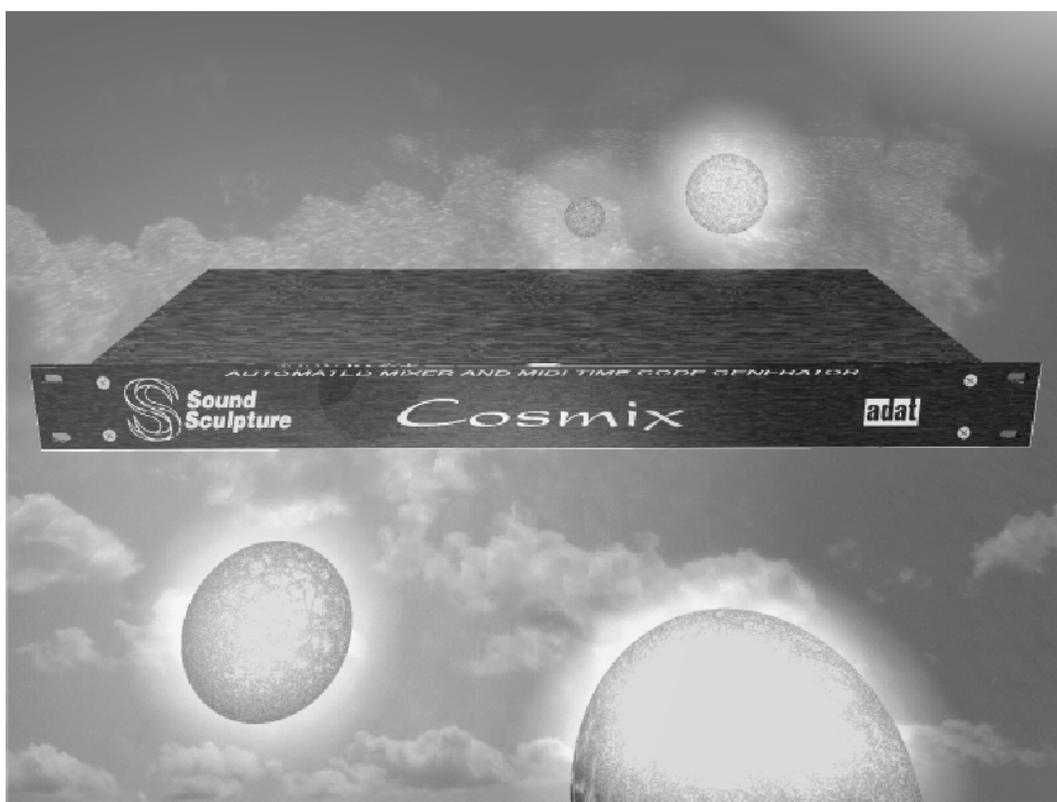


Cosmix

Owners Manual

Document OM0798



2 Year Limited Warranty

Sound Sculpture Musical Instrument Products (Sound Sculpture) warrants the Cosmix Automated Mixer to the original purchaser to be free of defects in material and workmanship under normal use for a period of 2 year from the date of purchase from an authorized Sound Sculpture dealer or directly from Sound Sculpture.

Sound Sculpture's liability under this warranty is limited to repairing or replacing defective materials that show evidence of defect, and only if the product is returned for repair directly to Sound Sculpture or to the authorized Sound Sculpture dealer from which the unit was purchased.

Sound Sculpture reserves the right to make changes in design or make additions or improvements on the product without incurring any obligation to install the same on products previously manufactured.

Sound Sculpture shall not be liable for any consequential damage or loss of profits as a result of the use of this product even if Sound Sculpture is advised of the possibility of such damages or loss. In no event will Sound Sculpture's liability exceed the price paid for the product.

No other warranties are expressed or implied and Sound Sculpture neither assumes nor authorizes any person to assume for it any obligation or liability in connection with the sale of this product. In no event shall Sound Sculpture or its dealers be liable for special or consequential damages due to the use of this product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusions or limitations may not apply to you.

In Case of Difficulty

In the unlikely event that you experience problems with the Cosmix, please refer to the section in this manual pertaining to the operation you are having difficulty with. Very often the difficulty is simply a result of improper setup or programming and can be resolved by studying this manual.

If, after reading this manual, you are unable to resolve the problem call Sound Sculpture at (303) 442-1954 during normal business hours. If we are unable to resolve your problem over the phone and determine that the unit needs repair, you will be given a return authorization number and further procedures for returning the unit. **UNAUTHORIZED REPAIR OF THE Cosmix BY ANYONE OTHER THAN THE FACTORY VOIDS THE WARRANTY. NO UNITS WILL BE ACCEPTED FOR REPAIR WITHOUT FIRST CONTACTING THE FACTORY FOR A RETURN AUTHORIZATION NUMBER.**

Precautions and safety notes

To reduce the risk of fire or electric shock, do not expose this unit to rain or operate this unit in a wet environment.

Use only the power module supplied with the unit. Use of another module will void the warranty.

If the unit becomes physically damaged due to dropping or for other reasons, it should be returned to the factory for repair to avoid the risk of further damage to the unit or to attached units.

To avoid damage due to overheating this unit should not be exposed to, or operated in, direct sunlight for extended periods of time.

To avoid damage due to lightning, this unit should be unplugged during an electrical storm.

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OVERVIEW

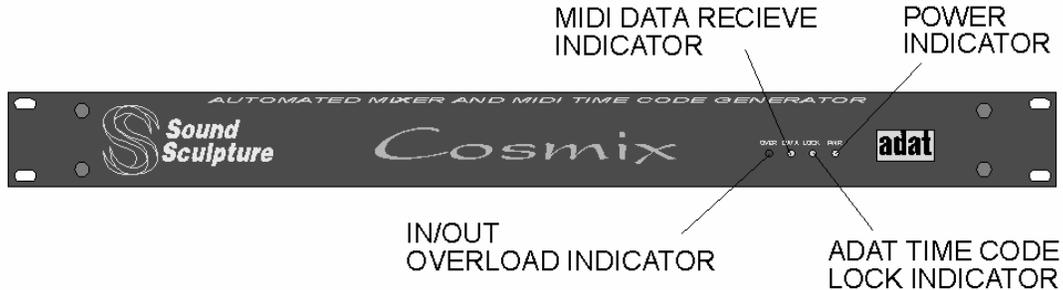
The Cosmix incorporates the following features:

- 8 input channels
- 4 output channels (stereo main and stereo aux or 4 main)
- Stereo aux return and stereo expansion input
- Individual control over pan and volume to both the main output and aux output
- Alternate control over volume to 4 outputs using a different set of Control Change values
- Channel mutes using Program Change numbers
- Superb audio quality with no zippering or other artifacts
- No VCA's
- MTC generation from Adat timecode
- Completely expandable for multiple Adats and outputs.

The Cosmix was designed as a versatile and powerful automated mixing system with excellent audio purity and noise characteristics while maintaining low cost and ease of use. The versatility of the Cosmix makes it usable in a variety of applications.

- Automate the mixdown of an Adat under sequencer control. Both pan and volume of each channel is controllable for both the stereo Main buss and stereo Aux buss via a set of 32 predefined MIDI Control Change values. This extended control over the Aux buss allows for precise blending of a stereo signal processor attached to the Cosmix to enhance the mix.
- Up to 16 Adats and Cosmix units can be combined in an expanded system to allow mixdown of up to 256 tracks with a different signal processor attached at every 8 tracks.
- Use the Cosmix Main and Aux outputs to drive 4 speaker systems for live surround sound. Each track of an attached Adat can be routed at different levels to any or all of the 4 speakers for circular pans and fades. A different set of 32 predefined MIDI Control Change values are used to individually control the volumes from each track to each speaker.
- Two or more Cosmix units can be attached to one or more Adats to expand surround sound capability to 8 or more speaker systems.
- With the addition of a MIDI card that supports writing of SMPTE stripes, the Cosmix can be used to automate the mixdown of analog tape decks.
- Various active signal sources such as mic preamps, CD players and so on can be attached to a Cosmix and in conjunction with simple desktop MIDI fader panel can be used to distribute signal sources to various speakers in live sound installations.

FRONT PANEL INDICATORS



The front panel has 4 LED indicators offering a quick view of the status of important information. The indicators are, from left to right:

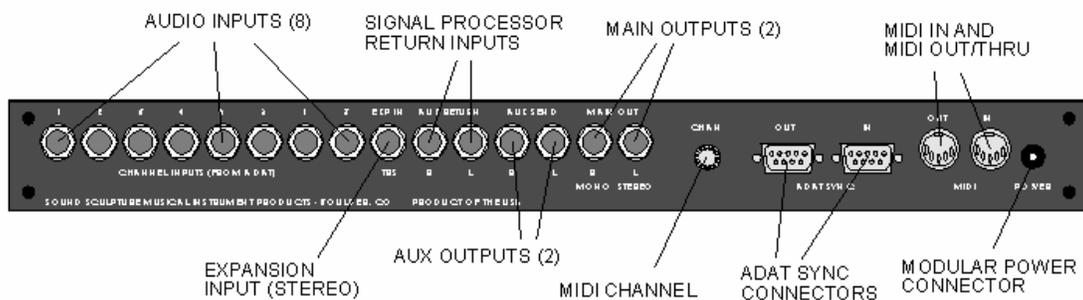
IN/OUT OVERLOAD INDICATOR: This indicator blinks whenever the audio level of any or the 8 inputs or any of the 4 outputs (Main out and Aux out) detect an overload condition. The indicator will blink if the level reaches 1 dB below the clip level.

MIDI DATA RECEIVE INDICATOR: This indicator blinks whenever valid MIDI data is received. Data is considered valid if it matches the channel that the Cosmix is set to and if the data is in the range that is used by the Cosmix. Receipt of valid and useful Sys-Ex data will also cause the indicator to flash.

ADAT TIME CODE LOCK INDICATOR: This indicator lights solid when the Cosmix detects and locks to the ADAT time code. This occurs if the ADAT is in the play mode and the Sync cable is properly attached. This indicator also indicates that the Cosmix is transmitting MTC (MIDI TIME CODE) out the MIDI Out connector.

POWER INDICATOR: This indicates power is applied to the Cosmix.

BACK PANEL DESCRIPTION



The rear panel consists of the following:

- Two 9 pin D-sub for connection to Adat sync lines
- MIDI in and MIDI out connectors
- Power connector for modular power supply
- Audio inputs and outputs via 1/4" TRS (Tip-Ring-Sleeve) and TS (Tip-Sleeve) jacks

- MIDI Channel selector switch

SYNC CONNECTORS

The two sync connectors on the back panel attach to the ADAT sync connectors. The Cosmix SYNC OUT connects to the ADAT SYNC IN and the Cosmix SYNC IN connects to the ADAT SYNC OUT.

The Cosmix SYNC OUT transmits and receives serial communication information to and from the ADAT to perform status checks and to perform MMC transport functions.

The Cosmix SYNC IN receives the timecode and clock information from the ADAT. This information is used by the Cosmix to generate MTC (MIDI time code).

In multiple unit configurations, only the sync connectors on the last unit are used (see expanded system sections).

MIDI CONNECTORS

The MIDI IN connector is used to accept computer automation signals from the computer or MIDI controller.

In a system that has an Adat connected to the Sync In connector, The MIDI OUT/THRU connector is configured as MIDI OUT. This allows the Cosmix to transmit MTC back to the computer sequencer. In this mode no MIDI data is passed from the MIDI IN to the MIDI OUT.

In expanded systems the MIDI OUT/THRU connector is always connected to the MIDI IN port of the next Cosmix in the chain. All units automatically configure their MIDI OUT/THRU connector as MIDI THRU with the exception of the unit that has the ADAT sync cable connected which will configure it's MIDI connector as MIDI OUT. This will always be the last unit in the chain. This enables any MIDI data from the computer to pass freely through all Cosmix units except the last unit without interruption. The last unit in the chain automatically configures it's port to a MIDI OUT since it is the only unit responsible for generating MTC.

In single or expanded systems that are not connected to an Adat, all Cosmix's configure the MIDI OUT/THRU to THRU including the last unit. Therefore in systems where no Adat is connected the MIDI OUT/THRU of the last Cosmix may be connected to more MIDI equipment if you wish to pass information specific to the additional processors from the Computer to the processors.

In single or expanded systems where an Adat is connected, if you wish to control additional processors, you should either place the processors in the MIDI chain before the first Cosmix and the computer and use only the MIDI THRU ports of the processors or use a second MIDI out port for additional processors.

POWER CONNECTOR

This is the power supply input. Use only the supplied power supply for powering the Cosmix.

INPUTS 1 THROUGH 8

These 8 inputs are TR (tip-ring) jacks that connect to the 8 outputs of the ADAT. On the original ADAT use standard 1/4" to 1/4" cables and plug into the 8 "-10dBv" outputs on the ADAT. On the ADAT XT use eight 1/4" to RCA type cables to plug into the "-10dBv" outputs.

For non Adat use you can plug any non-passive signal source into any of these inputs. The signal level of the source should not exceed the maximum input level indicated in the Specification section to avoid clipping the input. This level can be set to either -10dBv (consumer level) or +10dBu (pro level) by changing a jumper inside the Cosmix (See SETTING THE

INTERNAL JUMPERS). All inputs are set as -10dBv at the factory which match the ADAT outputs properly. This level will suffice for most all processors that have an adjustable level out or a -10dBv output switch and most other active gear, CD players, tape decks, microphone preamps with output level controls, keyboards, and so on. Since the input impedance is around 10K, it is not suggested that you plug passive instruments such as a guitar or microphone directly into the Cosmix input without a guitar preamp or microphone preamp to avoid hi frequency roll off of the signal.

EXPANSION IN

This is a stereo TRS (tip-ring-sleeve) 1/4" input that is used when multiple Cosmix units are used allowing more than 8 inputs to be mixed together. See the expanded systems section for more information about this input.

AUX IN (LEFT AND RIGHT) AND SECONDARY EXPANSION IN

These two jacks are 1/4" mono (TS) inputs that serve a dual purpose.

For situations where the Cosmix is used to mix down to stereo with a stereo signal processor these inputs are connected to the processors outputs. The instrument level outputs (-10dBv) should be used for this connection.

For situations where the Cosmix is used to mix down to 4 outputs, these inputs are unused for a single Cosmix or for multi Cosmix systems, these inputs are connected to the Aux Out connectors of the previous Cosmix, this, in conjunction with the Expansion input, allows all 4 signals from the previous Cosmix to mix in with the next Cosmix.

In both cases standard mono instrument cords are used.

AUX OUT (LEFT AND RIGHT) AND SECONDARY EXPANSION OUT

These two jacks are 1/4" mono (TS) outputs configured as left and right aux sends. Use standard 1/4" mono instrument cables to attach these 2 outputs to the left and right inputs of a stereo signal processing device or for 4 output expanded systems, these outputs are connected to the AUX IN connectors of the next Cosmix unit.

MAIN OUT (LEFT AND RIGHT)

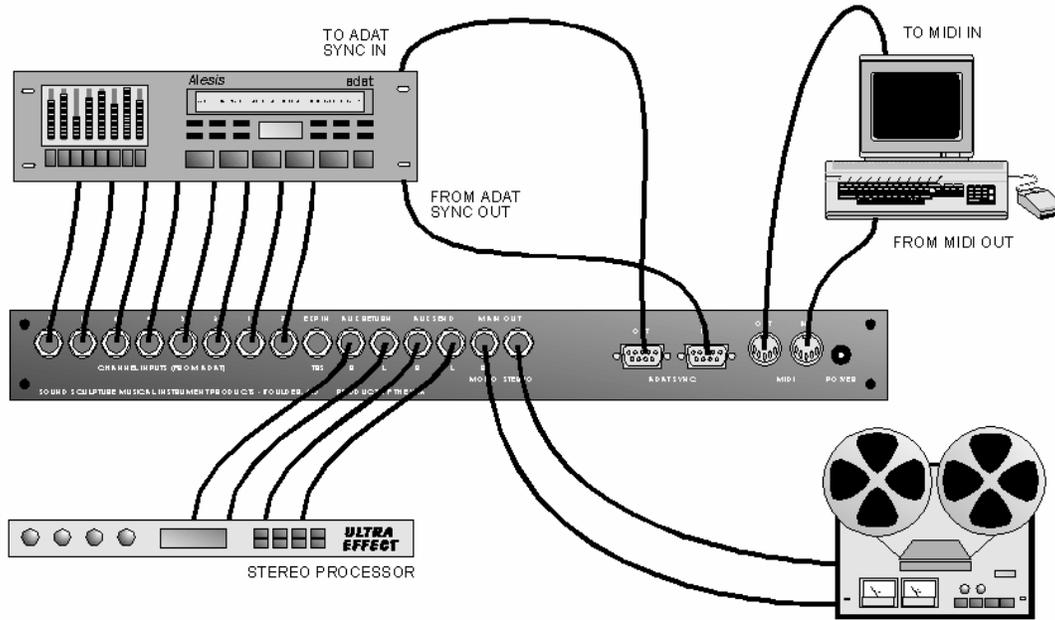
These two outputs are the main left and right outputs that contain the final mix output. Normally you would use two standard mono instrument cables in these two outputs. If you are connecting to a device that has a single stereo input you can optionally use a TRS to TRS (stereo) cable and plug it into the LEFT output and leave the RIGHT output unplugged. This will internally route the left channel to the TIP and the right output to the RING of the stereo cable.

In expanded systems, use a stereo cable to plug the LEFT output only to the EXPANSION input of the next Cosmix unit.

MIDI CHANNEL SELECTOR SWITCH

This switch is used to select the MIDI channel that the Cosmix will respond to when receiving MIDI information. The Switch is labeled 0-9 and A-F representing MIDI channels 1-16. If more than one Cosmix is connected to a MIDI port, than each Cosmix must be assigned a unique MIDI channel. Use a fine screwdriver and gently turn the dial to select the MIDI channel. The channel is only detected during power up, so be sure to change the channel before power is applied. The Switch is set at the factory to MIDI channel 1.

BASIC SETUP



The basic setup shown here connects a single Adat, a stereo signal processor such as a reverb, multi-effects unit, EQ, or other stereo processor, the controlling computer equipped with a MIDI interface and sequencer software and the final recording device such as a DAT machine, cassette deck, tape deck or a stereo amplifier/speaker arrangement. Additional configurations will be described later in the manual.

Using ADAT compatible 9 pin sync cables (not supplied), attach the Cosmix SYNC OUT to the ADAT SYNC IN. Attach the Cosmix SYNC IN to the ADAT SYNC OUT.

Using 8 standard audio cables, (1/4" to 1/4" for ORIGINAL ADAT or 1/4" to RCA for the ADAT XT) attach the 8 output channels of the ADAT into the 8 channel inputs labeled inputs 1-8. Attach the stereo signal processing device to the AUX inputs and outputs using standard mono instrument cables.

Connect the left and right MAIN outputs to the line inputs of the recording device or the aux inputs of a stereo amplifier or inputs of powered monitors using mono cables.

Connect the MIDI OUT of your computer to the MIDI IN of the Cosmix using standard MIDI cable (not supplied). Connect the MIDI OUT/THRU of the Cosmix to the MIDI IN of the Computer.

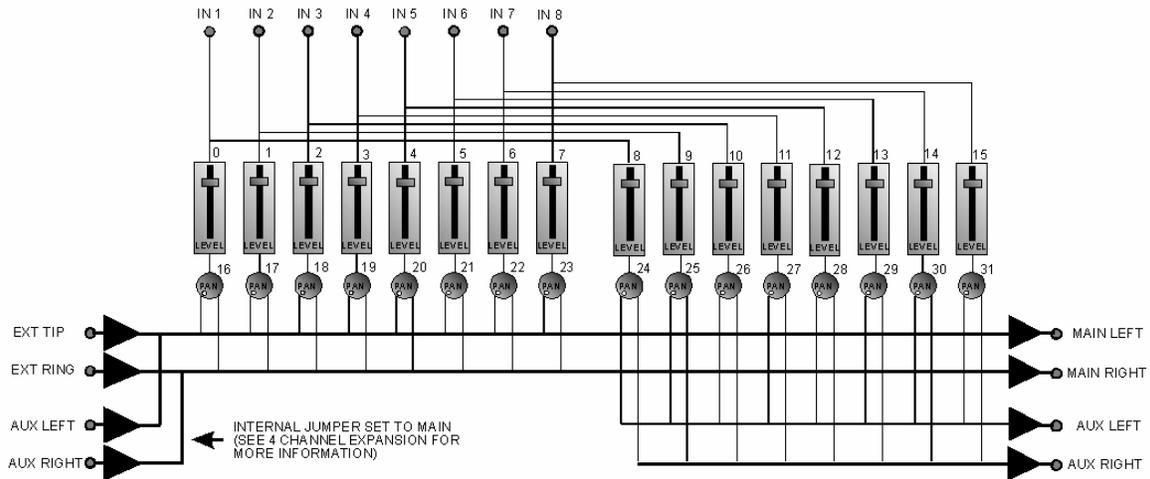
Apply power to all equipment.

GENERAL THEORY OF OPERATION

To take full advantage of the power of the Cosmix, an understanding of the audio paths of the Cosmix is necessary and will be presented here.

The audio structure can be viewed as two distinct arrangements depending on whether the Cosmix is used for stereo mixdown or for 4 channel mixdown. Each arrangement is used with its own appropriate group of Control Change numbers.

Stereo Mixdown Arrangement



As can be seen from the figure above, the Cosmix can be viewed as two groups of 8 volume and pan controls. One group outputs to the MAIN OUT stereo buss. The faders in this group are controlled by MIDI Control Change numbers 0-7 as indicated in the diagram. The pan pots are controlled by numbers 16-23. A low value on the pan pots pans the signal to the left channel. The second group is identical to the first but outputs the signal to the AUX OUT stereo buss. The faders in this group are controlled by MIDI Control Change numbers 8-15 and the pan pots in this group are controlled by numbers 24-31.

The EXPANSION input is tied to the MAIN OUT buss through the TIP (left) and RING (right) of the EXP jack. This input is used to string several Cosmix units together to expand the number input channels.

The AUX inputs are also tied to the MAIN OUT buss and are used to mix the returns from the signal processor to the main output.

By selective use of the aux group of faders and pan controls, varying amounts of signal processing can be added to each track individually. For example, if a reverb is connected to the Cosmix, you can elect to mix in a large amount of the track one signal (which may have vocals) while at the same time electing to mix in only a small amount of tracks 2-4 (which may hold drum tracks). This gives you a tremendous amount of control over the “wetness” of each of the tracks. In addition, the stereo position of the track can be maintained through the signal processor if the pan pot for the main and aux outputs are tracked. Alternately, if the pan pots are not tracked, then a dry signal may appear at the far left main out while its reverbed signal may be panned to the opposite side giving the final signal a wide stereo spread.

The AUX IN inputs are connected to the main buss via an internal jumper (factory set as shown above), appropriate for stereo mixdown. For 4 channel output as described later, this jumper must be set to the AUX position, which ties the AUX IN to the AUX OUT buss. See the section on 4 CHANNEL OUTPUT for more information on this setting.

SYNCHRONIZATION

The ADAT transmits a proprietary time code over its sync out connector whenever it is in play or record mode. This time code is translated by the Cosmix into industry standard MIDI Time Code (MTC) and transmitted out the MIDI OUT/THRU connector. This MTC can then be used by any computer sequencer program that is designed to lock to MTC to chase lock sync to the ADAT.

MIXING UNDER MIDI CONTROL

To control the Cosmix both MIDI Control Change (for level and pan) and MIDI Program Change (for mute) are used. The Cosmix Channel Selector Switch on the back panel must be set to the same channel as the MIDI data to be sent in order for the Cosmix to accept it. This switch should only be set with the Cosmix powered down, since power up is the only time the switch is detected. See expanded system section for additional information about MIDI channel assignment.

Control Change commands are used to control levels and pan positions when used in a stereo mixdown configuration. Program Change numbers are used to mute and unmute. When muting and unmuting both the Main and Aux outputs are affected together. In other words, Program Change number 0 will mute input 1 to all 4 outputs and PCC number 16 will restore input 1 to all 4 outputs.

The Control Change and Program Change assignments are fixed in the Cosmix and each value performs a specific operation as shown in the tables below. Two tables are shown. The first table shows the Control Change numbers used for stereo mixdown for both level and pan and the second shows the MIDI Program Change numbers that are used to control muting and unmuting.

Control Change Numbers for Stereo Mixdown

	Volume	Pan
In 1 to Main out	0	16
In 2 to Main out	1	17
In 3 to Main out	2	18
In 4 to Main out	3	19
In 5 to Main out	4	20
In 6 to Main out	5	21
In 7 to Main out	6	22
In 8 to Main out	7	23
In 1 to Aux out	8	24
In 2 to Aux out	9	25
In 3 to Aux out	10	26
In 4 to Aux out	11	27
In 5 to Aux out	12	28
In 6 to Aux out	13	29
In 7 to Aux out	14	30
In 8 to Aux out	15	31

Program Change Numbers for Mutes and Unmutes (Note: each value mutes or unmutes the input to all 4 outputs)

	Main/Aux out mute	Main/Aux out unmute
In 1	0	16
In 2	1	17
In 3	2	18
In 4	3	19
In 5	4	20
In 6	5	21
In 7	6	22
In 8	7	23

USING YOUR SEQUENCER PROGRAM WITH THE COSMIX

This section describes the best ways to use your computer sequencing software with the Cosmix and also MIDI card requirements.

MIDI CARD REQUIREMENTS

The MIDI interface card in your computer must be MPU-401 compatible and support MTC (MIDI Time Code). Most all popular sound cards with optional cables supplied by the vendor offeres MIDI ports compatable with the Cosmix. If you are using the Cosmix to chase lock sync to an analog tape deck rather than an Adat, then your MIDI card must also be capable of writing and reading SMPTE striping to and from an analog track of the tape deck. The Music Quest MQX-32 is one such card although there are others to choose from.

SEQUENCER REQUIREMENTS AND PREFERENCES

To use your sequencer with the Cosmix there are certain things the sequencer should be capable of and are listed here. If you have not yet purchased a sequencer package, contact the manufacturers to determine if their software meets the following requirements and preferences.

The sequencer should have graphic faders and pan controls (usually called the mixer). In addition you must be able to assign any MIDI Control Change number over any MIDI channel to each graphic fader and pan control individually. Some sequencers have faders that have a fixed Control Change value of 7 (volume) and cannot be changed. **These faders will not work with the Cosmix.**

The sequencer must be able to lock to MTC (MIDI Time Code). This feature is required if your sequencer is to chase lock sync to the Adat. This sync option is usually selected from the sequencer's Option or Sync menu where you have the choice of synchroning internally, externally to Song Position Pointer, or externally to SMPTE/MTC. Enable the "externally to SMPTE/MTC" setting. Bear in mind that the sequencer will post the message "Waiting For Sync" if you press play or record on the sequencer without your Adat hooked up and in play mode.

In addition to the above requirements, the following features are of great benefit for use with the Cosmix.

The ability to assign several faders to a group fader is useful for doing (obviously) group fades. This comes in handy when fading in and out of songs and all 8 inputs fade at the same time.

The ability to assign one or more Program Change numbers to pushbuttons is useful for muting and unmuting channels. If the pushbutton is capable of transmitting a different value when released than when pressed, this is even more useful since you will only need one pushbutton to mute/unmute a channel rather than two separate buttons since separate Program Change numbers are used to mute and unmute.

The ability to assign System Exclusive data streams to pushbuttons is useful for performing precise fades using the Cosmix Sys-Ex commands for this function. This allows you to use a pushbutton to perform a fast fade for example or to do a fade or pan over time on one or more channels just by pressing a button. This is a great way to save on MIDI bandwidth since an entire fade can be done with a small burst of data rather than 127 packets of data required for a full sweep when using the regular faders. See the Sys-Ex section for more information on this feature.

The ability to assign one or more Control change numbers to pushbuttons is useful for moving quickly to a predefined level. For example, assigning 8 Control Change numbers to a single push button will drop the levels on all 8 channel simultaneously to a background volume for audio ducking purposes.

PROGRAMMING EXAMPLES

The following is a typical way of setting up your sequencer for stereo mixdown using 16 faders, 16 pan pots and 8 mute buttons. Note that all examples show channel 0 as the MIDI channel. This assumes you have your Cosmix set to this channel.

Program a group of 16 faders with these values:

Fader 1=Control Change #0 Channel 0

Fader 2=Control Change #1 Channel 0

.

.

Fader 16=Control Change #15 Channel 0

Next program each of the 16 Pan controls above each fader with these values:

Pan 1=Control Change #16 Channel 0

Pan 2=Control Change #17 Channel 0

.

.

Pan 16=Control Change #31 Channel 0

The 8 mute buttons will be set up to mute the 8 channel signals to both the main out and the aux out when depressed and to unmute when released. This covers the usual case where you wish to mute the signal feeding your signal processor whenever you mute the main output rather than having to mute each individually. To cover this task, program each button as follows: (note the switch is programmed for both pressed and release situation to simulate a button muting and unmuting)

Button 1 (press) = Program Change #0 Channel 0

Button 2 (press) = Program Change #1 Channel 0

.

.

Button 8 (press) = Program Change #7 Channel 0

and

Button 1 (release) = Program Change #16 Channel 0

Button 2 (release) = Program Change #17 Channel 0

.

.

Button 8 (release) = Program Change #23 Channel 0

NOTE: If your sequencer does not allow you to program the buttons for press then you can make due by using 16 buttons instead. Button 1 sends out a mute and Button 2 sends out an unmute for input 1, Button 3 and 4 for input 2 and so on. Use the Chart above to determine which Program Change number to use for each switch, and all should be set to the proper MIDI channel.

If your sequencer allows you to assign Sys-Ex bursts to buttons, then see the section on Sys-Ex control for an example of how to use buttons to perform pans and fades over time.

ADAT TRANSPORT CONTROL FROM THE SEQUENCER

If your sequencer is also capable of transmitting basic MIDI Machine Control commands, then you can use this function to control the ADAT transport from your computer. When the Cosmix sees a PLAY, STOP, FAST FORWARD, or REWIND command following the MMC (MIDI Machine Control) format, it will automatically transmit these commands to the ADAT to initiate these functions. If your sequencer does not have a specific function for transmitting MMC but it does have function buttons that can be programmed with System Exclusive data, then you can program the correct Sys-Ex data string into these

switches instead to perform the same functions. Refer to the System-Exclusive section for the correct data strings to use to control the ADAT transport using Sys-Ex.

OTHER SEQUENCER SETTINGS

There are some final sequencer options that need to be set. **Be sure to set the MIDI THRU function in the sequencer to off so any MIDI coming into the computer is not echoed to the MIDI OUT.** Also set the MIDI sync selection to sync to external MTC. Refer to the manual supplied with your sequencer to determine how to properly set these.

NOTE: WHEN YOUR SEQUENCER IS SET TO SYNC ON EXTERNAL MTC, IT WILL NOT PLAY OR RECORD UNTIL IT SEES AN INCOMING MTC FROM THE MIDI IN PORT. SINCE THIS SIGNAL IS GENERATED FROM YOUR ADAT, THE ADAT WILL HAVE TO BE IN EITHER PLAY OR RECORD MODE IN ORDER FOR THE SEQUENCER TO SEE THE MTC. IF YOU GET A MESSAGE SUCH AS "WAITING FOR SYNC" WHEN YOU PRESS THE PLAY OR RECORD BUTTONS ON YOUR SEQUENCER THIS LIKELY MEANS THAT THE ADAT IS NOT IN PLAY OR RECORD MODE OR THE SYNC OR MIDI CABLES ARE NOT ATTACHED CORRECTLY.

PERFORMING A MIX

To experiment with the capabilities of the Cosmix, connect the MAIN outputs from the Cosmix to the Aux inputs of a stereo system or studio monitoring system instead of to a recorder. Once you get a handle on how to perform a mix you can then connect the Main Outs to the inputs of a recorder such as a Cassette recorder, MiniDisc or DAT to actually do a mixdown to this medium.

It is not necessary to have your sequencer running in order to operate the graphic controls and control the Cosmix. Experiment with the controls to get a feel for them before actually recording your fader movements.

IMPORTANT: When first starting up your sequencer program or powering up the Cosmix, the Cosmix will not know the current positions of the faders and pan controls. Therefore, to initialize the Cosmix with this information, you will need to move each of the 16 faders and pans. This will update the Cosmix registers and then you can begin your mix. More sophisticated sequences have features that will transmit this initial information for you upon opening the program. This will work fine as long as the Cosmix is powered up first.

Set the 8 channel faders (the first 8 faders) to their maximum positions and the 8 aux faders (second 8 faders) to the minimum positions. Center all 16 pan pots if necessary. The Cosmix powers up with all pan positions centered so it is not necessary to move them if they are already centered.

Insert a tape into the ADAT that has 8 prerecorded tracks and press PLAY on the Adat transport (or use the transport control in your sequencer if you have this set up). You should now hear all 8 channels from the main outputs. You can now move any of the 8 channel faders to adjust the levels of the 8 Adat channels.

To add effect to any of the channels slide any of the 8 aux faders up (the second group of 8). Notice that you can add a lot of effect to some tracks and a small amount to others just by adjusting the levels of the 8 aux faders.

RECORDING AN AUTOMATION

Now that you have a feel for how you can adjust levels on the Cosmix using your graphic faders, it's time to perform an automated mix.

Rewind the Adat tape to the start of the song you are mixing and set a locate point on the Adat so you can return to this spot easily. If your sequencer chase locks, then you don't need to set the sequencer time since it will go to this time automatically once the Adat starts to play. If not, then just rewind the sequencer to 00:00.

Select a sequencer track that you wish to record on and enable it. Set all the fader levels to the levels you wish your mix to begin at. Press RECORD on your sequencer. The sequencer will now be waiting for MTC and will display a message such as "Waiting For Sync". Press PLAY on the Adat. Move the levels and pan controls of 1 or 2 of the tracks while listening to your recording. It is not necessary to do all the tracks at this time, since we will do several passes (the purpose behind automation). Also try muting and unmuting certain passages and adjusting the amount of effect in real time by moving an aux fader.

When you have completed your initial mix, stop the Sequencer, stop the Adat and go to the start of the song again (good time to use the locate). Press PLAY on the Sequencer, then Play on the Adat. You will now be able to listen to your mix. The sequencer should chase lock back to time of 00:00 if it is equipped to do so.

To begin work on additional tracks, disable the record enables on the sequencer tracks you just recorded on so they are not overwritten when you record on another track. Select an unused track on the sequencer to record new fader movements and enable that track for record. Rewind sequencer and Adat to the start and press RECORD on the sequencer and PLAY on the Adat. Perform the additional mix movements on the other tracks. You may repeat this as many times as you wish to complete your mix.

ADDITIONAL HINTS

INITIALIZATION VALUES

Upon power up, the Cosmix defaults to certain gain and pan settings until it receives Controller and Program Change information from the sequencer. These defaults are:

Levels from all 8 inputs to main out at max (MIDI value 127)

Levels from all 8 inputs to aux out at min (MIDI value 0)

All pan values to both main out and aux send to center position (MIDI value 64)

All mutes off. (unmute)

Since the starting mix you have chosen for your song will probably differ from the default it is always a good idea to record or insert (see your sequencer instructions) a Control Change Value burst at the very beginning of your sequencer file that will initialize all level and pan positions to the positions you wish your song to begin at. This will involve 32 Controller numbers (8 level, 8 aux level, 8 pan, 8 aux pan). In addition, if any channels are muted at the beginning of the song you will want to insert mute commands (Program Change commands) as well. Refer to the chart above for the values. NOTE: Some sequencers have the intelligence to insert all of this data for you if you set the graphic faders and mutes to the desired positions before starting to record. Again, check your sequencer manual to determine the best way to handle this initialization as all programs vary greatly in this regard.

In addition, if your effect processor is MIDI controllable, you may wish to insert initial Program Change and Controller values for the effect in the sequenced song as well so the effect will always go to that preset and value when the song starts. Or if the device is Sys-Ex programmable, a Sys-Ex burst to the effect at the beginning of the song may work for you as well. In this way your processor always goes to the correct settings regardless of the song you load into your sequencer.

COMBINING MAIN AND AUX PAN CONTROLS

Quite often the most natural way to handle Pan of a channel to the effect processor is to have the Aux pan position track the Main pan position. This frees you from having to adjust two pan controls unless special effects are desired. To do this (assuming your sequencer allows this) simply assign both the main and the aux pan values to a single graphic pan control. Whenever the pan control is moved, two controller values get transmitted to the Cosmix instead of one forcing the aux and main pans to track each other.

COMBINING MAIN AND AUX FADE CONTROLS

Although you can combine faders in the same way as pan controls described above, this situation is a little trickier since you need to have independent control over the amount of signal going to the signal processor relative to the main fader. The best way to handle this situation is to program a group fader with both the aux fader and the main fader. In this way the group fader can be used to change the levels to both the main and effect outputs without destroying the relative values between the two which are still set by the individual main and aux faders.

GROUP MUTES

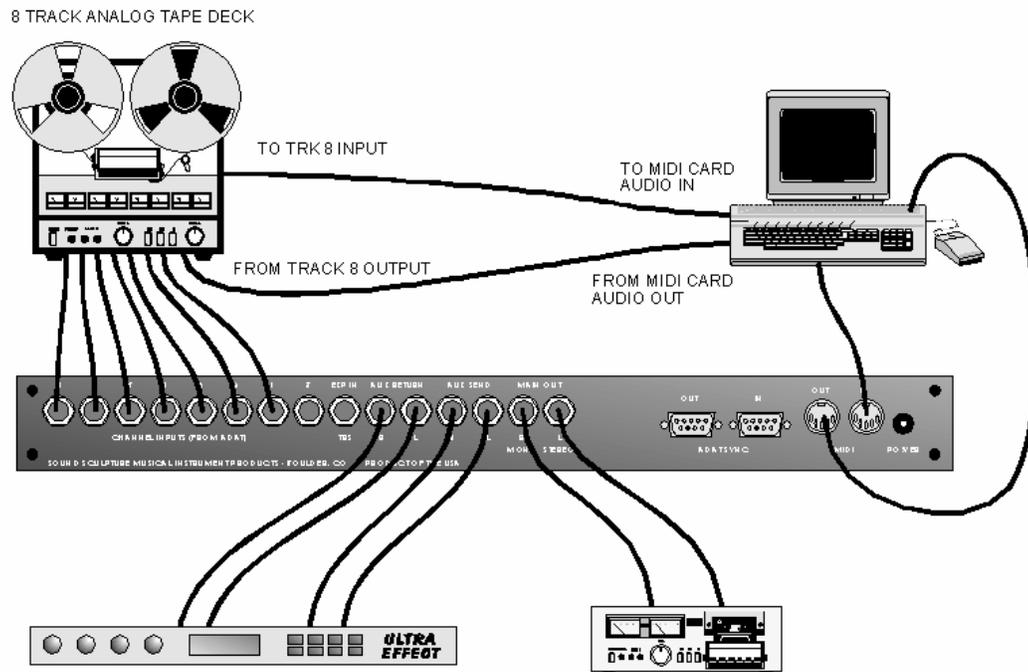
It is convenient to also have a master mute button to mute or unmute all tracks with a single action. To do this simply program a button to send out a burst of 8 Program Change commands that will mute all 8 channels when the button is pressed or unmute when the button is released. Refer to the chart for the Program Change values required to perform this function.

APPLICATION EXAMPLES

USING THE COSMIX WITH ANALOG 8 TRACK RECORDERS

If you have a MIDI card in your computer that is capable of striping an analog tape track with SMPTE time code information, then you can also use the Cosmix to automate mixdown of analog tape decks.

Attach the analog deck to the MIDI card and the Cosmix as shown in the diagram.



First open the driver for your MIDI card (under Windows Control Panel Drivers) by double clicking on it. This will enable the "write SMPTE function". Your MIDI card driver may differ from this method, so check the instructions that came with your card for specifics on your card.

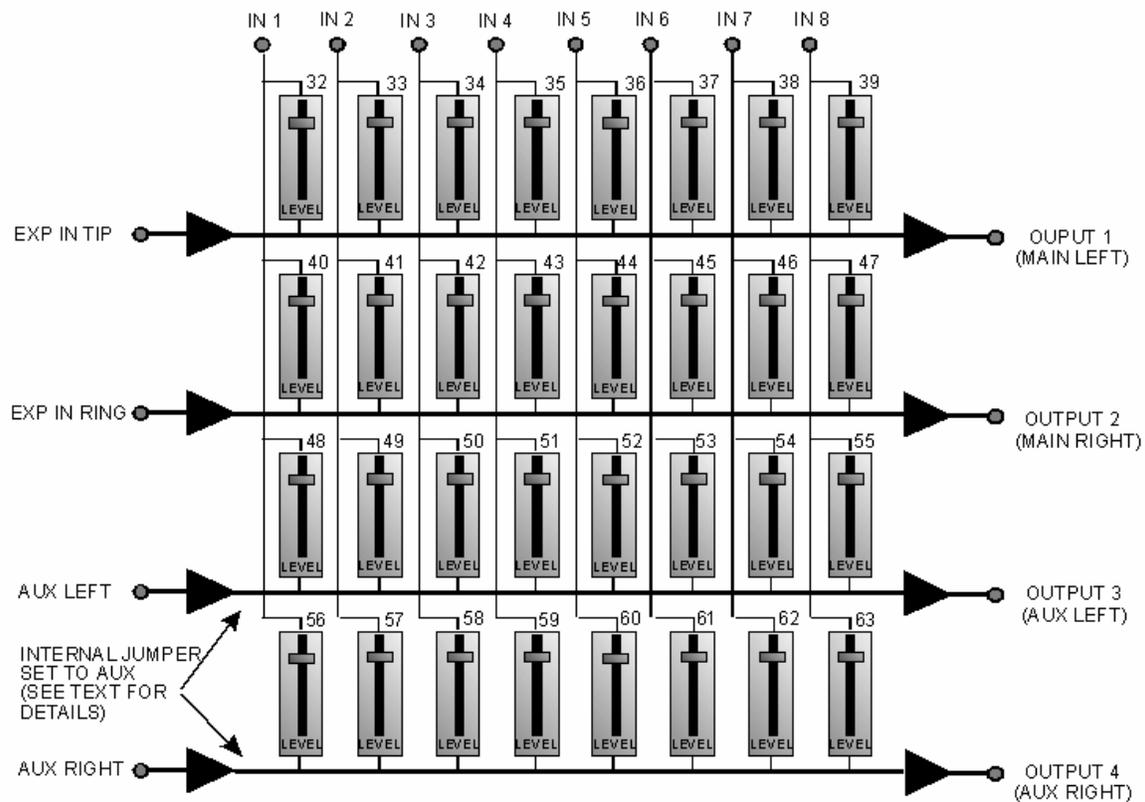
Start the tape deck recording from the beginning on track 8 (or whatever track you have chosen to stripe) and start the SMPTE stripe function from your MIDI card by pressing the start button in the driver or by whichever function is specific to your card.

When the tape has completed recording the entire length of the tape, rewind the tape, set your driver to sync to SMPTE stripe, open your sequencer and select SMPTE sync in the sequencer sync menu. You are now ready to record and playback automation tracks as described earlier.

USING THE COSMIX FOR 4 CHANNEL MIXDOWN

Since the Main and Aux control circuitry of the Cosmix are identical in function, the Aux outputs can be used in conjunction with the Main outputs for a powerful 4 channel mixdown system. The quiet and responsive circuit of the Cosmix make it an excellent choice for use in surround sound situations that require rapid pans and fades between all 4 outputs. With the inclusion of a high powered Sys-Ex instruction set to reduce MIDI bandwidth, the anti-zippering circuitry, and the separate set of Control Change values suitable for this type of operation, the Cosmix really shines in this application.

When used in a 4 channel situation, the internal block diagram is represented as shown in the diagram where 32 faders replace the 16 fader-16 pan cells of the stereo mixdown. A different set of pre-defined Control Change values are used to control the faders and are listed in the table and in the diagram both.



As indicated in the diagram, MIDI Control Change values 32-39 are used to control the levels from the inputs to output 1, 40-47 for output 2, 48-55 for output 3, and 56-63 for output 4. The complete chart is shown here

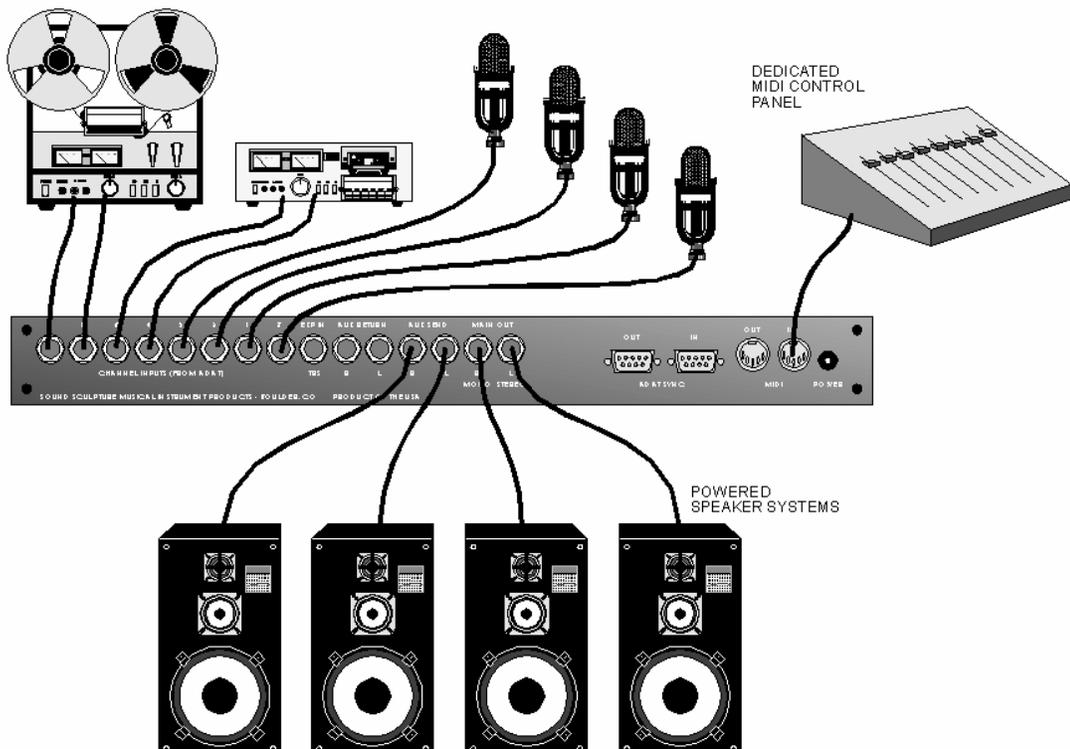
CONTROL CHANGE NUMBERS FOR 4 CHANNEL OUTPUT

	Control Change Number			
	Level Out 1	Level Out 2	Level Out 3	Level Out 4
In 1	32	40	48	56
In 2	33	41	49	57
In 3	34	42	50	58
In 4	35	43	51	59
In 5	36	44	52	60
In 6	37	45	53	61
In 7	38	46	54	62
In 8	39	47	55	63

The internal jumper setting as indicated in the diagram is set to send the aux inputs to the aux outputs. This setting is irrelevant for a single Cosmix situation and may be left at the factory setting since the Aux inputs are not used. For combining multiple Cosmix units in a 4 channel output where the Aux inputs are used to connect to the previous Cosmix unit in the chain, the internal jumpers must be set to AUX. See the section on “Setting the Internal Jumpers” for instructions on how to change this jumper.

EXAMPLE OF 4 CHANNEL USAGE.

The 4 channel arrangement can be used to mix down 8 tracks of an Aday to 4 outputs with full pan and level control over all 4 outputs. Or, as shown in the diagram, an entirely different setup can be used. In this case, several different signal sources are used. A stereo tape deck, a stereo cassette deck, and 4 microphones are routed to 4 speakers. In addition the entire setup is controlled by a simple dedicated MIDI control surface. This control surface is available from a number of manufacturers and simply consists of faders and buttons that generate MIDI Control Change, Program Change, and Sys-Ex data in real time.



This type of arrangement would be useful for example in a restaurant or night club where control over ducking of music sources and microphones for the house PA is an issue. The control panel can be programmed to bring down the music levels of the decks and bring up individual microphones when a button is pressed and then return the music source when another button is pressed.

EXPANDED SYSTEMS

It is possible to connect multiple Cosmix units and Multiple Adats together in a number of different ways for large expanded systems. For example, two Cosmix units can be combined with a single Adat to mix down to 8 speakers for larger surround sound systems, or 16 Cosmixs and 16 Adats can be connected together to mix down 256 tracks to stereo output with a separate signal processor for every 8 tracks. Or expand in both directions to mix down for example 24 tracks of Adats to 12 speaker systems. The possibilities are intriguing. This section describes the wiring unique to these setups.

MIDI CHANNEL ASSIGNMENT FOR MULTIPLE UNITS

When using more than one Cosmix, each unit must be set to it's own unique MIDI channel in order to be able to control the Cosmix units separately. In this way, several Cosmix systems can be controlled from the computer simply by assigning different channel numbers to the graphic controls. Be sure that the Cosmix Channel Selector Switch is set to the desired channel before the Cosmix is powered up and do not change the setting unless you plan on powering down again.

CONNECTING MIDI CABLES

Connect the MIDI OUT from the computer to the MIDI IN on the first Cosmix. Connect the MIDI OUT/THRU of the first Cosmix to the MIDI IN of the second Cosmix. Continue to connect all the rest of the Cosmix units together in this same fashion. Finally connect the MIDI OUT/THRU of the last Cosmix to the MIDI IN of the computer to complete the loop.

If a MIDI control panel is used with the Cosmixs in expanded systems, then the MIDI OUT for the last unit is left disconnected.

CONNECTING SYNC CABLES

In a multi-Cosmix setup, only the last Cosmix unit has it's sync connectors connected to the Adat. The last unit is defined as the one that is at the end of the MIDI cable chain.

Connect all of the Adat sync ports together as described in the Adat users manual. Connect the Sync Out of the last Adat in the string to the Sync In of the last Cosmix.

Connect the Sync Out of the last Cosmix to the Sync In of the first Adat. Notice that when using Adats with Cosmix units that the Sync cables complete a loop unlike using Adats alone where the last Adat Sync Out is left open.

The Sync connectors of all the other Cosmix units are left disconnected.

CONNECTING AUDIO EXPANSION FOR STEREO MIXDOWN

In order for all of the channels of all the Cosmix units to mix down to a single main output, the Expansion In jacks are used. This input is a stereo TRS jack that mixes any stereo audio coming into the jack to the Main output.

To connect the audio of the Cosmix units together, use a stereo 1/4" instrument cable. Connect one end of the cable to the Main Out Left channel of the first Cosmix. Connect the other end to the Expansion In jack of the second Cosmix unit. Continue to connect all the Cosmix units together this same way from Main Out Left to Expansion In all the way down the line. Connect the Main Outs of the last Cosmix to the device receiving the final mixdown (the 2 track recording system).

Notice that the Main Out Right channel of all the Cosmix units except the last one are unused. The right channel signal is automatically routed to the ring of the left output jack whenever the right output jack is left disconnected. The Expansion Input is a stereo input. So a single stereo cable can be used to connect the units together.

IMPORTANT: WHEN EXPANDING COSMIX UNITS IN A STEREO MIXDOWN CONFIGURATION (INSTEAD OF 4 CHANNEL MIXDOWN), 2 INTERNAL JUMPERS INSIDE THE COSMIX MUST BE CONNECTED TO THE SIDE OF THE JUMPER LABELED “MAIN”. THIS PASSES THE AUX IN LEFT AND RIGHT SIGNALS TO THE MAIN OUT LEFT AND RIGHT SIGNALS ALLOWING MIXING OF THE AUX SIGNALS TO THE MAIN OUTPUTS. THIS JUMPER IS FACTORY SET THIS WAY. See the section on “Setting the Internal Jumper” for details.

CONNECTING AUDIO EXPANSION FOR 4 CHANNEL OUTPUTS

For 4 channel setups, 4 channels of all Cosmix units in the chain must be passed to the next unit rather than just stereo. The additional 2 channels are passed by connecting the AUX OUT left and right to the AUX IN left and right of the next unit. Use 2 mono instrument cables for these connections in addition to the one stereo cable used to connect the MAIN OUT left to the EXP IN.

IMPORTANT: WHEN EXPANDING COSMIX UNITS IN A 4 CHANNEL SYSTEM (INSTEAD OF 2 CHANNEL), 2 INTERNAL JUMPERS INSIDE THE COSMIX MUST BE CONNECTED TO THE SIDE OF THE JUMPER LABELED “AUX”. THIS PASSES THE AUX IN LEFT AND RIGHT SIGNALS TO THE AUX OUT LEFT AND RIGHT SIGNALS ALLOWING PASSAGE OF THE 4 CHANNEL SIGNALS. THE JUMPER IS FACTORY SET TO “MAIN” SO NEEDS TO BE CHANGED FOR THIS TYPE OF SETUP. See the “Setting the Internal Jumper” for details on changing this jumper.

LAST UNIT JOB FUNCTION

The last Cosmix in a multi Cosmix setup (using Adats) has the unique job of generating the MIDI Time Code for the computer. It is also the only Cosmix that has its MIDI OUT/THRU port automatically set to MIDI OUT. All other Cosmix units in the chain have their ports set to MIDI THRU. This insures that the Controller data from the computer is received by all Cosmix units without delay. The last unit of course does not need to pass controller data, but it does need to send MTC data back to the computer.

A Cosmix knows it is the last unit if it can communicate to an Adat over the Cosmix Sync Out cable on power up or if it sees any status info being transmitted by the Adat at any other time. (during transport action for example). It remains in this state for as long as the Cosmix is powered up or unless it receives a MIDI System Reset command (FF hex) in which case it repolls for a connected Adat. If there is no MTC code coming from the last Cosmix with the Adats in PLAY mode, check that both Sync connectors are connected to the Adat or Adats. The Cosmix will not generate MTC unless the Adats are in Play mode.

SEQUENCER OPERATION FOR MULTIPLE SYSTEMS

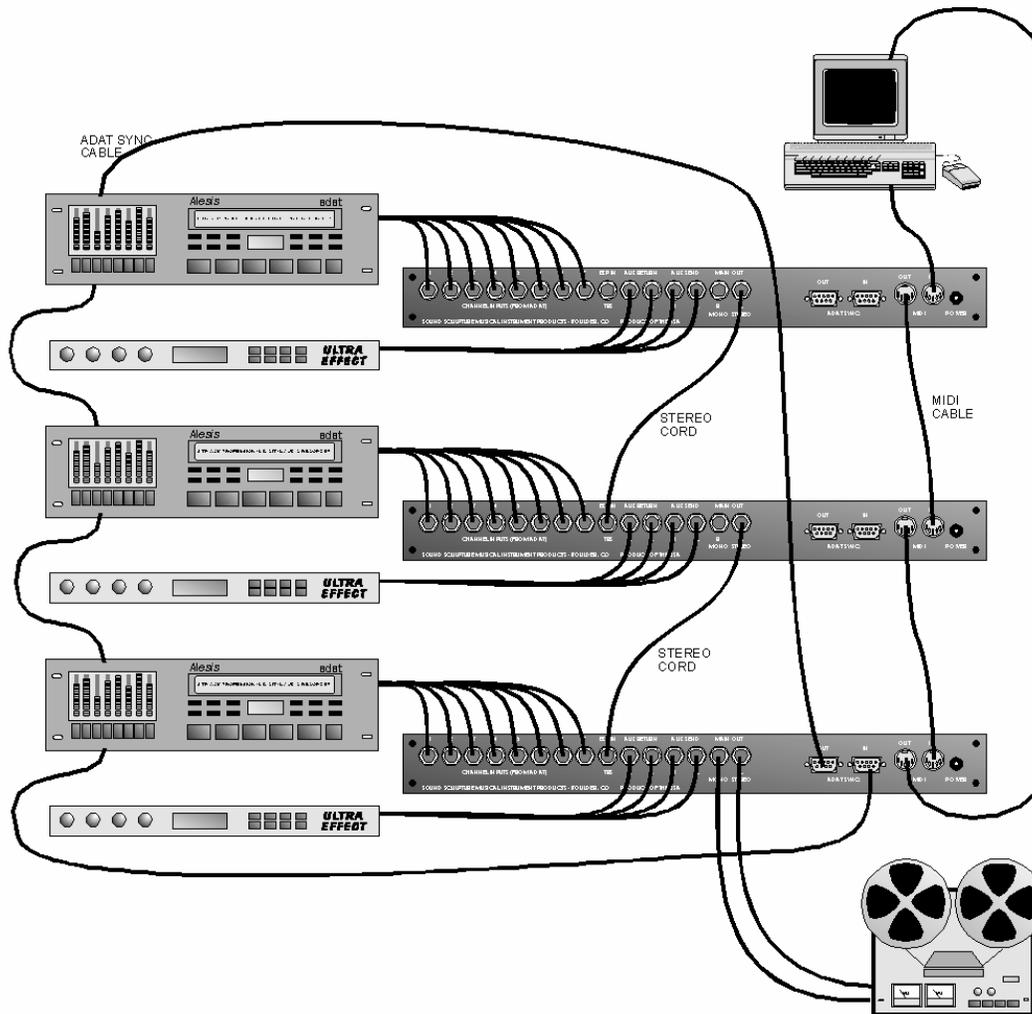
Sending automation data to an expanded system is the same as for one unit with the exception that the Controller and Program Change Commands are transmitted over different MIDI channels.

For example, in a two unit system, the first 8 graphic faders that control the channel levels to the main outputs would be programmed as Controllers 0-7 over channel 0, the next 8 faders which would control the levels of the second Cosmix would also be assigned Controllers 0-7 but over channel 1 instead and so on.

SOME EXPANDED SYSTEM EXAMPLES

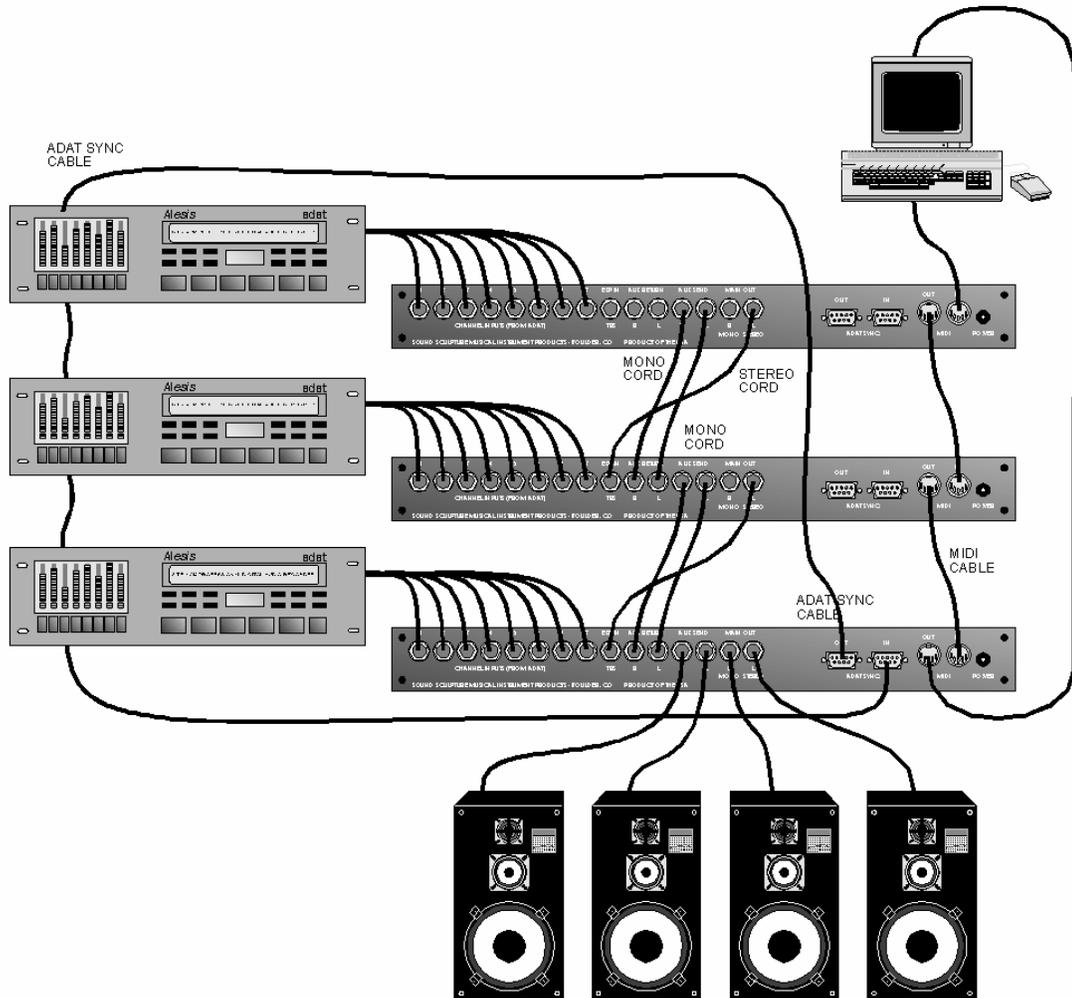
Use the following diagrams as examples of how to hook up the Cosmix in a variety of applications.

3 ADAT, 3 SIGNAL PROCESSORS FOR STEREO MIXDOWN



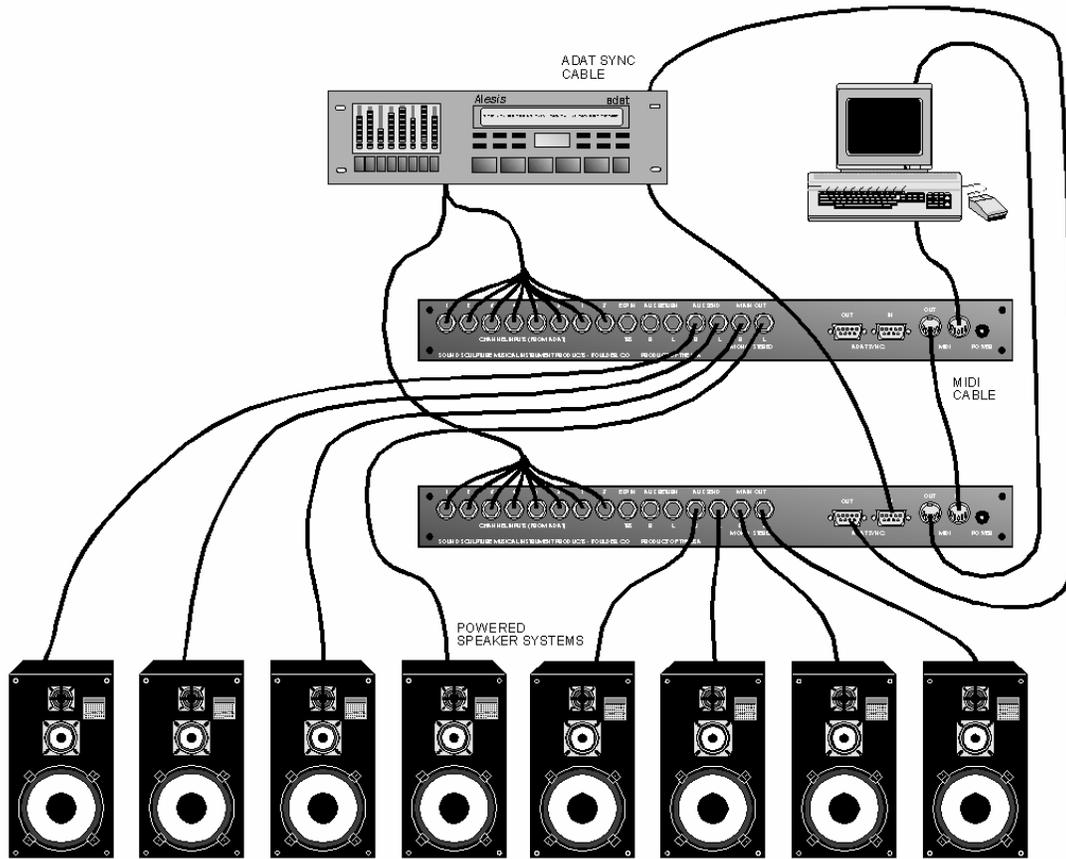
This setup allows mixdown of 24 tracks. A single stereo cable is used to tie one Cosmix to the next. Note only the last Cosmix in the MIDI chain is connected to the Adat sync. In addition, each 8 tracks gets its own signal processor which makes it convenient to add the appropriate processor for the group of tracks. For example, If one deck is all drum tracks, then perhaps as multi-effects would be appropriate for this deck while a second deck that has all guitar tracks might use a processor that is appropriate for guitar. A good reverb would might work for the third deck that contains mostly vocals.

3 ADAT, FOR 4 CHANNEL MIXDOWN



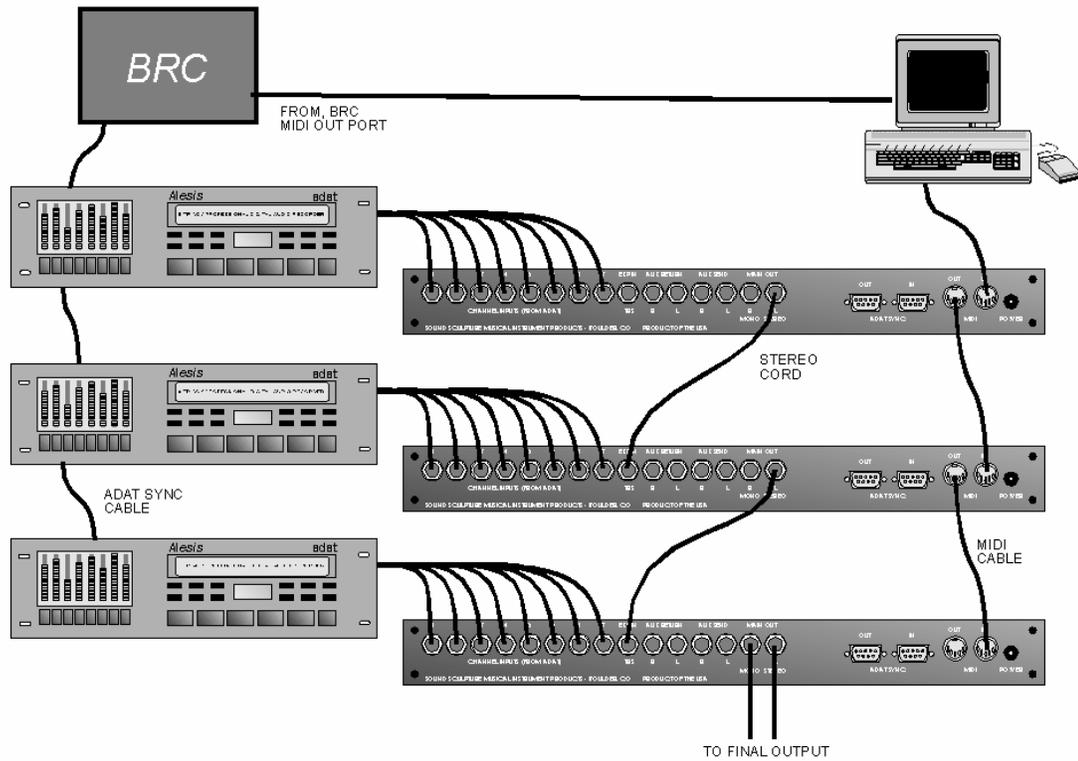
This arrangement is used to mix 24 Adats down to a 4 channel output. Note the additional 2 mono cords used to connect the Cosmix units together.

1 ADAT, 8 CHANNEL OUTPUT



By using 8 Y-style cords to connect each Adat output to 2 Cosmix units, the 8 Adat tracks can be mixed down to 8 outputs with full panning and level among all the outputs. In this arrangement, each Adat track has 8 faders connected to it making a total of 64 faders for the 8 outputs. Keep in mind that each of the two Cosmix systems are on their own MIDI channel.

3 ADATS AND A BRC



A BRC can be used in conjunction with the Cosmix system. In this case, the BRC takes full responsibility for generating MTC from the Adat time code and therefore, the MIDI OUT of the last Cosmix is not connected. In addition, no Sync connectors are used with the Cosmix units either. The Cosmix units are used strictly to control mixing and panning levels.

A WORD ABOUT SIGNAL LEVELS

The inputs to the Cosmix are perfectly matched to the output levels of the Adat when the internal jumpers are set for -10dBu operation (the factory setting), therefore no level adjustments are necessary. In addition, this matching insures that the best possible signal to noise ratio will be achieved during mixdown.

The gain from any of the 8 inputs to any of the 4 outputs is -12dB when the gains are set to maximum. This, in combination with the large headroom of the output insures that clipping is unlikely when all 8 inputs and aux returns are mixed down to the final outputs.

For expanded systems however, each stage contributes additional output to the next Cosmix in line. When 4 Cosmix units are combined with 4 Adats, the Combined signal of all 32 tracks eventually ends up in the last Cosmix. Still the Cosmix can handle such a mix. In the event that the combined output of the tracks exceed the limits of the output stage, clipping will result.

The Cosmix has a built in overload indication circuitry that can detect when signal levels reach -1dB of clip and output a System Exclusive signal on its MIDI output indicating the exact input or output that has the overload. This data can be detected by specialized software running on your computer to give a visual indication of the overload so the operator can take action to correct it such as reducing all of the fader levels a notch.

SYSTEM EXCLUSIVE OPERATION

The Cosmix uses System-Exclusive data to access some features not available through Control Change or Program Change values to perform some specific operations.

TRANSPORT CONTROL

The Cosmix will accept either standard MIDI Machine Control data, or manufacturer specific Sys-Ex data to control the transport on the Adat. Only REWIND, STOP, PLAY, and FAST FORWARD are supported.

For MIDI Machine Control the following data stream is used (values shown in hex). The data consists of the Sys-Ex status byte, the MMC id, the Machine id (in this case all machines are accessed), the sub id, the actual transport command value and the EOX byte.

REWIND	F0 7F 7F 06 05 F7
STOP	F0 7F 7F 06 01 F7
PLAY	F0 7F 7F 06 02 F7
FF	F0 7F 7F 06 04 F7

You may also use product specific Sys-Ex to control the Adat Transport. The data for this consists of the Sys-Ex status byte, Sound Sculpture manufacturer ID (3 bytes), unit id (universal shown), transport command, and EOX.

REWIND	F0 00 01 18 50 05 F7
STOP	F0 00 01 18 50 01 F7
PLAY	F0 00 01 18 50 02 F7
FF	F0 00 01 18 50 04 F7

FADE OR PAN OVER TIME (FADE COMMAND)

Sys-Ex bursts may be used to initiate a fade or pan over a specific amount of time. This command is extremely powerful since it allows massive amounts of fades and pans to take place across many Cosmix units while hardly using any MIDI bandwidth at all. A single Sys-Ex fade burst can replace up to 381 bytes of Control Change data in a situation where a full fade from max to min or min to max is required on a single channel and where no skipped codes are assumed. In a situation where 4 Cosmix units are hooked together, and where all 32 faders are moving at the same time a massive 48K bytes of data is needed requiring over 15 seconds to do a full fade if no skipped codes are to be allowed.

By using System Exclusive data the same situation requires only 8 bytes per fader resulting in a mere 1/3 second to complete the entire operation and allowing full fades as quickly as 50ms or less. In addition, the Cosmix always uses the smallest gain level increments when doing a fade except in the most extreme cases insuring that fades are very smooth and zipper free no matter how much activity is going on.

The format for this command is as follows (all values in hex):

F0 00 01 18	Status and manufacturer id number
4x or 50	Cosmix unit id where x is the MIDI channel number or 50 to address all units.
20	Fade command
ff	Fader or pan number to be controlled.
gg	Destination gain level or pan position from 0 to 127 (00 to 7f hex)
tl	Time low in 7 bit format in 4ms increments
th	Time hi in 7 bit format in 4ms increments
F7	EOX

The unit id number is a combination of 4x and the MIDI channel of the unit you wish the fade to occur in. For a unit which is set to channel 1 this would be 40 (hex) and for the 16th unit this value would be 4F. You can also command all of the units in the chain to respond to the burst by using the value 50 (hex). This would be useful if you wanted all the faders to go to zero in all of the units over a specific period of time. By addressing all of the units you only need 32 bursts to turn off all 512 faders in 16 units.

The command (20 hex) is the actual fade command.

The Fader or pan number addresses which of the 32 faders within the addressed unit is to be controlled. These numbers are identical to the Control Change numbers. So for example, if you wish to fade Input 1 to the Main Out, then use the value 00 here. To pan input 1 across the Main output use value 16 and so on. You can also use the alternate set of values given for 4 channel operation as well. So to do a level fade from input 1 to output 1 then use a value of 32 and so on. Refer to the charts in the stereo mix section and 4 channel section for all the allowable values.

The Destination gain level or pan position is the final value of the gain or pan control after the fade is complete. The fade gain or pan always starts from the current position and moves to the final value indicated in this byte. A gain value of 0 is off and a value of 127 is maximum level. For pan values, a value of 0 is fade to full left and a value of 127 is fade to full right with a value of 64 as fade to center.

The time value low and time value high bytes represent the 14 bits used to indicate time. The resolution is 4 ms. So a fade time of 4 ms would be 0001 or tl=01 and th=00. A value of 007f (tl=7f th=00) would be 127 times 4ms or about a half a second. Be careful not to exceed 127 in either byte since the high bit must always remain 0 in both bytes. So the next value after 007f would be 0100. The maximum time allowed is 7F7F or 16383 decimal. This gives a total fade time of about 65 seconds.

To simplify the task of figuring out the time number you can use these rules of thumb:

For fades below a half second, set th=00 and tl to the time in milliseconds divided by 4. So for a time of 200ms the value in tl would be 50 decimal.

For fades above a half second, simply set tl=00 and set th to the number of half seconds in the time. So to do a 10 second fade, set th = 20 decimal.

You may transmit a fade command to a particular fader at any time, even if a fade for that fader is currently in operation. This is useful if you want to keep a pan moving for example without ever coming to a resting point. For example, transmit a pan fade over 1 second but transmit a pan in the opposite direction after only 900ms. Then transmit the first command again 900ms after that and so on. This will insure that the pan keeps moving back and forth across the stereo image without ever stopping.

You may also transmit fades of different times to different faders. This can be very useful. For example you may wish to fade out all 8 inputs to the Main output over 1 second but you may want the reverb to fade out more slowly, such as 3 seconds. This gives the effect of all the tracks fading off into the distance. To perform this, transmit 16 bursts all at the same time with the first 8 set for 1 second and the second 8 set for 3 seconds. If all 16 bursts are programmed into a single button, then you can use this as a handy tool whenever you want to use this particular effect.

Or set a button to crosspan an entire stereo image to reverse stereo by programming a button to pan 4 tracks to the right over a half second and the other 4 tracks to the left over the same amount of time, then a second button to reverse this procedure. You can also go from stereo to mono by programming a button to fade all 8 tracks to a center pan value over some amount of time.

FADE RESTORE COMMAND

The Fade Restore command is a very powerful command used to restore a level or pan position to the value that was in effect before the last Fade command was issued for a particular controller. The most common use for this command is to perform a mute over time or a duck over time (where the levels reduce but not completely mute) and then returning to the original mix. Other uses is to pan to mono and then restore the original stereo image or pan to reverse stereo and back again.

The format for the Fade Restore command is: (all values in hex)

F0 00 01 18	Status and manufacturer id number
4x or 50	Cosmix unit id where x is the MIDI channel number or 50 to address all units.
21	Fade Restore command
ff	Fader or pan number to be restored.
tl	Time low in 7 bit format in 4ms increments
th	Time hi in 7 bit format in 4ms increments
F7	EOX

Whenever a fade is performed using the fade command (command 20) the value for the particular controller is always saved before the fade is executed. When a fade restore is executed (command 21), then the controller is made to fade back to the saved value at the fade time specified in the command.

If you wish to perform a slow mute/unmute, first transmit a fade command (20) to the controller to be muted at some specified time following the “fade” section above and using a gain value of 0. To unmute, transmit the fade restore command (21) using the same controller value that was used for the mute. Also specify either the same time or you may use a different time. The time (tl, and th) have the same meanings as described in command 20. The controller value will then return to the value that it had before receiving the fade command.

You can fade any number of controllers and then fade restore those controllers. The original values are save for all controllers separately.

A good application is to program a soft button in your sequencer with all of the level controllers to both the Main and Aux outputs with a time of 2 seconds or so. Then program another soft button with fade restore for the same controllers for the same time period. In this way you can fade out all audio with a single button and then use another button to restore the audio to the levels that you had before the fade without altering the mix. This is useful in a situation where you may want to fade out music to do a voice over then bring the music back up to where it was.

Another application is to program a button with a fade command to set the pan position of all the controllers to 63 (center position). Then program a second button to do a fade restore on all the pan controllers. In this way you can use one button to output a fade to mono, and the second button to restore the original stereo image over time.

A fade restore can be executed on a controller that is currently fading. The controller will stop the fade and begin its return over the time specified. If a fade restore is performed on a controller that was not previously faded, then the gain will not change.

ADDITIONAL SYS-EX COMMANDS

There are several additional System-Exclusive commands that can be used to for special purposes. These commands are normally not used unless you are creating a librarian or other specialized programs to use with the Cosmix. In all cases the 4x value in the header (F0 00 01 18 4x) indicates the specific unit you wish to talk where x is the channel number of the unit. You may optionally use 50 if you are only using 1 Cosmix unit since a Cosmix will always respond to 50 regardless of which channel it is set to. Do not use 50 if you have more than 1 Cosmix hooked up to avoid having all units responding at the same time.

REPORT VERSION: This command is used to tell the Cosmix to echo it's current PROM version. The version data is reported as 0X 0Y 0Z where these 3 bytes are the 3 digits of the PROM version. For example 01 05 00 indicates version 1.50. The format to request the version is:
F0 00 01 18 4x 46 F7

The unit will then respond with :
F0 00 01 18 4x 46 0X 0Y 0Z F7 where X,Y,Z are the 3 digits of the version number.

SET AUDIO OVERLOAD REPORTING ON OR OFF: These 2 commands are used to turn on or off the Cosmix reporting of any audio over levels. The Cosmix defaults to reporting off unless requested to be turned on by this command.

F0 00 01 18 4x 47 F7 Turn reporting on
F0 00 01 18 4x 48 F7 Turn reporting off (power up default)

When reporting is turned on the Cosmix transmits a burst of one or more Sys-Ex blocks every 100ms. If there is only one channel overloading, then there will be a single block in the burst. If more channels are overloading at the same time, then the burst will consist of as many blocks as there are channels overloading. Each block indicates the channel that is overloading as follows:

F0 00 01 18 4x 70 0y F7 where y indicates the channel that is overloading. 0-7 represents inputs 0-7, 8=Aux Right, 9=Main Right, A=Aux Left, B=Aux Right. The value 70 simply indicates that this is an over flow report.

REPORT CHANNEL NUMBER: This command will tell the Cosmix to report it's current channel number as selected by the hex switch on the back panel. If there is only one Cosmix, then you can use the value 50 in place of 4x to poll the cosmix since this ID is recognized by all Cosmix units regardless of it's channel setting. If there are several Cosmix units hooked together, each set to a different channel, then it's best to send out this command 16 times using 4x instead incrementing x each time until a unit responds. When you get a response, then you know that you have found a unit set to this channel. The command is as follows:

F0 00 01 18 4x(or 50) 45 F7

The response is:

F0 00 01 18 4x 45 0y F7 where y is the channel number. If y=0 then the channel is channel 1 and if y=F then the channel is 16.

SETTING THE INTERNAL JUMPERS

There are 2 groups of jumpers inside the Cosmix unit that can be changed for special situations. The MAIN/AUX jumpers and the INPUT LEVEL jumpers. The function of these jumpers is described here.

The MAIN/AUX jumpers are two groups of jumpers that can be set to convert an expanded 2 channel (stereo) Cosmix system into a 4 channel system. Both groups are labeled "MAIN" and "AUX" and all four jumpers in the two groups should always be set to the same way (either all to "MAIN" or all to "AUX"). These jumpers have the job of directing the AUX IN L and AUX IN R inputs to either the MAIN outputs (if set to "MAIN") or to the AUX OUT L and AUX OUT R (if set to "AUX") When set to MAIN this will mix a return from a signal processor with the main output. If set to AUX if you are using an expanded 4 channel system, where all 4 outputs from the previous Cosmix must pass through the next Cosmix. Please read this section to see if the jumper settings concerns you and how to set it if necessary.

If you are using only one Cosmix, the factory setting of the jumpers is suitable for operating either as a two channel system or a 4 channel system and may be left alone. The factory setting is all 4 jumpers set to "MAIN"

If you are using two or more Cosmix systems together to do a mixdown to stereo then you can also leave the jumpers at the factory setting with the jumpers set to "MAIN".

If you are using two or more Cosmix systems in a 4 channel system where both the EXT inputs and the AUX IN inputs are used as expansion inputs from a previous Cosmix, then these jumpers need to be set to the “AUX” side. To change the jumpers, follow these instructions.

Remove the 4 screws holding in the front panel using a standard Phillips style screwdriver.

Remove the front panel being careful not to disrupt the position of the 4 indicator LED's attached to the main board. Slide the top panel out a ways until the two jumpers are exposed. These jumpers are located just behind the 2 AUX RETURN audio jacks.

Notice the labels beside both jumpers. The jumpers are labeled “AUX” and “MAIN”. Move the two jumper on both groups from their factory setting of “MAIN” over to the sides labeled “AUX”.

Slide the top panel back in being sure that it sits in the groove in the back panel. Gently place the front panel back over the 4 indicators and reattach the panel. Be sure the top and bottom panel are seated properly into the two grooves along the upper and lower parts of the front panel.

SETTING THE JUMPERS FOR INPUT LEVELS

Refer to the above discussion for removal of the cover.

There are 8 jumpers just behind each of the 8 input jacks that can be individually set to change the input level to either -10dBv (consumer or Adat level) or +4dBu (pro audio level). These jumpers are factory set to consumer level. In most circumstances these jumpers can remain this way. If you have a piece of audio gear that you need to connect to the Cosmix and the input to the Cosmix becomes overloaded due to too high an input level, then the jumper for that channel can be changed to pro level to accept the higher signal.

With the jump set to the consumer level the nominal operating level is -10dBv with a maximum level of +5dBv for 15dB of headroom. +5dBv is equal to 5V p/p. With the jumper set at pro the nominal level is +4dBu with a maximum level of +13dBu for 9dB of headroom. +13dBu is equal to 10V p/p.

To set the input to consumer (factory default) simply place the jumper over both posts to connect the two. To set the input to professional mode, remove the jumper or set it only on one post (so you don't lose the jumper).

SPECIFICATIONS:

MAXIMUM INPUT LEVELS (INPUTS 1-8)	+5dBv (5v p/p) or +11dBv (10v p/p) with jumper change
MAXIMUM INPUT LEVELS (AUX INPUTS, EXP INPUT)	+12dBu
MAXIMUM OUTPUT LEVELS (AUX OUT, MAIN OUT)	+12dBu
NUMBER OF GAIN CELLS	32
RANGE OF GAIN	0dB to -63dB (1dB resolution) and mute
FREQUENCY RESPONSE	5Hz-100kHz (+.5dB-3dB) 20-20kHz(+/- .5dB)
DYNAMIC RANGE	105dB
THD+NOISE	.004%
GAIN FROM INPUT 1-8 TO MAIN OR AUX OUT	0dB (at maximum gain) or -6dB with jumper change
GAIN FROM AUX OR EXP TO OUT	0dB (independent of gain)
BLEEDTHROUGH (ANY IN TO ANY OUT AT MUTE)	<-90dB
SYS-EX FADE TIME RANGE	4MS to over 65 seconds in 4ms increments
ADDITIONAL SYS-EX COMMANDS	Adat transport control. Mute/unmute with variable slopes. Auto reporting of Main or Aux overload conditions.
ANTI ZIPPERING METHOD	zero cross detect
MIDI CONFORMITY	MIDI specification 1.00
MIDI I/O	MIDI IN, MIDI THRU/OUT (switches automatically)
MIDI CONTROL	Controllers 0-15 used for level. 16-31 used for pan. (2 chan mode). Controllers 32-63 used for level (4chan mode). Program 0-7 used for mute. Program 8-15 used for unmute (both modes). Units assignable to any of the 16 MIDI channels.
AUDIO CHANNELS	all analog audio channels with resistive gain elements (no VCA's)
DIMENSIONS	19"x5"x1.7" (1U)
WEIGHT	4 lbs.
MIDI CHAIN LENGTH	16 units maximum
INPUT IMPEDANCE (INPUTS 1-8)	10k Ohms
INPUT IMPEDANCE(AUX INPUT, EXP INPUT)	30k Ohms
OUTPUT IMPEDANCE	300 Ohms
INPUT AND OUTPUT CONFIGURATIONS	single ended
POWER SUPPLY	external modular 18VDC @ 250ma center pin positive
WARRANTY	2 years

