



**OWNERS MANUAL  
FOR  
SPECTRUM MXC SERIES  
LIGHTING CONSOLES**

## TABLE OF CONTENTS

INTRODUCTION . . . . .	2
THE CONTROLS OF THE MXC . . . . .	3
Description of Front Panel Controls . . . . .	3
Rear Panel Connections . . . . .	6
IMPLEMENTING A LIGHTING SYSTEM WITH THE MXC . . . . .	7
Connecting Spectrum MXP Dimmers . . . . .	7
Connecting Dimmers or Devices Through DMX-512 . . . . .	9
The Auxiliary Power Supply . . . . .	9
MANUAL OPERATION . . . . .	10
The X/M & Y Scene Masters and Channel Sliders . . . . .	10
The Grand Master . . . . .	10
Bump Buttons . . . . .	11
MEMORY OPERATION . . . . .	12
Memory Pages . . . . .	12
Recalling a Scene from Memory . . . . .	12
Using Auto-sequence . . . . .	12
Running a Chase Pattern . . . . .	13
The External Input . . . . .	13
Writing a Scene to Memory . . . . .	14
Programming a Chase Pattern . . . . .	14
OPTIONAL EQUIPMENT . . . . .	16
Audio Input . . . . .	16
The Analog Output Option . . . . .	16
The Foot Controller . . . . .	16
MIDI . . . . .	16
TROUBLE SHOOTING . . . . .	17
SERVICE . . . . .	18
GLOSSARY . . . . .	18
QUICK REFERENCE SHEET . . . . .	20
SPECIFICATIONS . . . . .	21

**INTRODUCTION**

Congratulations on your purchase of a Spectrum MXC Series Memory Lighting Controller. The MXC was designed to be a powerful manual and memory controller. Some features include:

- \* 128 scenes stored in non-volatile memory
- \* full manual two scene operation
- \* 60mm sliders
- \* split dipless crossfaders
- \* timed memory crossfades
- \* 32 programmable chases
- \* auto-sequence between memory scenes
- \* bump buttons for each channel
- \* solo function to add or kill
- \* output level LED indicators
- \* multiplexed output using standard XLR connections

## THE CONTROLS OF THE MXC

## Description of Front Panel Controls

The MXC realizes a straightforward approach to manual and memory operation. A description of the controls follows: (see fig. 1)

1 - SCENE X CHANNEL SLIDERS - These sliders control channel levels when scene X is active. They are also used to program memory scenes and chases. When the MXC is in manual mode, the SCENE X/M MASTER controls the output of the SCENE X CHANNEL SLIDERS as a group. (This process is described in detail under 5 - X/M & Y SCENE MASTERS)

2 - SCENE Y CHANNEL SLIDERS - These sliders control channel levels when scene Y is active. The SCENE Y MASTER controls the output of all of the SCENE Y CHANNEL SLIDERS.

3 - OUTPUT LED'S - These indicators display the channel output, exactly as it is seen by the dimmers.

4 - BUMP BUTTONS - Each channel has one of these buttons. Pressing one instantaneously increases (or "bumps") that channel's output to full. This continues until the button is released. If the MXC is in SOLO mode, pressing a bump button will affect other channels. (see SOLO)

5 - X/M & Y SCENE MASTERS - Individually, the scene masters control slightly different things.

The Y SCENE MASTER proportionally dims the levels set on the Y scene sliders, from 0% (off) to 100% (on).

The X/M SCENE MASTER proportionally dims either the X scene channel sliders or the memory scenes. When the MAN LED is on, the X/M SCENE MASTER controls the X scene sliders. Whenever a memory scene is active (one of the SCENE M LED'S is on) the scene master controls the channel levels stored in the memory scene.

The Y SCENE MASTER and X/M SCENE MASTER operate in opposite directions. When both scene masters are at the down position, the Y SCENE MASTER is at full on (10), and the X/M SCENE MASTER is at full-off (0). But when the two faders are at the up position, the Y SCENE MASTER is at (0) and the X/M MASTER is at (10). If you move these faders together you can fade from scene Y to scene X/M and back again.

6 - MASTER FADER - Also known as the Grand Master, this control proportionally dims all channel outputs from 100% to 0% (full on = 10, off = 0) This affects everything except the level of the BUMP BUTTONS.

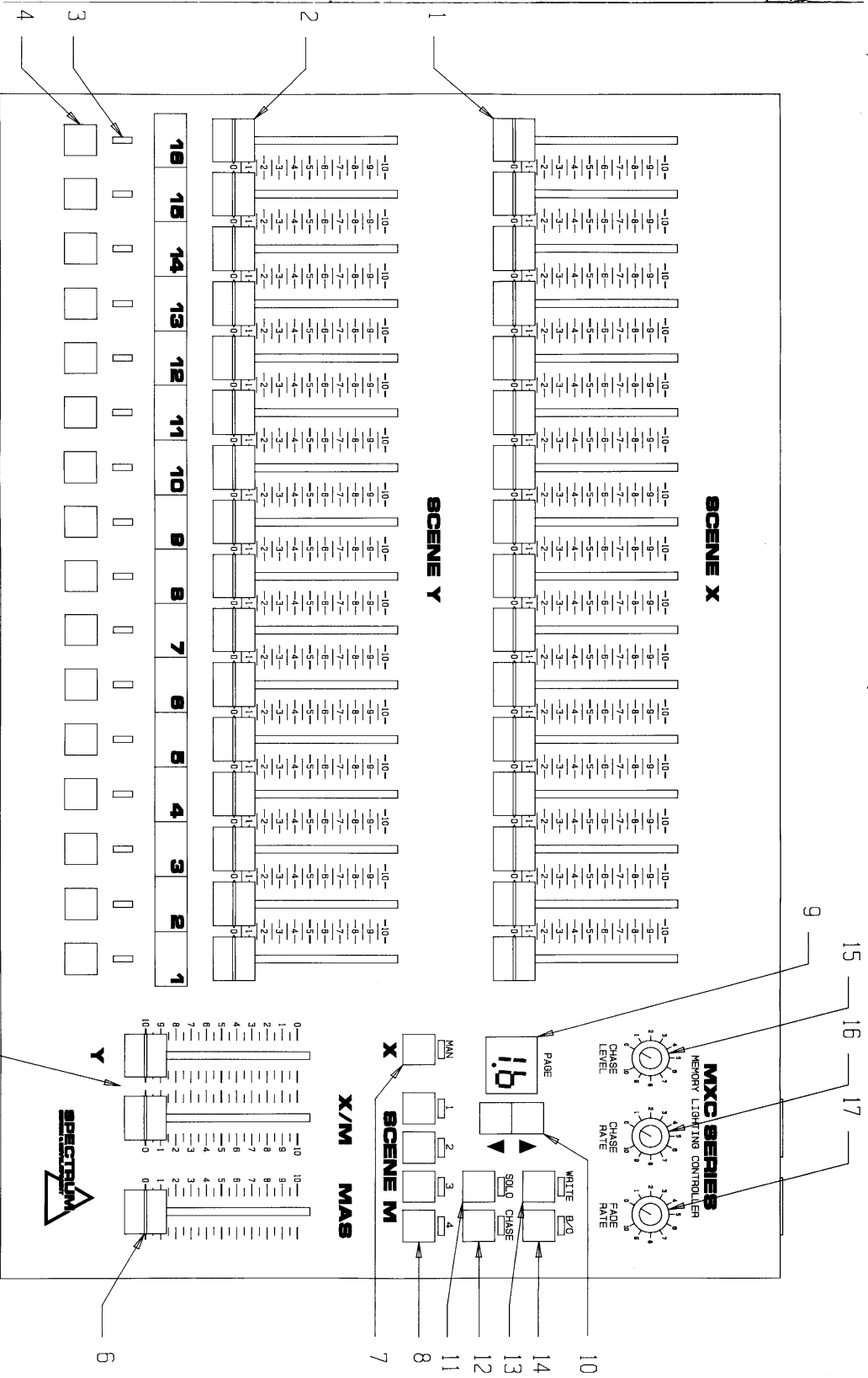


Figure 1

7 - X/MAN KEY - When the MXC is in memory mode, pressing this key begins an automatic crossfade, from the current memory scene to manual scene X. The fade time is set by the FADE RATE control. When the MAN LED is on, the X/M SCENE MASTER controls the SCENE X CHANNEL SLIDERS.

8 - SCENE M 1,2,3, & 4 KEYS - Pressing these keys initiates an automatic crossfade to the selected memory scene. The fade time is determined by the FADE RATE control. The red LED's above these buttons indicate which memory scene is selected. When a memory scene is active, its channel levels are scaled by the X/M SCENE MASTER. Writing memory scenes is covered on page 14.

Pressing any two SCENE M buttons at the same time activates auto-sequence. This is a repeating crossfade between each memory scene on the selected page. The fade time is determined by the FADE RATE control. Auto-sequence can be stopped by pressing any single SCENE M button or the X/MAN key.

9 - PAGE DISPLAY - The numeric readout shows which memory page is selected. There are a total of 32 pages, numbered 00 through 31. Each page has four memory scenes and one chase. The decimal point flashes at the current chase rate.

10 - PAGE UP/DOWN KEYS - These keys are used to increment or decrement the selected page. Holding either key down will auto-repeat the function.

11 - SOLO KEY - This key switches SOLO mode on and off. When SOLO is activated (the SOLO LED is on) pressing one or more BUMP BUTTONS will blackout all the non-bumped channels. Once you release the button(s), the output for each channel returns to normal. If you press bump buttons when SOLO mode is off, only the bumped channels will be affected.

12 - CHASE KEY - This key switches the chase function on and off. The speed and output level of the chase are determined by the CHASE RATE and CHASE LEVEL controls, respectively. The LED above this key indicates the status. If the LED is on, the chase is running. See page 14 to learn how to program a chase.

13 - WRITE KEY - The WRITE button is used to program scenes and chases. Pressing this key switches WRITE mode between performance and record. When the WRITE LED is off, the unit is in performance mode and does not change memory. This is the desired mode for live playback of prerecorded scenes and chases. The MEMORY LOCK switch, located on the rear of the MXC, can disable the WRITE key (see page 7 for details). To learn how to program a chase see page 14, or a scene see page 14.

14 - B/O KEY - Pressing this key switches blackout on and off. When the B/O LED is on, the MXC is in blackout mode and every channel output is set to zero. When you power-up the MXC, it will be in

blackout mode.

15 - CHASE LEVEL - This control determines the output level of the chase. 0 = off, 10 = full on.

16 - CHASE RATE - The setting of this knob determines the duration of each step in a chase. The scale extends from: 0 = two seconds per step, to 10 = 1/30th of a second per step.

17 - FADE RATE - This control selects the duration of automatic or "timed" crossfades. The MXC uses timed crossfades between memory scenes and the X scene. FADE RATE also determines the fade time, and ultimately the speed, of auto-sequence.

#### Rear Panel Connections (see fig. 2)

1 - MUX CONTROL OUT - MXP Series dimmers, as well as the optional power supply, connect to this standard microphone connector (3 pin XLR). Some applications require an auxiliary power supply, see page 9 for specific information.

2 - DMX-512 - This connector (5 pin XLR) provides a data link in accordance with the USITT standard. This is useful for controlling DMX-512 compatible dimmers from any manufacturer.

3 - EXTERNAL INPUT/AUDIO INPUT - This 1/4" stereo phono socket accepts either a 0 to +5 Volt signal or a line level audio signal (with the AUDIO INPUT option). The MXC uses this input to trigger the chase and auto-sequence. When then external trigger is selected, the sensitivity can be adjusted with the CHASE RATE control. The EXTERNAL INPUT is a standard feature; however, the AUDIO INPUT option replaces the external input. Consult the specifications section (page 21) for connection information.

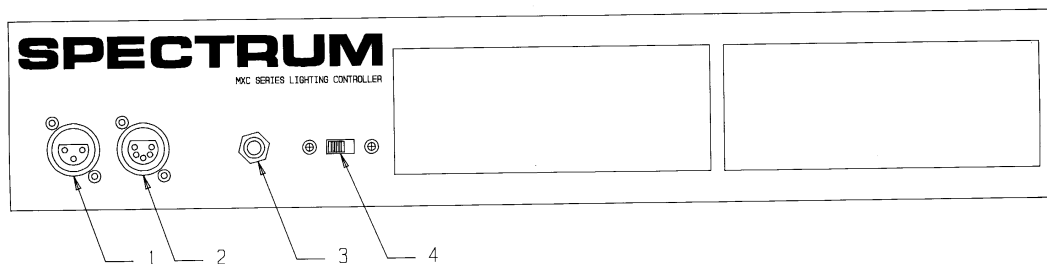


Figure 2

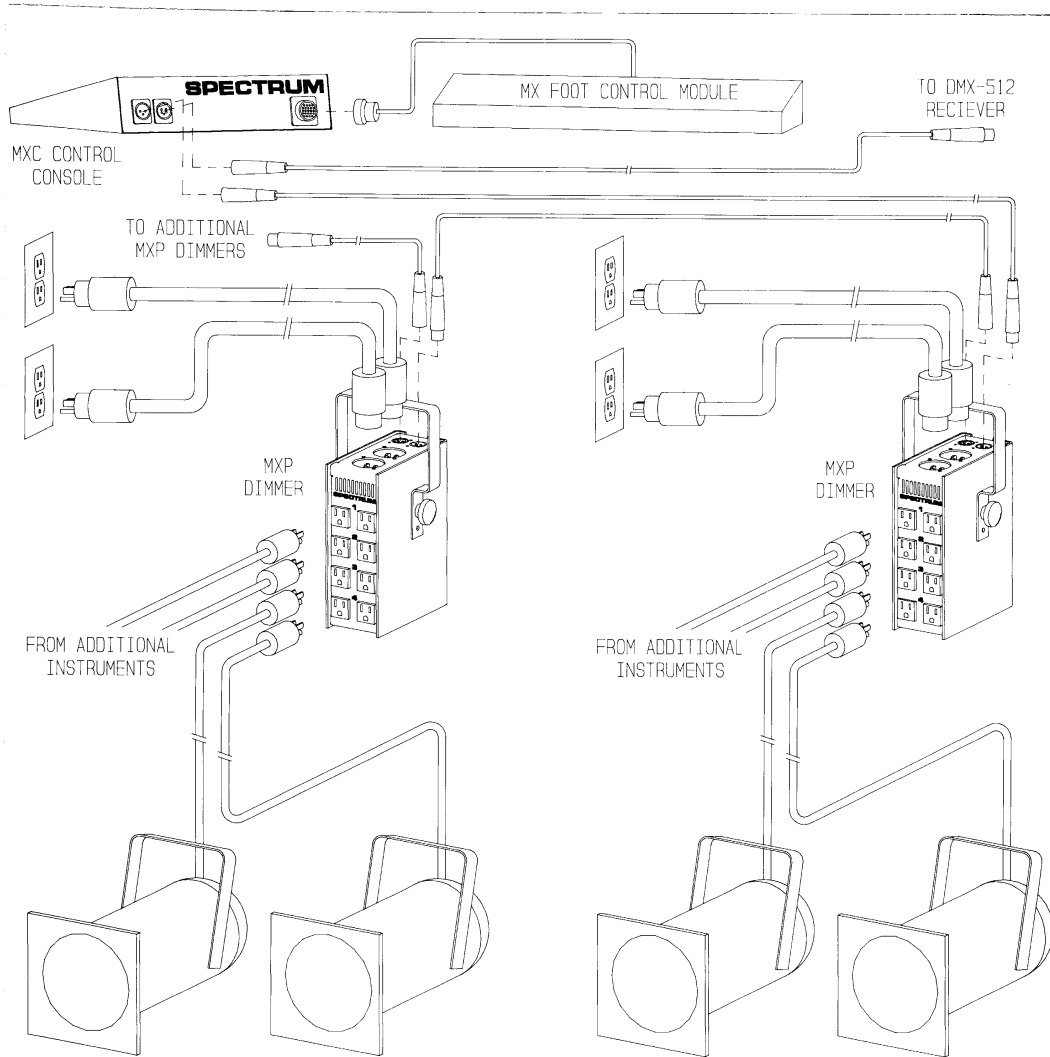


Figure 3

- 5) Connect the MXP(s) to AC receptacles.
- 6) Connect the female end of the XLR control cable to the back of the MXC. The MXC's display should light up.

**Caution:** A single MXP can be damaged if it is the only power source for the MXC. When the MXC is only controlling MXP dimmers, you will need at least two MXPs to adequately power the MXC. Therefore, it is important to connect the control cable to the MXC as the last step. Otherwise, it's possible that only one MXP would be connected to the MXC.

#### **Connecting Dimmers or Devices Through DMX-512**

The 5 pin XLR connector on the back of the MXC is the DMX-512 output. To control DMX-512 compatible dimmers, connect a control cable between the MXC and the dimmer. DMX-512 dimmers may be connected sequentially, similar to MXP's. Consult the dimmer manual for information about load capacity and AC line connections. If you are using nothing but DMX-512 to control dimmers, you will need an auxiliary power supply (see Auxiliary Power Supplies below).

#### **The Auxiliary Power Supply**

Since the MXC does not have its own power supply, it needs an external source of power. Spectrum Design's MXP series dimmers provide a power source for the MXC. Spectrum OX series dimmers, controlled through the analog output option, also provide the MXC with power. If you do not plan to use at least two Spectrum MXP or OX Series dimmers, you may need an auxiliary power supply. Some situations requiring power supplies include:

- \* If you plan to use DMX-512 exclusively
- \* If you are only controlling one MXP or OX dimmer
- \* If you are controlling nothing but Spectrum QEP dimmers, with the analog output option (The QEP's can't supply enough power)
- \* If you are only using non-Spectrum dimmers (through the analog output option) that are unable to supply +15 volts DC at 1 Amp

Auxiliary power supplies are available through Spectrum Design.

### MANUAL OPERATION

The MXC Series Lighting Controller has the ability to function as a standard manual controller. To prepare the unit for manual operation do the following:

- 1) If the MXC is in blackout mode (the B/O LED is on) press B/O to switch blackout mode off.
- 2) If MAN LED is off (the MXC is in memory mode) press X/MAN to enter manual mode.
- 3) Move the Master (MAS) fader to the up position (10), if it is not there already.

The following three sections provide instructions to demonstrate the controls used in manual operation.

#### The X/M & Y Scene Masters and Channel Sliders

- 1) Move the X/M and Y scene masters to the up position.
- 2) Now, move the channel sliders for both the X and Y scenes. Notice that the dimmers and output LED's only respond to the channel sliders of scene X.
- 3) Hold the X/M and Y scene masters with one hand and slowly slide them to the down position. While you do this, observe that the output levels set on the X scene fade out, while the levels set on the Y scene fade in. The process of fading from one scene to another is a "crossfade." When the fade-out is synchronized with the fade-in, it is considered a "dipless crossfade." This is the basis of manual operation.
- 4) Change the setting of the scene X sliders while the scene masters are still in the down position.
- 5) Simultaneously move both the X/M and Y scene masters back to the up position. Again, observe the channel LED's and the dimmers responding to the crossfade from the Y scene to the X scene. Setting one manual scene while the other is active is the standard method for using a manual lighting controller.
- 6) With the scene masters in the up position, move only the Y scene master to the down position. Notice that both the X and Y scenes are active at this point. Each channel's output reflects the higher setting between its scene Y fader and scene X fader. Using multiple scenes at the same time is referred to as "piling on."

#### The Grand Master

Try adjusting the grand master; notice how it affects the output from both scenes. The grand master is an easy way to control the channel levels produced by different sources (memory scenes,

manual scenes, the chase, etc.). The bump buttons are the only function not controlled by the grand master.

#### **Bump Buttons**

Press at least one of the bump buttons; they temporarily change their channel's output to full. If SOLO is on, "bumping" a channel will clear all non-bumped channels while the bump buttons are held down. SOLO functions similar to BLACKOUT (B/O), it will not stop a running chase or auto-sequence, but it will suppress the output. The bump buttons are useful for quick flashes and sharp effects.

Experiment with all of these controls until you are comfortable with manual operation.

## MEMORY OPERATION

The MXC combines the strengths of manual and memory systems through a powerful memory section that extends manual operation. The scene and chase memory is factory programmed, so you may utilize the memory features immediately. The MXC has an internal battery which holds the memory after the power has been turned off. This battery should last for many years.

### Memory Pages

The MXC's memory is subdivided into units. One of these units is called a "memory page" or simply "page". They are a convenient way to access the scene and chase memory of the MXC. There are 32 pages numbered 00 through 31. Each page has four memory scenes and one chase. The display shows the selected page. It can be increased or decreased with the PAGE UP/DOWN BUTTONS.

### Recalling a Scene from Memory

- 1) Slide the X/M scene master and the grand master to the up position, if they are not there already.
- 2) Select a memory page by pressing the page up/down buttons
- 3) Press the desired SCENE M button. The chosen memory scene will fade in, using the fade time set by the FADE RATE control.

When you use the MXC in memory mode, the memory scenes take the place of the scene X channel sliders. The X/M Scene Master controls the output of either the manual X scene or the memory scenes. The X/MAN and Scene M (1,2,3, & 4) keys work on an exclusive basis, only one can be active at a time. Consequently, only one LED--MAN, SCENE M 1, 2, 3, or 4--will be on at a time. However, you can perform complex crossfades by selecting another memory scene (or the X/MAN scene) while a timed fade is in progress.

Changing the memory page doesn't affect an active memory scene. The output will change when you select another memory scene or the X/MAN scene. Try selecting a scene on a different page by following steps 2 & 3 again.

### Using Auto-sequence

Auto-sequence is a repeating fade between each of the four scenes on a memory page. Press two SCENE M buttons at the same time to activate auto-sequence. Then, the MXC will repeatedly fade between each memory scene on the selected page. The FADE RATE control determines the fade time. You can stop auto-sequence by

pressing a SCENE M button or the X/MAN key.

Similar to the memory scenes, you can change the page without affecting a running auto-sequence. To update a running auto-sequence from another page to the auto-sequence on the current page, press two scene M buttons simultaneously (just like before). This will start the auto-sequence from the selected page and clear the old one. Since the auto-sequence function is directly related to memory scenes, it is also controlled by the X/M scene master.

#### **Running a Chase Pattern**

If the chase is already running (the CHASE LED is on) first follow step 4. The chase can be started and stopped as follows:

- 1) Turn the CHASE RATE knob to the desired speed. The decimal point on the display flashes at the current chase rate.
- 2) Select an output level for the chase by turning the CHASE LEVEL knob. Keep in mind that a chase level of zero produces no chase output.
- 3) Select the desired page with the PAGE UP/DOWN keys.
- 3) Press CHASE; the LED will switch on as the chase begins.
- 4) To stop the chase, press CHASE again. The CHASE LED will switch off.

You can change the CHASE RATE and CHASE LEVEL controls while the chase is running, and the MXC will respond accordingly. Changing pages doesn't affect a running chase. If you wish to update a running chase from another page to the chase from the current page, simply stop and restart the chase.

#### **The External Input**

The external input accepts a signal used to trigger the chase and auto-sequence. When the external trigger is selected, the CHASE RATE control adjusts the threshold voltage from 0 to 5 Volts DC. Whenever the signal goes above this voltage, the MXC advances both auto-sequence and the chase. Auto-sequence still uses the selected fade time. Once the fade is complete, auto-sequence waits for a trigger before it begins the next fade. The active clock source always flashes the decimal point in the page display. The audio input option, which replaces the external input, operates in a similar manner. The CHASE RATE control adjusts the sensitivity.

To switch the external trigger on & off, press WRITE and then SOLO.

### Writing a Scene to Memory

The process of writing a memory scene involves taking a "snapshot" of the channel levels set on the X scene sliders, and storing it in memory. This can be done whether the X scene is active or not. Writing memory without seeing the output is known as programming "blind." The ability to program scenes without affecting the controller's output makes programming during performances possible. You can write a scene by doing the following:

- 1) Set the scene X sliders as you would like the memory scene to look.
- 2) If you are not on the desired page, press the page up/down buttons as needed.
- 3) Press WRITE; the LED should go on.
- 4) Select the destination by pressing the memory scene (SCENE M) button of your choice. This will switch the WRITE LED off, and the scene writing process is complete. Notice that this process does not select the new scene, it only records it.
- 5) To view this new scene, slide the X/M scene master and the grand master to the up position, if they are not there already.
- 6) Press the SCENE M button that you just programmed. Now, the new memory scene will fade in, using the fade time set on the FADE RATE control.

Because writing a scene does not select it, you can program a memory scene while another memory scene is active. You can even program the active memory scene. Both of these possibilities allow you to do scene programming without affecting the output sent to the dimmers. So you could program scenes, during a performance.

### Programming a Chase Pattern

Each memory page has one chase memory, capable of storing a pattern from 1 to 16 steps. An individual step contains on/off information for all of the channels. Unlike scene programming, chase programming can be done from both the scene X sliders and the bump buttons. There are two ways to write a chase. With the first method, you must finish writing the chase before you see the results. To program a chase this way, do the following:

- 1) Select the desired page, using the PAGE UP/DOWN buttons.
- 2) Press WRITE; the LED should go on.
- 3) Press CHASE to start the chase writing process with the first step.

4) Set the desired output for the step on either the scene X sliders or the bump buttons. When using the bump buttons, you must hold them down while you press CHASE in step 5. Note: Since each chase step only contains on/off information, the channel sliders represent either on or off. When a channel slider is between 0 and 5 it is recorded as off, when it is above 5 it is recorded as on.

5) Press CHASE again to enter this data and advance to the next step.

6) Repeat 4 & 5 until you have written the desired number of steps.

7) After you have recorded the last step, press WRITE to complete the programming process. WRITE will automatically switch off after you write the sixteenth step.

You can program the chase "blind" by using the previous method with a slight change. In step 4, record each step from the scene X sliders, while another scene is active. The rest of the procedure is the same.

The second method of writing a chase is called "building a chase." It gets this name because the chase runs as you write it. This gives you a way to immediately see what you're programming. You can do this as follows:

- 1) Select the desired page, using the PAGE UP/DOWN buttons.
- 2) If the chase is not already running, press CHASE to start it.
- 3) Press WRITE; the LED should go on.
- 4) Press and hold CHASE for at least one second. After this time you will see the old chase stop.
- 5) Similar to the first method, set the desired output for the step on either the scene X sliders or the bump buttons.
- 6) Press CHASE again to enter this data and advance to the next step.
- 7) Repeat 5 & 6 for additional steps.
- 8) After you have entered the last step, press WRITE to complete the programming process. WRITE will automatically be turned off after you write the sixteenth step.

**Note:** With both methods of chase programming, keep in mind that the MXC records from both the scene X sliders and the bump buttons. It is easy to forget about levels set on the scene X sliders if you're using the bump buttons to record a chase.

**OPTIONAL EQUIPMENT****Audio Input**

This option enhances the external input, by adding circuitry designed to extract bass pulses from an audio signal. It operates the same as the external trigger, it is just suited for audio synchronization.

**The Analog Output Option**

As mentioned earlier, this option allows the MXC to control Spectrum QEP and OX series dimmers, as well as any dimmer or device that operates on a 0 - 10 Volt signal.

**The Foot Controller**

The MXF is a foot control to activate most of the MXC's functions. The controller has foot switches and LED's for the B/O, CHASE, X/MAN, and the SCENE M 1,2,3, & 4 buttons. It also has switches for PAGE UP and DOWN. It can be quite valuable when you don't have a free hand to operate the MXC.

**MIDI**

Spectrum offers a MIDI option to control one or more MXC's through a sequencer, keyboard, or other MIDI device. You can control the MXC with MIDI four ways.

First, the chase and auto-sequence can be synchronized to MIDI events. The trigger event can either be MIDI clocks (from a 1/32nd note to a whole note) or note on events from a particular channel. This allows the chase and auto-sequence to directly follow the tempo or a specific musical track.

Second, you can manipulate the MXC from any MIDI device. Most of the front panel controls can be triggered through standard note on commands. The most important functions are all within the same octave. If this system is used with a MIDI keyboard capable of "keyboard splits," you could incorporate the MXC controls into the instrument, alongside regular voices.

Third, recording MXC lighting data onto a sequencer track permits automatic playback of lighting commands. Then, sequencer auto-correction or quantizing can produce perfectly synchronized lighting commands.

Finally, you may link two MXC's together for parallel control. In this mode, both units respond to commands and scene/grand master adjustments from either console. This is similar to master/slave control, except parallel control allows both MXC's to be the master. Linking three or more MXC's permits only one master.

**TROUBLE SHOOTING**

Having problems? Consult the trouble shooting chart below. For further assistance see the Service section on page 18.

Symptom	Possible Cause
Controller is dead	<ul style="list-style-type: none"> <li>* control cable not plugged in to the controller and/or dimmer</li> <li>* dimmer not plugged in to AC outlet</li> <li>* auxiliary power supply may be required (see page 9)</li> </ul>
Erratic operation or strange displays	<ul style="list-style-type: none"> <li>* AC line spike could have garbled data. Power-down the unit and power-up again.</li> </ul>
Scene X doesn't work	<ul style="list-style-type: none"> <li>* controller in memory mode (MAN LED off)</li> <li>* X/M Scene master at down (off) position</li> <li>* blackout (B/O) on or master fader down</li> </ul>
Scene Y doesn't work	<ul style="list-style-type: none"> <li>* Y scene master at up (off) position</li> <li>* blackout (B/O) on or master fader down</li> </ul>
Memory scenes don't work	<ul style="list-style-type: none"> <li>* FADE RATE set too slow</li> <li>* blank scene accidentally written to memory</li> <li>* X/M scene master at down (off) position</li> <li>* blackout (B/O) on or master fader down</li> </ul>
Chase doesn't work	<ul style="list-style-type: none"> <li>* blank chase accidentally written to memory</li> <li>* MXC set in external trigger mode (press WRITE then SOLO to escape)</li> <li>* CHASE LEVEL set at 0</li> <li>* blackout (B/O) on or master fader down</li> </ul>

**SERVICE**

If the trouble shooting guide does not help, call Spectrum Design at ( ) , 7:30 a.m. to 5:00 p.m. EST. Some problems can be solved over the telephone, so please call before shipping the unit back to the factory.

**GLOSSARY**

This glossary is intended to clarify some terminology as it relates to the MXC Series Memory Lighting Controller. Some definitions may not apply to other controllers.

**Active** - A scene or function is considered active when it can be seen on the dimmers (and channel output LED's).

**Auto-sequence** - A repeating fade through each memory scene (1 => 2 => 3 => 4 => 1 => 2 => etc.) The fade time is determined by the FADE RATE control.

**Blind** - setting or programming without seeing the results on the dimmers

**Bump** - momentarily raising a channel(s) output to full

**Channel** - An individual unit of the controller's output. Each channel can control one or more dimmers.

**Chase** - A repeating pattern consisting of 1 to 16 steps. Each step contains on/off data for each channel.

**Chase rate** - a parameter that controls the duration of each chase step (1/30th of a second to 2 seconds)

**Crossfade** - the process of fading a new scene in while an old scene fades out.

**Dipless crossfade** - fading between two scenes in a way that keeps the old scene level + new scene level = 100%. Using the crossfaders (the X/M & Y scene masters) together produces a dipless crossfade.

**DMX-512** - a controller to dimmer protocol developed by the USITT (United States Institute for Theater Technology). It was designed so that controllers and dimmers from different manufacturers may work together.

**Fade time** - The length of time it takes for one scene to fade out while another fades in simultaneously. This parameter can be specified by the user.

**Grand Master** - a fader that controls all output levels except for channels currently being bumped.

**Live** - setting or programming levels that are displayed on the dimmers and channel output LED's

**Manual operation** - controlling channel outputs by mechanical means (channel sliders, scene masters, the grand master, and the bump buttons.)

**Manual scene** - a group of sliders, one for each channel, that determine output levels. A manual scene usually has a scene master.

**Memory operation** - controlling channel output by recalling and manipulating data. You can generally do this with a few key presses.

**Memory scene** - a set of data which completely specifies channel output levels. Memory scenes may be stored and recalled.

**MIDI** - (Musical Instrument Digital Interface) MIDI is a data exchange protocol managed by the MIDI Manufacturers Association. It was first developed so that electronic musical instruments from different manufacturers could communicate with one another. Today, it is also used to interface electronic musical instruments and devices with lighting controllers.

**Non-volatile memory** - memory that is retained by a battery when there is no power to the unit

**File on** - the practice of merging output levels in a highest-takes-precedence manner

**Scene** - a complete set of channel output values

**Scene Master** - a slider that governs a set of output levels. This set can either be a group of channel sliders (a manual scene) or data (a memory scene).

**Solo** - A mode which allows bumped channels to clear all other channels, while the bump buttons are held down.

## QUICK REFERENCE SHEET

- Fade to Scene Y  
Slide Y & X/M scene masters to down position
- Fade to X/MAN scene  
Press X/MAN key  
and/or Slide Y & X/M scene masters to up position
- Switch Blackout on & off  
Press B/O
- Switch Solo on & off  
Press SOLO
- Recalling Memory Scenes  
Press SCENE M (1,2,3, or 4) keys
- Running a Chase  
Press CHASE to switch on & off  
(CHASE RATE controls speed, CHASE LEVEL dims output)
- Running Auto-sequence  
Simultaneously press two SCENE M buttons  
(speed & fade time controlled by FADE RATE)  
Press a SCENE M or X/MAN key to stop
- Enable/Disable External Trigger  
Press WRITE, then SOLO  
(CHASE RATE selects external trigger's sensitivity)
- Writing Memory Scenes  
Set levels on Scene X sliders  
Press WRITE, then a SCENE M (1,2,3, or 4) key
- Writing a Chase - Method 1  
Press WRITE, then tap CHASE  
\* Set levels on bump buttons or scene X sliders  
Press CHASE to record step  
Repeat from \* until all steps recorded (16 max.)  
Press WRITE to complete process
- Building a Chase  
Start with chase running  
Press WRITE, then hold CHASE for at least one second  
\* Set levels on bump buttons or scene X sliders  
Press CHASE to record step  
Repeat from \* until all steps recorded (16 max.)  
Press WRITE to complete process

**SPECIFICATIONS****Physical**

	16 Channel version	32 Channel version
Size:	19.00"w x 12.50"d x 4.50"h	33.00"w x 12.50"d x 4.50"h
Weight:	12 lbs.	21 lbs.
Material:	18 gauge CR steel textured black finish with white graphics	

**Electrical**

System Power Requirements: 15 Volts DC @ 1 Amp  
(MXP & OX Series Dimmers can supply this power)

External Input: 0 - 5 Volts

Audio Input: A line level audio signal

External Input/Audio Input phono plug connections

Tip - signal

Middle - system common

Barrel - no connection

**Output:**

Spectrum Multiplex -10, 0 - 10 Volts (3 pin XLR)

Pin 1 - System Common

Pin 2 - +15 Volts DC

Pin 3 - Spectrum Multiplex control signal

DMX-512 (5 pin XLR)

0 - 10 Volts Analog (optional)

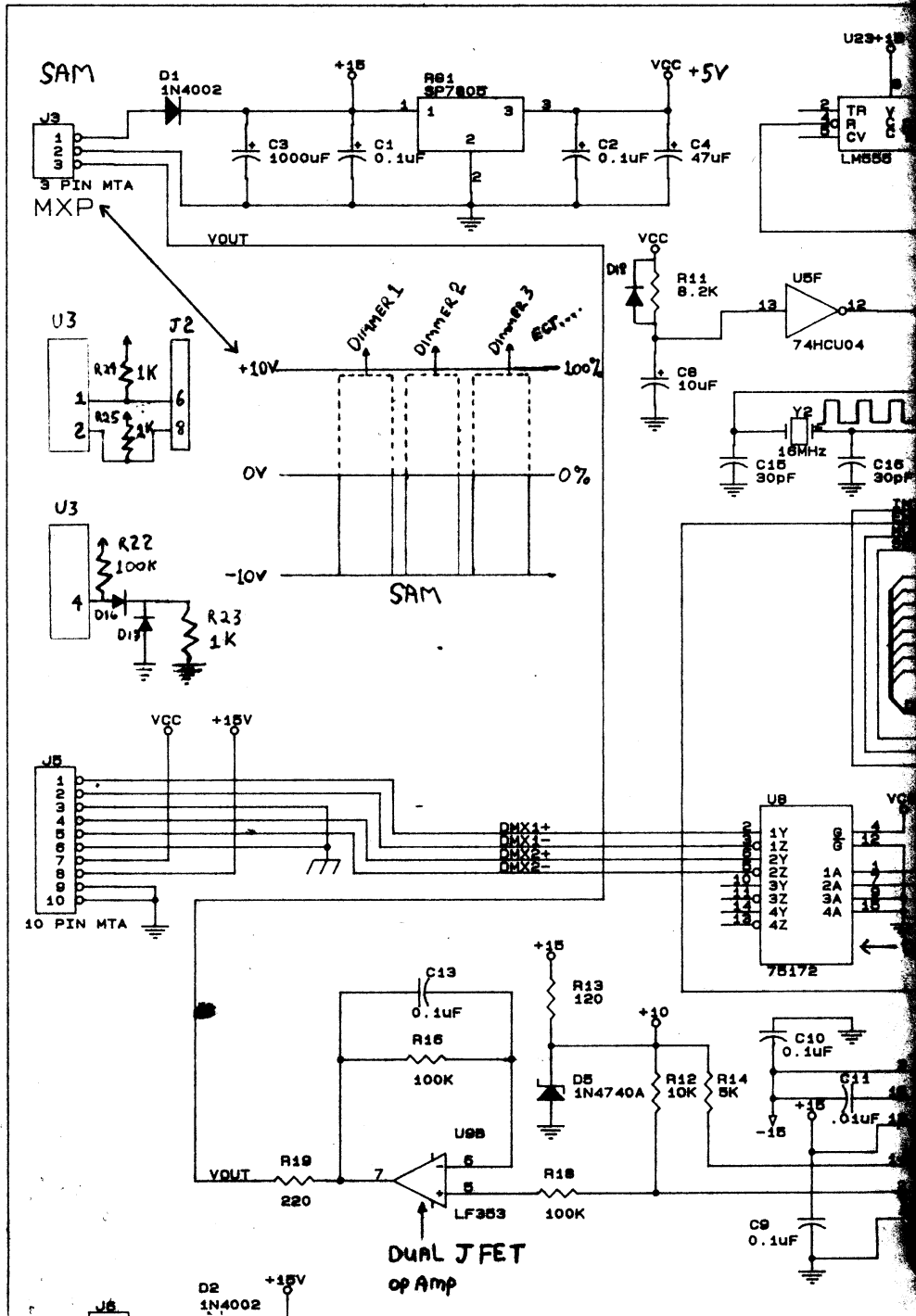
10 - 2 Volts Analog (QEP signal, optional)

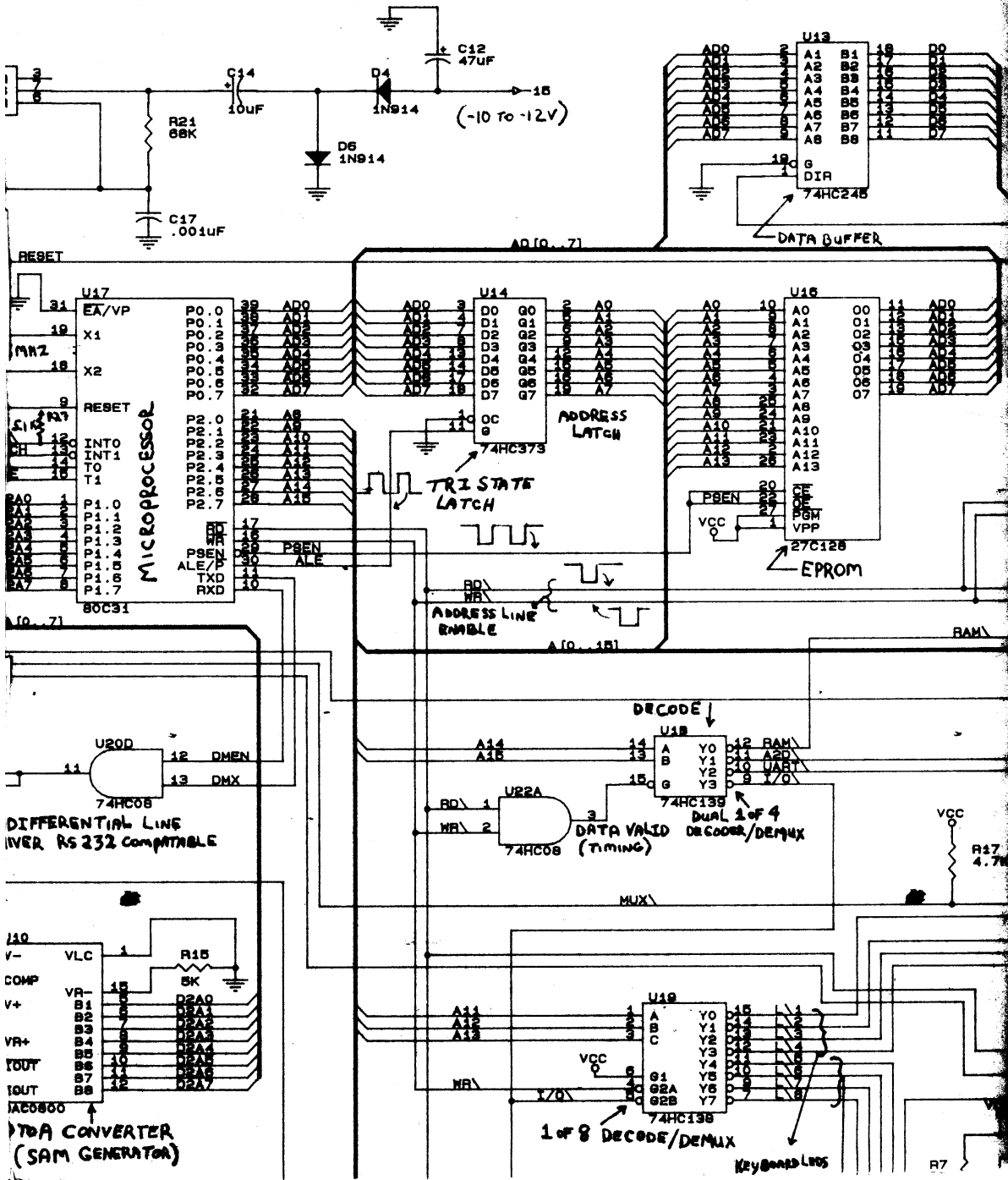
**Optional Output Connectors:**

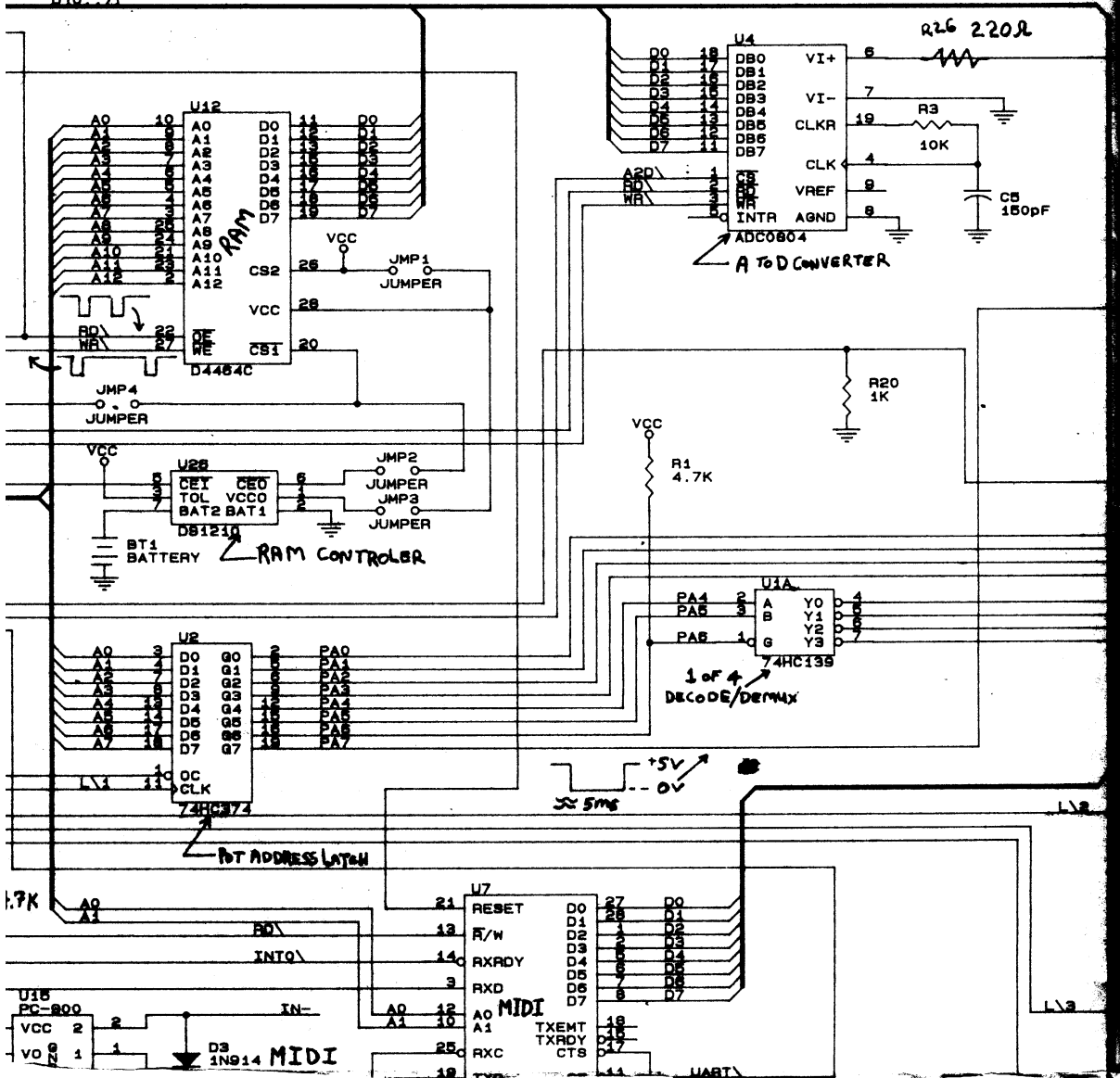
Cinch/Jones (6, 8, and 10 pin versions)

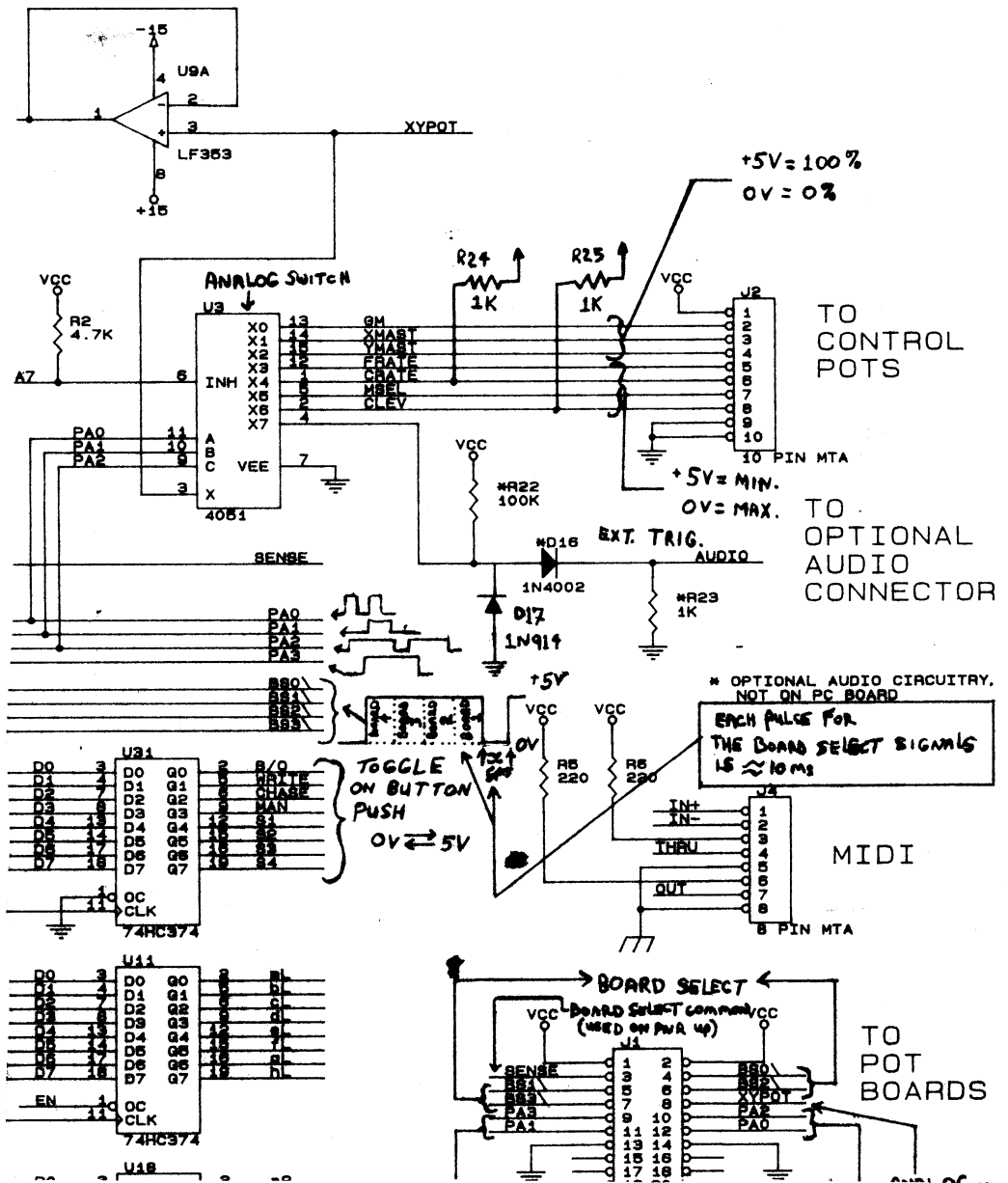
AMP CPC Style

37 pin Socapex









TO CONTROL POTS

TO OPTIONAL AUDIO CONNECTOR

\* OPTIONAL AUDIO CIRCUITRY, NOT ON PC BOARD  
 EACH PULSE FOR THE BOARD SELECT SIGNALS IS  $\approx 10$  ms

MIDI

TO POT BOARDS

TOGGLE ON BUTTON PUSH  
 0V  $\leftrightarrow$  5V

+5V = 100%  
 0V = 0%

+5V = MIN.  
 0V = MAX.

EXT. TRIG. AUDIO

ANALOG SWITCH

XYPOT

VCC  
 R2 4.7K  
 A7

R24 1K  
 R25 1K

VCC  
 #R22 100K

D17 1N914  
 #R23 1K

VCC  
 R5 220  
 R6 220

PA0  
 PA1  
 PA2

SENSE

PA0  
 PA1  
 PA2  
 PA3

U31 74HC374  
 D0 D1 D2 D3 D4 D5 D6 D7  
 Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7  
 CC CLK

U41 74HC374  
 D0 D1 D2 D3 D4 D5 D6 D7  
 Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7  
 CC CLK

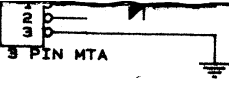
U48

J2 8 PIN MTA  
 IN  
 INH  
 OUT

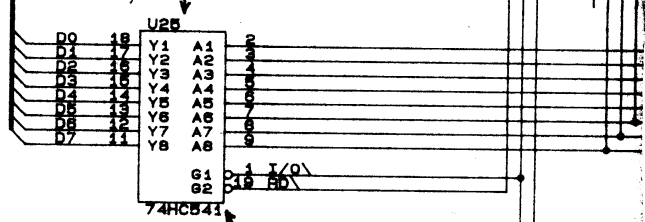
J2 14 PIN MTA  
 SENSE  
 BSA  
 BSA1  
 BSA2  
 BSA3  
 BSA4  
 BSA5  
 BSA6  
 BSA7  
 BSA8  
 BSA9  
 BSA10  
 BSA11  
 BSA12  
 BSA13  
 BSA14

J2 10 PIN MTA  
 #R24  
 #R25  
 #R22  
 #R23

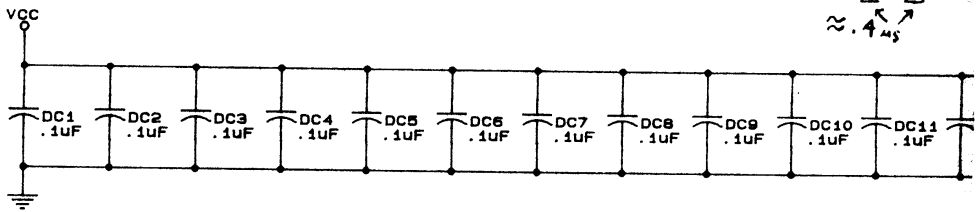
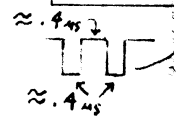
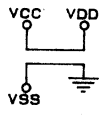
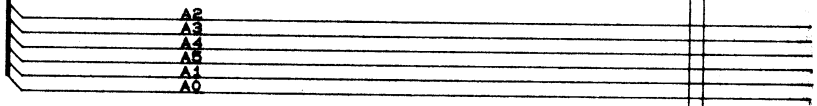
J2 10 PIN MTA  
 #R24  
 #R25  
 #R22  
 #R23

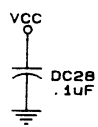
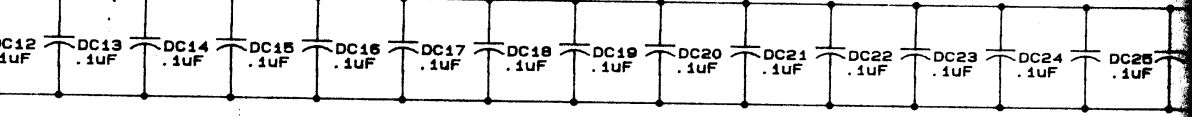
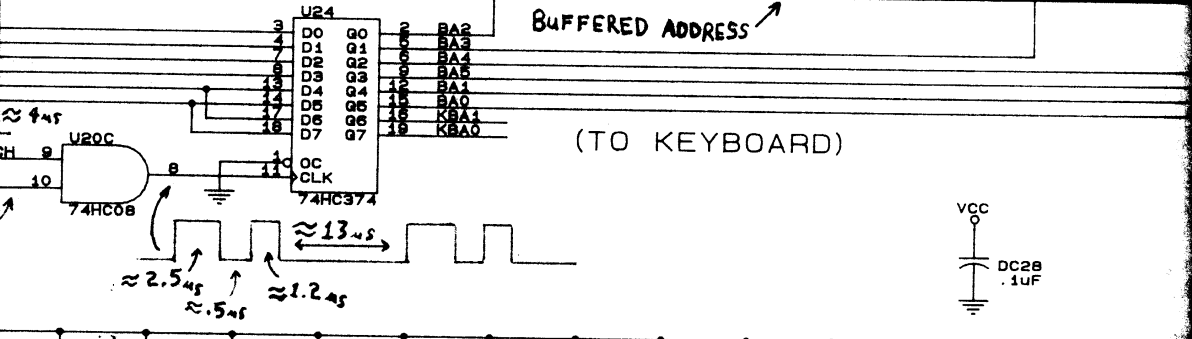
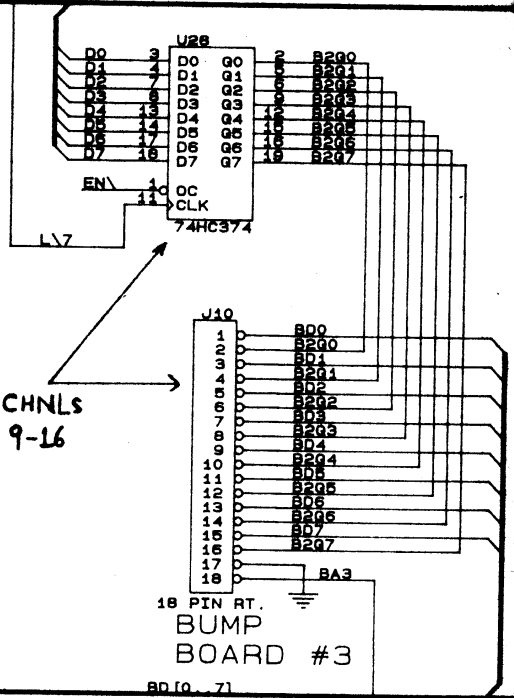
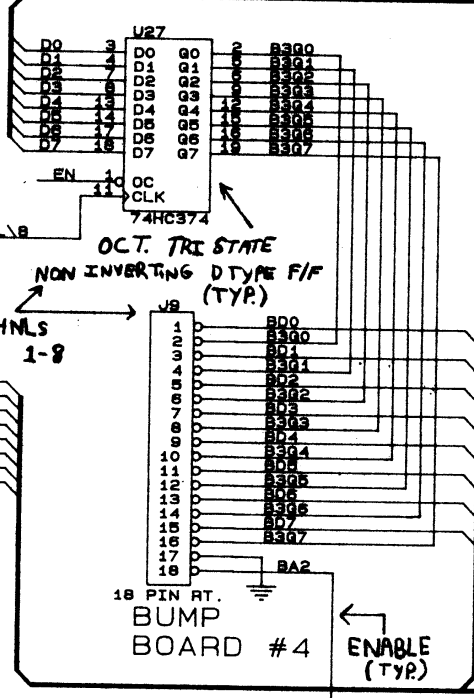
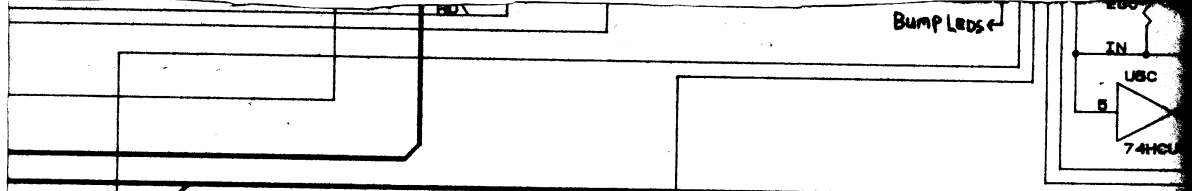


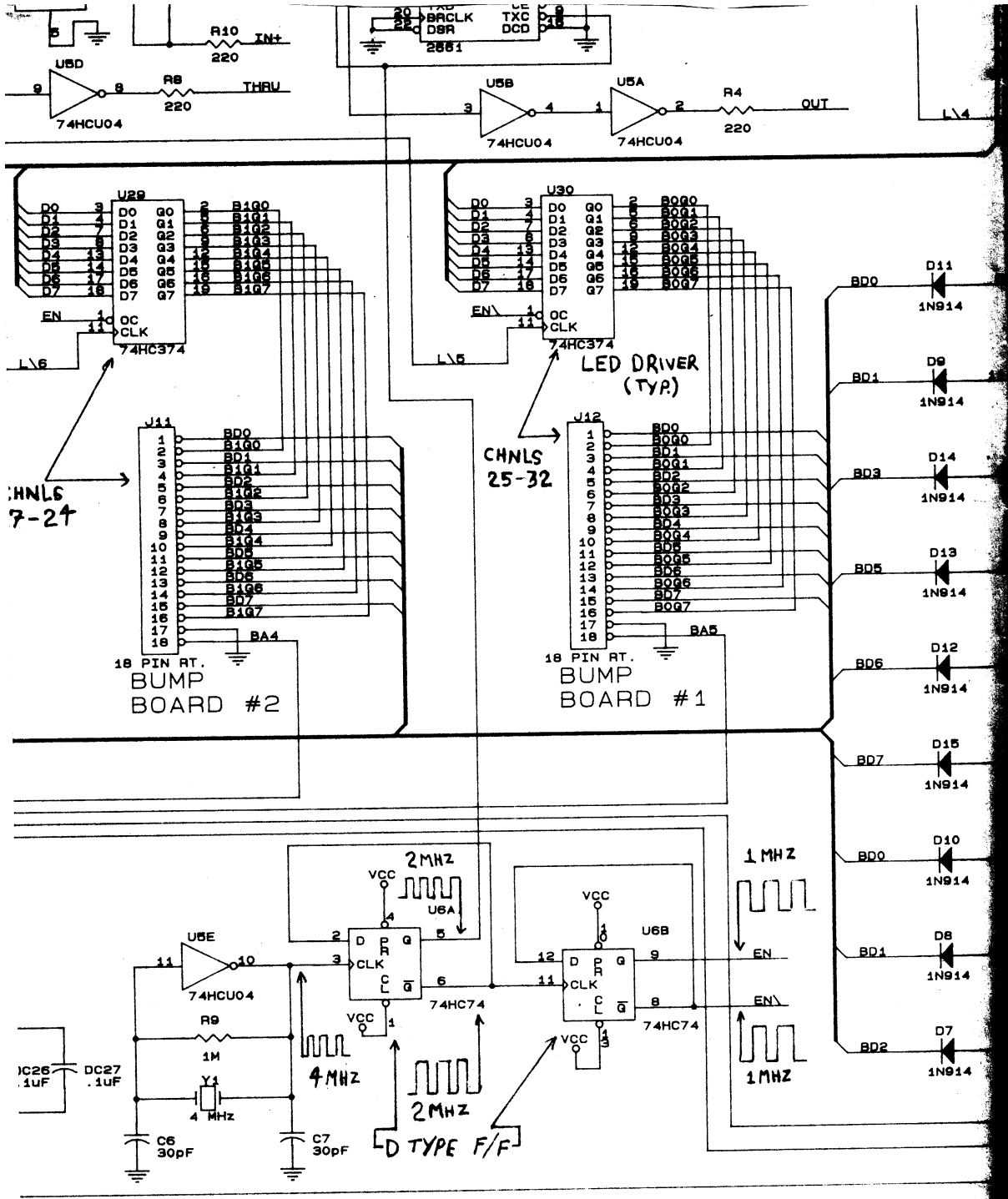
Bump + Key  
BUTTON BUFFER



TRI STATE  
NON INVERTING BUFFER

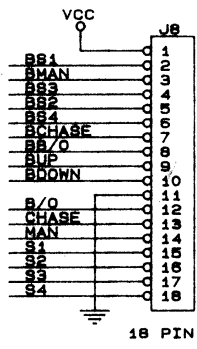
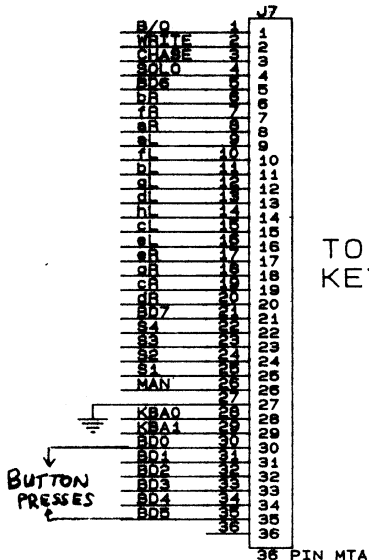
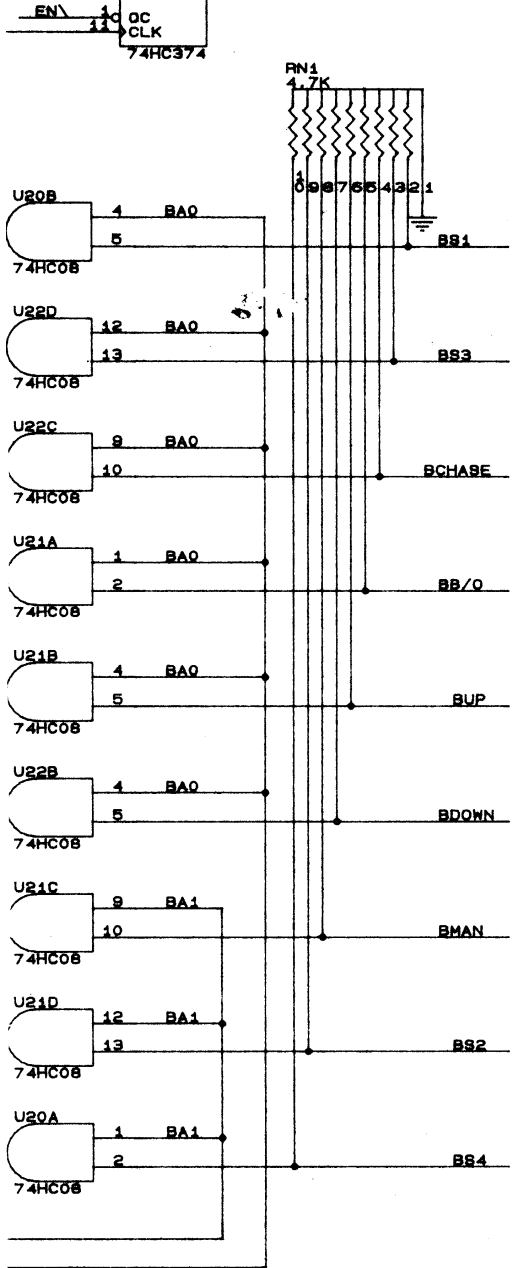






D1	4	Q1	1	Q1	1
D2	5	Q2	2	Q2	2
D3	6	Q3	3	Q3	3
D4	7	Q4	4	Q4	4
D5	8	Q5	5	Q5	5
D6	9	Q6	6	Q6	6
D7	10	Q7	7	Q7	7
		Q8	8	Q8	8
		Q9	9	Q9	9
		Q10	10	Q10	10
		Q11	11	Q11	11
		Q12	12	Q12	12
		Q13	13	Q13	13
		Q14	14	Q14	14
		Q15	15	Q15	15
		Q16	16	Q16	16
		Q17	17	Q17	17
		Q18	18	Q18	18
		Q19	19	Q19	19
		Q20	20	Q20	20
		Q21	21	Q21	21
		Q22	22	Q22	22
		Q23	23	Q23	23
		Q24	24	Q24	24
		Q25	25	Q25	25
		Q26	26	Q26	26
		Q27	27	Q27	27
		Q28	28	Q28	28
		Q29	29	Q29	29
		Q30	30	Q30	30
		Q31	31	Q31	31
		Q32	32	Q32	32
		Q33	33	Q33	33
		Q34	34	Q34	34
		Q35	35	Q35	35
		Q36	36	Q36	36
		Q37	37	Q37	37
		Q38	38	Q38	38
		Q39	39	Q39	39
		Q40	40	Q40	40
		Q41	41	Q41	41
		Q42	42	Q42	42
		Q43	43	Q43	43
		Q44	44	Q44	44
		Q45	45	Q45	45
		Q46	46	Q46	46
		Q47	47	Q47	47
		Q48	48	Q48	48
		Q49	49	Q49	49
		Q50	50	Q50	50
		Q51	51	Q51	51
		Q52	52	Q52	52
		Q53	53	Q53	53
		Q54	54	Q54	54
		Q55	55	Q55	55
		Q56	56	Q56	56
		Q57	57	Q57	57
		Q58	58	Q58	58
		Q59	59	Q59	59
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		Q61	61	Q61	61
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		Q69	69	Q69	69
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		Q71	71	Q71	71
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		Q73	73	Q73	73
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		Q75	75	Q75	75
		Q76	76	Q76	76
		Q77	77	Q77	77
		Q78	78	Q78	78
		Q79	79	Q79	79
		Q80	80	Q80	80
		Q81	81	Q81	81
		Q82	82	Q82	82
		Q83	83	Q83	83
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		Q88	88	Q88	88
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		Q96	96	Q96	96
		Q97	97	Q97	97
		Q98	98	Q98	98
		Q99	99	Q99	99
		Q100	100	Q100	100

20 PIN RIB.  
 ← POT ADDRESS →  
 ANALOG FROM POT



SPECTRUM DESIGN & DEVELOPMENT  
 6265 HAMILTON BOULEVARD  
 ALLENTOWN, PENNSYLVANIA 18106

Title: MXC-2 MAIN BOARD

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Date: June 5, 1990 Sheet 1 of 1