. MC/P-2020 Basic Setup

System Overview

This chapter summarizes the MC-2020 Master Control process, illustrating the basic switcher operation with the hardware and software components contained within the MC-2020 and MCP-2020 Digital Master Control System.

Note: Check the system configuration that was ordered from the factory to determine which connections must be made at your facility.

This Chapter Contains the Following:

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| Abbreviations | 2-6 |
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Introduction

Master Control is an essential system in any television broadcast facility because it delivers program audio, program video, and other vital components of the on-air signal. Key equipment like this must be very simple to use and reliable, and withstand many hours of continuous use.

The MC-2020 Digital Master Control Processor provides digital audio and video processing for master control switching applications. The MC-2020 can maintain one or two independent signal processing channels, allowing both standard and high definition signal formats within a single frame. The MC-2020 provides a full range of mixing and keying functionality, with up to four keyers available a plug-ins.

The MCP-2020 Master Control Panel completes this larger configuration by providing a comprehensive digital and multi-channel operation. The MC-2020 controls the MCP-2020's keyers, DVE, audio operation, and multi-channel functionality from a single operations panel.

The mainframe contains several circuit card assemblies that control the system and process the video inputs. The MC-2020 card scans the control panel for operator actions such as audio level changes, input selection changes, or takes. When a change occurs, the mainframe initiates and controls the action. The mainframe manipulates three dedicated inputs from the router: (1) the program bus (PGM), (2) the preset bus (PST), and the preview/key bus (PVW/KEY). The routing switcher selects the video source for each bus in response to operator inputs.

MCP-2020 Control Panel Views

Angled top



Flat top



FIGURE 2-1. MCP-2020 Master Control Panel (actual views)

The interface processor in the control panel encodes operator inputs, and decodes drive signals for incandescent lamps and LEDs on the control panel. It also provides RS-422 and Ethernet interfaces that enable the MCP-2020 to communicate with other equipment.

System Overview

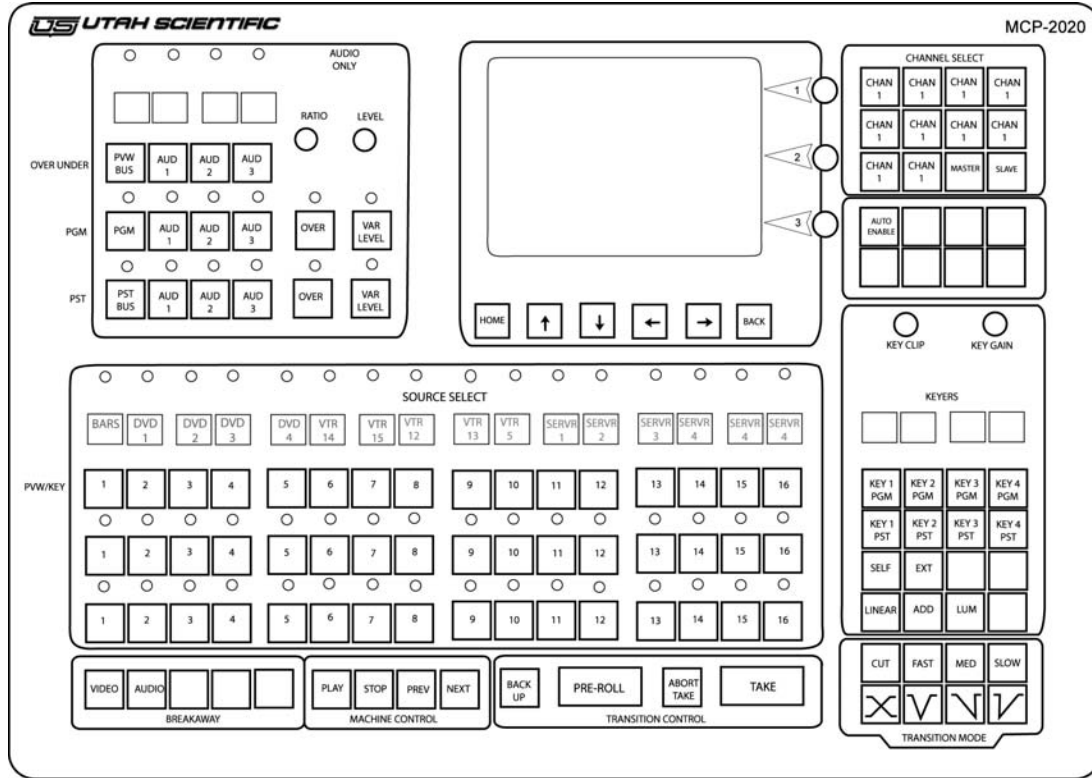


FIGURE 2-2. MCP-2020 (basic layout)

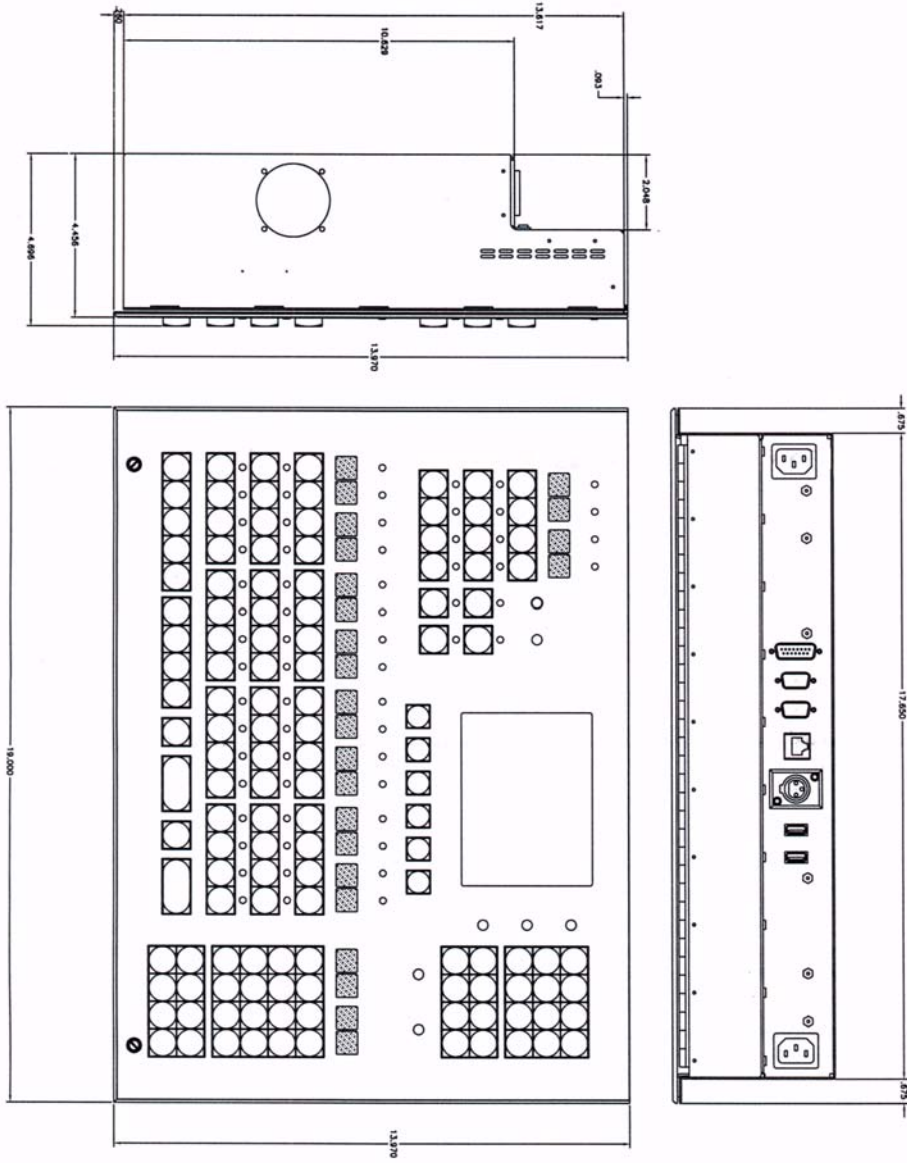


FIGURE 2-3. MCP-2020 (dimensions)

Abbreviations

The following abbreviations may be used in this guide:

TABLE 2-1. Common Abbreviations and Mnemonics

| Abbreviation | Description |
|---------------------|----------------------------------|
| ATR | Audio Tape Recorder |
| AES | Audio Engineering Society |
| CPU | Central Processing Unit |
| DTR | Digital Tape Recorder |
| EBU | European Broadcast Union |
| ENET | Ethernet |
| HDTV | High Definition Television |
| I/O | Input / Output |
| IP | Internet Protocol |
| JPEG | Joint Photographic Experts Group |
| M-JPEG | Motion – JPEG |
| MPEG | Motion Picture Experts Group |
| MX-Bus | Utah Router Control Comm. Bus |
| RMS | Router Management System |
| RU | Rack Unit |
| SDI | Serial Digital Interface |
| U-Net | Utah Control Panel Comm. Network |
| UTP | Unshielded Twisted Pair |
| VTR | Video Tape Recorder |

Abbreviations

TABLE 3. Master Control Mnemonics

| Abbreviation | Description |
|---------------------|--------------------|
| AUD | Audio |
| BRDR | Border |
| BACK | Background |
| CAM | Camera |
| CHAN | Channel |
| DEL | Delay |
| EMRG | Emergency |
| ENAB | Enable |
| FOR | Foreground |
| GND | Ground |
| PGM | Program |
| PRVW | Preview |
| PST | Preset |
| PVW | Preview |
| SRC | Source |

Terms

The following terms are used throughout the documentation in this guide:

- **"Operator"** and **"User"** refer to the person using or operating the MC-2020 System.
- **"System"** refers to the entire interconnected MC-2020 System including control panels, routers, software, and chassis.
- **"Input"** refers to an audio or video signal source that is connected to the MC-2020.
 - One video input represents one High Definition or Serial Digital Interface video input signal.
 - One audio input represents a single monophonic track from an analog audio source.
 - One digital audio input represents two tracks (left and right channel) from a digital audio source.
- **"Source"** refers to an audio or video device whose output signals are connected to the MCP-2020 inputs. Examples of audio / video sources are ATR's, VTR's, DTR's, cameras, video / audio routers, audio mixers, graphics systems, and satellite feeds.
- **"Output"** refers to the MCP-2020 audio or video signals from the unit's "outputs", which are connected to the 'destination device'. This term also includes the physical output connectors on the frame.
- **"Destination"** refers to the device, which is receiving the MCP-2020 output signal. This could include VTRs, monitors, satellite feeds, or video/audio routers.
- **"Signal Level"** refers to the logical level of the audio/video routers in relation to the entire connected system(s). Typically the master control occupies the lowest logical level.
- **"Hot Swappable"** refers to a printed circuit board, which can be removed or replaced with system power "on".
- **"Control Panel"** refers to the physical human interface used to control the various systems in use.
- **"Display"** is the 'LCD Display' on the panels in use.
- **"Monitor"** refers to the monitor attached to the monitor matrix port of a video or audio router system.

Terms

- **"High Definition"** refers to all 720p and 1080i formats – as per SMPTE 292M definition. The typical high definition data rate is 1.485 GB/S and a 16:9 Aspect Ratio Picture characterizes this technology.
- **"Serial Digital"** Interface (SDI) refers to the serial digital video signal operating at 125 to 270 MB. Utah Scientific data rates for the serial digital router are 143, 177, 270,360 and 540 MB.

Operational Description

This illustration contains an overview of the button groups and locations.

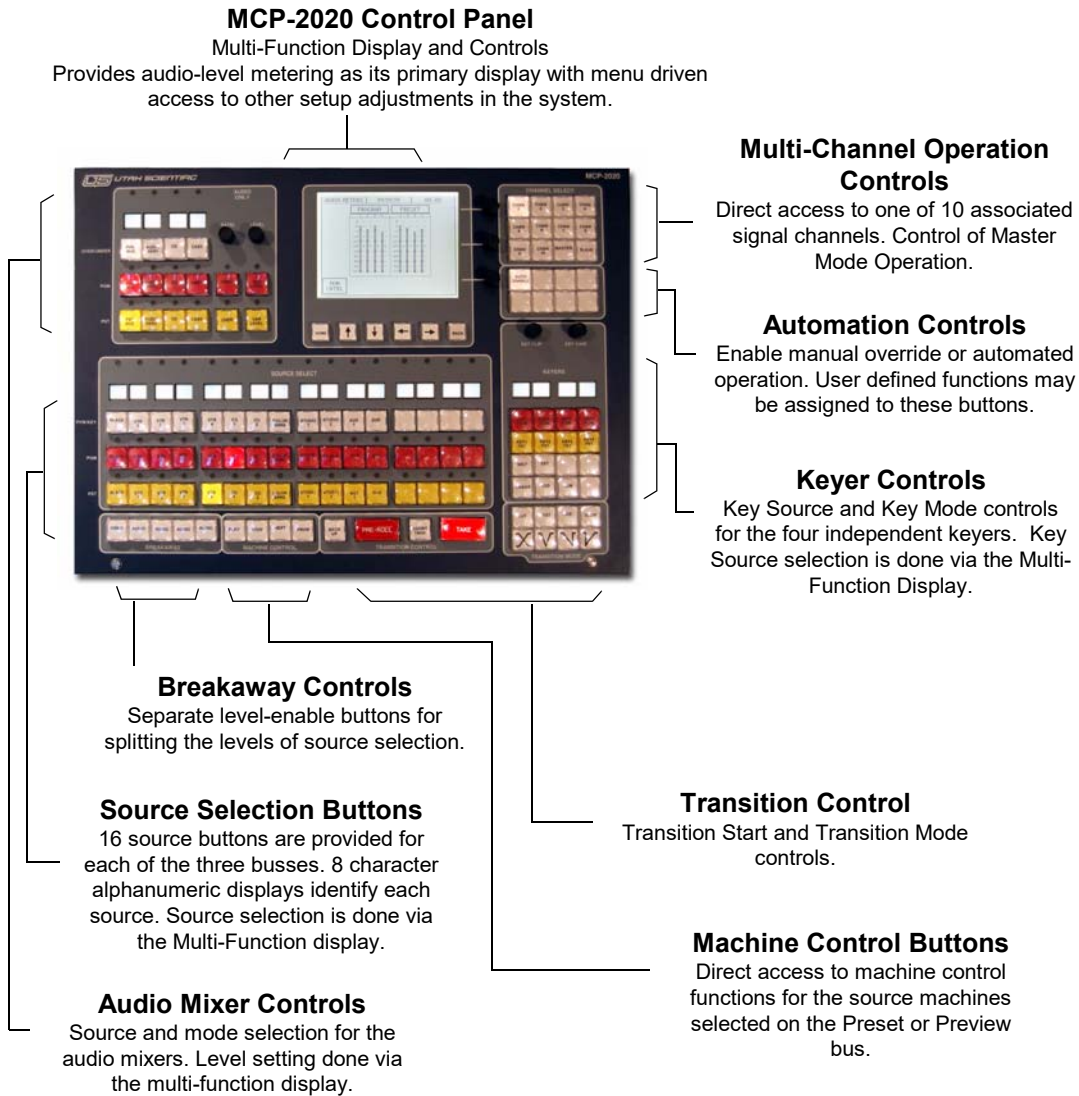


FIGURE 2-4. MCP-2020 Control Panel

Operational Description

MCP-2020 Panel Operations

In This Chapter

This chapter describes the overall operation of the MCP-2020 Control Panel. **The following sections are presented in the sequence you may follow for panel setup and basic on-air operation.**

Check the system configuration that was ordered from the factory to determine which connections must be made at your facility. You can also refer to the System Installation Guide (Part No. 82101-0066 for additional detail.

Note: *Source configurations for your switcher are defined in the set-up file, which is usually done prior to delivery. Though instruction for source assigning is contained in this chapter, please contact Customer Service if you need additional configuration assistance.*

The following topics are presented:

| | |
|----------------------------------|------|
| New Panel Operations | 3-2 |
| Channel Select | 3-4 |
| Master and Slave | 3-4 |
| Automation Controls | 3-5 |
| Source Select | 3-6 |
| Transition Controls | 3-7 |
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| Keyer Controls | 3-10 |
| Logo Placement – MCP Keyer | 3-12 |
| Breakaway Controls | 3-13 |
| Audio Only | 3-14 |
| Multi-Function Display | 3-16 |

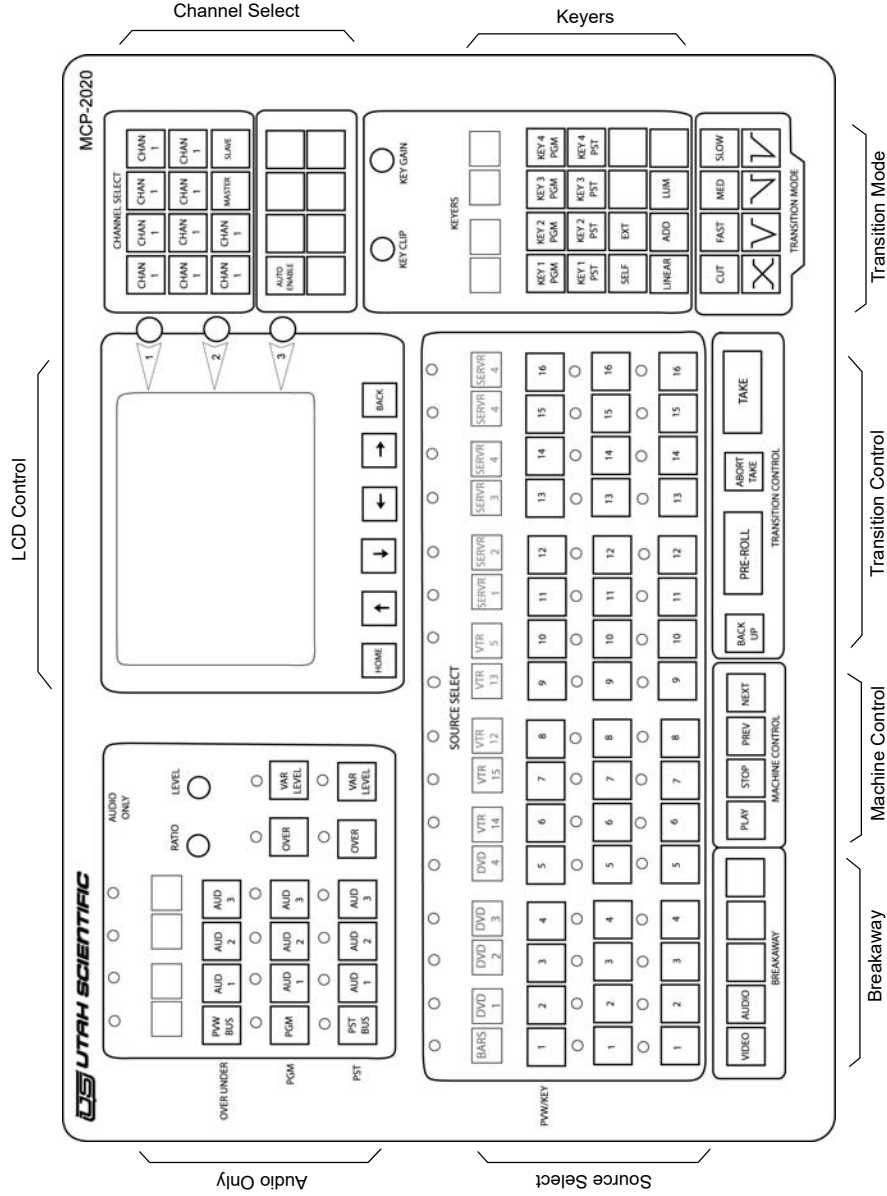
New Panel Operations

The MCP-2020 [panel] includes the following function keys:

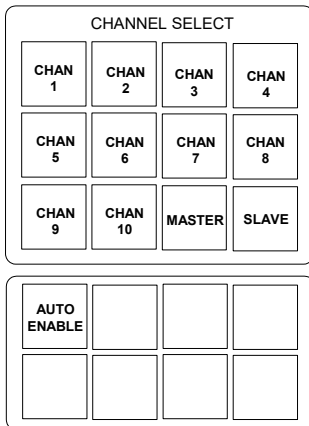
- Logo Option
- EAS Option

The MCP-2020 panel will contain the above button functionality once the updated firmware (provided) is in place.

MCP-2020 Visual Overview



Channel Select



In most broadcast facilities, various mainframes or channels are associated with, and controlled by the switcher. The MCP-2020 behaves the same way, and the *Channel Select* button group is used to assign the control panel to one or more of the channels within a *multi-channel* system. (The default selection is 'Channel 1'. Additional channel groups must be assigned during system setup.)

Pressing any one of the Channel Select buttons immediately transfers control of that channel to the MCP-2020; the panel is then updated with the current status and settings for the selected channel.



FIGURE 3-1. Channel Select group

You may notice changes in the panel's LED status when different channels are selected.

Master and Slave

When **Slave** is pressed, any of the other channels (in the above button group) can be selected and safely monitored. No other panel button [pressed] will affect the channel's program output while Slave is illuminated.

When **Master** is pressed, any other MCP-2020 panel selection will affect *all* channel groups that are currently illuminated (within the *Channel Select* group).

You can assign channels to the Master Mode by holding down the MASTER button, then selecting the channels to be included.

Automation Controls

The **Auto Enable** button, when illuminated, indicates that the current channel will accept control commands from the automation system (if present). Pressing this button will enable the channel's automation port.



FIGURE 3-2. Automation control buttons

The additional blank buttons in this group can be assigned to control other automation functions, depending on the specific capabilities of the automation system. They may also be assigned to other functions and external devices, such as Utah Scientific's SqueezeMAX.

These buttons can be configured individually for external control and automation.

Source Select

The Source Select button group controls the primary *PVW/Key*, *PGM*, and *PST* selection busses for router switching.

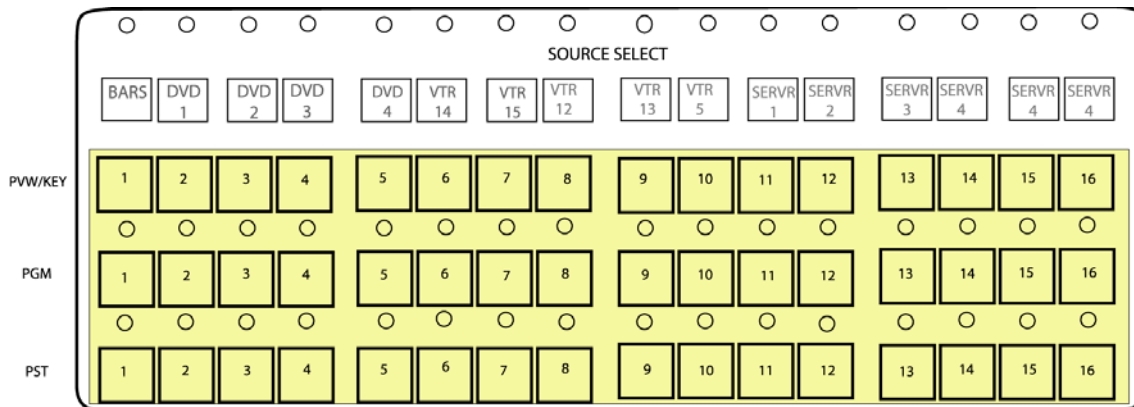
Button definitions are made during the MCP-2020 configuration process. Source (button) assignments can be modified, if necessary, through the LCD display. This process is described later in the chapter.

Prior to going to air, desired sources are selected along the *Preset* bus (bottom), then taken to air by pressing the **TAKE** button (lower right on control panel). The **PREROLL** button can also be used if a preroll time designation has been made in the initial system configuration. The **PREROLL** button will illuminate if the selected *PST* sources have been given preroll (time) assignments, or if the transition speed and type affect the new source's on-air appearance.

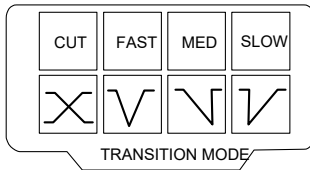
TAKE occurs with no router machine control.

PREROLL occurs *with* router machine control

The Preview bus (white on panel) is most commonly used for monitoring (corresponds to AUX OUT) when you don't want to disturb the Preset bus. Additionally, the output of "MON" can be toggled between the Preview and Preset video outputs -- See "5 - MON (Audio)*" on page 3-33.



Transition Controls



Transition Controls

The buttons in this group select the type of transition to be executed by the next TAKE command. The transition types are Dissolve (Cross-Fade), Fade-Down/ Fade-UP (V-Fade), Fade-Down/ Cut-UP, and Cut-Down-Fade-UP. Each transition can be executed at Slow, Medium, or Fast rates. The timing of these rates is set during the system configuration process.



FIGURE 3-3. Transition mode controls

A first button in the Transition Rate group selects CUT as the rate. When selected, the system will automatically default to dissolve ("X") as the transition rate.

The TAKE button executes the preset event including source selection, keys, and audio mixes. If selected, the **Abort Take** button will stop the execution of the event after the **Pre-Roll** button is pressed, leaving the Program bus in its original condition.

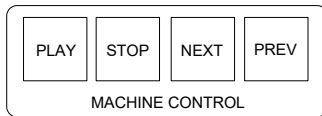


FIGURE 3-4. Transition Control group

If the Preset Source's machine control definition includes machine control commands (or if the transition used affects the time to air), the **Pre-Roll** button will be illuminated, showing the operator that he may need to start the event early to allow for the preroll time.

Whenever the **Pre-Roll** button is illuminated, that button should be used to initiate the transition so that the appropriate machine control commands will be issued.

If the Preset source has a "back-up" source assigned to it, the **Back-Up** button will be illuminated. Pressing this button will immediately place the back-up source onto the Program Bus.



Machine Control

These buttons give the operator access to machine control functions on the source machine that is selected (Preset Bus). The actual commands available are determined by the machines that are used and by the design of the specific installation.



FIGURE 3-5. Machine control group

This control can be either relay or serial. (The serial configuration accompanies the ESI-2020 only.)

Machine control for a given source is disabled once it is on air.

Shuttle, Forward, and Shuttle-Reverse

These are hidden key assignments. Shuttle, Forward, and Shuttle-Reverse actions can be 'shifted through' by doing the following; hold down the audio and video keys corresponding to a given source (preset bus) while simultaneously pressing the PREV button.

A 'ready' (for the above command) is issued to a device along the preset bus when the button is held down and released within one second.

When a device is selected (along the Preset bus) and showing 'not ready', the illumination of the keys will be reduced to the lowest level. When the device is ready, the preset bus illumination will become brighter.

For more information, See "Machine Control" on page 3-22.

Keyer Controls

This section of the panel provides control of the channel's built-in keyers. Each channel may contain from one to four independent keyer boards, numbered from 1 to 4.

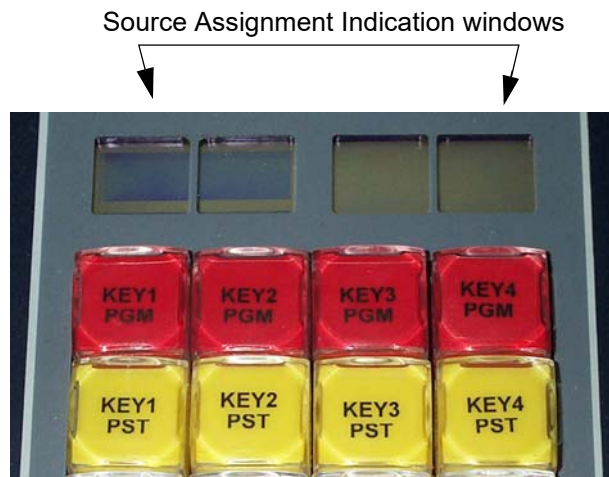
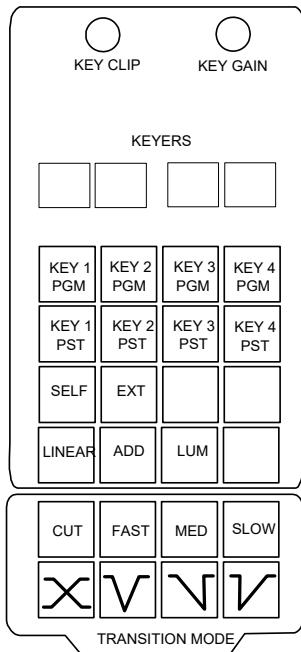


FIGURE 3-6. Keyer source assignments

The key source assigned to each keyer is indicated on the LCD source display located directly above each Keyers' control buttons. This is set up during the software configuration process.

The KEY PST buttons put the keyers on-line on the preset bus. A key that is preset will be put on-line on the program bus at the next TAKE transition. It is possible to put the keyer on-line directly by pressing the KEY PGM button, and it is recommended that the key be previewed before being taken to air.

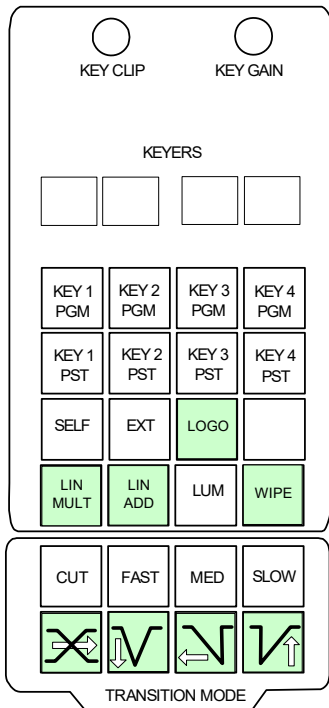
Multiple keys can be enabled simultaneously. The key that is currently active will be brightly illuminated, while other enabled keys will have a dimmer illumination.

Keyer Mode

The Keyer Mode controls include Key Source selection (External, Logo, or Self Key from the *Preview Bus*) and LIN, ADD, or LUM selections for the actual mode of the keying process.



FIGURE 3-7. Keyer mode controls



- Linear is a Multiplicative linear key.
- Additive is an additive linear key.
- Luminance is a non-linear key mode.

The Key Clip and Gain controls are used to set the values of the key. The settings of these controls are stored in each Keyer and remain fixed until they are changed by a later adjustment.

The Clip and Gain will both function in the Linear mode. Neither clip or gain will function in the *Additive* mode. Gain *only* will function in the *Luminance* mode.

Key Summary

| KEY SUMMARY | 99:99:99 | | 00.00 | |
|--------------|----------|-------|-------|-------|
| | KEY 1 | KEY 2 | KEY 3 | KEY 4 |
| ACTIVE | NO | NO | NO | NO |
| TYPE MODE | LOGO | LOGO | LOGO | LOGO |
| PGM PST | | | | |
| GAIN | 000 | 000 | 000 | 000 |
| CLIP | 000 | 000 | 000 | 000 |
| LOGO X | 000 | 000 | 000 | 000 |
| LOGO Y | 000 | 000 | 000 | 000 |
| | KEY 1 | KEY 2 | KEY 3 | KEY 4 |

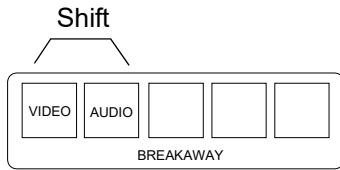
The Key Summary display shows the status of the (up to) 4 keyer control cards installed within the MC-2020. The LCD will reflect the operational status of any card that shows a fault, or if it has been removed from the chassis.

The LCD table also displays the current keyer mode; such as linear or luminance, Type, Logo, Ext, or Self. This display status is in response to the actual corresponding key pressed on the switcher.

Clip and Gain adjustments can be made via the Program or Preset bus. These values are also visible within the LCD's keyer table.

The Key Summary screen also provides access to the Logo (option) selection and positioning screen.

Breakaway Controls*



Breakaway Controls*

These buttons allow the operator to select audio signals from a source that is different from the Preset video source. The MCP-2020 system is capable of working with four AES audio streams for each source. Any of these levels can be controlled separately for breakaway operation.

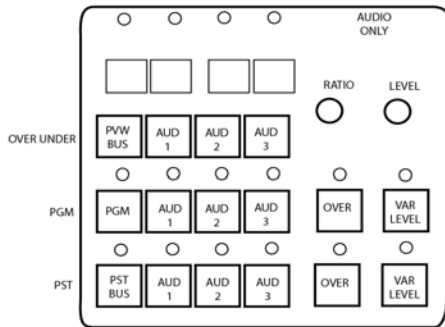


FIGURE 3-8. Breakaway group

Specific audio streams can be assigned to any of the four buttons. To make a breakaway; select the Preset video source, select the Preset audio source, then hold down the corresponding button (above) while TAKE is pressed.

** Requires Audio Input card*

Audio Only



In normal operation (with no audio split taking place), the *Preview*, *Program*, and *Preset* audio follows the selection made within the **Select Source** button group (previously described). In this operating mode, the left-most buttons in the **Audio Only** group are illuminated (PVW, PGM, and PST). When an audio stream is to be split (to an audio only source), one of the selections to the right of the PVW, PGM, and PST buttons is made (Audio Only group). In the illustrations on this page, these 'audio only' examples would include *Audio Server*, *CD*, and *Cass*.

Prior to going to air, split audio streams can be adjusted by pressing the VAR LEVEL button along the PST bus, then using the *Level* knob to increase or decrease the volume. The actual setting can then be viewed on the Multi-Function Display's audio metering screen. The audio split is taken to air by pressing the TAKE button. You can of course go immediately to air by directly selecting an audio source along the PGM bus.

Audio Only

Audio level adjustments for each source can be stored as part of that source's definition and will be retained until a new adjustment is made.



FIGURE 3-9. Audio only

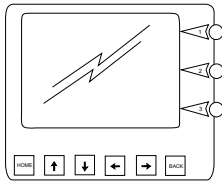
When an external audio signal is mixed with the Program audio, the mix ratio (between the two) is set using the corresponding *Ratio* level knob. (Hold the corresponding Over/Under button down while making ratio adjustments.)

The *Over/Under* audio comes in at unity, while the *Program* and *Preset* levels will move up or down by adjusting the ratio control.

This mix then becomes part of the preset for the next event.

Note: This feature requires the optional Audio Input Board. If this board is not present, external audio can be brought in on the Preview video bus input (as embedded audio) for limited 'over' capability.

Multi-Function Display



The panel's large LCD Display and its associated knobs and buttons are used to perform a wide variety of secondary functions. The touch screen panel provides full navigational assistance on all menus.

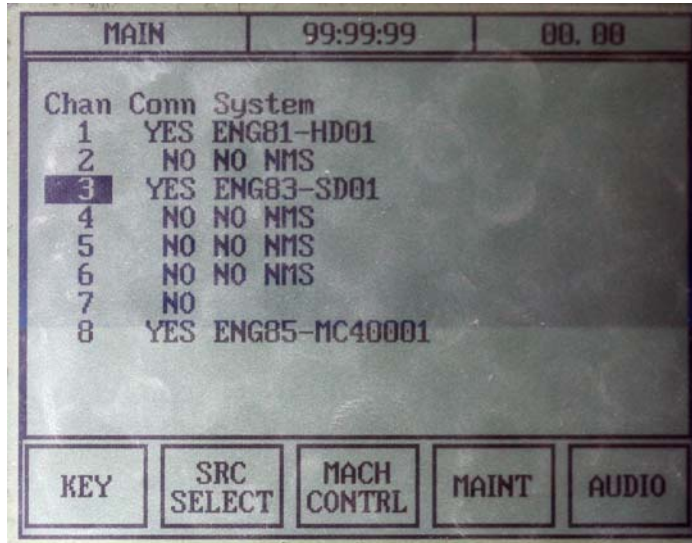


FIGURE 3-10. LCD Display

The navigation buttons below the display give an easy way to move between screens or between the selections on a screen. The menu structure contains the entries described below:

LCD Overview

The *Main* screen contains informational detail for the devices currently attached to the master control network. This screen also presents the following menu buttons:

Key



Gives access to the adjustments for the keyer that is currently active on the PST bus as indicated by the full illumination of the KEY PST button.

Source Select



The following selections are available; Source Assign, Audio Only Source assign (AO SRC), and Key Source assign (KEYSRC).

Source Assignment

This button set provides access to the Source Assignment process. One or more pages of sources will be displayed on the LCD, depending on the sources listed for assignment in the configuration process.

From the LCD screen, select **SRC Select**, then select **Source Assign**. Choose the group source from the 'Select Router Group' directory (such as VTR, DVD, Server, Test, etc.), then make the specific device selection from those presented. (Your selections will vary depending on your particular configuration.)

Once the selection has been made, you will be prompted (on screen) to press the PVW button corresponding to the actual button position you would like to assign.

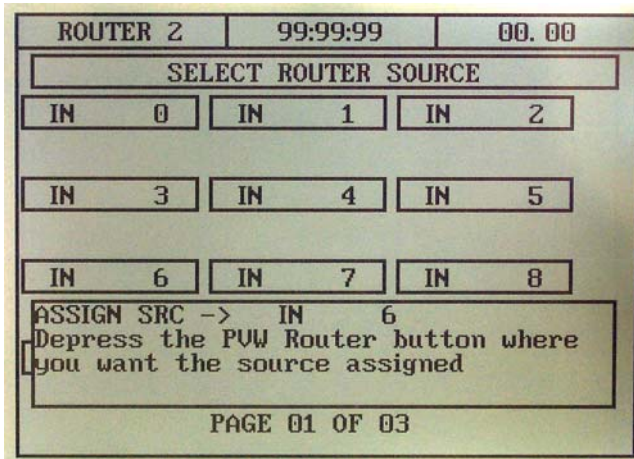


FIGURE 3-11. LCD source assignment confirmation

The completed assignment is indicated when the new source name appears in the source identification window above the Preview bus button.

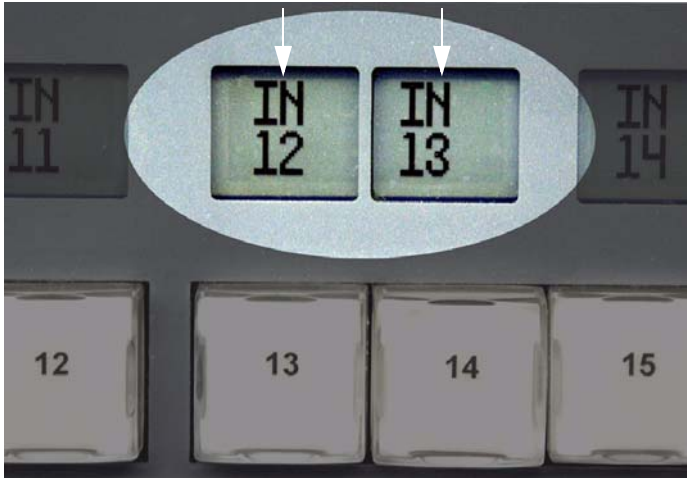


FIGURE 3-12. Assignment indication

KEYSRC Assign - Soft Key Source Assignment

The MC-2020 supports a feature called routable keys. This is defined as a pair of router outputs connected to the EXTERNAL KEY and FILL inputs on a MC-2020, which are then controlled from the MC-2020 control panel.

This feature allows a single external keyer input to utilize any input on the router as a key source. Practically, a small number of devices will typically be used as sources for the keyers.

Complete the following steps to use this feature:

1. Enable the PST KEY of the keyer channel where the router outputs are connected. The possible selections are Keyer 1, Keyer 2, Keyer 3, and Keyer 4.
2. Now select the EXTERNAL KEY. This will cause the status window above the PGM KEY button to change. You should now see either NO RTR or a source name.
3. Select a new source for the keyer using the LCD touchscreen interface.
 - Select HOME, then SRC SELECT, then KEYSRC ASSIGN.
4. Select the source using the same method used to select sources for the main PGM, PST, PVW buttons.

Once the source is selected, press the PST KEY button on the keyer channel you selected in step 1 (above). This assigns the source to the keyer, which you can now use.

If your system contains other keyer channels configured for routable keying, follow the same steps above, substituting the keyer channel as necessary.

Once the selection has been made, you will be prompted (on screen) to press the PVW button corresponding to the actual button position you would like to assign.

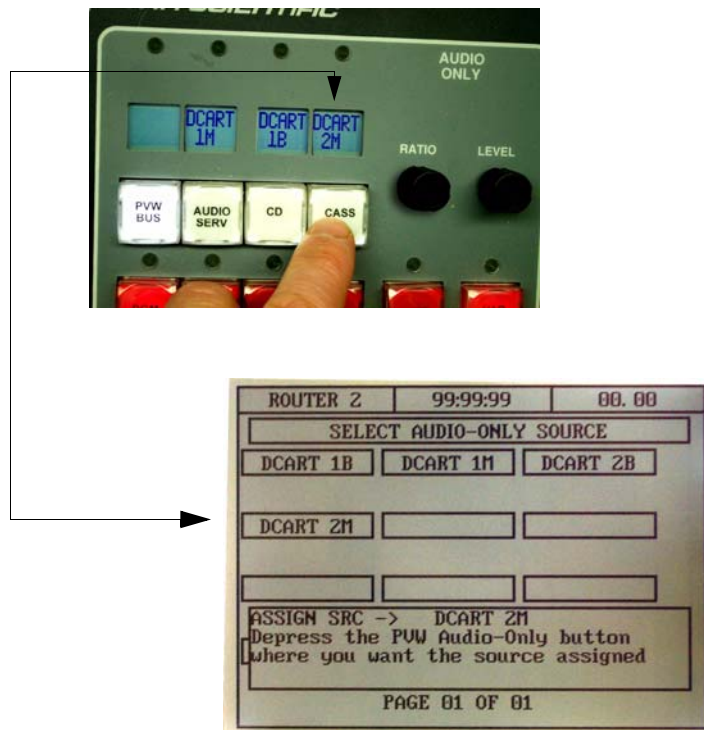
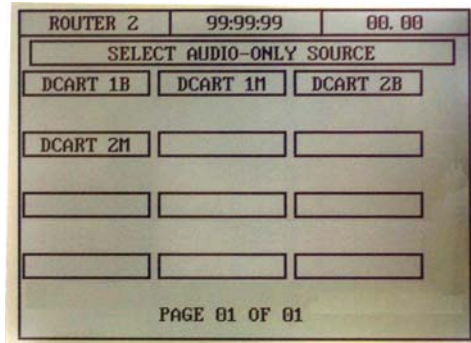


FIGURE 3-13. Source screen prompt (LCD), and new assignment indication

Audio Only - AO SRC Assign

This button set provides access to the Source Assignment process for the audio only button set. When the **AO SRC Assign** button is pressed, one or more pages of sources will be displayed on the LCD, depending on the sources listed for assignment in the configuration process.

Choose the group source from the 'Select Router Group' directory (such as VTR, DVD, Server, Test, etc.), then make the specific device selection from those presented. (Your selections will vary depending on your particular configuration.)



Machine Control

The MCP-2020 Machine Control contains a basic operational display for current machine status; this includes switcher bus position, source, and time code. Control elements include shuttle forward, reverse, play, and stop.

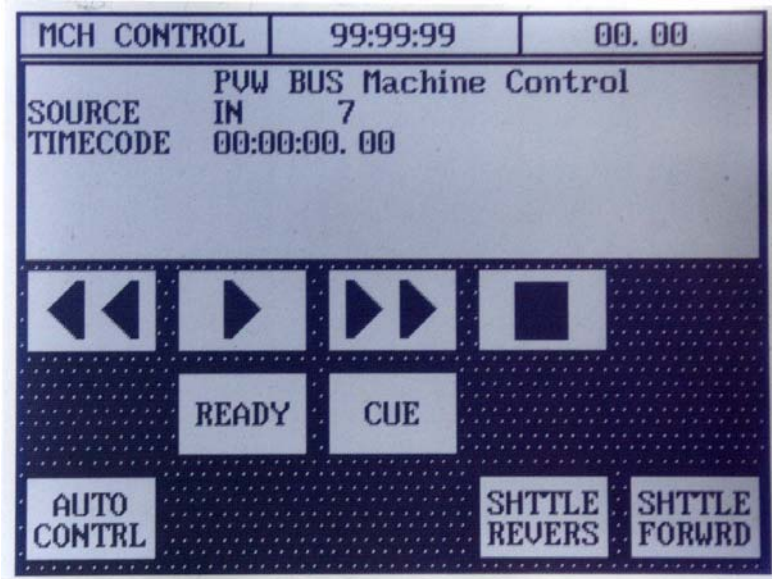


FIGURE 3-14. Machine Control operational display

The setup parameters for a specified playback device are defined within the MCP Configuration process.

Maintenance (MAINT)

This button gives access to a number of system maintenance functions:

| | | | | |
|---------------|---------------|--------------|--------------|-------------|
| MAINT | | 99:99:99 | | 00. 00 |
| DISP LOGO | LAMP TEST | PANEL CONFIG | PANEL NORMAL | ADU OPS |
| FRAME LOG | FRAME XPNTS | FRAME LUDS | MESG COUNTS | TIMER CNTRL |
| SET FR COLORS | CLR FR COLORS | PANEL DEBUG | | |
| SYSTEM INFO | SYSTEM ERRORS | SRC STATUS | FLIP FLOP | |
| BUTTON TEST | | | | |

Display Logo

Panel manufacturer and series.



Frame Log



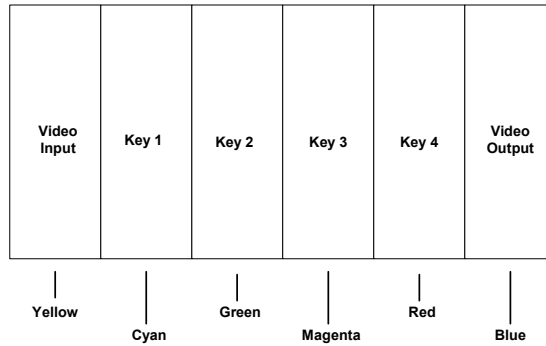
The Frame Log gathers information on the state of the machine and delivers the detail to the configuration PC. The Log file is primarily used during factory testing for debug purposes.



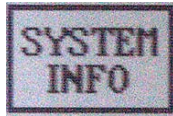
Set FR Colors

This sets the default error colors in a processing frame to the COLOR BARS values starting with yellow on the video input

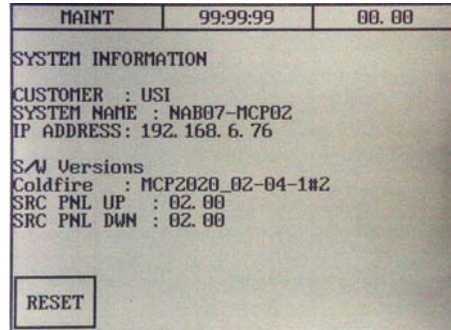
card and working up through BLUE on the video output card. This provides a means of knowing which card is detecting the bad signal. For example, a yellow display on the monitor indicates the Video Input card has detected a bad input signal. A blue display indicates that the Video Output card has detected a bad signal from one of the other cards in the chassis.



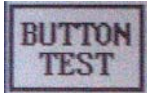
System Info



Shows software versions and network configuration parameters. The *Reset* button affects the panel only, not the main-frame or video signal paths.



Button Test



Test routine to verify operation of all areas of the LCD touch screen. Each time a button is pressed the associated area of the LCD should toggle states.

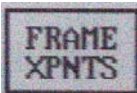
| MAINT | | 99:99:99 | | 00.00 |
|-------|----|----------|----|-------|
| 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 |

Lamp Test



Provides a quick bulb test on all buttons, separated by the upper and lower sections.

Frame Crosspoints



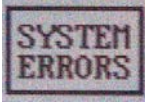
Primarily used for debugging purposes. Sends a log file containing all system crosspoints to a separate PC (using the debug port). The log file contains the video and audio processor crosspoints settings through the entire system. Pending errors are displayed (in the log) for debug purposes.

Clear FR Colors



This sets the default error colors in a processing frame to black. The error colors are displayed when the boards in the MC-2020 frame detect a problem with an incoming signal.

System Errors

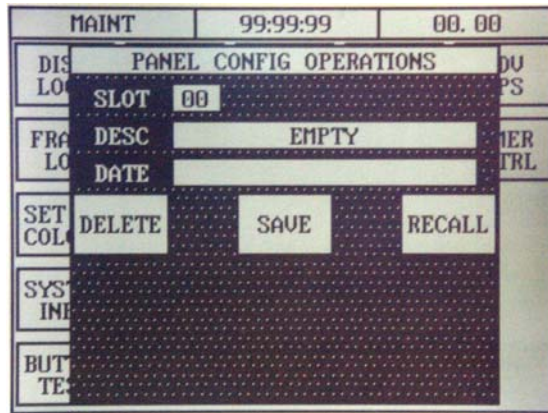


The system generates and displays a log containing current errors and status.

Panel Config



Provides the user with the ability to save and restore up to 10 panel configurations.



Frame LVDS



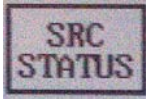
Primarily used for debugging purposes. Sends a log file containing information related to the video and audio data, passing along the high speed busses on the back panel. Frame LVDS sends a log containing the status of the LVDS structures. Pending errors are displayed (in the log) for debug purposes.

Panel Debug



This is a diagnostic tool for engineering troubleshooting purposes.

Source Status

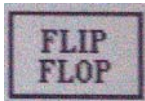


Descriptions of the various signal inputs to the panel.

| RTR STATUS | 99:99:99 | 00. 00 |
|---------------|--------------|---------|
| Video | Audio | Backup |
| 00:00:00. 00 | 00:00:00. 00 | ----- |
| Video | Audio | Back |
| IN 10 | IN 10 | ----- |
| 00:00:00. 00 | 00:00:00. 00 | |
| [xxxx] V +000 | H +0000 | SD 625I |
| Video | Audio | Back |
| IN 10 | IN 10 | ----- |
| 00:00:00. 00 | 00:00:00. 00 | |
| [xxxx] V +000 | H +0000 | SD 625I |

FIGURE 3-15. Status Display

Flip Flop



When selected, *Flip Flop* causes the button preset to assume the Program bus's previous (button) position after the Take occurs.

MC-400 Control



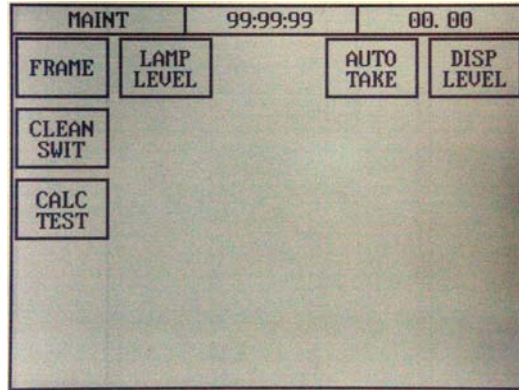
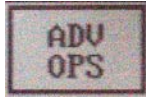
Description

Timer Control



Description

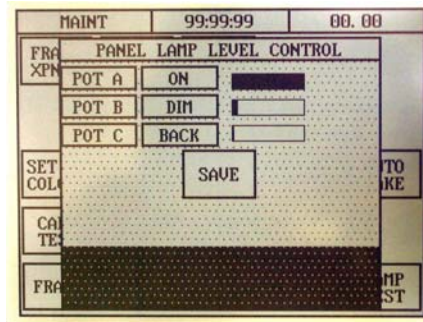
Advanced Options



Lamp Level



Allows the value of the 3 button states (ON, DIM, BACKLIGHT) to be adjusted using the shaft encoders next to the LCD. This applies to all MCP-2020 buttons.



Calc Test



The CALC TEST feature is a setup utility that allows the user to enter numeric values for completing pre-roll calculations.



Trans Times

Description



Auto Take

Additional diagnostics tool, containing a simple automation script for testing purposes; cycling through a given button set then starting over.



Display Level

Discussion



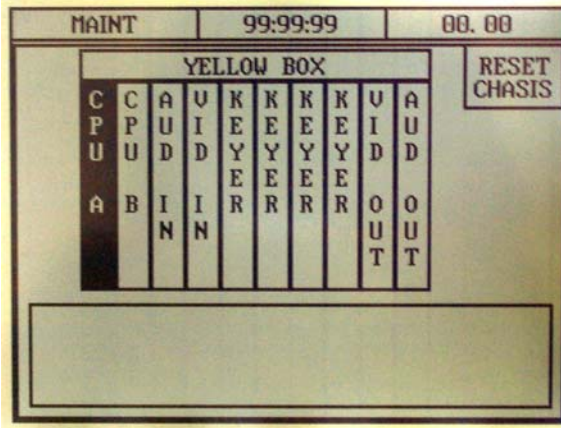
Clean Switch

Discussion

Frame



This screen displays the MC-2020 processor chassis that is currently selected by the panel; showing which boards are present in the frame's card slots, serial numbers, part numbers, and installation status. This screen also provides a chassis reset option, identical to the one found on the chassis itself.



Timer Control

See **Appendix A** - 'Time Key and Monitor Channel'

Monitor Control Panel

The audio button displays the monitor screen. The monitor menu buttons on this display provide access to screens that allow adjustment of the Monitor Output levels and selection of the monitor output modes: Mono, Stereo, or SAP.

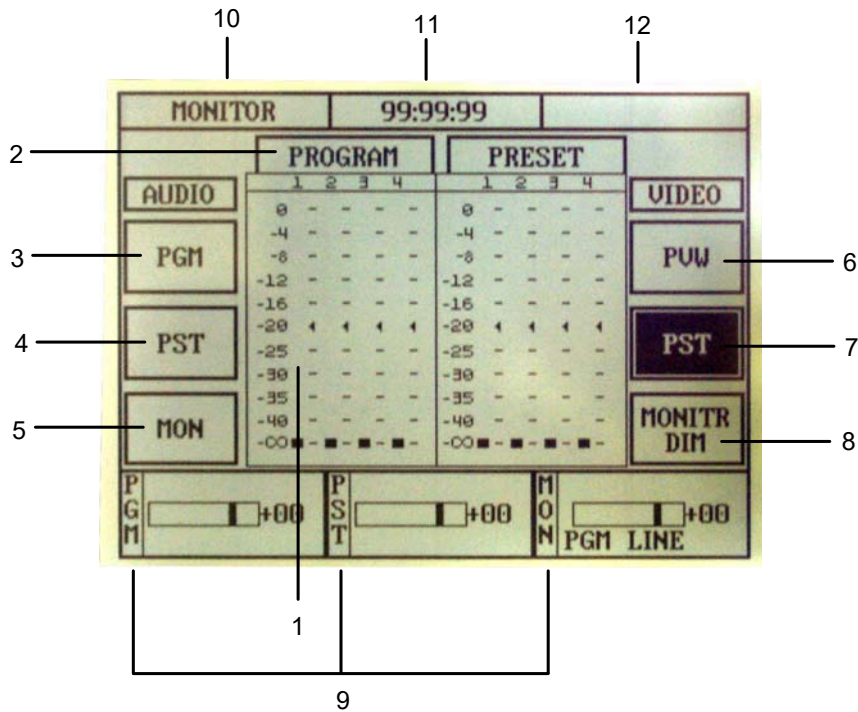


FIGURE 3-16. Audio/Video Control Panel (LCD)

1 - Metering - PROGRAM and PRESET

This is a display of the individual channels of the AES stream. Two AES streams are displayed on both left and right -- audio metering sections of the display.

2 - Meter Assignment buttons

The audio metering display sections can be re-assigned by touching either of these buttons. A separate menu will appear that allows the meter section to be assigned to PROGRAM or PRE-SET channels 1 - 4 or 5 - 8.

3 - PGM (Audio)

This gives the operator the ability to manually change the audio streams coming from the PGM OUTPUT; stereo, mono, SAP, Dolby, etc.

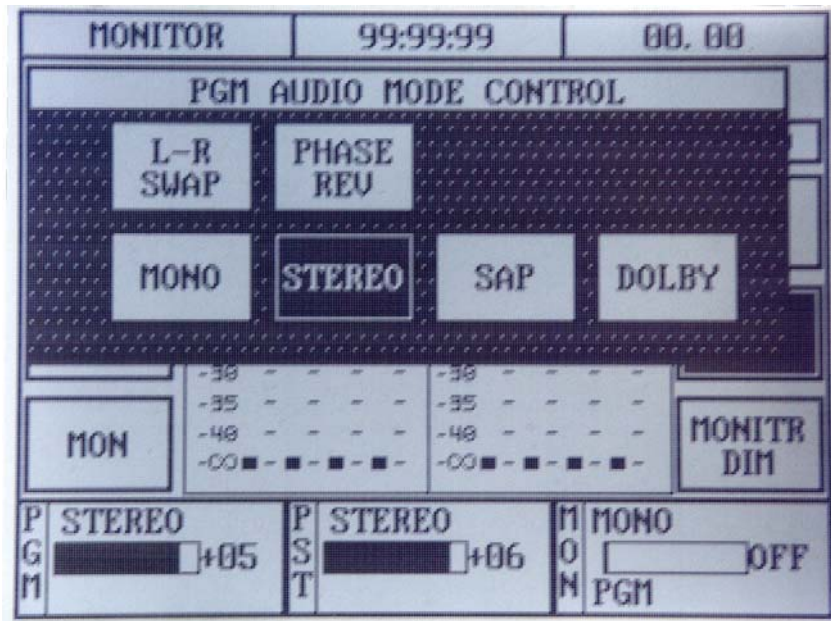


FIGURE 3-17. Program audio selection

4 - PST (Audio)

This provides the operator with the ability to manually change the audio streams from the Pre-set bus; stereo, mono, SAP, Dolby, etc.

5 - MON (Audio)*

This provides monitoring options, which are made available from the *audio monitor source select* menu. Typically the Demod is monitored. Audio monitor volume is adjusted with the bottom pot, located to the immediate right of the MON (LCD button).

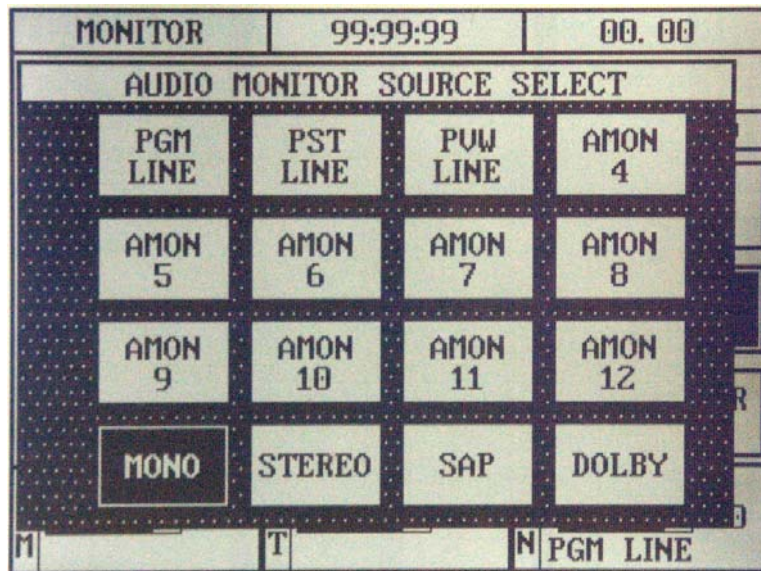


FIGURE 3-18. Monitor Source Select

6 - PVW (Video)

Calls the output of the PREVIEW bus to the video and audio MON outputs.

7 - PST (Video)

Calls the output of the PRESET bus to the video and audio MON outputs.

8 - MONITOR Dim

This forces a 30db¹ drop in the volume of the audio monitor (spare) output when pressed.

* Requires Audio Output board

1. This magnitude of the drop can be changed in the encoding file.

9 - PGM, PST, and MON level display

This displays the actual level status information for Program, Preset, and the Audio monitoring (spare) outputs. The program level can be adjusted by pressing the VAR LEVEL button on the Program bus (Audio Only group), then turning the *LEVEL* knob (immediately above).

A solid bar displays the current VAR Level position. If the RATIO knob is turned while the OVER function is enabled, the display will contain the actual ratio setting. This display reverts back to the LEVEL DISPLAY after 3 seconds of inactivity.

10 - Monitor

Name of LCD screen being displayed.

11 - Time Code

Provides a time code display when an active signal is cabled into the panel.

12 - Clock Display

(The actual preroll time.) Provides time differential between actual takes and preroll.

Section Conclusion

Time Key and Monitor Channel

Operation

The Monitor Channel's Time Key feature has been implemented within the MCP-2020 as a means of timing sequences within certain broadcast source events, or individual segments from one take to the next. Master Control operators can maintain a convenient, on-screen time prompt between on-air events. The Monitor Channel's Time Key can automatically reset itself to make proper time indications for any given source.

The Timer function is accessed from the Maintenance button by pressing the **TIMER CNTRL** button.

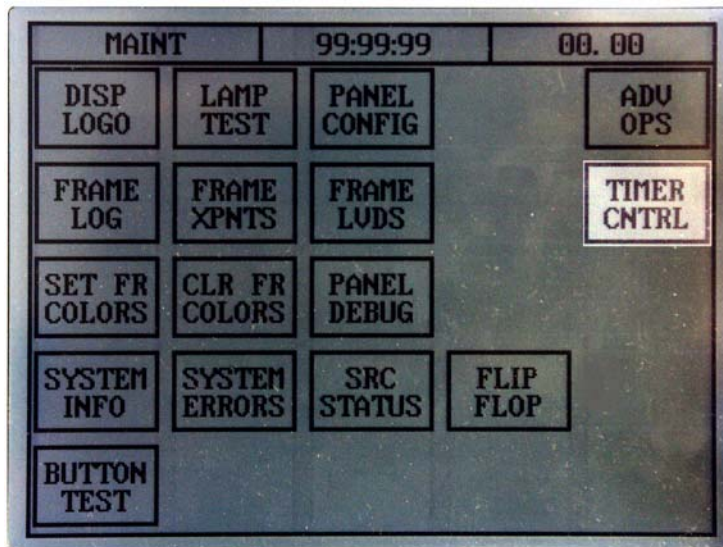


FIGURE A-1. Timer Control button (Maintenance menu)

Upon initial startup, a specific counter display will appear (on the monitor) by default. This display typically contains certain statuses, and at times warnings, during switcher operation.



FIGURE A-2. Monitor Output (warning status)

This will reflect the status of individual source devices. Warnings are displayed in red type (on screen) and remain for a duration of 20 seconds before the display cycle is eventually repeated. The warning indication will continue cycling, or displaying, until the error situation is addressed.

The timecode meter at the bottom of the monitor display represents the frame duration for the switch.



Timer Control Display

Various timing displays can be presented on-screen through the selection made in 'Timer Control'. Once the LCD menu appears, you will have several selections pertaining to the type of monitor display needed.

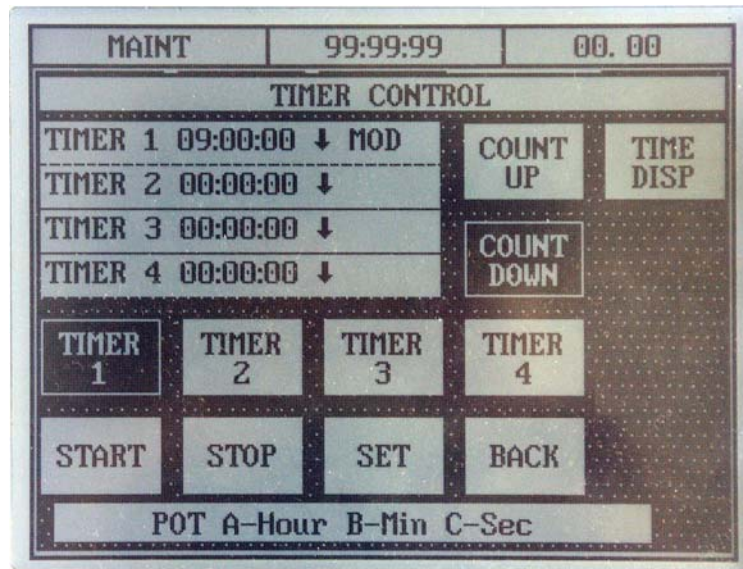


FIGURE A-3. Timer Control LCD

The Time Display button allows you to cycle through the various timer options (displays).

- Time Code
- Segment Timer
- User 1
- User 2

The Segment Counter (SG) displays the time duration from the last switch made.

The User 1 and User 2 counters allow for user-designated clock entries for customized timing needs. Depending on the timer selection (Timers 1 - 4), each can be preset using the (3) control pots to the right of the LCD. Minutes, seconds and frame indications are made by moving each knob.

To activate the display with the newly designated counter time, press the **SET** button. This will *send* the corresponding counter time to the Preview monitor. Counting can be done upward or downward by selecting either the **Count Up** or **Count Down** buttons.

Up or *Down* counts can be designated for specific counter numbers. By adjusting the three pots to the right of the display, you can make specific time designations for any of the three timers.

Again, the individual timers can be set to count either up or down. (Selection on LCD) There are 4 individual timers available for display selection, located at the bottom of the LCD. Each can be viewed individually on the monitor by pressing the Time Display button (continuously).

Usage Example: To set the timer to count up, preset the exact time to count *to*, press the **Set** button, then press the **Start** button. The monitor's timer will begin counting upward from zero when the take occurs.

Segment Timing

You can set the display to indicate the length of time since the last completed take. There is no change in the frame count for CUT transitions. Certain transitions, such as slow dissolves, take longer than others to complete. In such a case, the counter would not start until the transition is complete.

The transition length timer always appears on the monitor, by default.

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