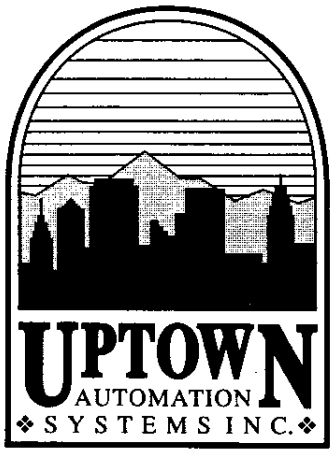
Uptown™ Automation System 990 Installation Manual



Uptown™ Automation System 990 Installation Manual

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Chapter 1

Introduction

This Uptown Automation System 990 installation manual is provided to help assure simple, efficient, correct installation and to serve as a technical reference guide describing the functional operation of the entire system.

This manual is organized into six chapters:

- **Introduction:**
  quick overview of the System 990 installation
- **Pre-installation planning:**
  issues to be resolved before installation
- **Hardware reference guide:**
  detailed technical discussion of how the system works
- **Installation:**
  instructions for system hardware and software installation
- **System testing:**
  verification that the system is performing properly
- **Troubleshooting:**
  a guide to solving system problems
- **System Maintenance:**
  a guide to performing your own system maintenance

System Hardware Overview

The Uptown Automation System 990 is composed of the following major hardware components:

- Uptown fader controller boards
- Motorized faders
- IBM AT compatible computer
- Computer plug-in boards
- Power supply.

These major components are interconnected using the following types of wiring:

- Power distribution cables
- Digital data bus cables
- Fader control cables

Each System 990 fader controller circuit board is designed to control up to 8 motorized faders. Each fader controller circuit board receives one power distribution cable and one digital data bus cable. The 22AWG power distribution cables may be up to 12 meters (40 feet) long. The digital data bus wire may be up to 5 meters (17 feet) long.

Mute interface

Due to the wide variety of console designs and the fact that it is quite common for console manufacturers to change the design of features such as the mute circuitry, connectors, component values, component locations and connector locations, it is not practical for Uptown to provide exact instructions for the automation of your mutes. We do, however, provide schematic diagrams that illustrate mute circuitry which has been reported to perform properly. You may have to consult the manufacturer of your console for further recommendations concerning the automation of mutes or other switch functions.

Fader audio wiring

Each fader has a 4 pin audio connector to allow easy installation of the audio wiring. Due to the wide variety of console connector types, wiring locations and connector locations, the audio wiring and/or connector installation must generally be performed during system installation.

Installation Overview

Installation of a 40 channel system may be completed in about 8 to 16 man-hours, not including mute wiring.

For some automation-ready systems, the mute wiring will add only an hour or two to the installation. For difficult cases, some additional mute circuitry may have to be designed and built. Also, new mute switches may be required in some installations where the original mute switch was used to directly carry the audio. In such cases, mute automation may require an additional 20 hours or more.

Computer Overview

To minimize studio down time, the computer can be set up and some preliminary testing performed outside the studio.

Beware... all systems are not created equal. Some particularly scary problems are far-east BIOS, temperature problems affecting timing on the motherboard, strange mouse drivers and incompatible adapter boards. Some super-VGA boards have been found to be incompatible with some mouse drivers. Most bus mice won't work with the system.

As a service, we will purchase a computer for you and we will set up, test, and ship your computer with the system. When we install our circuit boards and install

our software in the computer, we can verify that the computer and its accessories are compatible with our system. This service will simplify your installation and may save you quite a bit of time.

General Computer Requirements

The automation system computer needs to meet the following specifications:

- IBM AT 80386 or 80486 compatible computer, 33 MHz, 64K cache
- hard disk
- 5 1/4", 1.2 meg floppy disk or 3 1/2", 1.44 meg floppy disk
- VGA (or EGA) graphics adapter
- VGA (or EGA) monitor, color or monochrome
- mouse or trackball (we recommend the 3-button Logitech mouse and trackball)
- at least 1 megabyte of LIM 4.0 expanded memory.

We recommend using a VGA adapter and monitor since they provide the sharpest, clearest display. An EGA system also provides good results.

The choice of mouse versus trackball is purely a matter of personal preference. The major advantage of the trackball is that it occupies a fixed location and doesn't have to be moved on a special mouse pad, and it can be operated easily on a sloping surface.

The amount of expanded memory available determines how many automation moves can be recorded during a mix. We recommend starting with 4 megabytes of RAM for most installations, or 8 megabytes if you plan on doing extremely long and complex mixes. If your particular usage of the system shows that you need more memory, then you can add more memory as required.

I/O Cards

One Uptown AT I/O card must be installed in the computer for each group of four 990 fader controller modules (up to 32 faders) in the automation system. That is, a system having 1 to 32 automated faders would require only one AT I/O card. A system of 33 to 64 automated faders requires two AT I/O cards. A system of 65 to 96 automated faders requires three AT I/O cards.

Each AT I/O card must have the System Information and Address jumpers set during installation.

A data cable connects each 990 fader controller, which controls up to eight faders, to the AT I/O card. Three conductors of the data cable are required to carry the data to each fader controller board.

MIDI/SMPTE Card

One MIDI/SMPTE co-processor card must be installed. The switches on the card must be set up during installation.

Power Supply

Each rack mounted power supply is designed to provide power for up to 64 of the System 990 motorized faders. Each bank of 8 modules has a 6 mm (1/4") diameter, shielded cable running from the power supply to the fader controller board. The maximum recommended distance from the power supply to the fader modules is 12 meters (40 feet) when using #22 AWG wiring.

Chapter 2

Pre-installation Planning

Planning

Planning the installation of your Uptown Automation system can greatly simplify the installation process and considerably reduce your studio downtime.

Components

Installing the Uptown Automation System 990 involves the following major components:

- Fader controller boards
- Motorized faders
- IBM AT compatible computer system
- Power supply
- System wiring

Technical specifications including fader controller size, fader controller mounting methods, fader dimensions, fader audio connections, power supply wiring and data bus wiring are presented in Chapter 3, the technical reference section of this manual. From time to time, as you read the following descriptions, it may be helpful to look in the technical reference section for additional information and illustrations.

Fader Controller Boards

The fader controller boards can be mounted directly below the faders, or, if there is no space inside the console, they can be mounted at a distance up to 24" from the faders, for example, on the underside of the console.

The fader controller board installation is the simplest when the fader controller can be mounted directly beneath the faders. Each fader is connected to the fader controller board with an eight-conductor ribbon cable. The fader controller and the associated cables should be kept away from non-shielded audio.

We offer several standard lengths of fader control cables, and we can custom manufacture cables to suit your particular installation if necessary.

Wiring

Each fader controller connects to one four-conductor shielded power cable, about 6mm (1/4") diameter. The power cable originates at the barrier strip on the back of the power supply and plugs into the power connector on the fader controller circuit board. The power cables normally supplied are #22 AWG cables, 12 meters (40 feet) long.

The data cable which carries the automation system data between the computer and the fader controller is normally a #22 AWG ribbon cable, 5 meters (17 feet) long, using three conductors for each fader controller. For example, the data cable for a 32 channel system is a 12 conductor ribbon cable, about 2mm (.080") thick and 30 mm (1.2") wide

For consoles with individual fader panels, the power and data cables to the system are most easily installed from beneath the console. Many consoles have a removable bottom panel located beneath the faders which simplifies installation. If your console does not have a removable bottom, the console may require modification prior to the automation system installation.

Mutes

The System 990 fader controller board contains all of the logic to provide mute automation. Due to the wide variety of consoles and the preferences concerning the mute circuit technology, the System 990 fader controller board has only the 5 volt logic to control an electronic mute. That is, there is no audio mute on the fader controller board.

In consoles which are automation ready, such as the DDA DMR12 for example, our 5 volt logic is fully compatible and is a simple plug-in installation to automate the mutes. Some consoles, such as Trident TSM or Sony MXP-3000, require the addition of an opto isolator or a new mute switch to each input module. If the console does not have electronic mutes, then some sort of electronic mute such as the PMI SSM2402 must be installed.

The automation system software provides a mute Invert function, available from the keyboard or control panel, which will cause all of the mute buttons to turn channels on rather than off, thus performing a solo-in-place function.

Computer

For the computer, the major planning issues involve placement of the computer, computer monitor, keyboard, trackball (or mouse) and the automation data bus. The automation data bus has a maximum length of 5 meters (17 feet) from the back of the computer to the fader controller board. The automation data bus wiring should be kept as far as possible from any audio wiring (at least 4 inches).

The computer monitor is a possible source of audio noise and should be kept at least a foot or two away from any high level audio wiring, including patch bays.

The trackball will be used more often than the keyboard and should be placed close by for easy access.

Control Panel

The System 990 has provisions for a system control panel. Up to 8 switches and 8 LEDs may be added to your console to perform commonly used system functions. Six of the switches are preprogrammed mode buttons, Hold, Manual, Auto, Ready, Touch and Write.

The remaining two switches perform keyboard macros and can be programmed to perform any function which you could perform at the keyboard. For example, one of the user programmable buttons might be used to invert the function of the mute switches, thereby providing a solo-in-place function.

Power supply

You need to decide where to put the power supply and how to route the wiring. The Uptown Automation system provides a rack-mounted power supply for each 64 channels of automation. The power supply is 7 inches tall, 14 inches deep and mounts in a full width 19 inch rack. The power supply has a low noise fan (27 dBA) which blows air our of the back of the supply.

Each bank of eight fader modules is connected to the power supply by a shielded 4 conductor cable, about 1/4 inch diameter. See Chapter 3, Hardware Reference Guide, Power Supply, for a complete description of the power supply, power cables and connectors.

Questions to Answer

The following list summarizes the decisions that need to be made prior to installation:

1. **Is the console bottom (beneath the faders) removable? If not, will installation require removal of the bottom?**
2. **Where will the fader controller boards be mounted?**
3. **What length of fader controller cables will be required?**
4. **Is any additional interface circuitry required for mutes?**
5. **Will new, or additional, mute switches be required?**
6. **Where will the computer, monitor, and keyboard be located?**
7. **Where will the automation data bus cable enter the console?**
8. **Where will the rack-mounted power supply be mounted?**
9. **Where will the power cables to the console to be routed?**
10. **Where will the power cables enter the console?**
11. **Will control panel switches and LEDs be added to the console?**

Chapter 3

Hardware Reference Guide

Introduction

This chapter describes in detail the hardware components of the system. You should read this section thoroughly to become familiar with the system hardware before going on to the actual installation. Then you can refer back to this section while reading the Installation chapter for specific information about your installation.

The hardware reference section will present the following topics:

- System overview
  - Major components
  - Wiring overview
- Motorized faders
  - Dimensions
  - Audio connector wiring
- Fader controller boards
  - Controller Dimensions
  - Controller mounting methods
  - Fader bay depth requirements
  - DIP switch
  - Mute interface
- Control panel
  - Interface description
  - I/O connector
- AT I/O boards
  - I/O board jumpers
  - Data connectors
- Data bus wiring
  - Routing
  - Construction
  - Direction
- Power supplies and power wiring
  - Dimensions

Line voltage selector and fuses
Wiring

- Firmware and Software
  Version control

System Hardware Overview

The Uptown Automation System 990 is composed of the following major hardware components:

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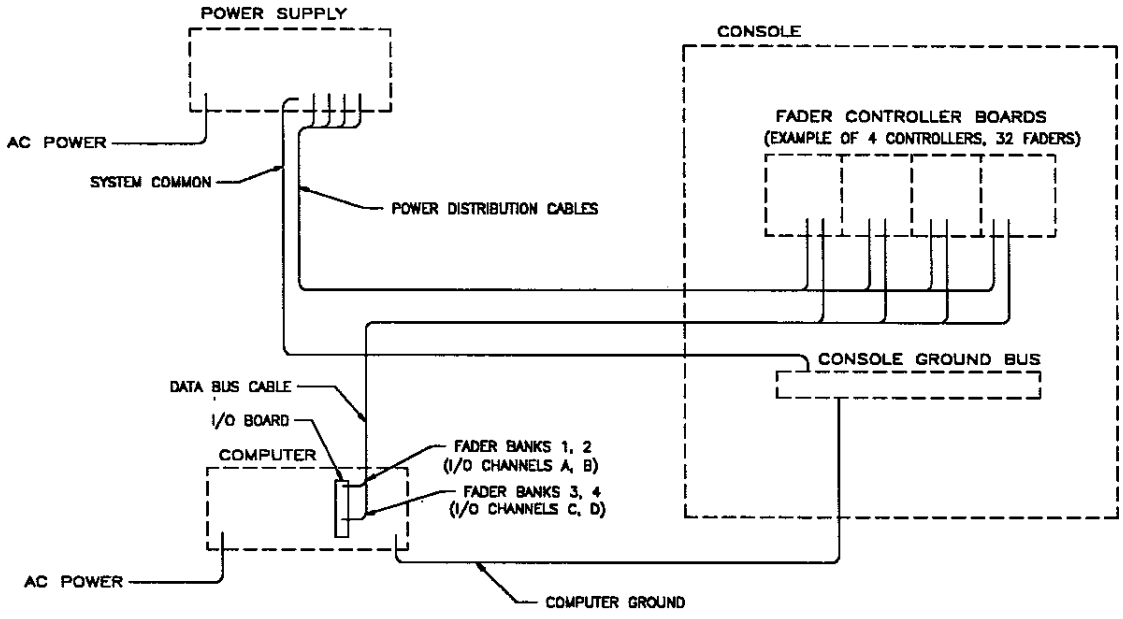
The overall system wiring is really quite simple, as shown in the following illustration of a 32 channel system which has 4 fader controller boards.

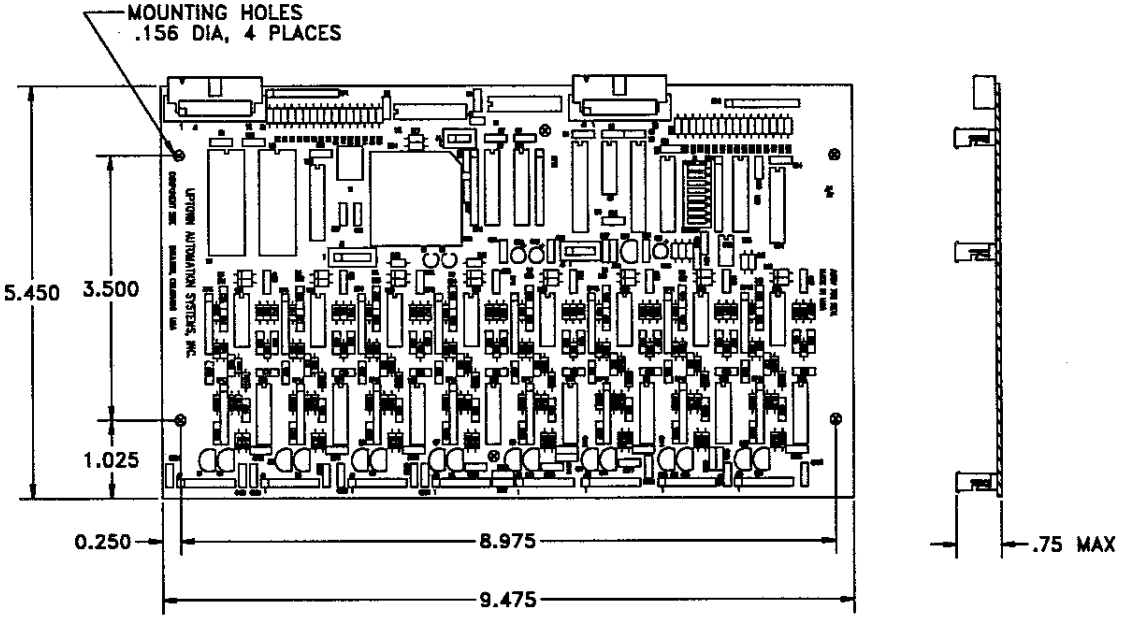


Fader Controller

This section will describe the physical size of the System 990 fader controller and will provide suggestions for mounting the fader controller.

The fader controller board is approximately 5.5" by 9.5" overall. Each fader controller circuit board is designed to control up to 8 motorized faders. Each fader is connected to the fader controller by an 8 conductor ribbon cable.

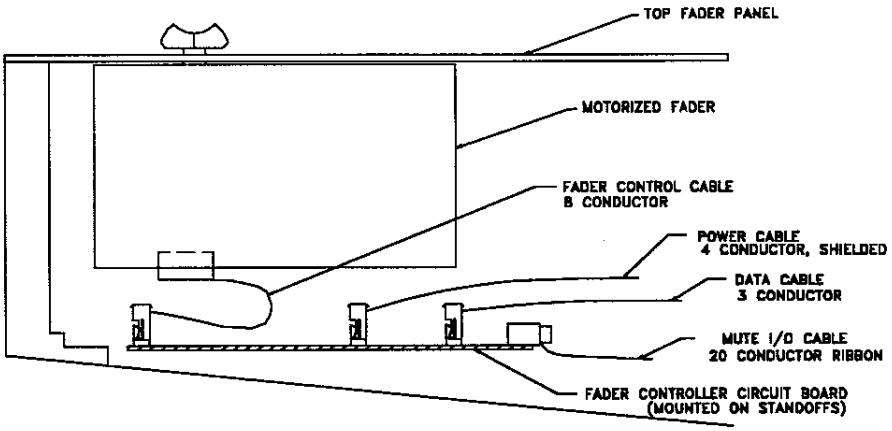
The fader controller board size, mounting hole locations and a side view of the connector heights are shown in the following illustration:



Fader Controller Mounting

The simplest, most straightforward installation will be to put the fader controller directly beneath the faders. In this manner, the wiring will be kept short and direct.

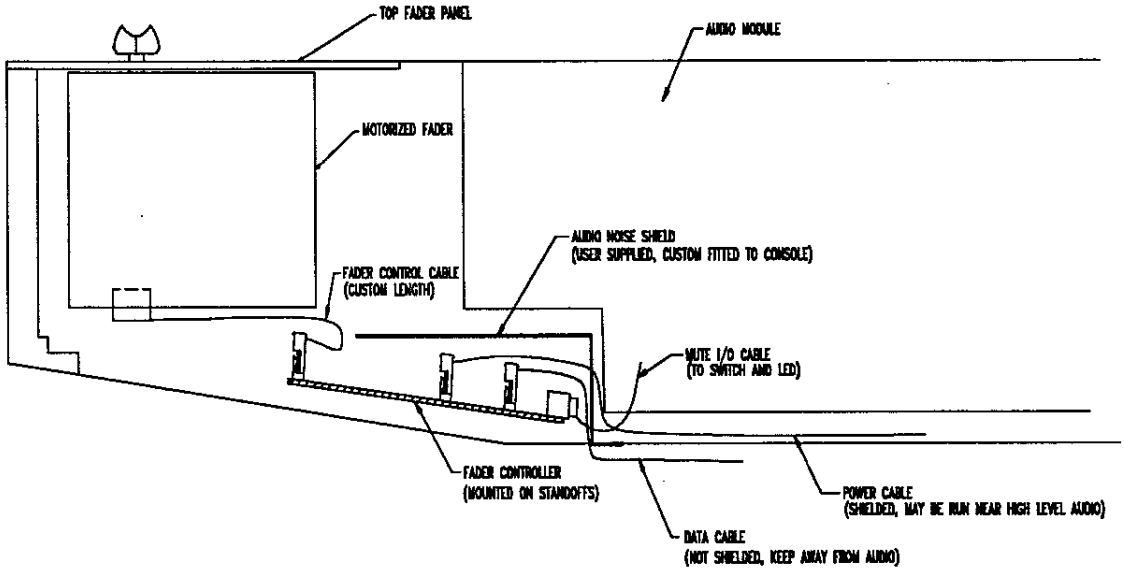
For typical mounting, we provide six rugged nylon standoffs which snap into the six fader controller mounting holes and are then attached to the console metalwork with double sided permanent foam tape.



TYPICAL CROSS SECTION VIEW
FADER CONTROLLER MOUNTED IN FADER BAY (PREFERRED MOUNTING METHOD)

In some cases, there is not enough room beneath the faders to install the fader controller in the fader bay. In such cases, the first choice is to see if the MF260 miniature fader will allow room for the fader controller. If not, then the next choice is to remotely locate the fader controller.

If there is room near the fader, the following scheme might be used as a compromise in order to keep the fader controller wiring as simple and neat as possible:

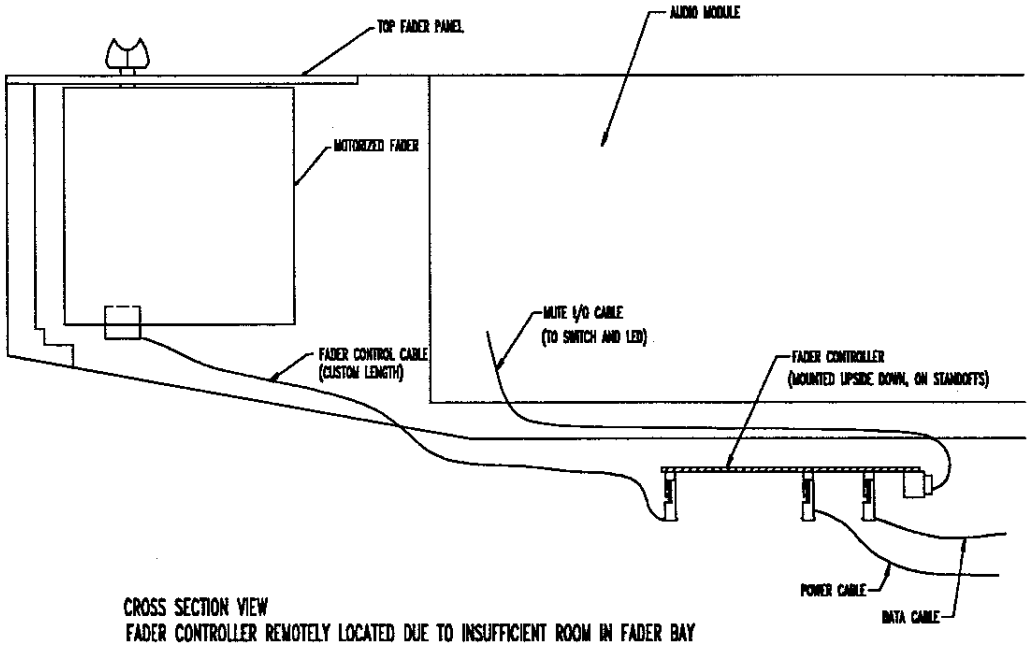


CROSS SECTION VIEW
FADFER CONTROLLER OFFSET AND SHIELDED DUE TO LIMITED SPACE IN FADER BAY

Whenever the fader controller must be mounted near audio circuitry, you may have to fabricate a simple shield, connected to chassis ground, to avoid coupling digital noise into the audio. Brass shim stock or aluminum sheet are easy to work

with and should provide satisfactory results with thicknesses of .25 mm (.010") or greater.

If there is not enough room for the fader controller to be mounted inside of the console, then the next choice is to mount the fader controller on the outside bottom of the console. The fader controller should be mounted back far enough that knees will not be hitting it. The controller-to-fader cables may be up to 24" long if necessary.



CROSS SECTION VIEW
FADER CONTROLLER REMOTELY LOCATED DUE TO INSUFFICIENT ROOM IN FADER BAY

Depth requirements

It is possible to install the Uptown System 990 in a wide variety of consoles. The following table lists the approximate depth requirements for different system configurations:

Whenever possible, we recommend that the fader controller be mounted beneath the faders, as illustrated previously. This configuration keeps all of the fader wiring short and direct, thus minimizing the potential for audio noise and possible damage to the fader controller wiring.

The decision to remotely locate the fader controller, in a location such as on the bottom of the console, should be done only if there is not sufficient room to mount the fader controller near the faders. In the following table, the minimum depth allows just enough room for the fader and the fader controller connector. It is recommended that you allow a bit more room to allow for console depth variations and to allow room for fader wiring service loops.

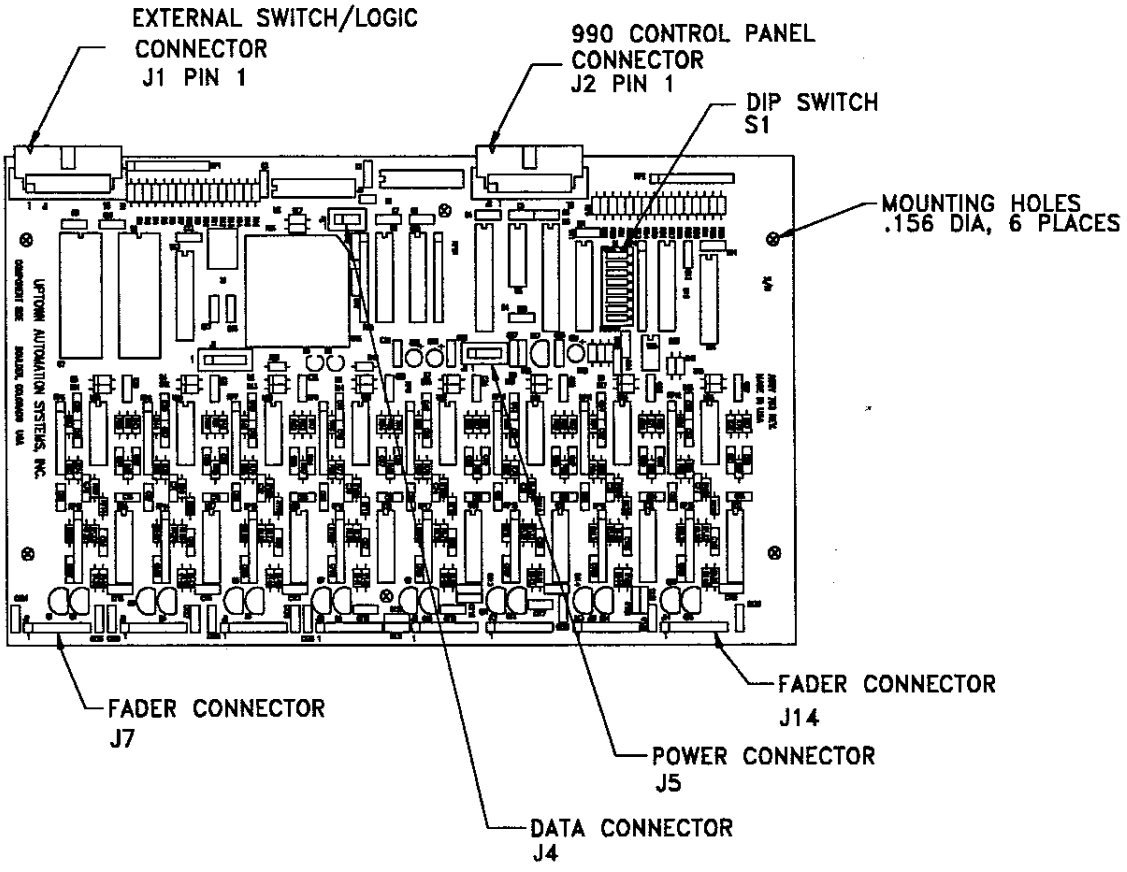
Controller Location	Fader	Minimum Depth	Recommended Depth
Beneath faders	AF102N	4.0"	4 1/2"
Beneath faders	MF260	3 3/8"	3 3/4"
Remote	AF102N	3 1/4"	3 1/2"
Remote	MF260	2 3/4"	3.0"

Power requirements

Each fader controller board requires 75 ma of power at 5 VDC, and 200 ma of power at 24 VDC for each fader motor installed on the board.

Connector locations

The following illustration shows the System 990 fader controller board and the locations of the interface connectors.



External I/O interface connector J1 allows the board to receive up to 8 logic level inputs from switches or logic and to output 8 logic level signals to control LEDs or other indicators. This is normally wired to the console mute logic, but could be used to automate any 8 switch functions.

Pin 1 of J1 and J2 is located near the small arrowhead molded into the top of the connector housing. The top row of pins are the odd numbers, 1, 3, 5, 7...19. The bottom row of pins, closest to the fader controller circuit board, are the even numbered pins 2, 4, 6, 8...20.

Control panel connector J2 provides the interface to an 8 switch control panel which can have up to 8 LED indicators. The first two inputs and outputs are user definable via the keyboard in the MIX program as F1 and F2. The other 6 inputs and outputs are defined as follows: Hold, Manual, Auto, Ready, Touch and Write.

Dip switch S1 allows the fader controller to be customized for a particular application and also provides a special test mode which allows the fader controller performance to be evaluated without any computer.

Connectors J7 through J14 are the 8 pin ribbon cables which connect to the faders. These control cables provide motor power, position sensing and knob touch signals. The control cables should be kept as short as possible to avoid audio noise problems and to prevent motor control signal errors.

The data connector J4 connects to the Uptown I/O board in the system computer.

The power connector J5 provides the connections for the +5 volt logic and the +24 volt fader motors.

Fader controller connectors

The connectors provided for the fader control, power supply and data wiring are mass-termination type connectors in which the wire is forced into place in the housing using a special installation tool. This connection forms a reliable, gas-tight joint. These connectors have been selected for their reliability, ease of installation, low profile and versatility.

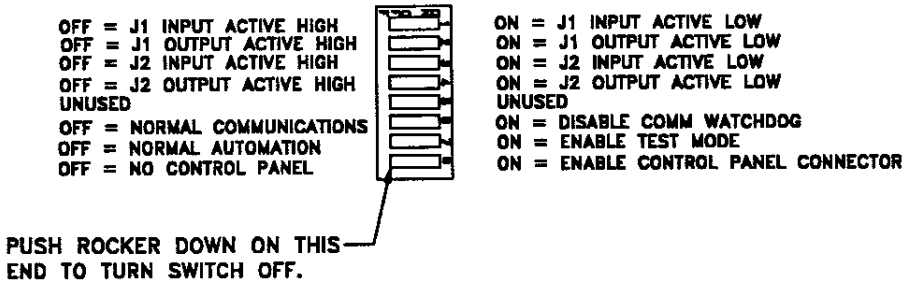
We generally use AMP connectors. The recommended installation tool for special wiring or repairs is a simple hand tool, AMP 59803-1, which costs about $11 from any AMP distributor.

Power-on Reset

Proper power-on reset of the System 990 fader controller board requires that the logic power supply drop below 1 volt when turned off, and that the logic supply risetime be on the order of 20 msec or less. Longer risetimes may result in erratic reset.

DIP Switch

Each fader controller board has a DIP switch which governs the operation of the fader controller. The DIP switch is read only at power-on reset. Any change in any DIP switch settings will only be read if the 5 volt logic supply is turned off, allowed to drop down to under 1 volt and turned back on.



DIP SWITCH S1 SETTINGS

The first four switches are used to define the logic on states of the switch inputs, switch outputs, control panel inputs and control panel outputs.

Switch 1 OFF defines the external switch input active state as logic high. That is, when an external device provides a low-to-high logic level transition, the fader controller will toggle the state of the automated switch output. When switch 1 is ON, a high-to-low transition will toggle the output.

Set this switch ON if holding down the switch button produces 5 volts. Set it OFF if the switch pulls to ground.

Switch 2 defines the initial power-on reset value of the automated switch outputs. Switch 2 OFF will cause the initial power-on output to be logic low. Switch 2 ON will cause the initial power-on reset switch outputs to be all logic high.

Set this switch ON if you want the external switch to be ON (muted, for most consoles) when pulled to ground. Set this switch OFF if you want the external switch to be ON when pulled to 5 volts.

Switch 3 OFF defines the control panel switch input active state as logic high. That is, when the control panel provides a low-to-high logic level transition, the fader controller will toggle the state of the control panel output. When switch 3 is ON, a high-to-low transition will toggle the output.

Set this switch ON if holding down the control panel switch button produces 5 volts. Set it OFF if the switch pulls to ground.

Switch 4 defines the initial power-on reset value of the control panel outputs. With switch 4 OFF, the outputs to the control panel output will be logic low at power-on reset. Switch 4 ON will cause the initial power-on reset state of the control panel outputs to be all logic high.

Set this switch ON if you want the control panel LED to be ON when pulled to ground. Set this switch OFF if you want the control panel LED to be ON when pulled to 5 volts.

Switch 5 is not used.

Switch 6 OFF enables the Serial Communication Watchdog feature which is designed to automatically reset the System 990 fader controller if serial communications are disrupted. With the switch ON, the communications watchdog is disabled and the fader controller will only reset when the 5 volt supply is cycled off and on again. This switch should normally be set to the OFF position.

Switch 7 ON enables a special test mode which does not require any communication with the central computer and allows all of the switches and faders to be tested without use of the central computer. With switch 7 OFF, the fader controller will be in the normal automation mode which is totally under control of the central computer. this switch will normally be set to the OFF position.

Switch 8 ON enables the control panel functions via the control panel connector on this fader controller board. With switch 8 OFF, the control panel connector is ignored. This switch should be set to the OFF position on all fader controllers except for the one which is connected to the control panel.

test mode

As mentioned above, DIP switch 7 enables the System 990 fader controller test mode. When in the test mode, all functions of the fader controller except for central computer data communications can be evaluated. With DIP switch 7 set to the ON position, all of the System 990 input module switch signals are used to toggle the state of the corresponding logic output. So, pressing the first switch (channel 1 MUTE), will alternately mute and unmute the channel each time the switch is pressed

In addition, when the first switch (channel 1 MUTE) is pressed, the fader motors are toggled on and off. When the second switch (channel 2 MUTE) is pressed, the motor speed is decreased. When the third switch (Channel 3 MUTE) is pressed, the motor speed is increased. Using these switches, it is possible to evaluate the fader movement at any desired speed.

External mute I/O interface

Each Uptown System 990 fader controller module may be connected to 8 external switch inputs and will return 8 logic outputs via a 20 conductor ribbon cable. Typically, this interface will be used to automate the mutes for each channel, but this external I/O capability can be adapted for other uses such as automating EQ selections or insert selections. In addition, the 5 volt logic supply and logic ground are also included at the ribbon cable connector in order to power the external switches, logic and indicators as may be required.

On the Uptown fader controller, all of the switch signals from the System 990 I/O connector are routed to 74HC541 tri-state bus buffers which are used to sample the state of each of the 8 inputs. The fader controller circuit board has 47K

pulldown resistors on all switch inputs. Additionally, all inputs have a 10K series resistor for protection from minor wiring errors and momentary short circuits.

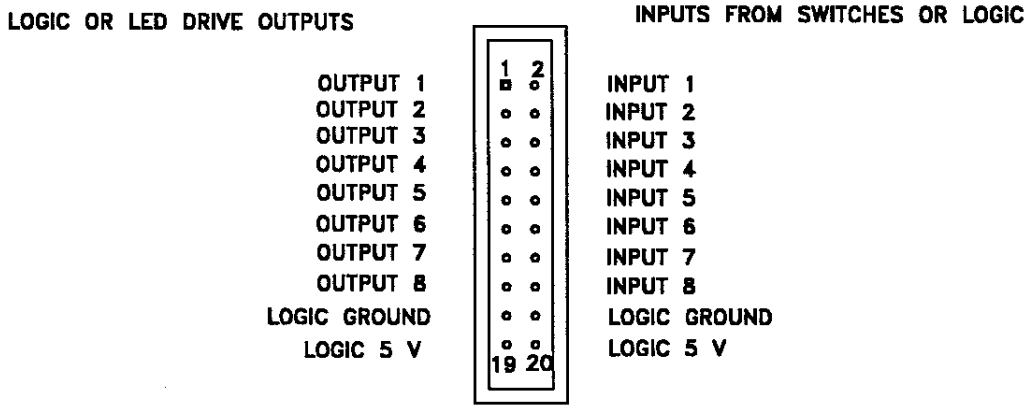
The outputs of the fader controller board are 74HC377 latches which hold the state of the output. The latch outputs have a series 180 ohm resistor to provide protection from short circuits to ground or to the logic power supply. With the series resistance, the outputs can easily source or sink up to 5 mA. During power-on reset, typically about 100 msec after the turn on of the 5 volt logic supply, the state of the output latches is indeterminate. Following power-on reset, all latch outputs are set to the inactive logic state, as defined by dip switch 4 setting.

Console mute ribbon cable interface

Each Uptown fader controller module is connected to the console mutes (or other switches) via a 20 conductor ribbon cable. The ribbon cable provides 8 switch inputs to the Uptown controller and returns 8 analog switch control signals back to the sub-board.

On the Uptown fader controller, all of the switch signals from the console mutes are routed directly to 74HC541 tri-state bus buffers which are used to sample the state of each switch. The fader controller has 47K pulldown resistors on all of the switch lines. All CMOS inputs are protected from minor interface logic voltage differences and small static discharges by means of 10K series resistors. The active input logic state is defined by DIP switch 1.

The outputs of the fader controller board are 74HC377 latches which hold the state of the analog switches. The latch outputs have a series 180 ohm resistor to provide protection from short circuits to ground or to the logic power supply. With the series resistance, the outputs can easily source or sink up to 5mA. During power-on reset, typically about 100 msec after the turn on of the 5 volt logic supply, the state of the output latches is indeterminate. Following power-on reset, all latch outputs are set to the inactive logic low high state as defined by DIP switch 2.



SYSTEM 990 I/O CONNECTORS J1 AND J2

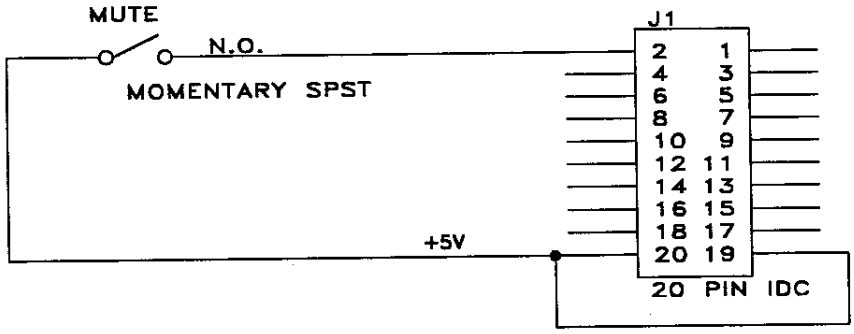
Mute switch interface

The following schematics are meant to illustrate the proper installation concepts and are not warranted to be appropriate for any specific application. Uptown Automation will not be liable for any use or misuse of these schematics.

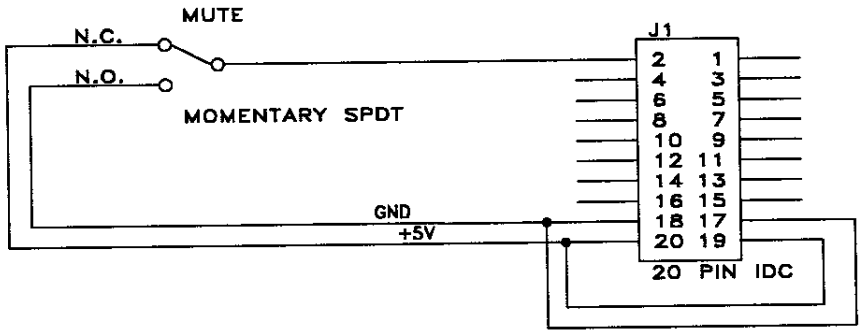
The mute switches may provide either a contact closure to ground (active low logic) or a contact closure to logic high (active high logic). The dip switch is used to tell the automation system which type of switch signal is being provided.

The following illustrations depict some of the possible mute switch connections that will work with the System 990 fader controller. The connector in the illustrations is J1 on the fader controller. The active high configuration is the simplest and is recommended whenever possible.

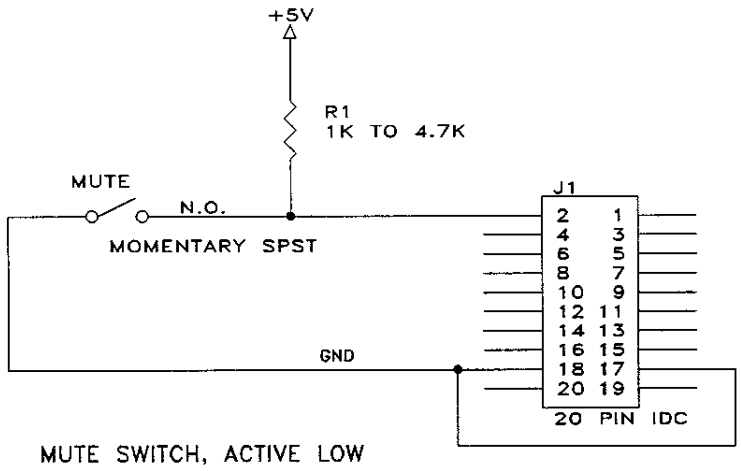
For clarity, only the channel 1 mute switch is shown. All of the other mute switch interfaces should be identical.



MUTE SWITCH, ACTIVE HIGH



MUTE SWITCH, ACTIVE LOW

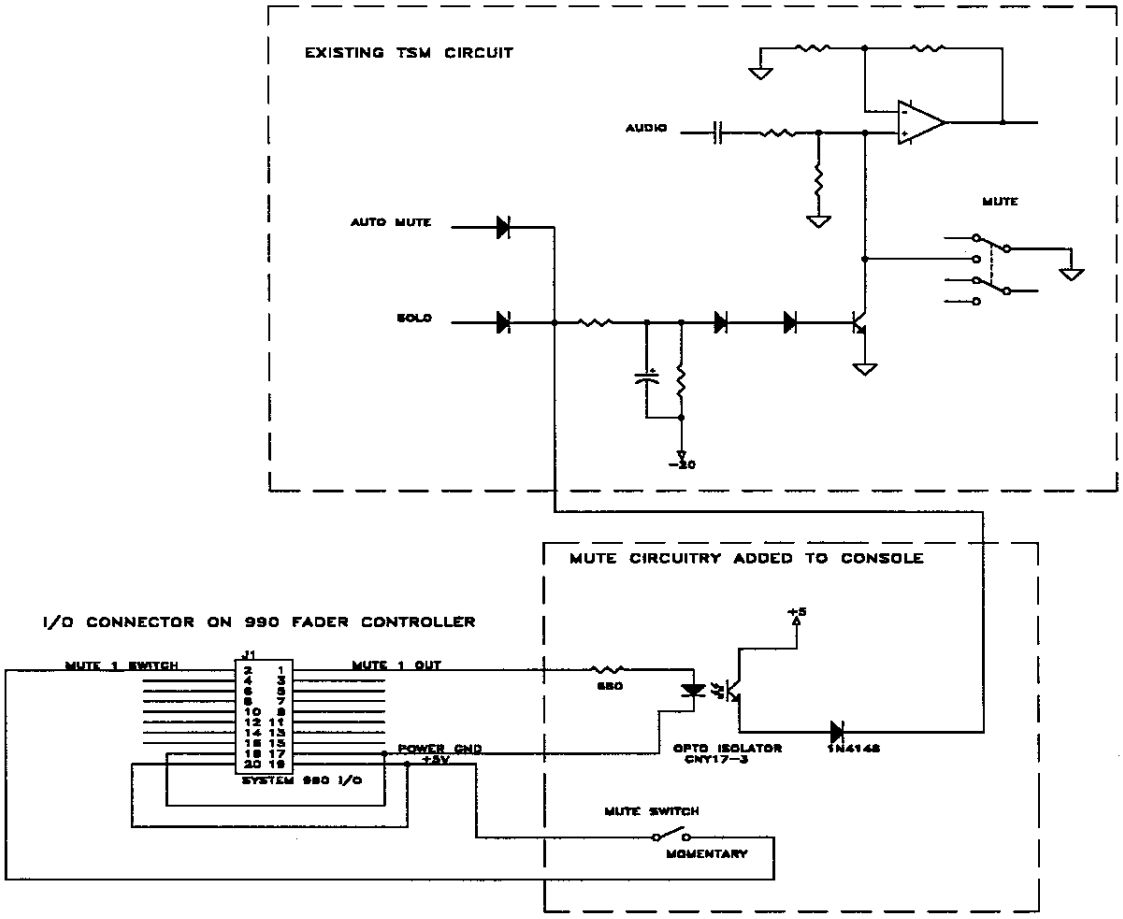


Mute interface schematics

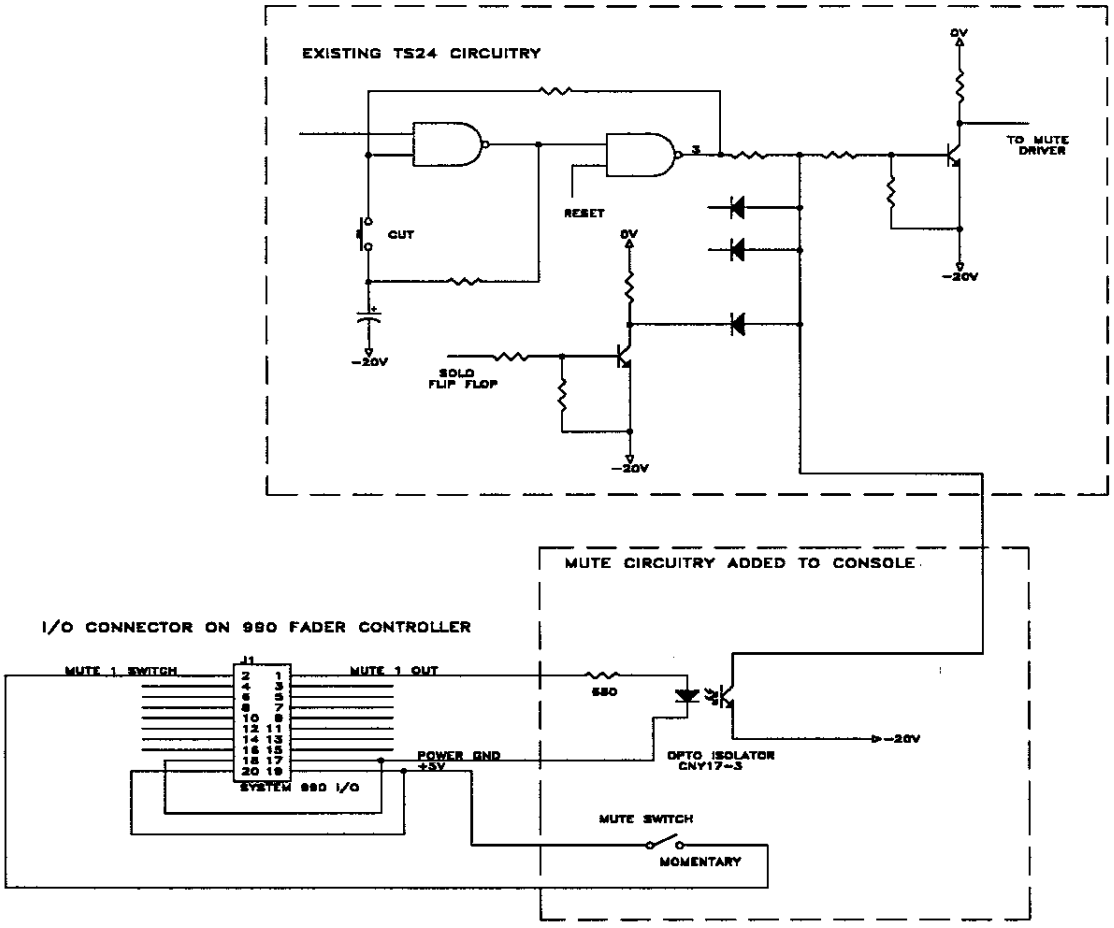
The following schematics are provided to illustrate the mute interface concepts and are not warranted to be appropriate for any specific application. Uptown Automation will not be liable for any use, misuse, or patent coverage of these concepts.

In some cases, such as the DDA DMR12, the mute circuit interface is automation-ready and the Uptown logic can be directly plugged into the console modules.

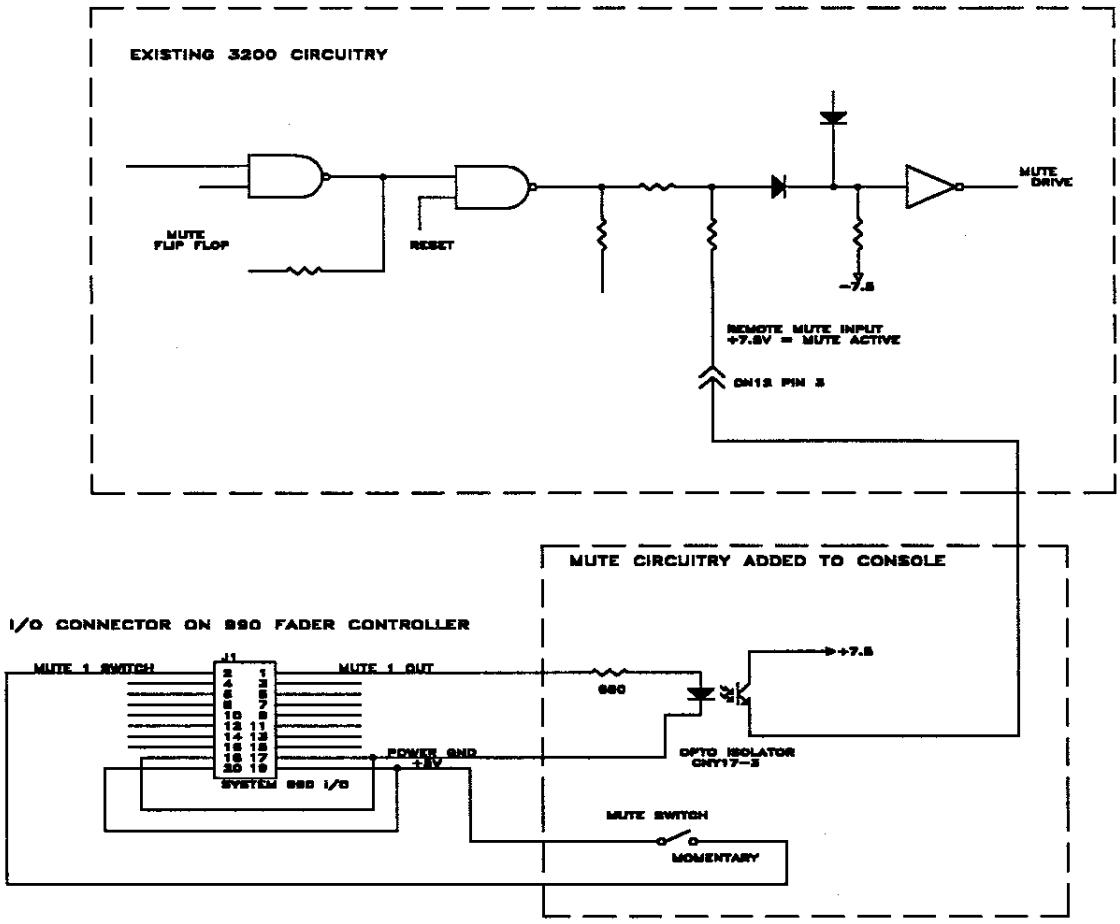
In other cases, the consoles have electronic mutes, but the interface requires some additional circuitry because of the logic levels involved. Examples of such interfaces would be the Trident TSM, Soundcraft TS24 or Soundcraft 3200 as illustrated below:


EXISTING TSM CIRCUIT
AUDIO
AUTO MUTE
SOLO
MUTE
-15
MUTE CIRCUITRY ADDED TO CONSOLE
I/O CONNECTOR ON 990 FADER CONTROLLER
MUTE 1 SWITCH
J1
MUTE 1 OUT
SYSTEM 990 I/O
POWER GND
+5V
680
+5
OPTO ISOLATOR
CNY17-3
1N4148
MUTE SWITCH
MOMENTARY

Trident TSM



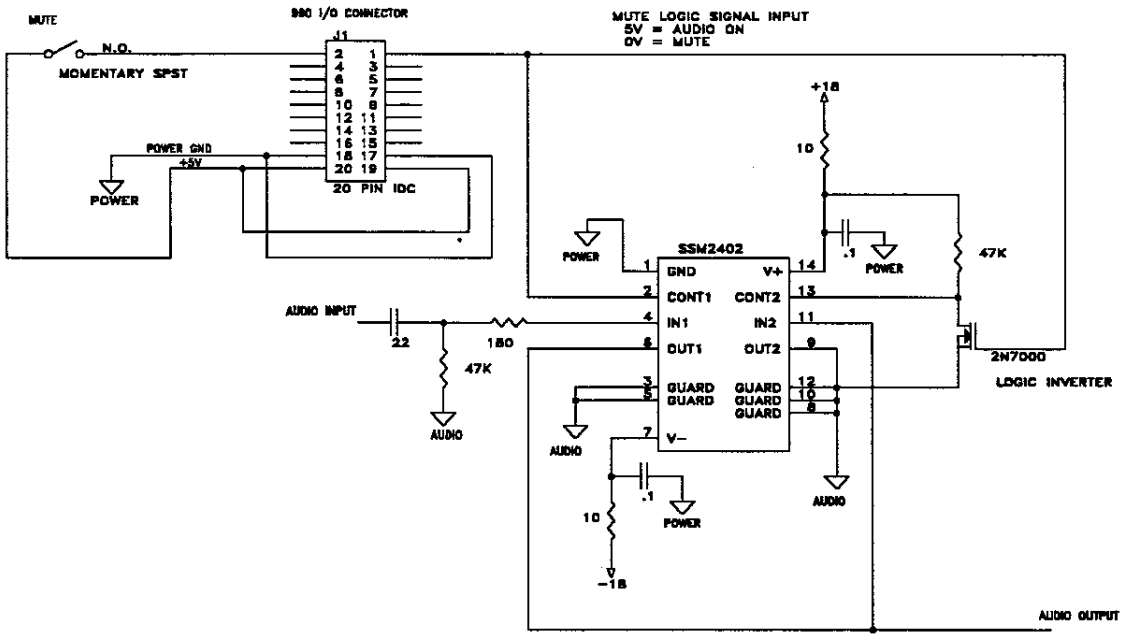
Soundcraft TS24



Soundcraft 3200

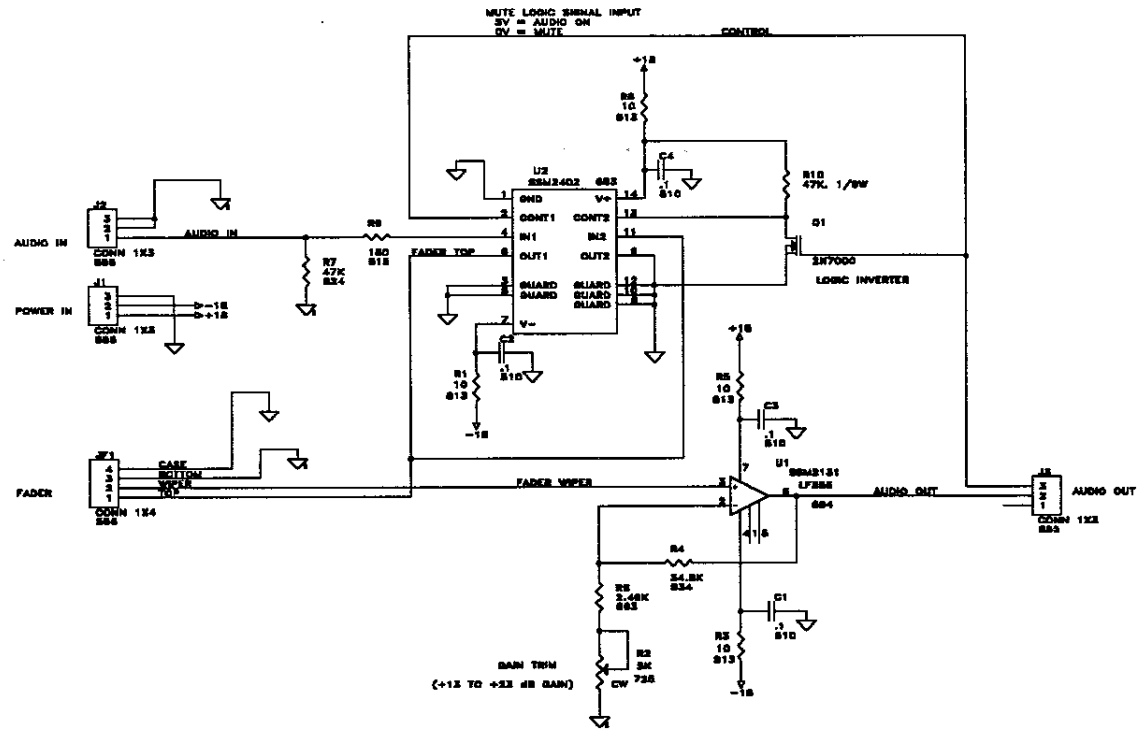
Unfortunately, not all consoles have appropriate electronic mute circuitry. In such cases, it will be necessary to add a new electronic mute circuit. In most cases, the mute will be added prefader, but that is really a matter of choice.

The following schematic depicts a high performance, yet quite simple, mute circuit based on the SSM2402 integrated circuit (now available from Analog Devices). The SSM2402 is appearing in many new console designs and is optimized to reduce the mute thump by turning off and on slowly.



The logic inverter shown in the schematic allows the use of the second section of the SSM2402 to ground the top of the fader when the mute is active. Grounding the top of the fader during the mute operation will assure the ultimate in mute performance, but this extra performance may not be required in all consoles. This inverter could be a CMOS IC inverter if desired. If you chose not to use any inverter, then pins 11 and 13 of the mute IC would be left unconnected.

When replacing VCA circuitry, you will generally need to add an amplifier stage to provide 10 to 15 dB of gain. An example of a VCA replacement circuit, including both the mute and the make-up amplifier is shown below:



Control Panel

The System 990 has provisions for a system control panel. Up to 8 switches and 8 LEDs may be added to your console to perform commonly used system functions. Six of the switches are preprogrammed as mode commands: Hold, Manual, Auto, Ready, Touch and Write.

The remaining two switches perform keyboard macros and can therefore be programmed to perform any function which you could perform at the keyboard. For example, one of the user programmable buttons might be used to invert the function of the mute switches, thereby providing a solo-in-place function.

The control panel can be connected to any one of the fader controller boards. (Note: The System 990 control panel should not be confused with the special theater control panel which plugs directly into the I/O board.)

Control panel interface

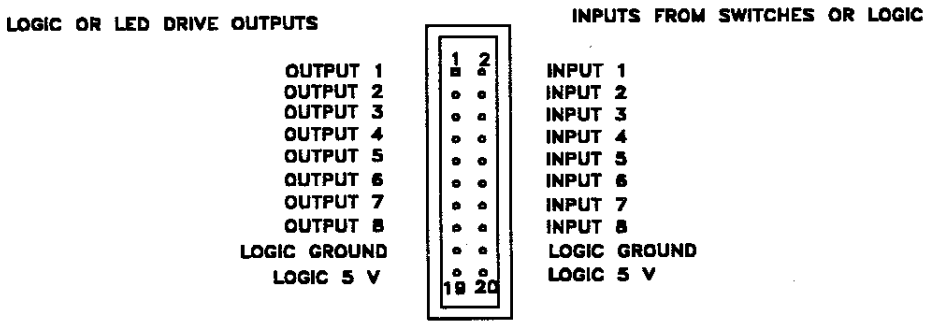
Any Uptown fader controller module is capable of supporting the system control panel, if DIP switches 3 and 4, as discussed above, are properly set.

The control panel is connected to the fader controller via a 20 conductor ribbon cable. The ribbon cable provide 8 switch inputs to the Uptown controller and returns 8 analog switch control signals back to the sub-board. In addition, the 5 volt logic supply and logic ground are also included at the ribbon cable connector in order to power the control panel as may be required.

The control panel switch signals may be either active high or active low as shown above for the mute switches. The active high configuration is the simplest and is recommended where possible.

On the Uptown fader controller, all of the switch signals from the control panel connector are routed to 74HC541 tri-state bus buffers which are used to sample the state of each of the 8 inputs. The fader controller circuit board has 47K pulldown resistors on all switch inputs. Additionally, all inputs have a 10K series resistor for protection from minor wiring errors and momentary short circuits. DIP switch 3 defines the active logic state.

The control panel outputs of the fader controller board are 74HC377 latches which hold the state of the output. The latch outputs have a series 180 ohm resistor to provide protection from short circuits to ground or to the logic power supply. With the series resistance, the outputs can easily source or sink up to 5 mA. During power-on reset, typically about 100 msec after the turn on of the 5 volt logic supply, the state of the output latches is indeterminate. Following power-on reset, all latch outputs are set to the inactive logic state, as defined by DIP switch 4 setting.



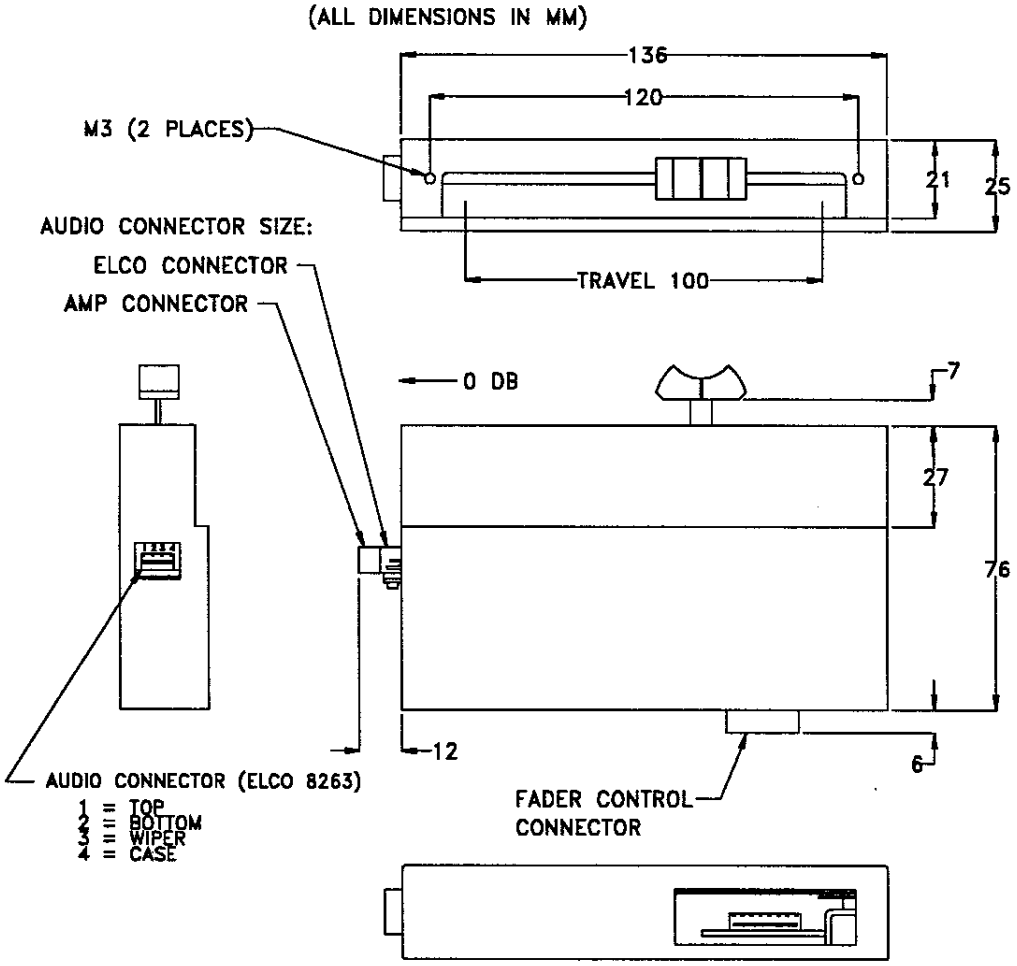
SYSTEM 990 I/O CONNECTORS J1 AND J2

Fader Specifications

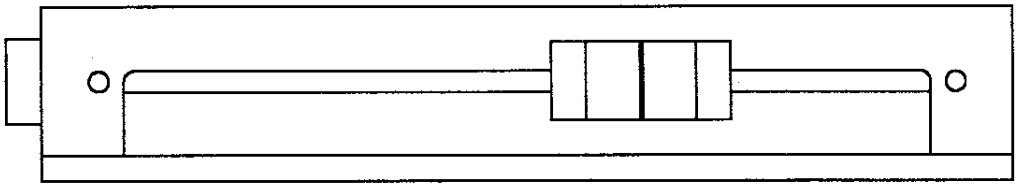
At present, we offer two faders for use with the System 990. Our standard fader, the AF102N, is used in our System 2000 fader modules and is recommended for all applications where it will fit. If space becomes a problem, then you can select the MF260 miniaturized fader.

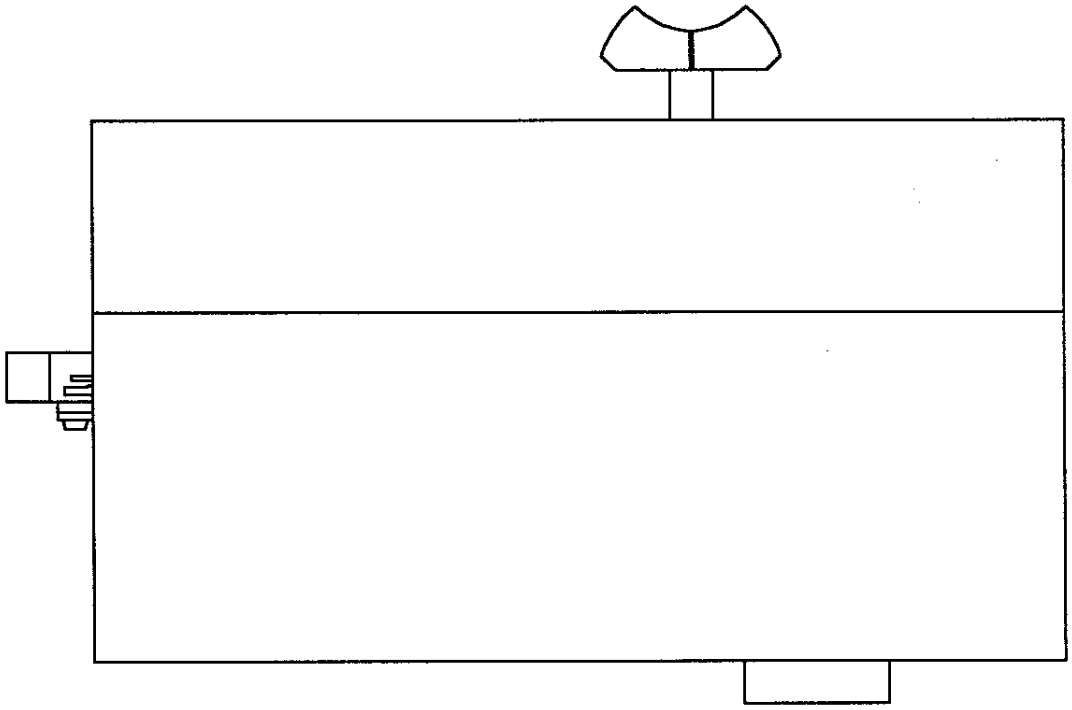
The following illustrations depict the dimensions of the faders and also include actual size illustrations.

AF102N FADER DRAWING



Full size illustration of the AF102N motorized fader:





The audio connector on the AF102N is illustrated below. The audio connector for the MF260 is located in a slightly different position, but it is wired the same.

Audio Connector

The TKD motorized faders which are normally supplied with the Uptown™ systems have a 4 pin connector for the audio wiring. In this manner, the fader can easily be used in a variety of systems and easily adapted to special requirements. The ultimate in performance would be to use a fully shielded audio cable, but in some cases, ribbon cable is fine.

In order to maximize fader cutoff, it is important to minimize the capacitance between the Top of fader wiring and the Wiper wiring. when using ribbon cable, take care to assure the Wiper is not run alongside the Top wire, because the cable

capacitance from Top to Wiper will reduce the fader cutoff. For example, if 2 feet of 28 AWG ribbon cable (12 pF per foot) had the Wiper running directly alongside of the Top wire, and the fader had an internal contact resistance of 200 ohms (typical for audio faders), the crosstalk at 10 KHz would be about -70 dB. So, if a 0 dBu signal was on the Top, the fader cutoff could never be better than -70 dBu.

The fader connector is designed to allow ribbon cable to be used successfully because the Bottom wire (typically audio ground) is placed between the Top and Wiper wires to greatly reduce the effects of capacitive coupling.

Hypothetically, we believe that the ultimate in audio wiring for the fader would have three individually shielded conductors, foamed dielectric, and an overall shield. The individual shields, connected to audio ground, would eliminate conductor to conductor capacitance, while the overall shield, connected to chassis ground, would keep stray fields off of the audio wiring.

Belden 8733 is a readily available audio cable with three individually shielded conductors, which solves the top-to-wiper capacitance problem and provides excellent fader cutoff. But fortunately, in practice, short lengths of audio wiring are not really very fussy and such high performance cables are not likely to be needed for runs of 6" or less..

The mating ELCO female connectors are often quite difficult to procure in the US, so we generally use the AMP MTA series connectors such as 643815-4. The ELCO connector is a bit smaller, but the AMP connector is generally satisfactory.

audio wiring

Digital signals coupling to the audio wiring via stray capacitance could possibly cause audio noise. Whining or very fast buzzing could indicate that the fader driver printed circuit board is the source of the radiated signal. A ticking sound might indicate stray capacitive coupling to the digital data bus.

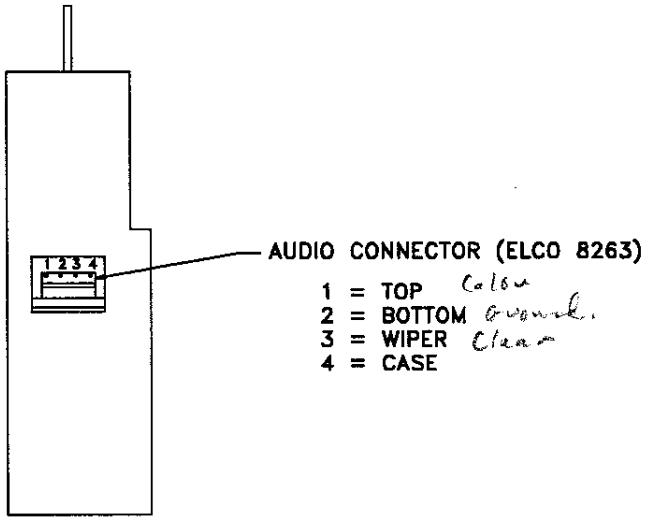
In some applications, the audio wiring does not require shielding. However, in high performance applications, the audio wiring to/from the fader should be shielded for the ultimate in low noise performance. The wiring shield should generally be connected to analog power ground. Copper braid, metallized heat-shrink tubing or aluminum foil should be satisfactory shielding materials.

If the audio wiring to the fader includes an unshielded in-line connector, such as a Molex connector with a plastic housing, the shielding should also cover the connector.

Each fader housing should be connected to chassis ground using pin 4 of the audio connector on the fader. This chassis ground wire should be as short and direct as possible. Lengths of 150 mm (6") or less are ideal.

All audio wiring should be kept as short and direct as possible. The audio wiring should be kept away from all of the fader controller power and data wiring. The

audio wiring should also be kept as far away from the fader controller circuit board as possible.

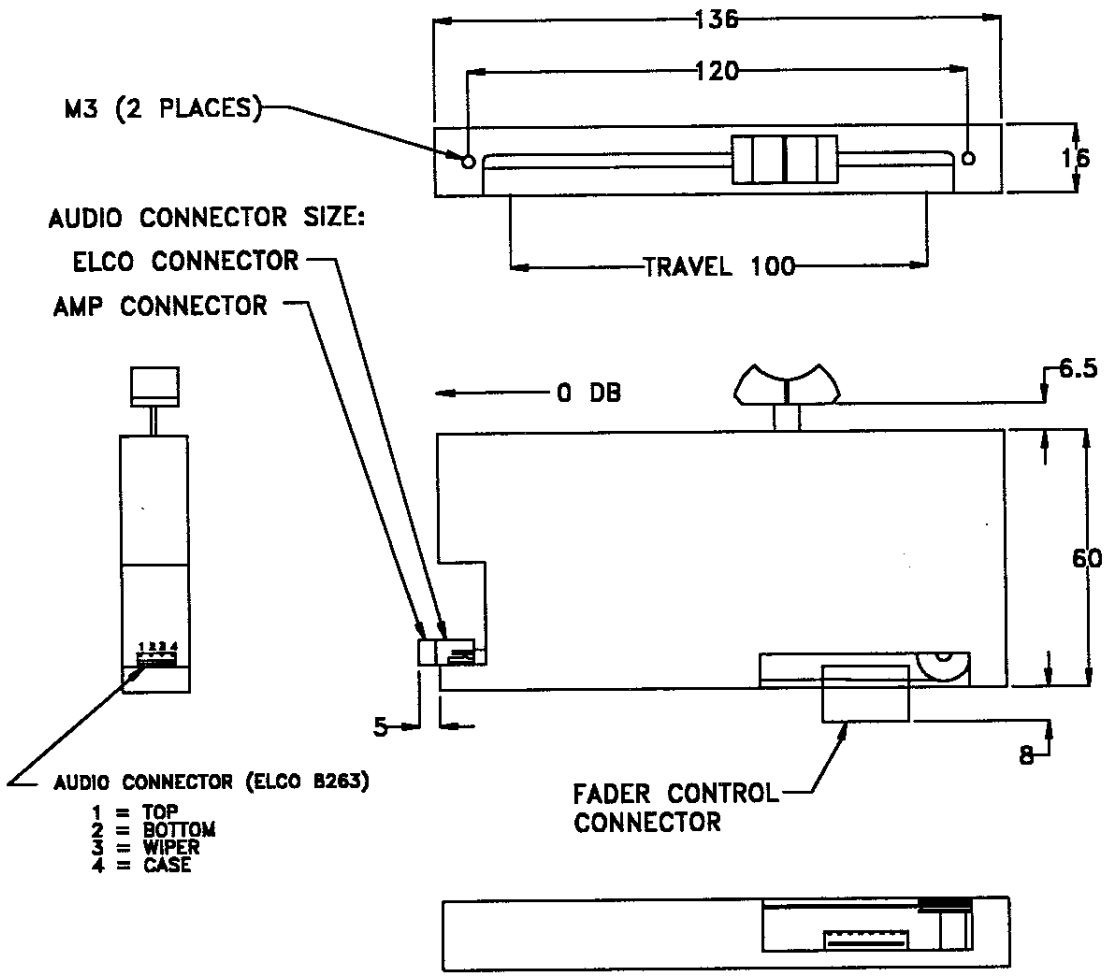


AUDIO CONNECTOR FOR AF-102-N MOTORISED FADER

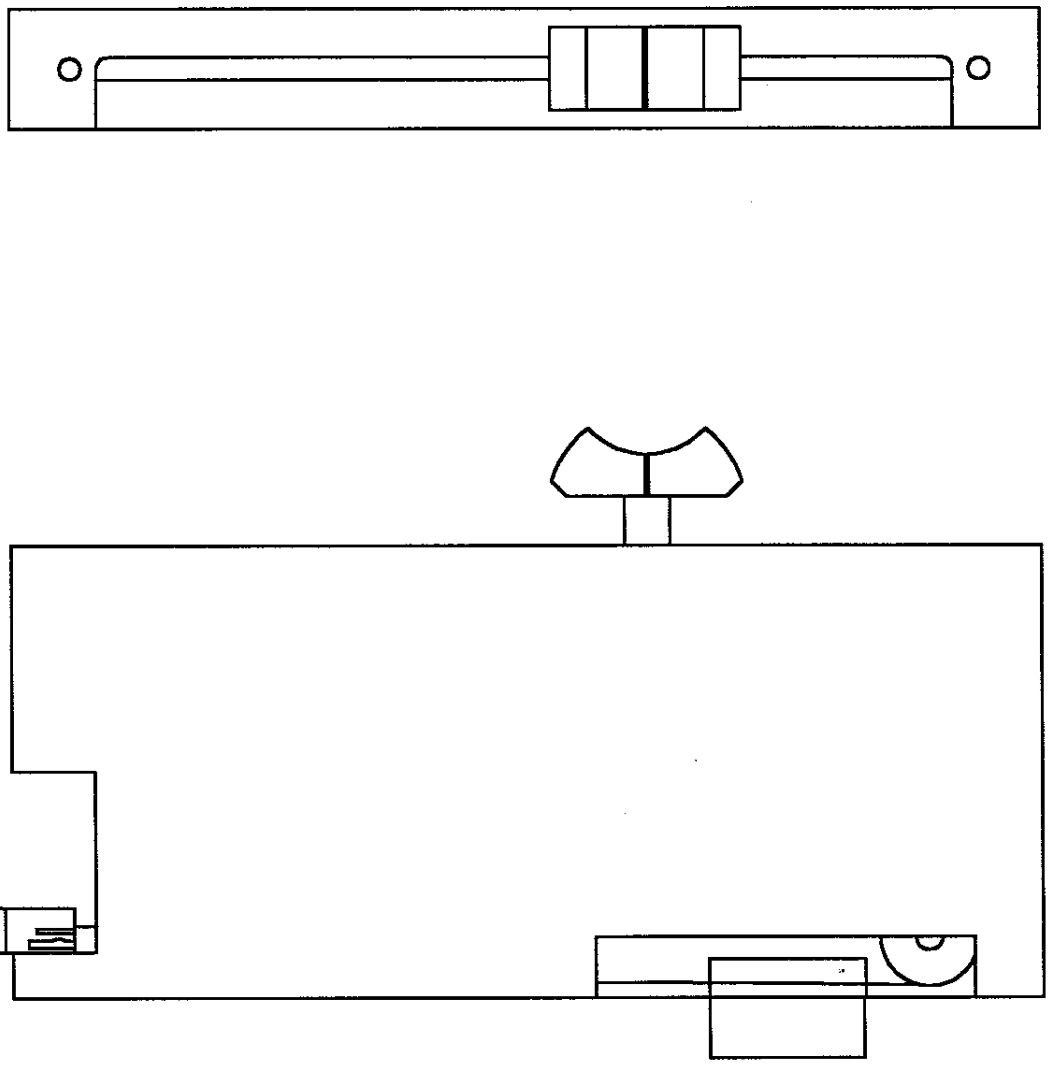
The following illustration shows the major dimensions of the MF260 miniaturized fader:

MF260 FADER DRAWING

(ALL DIMENSIONS IN MM)



Full size illustration of the miniaturized MF260 motorized fader:

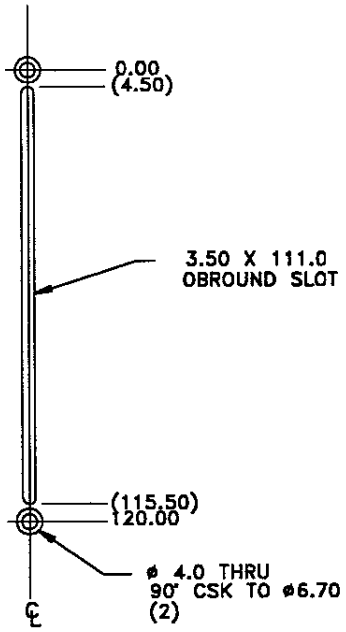


Fader Mounting Depending upon the fader mounting pattern in your console, you may be able to utilize your existing metalwork, you may have to make some modifications, or you may want to buy new custom made metalwork.

The AF102N and MF260 motorized faders require M3 metric screws for proper mounting. The screws must not be too long or they will interfere with the internal operation of the fader. The screws should be no longer than the panel thickness plus 4.0 mm, and should be not shorter than the panel thickness plus 2.0 mm.

DIN 7991 black, flat, socket head machine screws work well and have a nice appearance. For panels of 2.0 to 4.0 mm (.080 to .160") thickness, M3 x 6 flathead screws are appropriate. For panels of 4.0 to 6.0 mm (.160 to .240") thickness, M3 x 8 flatheads are appropriate.

The following illustration depicts the recommended fader mounting pattern (with dimensions in mm):

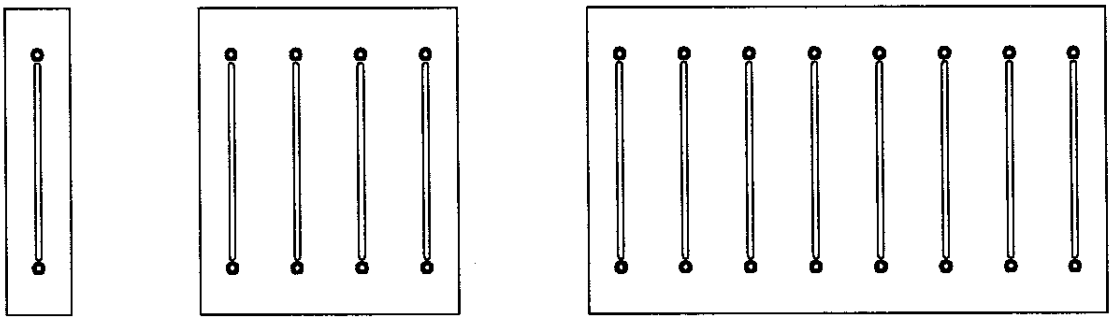


TYPICAL FADER MOUNTING

(ALL DIMENSIONS IN MM)

Some consoles (such as Trident TSM, Trident 80, DDA AMR) have individual fader panels and good access to the bottom of the fader bay. In most cases, these fader panels can be used with little or no modification.

Other consoles (such as Tascam) use quad fader panels, while some consoles (such as Peavey) use octal fader panels. These fader panels generally fit our faders with no modification. These various types of fader panels are illustrated below:



SINGLE FOUR FADERS EIGHT FADERS

If your console has sufficient fader bay depth, but has no access through the bottom of the fader bay, you may want to consider buying custom made octal

(eight) fader panels which will allow you to easily install an entire bank of faders as one large assembly.

Fader Calibration

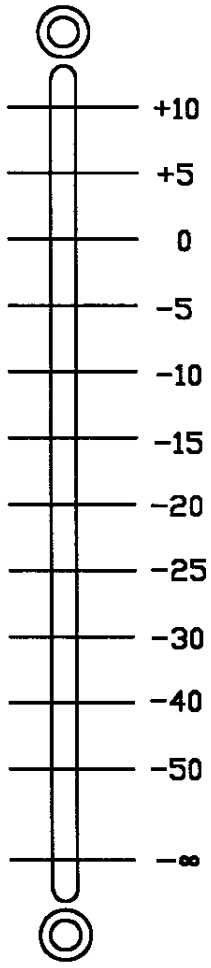
There are a wide variety of fader calibration schemes. Consequently, it is very unlikely that the fader calibration marks on your existing metalwork will agree precisely with our faders.

For both the AF102N and the MF260, the fader calibration is as follows. Please note that this fader calibration data is attenuation relative to the setting at the top of the fader and therefore starts off at zero dB.

Attenuation, dB	Travel, mm
0	0
5	8.8
10	17.6
15	26.4
20	35.2
25	44.0
30	52.8
35	61.6
40	70.4
50	79.2
60	88.0
OFF	100.0

Attenuation at the OFF position is dependent upon the fader wiring, but the fader is capable of cutoff greater than 120 dB.

Following is a full size illustration of the audio fader calibration:



- The fader audio track resistance is 10K ohms ± 10%. We also offer the MF260 fader with a 2.7K ohm VCA track.

Panel Thickness

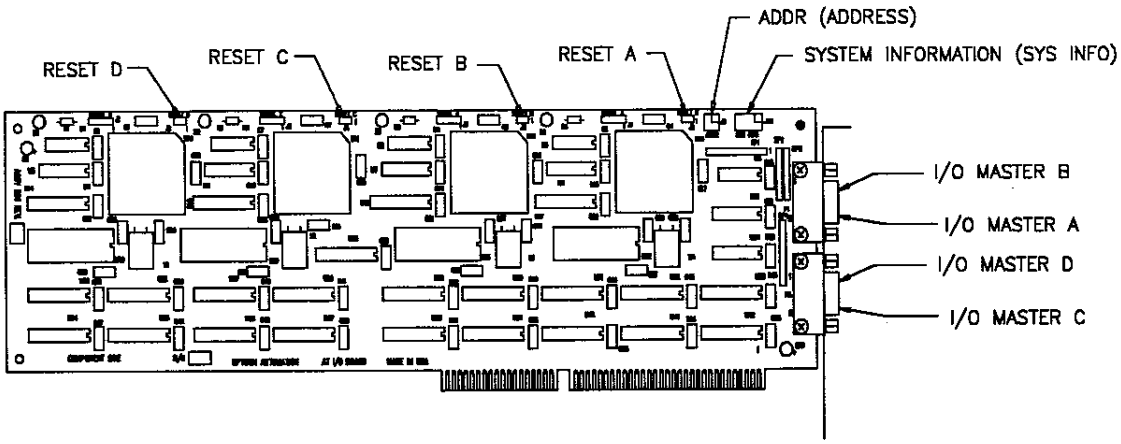
For the AF102N fader, the maximum panel thickness is about 5.5 mm (.220"). With the MF260 fader, the maximum panel thickness is about 5.0 mm (.20").

Thicker panels may cause erratic operation of the knob touch sensor.

Computer I/O Board

The I/O boards in the computer communicate with the fader controllers . The data cable requires 3 conductors for each bank of eight faders. These 3 conductors carry the ground reference, serial clock and serial data from the AT I/O board in the computer to the System 990 fader controller board.

Each AT I/O board in the computer can communicate with up to four System 990 fader controller boards.



The DE-9 connector near the top of the I/O board (farthest away from the PC motherboard connector), interfaces to two banks of faders. These two upper I/O ports are called A and B. Each of these two ports can be connected to one of the System 990 fader controller boards using a 3 pin AMP polarized connector. The pin out for the connectors is as follows:

DE-9 Pin	Function	AMP 3 Pin
5	Clock A	3
9	Data A	2
4	Ground A	1
6	Clock B	3
1	Data B	2
2	Ground B	1

The DE-9 connector near the bottom of the I/O board (closest to the PC motherboard connector) also interfaces to two banks of faders. These two lower I/O ports are called C and D. Each of these two ports can be connected to one of the System 990 fader controller boards using a 3 pin AMP polarized connector. The pin out for the connectors is as follows:

DE-9 Pin	Function	AMP 3 Pin
5	Clock C	3
9	Data C	2
4	Ground C	1
6	Clock D	3
1	Data D	2
2	Ground D	1

For consistency and compatibility with Uptown test and demo programs, we recommend that the AT I/O board having address setting 300 (the system's first I/O board) use port A to connect to the first bank of faders, that is faders 1 through 8 (where fader 1 is the leftmost fader in the console). Port B of the first I/O board should connect to the second bank of faders, Port C to the third bank of faders and Port D to the fourth bank of faders. Used in this manner, these ports are called A1, B1, C1 and D1.

The AT I/O board having address setting 310 (the system's second I/O board) should use port A to connect to the fifth bank of faders, that is faders 33 through 40. Port B of the first I/O board should connect to the sixth bank of faders, Port C to the seventh bank of faders and Port D to the eighth bank of faders. These ports are termed A2, B2, C2 and D2.

The System 990 is designed to support up to a maximum of 96 faders using three AT I/O boards and 12 banks of 8 faders.

Jumpers

Figure 3.12 illustrates the locations of jumpers and connectors on the I/O board:

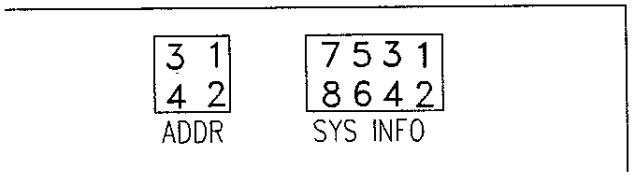


Figure 3.12 I/O Board Jumper Locations

The system information (SYS INFO) jumpers tell the computer how many System 990 fader controllers this specific card can talk to and also define whether additional I/O cards are to be interrogated.

The address (ADDR) jumpers define the location of the I/O board in the I/O space of the AT computer. The possible addresses are 300, 310, 320 and 330. The first I/O board must be address 300 and additional I/O boards must be assigned consecutively.

Unused portions of the I/O board may be turned off by installing shunts on the reset (RESET) jumper pins.

The system information (SYS INFO) jumpers will be set as follows:

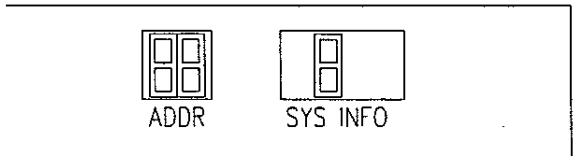
Number of banks	Installed jumpers
1	1 to 2
2	3 to 4
3	1 to 2 and 3 to 4
4 (default)	5 to 6

Additional I/O Card	Installed jumpers
no	none
yes	7 to 8

The address (ADDR) jumpers will be set as follows:

Board	Address	Installed jumpers
First	300	1 to 2 and 3 to 4
Second	310	1 to 2
Third	320	3 to 4
Fourth	330	none

As an example of the use of the jumpers, the following figure illustrates the settings which would be used for a system having four System 990 controller boards (that is, four banks of faders, a maximum of 32 fader channels):



Data bus wiring

The Uptown Automation system uses unique distributed data processing technology. The IBM AT compatible computer is the central processor. Each plug-in I/O board in the AT has up to four microprocessors and each automated fader controller board has its own microprocessor. A 64 channel automation system will have the combined power of the AT computer plus 16 microprocessors.

Each of these microprocessors must establish communication with the other processors via the digital data bus. The signals on the data bus are essentially digital logic levels of 0 or 5 volts.

In order to simplify the system wiring, each digital data bus is shared by up to 8 automated faders (one fader controller module). The digital data bus wiring for a

32 channel system is divided into 4 data distribution buses, each serving one fader controller module. The data bus is applied to the three pin connector on the fader controller board.

There are two primary concerns when installing the digital data buses:

1. The digital data bus should be kept as far as possible from all audio wiring. This is to avoid possible capacitive coupling between the data bus and the audio wiring which could cause a ticking sound.

In most consoles, keeping the digital data bus at least 2 or 3 inches away from any unshielded audio wiring will prevent any audible or measurable noise.

For the ultimate in noise prevention, the audio wiring to/from the fader should be completely shielded (including fully shielded connectors). Since the data bus is the source of possible high impedance near field radiation, shielding of the associated electric field may be easily performed with thin shielding such as copper foil or even with ordinary aluminum foil. The audio shield should be electrically connected to console chassis ground. Grounding the shields at both ends is a possible source of ground loops and increased noise, but sometimes it works best. Other times, the shield must be connected to chassis ground only at one end.

2. The digital data bus must have a very low capacitance to ground. The longer the data bus, the fussier it will be about the stray capacitance to ground in your particular installation.

For this reason, we provide special low capacitance #22 AWG ribbon cable with .100 wire-to-wire spacing. The ribbon cable should be kept away from all metal, including the console. A spacing of 1 to 3 mm (.04 to .12 inches) from the ribbon cable to metal through air is recommended. Where the ribbon cannot be suspended in air to keep it away from metal, a spacing of 2.5 to 5 mm (.10 to .20 inches) from the ribbon cable to metal through plastic or wood is also satisfactory. Occasional violations of these guidelines, for an inch here or there, will not degrade the system performance. The cable capacitance from conductor to conductor or from conductor to chassis cannot exceed 150 pF for the entire cable.

Foam tape or foam rubber are excellent spacers to minimize the stray capacitance. (Air is the best available dielectric spacer material. Therefore, foamed plastic materials which contain a lot of air are very good spacers.) Double sided adhesive foam tape, 3 mm (1/8 inch) thick is very convenient as a combination spacer and adhesive. In some cases, the use of molded plastic dielectric spacer material may be more convenient. Such material is manufactured by the Zippertubing Co. (type DS spacer) and 3M (3352-0200).

If shielded cable is required in a particular installation, high performance cable with foamed dielectric will be most suitable. For example, Belden 8132 has typically about 11 pF per foot conductor to conductor and about 10 pF per foot capacitance from one conductor to shield. Shielded data cables up to 10 feet long can be built with such special cable.

Data Cable Construction

The System 990 is normally delivered with a data cable. The information in this section is provided for reference.

The critical parameters here are the total capacitance from wire-to-wire and wire-to-chassis. Each of these capacitance must be kept to a maximum of about 150 pF. For that reason, we utilize the .10" spacing ribbon cable and keep it .1" away from chassis using foam core tape or plastic mounting clips. The capacitance from conductor to conductor in the .10" spacing ribbon is about 7 to 10 pF per foot, depending upon the dielectric and the wire gauge.

For 150 pF max., that allows a #22 AWG data ribbon cable length of 15 to 18 feet maximum. The use of #28 AWG, .10" spacing ribbon, at 7 pF per foot would theoretically allow up to 20 feet overall length, but we have not tested such a cable.

Virtually any type of cable can be used, but the limit of 150 pF must be not be exceeded or erratic performance may result. We use wide sections of ribbon cable because of the small size and tidy appearance, but individual ribbons cables or individual shielded cables should provide equivalent performance.

Data cable direction

The system is normally supplied with pre-wired data bus cables. The data cables may be "right-handed" or "left-handed". A "right-handed" data cable is one that is designed to enter/exit the right side of the console (as you are seated at the console).

concepts

It is important that all of the fader controller module data bus wiring is installed so that the computer views the modules as being installed in sequential order from left to right across the console. If this is not true, many difficulties could occur. The root of the problem is that the numbers by which the MIX program refers to fader modules will not correspond to the fader's actual position in the console, and the results will be very confusing to the user.

testing

The easiest way to verify that the faders are numbered properly is to touch the faders in READY mode and observe the "Faders in Write" box on the screen.

You can also run the program SYSTEST to show you the number of I/O boards, fader banks, and faders attached to the system.

fixing problems

To determine the correct bank numbering, you have to understand how the bank numbering relates to the I/O boards. Each I/O board can have up to 4 banks of faders connected, using 2 DE-9 connectors. We label these 4 banks A-D. Each bank uses 3 wires, so each of the 2 DE-9 connectors can have 2 banks, (6 wires) connected.

There can be up to 3 I/O boards installed, so up to 12 banks of faders can be supported. The I/O board jumpers (described above) define which board is which.

The first task is to determine how many fader controllers your system has, and what order they should be in. If you had 36 faders, for example, you would need 5 fader controllers. This would require 2 I/O boards, with 4 fader controllers on the first board (A, B, C, and D) and 1 fader controller (A) on the second board. After you have determined the correct order for the system, the next step is to build (or modify) the data cable. You can refer to the following chart for the wiring required for the data cable. The pins on the red 3-wire AMP connector that attaches to the fader as well as the pins on the DE-9 that plugs into the I/O board are shown to allow testing the data cable prior to installing it. Note that fader controllers A and B connect to the DE-9 installed at the top of the I/O board, away from the computer motherboard.

I/O Board Data Cable Wiring

Fader Bank	Amp Pins	DE-9 Pins
A	1	4
	2	9
	3	5
B	1	2
	2	1
	3	6
C	1	4
	2	9
	3	5
D	1	2
	2	1
	3	6

Power Supply

The System 990 moving fader automation system uses 1 rack-mounted power supply to provide the 24 VDC to the fader motors for up to 64 channels.

The Uptown™ power supply provides +5 volts at up to 3 amps and +24 volts at up to 12 amps. A small, very quiet (27 dBa) fan assures adequate cooling for the power supply. An air space of at least 1/2 inch (12 mm) must be provided above the power supply to assure proper air circulation.

5 volt power source:

If the console already contains 5 volt logic which the System 990 fader controller will be connected to, then the 5 volt portion of the fader controller should be powered from the console power supply.

If the console does not have a suitable 5 volt supply, or if the interface circuitry uses opto isolators, then the fader controller should receive the 5 volt power from the Uptown power supply.

The power supply provided with the System 990 system is identical to the power supply which we deliver for use with the System 2000 automation.

CAUTION Voltage selector

The power supply AC input connector assembly contains a voltage selector which allows international operation of the Uptown Automation system. The voltage selector must be properly set at the time of installation. System damage resulting from improperly setting the power supply voltage selector is NOT covered by any warranty, express or implied. The voltage selector may be set for nominal line voltages of 100, 120, 220 or 240 VAC, 50 to 60 Hz only.

Verify that the proper voltage selection number is clearly visible through the fuse holder window before applying AC power.

CAUTION AC line fuse

An AC mains fuse is included in the power input connector. For 100 or 120 VAC operation, the fuse must be a 5 x 20 mm, 6 A, slow-blow. For 220 or 240 vac operation, the fuse must be a 5 x 20 mm, 3 A, slow-blow. No other type of fuse should be used.

CAUTION Hazardous voltages

The power supply enclosure should not be opened. Hazardous voltages are present inside. All service should be referred to qualified personnel.

CAUTION Avoid moisture

To avoid hazardous conditions, do not subject the power supply to rain or extreme moisture, i.e. do not give the power supply coffee.

CAUTION Use grounded outlet

For safety, the power supply must be connected to a properly grounded three-wire AC outlet using a suitable three-wire IEC/CEE line cord.

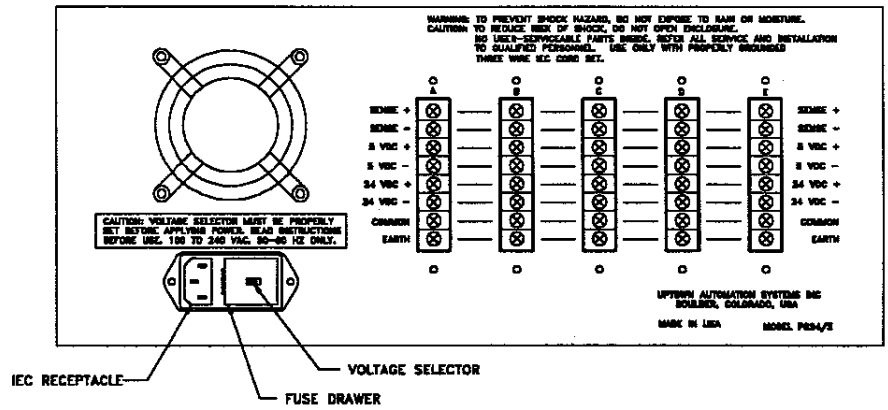


Figure 3.3 Rear View of Power Supply

AC Power

The AC power inlet receptacle contains an IEC 320/VI, CEE 22/VI three wire AC power line connector, a four-way voltage selector and a power line fuse.

power cord

The AC line cord must be a properly grounded, three wire IEC/CEE-type line cord.

voltage selector

The input voltage selector must be properly set for the AC power line conditions. Failure to properly set the voltage selector may result in severe damage to the power supply and/or automation system. Such damage is NOT covered by any warranty, express or implied.

To determine the proper voltage selector setting, the AC power line voltage should be measured at various times of the day in order to find what typical line voltage excursions will be encountered. We recommend the use of an accurate (better than +/- 1%), averaging type of AC voltmeter (i.e. NOT a so-called true-RMS meter) for the line voltage measurements. Based upon such line voltage measurements, as performed by qualified personnel, the voltage selector settings are to be as follows:

AC line voltage	Voltage Selector
87 to 110 vac	100
104 to 132 vac	120
191 to 240 vac	220
208 to 264 vac	240

Voltage excursions beyond the AC line voltages listed may cause damage and/or malfunctions to the power supply and/or automation system.

AC fuses

The AC mains fuse contained in the fuse drawer of the AC power inlet receptacle must be a 5 x 20 mm, slow-blow fuse:

AC line voltage	AC power fuse rating
87 to 132 vac	6 Amp, slow-blow
191 to 264 vac	3 Amp, slow-blow

Use of any other fuse type or rating may result in safety hazards, may cause improper operation and will void all automation system warranties.

dc power requirements

Each System 990 fader controller board typically requires approximately 50 milliamps from the +5 and each fader requires approximately 200 milliamps from the +24 volt supply. The 5 volt supply must be regulated at 5 v ±5%. Our standard power supply is designed for use with up to 64 System 990 automated faders.

For a system with 64 fader modules, the typical total current will be .4 amps from +5 and, if all faders are moving simultaneously, 12 amps from the +24 volt supply. It is of course quite rare in a real mix for all of the faders to simultaneously move at full speed and require full power. In general, the current from the +24 volt supply is very low, but the power supply and the wiring must be capable of handling large currents when required.

Power supply front panel

The AC power on/off switch is located on the front panel. The OFF position is labeled with the international symbol O (zero). The ON position is labeled with the international symbol 1. Figure 3.4 depicts the front panel of the power supply.

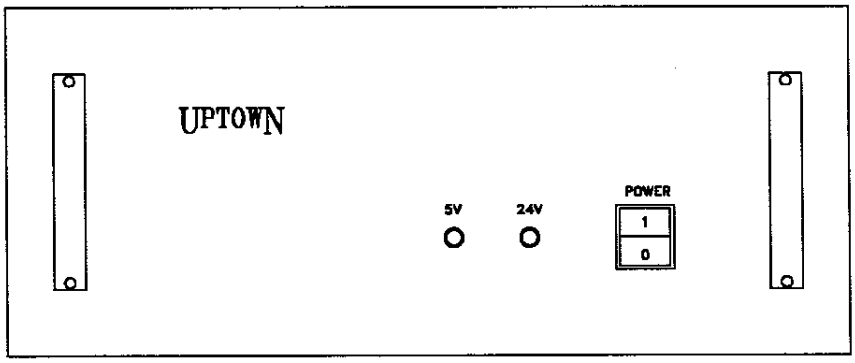


Figure 3.4 Power Supply Front Panel

voltage indicators and fan

Also located on the front panel are two green LED output voltage indicators. The 5 V LED is powered by the 5 volt DC power supply. If the 5 volt power supply is operating normally, the 5 V LED will be illuminated. If the 5 volt power supply is shut down due to an external short circuit, blown fuse or power supply failure, the 5 V LED will be off.

Similarly, the 24 V LED is powered by the 24 volt DC power supply. If the 24 volt power supply is operating normally, the 24 V LED will be illuminated. If the 24 volt power supply is shut down due to an external short circuit, blown AC line

fuse or power supply failure, the 24 V LED will be off. The power supply cooling fan is powered from the 24 volt power supply.

Construction of the Power Cable

The System 990 is shipped with DC power cables. This information is provided for reference.

There is nothing known to be critical about the power wiring. We normally use shielded wire just as a precaution, but the fader controller should not really make much noise on the power wiring.

The System 990 fader controller board typically needs very low current from the 5 volt logic supply, about 50 milliamps typical, 100 milliamps max. Assure that the logic supply voltage to the fader controller remains between 4.75 and 5.25 volts for proper operation.

The motor power supply wiring will carry 200 milliamps max. per fader motor, or 1.6 A max. per bank of eight faders. The wiring should assure that at full power, the voltage drop due to the power cable is not greater than about 1 or 2 volts. Excessive voltage drop will make the faders sluggish. The motor power supply which we provide is set for 25 volts and is capable of providing up to 12 Amps, thus being capable of supplying power to as many as 64 channels of 990.

The power connector on each fader controller board requires 5 volts $\pm 5\%$ for the logic supply and requires 24 volts $\pm 10\%$ for the motor power. CAUTION: Voltages above 27 volts on the motor power connector may severely damage the fader controller circuitry.

The 4 pin AMP (102241-2) power connector to the fader controller is wired as follows:

AMP 4 Pin	Function	Uptown Color
1	Logic Ground	Black
2	Logic 5 volts	Red
3	Motor Ground	Green
4	Motor 24 volts	White

remote sense

The 5 volt sense lines are not used in the System 990.

power supply size

The Uptown™ model 24/5 power supply is designed for use with up to 64 System 990 automated faders. The power supply is intended to be mounted in a standard 19 inch rack. The supply is 7 inches tall, extends 14 inches behind the front panel and weighs approximately 35 pounds. The handles on the front extend 1 3/4 inches out from the front panel.

Power Wiring

In order to simplify wiring and avoid massive power cables, the fader modules are powered in banks of 8 modules. The power distribution and the digital data bus each use one cable for each bank of 8 fader modules.

Each bank of 8 fader modules must have a power distribution cable connected to one of the barrier strips on the back of the power supply. All of the barrier strips are functionally identical. For ease of reference, the letters A through E are printed above the barrier strips.

local wiring codes

The power supply wiring should be done in accordance with all appropriate statutes and codes. Consult a qualified electrician to determine the specific requirements in your area. Uptown Automation Systems Inc. makes no claims or recommendations concerning power wiring and all responsibility for compliance with statutes and codes rests with the purchaser and/or installer.

Our standard power distribution cable, Carol Cable C0762, is a PVC jacketed, foil shielded, 4 conductor #22 AWG cable. This cable is rated NEC Article 800 type CM, NEC article 725 type CL2, UL style 2464, and passes the UL 70,000 BTU vertical flame test. For a typical installation in the USA, this type of cable is, according to the manufacturer, generally suitable for use in a fully enclosed raceway or conduit, non-concealed runs of 10 ft or less, concealed runs in walls, or non-plenum ceiling runs.

The 22 AWG power distribution cable is designed for runs up to 12 meters (40 feet) maximum. For longer runs, a larger wire size is required. Contact Uptown Automation for specifics about wire size for runs longer than 12 meters (40 feet).

grounding

The power distribution cable is shielded to help prevent noise from being coupled into the console or other nearby equipment. One end of the shield should be connected to system common at the power supply, the other end of the shield should be trimmed neatly and not connected to anything. This type of single-point grounding of the shield is recommended to avoid ground loops and possible resultant hum problems.

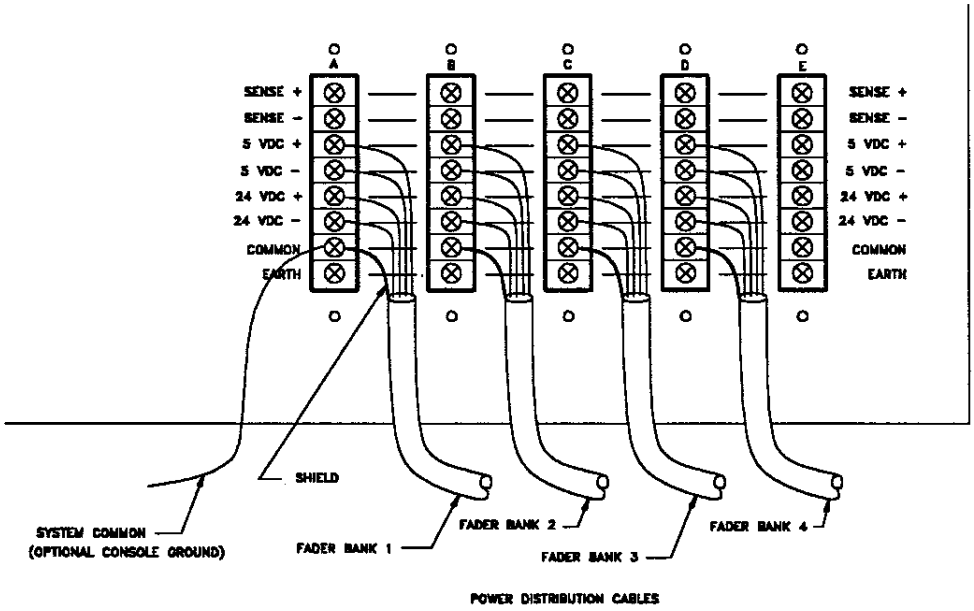


Figure 3.5 Power Supply Wiring

Figure 3.5 depicts the wiring at the back of the power supply for a typical 32 channel System 990 installation. The following color codes are listed in order of appearance on the power supply barrier strip: Please note that the positive terminal of the 5 volt power supply is labeled 5 VDC +, while the 5 volt supply negative terminal, also called return or ground, is labelled as 5 VDC -. The total voltage measured between these two terminals is 4.85 to 5.15 volts.

Similarly, please note that the positive terminal of the 24 volt power supply is labelled 24 VDC +, while the 24 volt supply negative terminal, also called return or ground, is labelled as 24 VDC -. The total voltage measured between these two terminals is 23.0 to 25.0 volts .

Supply Terminal	Signal Name	Color Code
SENSE +	unused	unused
SENSE -	unused	unused
5 VDC +	+5	Red
5 VDC -	Digital Gnd	Black
24 VDC +	+24	White
24 VDC -	Power Gnd	Green
COMMON	Common	unspecified

The system COMMON terminals are provided to connect the automation power supply to the console ground. A large gauge (#12 AWG or larger) stranded wire should be connected from the power supply COMMON terminal to the center point of the console star ground. Since all of the COMMON terminals are connected together, you may use any of the terminals for this connection.

If a console ground is not available, connect one of the COMMON terminals to one of the EARTH terminals. The EARTH terminals on the barrier strip are all connected directly to the safety earth (ground) pin of the AC power line connector.

If the COMMON is not connected as described to the console ground, it is possible that problems may be encountered with the touch sensors on the faders.

power supply size

The Uptown model 24/5 power supply is designed for use with up to 64 System 990 automated faders. The power supply is intended to be mounted in a standard 19 inch rack. The supply is 7 inches tall, extends 14 inches behind the front panel and weighs approximately 35 pounds. The handles on the front extend 1 3/4 inches out from the front panel.

Power wiring

CAUTION
Improper wiring

Improper wiring of the system, a reversed connector, or a connector on the wrong pins may severely damage the fader control electronics and/or computer I/O board. Such damage is not covered by any warranty express or implied. All power distribution cables, bank bus cables and bank links should be very carefully double checked before applying power to the system. If you have any questions, please check with your dealer or call Uptown Automation for assistance.

power distribution color coding

For ease of maintenance and to allow for visual inspection against wiring errors, we strongly recommend that the power supply distribution wiring be consistently color coded as follows:

Supply Terminal	Connector pin	Signal name	Color code
5 VDC -	1	Digital Gnd	Black
5 VDC +	2	+5	Red
24 VDC -	3	Power Gnd	Green
24 VDC +	4	+24	White

Audio noise prevention

There are two possible types of audio noise which could be produced by improper installation of the Uptown Automation system. First, ground loops in the power supply and/or computer wiring could cause audio hum. Second, improper routing of the audio wiring, power supply wiring or digital data bus could result in audio noise which might cause a ticking or whining sound.

routing of wiring

The power and data bus wiring for the fader modules should be kept as far as possible from all audio wiring.

In a typical console installation, the audio wiring to/from the fader will be located at the top of the fader module. Therefore, to keep the power and data wiring as far from the audio as possible, we recommend that the power and data wiring be dressed neatly and fastened to the console chassis near the bottom of the fader, as far as possible from the audio wiring.

grounding

Low frequency hum is most likely caused by ground loops involving the AC power grounding.

In order to avoid ground loops in the power supply wiring, the Uptown fader modules do not connect their power ground to the console chassis. The ground reference for the power supply and the power wiring shield is created at the power supply only. The shield on the power supply wiring is only connected to ground at the power supply and, to prevent ground loops, must not be connected anywhere else. That is, one end of the power supply wiring shield is grounded at the power supply and the other end is left floating.

If you encounter noise after the system is installed, we recommend that you disconnect all of the faders and fader controllers except for one fader controller and one fader, including the data cable and power cable. In this manner you can then experiment with connecting and disconnecting the fader ground wire to see if the noise situation improves. In some cases this has solved ground loop problems.

Software Versions

The Uptown™ System 990 utilizes three types of software, all of which must be of compatible versions, in order for the system to operate properly.

- The MIX software
- the I/O board EPROMs
- the fader controller EPROM

The I/O board for a System 990 is the same circuit board as used with our System 2000 automation systems. The only difference is the EPROM version. (The last I/O board in a DCM is specially modified to interface with the DCM controller and is not compatible with other I/O boards.)

As we update the firmware (PROMS) or software (MIX program), we will keep you appraised of the changes and version compatibility.

Chapter 4

Installation

This section describes the setup of the System 990 computer and final checkout of the system.

CAUTION Static Electricity

CAUTION: static electricity can damage electronic circuitry.

During installation and maintenance of the Uptown automation systems, serious damage may be caused by static electricity. A static discharge which cannot even be felt by a person can cause permanent damage to the system. Some types of static damage will not result in immediate failure, but will gradually degrade performance, perhaps resulting in intermittent problems.

During system installation and/or maintenance, extreme caution should be exercised to avoid static electricity. Use an anti-static spray such as Staticide (available from computer supply or office supply stores) on floors, chairs and clothes. If the humidity is low, the use of a humidifier is recommended. For the best protection against static damage, we recommend that you wear a grounded wrist strap while handling components of the system.

Installation Overview

In this section, the complete installation of a typical Uptown Automation system will be described. Our goal here is to present the steps which will lead to a successful, fully operational system installation. These installation steps assume that you have become familiar with, and will refer to as needed, the technical details of the system which have been presented in Chapter 3, the Hardware Reference Guide.

Installation of the Uptown automation system consists of:

- Setting up the computer and software
- Installing the power supply
- Installing the faders and controllers in the console
- Wiring the system together

The following installation procedure is designed to minimize the down-time of your studio. To this goal, the computer and power supplies are installed and preliminarily tested before the automated fader modules are installed.

Before beginning the installation, you should have resolved the issues raised in Chapter 2, Pre-Installation Planning.

Setting up the Computer

First, we'll accomplish the computer setup. The computer may be set up outside of the studio environment, if desired, to keep studio downtime to a minimum.

General Specifications

The UPTOWN system requires an IBM-PC AT compatible computer. It must be an 80286, 80386, or 80486 with EGA or VGA color or monochrome display, at least 1 meg of expanded memory (2 megs total system RAM), 2 serial and 1 parallel ports, a hard disk (28 ms access time max.), and a printer if you want to print track sheets. A pointing device (mouse or trackball) is highly recommended, although the system may be run without one.

Initial setup

The first phase of computer setup is to follow all of the computer manufacturer's instructions for unpacking and setup. On an 80386 or 80486 computer, this often includes the installation of an expanded memory manager, such as the DOS 5.00 utility EMM386, QEMM386 by Quarterdeck or 386-to-the-Max by Qualitas. When the computer is happily running, you should install the trackball (or mouse) according to manufacturer's instructions.

Other items included in the initial setup are:

environment variables

There are several DOS environment variables that can affect the operation of the system.

To set an environment variable, type

SET variable=number<ENTER>

Where "variable" refers to the environment variable you wish to set, and "number" refers to the value you wish to assign to the variable. To see what variables have been set, and are currently in effect, type

SET<ENTER>

To remove an environment variable that has been set, type

SET variable=<ENTER>

Environment variables are all cleared from memory when the computer is turned off, so variables that are useful are generally set automatically by the AUTOEXEC.BAT file. To do this, just include the individual SET commands in the AUTOEXEC.BAT file.

990

The MIX software can be used with either the Uptown™ System 2000, such as in the DCM or AMR, or with the System 990. Setting the 990 environment variable allows the software to establish proper communications with the fader controller modules and provides the 990 switch automation. For use with the 990 system, type

SET 990=1.

CONTROL PANELS

In order for the control panel switches to be interrogated and processed, the MIX software must be informed that the system includes a control panel. For use with the System 990 system, type

SET CONTROL_PANELS=1.

SYNC_PORT

Normally, the MIX program tests the serial ports COM1 and COM2 to try to find an attached synchronizer. The SYNC_PORT environment variable can be used to override this behavior. If SYNC_PORT is set to 0, the synchronizer search will not be done at all, and even if a synchronizer is present it will not be found by the system. If SYNC_PORT is set to 1 or 2, the program will try to communicate with the synchronizer only on port COM1 or COM2, respectively.

If no synchronizer is to be used with the MIX program, it will start up more quickly if you type

SET SYNC_PORT=0.

MIDI_NUM

Normally, the MIX program searches all possible IRQ lines for the MIDI/SMPTE board and automatically detects it. The MIDI_NUM environment variable is used to override the automatic search of IRQ lines for the MIDI board. If MIDI_NUM is set to 0, the automatic search for the MIDI board will not be done, and even if it is installed in the computer, it will not be found. MIDI_NUM may be set to 2, 3, 4, 5, or 7 to force the program to look only at IRQ2, IRQ3, IRQ4, IRQ5, or IRQ7, respectively.

This environment variable would only be necessary if the MIDI board were installed, but due to hardware incompatibilities the MIDI board was not found by the automatic search process.

MONOCHROME The MONOCHROME environment variable may be used to alter the color scheme used by the MIX program to make the display more readable when using a monochrome display, such as the display used with laptop VGA computers. The two possible settings are:

SET MONOCHROME=1<ENTER>

or

SET MONOCHROME=2<ENTER>

Experiment to see which of these values produces the best results.

DOS 5.00 We recommend using Microsoft DOS 5.00. The normal setup includes installing EMM386.EXE and HIMEM.SYS. DOS is loaded high, and UMBs (Upper Memory Blocks) are enabled. When the MIX software is loaded, sample CONFIG.SYS and AUTOEXEC.BAT files can be copied to the \MIX directory. These files can be used as models for your PC setup. or copied and modified as needed.

expanded memory Expanded memory is required to do mixes that have more than a few faders moving for longer than a few minutes. It is recommended that at least 1 megabyte of expanded memory is available for the UPTOWN system.

If an 80386 or 80486 computer is used, a memory manager such as Microsoft's EMM386.EXE or QEMM386 by Quarterdeck Systems is recommended to provide the expanded memory support without using a lot of conventional system memory.

mouse driver software If you are using a mouse or trackball with the system, you must install the mouse driver software. If you have installed HIMEM.SYS or QEMM386, you can load the mouse driver software in high RAM (UMBs) to make the greatest amount of conventional system RAM available. Refer to the DOS 5.00 or QEMM manual for this procedure.

CONFIG. SYS file You must have a FILES= statement in your CONFIG.SYS file. FILES=20 is the minimum value.

A typical CONFIG.SYS file for DOS 5.00 might look like this:

```
DEVICE=C:\DOS\HIMEM.SYS RAM
DEVICE=C:\DOS\EMM386.EXE m9 2796
DOS=HIGH,UMB
FILES=20
BUFFERS=15
```

The parameter "m9" tells EMM386 to put the page frame at E000 instead of D000. This makes about 64k more high memory available. The MIX program will

use any available DOS UMB high memory. The parameter "2796" is the amount of memory to be converted from extended to expanded memory. This number will vary from system to system. To determine the exact number to use for this parameter, put in a large value (such as 8000) and then re-boot the computer. When EMM386 loads, you will get an error message telling you that your value is too large, and then in the list of how EMM386 is set up you will see the amount it has used. Enter this amount in the CONFIG.SYS file in place of 2796.

AUTOEXEC.-BAT file

Normally an AUTOEXEC.BAT file is created. There are no special requirements for the Uptown system, but many installations set up AUTOEXEC.BAT to automatically run the MIX software when the system boots ups after power has been turned on.

An example of an AUTOEXEC.BAT file with a mouse driver loaded high, the synchronizer search turned off, MIDI board search set to IRQ5, and a monochrome screen display might look like this:

```
PATH=C:\DOS;C:\UTILITY
PROMPT=$P$G
C:\DOS\LOADHIGH C:\LOGITECH\MOUSE.COM
SET 990=1
SET CONTROL_PANELS=1
SET SYNC_PORT=0
SET MIDI_NUM=5
SET MONOCHROME=2
CD \MIX
MIX
```

Note that the environment variables SYNC_PORT, MIDI_NUM, and MONOCHROME are not used in most installations, but are only shown here as an example. However, the environment variables 990 and CONTROL_PANELS wll be required for most installations.

AT I/O boards

After the computer has been setup and is running happily, the Uptown I/O boards may be installed. There is one Uptown™ I/O board per each 4 fader controller boards (usually 32 faders) that are installed in the system. Each I/O board requires a 16-bit full-length slot in the PC. 16-bit slots have a double edge-card connector, while 8-bit slots have a smaller, single edge-card connector. A system will require between one and three I/O boards, depending on the number of faders installed.

Do not install the I/O boards in 32 bit slots. These slots often work only with memory cards, and could cause the computer to fail to boot up.

setting the jumpers

Each AT I/O board has several jumpers. The address and system information jumpers must be properly set on each I/O board for the computer to establish proper communications. Each I/O board has 2 DE-9 data bus connectors, which each support 2 banks of up to 8 fader modules each, so each I/O board can communicate with up to 32 fader modules.

It is a good idea to check the jumpers on the AT I/O boards at this time to see that they are set correctly for your system configuration.

PC MIDI/SMPTE board

Each UPTOWN system requires one MIDI/SMPTE co-processor board. This section describes the setup and installation of the board.

find the interrupt number

Before installing the MIDI/SMPTE board, you must determine the interrupt number at which to install it. This is done by first running the program MQDIAG, found on the disk that comes with the MIDI/SMPTE board, before the MIDI board is installed in the system. MQDIAG will show you on the bottom of the screen a set of interrupt numbers, and IRQ status. Choose a number that is marked "UNUSED". The numbers available are 2, 5, 7, and 9. **In most AT-class machines, interrupt 5 is available and recommended.**

set the midi board switch or jumper

When you have found an unused interrupt number, set the jumper or switch on the MIDI/SMPTE board to match that number. See the installation manual for the MIDI/SMPTE board for information on how to set this jumper or switch. The MIX program will search for the MIDI board and automatically assign the correct interrupt number for it.

The normal dip switch settings for the MIDI/SMPTE board have switches 3 and 7 ON, all other switches OFF. This sets the address to 330 and the IRQ line to IRQ5. This setup generally works on AT type computers.

install the midi board

The MIDI/SMPTE board can now be plugged into any 8- or 16-bit slot in the PC. Since it is a short board, you can plug it into any slot on the motherboard. Do not install this board into a 32-bit slot.

connect the board

There are several connectors on the back of the MIDI/SMPTE board. These protrude out the back of the computer.

Plug the 9-pin to MIDI cable adapter supplied with the board into the 9-pin connector on the MIDI/SMPTE board. Then you can connect either MIDI out plug to any devices you wish to control by MIDI.

Connect the source of time code (typically the output of track 24 on the tape machine, or perhaps the output of a synchronizer) to the phono jack nearest to the 9-pin connector.

If you are using a synchronizer, the recommended time code wiring is to connect the output of track 24 of the tape machine to BOTH the input of the

MIDI/SMPTE board (RCA phono jack nearest the 9-PIN connector) AND the master time code input of the synchronizer.

If you want to be able to stripe tape from the automation system, plug a cable into the middle RCA phono jack on the board and connect it to the tape machine input (normally track 24) or the patch bay to route to the tape machine input.

Synchronizer

If you are connecting an Adams -Smith Zeta III synchronizer to the system, follow these steps.

make a serial cable

You will need to make a cable to connect the synchronizer to the computer. It will be a 3-wire cable, with serial connectors on each end.

The ground pin is connected on both ends. The AT computers use 2 different types of serial port connectors, a 9-pin and a 25-pin connector. The following charts show how to build a serial cable for either type of serial port to connect to an Adams-Smith Zeta III synchronizer. Note that this chart assumes that the serial I/O board in your computer follows normal PC conventions for DTE and DCE wiring.

DB25	Zeta
2	2
3	3
7	5

DE9	Zeta
2	3
3	2
5	5

connect to the serial port

Connect the cable to an unused serial port on the computer. The MIX program will search serial ports COM1 and COM2 and select the correct serial port automatically.

set communications parameters

You need to set up the synchronizer serial protocol as follows:

computer port on
RS232 communications
19200 baud
8 data bits
1 stop bit
no parity

Adams-Smith Zeta-Three setup

On the Adams-Smith Zeta-Three, select the "system" menus by pressing the DISPLAY SELECT key until one of the Z selections are shown, such as Z-GO. Now press MENU to go the parameters that can be set, and then press the /\ key until you reach COMPUTER PORT. Now press MENU to get to the parameter, and then press /\ until ON or Adams-Smith RS232 is displayed. Now press CAPTURE to save this new value.

Now press PREV [SHIFT MENU] to go back to the COMPUTER PORT selection, and press /\ until you reach BAUD RATE. Press MENU to go the parameter, and press /\ until 19200 is shown, and press CAPTURE to save the new value.

Now press PREV [SHIFT MENU] to go back to the BAUD RATE selection, and press /\ until you reach RS232 FORMAT. Press MENU to go the parameter, and press /\ until 8 NONE 1 is displayed (this may be the default), and press CAPTURE to save the new value.

The Zeta-Three is now set up to communicate with the MIX program. The settings you have recorded are saved in non-volatile memory and will not be lost after you power-down the Zeta-Three.

Installing the Mix Software

To install the mix software, place the UPTOWN diskette in drive A: or B:, log onto the drive by typing A:<ENTER> or B:<ENTER>, and then type INSTALL<ENTER>. The installation program will check the computer hardware, and then ask you on which disk drive to install the program. Type the letter for the drive that you choose. (Typically drive C).

The software will be installed in the MIX directory on that disk drive.

Configuring the Software

The MIX software will configure itself as much as it can, but there are some items you must customize for your installation.

If you have not already done so, type MIX to start the software. If you get the message "Bad command or file name", it means that you are not currently in the MIX directory. If you installed the software on the C: hard disk, type C:<ENTER>, then CD \MIX<ENTER>. Now try typing MIX again.

When the System Configuration screen appears, type the letter 'O' or click the OK box with the mouse. Then type another 'O' or click the OK box with the mouse. You will be using the Setup menu screens to configure the system. Type 'S' (or click the word 'Setup') to bring up the Setup Menu. Then type the letter for the screen you want, or click the bar with the mouse to access the screen.

System 990 environment variables

In order for the MIX software to operate with the System 990 system including a control panel, you must set the following environment variables, preferably in the AUTOEXEC.BAT file:

```
SET   990=1
SET   CONTROL_PANELS=1
```

Hardware setup

This screen appears on the Setup menu. Fill in all the fields on this form. You will enter the number of fader modules installed, default time code information (only applies when striping tape from the automation system), and your facility name. The next time the program is started, the facility name will appear on the Automation Screen.

Audioframe setup

If you are connecting the system to a Waveframe Audioframe system, there are additional items to setup.

MIDI controllers

You must set up each fader in the system that you wish to use to control a fader (or other mixer function) as a MIDI controller. This is done with the MIDI Controller function on the Setup menu.

Select the function MIDI Controller, then click Insert. On the form that appears, enter the Uptown fader number, the MIDI channel number (which corresponds to the Audioframe mixer channel number), and the controller number. Controller number 7 is MIDI volume, and controls the fader on the Audioframe mixer. Repeat this for all the faders you wish to use as MIDI controllers. Now when the Uptown faders move, the faders (and the digital volume level) on the Audioframe will also be controlled.

MIDI switches

To use the Uptown switch banks to control one or more switch banks on the Audio frame, use the MIDI Setup function on the Setup menu. Then enter the MIDI controller number assigned to the switch you wish to control on the Audioframe in the field on the form for the desired switch bank. Now when you change the state of the switch on the Uptown fader module, the switch will also change on the Audioframe.

Exit the program

Now exit the program. When you next start the program, it will be set up the way you left it.

This completes the setup of the computer. After the rest of the installation is complete, you will verify that the computer as setup works correctly with the attached hardware.

Installing the Hardware

The hardware installation consists of installing the power supplies, the fader controllers, and the computer, and wiring them together.

Power supply

CAUTION: Before installing, wiring, or applying power to the power supply, carefully read the power supply portion of Chapter 3, Technical Reference Guide. Improper installation of the power supply may cause damage to the power supply and/or the automated faders. Damage caused by such power supply related installation errors is not covered by any warranty, express or implied.

supply location

Each group of up to 64 faders has one rack-mounted 24 volt power supply. The power supplies may be located remotely from the console. Since the power supplies are quite heavy, we suggest that they be installed at the bottom of a rack. Ventilation space of at least 12 mm (1/2 inch) is required above the power supply for proper air circulation.

The power distribution cables supplied with the system are 12 meters (40 feet) long. The power distribution cables (4 pin connector with four wires) and the voltage sense cable (4 pin connector with two wires) should now be run from the console to the power supply.

fuses and voltage selection

Check, and double check, the proper value of AC line fuse and proper voltage selector setting as described in Chapter 3.

initial power wiring testing

When the wires are installed and connected to the power supply, but before they are connected to the fader controllers, turn on the power supply in order to test each and every connector for proper voltage. For each connector:

- verify +5 VDC on pin 2 relative to pin 1 for all connectors including the sense line.
- verify +24 VDC on pin 4 relative to pin 3 for all connectors.

Installing the fader controllers in the console

Each 990 fader controller has one power distribution cable and one digital data bus cable connected to it. An AWG 22 power distribution cable for the 24 volts may be up to 12 meters (40 feet) long. The digital data bus may be up to 5 meters (17 feet) long. In both cases, it is recommended that the wiring be as short as possible and kept at least two or three inches away from any audio wiring. Run the cables from the power supply and computer to the fader modules, but don't plug in the power connectors yet. Save that step for the post-installation checkout.

power and data connectors

The connectors provided for the power and data wiring are mass-termination type connectors in which the wire is mechanically forced into place in the housing. The contact formed by such connectors is a reliable, gas-tight joint. These connectors have been selected for their reliability, ease of installation and versatility. The recommended wire installation tool is AMP 59803-1.

The fader controller connectors are fully described in Chapter 3.

Do not install the power distribution wires or power sense cable now, they will be tested and connected during system check-out.

Install the digital data bus now. Each fader controller must have one and only one 3-pin data bus connector.

wiring completed

The wiring for the automation should now be complete. **Do not apply power now.** The system will be checked out first in chapter 5, Post-Installation Testing to prevent wiring errors from damaging the system.

Computer

By now the computer should have been set up, with the Uptown I/O and MIDI boards installed and the MIX software installed and configured. If not, go back to the section above and complete the computer setup.

location

The computer must be located within 5 meters (17 feet) of the most distant fader module, so that the digital data bus wiring will reach the back of the computer. The computer may be mounted under the console, or in a ventilated enclosure near the console. The floppy disk drives will have to be available for making backups.

digital data bus wiring

After a location is selected, the Uptown digital data bus wires must be connected to the I/O board ports at the rear of the computer. For proper system operation, **it is important that the data bus cables for each fader bank be plugged into the proper ports on the AT I/O board.** Fader controllers 1 and 2 must be plugged into port A/B of the first I/O board, controllers 3 and 4 go in port C/D of the first I/O board, controllers 5 and 6 go to port A/B of the second I/O board and so forth. If this practice is not followed, fader numbers at the console will not correspond to fader numbers in the software and someone will eventually get very confused.

time code wiring

For the system to operate, time code must be available to the MIDI board. This is often obtained from track 24 of the multi-track, or in some cases from the output of a synchronizer. The automation system will simply slave to any time code presented it. Connect the time code wire to the RCA phono jack nearest the 9-pin MIDI port on the MIDI board, at the rear of the computer.

If you are using a synchronizer with the system, we recommend that you connect the time code source (often track 24 of the tape machine) to BOTH the input of the MIDI/SMPTE board (RCA jack nearest to the 9-pin MIDI connector) AND to the master time code input of the synchronizer.

If you desire, you can make the time code generated by the automation system available for striping tape. To do this connect a wire to the middle RCA phono jack on the MIDI board.

synchronizer wiring If a synchronizer is being used with the system, plug the RS232 data wire from the 9-pin port marked COMPUTER on the back of the Zeta III into any unused serial port at the rear of the computer.

mouse or trackball wiring Plug the mouse or trackball into an unused serial port at the rear of the computer. Note that you may have to select a particular serial port to match the port selected with the mouse driver software. You may use a mouse extender cable if desired.

keyboard wiring Plug the keyboard into the keyboard port on the computer. You may use a keyboard extender cable if desired.

monitor wiring Plug the monitor into the computer monitor port. A monitor extension cable may be used.

done The computer is now set up and ready for testing with the automation system.

Chapter 5

Post-Installation Testing

Power Supply and Wiring Check-out

This chapter will cover testing and verification that the system is functioning properly. First the power supply and wiring will be tested, then the fader modules will be checked out using the computer.

CAUTION Wiring errors

The worst possible installation error is to somehow apply the 24 volt motor power to either the 5 volt logic connectors or the data bus connectors of any automated fader module. The 24 volt supply will quite quickly destroy the fader connector if misapplied. Damage caused by wiring errors is not covered by any warranty, express or implied.

ALWAYS, before applying power, double-check that all connectors are installed properly.

If any of the power supply and wiring tests do not check out, stop and correct the problem before going any further. Refer to figure 3.2 while checking the wiring.

Power supply

Check once more that the power supply is set for the correct AC line voltage, and that it has the correct fuse installed. **Make sure that NO power connectors are plugged onto any fader controllers.** Now turn on the AC power. Both the 5 VDC and 24 VDC lights should turn on and stay on.

voltage check

Check that 5 VDC and 24 VDC (actually set to 25.0 VDC, should never exceed 27 VDC) appear at the rear of the power supply as shown on the barrier strips.

Now check EVERY power distribution connector for 5 VDC and 24 VDC on the correct pins, as described in the Hardware reference section in chapter 3.

Turn OFF the power supply.

install power connectors

Now the power connectors may be installed on the fader controllers. Install one power connector on each controller.

Check power supply wiring

Verify that all the power wires have been installed properly at the rear of the power supply and that no shorts are present.

Check power distribution cables Check that each controller has one power-distribution cable connected properly to a 4-pin connector.

Check data bus connectors Check that each controller has exactly one data bus connector on the 3-pin data connector.

Apply power After doing a final sanity check that all connectors are installed properly, turn on the system power.

Computer System Check-out

Now you are ready to re-start the computer and check that everything is working. First, turn on the console power supply. Wait a second or two before turning on the Uptown power supply to allow the 5 volt logic supply to stabilize. Then turn on the Uptown power supply, and just as you did for the system setup above, turn on the computer, change to the MIX directory, and , if the MIX program is not automatically started by your AUTOEXEC.BAT file, type MIX<Enter> to start the program.

Many of the following steps assume that you are familiar with the operation of the System 990 system. If you have no previous experience with this system, you may need to study the system User's Guide.

Start-up screen A box will appear showing you what hardware the program has found as it starts up. It should show you the number of faders that you actually have installed, whether or not a synchronizer has been found, the amount of mix memory available, and whether or not the MIDI coprocessor board was found.

If any of the information is not correct, stop NOW and correct the problem. Each item will be discussed in detail next. To bring up the Installation screen at any time, you can run the Initialize Hardware function on the Setup menu.

version **You must see the message "990 Version" followed by the software version number.** If you don't, the DOS environment variables have not been set properly.

synchronizer A synchronizer is not required to operate the Uptown automation system. If you have a synchronizer installed in the studio, and have connected it to the serial port on the computer, check the following:
1) Baud rate and serial communications are set up properly on the synchronizer.
2) Serial cable wired properly.
3) No SYNC_PORT environment variable is set.

channels

You must see the correct number of channels found. If you do not, check the following:
1) Power supply is turned on.
2) Data connectors are installed properly.
3) Jumpers are installed properly on the modules and I/O boards.
4) DIP switches are set properly on all fader controller boards.

You can also run the SYSTEST program to check individual fader modules. See the file SYSTEST.DOC in the MIX directory for information about SYSTEST.

memory

If you have no expanded memory available for the system, the system will have less than 10000 automation records available. If you have expanded memory available, you will see about 83000 records per each megabyte of expanded memory available. If this does not seem to match what you see on your system, check the following: 1) Memory is set up as EXPANDED, not EXTENDED memory 2) Expanded memory is not being completely used by another program. If you have an 80386 computer, extended memory can be used as expanded by using a memory manager such as EMM386, QEMM386 or 386-to-the-Max.

The program TEMM, supplied with the MIX software, will look for expanded memory and report if it has been found, and how much is available for the MIX program. To run it, type TEMM<ENTER> at the DOS prompt. TEMM.EXE is in the MIX directory.

MIDI/SMPTE coprocessor

The Uptown MIX software will automatically search for the presence of the MIDI/SMPTE board. This MUST be found to operate the automation system. If it cannot be found by the software, check that: 1) The board is installed properly, seated fully in its connector 2) The board's interrupt selection switch has been set to an unused interrupt (IRQ) and 3) The board's address switch setting is not conflicting with any other cards (such as a bus mouse card) in the computer.

Run the Test Mix

If everything seems to be working, run the test mix. This will check that all the data wires are installed in the correct order and faders are being addressed properly. It will also check that the computer is powerful enough to run the system.

Create the demo file

You will create a demo file using a utility program call WRTDEMO. To run WRTDEMO, make sure you are in the MIX directory and type:

WRTDEMO \mixes\demo xx<ENTER>

where "xx" is the number of faders installed in your system. A file will be created in the MIXES directory called demo.m01 that has a test program for your system.

Run the demo mix

If you are using a synchronizer, temporarily unplug it from its serial port in the rear of the computer (or turn it off). Make sure the system power supply is on, and start the MIX software again. After the start-up screen and the directory screen appear, go to the Automation menu and select Retrieve Stored Mix. Select the latest version of mix file DEMO. This is the mix file you have just created.

To start the demo running, select the Play button (click it with the mouse or type <ALT>+P). The faders should start to go through the demo. Note that you must either turn the synchronizer off or have a tape available with time code on it starting at 01:00:00:00 for the demo to run.

Things to look for

Look for these things:

fader order

The first thing to observe is that the faders move in the correct order, from 1 to the last fader installed. If they do not, either the DIP switches are set incorrectly or the jumper, or, the bank wires are plugged into the wrong ports on the back of the computer.

fader smoothness

When the Wave is running all the faders, they should move smoothly. If they look choppy, look at the computer screen while they are moving roughly and look for a letter "L" next to the mix name. If an "L" flashes, the computer is not powerful enough for the number of faders installed. A common problem is that the turbo button is not pressed in on the computer.

fader speed

When the faders do the Rocket faders demo, they should look uniformly fast. If any look very different, it could indicate a bad fader module or a problem on the fader controller board.

touch sensors

Click the Ready button on the Automation window with the mouse (or type <CTRL>+R) Now go down the console, one by one, and touch all the fader knobs. The red box in the Fader Write window should turn on and the fader must not fight you.

switches

While the MIX program is in the Ready or Write modes, mute switch activity will be memorized and played back. Try pressing a few of the automated switches while the demo program is running (with the switches enabled on the computer screen, and the system in Ready mode). Then, stop the mix, rewind, and play back the new mix.

control panel

Using the Setup pull down menu, the soft switches (switch 1 and switch 2) can be setup now if desired. (For full details on using the menus and setting the switch functions, see the User Guide.)

Time code test

Stop the demo mix. Load a tape that has known good time code, or stripe a tape using the MIX software function Stripe Tape on the tape menu. Play the tape and observe that the correct time code is displayed on the computer screen.

Synchronizer test

Turn on the synchronizer and make sure it is connected to the tape machine(s) it controls. Plug the synchronizer back into its serial port at the rear of the computer and run the Initialize Hardware function on the Setup menu. The start-up screen should show "Synchronizer Found". You should be able to operate the tape machines from the computer now. Note that you probably have to enable the tape machines you want to control with the Tape1, Tape2, and Tape3 buttons on the Tape Machine Control window on the computer screen. You should also see time code moving while you rewind the tape, if your synchronizer and tape machine support this function.

Check-out Complete

If the system has passed all the tests so far, it is in good working order. If you want to start mixing right away, read the User's Manual section "Quick-Start" for complete information about doing mixes.

Chapter 6

Troubleshooting

Symptoms and Solutions

This section describes some of the symptoms that may be observed and how to fix the problems they represent.

1.) Faders enter manual mode

One or more fader modules go into manual mode (stop moving) unexpectedly:

If a fader cannot park accurately for any reason, the microprocessor will turn it off by entering the manual mode.

The problem may be due to a fader which is not moving freely. In order to prevent the fader motor from overheating if an obstruction is encountered (such as something laying on the console), the fader channel is turned off and put into manual mode if the fader position does not match the desired position within a few seconds.

Such a situation could be caused by an obstruction on the console, a knob or shaft rubbing on the fader panel, or a defective fader.

Another possible cause for this condition could be if the screws that hold the fader in fader the module are too long, or have been forced down too far. This causes the screw to prevent the fader from going all the way to the bottom or top of its travel.

2.) Power supply lights are not on

Power supply is turned on, but 5 VDC or 24 VDC LED is not illuminated:

The LEDs directly monitor the outputs of the DC power supplies. If one of the two LEDs is not illuminated, the proper operation of one LED shows that the power line voltage and fuse are ok. If neither LED is on, the AC power cord, connector and fuse should be checked.

A particular power supply output voltage may be abnormal if the output wiring is shorted, the protection fuses are blown, the power supply has failed or if the sense leads are shorted.

4.) Can't get a mix to start

You can't get a mix to start, and the red fader boxes stay lit while you start and stop the tape.

This indicates that time code is not being read by the MIDI board. To verify this, watch the area just above the time code display. If the "Tach" does not go away when the tape machine is started, the MIDI board is not reading time code. This is true **even if time code appears to roll.** This can occur if a synchronizer is attached and it is reading time code in tach mode, and supplying the system with this guess of the actual time code.

To diagnose this problem, you must prove to yourself that real time code is reaching the MIDI board input. Try to patch the wire that plugs into the MIDI board into the console and listen to the time code. If this appears OK, try another tape with known good time code. If the second tape works, re-stripe the first tape.

5.)Synchronizer is connected, but not found

There are several things to check here:

- Check that the internal parameters are set correctly in the synchronizer. See the "Synchronizer" section above.
- Verify the integrity of the serial cable.
- Try the "other" cable polarity. Reverse the connections to pins 2 and 3 on one of the connectors, or install a null modem in series with the cable.
- Make sure the SYNC_PORT environment variable is not set. See the "environment variables" section above.
- Check the internal synchronizer jumper. The Zeta III has a jumper to connect either the RS422 or RS232 to the computer port. It is factory-set to the RS232 port, but you could check it to make sure.
- Test the PC's serial port,using a program such as checkit witha loopback plug.

6.) "Disk Drive Door Open" Message When Starting the Program

If you get the message "Disk Drive Door may be Open" when you try to start the system, this could be caused by the MIX program trying to read the A: or B: floppy disk drive. This could occur if the last time you left the program you had selected one of the floppy disk drives, for example if you were loading mixes from a floppy disk. The program remembers the last disk drive and directory you have selected and tries to move to it when you next start the program.

To get around this problem, just insert a formatted floppy disk in the computer, with or without any data on it, and click OK on the message box. Then change to the hard disk by using the file menu function to move to a new directory.

7.)Fader touch sensor problems

If the fader touch sensors are not working properly, it may be due to an improerly grounded system. The "COMMON" terminal on the rear of the Uptown power supply should normally be connected to the central grounding point at the console, using a heavy-guage wire. If this wire is not connected, there may not be a ground reference for the touch sensors and their behavior may be erratic.

If the problem is on only one fader, it is possible that the fader may have an electrical or mechanical problem.

Appendix A
Audio Noise

Performance

It has been our experience that the equivalent noise per channel with proper installation of the Uptown™ automation system is less than -100 dBu. In most cases, such low noise will not be heard and is difficult to directly measure on any individual channel. The only way to find such a low level noise is to sum together the outputs of a large number of channels. For example, considering uncorrelated noise sources on a 40 channel console, a noise level of -100 dBu for each channel would result in a total noise level of -84 dBu if all 40 channels are summed together. In this manner, measuring the noise level of a large number of channels with and without the automation system turned on, it is possible to deduce the average noise level of each channel.

The amount of increase in noise level as more channels are added together may be a useful clue in determining the source of the noise. If the noise source is correlated, such as mains hum, the noise will increase in direct proportion to the number of channels mixed together. If the noise sources are uncorrelated, such as digital processor noise, then the noise will increase as the square root of the number of channels. Therefore if the noise increases by 6 dB each time you double the number of channels summed together, the noise is correlated and therefore is most likely arising from the same source. If, however, doubling the number of channels only results in 3 dB or less rise in noise level, then the noise is uncorrelated and is arising from unrelated or random sources.

Sources of Noise

There are a number of possible sources of noise. The first task is to try to determine the actual source of the noise. Then, armed with an understanding of the cause, various types of solutions will be appropriate. In order to find the source of audio noise, considerable sleuthing may be required.

Keep in mind that the noise might be arising from several sources, so that several small, incremental solutions could be required to achieve the desired result. For, example, one type of noise might be masking other noise such that after you correct one condition, you may want to start over and find the cause of some other noise source which was previously not audible.

In general terms, the process of making changes to the console while adding the automation system could possibly cause audio hum due to improper grounding,

audio hum or digital noise due to ground loops, digital noise from the automation system data bus, digital noise from the automation fader controllers, digital noise from the AT computer, noise from a defective fader motor, or radiated noise from the computer monitor.

Although noise may be difficult to describe in words, particularly if the noise is arising from more than one source, the following are a few fundamental categories of noise which may be recognizable.

MAINS HUM

The best way to verify that the hum is really arising from some sort of stray coupling to the power line is to view the audio on an oscilloscope and set the scope to trigger from the line. If the hum stays exactly stationary on the scope, then it is indeed mains hum, but if the trace does not exactly sync to the power line, the noise is from some other source (such as the computer monitor).

Mains hum is most likey due to a shielding or grounding problem related to the fader audio wiring. Is the hum on all channels or only on a few? Do the faders seem to operate properly? Check the audio wiring carefully. Shielding of the audio wiring might be required. The fader case ground may or may not need to be connected to console chassis ground. (The fader case ground should never be connected to audio ground.) In most cases, any fader wiring shield should only be connected to ground at one end, in order to avoid ground loops.

DIGITAL NOISE

Digital noise might arise from a number of sources. So, the first step is to figure out what is causing the noise, then an appropriate solution should be quite straightforward. The noise from the computer monitor and the noise from the digital data bus are the most easily recognizable, and the easiest to fix.

Computer Monitor: Noise from the computer monitor is generally made up of two types of noises. The most troublesome is the magnetic field spike generated by the high voltage flyback transformer. With some monitors, this magnetic spike will cause a nasty buzz in audio wiring for a distance of up to several feet. The buzz will typically be at a frequency of 50 to 90 Hz, depending upon the type of display card in your computer.

The monitor will also radiate a high frequency noise, typically 15 to 50 KHz, which will not generally be audible, but might end up causing audio intermodulation problems. The low frequency is the vertical scan rate of the monitor, while the high frequency is the horizontal scan rate.

Digital Data Bus: The digital data bus from the computer to the fader modules is a possible source of noise. The data cable, all the way from the computer to each of the fader modules, must be kept several inches away from any audio wiring. The entire data cable, from the computer to every module, should be carefully inspected and rerouted if necessary. Ordinarily, the noise from the data cable sounds like a tick occurring at the system frame rate.

For test purposes, to determine if the data cable is the culprit, you may find it useful to deliberately create some data bus noise by placing a portion of the data cable against an audio cable on a fader while the system is running an automated mix. If the resultant noise is the same sort of sound as the original noise, then you'll know that the data bus is indeed the cause.

Fader Controller circuit noise: The audio wires from the faders to the motherboard should be short and direct, and should be as far as possible from the data cable, the bank bus wiring and should be kept as far as possible from the fader controller circuit board which is located under each fader.

Any digital noise from the fader controller would generally be sort of a high pitched whine with irregular variations.

GENERAL TEST PLAN

If the source of the noise has not yet become apparent, it may be necessary to start on a methodical plan which will help to isolate the source of the noise. The following tests are designed to assist you in isolating the cause of any sort of noise.

a.) First of all, you should positively verify whether the noise is being caused by any of the automation system, including the computer and the monitor. For this test, try turning off the Uptown power supplies, turning off the computer and turning off the computer monitor. That will turn off all of our digital logic, end all data communications and will stop any radiation from the computer and from the computer monitor.

If there is any noise left at this point, the automation system and/or computer system cannot be the cause. Therefore, noise sources such as missing grounds or ground loops in the console must be suspected as the cause.

b.) Next, try turning on the Uptown power supplies while leaving the computer and monitor turned off. This will allow the fader controller circuit boards to begin normal operation. If there is any noise increase when turning on only the power supplies, then the digital logic in the fader controller modules is probably the source of the noise.

The most likely causes of such noise would be stray capacitance to the audio wiring or a ground loop problem allowing digital logic currents to flow through the audio ground system. Make certain that all audio wiring is kept as far as possible from the fader controller circuit board.

The fader audio wiring is a possible source of noise pickup and is also a potential source of a ground loop. While some versions of the audio cable have used shielded audio wiring, we have generally changed to ribbon cable to help to improve the fader cutoff (which is greatly affected by fader input to wiper capacitance). As long as the audio ribbon cable is kept well away from the fader controller circuitry, the ribbon cable should work fine. The audio connector on the fader has four connections: fader top, wiper, bottom and case ground. While some installations have connected the fader case to the chassis ground, this ground is a possible source of a ground loop

and should be removed for a comparison test. For removal, simply remove the chassis ground wire from of the audio connector.

This test will require a bit more effort than the tests above, since the ground wire (i.e. the wire which is connected to the case of the fader) will have to be removed from or added to each and every fader. This effort is suggested because there is some possibility that the fader case ground connection may be causing a very low level ground loop due to the touch sensor power connections which utilize both the 5 volt logic supply ground and the case of the fader (which serves as a reference for the touch sensor operation).

It is possible that the fader wiring may require shielding and it may be very important whether the shield is connected at both ends or only at one end, and it may also be important which end (fader end or console end) the shield is connected.

c.) Next, with the Uptown power suppliies turned on, try turning on the automation system computer and the monitor. Note whether turning on the monitor causes any noise. If the monitor is the source of the noise, it will probably be necessary to either relocate the monitor or buy a shielded monitor. The noise from the monitor is quite difficult to shield against. Simple measures such as copper braid or aluminum foil shielding will probably not work. Special alloys such as mu-metal are generally required to eliminate such magnetic field interfence.

Noise from the computer, when the MIX program is not loaded (the DOS cursor sitting at the DOS prompt), could arise due to system ground loops or radiation directly from the computer (most likely the power supply in the computer). Try connecting a very large ground wire from the computer chassis to the console chassis ground. The mains ground in the computer power cord may have to be eliminated when other grounds are provided in order to avoid creating even worse ground loops. Also, try connecting the computer case to the Uptown power supply common terminal.

With the computer running the MIX software, and a mix actually running (with the on-screen status box showing RUN mode) the normal data communications will exist on the data bus. If data noise is detected in this condition, then the routing of the digital data bus is allowing some coupling of digital data into the audio wiring.

Any such coupling will most likely be due to stray capacitance between the data bus and the audio wiring. The audio wiring should be kept as far as possible from the data bus cables and the bank bus cables. Generally, with customary console impedances of 10K or less, an inch or two of separation between the audio wiring and the data cable is sufficient. The higher the impedance of the audio line, the more noise will be capacitively coupled. The audio wiring may require shielding if the audio wiring must be with an inch or two of the data bus wiring or if the impedance is very high.

d.) If none of these tests have yet been enlightening, try unplugging all of the automation system data connectors from the back of the computer. If this affects the

noise, then there is probably a ground loop involving the mains power ground or the computer chassis. Try different schemes of grounding of the computer chassis.

NOISE ON ONLY SPECIFIC CHANNELS

If the noise is only on a single channel or is only on a few specific channels, try swapping a noisy module with a quiet module from some other channel and see if the problem follows the noisy module or stays at a certain place in the console.

If the problem stays at a certain place in the console, then the problem is associated with the wiring for that specific channel or something in the console is causing the noise. In some cases, a very informative approach to verify the performance of the system is to install a standard, manual (not motorised) fader and then carefully note any changes in system performance. How is the hum affected? How does this affect any other sort of noise?

If the problem follows the module, then the module must have a problem and should be returned for repair. Perhaps the fader has a defect. For example, a fader with an internal short, some sort of leakage, or excessive capacitance from the knob to the audio tracks could couple both hum and other noise from the knob into the audio.

Appendix B
AF102 FADER STRING TENSION ADJUSTMENT

Introduction

If the fader movement becomes jerky or if the fader begins to occasionally buzz at a rate of about 30 to 60 Hz, it is most likely due to an improperly adjusted fader string. (Although we refer to it as a string, it is actually a nylon coated stainless steel cable.)

Jerky fader movement can also be caused by excessive friction in the fader bearings. If the fader knob requires you to push with more than about 30 to 60 grams to begin movement, then the bearings may need cleaning and/or lubrication. If the force required to move the fader seems normal, then you should check the fader string tension.

In many cases, the fader string tension can be adjusted without disassembling the fader module, and in consoles which have good access to the bottom of the modules, can even be adjusted while the fader is in the console.

If the string is too loose, the fader will be prone to move erratically, oscillate and may cause a nasty buzzing sound. If the string is too tight, the fader movement will be sluggish and may not be positioned accurately. So, the goal is to achieve a setting which is tight enough to prevent the oscillation but loose enough to allow the fader to move easily.

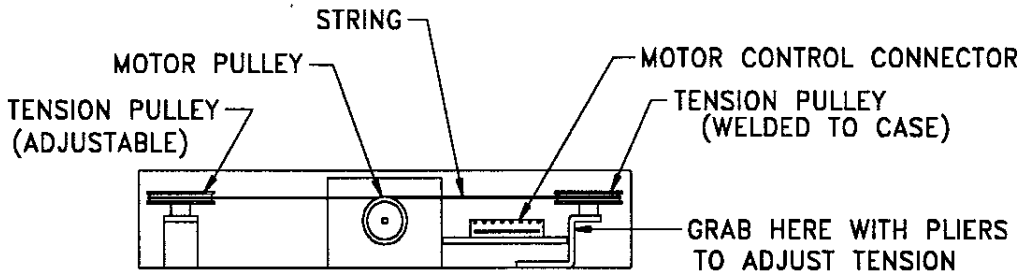
Power off

Before making any tension measurements or any tension adjustments, be certain to turn off the automation system power supplies.

Tension measurement for AF102

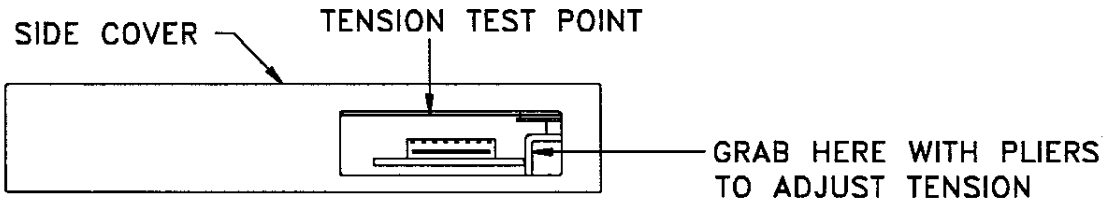
In order to check the string tension, position the fader knob at about a mid-travel position (somewhere around -15 to -20 dB indicated on the panel). Remove the motor control connector from the back of the fader, using a small screwdriver or similar tool to pry the connector out and being careful to avoid pulling on the delicate wires.

As an overview, following is a somewhat simplified illustration of the inside of the fader, as you would see it if you removed the fader side cover.



FADER INTERIOR VIEW WITH COVER REMOVED

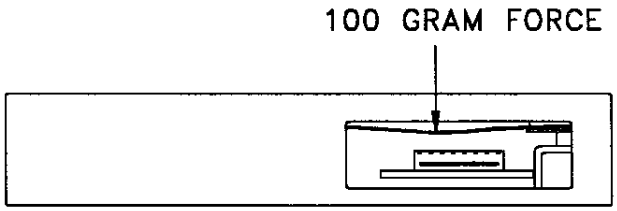
Now, using a small, smooth, tool such as an awl to avoid damage to the string, check the deflection at a point midway between the motor pulley and the tension pulley as shown in the figure below. A force of 100 grams (about 4 ounces) should deflect the string 1 to 2 mm (.040 to .080 inches). The force should be applied so as to deflect the string toward the connector, not forcing the string in or out, but only applying force perpendicular to the side cover of the fader.



FADER VIEW WITH COVER INSTALLED
AND FEMALE CONTROL CONNECTOR REMOVED

Since the distance from the normal string position to the housing of the male connector is about 5.5 mm (.20 inches), the ideal string deflection is about 1/3 to 1/2 of the distance from the normal string position to the male fader connector housing.

With 100 grams applied, the string should deflect as shown in the following illustration.



DESIRED STRING DEFLECTION USING 100 GRAM FORCE

As a sanity check, if the string is loose enough to deflect all the way to the connector, using up to 200 grams (about 8 ounces) of force, it is way too loose.

If you have the fader cover removed, another tension test is to move the fader knob all the way to either end and verify that the string between the two small pulleys at the top of the fader cannot easily be pushed all the way down to the shaft which is directly beneath the string. The string should flex easily, but stop just short of the shaft.

Tension Adjustment

There are two types of fader string tension adjustments which can be made. If the string is extremely loose, you will have to take the fader apart and adjust the tension by means of the movable pulley. The moveable pulley is locked in place with a retaining screw and the assembly is also held in place with super-glue. Fortunately, in most cases, the string tension can be adjusted by simpler means.

The simplest way to make minor adjustments to the string tension is to slightly bend the pulley mounting bracket which is welded to the case. In order to adjust the tension, use a pair of very durable long nose pliers to grab the portion of the tension pulley mounting bracket which is perpendicular to the case, as shown in the figures above. The pulley mounting bracket is made of steel and is not easy to bend, so you will have to make a very deliberate effort to change the tension any significant amount.

After bending the pulley mounting bracket, you should check the string tension and then readjust as required. You may have to make several attempts before you get the tension set properly.

Final Test

When you think you have it set right, plug in the fader motor connector, power up the system and test the fader for proper movement. If it still moves erratically or oscillates, then tighten the string some more. However, if the oscillation is gone but the accuracy is not good, then loosen the string slightly.

If all else fails and you would like us to adjust the fader, call or fax Uptown Automation for a return authorization number (RMA) and then send the complete fader module directly to Uptown Automation.

Glossary

Auto Mode	Fader plays back stored data, no changes can be made to the stored mix.
Auto-chase	Following the master tape machine automatically as it moves forwards or backwards.
Auto-sync	Adjusting the fader positions and mutes to the positions appropriate for the current time code.
Auto-override	Feature allowing easy updating of stored switch (mute) instructions by holding down the ON or OFF buttons.
Character	Any letter or single number digit.
Cross-fade	Changing the level of one or more channels smoothly from one level to another.
Cursor	The highlighted box on the screen. The cursor may cover just one letter, or it may highlight a whole menu option. When you are in a field, the cursor indicates where what you type next goes. On a menu, it indicates the choice you will activate by pressing <ENTER>.
Cursor Movement Keys	The keys (such as arrow keys) that move the cursor around the screen.
EBU	European time code standard, similar to SMPTE, but running at 25 frames per second.
Field	A place to enter information.
File	A collection of related information stored on the disk.
Frame	Refers to video frame, 1/30th of a second (in the US). Also used to refer to a single time code number on audio tape.
Groups	A number of faders or mutes that act as one, moving in unison.
Help	The on-line help system, available by pressing the help key <F1> or clicking the right mouse button. While the program is running, you can get information on topics. The information is relevant to where you are in the program.
I/O Card	Stands for Input/Output card. Refers to the printed circuit board that plugs into the computer and handles the input and output of data for the fader modules.

Manual Mode	The fader acts like a non-automation fader, and the automation mute is released but still available in manual.
Menu	A list of options to select from.
MIDI	Musical Instrument Digital Interface, a standard originally created for synthesizers to use to communicate, now used by many types of musical and recording equipment.
Mouse	A pointing device with several buttons.
Mouse Pointer	Small arrow that moves when the mouse moves, used to select items on the screen.
Mute	To electronically silence a channel.
Null LEDs	The two LEDs that show relation between current and stored fader position.
Opto	Stands for optically-coupled switch. They are used (much like relays) to connect the Uptown fader module to the mutes and other switches in the console.
UPTOWN Session	The time between starting the UPTOWN program and exiting it.
RAM	Random Access Memory. On a computer, internal system memory. This is not disk space.
Ready Mode	Normal automation mode. Faders play last recorded moves, and touching a fader records the new position.
SMPTE	The type of time code used in the US that the system uses to keep track of when automation moves are made. A unique number is stored every frame. The format of SMPTE time code is HH:MM:SS:FF, (hours:minutes:seconds:frames).
Snapshot	A "picture" of all fader levels at a given time. May be used to cross-fade to.
Splice	In this context, connecting two or more previously made automation mixes to get a new, combined, mix.
Synchronizer	The electronic equipment that reads time code from the tape machines connected to it. Also, it will synchronize two or more machines.
Time code	A system of storing a unique time number on video or audio tape to keep track of synchronization.
Write Mode	The automation mode where the fader's position is constantly being recorded, whether or not it is being touched.

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