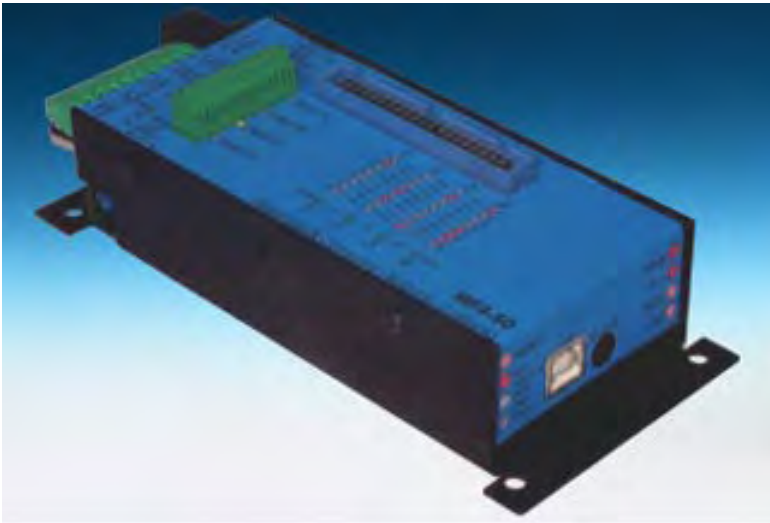


Mp3-50, Mp3-50/8, Mp3-50/40 **Audio & Show Control Systems**

Preliminary - printed September 19, 2003



The **Mp3-50** is a complete, stand alone Mp3 Audio playback system. Just add a power supply and your speakers, and it will play Mp3 audio from the SmartMedia card.

The **Mp3-50/8** & **Mp3-50/40** add eight or forty digital Show Control outputs, DMX-512, MIDI or networked RS-422 serial port input and DMX-512 output to a **Mp3-50** player. The **Mp3-50/8** & **Mp3-50/40** are complete audio *and* Show Control solutions.

The **Mp3-50/8C** & **Mp3-50/40C** adds WWV synchronized scheduling. This gives you 'Atomic' clock accuracy for carillons, schools, churches, bell towers & industrial annunciator systems.

Safety Disclaimer: Any electronic or mechanical system has the potential to fail. Certain applications using Gilderfluke & Company equipment may involve potential risks of death, personal injury or severe property or environmental damage (“Critical Application”).

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A note about this manual:

This manual covers the specifics of the **Mp3-50, Mp3-50/8 or Mp3-50/40**. To program the **Mp3-50, Mp3-50/8 or Mp3-50/40** you will need to also need the **PC-MACs** manual sections that cover the **PC-MACs** software.

The **Mp3-50, Mp3-50/8 or Mp3-50/40** is typically programmed in '**Software-only**' or '**Hardwareless RealTime**' mode. If you are using the **PC-MACs MACs-USB** for programming your **Mp3-50, Mp3-50/8 or Mp3-50/40** through the DMX-512 input, please refer to the **PC-MACs 'Unlimited'** mode.

The full **PC-MACs** manual can be downloaded from our web site at:

<http://www.gilderfluke.com>

Mp3-50, Mp3-50/8 or Mp3-50/40 Overview

The Mp3-30 is a complete audio playback box. It uses a SmartMedia card to hold audio files stored in the standard Mp3 format. With no moving parts to wear out, the **Mp3-50** should well outlast the speakers it is attached to. The **Mp3-50** can be used singly, or in combination with additional **Mp3-50s**, **Mp3-50/8s** or **Mp3-50/40s**, BR-SmartMedia cards or any Gilderfluke & Co. equipment. It can provide the audio for animated shows and displays, fountains, fireworks, safety announcements, advertising, alarm systems, window displays special effects, signs, clocks and carillons, or anything else that needs a sound to be played back upon command.

Audio is loaded onto the **Mp3-50** by first converting it to a Mp3 format file. There are a number of shareware programs for doing this, as well as Mp3 encoders included as part of most audio editing programs¹. The AudioFiles are moved to the **Mp3-50's** SmartMedia card by temporarily moving the SmartMedia card to an appropriate slot or reader attached to your computer, or plugging in a USB cable to the front of the **Mp3-50** from your computer. In the later case, the **Mp3-50** will appear as a 'removable disk drive' on your computer. You can then 'drag and drop' your audio files onto to the SmartMedia card.

The **Mp3-50/8** and **Mp3-50/40** are complete stand-alone Show Control and Audio Playback Systems. The **Mp3-50/8s** or **Mp3-50/40s** can be used singly, or in combination with additional **Mp3-50s**, **Mp3-50/8s** or **Mp3-50/40s**, BR-SmartMedia cards or any Gilderfluke & Co. equipment. It can be used to control animated shows and displays, fountains, fireworks, lighting, sound systems, simulators, slide and movie projectors, fiber optics, window displays, motors, pneumatic and hydraulic systems, neon special effects, signs, machines and machine tools in process control, or anything else that can be controlled by an electrical

¹ Contact our sales staff for current Mp3 file converter recommendations.

signal.

The Show Control side of the **Mp3-50/8** or **Mp3-50/40** is programmed using our **PC-MACs** Show Control software. While programming, data can be sent to the **Mp3-50/8** or **Mp3-50/40** through its DMX-512 input, 'Net Serial' RS-422 port, or RS-232 serial port. Once programmed, data is sent to the **Mp3-50/8** or **Mp3-50/40** through the PC's serial port or loaded onto the SmartMedia card for permanent storage. The **Mp3-50/8** or **Mp3-50/40** can then be disconnected from the PC and it will run all by itself.

When used with a 'Hardwareless RealTime' licensed copy of **PC-MACs** software, **Mp3-50/8s** or **Mp3-50/40s** can have their outputs programmed and updated in real time with just a PC and a serial connection. When used with the **PC-MACs** hardware (MACs-SMP or MACs-USB Smpte Card), up to sixty-four **Mp3-50/8s** or **Mp3-50/40s** can be updated in RealTime through the DMX-512 port.

Features of the **Mp3-50/8** or **Mp3-50/40** include:

- Stand alone stereo playback of standard Mp3 audio files. Up to 255 different AudioFiles can be selected and played. Sound capacity is only limited by the size of the SmartMedia card installed. Player supports all standard Mp3 encoding rates, including 'variable'.
- Two line level outputs (RCA Jacks), or you can use the powerful 11 watt/channel onboard amplifier. In most applications, this amplifier means that all you need to add are appropriate speakers, a SmartMedia card and a power supply to get up and running.
- Audio data is stored in standard SmartMedia cards. You can use the built-in USB port to temporarily attach the **Mp3-50** to your computer as a 'removable hard drive' or move the SmartMedia card itself to your computer for high speed 'drag-n-drop' downloading. As a bonus feature, you can also use a USB connected **Mp3-50** to download photos from your digital camera, or program SmartMedia cards for any other devices that need them. This includes the BR-SmartMedia.
- All configuration is done through a user friendly Windows-based program. You can set the volume, EQ, and what each of sixteen

trigger inputs does. Eight of the inputs are from the outside world through optoisolators. The other eight inputs come directly from the Show Control side of the **Mp3-50/8** or **Mp3-50/40**, if these options are installed. Any of the inputs can be used to ramp audio to preset levels, select and play specific AudioFiles or select AudioFiles from a preset list or randomizer. Shows can be selected directly by an input, or using a binary pattern to allow access to all 255 different possible audio files.

- Mounts stand alone, in 2-3/4" Augat Snap Track, or up to 10 in a **Mp3-50/CC10** cage (**Mp3-50** only).
- Runs on any voltage from 12 to 24 volts DC. The **Mp3-50s**, **Mp3-50/8s** or **Mp3-50/40s** can even be run from batteries! For maximum output with the onboard amplifier, use 24 volts, and add approximately 25 Watts (for amplifier) plus your loads when selecting your power supply.

Features of the Mp3-50/8 and Mp3-50/40 include:

- Adds eight (**Mp3-50/8**) or forty (**Mp3-50/40**) digital (on/off) Show Control outputs to a **Mp3-50**.
- DMX-512 input for programming or controlling the audio playback. DMX-512 output for sixteen channel from onboard Show Control memory or when running from RealTime updates through the RS-232 serial port.
- Automatic 'program in place' download through the serial port on your PC or through the SmartMedia card. There are no Eproms to program or install! The amount of time it takes to download shows the **Mp3-50/8** or **Mp3-50/40** depends on the length of the show(s). Short shows take only seconds. Shows that fill the entire **Mp3-50/8s** or **Mp3-50/40s** memory will take about ten minutes to download. Show audio and animation data can be distributed to clients by sending out preloaded SmartMedia cards.
- 512 KBytes of nonvolatile Show Control memory. Using all forty **Mp3-50/40** Show Control outputs, this gives a show capacity of about an hour at thirty updates per second! About five hours for the **Mp3-50/8** using all eight of its outputs! Once downloaded, show data is retained for approximately forty years, with or without power applied. Up to 255 individual shows can be loaded onto a **Mp3-50/8** or **Mp3-50/40** at one time.
- Mp3 Audio files can be selected, played and audio levels controlled from the Show Control System. Left and Right audio out-

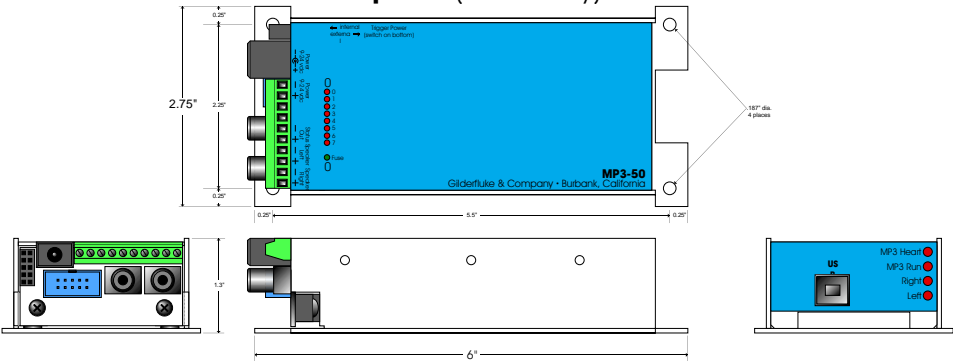
puts can be controlled individually, or assigned to the same analog control channel.

- Two hundred fifty-five shows can be loaded onto a **Mp3-50/8** or **Mp3-50/40** at one time. Shows can be accessed sequentially or directly using the four optoisolated inputs or serial commands sent through the RS-422 serial port. The 'Next' show can be set for the end of any show, allowing you to loop a single show or build 'chains' of shows.
- The **Mp3-50/8** or **Mp3-50/40** supports update rates from one frame per second to a maximum of one hundred frames per second. Different shows can each be programmed at different frame rates. This allows you to program 'delay' shows that tick along at a low frame rate between your main shows, and use very little memory.
- Four optoisolated inputs to synchronize **Mp3-50/8s** or **Mp3-50/40s** with pushbuttons or other real-time events. Multiple **Mp3-50/8s** or **Mp3-50/40s** can be triggered simultaneously or sequentially. Each **Mp3-50/8** or **Mp3-50/40** input can be set to start, stop, pause, continue, or directly select and play a specific show. Different actions can be requested on each inputs' opening or closing edges. If not used for anything else, the four optically isolated inputs can be used to select and play up to fifteen shows at random through using a binary weighted pattern.
- Shows can also be triggered via the RS-232 or RS-422 serial ports, MIDI 'notes', or IR Triggers.
- Each of the thirty-two outputs is rated for a continuous load of 150 ma., or 500 ma. peak. This is enough to drive small solenoid valves, relays, LEDs and similar loads. Relays can be used to control higher current or voltage loads (DRV-03 or SSR-FS). If more than forty outputs are needed, additional **Mp3-50/8s** or **Mp3-50/40s** can be added to give you as many outputs as you need.
- The outputs from a **Mp3-50/8** or **Mp3-50/40** can be fed to Digital to Analog converters (like our single channel DAC-08 or four channel DAC-QUAD) wherever you need 0-10 volt analog control signals.
- When programming, or when installed as a permanent part of a larger control system, the **Mp3-50/8** or **Mp3-50/40** accepts data through its DMX-512 and RS-422 serial port. This data is used to update the outputs, and takes precedence over the on board Flash memory.

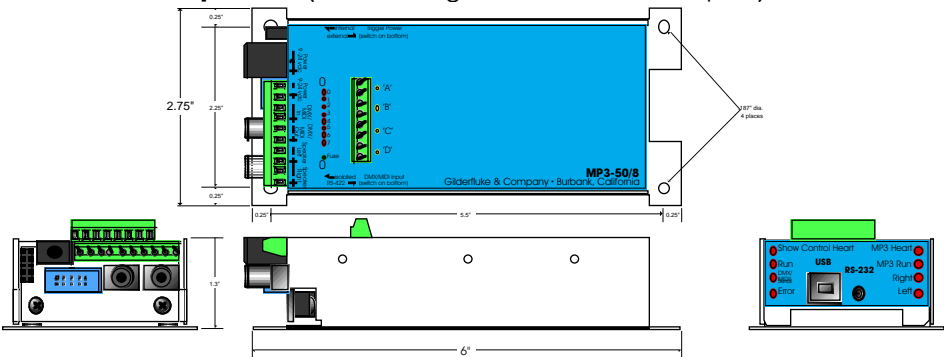
Mp3-50/8 or Mp3-50/40 Indicators

There are only a small number of connections, indicators, and configuration switches on each **Mp3-50**, **Mp3-50/8**, **Mp3-50/40**.

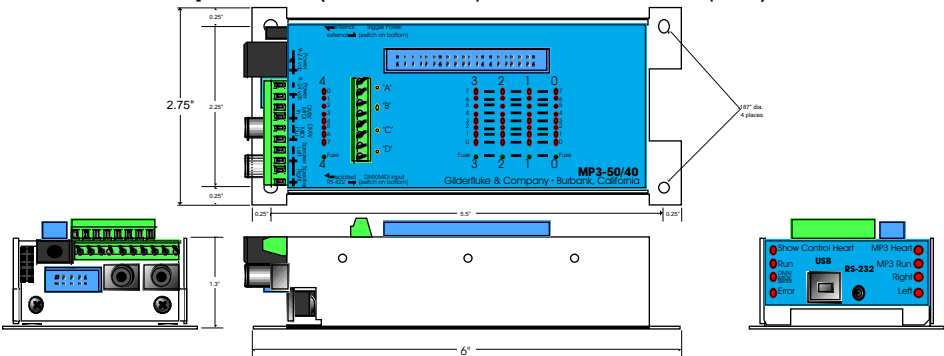
Mp3-50 (audio only):



Mp3-50/8 (audio & eight Show Control Outputs):



Mp3-50/40 (audio & forty Show Control Outputs):



There are up to fifty-seven Status LEDs on the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**:

- 1) **Mp3 Heart:** (***Mp3-50, Mp3-50/8, Mp3-50/40***) The Mp3 'heartbeat' will always flash so that you can see that the audio playback half of the **Mp3-50, Mp3-50/8** or **Mp3-50/40** is alive. If this LED doesn't flash at least twice per second, you should power down the **Mp3-50, Mp3-50/8** or **Mp3-50/40** and check the power supply and connections to the **Mp3-50, Mp3-50/8** or **Mp3-50/40**.
- 2) **Mp3 Run:** (***Mp3-50, Mp3-50/8, Mp3-50/40***) This LED will light to show that the **Mp3 Player** is currently playing back an audio file.
- 3) **Right:** (***Mp3-50, Mp3-50/8, Mp3-50/40***) This LED flickers to give you a rough approximation of the audio being played out of the right side of the audio player. It is upstream of the volume processing done on the **Mp3-50**, and will **not** dim to reflect changes in volume level.
- 4) **Left:** (***Mp3-50, Mp3-50/8, Mp3-50/40***) This LED flickers to give you a rough approximation of the audio being played out of the left side of the audio player. It is upstream of the volume processing done on the **Mp3-50**, and will **not** dim to reflect changes in volume level.
- 5) **Show Control Heart:** (***Mp3-50/8, Mp3-50/40***) The Show Control 'heartbeat' will always flash so that you can see that the Show Control half of the **Mp3-50/8** or **Mp3-50/40** is alive. If this LED doesn't flash at least twice per second, you should power down the **Mp3-50/8** or **Mp3-50/40** and check the power supply and connections to the **Mp3-50/8** or **Mp3-50/40**. During flash memory downloads, this LED will flash alternately with the DMX/MIDI/Serial LED at twice the normal heartbeat rate.
- 6) **Run:** (***Mp3-50/8, Mp3-50/40***) This LED will light to show that the Show Control half of the **Mp3-50/8** or **Mp3-50/40** is currently running a preprogrammed show. This LED will also flash at half of the frame rate (usually 15 Hz) when the **Mp3-50/8** or **Mp3-50/40** is receiving RealTime update data either through the DMX-512 or serial ports.
- 7) **DMX/MIDI/Serial:** (***Mp3-50/8, Mp3-50/40***) This LED will light to show that the **Mp3-50/8** or **Mp3-50/40** is receiving RealTime Update data through the DMX-512, MIDI or serial ports. If the **Mp3-50/8** or **Mp3-50/40** is receiving show starts from MIDI input, then this led will flash for about 1/10th of a second each time a 'start' happens. During flash memory downloads, this LED will flash alternately with the Show Control Heart LED at twice the normal heartbeat rate.

- 8) **Board Error: (*Mp3-50/8, Mp3-50/40*)** This LED will flash to show you that the **Mp3-50/8** or **Mp3-50/40** has sensed one of the following errors:
- a) **Just booted:** Lights for a short period each time the **Mp3-50/8** or **Mp3-50/40**'s microcontroller starts up.
 - b) **RealTime DMX-512 Update Error:** The optional checksum in the DMX-512 RealTime update didn't agree with the data received.
 - c) **RealTime Serial Update Error:** The checksum in the RS-422 serial port RealTime update didn't agree with the data received.
 - d) **Download Error:** There was an error in the data being downloaded to the **Mp3-50/8** or **Mp3-50/40**.
 - e) **Download Timeout:** If the data being downloaded to the **Mp3-50/8** or **Mp3-50/40** stops mid-stream, this LED will flash as the **Mp3-50/8** or **Mp3-50/40** returns itself to normal operating mode.
 - f) **Data Verification Failure:** If you ask the **Mp3-50/8** or **Mp3-50/40** to verify the data in its flash memory, and it finds an error, it will flash this LED as well as displaying an error message on your computer screen.
 - g) **Memory locked:** If you try to clear the flash memory or send a show to the **Mp3-50/8** or **Mp3-50/40** while the Write Protect is in the 'locked' position.
- 9) **J8 'A', 'B', 'C', & 'D' Input LEDs: (*Mp3-50/8, Mp3-50/40*)** These four LED will light to show current is flowing through the four Show Control Trigger inputs. These LEDs are on the input side of the optoisolators, so a dim glow may indicate an input is getting a current, but not necessarily enough to trigger an action. These four trigger inputs are the only way to use a switch closure input to start the animated sequence playing on a **Mp3-50/8** or **Mp3-50/40**.
- 10) **Output LEDs (*8 LEDs on Mp3-50, 8 LEDs on Mp3-50/8, 40 LEDs on Mp3-50/40*):** These LEDs show the current status of the Show Control digital outputs. If a LED is lit, then that output is 'ON'. Because the outputs of a **Mp3-50/8** or **Mp3-50/40** are 'Open Collector, Switch To Ground', you can ground out any output pin, and the appropriate LED will light. This can be useful when diagnosing output wiring problems. If you are commanding 'on' an

output and you don't see a LED, then the output is probably drawing too much current and the output is 'self protecting'. Disconnect the load and see if the LED now lights. If it does, then it definitely is an overload problem. If it does not, then try turning 'on' some of the other outputs. If they light OK, then the output driver might be damaged. If they do not, then verify your addressing and retest.

A **Mp3-50** has eight optically isolated trigger inputs which can be used to select, start and change the audio levels of the audio half of the **Mp3-50** player. These LEDs will light to show trigger inputs being sent into the audio half of the **Mp3-50**. The only output channel on a **Mp3-50/8**, and the last output channel on a **Mp3-50/40** are shared with these audio trigger inputs. Normally these are not used to trigger the audio on a **Mp3-50/8** or **Mp3-50/40**. The 'hidden' MPU trigger inputs from the Show Control half of the **Mp3-50/8** or **Mp3-50/40** are normally used instead. This leaves these eight outputs free to be used as outputs.

11) Fuses (1 LED on Mp3-50, 1 LED on Mp3-50/8, 5 LEDs on Mp3-50/40): The eight inputs of a **Mp3-50** and the eight outputs of the **Mp3-50/8** or **Mp3-50/40** make one, eight-bit wide 'channel'. The forty outputs of the **Mp3-50/8** or **Mp3-50/40** are divided into five, eight-bit wide 'channels'.

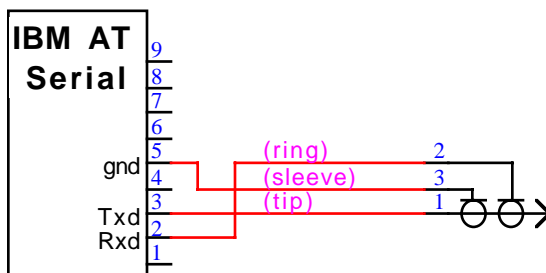
The eight inputs of a **Mp3-50**, eight outputs of a **Mp3-50/8**, and last channel of a **Mp3-50/40** are shared with the eight optically isolated inputs to the audio half of the **Mp3-50/8** or **Mp3-50/40**. This channel, and only this channel can be switched between using 'internal' and 'external' power using the switch on the bottom of the unit. This will be lit when there is an external voltage source present between pins #1 and #10 of the 1/4 J6 input, when the switch is in the 'external' position. If the fuse LED is off for this channel, check to make sure that this switch is not in the 'external' position if you are not feeding this channel an external voltage source.

Each channel is fused for approximately one Amp of continuous current. These LEDs light to show if the fuses are OK. If any are out, then a short circuit (or too heavy of a load) is dragging the outputs down and causing the fuse to open. The fuses are actually 'PTC fuses', which act more like circuit breakers. Once the overload is removed, they reset.

Mp3-50, Mp3-50/8 or Mp3-50/40 Connections

- 1) **RS-232 Serial Port: (Mp3-50/8, Mp3-50/40)** The serial command set is identical to, and compatible with all of the RS-422 Serial Ports used on Gilderfluke & Company products. One difference between the **Mp3-50/8** or **Mp3-50/40** and most of our products is that the serial port is the primary method used to configure it. A **Mp3-50/8** or **Mp3-50/40** is normally configured through the '**Mp3 Configurator**' program which is also used to configure the Mp3 half. This configuration is downloaded to the Show Control half of the **Mp3-50/8** or **Mp3-50/40** each time the **Mp3-50/8** or **Mp3-50/40** is turned on. The **Mp3-50/8** or **Mp3-50/40** has a serial 'configuration' mode which will allow you to check and modify the status and configuration of the Show Control half of the **Mp3-50/8** or **Mp3-50/40**. This is used to configure the animation half of a **Mp3-50/8** or **Mp3-50/40** if the audio half is not yet, or never is going to be used.

The serial data signals from the **Mp3-50/8s** or **Mp3-50/40s** are brought out on a 1/8" three conductor 'stereo' socket. Its pin out and cross connect to the standard serial port on a PC is as follows:



The **Mp3-50/8** or **Mp3-50/40** expects to see the serial data in the following format:

ONE START BIT
EIGHT DATA BITS
ONE STOP BIT

- 2) **USB: (Mp3-50, Mp3-50/8, Mp3-50/40)** The standard USB port can be used to download audio files and configurations to the **Mp3-50/8** or **Mp3-50/40**. Alternatively, the SmartMedia card can be removed from the **Mp3-50/8** or **Mp3-50/40** and plugged into an appropriate slot on your computer to configure and load audio

files onto it. Once the **Mp3-50/8** or **Mp3-50/40** software drivers have been loaded onto your computer, you can plug a USB cable from your computer to the **Mp3-50/8** or **Mp3-50/40**. After a few moments the **Mp3-50/8** or **Mp3-50/40** will appear on your computer as a 'removable hard disk drive'. You can then access the SmartMedia card in the **Mp3-50/8** or **Mp3-50/40** just as you would any disk that is attached to your computer. You can even use the **Mp3-50/8** or **Mp3-50/40** to download pictures from the SmartMedia card you normally use in your digital camera.

- 3) **Power Supply: (Mp3-50, Mp3-50/8, Mp3-50/40)** The power supply connections to the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** are available on both a 2.1 mm power jack and two of the screw terminal positions. For mobile, permanent or higher current applications, you may wish to use the screw terminals instead of the 2.1 mm power jack. It is less prone to being accidentally unplugged or vibrating loose. The screw terminals are also a very convenient place to 'steal' a little 'juice' to power the four optically isolated inputs.

If you are not using the onboard amplifier, the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** can be run from any supply voltage from 9 VDC to 24 VDC. If you are using the onboard amplifier and want to reach the maximum possible power from the amplifier, you will need to run the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** from 24 VDC.

The Show Control outputs are powered from this supply connection as well. If you are driving 24 VDC loads, then run the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** on 24 VDC. If your loads require 12 VDC, then run the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** on 12 VDC.

The power supply connections are protected from reversed polarity. An idle **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** draws only about ??? milliamperes. The onboard amplifier and loads which the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** is controlling will usually draw far more current than the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** itself. If you are using the onboard amplifier, you should allow at least 25 Watts for it, in addition to the current for controlling your animation loads (**Mp3-50/8** and **Mp3-50/40**). If you hear 'clicks' or clipping on your amplifier outputs, then your power supply capacity may need to be increased.

- 4) **DMX-512/MIDI Serial In: (Mp3-50/8, Mp3-50/40)** Two position Screw Terminals. This input can be selected for RS-422 (high-z) or optoisolated (low-z) input by a switch on the bottom of the unit.

DMX-512 is normally used with the 'RS-422' position. MIDI will only work in the 'optoisolated' position. The Net Serial or IR Trigger modes are normally used in the 'RS-422' position, but will actually work in either position.

If you need to optically isolate the signal, but feed multiple **Mp3-50/8** or **Mp3-50/40**, you can use a single **Mp3-50/8** or **Mp3-50/40** as an isolator/buffer: The external signal can be fed into one of the 'optoisolated' DMX/MIDI inputs on any one **Mp3-50/8** or **Mp3-50/40**, and the other units fed in parallel from the DMX/MIDI output from that first unit. All of these other 'down-stream' **Mp3-50/8s** or **Mp3-50/40s** should have their inputs set for RS-422.

This connection has five possible modes of operation. These are selected through the '**Mp3 Configurator**' program.

- a) **DMX-512:** The switch on the bottom of the **Mp3-50** should be in the RS-422/High-z position to be used for DMX-512. The **Mp3-50/8** or **Mp3-50/40** will stop playing any shows from the onboard flash memory as soon as valid DMX-512 signal is received.

The DMX-512 standard was developed by the United States Institute for Theatrical Technology (USITT) for a high speed (250 Kbaud) asynchronous serial data link. Although it was originally designed for controlling light dimmers, it is now supported by hundreds of suppliers throughout the world for controlling all kinds of theatrical equipment.

Even though the DMX-512 standard calls for 512 channels of data, the DMX-512 transmission from **PC-MACs** is limited to 256 eight-bit wide channels. If you have enabled the DMX-512 checksum, you can address your DMX-512 compatible output devices to respond to any address between 0 and 255. Addresses above the 256th are used in **PC-MACs** for transmitting a checksum. The **Mp3-50/8** or **Mp3-50/40** can use this to verify that the data received from **PC-MACs** has no transmission errors in it. If you address a light dimmer or other DMX-512 device to addresses 256 or 257, you will see this verification data displayed as a flickering pattern.

If you have NOT selected DMX-512 checksums, the '**Mp3 Configurator**' will allow you to set the addresses for DMX-512 to any address from 1 through 512. Address '1' is

equivalent to address '0' if you were using checksums.

The DMX-512 checksums should be enabled if the DMX-512 that is sent to the **Mp3-50/8** or **Mp3-50/40** is coming from ANY piece of Gilderfluke & Company equipment. The checksums assure that the **Mp3-50/8** or **Mp3-50/40** will not update its outputs on 'bad' data.

- b) MIDI Notes:** The switch on the bottom of the **Mp3-50** must be in the optoisolated/Low-z position to be used for MIDI. The MIDI should be fed to the **Mp3-50/8** or **Mp3-50/40** as follows:

MIDI pin #1 = no connection
MIDI pin #2 = no connection
MIDI pin #3 = no connection
MIDI pin #4 into - DMX/MIDI In
MIDI pin #5 into + DMX/MIDI In

The **Mp3-50/8** or **Mp3-50/40** will respond to MIDI 'Note On', 'Note Off', 'Reset', 'All Notes Off' and 'All Sounds Off'. Running commands for 'Note On' and 'Note Off' commands are accepted. All other defined MIDI commands should be received and properly ignored. There are two ways the **Mp3-50/8** or **Mp3-50/40** can be configured to respond to MIDI Note commands.

- 1)** When 'MIDI Notes Trigger Animation' checkbox is OFF, then MIDI is used to directly access the Show Control Outputs and Mp3 audio files:
- a)** Any MIDI notes which are below the number you have set for the 'MIDI Offset' are ignored.
 - b)** The next eight (**Mp3-50/8**) or forty (**Mp3-50/40**) MIDI notes are mapped directly to the 8/40 Show Control outputs. These can be used to ring mechanical bells or control animation directly from MIDI notes.
 - c)** The next eight MIDI notes are sent to the 'MPU Interface' to select and trigger audio files, mute, and otherwise control the **Mp3 Player**.
 - d)** The remaining notes are used to directly select and play individual AudioFiles stored on the **Mp3 Player**. Only note 'On' MIDI commands will have any effect on selecting and playing AudioFiles. The 'velocity' of the note will set the playback level of the triggered AudioFile, if Re-

alTime level control has been enabled on the **Mp3 Player**.

The DMX/MIDI/Serial LED will be lit once MIDI is received through this port. This LED will remain on for approximately 10 seconds after the MIDI is removed from the **Mp3-50/8** or **Mp3-50/40**. The **Mp3-50/8** or **Mp3-50/40** will stop playing any shows from the on-board flash memory as soon as valid MIDI signal is received. It will not restart automatically if the MIDI signal is removed.

- 2) When 'MIDI Notes Trigger Animation' checkbox is ON, then MIDI notes are used to directly access Animation sequences stored in the flash on the **Mp3-50/8** or **Mp3-50/40**. These sequences in turn can access audio files on the **Mp3 Player**, as well as controlling the Show Control outputs. When operating in this mode:

- a) Any MIDI notes which are below the number you have set for the 'MIDI Offset' are ignored.
- b) The remaining notes are used to directly select and play individual animation sequences stored on the Show Control half of the **Mp3-50/8** or **Mp3-50/40**. These animation sequences can in turn select and play audio files and control audio levels on the **Mp3 Player**. Only 'Note On' commands are used to select and play animated shows when operating in this mode.

The DMX/MIDI/Serial LED will be flash for 1/10 second each time a preprogrammed show is started by a MIDI note. The Show Control side of the **Mp3-50/8** or **Mp3-50/40** can still accept starts though the serial port and four trigger inputs while operating in this mode.

- c) **Net Serial:** The Optoisolated/RS-422 switch on the bottom of the **Mp3-50** can be in either position. If feeding multiple **Mp3-50/8** or **Mp3-50/40**, then the 'RS-422' position should be used.

One big disadvantage of the RS-232 serial port on the **Mp3-50/8** or **Mp3-50/40** is that only one **Mp3-50/8** or **Mp3-50/40** can be attached to the same serial port at the same time. This is the unfortunate nature of a RS-232 port. If you had a bunch of **Mp3-50s** in the same system, this could

quickly chew up a lot of serial ports! Most of our other products use RS-422 serial ports. Along with being able to run your wires up to a mile (RS-232 is limited to about 50 feet if the wind is blowing in the right direction), RS-422 allows lots of devices to be attached to the same serial port at the same time.

Because it is not uncommon to access and control a large number of repeaters on the same serial line, the DMX-512/MIDI input can be selected to turn the DMX-512/MIDI port into a multidrop Serial network. This mode parallels the data received on the DMX-512/MIDI input pins with the serial data received on the regular RS-232 serial port. The serial data is still output from the **Mp3-50/8** or **Mp3-50/40** still comes ONLY through the RS-232 serial port on the front to the unit.

This serial port can be used to select and play shows, check the status of a card, or AutoDownload shows from any point on the network. Since it is 100% compatible with the RS-422 serial ports on all other Gilderfluke & Company equipment, a multidrop network can consist of up to 256 **Mp3-50/8** or **Mp3-50/40** and any other Gilderfluke & Company devices. The only requirement is that they all be set to unique addresses.

Since RS-422 is probably the most widely used of industrial data networks, a myriad of other pieces of equipment are available which will also work with the Net Serial mode. These allow you to do tricks like controlling the **Mp3-50/8** or **Mp3-50/40** through a wireless modem using off-the-shelf hardware.

A typical application is to use a touch screen operator interface to access and play shows. These generally use a user definable graphical interface. You pretty much draw a button, and then attach a string to it. When this on-screen button is pushed, this string is sent out to control the downstream equipment.

- d) **IR Mode:** The Optoisolated/RS-422 switch on the bottom of the **Mp3-50** can be in either position, but RS-422 is preferred. This turns on a special serial port mode on the **Mp3-50/8** or **Mp3-50/40** which allows it to be used with our InfraRed Transmitters and Receivers. The IR Remote mode is typically used to trigger an animation or sound system

mounted on a vehicle, turntable, or other installation where wires can't be used. The DMX-512 /MIDI port is forced to 1200 baud and all serial port commands are disabled on the DMX-512/MIDI port when this mode is ON. Any binary show number received by the serial port for more than ten times will trigger the requested show. Typically the transmitters are placed along the path of the vehicle's travel to trigger the appropriate animation sequences at the appropriate times.

The connections to the IR Remote Receiver are as follows (view is facing end of cable with latch up):

	<u>NAME</u>	<u>COLOR</u>	<u>SIGNAL FUNCTION</u>
LEFT	Ground	WHITE	Ground
	n/c	BLACK	no connection
	n/c	RED	no connection
	- TxD	GREEN	- DMX-512/MIDI Input
	+ TxD	YELLOW	+ DMX-512/MIDI Input
RIGHT	Ground	BLUE	Ground

In addition to these connections, the IR Receiver requires a 7 to 24 volt DC power supply connection. This is normally attached to the two pads marked "+" and "-" on the receiver. A jumper option allows you to bring this in through the blue wire on the RJ-11 connector.

When in this mode the 'Early Starts' for all shows should be set to 'NOT Steppable'. If this is not done, then the same show will be retriggered over and over again until the vehicle moves out of the IR beam from the transmitter.

The IR Transmitter has an eight position dipswitch which sets which show it selects. The lower nibble of the address are set with the first four switches, and the upper nibble is set with the last four. Valid show numbers are 01h through FFh:

<u>SWITCH #1</u>	<u>SWITCH #2</u>	<u>SWITCH #3</u>	<u>SWITCH #4</u>	<u>LOWER NIBBLE OF ADDRESS</u>
OFF	OFF	OFF	OFF	x0h
ON	OFF	OFF	OFF	x1h
OFF	ON	OFF	OFF	x2h
ON	ON	OFF	OFF	x3h
OFF	OFF	ON	OFF	x4h
ON	OFF	ON	OFF	x5h
OFF	ON	ON	OFF	x6h
ON	ON	ON	OFF	x7h
OFF	OFF	OFF	ON	x8h
ON	OFF	OFF	ON	x9h
OFF	ON	OFF	ON	xAh
ON	ON	OFF	ON	xBh
OFF	OFF	ON	ON	xCh
ON	OFF	ON	ON	xDh
OFF	ON	ON	ON	xEh
ON	ON	ON	ON	xFh
<u>SWITCH #5</u>	<u>SWITCH #6</u>	<u>SWITCH #7</u>	<u>SWITCH #8</u>	<u>UPPER NIBBLE OF ADDRESS</u>
OFF	OFF	OFF	OFF	0xh
ON	OFF	OFF	OFF	1xh
OFF	ON	OFF	OFF	2xh
ON	ON	OFF	OFF	3xh
OFF	OFF	ON	OFF	4xh
ON	OFF	ON	OFF	5xh
OFF	ON	ON	OFF	6xh
ON	ON	ON	OFF	7xh
OFF	OFF	OFF	ON	8xh
ON	OFF	OFF	ON	9xh
OFF	ON	OFF	ON	Axh
ON	ON	OFF	ON	Bxh
OFF	OFF	ON	ON	Cxh
ON	OFF	ON	ON	Dxh
OFF	ON	ON	ON	Exh
ON	ON	ON	ON	Fxh

- e) None:** If the DMX-512/MIDI input is not being used, then the DMX-512 transmission is enabled on the DMX-512/MIDI output terminals.
- 5) DMX-512/MIDI Output:** (*Mp3-50/8, Mp3-50/40*) Two position Screw Terminals. If any of the modes where the DMX-512/MIDI input is being used (DMX-512 Input, MIDI Input, Net Serial or IR Trigger), this pair of screw terminals will retransmit whatever comes in on the DMX-512/MIDI inputs. This works something like the 'MIDI

Through' port on a MIDI device, where no content changes take place in the data as it passes through the **Mp3-50/8** or **Mp3-50/40**. The data is simply buffered and retransmitted.

The output levels on these pins is RS-422. It can be used directly to control other RS-422 devices. For MIDI, you should add a pair of 220 Ohm resistors in series with the two output wires, but this is not strictly necessary (there are already resistors in the MIDI devices which may be receiving this signal).

The MIDI should be wired from the **Mp3-50/8** or **Mp3-50/40** to the next MIDI device as follows:

- MIDI pin #1 = no connection
- MIDI pin #2 = Shield (ground)
- MIDI pin #3 = no connection
- MIDI pin #4 from - DMX/MIDI Out
- MIDI pin #5 from + DMX/MIDI Out

If none of the serial Receive modes of the **Mp3-50/8** or **Mp3-50/40** (DMX-512 Input, MIDI Input, Net Serial or IR Trigger) are being used, then the serial port is turned around and used to transmit DMX-512. Data for this DMX-512 output stream comes from either the RS-232 serial port if the **Mp3-50/8** or **Mp3-50/40** is being fed RealTime update messages, or the Show Control flash memory, if shows have been programmed into the **Mp3-50/8** or **Mp3-50/40**.

DMX-512 transmission is limited to sixteen, eight bit wide channels. The addresses of these DMX-512 channels are set in one of two ways:

- a) If running from RealTime updates through the RS-232 serial port, the DMX-512 data will always start with channel '0' (which is channel '1' on most dimmers). Data after the first channel will be padded with '0' values through the 256th byte, and then followed by two checksum bytes.

The Show Control Outputs, Audio Level Control, And Repeater Control channels typically overlap with some of the lighting control channels when operated in this mode.

- b) If running from a show file which has been AutoDownloaded to the **Mp3-50/8** or **Mp3-50/40**'s Flash memory, the 'First address' of the downloaded data will be the first DMX-512 channel to have your programmed data in it. Channels before and after these sixteen channels will be padded with '0'

values up until the 256th bytes sent, then followed with a two byte checksum.

The Show Control Outputs, Audio Level Control, And Repeater Control channels often overlap with some of the lighting control channels when operated in this mode. If you don't want to do this, you can actually use all sixteen DMX-512 channels for lighting control if you address your Show Control Outputs, Audio Level Control, and Repeater Control channels *after* the sixteen lighting control channels. Of course this will eat up your Flash memory capacity mighty quickly.

- 6) **Status Output: (Mp3-50)** Two position Screw Terminals. This output is the uncommitted collector (+) and emitter (-) of a darlington optoisolator. It can be used as a remote 'audio running' indicator for an external system. The current capability of this output is only about 50 ma.. It can be used to drive LEDs and solid state relays, but not heavy or inductive loads.
- 7) **Left Speaker Output: (Mp3-50, Mp3-50/8, Mp3-50/40)** Two position Screw Terminals. This is one of the two outputs of the **Mp3-50, Mp3-50/8** or **Mp3-50/40** 's onboard amplifier. It can be used with any speakers from 4 ohms upwards. The amplifier is rated for a maximum output of 11 Watts per channel. This is plenty powerful for most applications. External amplifiers can be fed from the Line Level Outputs if more power than this is needed.
- 8) **Right Speaker Output: (Mp3-50, Mp3-50/8, Mp3-50/40)** Two position Screw Terminals. This is one of the two outputs of the **Mp3-50, Mp3-50/8** or **Mp3-50/40**'s onboard amplifier. It can be used with any speakers from 4 ohms upwards. The amplifier is rated for a maximum output of 11 Watts per channel. This is plenty powerful for most applications. External amplifiers can be fed from the Line Level Outputs if more power than this is needed.
- 9) **'1/4 J6' Inputs/Outputs:** Ten Position IDS Connector. This connection serves two completely different functions, using the very same pins:

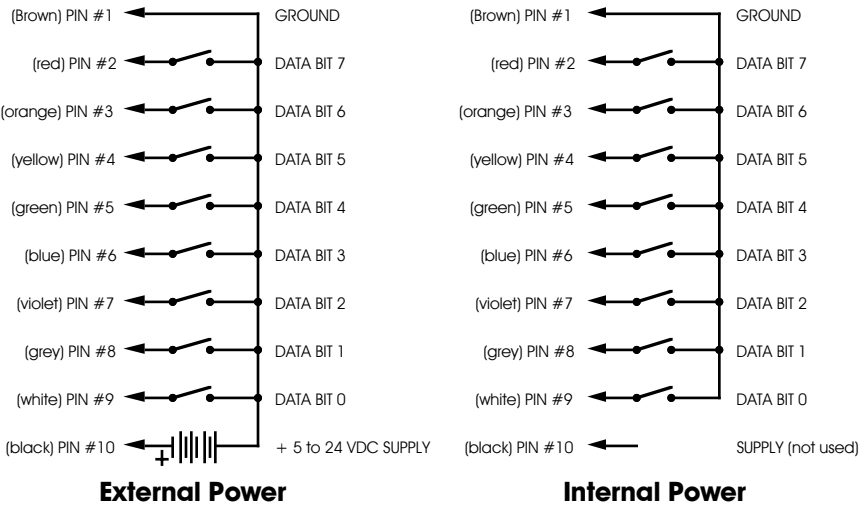
Mp3-50: These pins are used to connect to the eight optically isolated trigger inputs which are used to select AudioFiles, start, mute, half mute, pause, or unmute the **Mp3 Player**. What each of these pins will do is set using the '**Mp3 Configurator**' program. These inputs **CAN NOT** be used to start an animation sequence running on the Show Control half

of a **Mp3-50/8** or **Mp3-50/40**.

Mp3-50/8: This connector is used for the optically isolated trigger inputs of the **Mp3 Player**, but these are not normally used to control the **Mp3 Player**. The same connector is also used as the eight Show Control outputs. The inputs to the **Mp3 Player** are typically configured not to do anything, and the 'MCU' Show Control Trigger channel is used instead for controlling the **Mp3 Player**. This leaves all eight of these pins available for Show Control Outputs.

If you need to use a switch input to mute or stop the audio, it can still be wired into this connector. The input to the **Mp3 Player** is then configured for the desired function. The corresponding Show Control output is left unprogrammed, so that show data does not interfere with the operation of the **Mp3 Player**.

Mp3-50/40: This connector is also used as the optically isolated trigger inputs the **Mp3 Player**, and the last eight of the forty Show Control outputs. Other than that, it is identical to a **Mp3-50/8**.

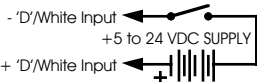
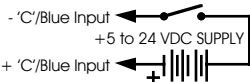
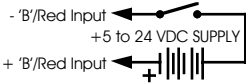
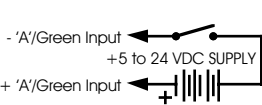


For a **Mp3-50**, the 1/4 J6 input is strictly a Mp3 input. It is optically isolated. It can be set to run from an external power source or the same power as the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** (default configuration). This is selected by moving the switch on the bottom of the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**. The 'external'

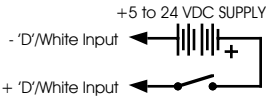
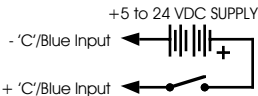
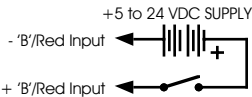
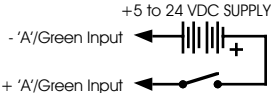
setting is used when you want to completely isolate the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** from the switch closures that control it.

On a **Mp3-50/8** or **Mp3-50/40**, this input/output is almost always run in the 'Internal' power mode. The only exception to this is if you are going to be running the devices controlled by these eight Show Control outputs from a different voltage from the rest of the **Mp3-50/8** or **Mp3-50/40**. As an example, if the **Mp3-50/8** or **Mp3-50/40** is running from 24 VDC, and you need to control eight 12 VDC relays, you can power this one port from a 12 VDC power supply separate from the main one (you will need to connect the grounds of the two power supplies).

- 10) Left Line Output:** Female RCA jack. This is one of the two line level outputs from the **Mp3 Player**. It is used for attaching an external amplifier to the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**.
- 11) Right Line Output:** Female RCA jack. This is one of the two line level outputs from the **Mp3 Player**. It is used for attaching an external amplifier to the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**.
- 12) J8 'A', 'B', 'C' & 'D' inputs:** These are four optically isolated digital inputs which can be used to start, stop, pause or select specific show sequences to play on the Show Control of the **Mp3-50/8** or **Mp3-50/40**.

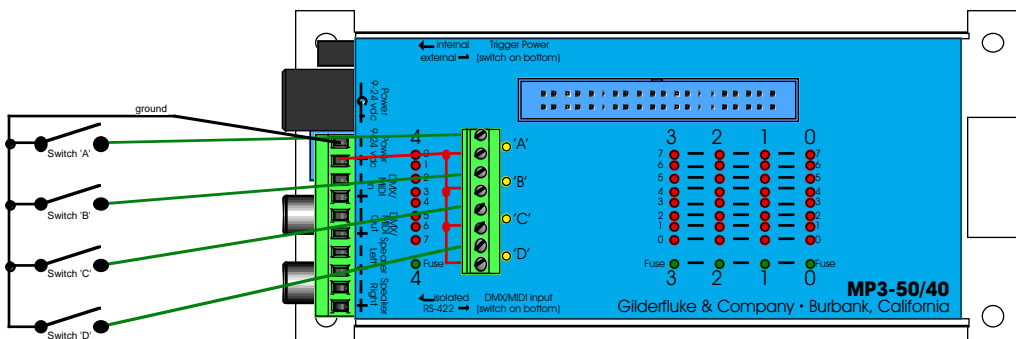


Switching Negative Side



Switching Positive Side

In most cases, you will simply be 'borrowing' the power for these switches from the adjacent power terminals:



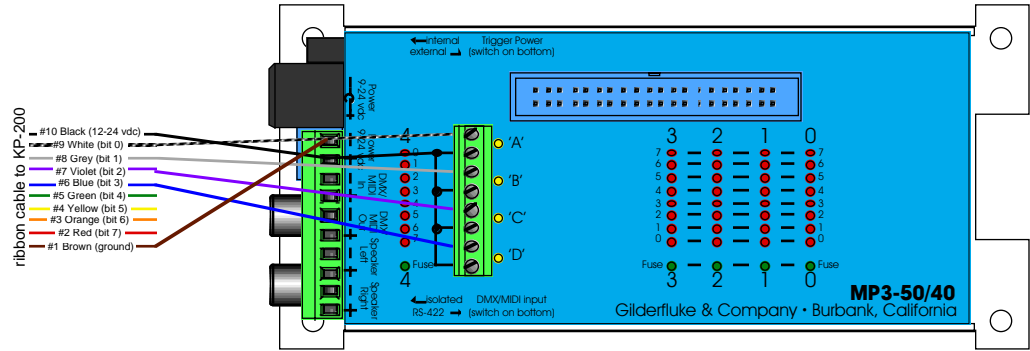
Any event can be triggered on either the 'closing' or 'opening' edge of any input. A 'closing' is when you apply a voltage to an input. An 'opening' is when that voltage is removed. The inputs can be triggered on any voltage from 12 to 24 VDC. If you don't have an external source of power for these two inputs, you can 'steal' some juice from the **Mp3-50/8s** or **Mp3-50/40s** power supply connections. The two screw terminals with the Mp3-50's power on them are immediately adjacent to these inputs for just this purpose.

These four inputs are uncommitted optoisolators. Effectively, you are sending the external control signal into a LED which has a resistor wired in series. This requires external power be supplied from somewhere. If the device you are controlling the input from supplies power, then all is well. If you are wiring these inputs to simple dry switch closures, you will need to 'steal' the power for them from somewhere. Conveniently, there is the 'power' screw terminals adjacent. You can pick up whatever power is being used to run the **Mp3-50/8** or **Mp3-50/40** from these two screw terminals.

'A', 'B', 'C' & 'D' Binary: *Firmware versions 1.07 and later only.* The four optically isolated digital inputs can be used to select up to fifteen different shows directly with a binary weighted pattern of bits. TO do this, you must set all four of these inputs (both opening & closing edges) as 'unused' when you generate your AutoDownload file from PC•MACs. The binary pattern is applied as follows:

show #	'A'	'B'	'C'	'D'	comment
0	off	off	off	off	not used (there is no show '0')
1	on	off	off	off	
2	off	on	off	off	
3	on	on	off	off	
4	off	off	on	off	
5	on	off	on	off	
6	off	on	on	off	
7	on	on	on	off	
8	off	off	off	on	
9	on	off	off	on	
10	off	on	off	on	
11	on	on	off	on	
12	off	off	on	on	
13	on	off	on	on	
14	off	on	on	on	
15	on	on	on	on	

If you are using our KP-200 for selecting and playing shows, it is wired as follows. The connection to the KP-200 is through a ten position ribbon cable. Power for the KP-200 in this example is being 'borrowed' from the **Mp3-50/8** or **Mp3-50/4**. If you are going to be running the cable from the KP-200 to the **Mp3-50/8** or **Mp3-50/40** a long distance, or if you are picking up audio 'noise' through this input, you can use a separate power supply to completely isolate the KP-200 and the **Mp3-50/8** or **Mp3-50/40**.



If used with the **'Atomic' Clock** option, the **'C'/Blue** input can be used to disable scans of the RTC schedules when the input is opened. This can be used to stop sounds from playing automatically when they shouldn't. Examples of where this feature can be used are:

- a) In a church bell tower, where a simple switch opening can be used to temporarily disable bells from ringing during a service.
- b) In a Theme Park, where this input can be tied to the existing power management grid to disable tolling when the park is closed.
- c) If you have a show or sound which should not be interrupted by a scheduled event, or if schedule scans are causing glitches in your show playback. You can set the show/sound so that it 'can not' be stepped on, but if you have a particularly long schedule that must be scanned, it may cause a hesitation in the show which is running. By using a show control output wired into this input, you can control when schedule scans can and can not take place during different parts of the show.

If used with the **'Atomic' Clock** option, the **'D'/White** input is what is used to resynchronize the RTC with the external **'Atomic' Clock**. The time which has been entered in the **Mp3 Configurator** must agree with the time set for the alarm on the **'Atomic' Clock** module. In most cases, the reset time is set about a second earlier than the 'alarm' time, to offset for the slight delays in starting a Mp3 playback.

We are using 3:05:01 as the default resynchronization time. The external **'Atomic' Clock MUST** be set so that the alarm goes off at 03:05:00. The extra second we are offsetting by is to allow for the 1 second lag before a Mp3 SoundFile starts playing after it is triggered. It is at 3:05 AM so that when daylight savings starts and ends, there will be no more than one hour before the **Mp3-50/8** or **Mp3-50/40** is resynchronized to the appropriate time. Any earlier, and the daylight savings transition might be missed until the next resynchronization time.

A single two conductor cable connects the **'Atomic' Clock** module to the **Mp3-50/8** or **Mp3-50/40**. This wire lands on the 'D'/White input to the **Mp3-50/8** or **Mp3-50/40** (the striped lead is the positive, bottom most terminal). The input to the **Mp3-50/8** or **Mp3-50/40** is optically isolated. If needed, you can stretch these wires for hundreds of feet, if needed.

The link between the **'Atomic' Clock** module and the **Mp3-50/8** or **Mp3-50/40** can be tested by pressing the 'snooze' button atop the **'Atomic' Clock**. This will light the backlight on the LCD

display, as well as the LED indicator for the 'D'/White input to the **Mp3-50/8** or **Mp3-50/40**. This will also set the RTC inside the **Mp3-50/8** or **Mp3-50/40** to the completely WRONG time, if the connection is working. You must manually set the time within the **Mp3-50/8** or **Mp3-50/40** after testing it in this way. If you don't want this to happen when testing this connection, power down the **Mp3-50/8** or **Mp3-50/40** before doing this test. The LED will light even with the **Mp3-50/8** or **Mp3-50/40** off. Power the **Mp3-50/8** or **Mp3-50/40** back up when you are finished testing.

To permanently prevent such accidental clock 'miss' settings after the '**Atomic**' Clock is installed, you can open the battery compartment and cut the wire which runs through it. This will disable the 'snooze' button, and thereby prevent it being hit accidentally in the future.

13) 'J6' Digital Outputs: Forty Position IDS Connector. Each **Mp3-50/40** has forty outputs. This connector is used for the first thirty-two outputs. The last eight appear on the '1/4 J6' connector on the back of the **Mp3-50/40**.

These J6 Show Control outputs are just like the standard outputs used on all Gilderfluke & Company Show Control Systems. Forty and ten position transition connectors are available for the **Mp3-50/8s** or **Mp3-50/40s** to adapt the ribbon cables to screw terminals.

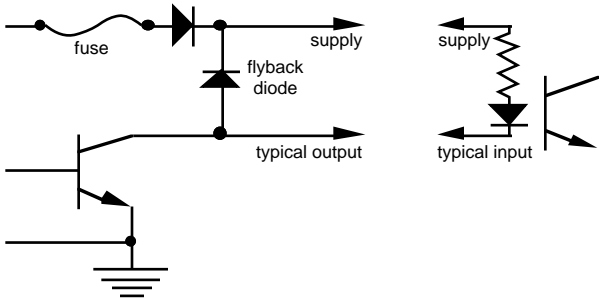
The output connections for all Gilderfluke & Company Show Control Systems are through 'J-6' output cables. These are forty wire ribbon cables which are made up of four identical eight-bit wide 'channels'. A J-6 cable is often split up into four individual channels. Each '1/4 J-6' ribbon cable is made up of ten wires, and can be used to control eight individual 'digital' (off/on) devices, or one eight-bit wide 'analog' device. Each group of ten wires also includes a common power supply and ground wire.

To simplify wiring to any Gilderfluke animation system, the connectors used on the 1/4 J-6 cables are what are called 'insulation displacement' (IDS) connectors. These simply snap on to an entire cable, automatically 'displacing' the wire insulation and making contact with the wires within. This means that an entire ten wire cable can be terminated in seconds. All connectors are polarized, to keep them from being plugged in backwards. Although there are tools made specifically for installing these connectors, the tool we find works best is a small bench vise.

If attaching discrete wires from the J6 ribbon cable connector presents a problem, we have forty and ten position transition connectors are available for the **Mp3-50/8s** or **Mp3-50/40s** to adapt the ribbon cables to screw terminals. Ribbon cable to screw terminal adapters are also available from a number of different sources.

Any eight digital devices or one eight-bit analog device can be connected to any 1/4 J-6 cable as shown. The LED between the ground (pin #1 brown) wire and supply (pin #10 black) wire acts as an indicator that is lit if the fuse for that channel is OK.

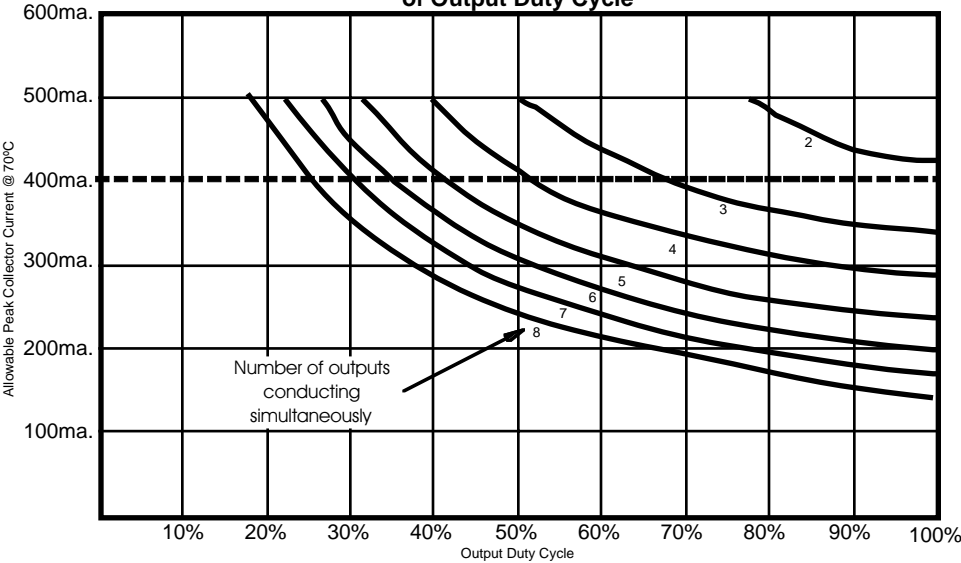
All outputs are open collector switches to ground. Small flyback diodes are included in the outputs for driving inductive loads. Larger inductive loads may require flyback diodes be installed directly across the loads. Power is supplied through a diode and a solid state circuit breaker to the common pin(s) on the connector. A safe level of current is 150 milliamperes simultaneously on each output. This is sufficient to drive most small relays, valves and other similar loads directly. If fewer than eight outputs are on at one time, then the outputs are rated as follows.



The supply line for each 1/4 J-6 is PTC fused for 1 amp. You should treat each 1/4 J-6 as an individual, and not cross the outputs or supply lines from one channel to the lines from any other channel. Doing this won't cause any damage, but can reduce the protection for the outputs that the fuses normally provide.

The current Output Capacity of each output is as shown in the following chart:

Peak Collector Current as a function
of Output Duty Cycle



Each J-6 cable is arranged in the following order:

<u>wire number</u>	<u>color</u>	<u>wire function</u>
1	brown	circuit ground
2	red	channel 0 data bit 7
3	orange	channel 0 data bit 6
4	yellow	channel 0 data bit 5
5	green	channel 0 data bit 4
6	blue	channel 0 data bit 3
7	violet	channel 0 data bit 2
8	gray	channel 0 data bit 1
9	white	channel 0 data bit 0
10	black	+ VDC unregulated power supply
11	brown	circuit ground
12	red	channel 1 data bit 7
13	orange	channel 1 data bit 6
14	yellow	channel 1 data bit 5
15	green	channel 1 data bit 4
16	blue	channel 1 data bit 3
17	violet	channel 1 data bit 2
18	gray	channel 1 data bit 1
19	white	channel 1 data bit 0
20	black	+ VDC unregulated power supply
21	brown	circuit ground
22	red	channel 2 data bit 7
23	orange	channel 2 data bit 6
24	yellow	channel 2 data bit 5
25	green	channel 2 data bit 4
26	blue	channel 2 data bit 3
27	violet	channel 2 data bit 2
28	gray	channel 2 data bit 1
29	white	channel 2 data bit 0
30	black	+ VDC unregulated power supply
31	brown	circuit ground
32	red	channel 3 data bit 7
33	orange	channel 3 data bit 6
34	yellow	channel 3 data bit 5
35	green	channel 3 data bit 4
36	blue	channel 3 data bit 3
37	violet	channel 3 data bit 2
38	gray	channel 3 data bit 1
39	white	channel 3 data bit 0
40	black	+ VDC unregulated power supply

Since it is unusual to have more than 50% of the outputs on at any one time, you can usually assume the system has a 250 ma output current capacity per output. If you are going to be turning on lots of heavy loads at the same time, you should derate this to 150 ma.. This is sufficient to drive the majority of loads which will be directly connected to the outputs of the animation system. If additional current capacity is needed, or if you need to drive higher voltage loads, you can connect relays as needed to the outputs of the animation system. Coincidentally, boards for doing this are available from Gilderfluke & Company. These include:

DPDT relay board: A set of eight electromechanical relays with double pole/double throw contacts rated at 5 amps each.

Reed relay board: A set of eight small electromechanical relays with normally open contacts rated at 150 ma each.

I/O module: A set of eight small solid state relays with normally open contacts rated at 3.5 amps each (alternating current and direct current relays available).

Solid State Relay Fanning Strip: For connecting up to eight popular 'hockey puck' style relays to a 1/4 J-6 output cable. These are available with capacities of up to 75 amps each.

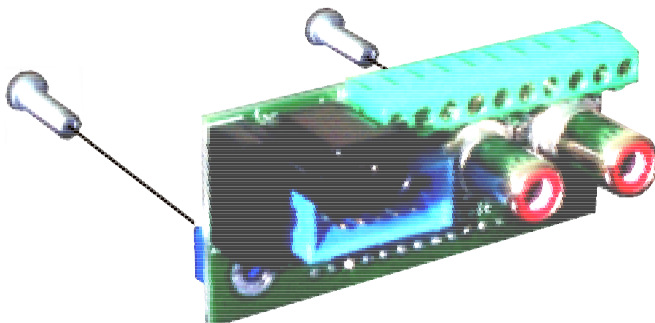
Mp3-50/CC-10 Card Cage

The **Mp3-50/CC-10** is a card cage designed to hold up to ten **Mp3-50s** in 2U (3-1/2") of standard 19" rack space. The **Mp3-50/CC-10** can also be used with **Mp3-50/8** or **Mp3-50/40**, but there is no space between the cards for the animation trigger inputs or Show Control Outputs (**Mp3-50/40** only). In most cases, you will have to leave every slot adjacent to a **Mp3-50/8** or **Mp3-50/40** vacant.

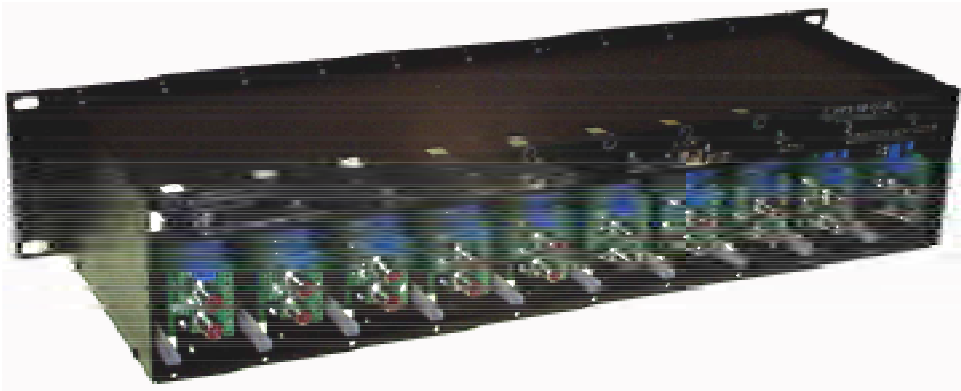
Once installed in a **Mp3-50/CC-10**, the DMX-512/MIDI serial ports on **Mp3-50/8** or **Mp3-50/40** cards are all daisy chained together. These serial ports can be used for DMX-512, networked serial, IR Triggers or MIDI input to **Mp3-50/8** or **Mp3-50/40** cards. **Mp3-50s** do not include the DMX-512/MIDI serial port.



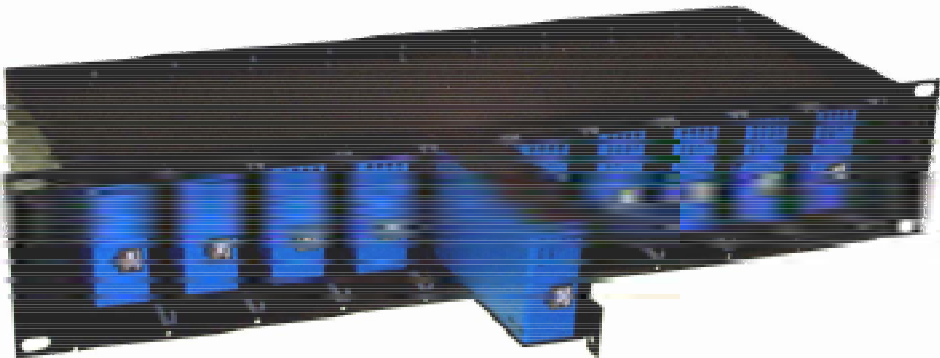
Mp3-50, **Mp3-50/8** or **Mp3-50/40** cards are installed in a **Mp3-50/CC-10** by first removing the two screws which hold the connector card to the end of the **Mp3-50**. The connector card at the end of the **Mp3-50** is then removed to be installed in the **Mp3-50/CC-10**.



The same two screws which you removed are inserted through the same holes through the connector card of the **Mp3-50**, but going the opposite direction. These two screws are then used to hold the connector card into the **Mp3-50/CC-10** (the cards and the screws are installed through the front of the cage). As the connector card is plugged in to the backplane, make sure that all twelve pins of J2 are inserted correctly into the mating connector on the backplane of the **Mp3-50/CC-10**.



Now the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** can be plugged into the card cage. Nothing else needs to be removed or changed on the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** before they are inserted into the **Mp3-50/CC-10**.



Power can be wired into any of the card cage positions, or through the heavy current screw terminals. The latter should be used if you are using the amplifiers or Show Control outputs on **Mp3-50/8** or **Mp3-50/40** cards. This is because the total current draw can exceed the capacity of the 2.1 mm power connector or smaller screw terminals located on the back of each **Mp3-50**.

The DMX-512/MIDI serial port is daisy chained from higher numbered

slots towards lower number slots. If a single slot is left unpopulated, or populated with a **Mp3-50**, will break the daisy chain. This can be used to divide the backplane into two or more universes.

If you are daisy chaining MIDI, run the MIDI signal into the highest numbered populated slot in the **Mp3-50/CC-10**. This card **MUST** be set for an optoisolated, current loop input. All of the consecutive cards downstream of the first card should be set for RS-422 operation.

If you are daisy chaining DMX-512 or networked serial commands, all of the cards should be set for RS-422 operation. Again, the signal is wired into the highest numbered populated slot and will be daisy chained through all of the adjacent lower numbered slots.

An **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** can be converted back to stand-alone use by simply reversing the installation process. Remove the two screws which hold the connector card into the **Mp3-50/CC-10**, Plug it back into the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**, and secure it with the two screws.

PC-MACs Shows for Mp3-50/8

This section gives some hints for setting up the shows that will be used by the Show Control side of a **Mp3-50/8**. There are literally thousands of possible configuration arrangements. Most applications will use one of the following configurations. The most common configuration is the 'b' option. The 'Show Capacities' shown is at 30 frames (updates) per second.

Mp3-50/8:		1st	MPU	DMX-	Vol.	Vol.	Show
#	description	Anim.	Control	512	Right	Left	Capacity
a	8 digitals/MPU	0	x	x	x	x	5 Hours
b	8 digitals, 8 MPU	0	1	x	x	x	2.5 hours
c	8 digitals, 8 MPU, 1 volume	0	1	x	2	2	97 min.
d	8 digitals, 8 MPU, 2 volume	0	1	x	2	3	72 min.
e	8 digitals, 8 MPU, DMX-512	0	1	2	x	x	18-97 min.
f	8 digitals, 8 MPU, 16 DMX	16	17	0	x	x	16 min.

Mp3-50/8 Show Configurations: The **Mp3-50/8** has eight Show Control outputs on one eight bit wide channel. Additional channels you may choose to use are the MPU Trigger channel (so you don't have to loose any digital outputs for triggering the **Mp3 Player**), RealTime Audio Level Control Channels, and DMX-512 output channels.

In all but the first of the following examples, the eight digitals can be used as one analog channel. The Show Control outputs will need to be fed through a Digital to Analog Converter (**DAC-08**) to convert the digital channels to a single analog voltage output.

- a) **Mp3-50/8 with One Combined Show Control/Mp3 Control Channel:** At a minimum, all you would need to program is the one eight bit wide Show Control output channel. This would mean that you would have to give up some number of your digital outputs to use for triggering the **Mp3 Player**. The **Mp3 Player** is configured for triggering AudioFile starts on the normal 1/4 J6 inputs.

This configuration gives you a show capacity of approximately five hours in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1) Open **PC-MACs**, Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels....'.
- 2) Select eight digital and zero analog channels. The first eight outputs (on channel '0') will go to the Show Control Outputs. These will be used for both Show Control and trigger-

ing the **Mp3 Player**.

- 3) Click 'OK' to create these channels.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' to '0' on the **PC•MACs** File Pulldown/Save as AutoDownload.... window.

In the **Mp3 Configurator** Program:

- 1) **Track Setup Tab**: Point it at your SmartMedia card and set as needed.
- 2) **PlayLists Tab**: Set up as needed, if needed.
- 3) **Audio Tab**: Set audio levels and EQ as needed. Disable RealTime Audio Level Control. Enable/Disable amplifier as needed.
- 4) **Input Tab**: You will be overlapping this input channel with the Show Control outputs of the **Mp3-50/8**. Set up some of the inputs to select and start AudioFiles, as needed. Don't forget to save a few outputs for the Show control!
- 5) **MPU Input Tab**: You will be using the Optoisolated inputs in this case. Disable ALL of the MPU Inputs.
- 6) **Serial Control Tab**: The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel is unused, so it can be set anywhere. First animation Channel Number must be set to '0'. Disable/Enable Net Serial and IR Trigger modes if needed (these are *usually* disabled)
- 7) **DMX-512 Control Tab**: Enable DMX-512 Control, unless you are using MIDI, Net Serial or IR Trigger Modes. Enable DMX-512 checksums if you will be feeding DMX-512 from any Gilderfluke & Company products (*usually* enabled). The Repeater Control Channel and First Animation channel number were set on a previous tab.
- 8) **MIDI Control Tab**: Disable MIDI, unless you plan to use it. Disable MIDI Notes Trigger Animation Playback, unless you plan to use it. Set MIDI Channel Number and Animation First Note number if you will be using MIDI, otherwise, ignore them.
- 9) **Flash Setup Tab**: Enable Animation from Flash, unless you will never be using the onboard show storage.

Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.

b) Mp3-50/8 with One Show Control, One Mp3 Control Channel:

The most typical installation for a **Mp3-50/8** uses one eight bit channel for Show Control, and a second one for controlling the **Mp3** playback. This means that none of the Show Control outputs are 'lost' to the **Mp3 Player**. The **Mp3 Player** is configured for triggering AudioFile starts on the MPU input bits.

This configuration gives you a show capacity of approximately 2-1/2 hours in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1) Open PC•MACs**, Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels....'.
- 2) Select sixteen digital and zero analog channels.** The first eight outputs (on channel '0') will go to the Show Control Outputs. The last eight outputs (on channel '1') will be used for triggering the **Mp3 Player**.
- 3) Click 'OK'** to create these channels.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' to '1' on the **PC•MACs** File Pulldown/Save as AutoDownload.... window.

In the **Mp3 Configurator** Program:

- 1) Track Setup Tab:** Point it at your SmartMedia card and set as needed.
- 2) PlayLists Tab:** Set up as needed, if needed.
- 3) Audio Tab:** Set audio levels and EQ as needed. Disable RealTime Audio Level Control. Enable/Disable amplifier as needed.
- 4) Input Tab:** You will be using the MPU inputs in this case. Disable ALL of the Optoisolated Inputs.

- 5) **MPU Input Tab:** Set up the inputs to select and start AudioFiles and ramp audio levels, as needed.
- 6) **Serial Control Tab:** The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel must be set to '1'. First animation Channel Number must be set to '0'. Disable/Enable Net Serial and IR Trigger modes as needed (these are *usually* disabled)
- 7) **DMX-512 Control Tab:** Enable DMX-512 Control, unless you are using MIDI, Net Serial or IR Trigger Modes. Enable DMX-512 checksums if you will be feeding DMX-512 from any Gilderfluke & Company products (*usually* enabled). The Repeater Control Channel and First Animation channel number were set on a previous tab.
- 8) **MIDI Control Tab:** Disable MIDI, unless you plan to use it. Disable MIDI Notes Trigger Animation Playback, unless you plan to use it. Set MIDI Channel Number and Animation First Note number if you will be using MIDI, otherwise, ignore them.
- 9) **Flash Setup Tab:** Enable Animation from Flash, unless you will never be using the onboard show storage. Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.
- c) **Mp3-50/8 with One Audio Level Control Channel:** This configuration adds a single analog channel which can be used to control the audio level of the **Mp3 Player** as a part of the show control file.

This configuration gives you a show capacity of approximately 97 minutes in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1) Open **PC-MACs**, Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels....'.
- 2) Select sixteen digital and zero analog channels. The first eight outputs (on channel '0') will go to the Show Control

Outputs. The last eight outputs (on channel '1') will be used for triggering the **Mp3 Player**.

- 3) Click 'OK' to create these channels.
- 4) Go to **PC-MACs** 'Channels Pulldown'/'Create Multiple Channels....'.
- 5) Select zero digital and one 8 bit analog channel. This will be your audio level control channel at address '2'.
- 6) Click 'OK' to create this channel.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' to '2' on the **PC-MACs** File Pulldown/Save as AutoDownload.... window.

In the **Mp3 Configurator** Program:

- 1) **Track Setup Tab**: Point it at your SmartMedia card and set as needed.
- 2) **PlayLists Tab**: Set up as needed, if needed.
- 3) **Audio Tab**: Set audio levels and EQ as needed. Enable Real-Time Audio Level Control. You can control one or both outputs from the analog channel you have created. Set the addresses of the Level Control Channels to '2'. Enable/Disable amplifier as needed.
- 4) **Input Tab**: You will be using the MPU inputs in this case. Disable ALL of the Optoisolated Inputs.
- 5) **MPU Input Tab**: Set up the inputs to select and start AudioFiles and ramp audio levels, as needed.
- 6) **Serial Control Tab**: The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel must be set to '1'. First animation Channel Number must be set to '0'. Disable/Enable Net Serial and IR Trigger modes as needed (these are *usually* disabled)
- 7) **DMX-512 Control Tab**: Enable DMX-512 Control, unless you are using MIDI, Net Serial or IR Trigger Modes. Enable DMX-512 checksums if you will be feeding DMX-512 from any Gilderfluke & Company products (*usually* enabled). The Repeater Control Channel and First Animation channel number were set on a previous tab.

8) MIDI Control Tab: Disable MIDI, unless you plan to use it. Disable MIDI Notes Trigger Animation Playback, unless you plan to use it. Set MIDI Channel Number and Animation First Note number if you will be using MIDI, otherwise, ignore them.

9) Flash Setup Tab: Enable Animation from Flash, unless you will never be using the onboard show storage. Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.

d) Mp3-50/8 with Two Audio Level Control Channels: This configuration adds two analog channels which can be used to independently control the left and right audio levels of the **Mp3 Player** as a part of the show control file.

This configuration gives you a show capacity of approximately 72 minutes in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1)** Open **PC-MACs**, Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels....'.
- 2)** Select sixteen digital and zero analog channels. The first eight outputs (on channel '0') will go to the Show Control Outputs. The last eight outputs (on channel '1') will be used for triggering the **Mp3 Player**.
- 3)** Click 'OK' to create these channels.
- 4)** Go to **PC-MACs** 'Channels Pulldown'/'Create Multiple Channels....'.
- 5)** Select zero digital and two, 8 bit analog channel. These will be your audio level control channels at addresses '2' and '3'.
- 6)** Click 'OK' to create these channels.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' to '3' on the **PC-MACs** File Pulldown/Save

as AutoDownload.... window.

In the **Mp3 Configurator** Program:

- 1) **Track Setup Tab:** Point it at your SmartMedia card and set as needed.
- 2) **PlayLists Tab:** Set up as needed, if needed.
- 3) **Audio Tab:** Set audio levels and EQ as needed. Enable Real-Time Audio Level Control. Each audio output has its own analog channel to control it. Set the addresses of the Level Control Channels to '2' and '3'. Enable/Disable amplifier as needed.
- 4) **Input Tab:** You will be using the MPU inputs in this case. Disable ALL of the Optoisolated Inputs.
- 5) **MPU Input Tab:** Set up the inputs to select and start AudioFiles and ramp audio levels, as needed.
- 6) **Serial Control Tab:** The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel must be set to '1'. First animation Channel Number must be set to '0'. Disable/Enable Net Serial and IR Trigger modes as needed (these are *usually* disabled)
- 7) **DMX-512 Control Tab:** Enable DMX-512 Control, unless you are using MIDI, Net Serial or IR Trigger Modes. Enable DMX-512 checksums if you will be feeding DMX-512 from any Gilderfluke & Company products (*usually* enabled). The Repeater Control Channel and First Animation channel number were set on a previous tab.
- 8) **MIDI Control Tab:** Disable MIDI, unless you plan to use it. Disable MIDI Notes Trigger Animation Playback, unless you plan to use it. Set MIDI Channel Number and Animation First Note number if you will be using MIDI, otherwise, ignore them.
- 9) **Flash Setup Tab:** Enable Animation from Flash, unless you will never be using the onboard show storage. Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.

- e) **Mp3-50/8 with DMX-512 w/Overlapping Channels:** This configuration goes back to the typical installation ('b' above) and adds one or more channels of DMX-512 output. If you are using Serial RealTime Update mode during programming, this is the only configuration which will allow you to access ALL of the Show control and DMX-512 channels through the serial port.

The DMX-512 transmission always starts with the first channel stored in the Flash memory, and transmits the first sixteen consecutive channels. The two channels of Show Control (one for the digital outputs and one for the MPU control) are sent out through the first two channels of DMX-512 (you probably don't want to put a dimmer on these channels). This leaves somewhere between one and fourteen channels of DMX-512 output for lighting, moving lights, or whatever.

Depending on the number of DMX channels you need, this configuration gives a capacity of between 97 and 18 minutes in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1) Open **PC•MACs**, Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels....'.
- 2) Select sixteen digital and zero analog channels. The first eight outputs (on channel '0') will go to the Show Control Outputs. The last eight outputs (on channel '1') will be used for triggering the **Mp3 Player**.
- 3) Click 'OK' to create these channels.
- 4) Go to **PC•MACs** 'Channels Pulldown'/'Create Multiple Channels....'.
- 5) Select zero digital and between one and fourteen, 8 bit analog channels. These will be your DMX-512 channels starting at address '2' and going to a maximum of '15'.
- 6) Click 'OK' to create these channels.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' to between '2' and '15' on the **PC•MACs** File Pulldown/Save as AutoDownload.... window.

In the **Mp3 Configurator** Program:

- 1) **Track Setup Tab:** Point it at your SmartMedia card and set as

needed.

- 2) **PlayLists Tab:** Set up as needed, if needed.
- 3) **Audio Tab:** Set audio levels and EQ as needed. Disable RealTime Audio Level Control. Enable/Disable amplifier as needed.
- 4) **Input Tab:** You will be using the MPU inputs in this case. Disable ALL of the Optoisolated Inputs.
- 5) **MPU Input Tab:** Set up the inputs to select and start AudioFiles and ramp audio levels, as needed.
- 6) **Serial Control Tab:** The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel must be set to '1'. First Animation Channel Number must be set to '0'. Disable Net Serial and IR Trigger modes.
- 7) **DMX-512 Control Tab:** Disable DMX-512 Control. The Repeater Control Channel and First Animation channel number were set on a previous tab.
- 8) **MIDI Control Tab:** Disable MIDI and MIDI Notes Trigger Animation Playback. Disregard MIDI Channel Number and Animation First Note number.
- 9) **Flash Setup Tab:** Enable Animation from Flash, unless you will never be using the onboard show storage. Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.
- f) **Mp3-50/8 with Sixteen DMX-512 Channels:** This configuration goes back to the typical installation ('b' above) and adds sixteen channels of DMX-512 output. If you are using Serial RealTime Update mode during programming, you will only be able to access the DMX-512 channels through the serial port. The show control ports are located above sixteen channels, so they will not be updated in RealTime.

The DMX-512 transmission always starts with the first channel stored in the Flash memory, and transmits the first sixteen consecutive channels. This is where the DMX-512 data will live.

This configuration consumes eighteen channels of Flash. This gives a capacity of 16 minutes in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1) Open **PC-MACs**, Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels....'.
- 2) Select sixteen digital and sixteen analog channels. The sixteen analog channels which will be sent tout through the DMX-512 output are located at channels '0' through '15'. The first eight digital outputs (on channel '16') will go to the Show Control Outputs. The last eight outputs (on channel '17') will be used for triggering the **Mp3 Player**.
- 3) Click 'OK' to create these channels.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' to '17' on the **PC-MACs** File Pulldown/Save as AutoDownload.... window.

In the **Mp3 Configurator** Program:

- 1) **Track Setup Tab**: Point it at your SmartMedia card and set as needed.
- 2) **PlayLists Tab**: Set up as needed, if needed.
- 3) **Audio Tab**: Set audio levels and EQ as needed. Disable RealTime Audio Level Control. Enable/Disable amplifier as needed.
- 4) **Input Tab**: You will be using the MPU inputs in this case. Disable ALL of the Optoisolated Inputs.
- 5) **MPU Input Tab**: Set up the inputs to select and start AudioFiles and ramp audio levels, as needed.
- 6) **Serial Control Tab**: The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel must be set to '17'. First Animation Channel Number must be set to '16'. Disable Net Serial and IR Trigger modes.
- 7) **DMX-512 Control Tab**: Disable DMX-512 Control. The Repeater Control Channel and First Animation channel number were set on a previous tab.
- 8) **MIDI Control Tab**: Disable MIDI and MIDI Notes Trigger Ani-

mation Playback. Disregard MIDI Channel Number and Animation First Note number.

- 9) Flash Setup Tab:** Enable Animation from Flash, unless you will never be using the onboard show storage. Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.

PC-MACs Shows for Mp3-50/40

This section gives some hints for setting up the shows that will be used by the Show Control side of a **Mp3-50/40**. There are literally thousands of possible configuration arrangements. Most applications will use one of the following configurations. The most common configuration is the 'b' option. The 'Show Capacities' shown is at 30 frames (updates) per second.

Mp3-50/40:		1st	MPU	DMX-	Vol.	Vol.	Show
#	description	Anim.	Control	512	Right	Left	Capacity
a	40 digitals/MPU	0	4	x	x	x	1 Hour
b	40 digitals, 8 MPU	0	5	x	x	x	48 min.
c	40 digitals, 8 MPU, 1 volume	0	5	x	6	6	41 min.
d	40 digitals, 8 MPU, 2 volume	0	5	x	6	7	36 min.
e	40 digitals, 8 MPU, DMX-512	0	5	6	x	x	18-41 min.
f	40 digitals, 8 MPU, 16 DMX	16	17	0	x	x	13 min.

Mp3-50/40 Show Configurations: The **Mp3-50/40** has forty Show Control outputs on five eight bit wide channel. Additional channels you may choose to use are the MPU Trigger channel (so you don't have to loose any digital outputs for triggering the **Mp3 Player**), RealTime Audio Level Control Channels, and DMX-512 output channels.

The forty Show Control outputs are normally used for digital outputs on the **Mp3-50/40**. Using an external Digital to Analog converter (DAC-08 or DAC-Quad), one or more of the analog channels can be used for analog functions. In the following descriptions, you are creating forty digital outputs for use on the forty digital Show Control outputs. The digitals can be combined with analog functions in any of the following combinations:

- 1 analog and 32 digitals
- 2 analogs and 24 digitals
- 3 analogs and 16 digitals
- 4 analogs and 8 digitals
- 5 analogs and 0 digitals

- a) **Mp3-50/40 with One Combined Show Control/Mp3 Control Channel:** At a minimum, all you would need to program is five eight bit wide Show Control output channels. This would mean that you would have to give up some number of your last channel's digital outputs to use for triggering the **Mp3 Player**. The **Mp3 Player** is configured for triggering AudioFile starts on the normal 1/4 J6 inputs.

This configuration gives you a show capacity of approximately one hour in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1) Open **PC•MACs**, Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels....'.
- 2) Select forty digital and zero analog channels. The digitals that come out of the J6 connector are addressed from '0' through '3'. The digitals that will come out of the 1/4 J6 are addressed at '4'.
- 3) Click 'OK' to create these channels.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' to '4' on the **PC•MACs** File Pulldown/Save as AutoDownload.... window.

In the **Mp3 Configurator** Program:

- 1) **Track Setup Tab**: Point it at your SmartMedia card and set as needed.
- 2) **PlayLists Tab**: Set up as needed, if needed.
- 3) **Audio Tab**: Set audio levels and EQ as needed. Disable RealTime Audio Level Control. Enable/Disable amplifier as needed.
- 4) **Input Tab**: You will be overlapping this input channel with the Show Control outputs of the **Mp3-50/8**. Set up some of the inputs to select and start AudioFiles, as needed. Don't forget to save a few outputs for the Show control!
- 5) **MPU Input Tab**: You will be using the Optoisolated inputs in this case. Disable ALL of the MPU Inputs.
- 6) **Serial Control Tab**: The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel is unused, so it can be set anywhere. First animation Channel Number must be set to '0'. Disable/Enable Net Serial and IR Trigger modes if needed (these are *usually* disabled)
- 7) **DMX-512 Control Tab**: Enable DMX-512 Control, unless you are using MIDI, Net Serial or IR Trigger Modes. Enable DMX-512 checksums if you will be feeding DMX-512 from any Gilderfluke & Company products (*usually* enabled). The Repeater Control Channel and First Animation channel number were set on a previous tab.

8) **MIDI Control Tab:** Disable MIDI, unless you plan to use it. Disable MIDI Notes Trigger Animation Playback, unless you plan to use it. Set MIDI Channel Number and Animation First Note number if you will be using MIDI, otherwise, ignore them.

9) **Flash Setup Tab:** Enable Animation from Flash, unless you will never be using the onboard show storage. Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.

b) **Mp3-50/40 with Five Show Control, One Mp3 Control Channel:** The most typical installation for a **Mp3-50/8** uses five eight bit channel for Show Control, and a final channel for controlling the **Mp3** playback. This means that none of the Show Control outputs are 'lost' to the **Mp3 Player**. The **Mp3 Player** is configured for triggering AudioFile starts on the MPU input bits.

This configuration gives you a show capacity of approximately 48 minutes in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1) Open **PC-MACs**, Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels....'.
- 2) Select forty-eight digital and zero analog channels. The digitals that come out of the J6 connector are addressed from '0' through '3'. The digitals that will come out of the 1/4 J6 are addressed at '4'. The last eight outputs (on address '5') will be used for triggering the **Mp3 Player**.
- 3) Click 'OK' to create these channels.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' to '5' on the **PC-MACs** File Pulldown/Save as AutoDownload.... window.

In the **Mp3 Configurator** Program:

- 1) **Track Setup Tab:** Point it at your SmartMedia card and set as needed.

- 2) **PlayLists Tab:** Set up as needed, if needed.
 - 3) **Audio Tab:** Set audio levels and EQ as needed. Disable RealTime Audio Level Control. Enable/Disable amplifier as needed.
 - 4) **Input Tab:** You will be using the MPU inputs in this case. Disable ALL of the Optoisolated Inputs.
 - 5) **MPU Input Tab:** Set up the inputs to select and start AudioFiles and ramp audio levels, as needed.
 - 6) **Serial Control Tab:** The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel must be set to '5'. First animation Channel Number must be set to '0'. Disable/Enable Net Serial and IR Trigger modes as needed (these are *usually* disabled)
 - 7) **DMX-512 Control Tab:** Enable DMX-512 Control, unless you are using MIDI, Net Serial or IR Trigger Modes. Enable DMX-512 checksums if you will be feeding DMX-512 from any Gilderfluke & Company products (*usually* enabled). The Repeater Control Channel and First Animation channel number were set on a previous tab.
 - 8) **MIDI Control Tab:** Disable MIDI, unless you plan to use it. Disable MIDI Notes Trigger Animation Playback, unless you plan to use it. Set MIDI Channel Number and Animation First Note number if you will be using MIDI, otherwise, ignore them.
 - 9) **Flash Setup Tab:** Enable Animation from Flash, unless you will never be using the onboard show storage. Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.
- c) **Mp3-50/40 with One Audio Level Control Channel:** This configuration adds a single analog channel which can be used to control the audio level of the **Mp3 Player** as a part of the show control file.

This configuration gives you a show capacity of approximately

41 minutes in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1) Open **PC•MACs**, Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels....'.
- 2) Select forty-eight digital and zero analog channels. The digitals that come out of the J6 connector are addressed from '0' through '3'. The digitals that will come out of the 1/4 J6 are addressed at '4'. The last eight outputs (on channel '5') will be used for triggering the **Mp3 Player**.
- 3) Click 'OK' to create these channels.
- 4) Go to **PC•MACs** 'Channels Pulldown'/'Create Multiple Channels....'.
- 5) Select zero digital and one 8 bit analog channel. This will be your audio level control channel at address '6'.
- 6) Click 'OK' to create this channel.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' to '6' on the **PC•MACs** File Pulldown/Save as AutoDownload.... window.

In the **Mp3 Configurator** Program:

- 1) **Track Setup Tab**: Point it at your SmartMedia card and set as needed.
- 2) **PlayLists Tab**: Set up as needed, if needed.
- 3) **Audio Tab**: Set audio levels and EQ as needed. Enable Real-Time Audio Level Control. You can control one or both outputs from the analog channel you have created. Set the addresses of the Level Control Channels to '6'. Enable/Disable amplifier as needed.
- 4) **Input Tab**: You will be using the MPU inputs in this case. Disable ALL of the Optoisolated Inputs.
- 5) **MPU Input Tab**: Set up the inputs to select and start AudioFiles and ramp audio levels, as needed.
- 6) **Serial Control Tab**: The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel must be set to '5'. First animation Channel Number must be set to '0'.

Disable/Enable Net Serial and IR Trigger modes as needed (these are *usually* disabled)

- 7) **DMX-512 Control Tab:** Enable DMX-512 Control, unless you are using MIDI, Net Serial or IR Trigger Modes. Enable DMX-512 checksums if you will be feeding DMX-512 from any Gilderfluke & Company products (*usually* enabled). The Repeater Control Channel and First Animation channel number were set on a previous tab.
 - 8) **MIDI Control Tab:** Disable MIDI, unless you plan to use it. Disable MIDI Notes Trigger Animation Playback, unless you plan to use it. Set MIDI Channel Number and Animation First Note number if you will be using MIDI, otherwise, ignore them.
 - 9) **Flash Setup Tab:** Enable Animation from Flash, unless you will never be using the onboard show storage. Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.
- d) **Mp3-50/40 with Two Audio Level Control Channels:** This configuration adds two analog channels which can be used to independently control the left and right audio levels of the **Mp3 Player** as a part of the show control file.

This configuration gives you a show capacity of approximately 36 minutes in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1) Open **PC-MACs**, Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels...'.
2) Select forty-eight digital and zero analog channels. The digitals that come out of the J6 connector are addressed from '0' through '3'. The digitals that will come out of the 1/4 J6 are addressed at '4'. The last eight outputs (on channel '5') will be used for triggering the **Mp3 Player**.
- 3) Click 'OK' to create these channels.
- 4) Go to **PC-MACs** 'Channels Pulldown'/'Create Multiple Chan-

nels....'.

- 5) Select zero digital and two, 8 bit analog channel. These will be your audio level control channels at addresses '6' and '7'.

- 6) Click 'OK' to create these channels.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' to '7' on the **PC-MACs** File Pulldown/Save as AutoDownload.... window.

In the **Mp3 Configurator** Program:

- 1) **Track Setup Tab**: Point it at your SmartMedia card and set as needed.
- 2) **PlayLists Tab**: Set up as needed, if needed.
- 3) **Audio Tab**: Set audio levels and EQ as needed. Enable Real-Time Audio Level Control. Each audio output has its own analog channel to control it. Set the addresses of the Level Control Channels to '6' and '7'. Enable/Disable amplifier as needed.
- 4) **Input Tab**: You will be using the MPU inputs in this case. Disable ALL of the Optoisolated Inputs.
- 5) **MPU Input Tab**: Set up the inputs to select and start AudioFiles and ramp audio levels, as needed.
- 6) **Serial Control Tab**: The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel must be set to '5'. First animation Channel Number must be set to '0'. Disable/Enable Net Serial and IR Trigger modes as needed (these are *usually* disabled)
- 7) **DMX-512 Control Tab**: Enable DMX-512 Control, unless you are using MIDI, Net Serial or IR Trigger Modes. Enable DMX-512 checksums if you will be feeding DMX-512 from any Gilderfluke & Company products (*usually* enabled). The Repeater Control Channel and First Animation channel number were set on a previous tab.
- 8) **MIDI Control Tab**: Disable MIDI, unless you plan to use it. Disable MIDI Notes Trigger Animation Playback, unless you plan to use it. Set MIDI Channel Number and Animation First Note number if you will be using MIDI, otherwise, ignore

them.

- 9) **Flash Setup Tab:** Enable Animation from Flash, unless you will never be using the onboard show storage. Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.

- e) **Mp3-50/40 with DMX-512 w/Overlapping Channels:** This configuration goes back to the typical installation ('b' above) and adds one or more channels of DMX-512 output. If you are using Serial RealTime Update mode during programming, this is the only configuration which will allow you to access ALL of the Show control and DMX-512 channels through the serial port.

The DMX-512 transmission always starts with the first channel stored in the Flash memory, and transmits the first sixteen consecutive channels. The six channels of Show Control (five for the digital outputs and one for the MPU control) are sent out through the first six channels of DMX-512 (you probably don't want to put a dimmer on these channels). This leaves somewhere between one and ten channels of DMX-512 output for lighting, moving lights, or whatever.

Depending on the number of DMX channels you need, this configuration gives a capacity of between 41 and 18 minutes in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1) Open **PC-MACs**, Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels....'.
- 2) Select forty-eight digital and zero analog channels. The digitals that come out of the J6 connector are addressed from '0' through '3'. The digitals that will come out of the 1/4 J6 are addressed at '4'. The last eight outputs (on channel '5') will be used for triggering the **Mp3 Player**.
- 3) Click 'OK' to create these channels.
- 4) Go to **PC-MACs** 'Channels Pulldown'/'Create Multiple Channels....'.

5) Select zero digital and between one and ten, 8 bit analog channels. These will be your DMX-512 channels starting at address '6' and going to a maximum of '15'.

6) Click 'OK' to create these channels.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' between '6' and '15' on the **PC-MACs** File Pulldown/Save as AutoDownload.... window.

In the **Mp3 Configurator** Program:

1) **Track Setup Tab**: Point it at your SmartMedia card and set as needed.

2) **PlayLists Tab**: Set up as needed, if needed.

3) **Audio Tab**: Set audio levels and EQ as needed. Disable RealTime Audio Level Control. Enable/Disable amplifier as needed.

4) **Input Tab**: You will be using the MPU inputs in this case. Disable ALL of the Optoisolated Inputs.

5) **MPU Input Tab**: Set up the inputs to select and start AudioFiles and ramp audio levels, as needed.

6) **Serial Control Tab**: The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel must be set to '1'. First Animation Channel Number must be set to '0'. Disable Net Serial and IR Trigger modes.

7) **DMX-512 Control Tab**: Disable DMX-512 Control. The Repeater Control Channel and First Animation channel number were set on a previous tab.

8) **MIDI Control Tab**: Disable MIDI and MIDI Notes Trigger Animation Playback. Disregard MIDI Channel Number and Animation First Note number.

9) **Flash Setup Tab**: Enable Animation from Flash, unless you will never be using the onboard show storage. Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.

- f) Mp3-50/40 with Sixteen DMX-512 Channels:** This configuration goes back to the typical installation ('b' above) and adds sixteen channels of DMX-512 output. If you are using Serial RealTime Update mode during programming, you will only be able to access the DMX-512 channels through the serial port. The show control ports are located above sixteen channels, so they will not be updated in RealTime.

The DMX-512 transmission always starts with the first channel stored in the Flash memory, and transmits the first sixteen consecutive channels. This is where the DMX-512 data will live.

This configuration consumes eighteen channels of Flash. This gives a capacity of 13 minutes in the onboard Flash memory.

Starting with a blank site file, you can create all the channels you need by:

- 1) Open PC-MACs,** Create a 'New' show. Go to 'Channels Pulldown'/'Create Multiple Channels....'.
- 2) Select** forty-eight digital and sixteen analog channels. The analogs are on channels '0' through '15'. The digitals that come out of the J6 connector are addressed from '16' through '19'. The digitals that will come out of the 1/4 J6 are addressed at '20'. The last eight outputs (on channel '21') will be used for triggering the **Mp3 Player**.
- 3) Click 'OK'** to create these channels.

When you have finished programming your show you will AutoDownload it to the **Mp3-50/8**. Set the 'First Channel' to '0' and the 'Last Channel' to '21' on the **PC-MACs** File Pulldown/Save as AutoDownload.... window.

In the **Mp3 Configurator** Program:

- 1) Track Setup Tab:** Point it at your SmartMedia card and set as needed.
- 2) PlayLists Tab:** Set up as needed, if needed.
- 3) Audio Tab:** Set audio levels and EQ as needed. Disable RealTime Audio Level Control. Enable/Disable amplifier as needed.
- 4) Input Tab:** You will be using the MPU inputs in this case. Disable ALL of the Optoisolated Inputs.
- 5) MPU Input Tab:** Set up the inputs to select and start Au-

dioFiles and ramp audio levels, as needed.

- 6) **Serial Control Tab:** The Brick Address is usually set at '0', unless you will be accessing the card using Net Serial commands. The Repeater Control Channel must be set to '17'. First Animation Channel Number must be set to '16'. Disable Net Serial and IR Trigger modes.
- 7) **DMX-512 Control Tab:** Disable DMX-512 Control. The Repeater Control Channel and First Animation channel number were set on a previous tab.
- 8) **MIDI Control Tab:** Disable MIDI and MIDI Notes Trigger Animation Playback. Disregard MIDI Channel Number and Animation First Note number.
- 9) **Flash Setup Tab:** Enable Animation from Flash, unless you will never be using the onboard show storage. Enable/Disable outputs when stopped, as needed. Leave the Write Protect Flash unchecked, or you will not be able to save the show you are creating to the **Mp3-50/8** or **Mp3-50/40**. Disable it after you have completed programming, if needed. The Repeater Control Channel and First Animation channel number were set on a previous tab.

Preparing Animation Data for AutoDownloads

The Eprom Memories used for the original 'Brick' products manufactured by Gilderfluke & Company each contained one channel (eight-bits) worth of data. As memory sizes increased, later products used Eproms which contained several channels each. The Flash Memories used on the **Mp3-50/8** or **Mp3-50/40**, **BR-MultiBrick32**, **BR-ANA**, **BR-EFB** and **BR-SmartMedia** use a MultiChannel format with a complex data header to allow them to be AutoDownloaded from **PC-MACs**. The following instructions apply to all of cards that use AutoDownload files.

After you have finished programming your show(s), files are AutoDownloaded from **PC-MACs** by:

- 1) Selecting the 'Save as AutoDownload...' command from the 'File' pulldown.
- 2) Use the 'Add' button to select any additional show(s) you would like to be saved into this AutoDownload file.
- 3) Use the 'Promote' and 'Demote' buttons to move selected show(s) into the order you would like to save them in the Flash Memory.
- 4) Select the 'first show' and what will happen to the **Mp3-50/8** or **Mp3-50/40** on power up. If you have set the **Mp3-50/8** or **Mp3-50/40** to 'wait' at power up, then the first frame of the show you have selected will be output as soon as power is applied to the **Mp3-50/8** or **Mp3-50/40**.
- 5) Set what will happen on each of the four 'J8' optoisolated inputs. You can set different actions for both the opening and closing edges.
- 6) Select each show to be downloaded one at a time and set what will happen at the end of each show and whether it can be 'stepped on'. Any show which 'can be stepped upon' can be interrupted mid-show by a new show start coming in. Any show which 'can not be stepped upon' will ignore all additional start commands while it is still playing.
- 7) Set the 'Brick Serial Address' to send the AutoDownload file to. This is the serial address of the **Mp3-50/8** or **Mp3-50/40** you want it to be received by. All other cards will ignore the data being sent to this one card. With **Mp3-50/8** or **Mp3-50/40**, the address is usually the same as the 'start' channel set in the next step.
- 8) Set the 'first channel' and 'last channel' boxes to set the number channels you want to go into this AutoDownload file. If you are

using one of the 'sample' configurations shown in the previous section of this manual, the numbers for these values are shown there for each sample configuration. Use those numbers

A **Mp3-50/8** or **Mp3-50/40** holds between one and 255 channels worth of data. The more channels you send to the **Mp3-50/8** or **Mp3-50/40**, the less show 'time' you will have available to you.

If you are not doing RealTime audio level control or transmitting DMX-512, a **Mp3-50/8** is typically loaded with two channels worth of data. The first channel is sent to the 1/4 J6 Show Control Outputs, and the second channel is sent to the Audio Trigger Channel. The 'start' address is for this situation is set to '0'. The 'end' address is set to '1'.

If you are not doing RealTime audio level control or transmitting DMX-512, a **Mp3-50/40** is typically loaded with six channels worth of data. The first four channels are sent to the J6 Show Control Outputs. The next channel is sent to the 1/4 J6 outputs. The final channel is sent to the Audio Trigger Channel. The 'start' address is for this situation is set to '0'. The 'end' address is set to '5'.

If you are transmitting DMX-512 from the **Mp3-50/8** or **Mp3-50/40**, you will also need to allow for these channels. If this is the first (or only) **Mp3-50/8** or **Mp3-50/40** in the system, the 'start' address is typically set for '0'. The 'end' address depends on what you are doing with your **Mp3-50/8** or **Mp3-50/40** and how much data you will be storing on it.

- 9) The '**Calculate Brick Start Frames**' checkbox must always be checked.
- 10) The '**Save Brick Starts**' checkbox should never be checked.
- 11) You can quickly test if the **Mp3-50/8** or **Mp3-50/40** is attached to the serial port properly by hitting the 'Reset MiniBrick' button. Of course, this will also erase any show data that was already in the **Mp3-50/8s** or **Mp3-50/40s** flash memory. **PC-MACs** will report if the Reset was successful or not.
- 12) Press the 'Build' or 'Download' button to begin the saving process. A 'Build' will just save the AutoDownload file to your disk, without sending it to the **Mp3-50/8** or **Mp3-50/40**. A 'Download' will save the file to disk and send it to the **Mp3-50/8** or **Mp3-50/40**. A standard file save dialog will open. Double check the Directory loca-

tion and name the file as desired (it defaults to the name of the first show in the list). You can tell Windows to save the file to a different directory, if needed. **PC-MACs** will warn you if a file already exists in this location with this same name. Hit OK (or change the name & hit OK if you want to preserve the older file) to save the data to a file.

After doing an AutoDownload, if you press the 'Report' button, **PC-MACs** will display the information about the AutoDownload file you just saved. This information is also saved in a text file with the same name as the Flash Memories, but with the extension of '.set'. You can open this file with any text editor (like Notepad or Wordpad). **The 'Eprom Memory start' and 'Eprom Memory end' are the actual locations of the shows in the Flash Memory set.** The number shown for the 'Eprom Memory End' for the last show in this file set is the last byte which will be saved into the Flash Memory. If your Flash Memory is smaller than this number, you will need to use external show data storage (such as a BR-SmartMedia).

The AutoDownload file that **PC-MACs** automatically generates will have the extension of filename.Ann. The 'A' in the extension flags it as a 'AutoDownload' file. The 'nn' is the HEXadecimal address of the first channel in the AutoDownload set. If you are AutoDownloading to a number of different cards, you can use the same name for all of them without fear of overwriting the others since they will automatically have different 'extensions'. This file can be sent to any other **Mp3-50/8** or **Mp3-50/40** at any time using a computer and a terminal program like terminal.exe or our GilderTerm. HyperTerm.exe will not work for this, because it randomly alters values above 128 in the AutoDownload file.

The address of the data sent out from Flash memory may be different from what you saw when programming through the DMX-512 or serial input. This is a question of the address selected for the **Mp3-50/8** or **Mp3-50/40** and address range selected for the data when sending the AutoDownload file. The **Mp3-50/8** or **Mp3-50/40** always uses the address saved in the AutoDownload file for its outputs. This is normally what you want to do.

The **Mp3-50/8** and **Mp3-50/40** have the ability to download AutoDownload files stored on the SmartMedia card to the Show Control half of the **Mp3-50/8** or **Mp3-50/40**. This is a convenient way to distribute show data, configurations *and* audio to a number of different shows in different locations.

To do this, just drag and drop the AutoDownload file from wherever you told **PC-MACs** to save it onto your SmartMedia card (you can actually save the file right to the SmartMedia card, if you have the **Mp3-50/8** or **Mp3-**

50/40 plugged into the USB port when you do your 'Save as AutoDownload...'). You will then need to open the configuration file for this card using the **Mp3 Configurator**. When you click on the 'Flash' tab, you will see that the 'Download' checkbox has been 'checked'. This is because the show data has changed. Save the current configuration and the next time the **Mp3-50/8** or **Mp3-50/40** is powered up, the AutoDownload file will be sent to the Flash memory on the Show Control half of the **Mp3-50/8** or **Mp3-50/40**. If the configuration is set with the 'always Download' checkbox clicked, then the last steps of opening the configuration file and saving it will be unnecessary. The **Mp3-50/8** or **Mp3-50/40** will automatically download the Show Control data every time the unit is turned on.

Mp3-50/8 or Mp3-50/40 Serial Port Commands:

The **Mp3-50/8** or **Mp3-50/40** can be accessed through the serial port from any computer running just about any modem or terminal program. The computer you are using doesn't even need to have any **PC-MACs** software installed on it.

Most Gilderfluke & Company products can be controlled through their RS-422 Serial ports. Up to 256 different cards and devices can be attached to the same serial lines, to form a complete RS-422 'multi Drop' network. Anywhere on this network you can attach operator panels to access and control it, or you can use a telephone or Internet modem so that it can be accessed from around the block or around the world. Commands can be addressed to a single card on the network, or all of the cards simultaneously.

One of the easiest and most flexible types of operator interfaces for accessing the serial network are the many touch screen operator panels. These are available from a number of different suppliers, and most of them will easily attach right to our serial network. Most of these allow you to 'draw' whatever buttons and user interface icons on their screens (using a provided Windows program), attach ASCII strings to these 'buttons', and then download the final configuration to the operator panel so the PC can be taken away.

Typical modem programs you can use are Terminal.exe (which came with Windows 3.1) and HyperTerm.exe (which comes later versions of Windows), or GilderTerm.

GilderTerm is available free from Gilderfluke & Co. for use with all of our products. It can be downloaded from our web page, and is included on all of our CD-ROMs. GilderTerm has been optimized for use with all Gilderfluke & Company equipment. All the commands are built in, and it will even let you use your mouse to select commands by simply clicking on them.

To use the **Mp3-50/8** or **Mp3-50/40** with a terminal program, just configure it for 9600 baud, no parity, eight data bits, one stop bit and 'xon/xoff' handshaking. If you are using GilderTerm, all the settings are fixed at the appropriate settings. All you will need to do is select the appropriate 'COM' port.

Echo Commands:

"a" [nn] (card address)
"b"

Echo On:
Echo Off:

The 'Echo ON' command will turn on a special mode that will

cause all the other serial port commands to echo on the selected card. This used when you are setting up serial commands so you can verify all the commands you are issuing are being received correctly (the 'echo' responses are shown in *italics*):

If you send "a00", the echo mode will be turned ON:

card 00h/_0, echo mode on

If you send "*03" to request a specific show:

card 00h/_0, requested show 03h/_3 CHEEBURG

If you send "t00" to start the requested show playing on a specific card:

card 00h/_0, starting show 03h/_3 CHEEBURG

If you send "!00" to start a show looping on a specific card:

card 00h/_0, looping show 04h/_4 FRUTCAKE

If you send "u" to stop a show playing:

card 00h/_0, stopped show 05h/_5 IGETARND

If you send "u" to stop a card that is already stopped, it will give you an error message:

card 00h/_0, error: not playing or looping 05h/_5 IGETARND

Similar error messages will be returned whenever you ask the card to do something that it can not do at the current time.

The 'Echo OFF' command will turn off the echo mode on all the cards in the system.

"i" [nn] (card address) Card Status:

When the **Mp3-50/8** or **Mp3-50/40** receives this command, it will respond with the following information:

- a)** Gilderfluke & Company, product name, Firmware revision number and copyright.
- b)** Card serial address and if the Flash is write protected.
- c)** Amount of Flash memory installed.
- d)** The current status of the four optically isolated inputs.
- e)** Whether the card is running, stopped, looping or paused.
- f)** Information on the currently loaded AutoDownload file:
 - 1)** AutoDownload file name (in DOS 8.3 format).

- 2) Number of shows in the AutoDownload file.
- 3) Number of channels in the AutoDownload file.
- 4) Offset to the first channel in the AutoDownload file.

The following shows a **Mp3-50/8** or **Mp3-50/40** information status response if there are no shows loaded (**Mp3-50s** with the **RealTime 'Atomic' Clock** option often don't have any shows loaded on them):

```
-Gilderfluke & Co. Mp3-50/40 Audio/Show Controller ver. 1.15 copyright 2003 DCM-
Card at 00h/___0 | 4 Mbits (512KBytes) memory | i:Y p:N s:N
A/Green: Open
B/Red: Open
C/Blue: Closed
D/White: Open
no shows loaded
```

(Sample data: Your show data will differ from what is shown.)

The following shows a **Mp3-50/8** or **Mp3-50/40** information status response if there are shows loaded:

```
-Gilderfluke & Co. Mp3-50/40 Audio/Show Controller ver. 1.15 copyright 2003 DCM-
Card at 00h/___0 | 4 Mbits (512KBytes) memory | i:Y p:N s:N
A/Green: Open
B/Red: Open
C/Blue: Closed
D/White: Open
show 01h/___1 stopped @ frame 000000h/___0
FileName: LIFETE-3.A00 | #shows: 11h/___17 | #channels: 01h/___1 | offset: 00h/___0
```

(Sample data: Your show data will differ from what is shown.)

The three flags 'i', 'p', and 's' are used to help in diagnosing problems:

- i) Shows 'Y' if interface between the Show Control and Mp3 Player sides of the **Mp3-50/8** or **Mp3-50/40** is active. If this is 'N', the Mp3 player side of the unit is probably not running. Either it has not booted (most common causes of this is either no SmartMedia card installed, or SmartMedia card which needs to be 'blessed'), or is busy being a hard drive via the USB port.
- p) This indicates if a Mp3 file is being played or not. A 'Y' indicates that sound is being played. A 'N' indicates that sound is not being played.
- s) This indicates a 'stuck' byte in the show control to Mp3 Player interface. It will normally be 'N'. If it is 'Y', it is because the Show Control side has sent a command to the Mp3 player, and the Mp3 player has not responded in a timely manner.

The status screen is a snapshot image of the current status of the **Mp3-50/8** or **Mp3-50/40**. If you want to update the status information displayed, you must hit the 'Card Status' command a

second time.

“j5AA5” [nn] (card address)

Card Reset:

This command will erase the ‘Flash’ memory on the **Mp3-50/8** or **Mp3-50/40**. The **Mp3-50/8** or **Mp3-50/40** will also determine the type and quantity of memory chips installed and report this and the software revision number when it accepts this command.

Start Commands:

“t” [nn] (card address)

Start Track:

“u”

Start Global:

These commands start the animation playing on the **Mp3-50/8** or **Mp3-50/40** (s) addressed by the command. The shows will always start from the beginning. If an addressed **Mp3-50/8** or **Mp3-50/40** is looping shows, it will have the ‘**LOOPING SHOWS**’ flag reset.

If the **Mp3-50/8** or **Mp3-50/40** receives a start command after it has received a request for a specific show, it will play that show. Otherwise it will play the show that has been set as the ‘next’ show for the show which is currently playing (or most recently played show if it is not currently playing). If this is the first show played after a **Mp3-50/8** or **Mp3-50/40** is reset, it will play the show which has been set as the ‘first’ show during the AutoDownload. Requests for specific shows can come only from the serial port.

When shows are downloaded to the **Mp3-50/8** or **Mp3-50/40**, they can be set to ignore additional start commands while they are playing. This allows individual shows to be ‘stepped’ upon or not. If the **Mp3-50/8** or **Mp3-50/40** is already playing a show which has this option set, it will ignore this command.

Stop Commands:

“x” [nn] (card address)

Stop Track:

“y”

Stop Global:

These commands stop the selected **Mp3-50/8** or **Mp3-50/40** (s) unconditionally. The stop takes place at the current frame being played.

Loop Commands:

“!” [nn] (card address)
“““”

Loop Track:
Loop Global:

These command acts much like the **START** commands, except that they also set the **‘LOOPING SHOWS’** flag. With this flag set, it is possible to set a sequence of shows playing in any order. Since the ‘next’ show can be any show you ask for, one show can be played over and over again, or you can set up a sequence of shows which will be repeated until the **Mp3-50/8** or **Mp3-50/40** is told to stop.

Stop at End Commands:

“%” [nn] (card address)
“&”

Stop at End Track:
Stop at End Global:

These commands reset the **‘LOOPING SHOWS’** flag in the selected **Mp3-50/8** or **Mp3-50/40** (s). What this does is to stop them playing when the end of the current show is reached. These commands are used when you want the shows to finish gracefully. The **STOP** commands are used when you want to stop a show immediately.

Select Show Commands:

“)” [nn] (Card Address) [nn] (show#) **Select Show Track:**
“*” [nn] (show#) **Select Show Global:**

Up to two hundred fifty-five different animated shows can be stored on a single **Mp3-50/8** or **Mp3-50/40**. These commands can be used to select an individual show on the selected **Mp3-50/8** or **Mp3-50/40** (s). Individual shows can be requested with a range of 01 to FFH. Once a show is selected, it will be played on the next serial port **START** or **LOOP** command.

If a show selection has been made inadvertently, it can be cleared by sending a request for show number 00.

A special mode is available with this command for users who just need to trigger audio files through the serial port. If NO shows are loaded onto the **Mp3-50/8** or **Mp3-50/40**, This command will start the selected audio track immediately. No additional ‘start’ or ‘play’ commands are needed to start the sounds playing.

Select Sound Commands:

“^i” [nn] (Card Address) [nn] (sound#)

Select Sound Track:

“^u” [nn] (sound#)

Select Sound Global:

These commands are available on firmware revisions 1.15

and later: Up to two hundred fifty-five different sounds can be stored on a single **Mp3-50/8** or **Mp3-50/40**. These commands can be used to select an individual sound on the selected **Mp3-50/8(s)** or **Mp3-50/40(s)**. Individual sounds can be requested with a range of 01 to FFH. Once a sound is selected, it will be played immediately. The sound number must be entered as a two digit hexadecimal number.

Show Pause Commands:

“<” [nn] (card address)

Pause Show:

“>” [nn] (card address)

Continue Show:

Any show can be paused at any point during its playback. The outputs are frozen at the levels they were at the instant the **PAUSE** command is received.

The **CONTINUE** command will resume any show playing which has previously been **PAUSED**.

“sA5A5” [nn] (card address) AutoDownload:

This is the format of the file that the **Mp3-50/8** or **Mp3-50/40** will receive and load into its ‘Flash’ memory.

An AutoDownload file is a binary file. Any AutoDownload file that has previously been saved can be sent to a **Mp3-50/8** or **Mp3-50/40** by selecting the ‘send binary file’ on your modem program and selecting the AutoDownload file for sending. You must be sure that the modem program has not been set to ‘gobble’ any special characters (carriage returns, line feeds, etc.).

The Hyper Terminal program that comes with Windows ‘95 and ‘98 will not work for sending AutoDownloads. For some strange reason it has been written to randomly change any binary value that is larger than one hundred twenty-seven.

“ ~ ”

RealTime Update:

This command sets the **Mp3-50/8** or **Mp3-50/40** into a mode where it will update the outputs in RealTime from the data received through the serial port. The **Mp3-50/8** or **Mp3-50/40** uses this command to update the outputs in real time.

The maximum frame rate supported by this function is thirty frames per second. Any faster than this just won't fit through the PC's serial port.

Serial Command Summary

Echo Commands:

“a” [nn] (card address)
“b”

Echo On:
Echo Off:

“i” [nn] (card address)

Card Status:

“j5AA5” [nn] (card address) Card Reset:

Start Commands:

“t” [nn] (card address)
“u”

Start Track:
Start Global:

Stop Commands:

“x” [nn] (card address)
“y”

Stop Track:
Stop Global:

Loop Commands:

“!” [nn] (card address)
““”

Loop Track:
Loop Global:

Stop at End Commands:

“%” [nn] (card address)
“&”

Stop at End Track:
Stop at End Global:

Select Show Commands:

“)” [nn] (Card Address) [nn] (show#) Select Show Track:
“*” [nn] (show#) Select Show Global:

Select Sound Commands:

“ ^ t” [nn] (Card Address) [nn] (sound#) Select Sound Track:
“ ^ u” [nn] (sound#) Select Sound Global:

Show Pause Commands:

“<” [nn] (card address) Pause Show:
“>” [nn] (card address) Continue Show:

“sA5A5” [nn] (card address) AutoDownload:

“ ~ ” RealTime Update:

Mp3-50/8 or Mp3-50/40 Hardware Configuration

Just about all of the **Mp3-50/8** or **Mp3-50/40** configuration is done using the '**Mp3 Configurator**' program or during the AutoDownload of the shows from **PC-MACs**. The only two hardware configuration options are:

- a) **Internal/External Power:** This switch (located on the bottom of the **Mp3-50/8** or **Mp3-50/40**) is used to switch the power from the 1/4 J6 connector between an internal source, and an external source that must be fed from outside the **Mp3-50/8** or **Mp3-50/40**. For a **Mp3-50**, this is the trigger input to the **Mp3 Player**, and either position can be used as determined by your application. For the **Mp3-50/8** or **Mp3-50/40**, this is also the first or last Show Control output channel. Only the 'Internal' position should be used.
- b) **RS-422/Optoisolated:** This switch (located on the bottom of the **Mp3-50/8** or **Mp3-50/40**) is used to switch the DMX-512/MIDI serial port between using RS-422 input signal levels to an optoisolated current loop. If receiving DMX-512, you must use the 'RS-422' setting. For MIDI, you must use the 'optoisolated' position. For Net Serial or IR Trigger modes, you can use either position, but 'RS-422' is normally used unless you need to optically isolate the input.

Mp3-50/8 or Mp3-50/40 Serial Configuration

Mp3-50/8 or **Mp3-50/40** is configured through the USB port (or SmartMedia card installed in any compatible hole in your computer) using the '**Mp3 Configurator**' program. As a backup, or for those of you who have not configured or installed your SmartMedia card, there is a series of configuration commands available on the **Mp3-50/8** or **Mp3-50/40** that will allow you to configure the Show Control half of the device. Once the SmartMedia card is configured and inserted into the **Mp3-50/8** or **Mp3-50/40**, the configuration you have set on using the '**Mp3 Configurator**' program will overwrite any configuration you have made directly through the serial port.

The **Mp3-50/8** or **Mp3-50/40** can be accessed through the RS-232 serial port from any computer running just about any modem or terminal program. The computer you are using doesn't even need to have any **PC-MACs** software installed on it.

The **Mp3-50/8** or **Mp3-50/40** is normally accessed through its RS-232 serial port. A configuration option available through the '**Mp3 Configurator**' program is to take over the DMX-512/MIDI serial port to use it as a RS-422 receive-only serial port. This is called 'Net Serial' mode. Selection this option disables DMX-512 in and out, MIDI in, and IR Trigger in. Up to 256 different cards and devices can be attached to the same serial lines, to form a complete RS-422 'multi Drop' network. Anywhere on this network you can attach operator panels to access and control it, or you can use a telephone or Internet modem so that it can be accessed from around the block or around the world. Commands can be addressed to a single card on the network, or all the cards simultaneously. When in 'Net Serial' mode, any serial responses from the **Mp3-50/8** or **Mp3-50/40** will be sent out through the normal RS-232 serial port. You will not get responses on the DMX-512/MIDI out terminals.

Typical modem programs you can use with Gilderfluke & Company equipment are Terminal.exe (which came with Windows 3.1) and HyperTerm.exe (which comes with later versions of Windows), or our favorite, GilderTerm.

GilderTerm is available free from Gilderfluke & Co. for use with all of our products. It can be downloaded from our web page, and is included on all of our CD-ROMs. GilderTerm has been optimized for use with all Gilderfluke & Company equipment. All of the commands are built in, and it will even let you use your mouse to select commands.

To use the **Mp3-50/8** or **Mp3-50/40** with a terminal program, just configure it for 9600 baud, no parity, eight data bits, one stop bit and 'xon/xoff'

handshaking. If you are using GilderTerm, all the settings are fixed at the appropriate settings. All you will need to do is select the appropriate 'COM' port.

If your terminal emulation program supports VT-52 terminal emulation (they all do!), you should enable it on the **Mp3-50/8** or **Mp3-50/40**. This will allow faster screen redraws. You should set your program NOT to insert an extra LineFeed (LF) character after each Carriage Return (CR) it receives. You should also tell it NOT to scroll automatically after the eightieth column is filled. If either of these are on, the screen will be displayed 'double spaced'. This won't cause any problem, but will make it hard to see the whole screen at one time.

If you have hooked up the **Mp3-50/8** or **Mp3-50/40** to your computer and it still doesn't seem to respond to the keyboard, the first thing to check is that you are attached to the right serial port. The easiest way to do this is to disconnect the **Mp3-50/8** or **Mp3-50/40** and short between the Tx data out and Rx data in pins on the serial port connector on the back of your computer. On all IBMs and compatibles this means sticking a piece of wire, paper clip, or similar tool between pins 2 and 3 on the 'Com.' connector. While still running the modem program, anything you type should be shown on the screen while this paper clip is in place, while nothing will appear when you remove it. If your computer passes this test, then you are using the right serial port and the problem is most likely the baud rate setting or in your wiring to the **Mp3-50/8** or **Mp3-50/40**. If you get characters on the screen even with the paper clip removed from the serial port, it means you probably need to set the 'echo' mode to 'none' or 'full duplex' and try this test again.

To enter the configuration mode you need to type the following. The (address) is replaced by the '**Serial Address**' set in the **Mp3 Configurator** program:

m5AA5(Card Address)

If any other card is in configuration mode (or even if it just thinks another card is in configuration), the **Mp3-50/8** or **Mp3-50/40** won't be able to enter configuration mode. To exit any other card from configuration type 'XN'. You can then try entering configuration again.

When you enter configuration the **Mp3-50/8** or **Mp3-50/40** will display the following screen if no shows are loaded:

```
-Gilderfluke & Co. Mp3-50/40 Audio/Show Controller ver. 1.15 copyright 2003 DCM-  
Card at 00h/__0 | 4 Mbits (512KBytes) memory | i:Y p:N s:N  
A/Green: Open  
B/Red: Open  
C/Blue: Open (disable RTC schedules)  
D/White: Open (close sets clock to 03:05:01)  
no shows loaded  
a) play A sound  
c) STMP Config  
h) set time (schedule loaded- Y)  
  
v) Verify  
x) eXit  
11:52:04 2 03/24/03 sc:dis Command-
```

(Sample data: Your show data will differ from what is shown.)

When you enter configuration the **Mp3-50/8** or **Mp3-50/40** will display the following screen if shows are loaded:

```
-Gilderfluke & Co. Mp3-50/40 Audio/Show Controller ver. 1.15 copyright 2003 DCM-  
Card at 00h/__0 | 4 Mbits (512KBytes) memory | i:Y p:N s:N  
A/Green: Open  
B/Red: Open  
C/Blue: Closed (enable RTC schedules)  
D/White: Open (close sets clock to 03:05:01)  
show 01h/__1 looping @ frame 1E240h/_123456  
FileName: LIFETES3.A00 | #shows: 11h/_17 | #channels: 01h/__1 | offset: 00h/__0  
a) play A sound  
c) STMP Config  
h) set time (schedule loaded- Y)  
i) show Info  
e) stop at End  
l) Loop show  
p) Play show  
s) Stop show  
v) Verify  
x) eXit  
11:52:04 2 03/24/03 sc:123 Command-
```

(Sample data: Your show data will differ from what is shown.)

To redraw the screen at any time, just press the <ESC>ape key or <SPACE> bar.

The three flags 'i', 'p', and 's' are used to help in diagnosing problems:

- i) Shows 'Y' if interface between the Show Control and Mp3 Player sides of the **Mp3-50/8** or **Mp3-50/40** is active. If this is 'N', the Mp3 player side of the unit is probably not running. Either it has

not booted (most common causes of this is either no SmartMedia card installed, or SmartMedia card which needs to be 'blessed'), or is busy being a hard drive via the USB port.

- p) This indicates if a Mp3 file is being played or not. A 'Y' indicates that sound is being played. A 'N' indicates that sound is not being played.
- s) This indicates a 'stuck' byte in the show control to Mp3 Player interface. It will normally be 'N'. If it is 'Y', it is because the Show Control side has sent a command to the Mp3 player, and the Mp3 player has not responded in a timely manner.

If the **Real Time 'Atomic' Clock** option has been installed in the **Mp3-50/8** or **Mp3-50/40**:

- a) The current time will start displaying on the command line. There is a delay of approximately 5 seconds after any command before the time will return to displaying. The time is displayed first (nn:nn:nn), followed by the day of week (1-7, with Sunday =1), date (mm/dd/yy), and then the schedule number (0=none, 1-255) being used for the day/DOW.
- b) The option to 'set time' will be available.
- c) A 'N' after the 'set time' command indicates that no schedule file has been loaded onto the **Mp3-50/8** or **Mp3-50/40**. A 'Y' indicates that the Schedule file for the **RealTime 'Atomic' Clock** has been loaded.
- d) If the option to enable/disable the **Real Time 'Atomic' Clock** has been selected from the **Mp3 Configurator**, the line which shows the status of the 'C/Blue' input will also show whether the clock is currently enabled or not. A closure on the 'C/Blue' input will enable the **Real Time 'Atomic' Clock**.
- e) If the option to resynchronize the **Real Time 'Atomic' Clock** has been selected from the **Mp3 Configurator**, the time it will be reset to is shown on the line which shows the 'D/White' input status. A closure on the 'D/White' input will resynchronize the internal RealTime clock to to this time. This keeps the **Mp3-50/8s** or **Mp3-50/40s** internal clock synchronized to the external '**Atomic**' **Clock**.
- f) When the **Real Time 'Atomic' Clock** starts a sound or show, this will be displayed on the command line for approximately five seconds before the current time starts displaying again.

Play a Sound

This command is available on firmware revisions 1.15 and later: This prompts you for a spiel number to play. Numbers must be entered as a two digit hexadecimal number.

Display Config. from SmartMedia

This displays the configuration which was downloaded from the SmartMedia card when the Mp3 half of the **Mp3-50/8** or **Mp3-50/40** is powered up:

```
-Gilderfluke & Co. Mp3-50/40 Audio/Show Controller ver. 1.15 copyright 2003 DCM-
Configuration....
1) serial: 00h/___0
Midi:
2) chan:00h/___0
3) lst: 00h/___0
4) MCU: 005h/___5 | i:Y p:N s:N
5) Lft: 002h/___2
6) Rt: 003h/___3
7) lst: 000h/___0
8) eeFlag0: 91h/145 / 10010001b / DMX-512 Rx
9) eeFlag1: 99h/153 / 10011001b
a) eeFlag2: 00h/___0 / 00000000b
b) eeFlag3: 00h/___0 / 00000000b
m) main menu
x) eXit
11:52:04 2 03/24/03 sc:___1 Command-
```

These numbers should agree with what you set using the '**Mp3 Configurator**' program. If they do not, you can double check that it is not receiving the configuration by changing one of these numbers, powering the **Mp3-50/8** or **Mp3-50/40** down, waiting 10 seconds, and powering it back up again. If the Mp3 side of the **Mp3-50/8** or **Mp3-50/40** has successfully booted (heart is flashing), the values you changed should have reverted to whatever is in the configuration set by the '**Mp3 Configurator**' program.

- 1) Serial Address:** This is the address of the **Mp3-50/8** or **Mp3-50/40** on the RS-422 serial multidrop serial buss. Even though the **Mp3-50/8** or **Mp3-50/40** is normally accessed through the RS-232 serial port, the address is still needed to access the **Mp3-50/8** or **Mp3-50/40**. Valid address values are from 00h to FFh (0 to 255 using decimal numbers).
- 2) MIDI channel:** This is the MIDI instrument number used to access the **Mp3-50/8** or **Mp3-50/40** through the MIDI port.

Valid address ranges are 00h through 0Fh (0 through 15 in decimal numbers).

- 3) **MIDI 1st Note:** Legal MIDI notes are numbered from 00h through 7Fh (0 through 127 in decimal numbers). The only problem is that if you are actually using a keyboard to access the **Mp3-50/8** or **Mp3-50/40**, no keyboards actually have all 128 keys. A real piano only has 88. 'Middle C' is located at 3Ch (or 60 in decimal numbers) on all MIDI keyboards. You can count to the South and North of 'Middle C' to determine what numbers your keyboard will actually generate.

Numbers below the value you set for the 'MIDI Note Offset' will be ignored. If you wanted to start accessing the features of the **Mp3-50/8** or **Mp3-50/40** at 'Middle C', you would set this offset to 3Ch (or 60 in decimal numbers).

- 4) **Repeater Control Channel:** This is the Show Control channel which is set to the **Mp3 Player** to select and play tracks, ramp audio to a level, stop and pause. If this address is larger than 255/0FFh, then it will be displayed with a '+256' notation. Valid values are from 00h to FFh (0 to 255 using decimal numbers). This is normally set to a channel which is not used for any of the Show Control outputs, but it can be if this suits your application.
- 5) **Left Level Control:** If using audio control from the Show Control side of the **Mp3-50/8** or **Mp3-50/40**, then this is the Show Control channel which will control the left audio output level. Valid values are from 00h to FFh (0 to 255 using decimal numbers). If this address is larger than 255/0FFh, then it will be displayed with a '+256' notation.
- 6) **Right Level Control:** If using audio control from the Show Control side of the **Mp3-50/8** or **Mp3-50/40**, then this is the Show Control channel which will control the right audio output level. Valid values are from 00h to FFh (0 to 255 using decimal numbers).
- 7) **First Animation Channel:** This is the first channel of Show Control data which will be sent to the first Show Control Outputs. Valid values are from 00h to FFh (0 to 255 using decimal numbers). If this address is larger than 255/0FFh, then it will be displayed with a '+256' notation.
- 8) **eeFlag0:** These are the binary 'flag' settings from the **Mp3**

Configurator program. Valid values are from 00h to FFh (0 to 255 using decimal numbers). You really shouldn't muck with these. Following this line are the DMX/MIDI serial port settings. These are controlled by the bits in eeFlag0. They will show:

- a) DMX Tx: DMX-512 transmission is enabled.
- b) DMX Rx: DMX-512 reception is enabled.
- c) MIDI Rx: MIDI reception is enabled.
- d) Net Serial Rx: Net Serial reception is enabled.
- e) IR Mode Rx: IR Mode reception is enabled.

9) eeFlag1: These are the binary 'flag' settings from the **'Mp3 Configurator'** program. Valid values are from 00h to FFh (0 to 255 using decimal numbers). You really shouldn't muck with these.

a) eeFlag2: These are the binary 'flag' settings from the **'Mp3 Configurator'** program. Valid values are from 00h to FFh (0 to 255 using decimal numbers). You really shouldn't muck with these.

These can be modified by entering the number/letter adjacent to each setting. This is not normally done, since the **Mp3 Player** will override any changes you have made here with the settings you have made in the **'Mp3 Configurator'** program.

About the only time you will need to modify these settings are if you have not yet configured or installed the SmartMedia card in the **Mp3-50/8** or **Mp3-50/40**. These can be used to do initial bring-up and testing on a Show Control System.

Show Info

This displays the vitals of the shows which have been downloaded to the **Mp3-50/8** or **Mp3-50/40**:

```
-Gilderfluke & Co. Mp3-50/40 Audio/Show Controller ver. 1.15 copyright 2003 DCM-
Header: 00 B4 22 00 01 11 00 01 01 00 01 00 01 00 01 00 01 00 01 00 01 00
show number/name          Start          Length      Flags      "next" show
01h/_1  LIFETEST: 000000h/____0  000384h/____900  C8h      whatever is next
02h/_2  LI955D~1: 000384h/____900  000384h/____900  C8h      whatever is next
03h/_3  LIFE_D~2: 000708h/____1800  00003Ch/____60   C0h      whatever is next
04h/_4  LIFE_D~3: 000744h/____1860  00003Ch/____60   C0h      whatever is next
05h/_5  LIFE_D~4: 000780h/____1920  00003Ch/____60   C0h      whatever is next
06h/_6  LI881D~1: 0007BCh/____1980  00003Ch/____60   C0h      whatever is next
07h/_7  LI8C1D~1: 0007F8h/____2040  00003Ch/____60   C0h      whatever is next
08h/_8  LI802D~1: 000834h/____2100  00003Ch/____60   C0h      whatever is next
09h/_9  LI842D~1: 000870h/____2160  00003Ch/____60   C0h      whatever is next
0Ah/_10 LIFETE~1: 0008ACh/____2220  000384h/____900  C8h      09h/_9 LI842D~1.sho
0Bh/_11 LIFETE~2: 000C30h/____3120  000384h/____900  C8h      whatever is next
0Ch/_12 LIFETE~3: 000FB4h/____4020  000384h/____900  C8h      whatever is next
0Dh/_13 LIFETE~4: 001338h/____4920  000384h/____900  C8h      whatever is next
0Eh/_14 LI994D~1: 0016BCh/____5820  000384h/____900  C8h      whatever is next
0Fh/_15 LI9D4D~1: 001A40h/____6720  000384h/____900  C8h      0Fh/_15 LI9D4D~1.sho
10h/_16 LI915D~1: 001DC4h/____7620  000384h/____900  C8h      whatever is next
11h/_17 LIFE_D~1: 002148h/____8520  00003Ch/____60   C0h      whatever is next
hit any key
```

These will help you confirm that the shows are the ones you thought they were and that they are in the order you expected them to be in.

Set Time

Available only if the **RealTime 'Atomic' Clock** option has been found on the **Mp3-50/8** or **Mp3-50/40**.: This is used to set the Real Time Clock (RTC) manually. It MUST be used at least once to 'roughly' set the date and time, before the external **'Atomic' Clock** can take over.

The RTC must be set using one or two digit numbers, as needed. A value for the month of March, for instance, must be entered as '03'.

Stop at End

This clears the 'looping' flag, so the currently running show (if any) will stop at the end and wait for the next start command. Do NOT use this command for controlling the **Mp3-50/8** or **Mp3-50/40** except during testing. Use the equivalent Serial Port command instead.

Loop a Show

This command is used to request and play a specific show with the 'looping' flag set. If the currently running show (if any) is NOT steppable, The **Mp3-50/8** or **Mp3-50/40** will confirm with you that you do indeed want to start another show. At the end of the

show (if it has been configured to do so), the next show will play. This will continue until the **Mp3-50/8** or **Mp3-50/40** is told to 'Stop', 'Stop at end' or a different show with is started with a 'start' command. Do NOT use this command for controlling the **Mp3-50/8** or **Mp3-50/40** except during testing. Use the equivalent Serial Port command instead.

Play a Show

This command is used to request and play a specific show with the 'looping' flag cleared. If the currently running show (if any) is NOT steppable, The **Mp3-50/8** or **Mp3-50/40** will confirm with you that you do indeed want to start another show. At the end of the show the **Mp3-50/8** or **Mp3-50/40** will sit and wait for the next 'start' or 'loop' command. Do NOT use this command for controlling the **Mp3-50/8** or **Mp3-50/40** except during testing. Use the equivalent Serial Port command instead.

Stop Playing

This command stops any show witch is playing or looping immediately. The **Mp3-50/8** or **Mp3-50/40** will sit and wait for the next 'start' or 'loop' command. Do NOT use this command for controlling the **Mp3-50/8** or **Mp3-50/40** except during testing. Use the equivalent Serial Port command instead.

Verify Shows

This command is used to test the show data which has been downloaded to the **Mp3-50/8** or **Mp3-50/40**. This will take anywhere from a few seconds to several minutes, depending of the size of the AutoDownload file that must be tested. If you have the '**Atomic**' Clock option installed in your **Mp3-50/8** or **Mp3-50/40**, it will give you the option of verifying the schedule or shows, if both have been downloaded, If no shows have been downloaded, but a schedule file has, then this command will automatically verify the schedule.

Exit

This is used to exit the configuration mode. It will ask you to press 'y' or 'n' before completing the command.

Mp3-50, Mp3-50/8 or Mp3-50/40 Software Installation

There are three pieces of software that you will need to install on your computer to use the **Mp3-50, Mp3-50/8 or Mp3-50/40**. These are:

- 1) '**StMp3Format.exe**': This is used to format the SmartMedia card through the USB port. After installation, this ends up in 'c:/Program Files/SigmaTel/STMp3400'. A shortcut can be found under the 'Start' button under 'Programs/SigmaTel StMp3400 **Mp3 Player/StMp3Format**'.
- 2) '**StMp3Update.exe**': This program is used to send the firmware to the SmartMedia card that the **Mp3-50, Mp3-50/8 or Mp3-50/40** needs to operate. After installation, this ends up in 'c:/Program Files/SigmaTel/STMp3400'. A shortcut can be found under the 'Start' button under 'Programs/SigmaTel StMp3400 **Mp3 Player/StMp3Update**'.
- 3) '**Mp3 Config.exe**': This is the Gilderfluke Program that you will use the most. It is used to configure what all the trigger inputs do on the Mp3-player, what the volume levels are, and all the other settings for the **Mp3-50, Mp3-50/8 or Mp3-50/40**.

The software for the Mp3 half of the **Mp3-50, Mp3-50/8 or Mp3-50/40** is distributed from Gilderfluke & Company on CD-ROM, or can be downloaded or emailed to you. If you download it or get it via email, it will probably be zipped, and you will need to decompress it before it can be installed. In any case, you will end up with a folder called 'Gilder Mp3 Installer' somewhere on your computer.

If you need to decompress the installer, it will be in a file called 'Gilder Mp3 Installer.zip'. To decompress any zip files you will need to have software to decompress .zip files already installed on your computer (PkZip or WinZip). It comes with most versions of Windows, so it is probably already installed. If you do not have any decompressor software, it can be downloaded from '<http://www.pkware.com>' or '<http://www.winzip.com>'. You do not need to use the versions that they charge for. Just download the 'free' version of the software.

- 1) It Double click on the 'Gilder Mp3 Installer.zip' file.
- 2) Press the 'Install' button if you have one. This will decompress and install the software. If you don't see an 'Install' button, press the 'Unzip' button.
- 3) Direct it to store the decompressed files somewhere on your computer. usually the easiest thing to do is direct it to the 'desktop'.
- 4) Make sure that it is set to extract 'all files' and 'Use Folder names'
- 5) Press 'Extract' again to start it unzipping.

- 6) This should leave the extracted folder on your desktop (or wherever you directed it to place the files.

Once the installer is decompressed, you can start the installation of the software. If you have a previous version of the **Mp3-50, Mp3-50/8 or Mp3-50/40** software on your compute, first unplug any **Mp3-50, Mp3-50/8 or Mp3-50/40** players from your computer, run the 'uninstaller' to get rid of old files, and reboot.

Double click on the 'setup.exe' program in the 'Gilder Mp3 Installer' folder. This will install the programs:

- 1) 'c:/Program Files/SigmaTel/STMp3400/StMp3Format.exe'
- 2) 'c:/Program Files/SigmaTel/STMp3400/StMp3Update.exe'

A shortcut to these can be found under the 'Start' button under 'Programs/SigmaTel StMp3400 **Mp3 Player**'.

The **Mp3-50, Mp3-50/8 or Mp3-50/40** Configurator program, 'Mp3 Config.exe', is shipped separately from the Mp3 drivers. You will need to move this to somewhere you can find it again. Usually, this is in the same folder as the other Mp3 programs: 'c:/Program Files/SigmaTel/STMp3400/'. You will want to add a shortcut to this on your desktop and/or 'start' menu. Do this by 'left clicking' in the Mp3 Config.exe and dragging and dropping it on the desktop or 'start' menu. When you release the left mouse button, Windows will ask you what you want to do there. Tell it to make a 'shortcut'.

Software/Firmware Versions

There are three different pieces of software and firmware used in a **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**:

Mp3 Configurator: This program lives on your PC. It can be easily updated by replacing the program on your PC. You should only use a **Mp3 Configurator** which has the same revision number as the **Mp3 Player Firmware**. The software revision number is found under the 'Help' pulldown under the 'about':



Mp3 Player Firmware: This resides on the SmartMedia card along with your Mp3 files. It is cleverly hidden, but it is there. You should only use a configurator which has the same revision number as the **Mp3 Configurator**. To determine the revision of this firmware, plug the player into the USB port on your computer (the software must have been previously installed on your PC) and run the Mp3 Updater. It is found under the 'Start' button **'Programs/SigmaTel StMp3400 Mp3 Player/StMp3Update'**. The current firmware revision number on your computer, and that on the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** will be shown. If your computer has a more up-to-date version, the card should be updated to bring it into line with the **Mp3 Configurator** program.

Show Control Firmware: This is the least likely to need updating. It resides in a socketed microcontroller on the **Mp3-50/8** or **Mp3-50/40**. The player will need to be returned to the factory for updating this chip, or we can send a revised firmware chip which can be swapped out in the field. The revision number of this firmware is shown at the top of all of the configuration screens accessed through the serial port of the **Mp3-50/8** or **Mp3-50/40**.

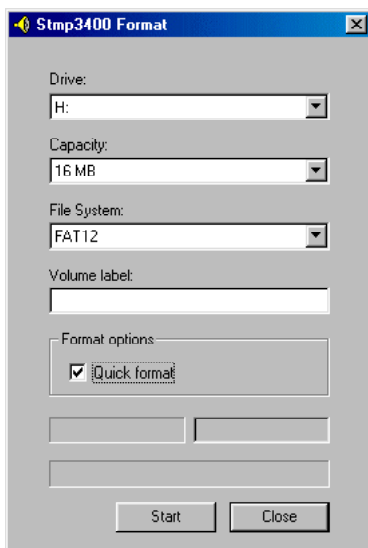
What to do with a new SmartMedia Card

SmartMedia cards need a slight amount of preparation before they can be used with the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**. They are normally shipped in a format which is ready to use with the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**. They only need to be 'blessed', which adds all of the firmware and stuff that the **Mp3 Players** need to actually operate. This can only be done on a computer which has had the **Mp3-50** software installed on it, and has an available USB port.

If a SmartMedia card has been formatted in a PC, the original format will have been destroyed. It will not work in the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** until the format is restored.

If you insert a SmartMedia card in an **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** and the Mp3 heart does not begin to flash soon after power is reapplied, then there is most probably a problem in either the format or firmware installed on the SmartMedia card.

To format a SmartMedia card, plug the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** into the USB port on your computer. After a few moments, an hour-glass should appear once or twice while Windows digests this addition. After that, open the Mp3 Formatter under the 'Start' button '**Programs/SigmaTel StMp3400 Mp3 Player/StMp2Format**'.

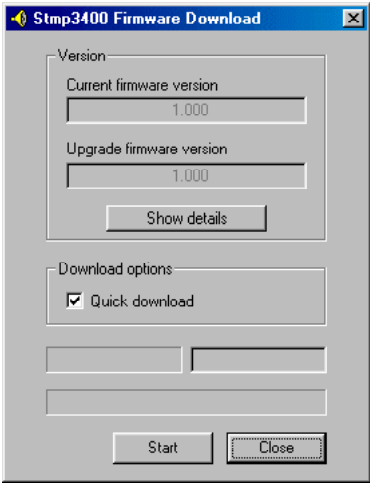


Select the appropriate disk drive. Windows will assign the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** SmartMedia card as the next available disk drive. The files system for SmartMedia cards of up to 64 MBytes should be 'FAT12'.

SmartMedia cards of 128 MBytes and larger should use 'FAT32'. In most cases a 'quick format' should be sufficient. You can uncheck 'quick format' to do a full format if you want to be sure that the SmartMedia card is completely reformatted. If the drive capacity is not what you think it should be, then you should do a full format on the SmartMedia card.

Press 'Start' to format your SmartMedia card, or cancel if you don't want to. All data which was on the SmartMedia card will be erased.

Once a SmartMedia card has been formatted, it then needs to be 'blessed'. This installs the firmware the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** needs to run onto the SmartMedia card. Open the Mp3 Updater under the 'Start' button **'Programs/SigmaTel StMp3400 Mp3 Player/StMp3Update'**.



The Mp3 Updater will show you both the current firmware version on the SmartMedia card, and the firmware revision number that you will be updating it to. If the current revision is larger, then you probably shouldn't 'downgrade' to an older revision. press 'Start' to update and/or install the firmware on the SmartMedia card.

Sometimes the **StMp3Update program** wants to reformat the card at the same time as it puts the new firmware on it. If you have already loaded your new Mp3 AudioFiles on the SmartMedia card, you may loose them during a firmware update. If you have AudioFiles on your SmartMedia, drag-n-drop them to your hard disk before running the **StMp3Update program**. After the 'blessing' ceremony has completed, you can just drag-n-drop them back onto the SmartMedia card.

Mp3-50 Configurator

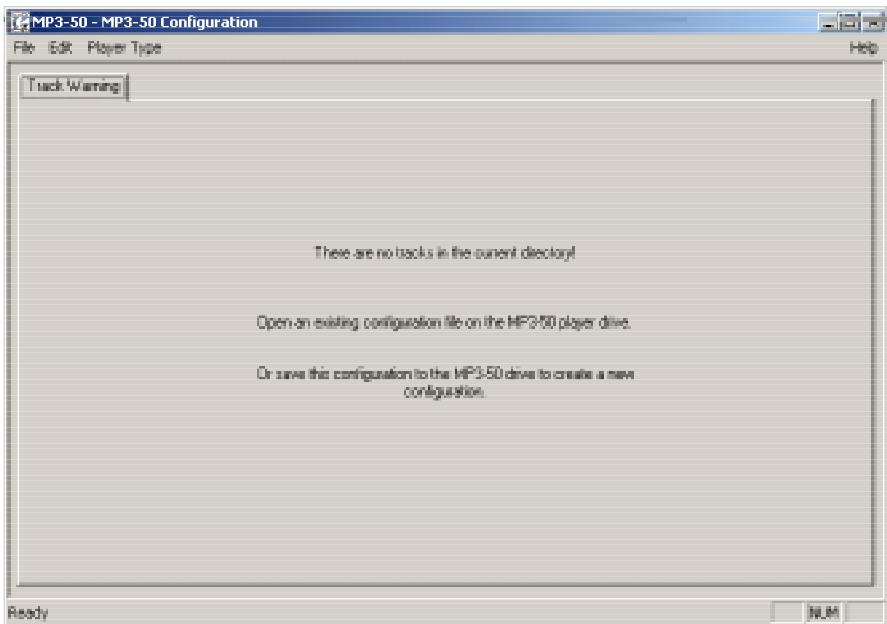
The '**Mp3 Configurator**' program is used to do the vast majority of the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** configuration. To use it, you must first have inserted the SmartMedia card into your computer so that you can access it. The two ways you can do this are:

- 1) Plug in a USB cable from your computer to the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** player. A few seconds later, an hourglass should appear to indicate that the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** has been mounted as what the PC thinks is a standard 'Removable Disk'.
- 2) Insert the SmartMedia card into any suitable hole in your computer. In most cases, this means that you are using a laptop with a built-in PCMCIA card slot, and have a PCMCIA to SmartMedia adapter. A few seconds after inserting the SmartMedia, an hourglass should appear to indicate that it is being mounted as what the PC thinks is a standard 'Removable Disk'.

In either case, you can then navigate over to the disk that Windows has assigned to the SmartMedia card. This is done just as you would on any Windows disk drive. Double click on 'My Computer', then the disk drive that Windows has assigned to the SmartMedia card. Drag and drop all the Mp3 audio files you want to use over to the SmartMedia card. If you need a Show Control file to AutoDownload to the Show Control half of an **Mp3-50/8** or **Mp3-50/40**, then drag it over to the SmartMedia card too.

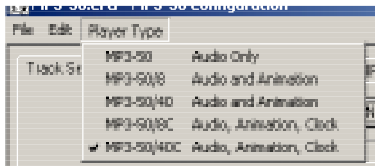
If this SmartMedia card has been configured for use in an **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**, there should be a '**Mp3-50.cfg**' file on it. You should be able to double click on it to open the '**Mp3 Configurator**' program.

If you open the '**Mp3 Configurator**' program directly, it will want to know where your Mp3 files are located. It will display the following screen:



Just navigate over to your Mp3 player (assuming it is plugged into a USB port and is acting as a hard drive for your computer) or whatever folder you are using to hold your Mp3 files. Either open an existing configuration '**Mp3-50.cfg**' file, or do a 'Save As...' to create one.

The '**Mp3 Configurator**' program has all the standard Windows pull-downs for opening and saving shows:



The Under the 'Type' Pulldown, you should select whether you are configuring a **Mp3-50** (Audio only) or a **Mp3-50/8** or **Mp3-50/40** (Audio and Show Control), or a **Mp3-50/8** or **Mp3-50/40** with the '**Atomic**' clock option installed. The audio-only **Mp3-50** configuration uses only the first four tabs of the '**Mp3 Configurator**' program. The Audio & Show Control **Mp3-50/8** and **Mp3-50/40** use six tabs tabs. With the '**Atomic**' clock option, all seven tabs are used.

You can manually configure your **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** player, but for the majority of users the defaults will do everything they

need and more. Once you have selected the player type, reset the configuration to defaults using the 'Reset Everything' command under the 'Edit' pulldown:



The default settings are as follows:

Mp3-50 (audio only): Volume to defaults. All sounds do nothing at end. Play lists unused. Amplifier Enabled. STMP Opto Inputs set as following:

- a) 1-8 audio tracks in the Mp3 folder: Bit 0=SoundFile 1, Bit 1=SoundFile 2, Bit 2=SoundFile 3, Bit 3=SoundFile 4, Bit 4=SoundFile 5, Bit 5=SoundFile 6, Bit 6=SoundFile 7, Bit 7=SoundFile 8. If seven or less SoundFiles are found, then bit 7 becomes Stop. If six or less SoundFiles are found, then bit 6 becomes full mute in 1 sec. on closing. If five or less SoundFiles are found, then bit 5 becomes half mute in 1 sec. on closing. If four or less SoundFiles are found, then bit 4 becomes unmute in 1 sec. on closing.
- b) 9+ audio tracks in the folder: Bits 0-7 are used to binary address the available SoundFiles. If 127 or less SoundFiles are found, then bit 7 becomes Stop. If 63 or less SoundFiles are found, then bit 6 becomes full mute in 1 sec. on closing. If 31 or less SoundFiles are found, then bit 5 becomes half mute in 1 sec. on closing. If 15 or less SoundFiles are found, then bit 4 becomes unmute in 1 sec. on closing.

Mp3-50/8: Serial address to 00h, First animation output at 00h, MPU triggers at 01h, Volume left @ 02h (but disabled), Volume right @ 03h (but disabled), DMX Rx Enabled, AutoDownload next time, auto Download on every boot, Flash enabled, DMX Checksum Enabled, All STMP opto inputs DISABLED, all MCU inputs set as following:

- a) 1-8 audio tracks in the Mp3 folder: Bit 0=SoundFile 1, Bit 1=SoundFile 2, Bit 2=SoundFile 3, Bit 3=SoundFile 4, Bit 4=SoundFile 5, Bit 5=SoundFile 6, Bit 6=SoundFile 7, Bit 7=SoundFile 8. If seven or less SoundFiles are found, then bit 7 becomes Stop. If six or less SoundFiles are found, then bit 6 becomes full mute in 1 sec. on closing. If five or less SoundFiles are found, then bit 5 becomes half mute in 1 sec. on closing. If four

or less SoundFiles are found, then bit 4 becomes unmute in 1 sec. on closing.

- b) 9+ audio tracks in the folder: Bits 0-? are used to binary address the available SoundFiles. If 127 or less SoundFiles are found, then bit 7 becomes Stop. If 63 or less SoundFiles are found, then bit 6 becomes full mute in 1 sec. on closing. If 31 or less SoundFiles are found, then bit 5 becomes half mute in 1 sec. on closing. If 15 or less SoundFiles are found, then bit 4 becomes unmute in 1 sec. on closing.

Mp3-50/40: All settings the same as the Mp3-50/8, except: MPU triggers addressed at 05h, Volume left @ 06h (but disabled), Volume right @ 07h (but disabled).

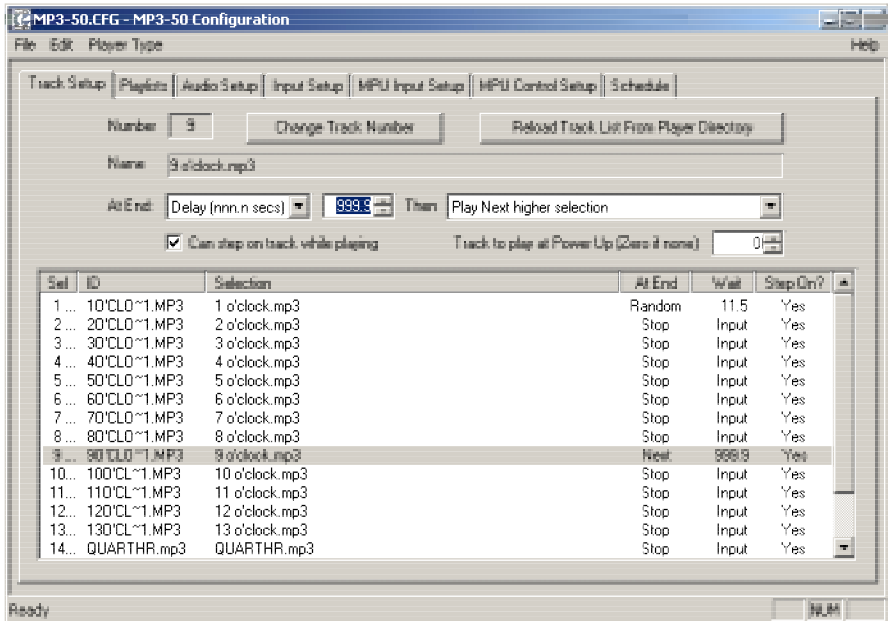
Mp3-50/8 w/clock: All settings the same as the Mp3-50/08. Reset the RTC enabled and set for 3:05:01 AM, and the Schedule disable on C/Blue is disabled.

Mp3-50/40 w/clock: All settings the same as the Mp3-50/40. Reset the RTC enabled and set for 3:05:01 AM, and the Schedule disable on C/Blue is disabled.

Mp3-50 Configurator: Track Setup

(Mp3-50, Mp3-50/8, and Mp3-50/40)

The Mp3 audio tracks are entered and sorted on this menu tab of the **'Mp3 Configurator'** program. To find your Mp3 files, you must point it to the disk that contains your Mp3 files. This is usually the SmartMedia Card that is, or will be inserted in the **Mp3-50, Mp3-50/8 or Mp3-50/40**. Up to 255 Mp3 audio files can be loaded onto the **Mp3-50, Mp3-50/8 or Mp3-50/40's** SmartMedia card at the same time.



Change Track Number: *You must have previously selected one of the AudioFiles from your list at the bottom of this window to use this command.* The AudioFiles are loaded in alphabetical order by default. This button allows you to select and renumber any of the audio tracks on the SmartMedia card. The current track number is shown just to the left of the This button is used to refresh the list of tracks loaded on the SmartMedia card. It is used when you have changed the name or number of AudioFiles loaded on the SmartMedia card.

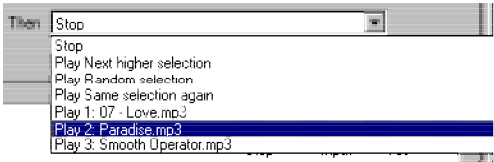
Reload Track List From Directory: This button is used to refresh the list of tracks loaded on the SmartMedia card. It is used when you have changed the name or number of AudioFiles loaded on the

SmartMedia card.

At End: *You must have previously selected one of the AudioFiles from your list at the bottom of this window to use this command. You can set what will happen at the end of any Mp3 AudioFile. It can either sit there and wait for the next input, or delay between 0 and 999.9 seconds (16.65 minutes) and play another track:*



After the delay (or immediately), you can set to it to do any of the following:



- 1) **Stop:** No AudioFile is selected or played at the end.
- 2) **Next Higher Selection:** This plays the next AudioFile sequentially. This settings is used to play tracks 'round robin'. You can choose if the next track will be selected from all the AudioFiles loaded on the SmartMedia card, or from one of the eight track lists. At the end of the list, the first track will be played again. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.
- 3) **Play Random Selection:** This plays an AudioFile picked at random from the entire card or one of the eight track lists. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.
- 4) **Specific AudioFile:** This selects and plays a specific AudioFile. This is how you would choose to loop a single any audio file. This selection ignores the 'on SmartMedia Card/From PlayList' settings. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.

Can Step On Track with a new Play request: *You must have previously selected one of the AudioFiles from your list at the bottom of this window to use this command. When checked, the selected track can be interrupted mid-play by a request for another Mp3*

AudioFile to begin playing. If not checked, any requests of other audio files to start will be ignored. The only way to interrupt a AudioFile which can't be interrupted is to stop it.

Track to Play at PowerUp: Whatever track you select will automatically begin playing as soon as the **Mp3-50, Mp3-50/8** or **Mp3-50/40** is powered up. This is used to start tracks looping that will just continue to run as long as power is applied to the unit.

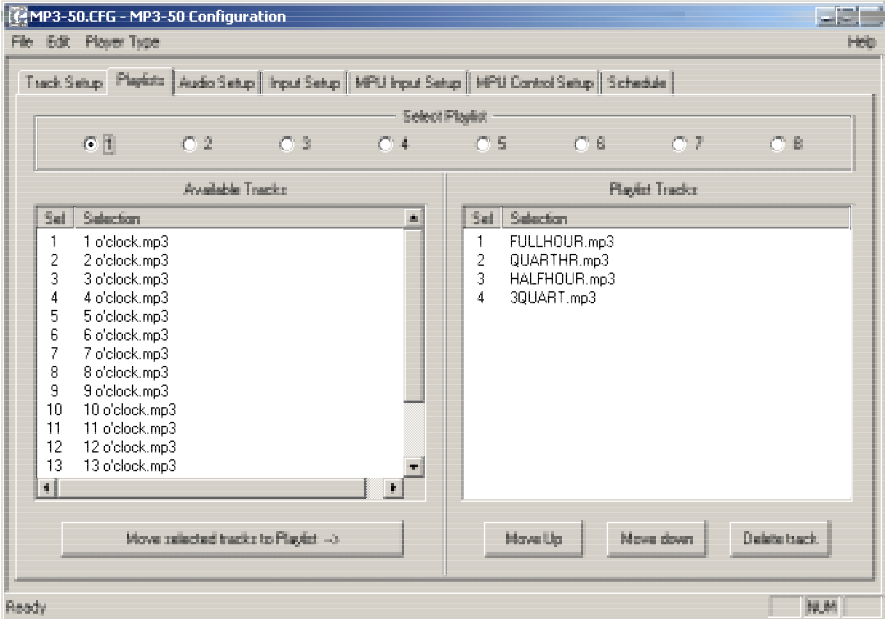
Mp3-50 Configurator: PlayList Setup

(Mp3-50, Mp3-50/8, and Mp3-50/40)

You can create up to eight lists of AudioFiles. Any AudioFile stored on the **Mp3-50, Mp3-50/8** or **Mp3-50/40** SmartMedia card (shown on the 'Track Setup' tab) can be added to any list. AudioFiles can appear in the same PlayList more than once.

The lists can be accessed from the trigger inputs or at the end of any AudioFile. In most cases, tracks can be selected to play 'round robin' or randomly from a list.

A typical application would have one input triggering AudioFiles from one list randomly, while another input triggers the AudioFiles on another list in a 'round robin' fashion.



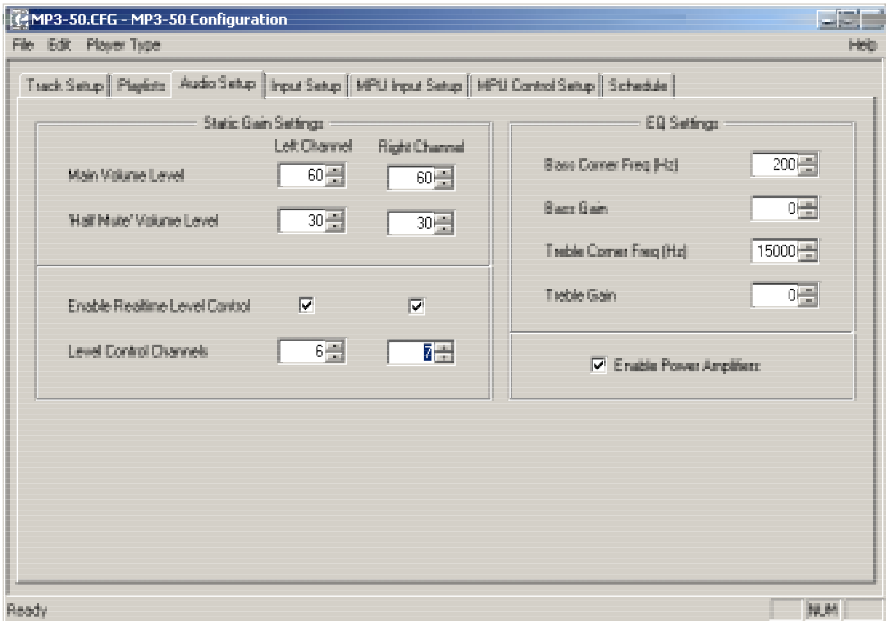
To create a 'PlayList':

- 1) select the list you are editing (using the eight radio buttons).
- 2) Move the AudioFiles you want in the list to the right column using the 'move selected tracks to PlayList' button.
- 3) Rearrange the list if needed using the 'move up', 'move down' and 'delete' buttons.

Mp3-50 Configurator: Audio Setup

(Mp3-50/8, and Mp3-50/40)

This tab is where you set the audio output levels for the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**.



Main Volume Level: This sets the normal audio level for the two outputs from the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**. It controls both the line level outputs, and the on board amplifier's output levels. This level is overridden if the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** has been set to use RealTime Level Controls from DMX-512, MIDI, or Show Control data as soon as that data starts arriving. Before any RealTime level information arrives, then this will set the 'default level' for the outputs.

Half Mute: This sets the normal audio level for the two outputs from the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** when the unit has been told to 'Half Mute' its outputs. It controls both the line level outputs, and the on board amplifier's output levels. The 'Half Mute' level is generally used to duck the audio output to some reduced level during PA or maintenance so that the audio plays at a more comfortable level. Although it is usually set to a level lower than the 'Main Volume Level', it can be set anywhere, including higher

values.

If the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** has been set to use RealTime Level Controls from DMX-512, MIDI, or Show Control data, then the 'half mute' level is scaled from whatever level these RealTime controls are setting as the 'full volume' levels.

RealTime Level Control: When enabled, Audio Levels can be controlled from:

- 1) DMX-512 data received through the DMX-512/MIDI serial port (if DMX-512 reception is enabled).
- 2) RealTime Serial data received through the RS-232 serial port.
- 3) RealTime Serial data received through the DMX-512/MIDI serial port (if net Serial is enabled).
- 4) MIDI data received through the DMX-512/MIDI serial port (if MIDI is enabled, and 'MIDI notes trigger animation playback' is NOT selected).

In the first three cases above, the 'level Control Channels' set where the data for controlling the left and right outputs comes from. These can be set to different addresses, or the same address if you want a single analog channel to control both left and right outputs.

To control output levels when triggering AudioFiles from MIDI, the 'Note On' velocity is used. Note velocity values from 1 through 127 translate into audio levels 0-100%. If an AudioFile is started with a high 'Note On' velocity, it will play loudly. If it is started with a low velocity, it will play more softly.

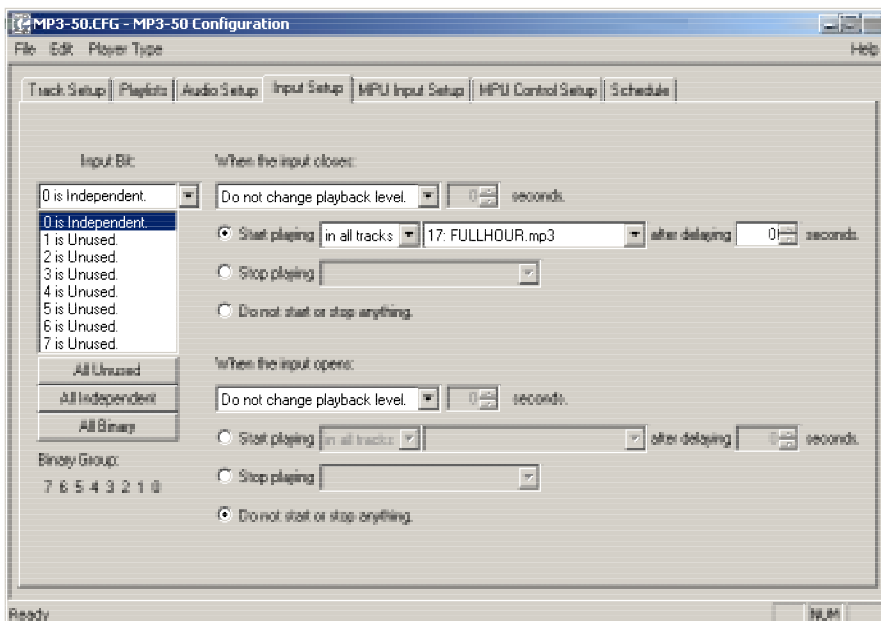
EQ Settings: You should always try to adjust your EQ before recording your AudioFiles. This equalizer is used to make up for sins in the studio by allowing you to adjust the overall EQ of the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**.

Enable Power Amplifier: This is used to turn on and off the onboard power amplifier. If you are not using the power amplifier, you should turn it off. If you are using it, you won't hear much coming out of it until you turn it ON.

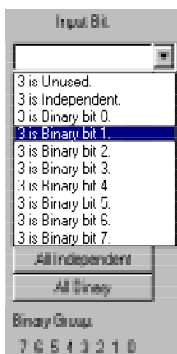
Mp3-50 Configurator: Input Setup

(Mp3-50/8, and Mp3-50/40)

The **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** has eight optically isolated trigger inputs that feed directly into the **Mp3 Player**. If you are using a **Mp3-50/8** or **Mp3-50/40**, These inputs are shared with eight of the Show Control outputs. You will probably want to set all of these inputs for 'Unused', and use the trigger inputs from the MPU instead.



You can set any of the eight inputs as unused, an independent control, or part of a binary address:



A Binary Select pattern can be used to directly access all possible 255 SoundFiles which can be loaded onto a **Mp3-50**, **Mp3-50/8** or **Mp3-50/40**. If you are assigning inputs as part of a binary address, you should start by assigning 'bit 0'. It is on this input that you will be able to tell the **Mp3-50**, **Mp3-50/8** or **Mp3-50/40** to start, stop, or change volumes (fade in or out). The other inputs can then be assigned as binary bits '1', '2', '3' etc.. The number of bits used will determine how many SoundFiles can be directly selected through the inputs:

of binary bits bits used

1	0-0 = 1 SoundFile
2	0-1 = 3 SoundFiles
3	0-2 = 7 SoundFiles
4	0-3 = 15 SoundFiles
5	0-4 = 31 SoundFiles
6	0-5 = 63 SoundFiles
7	0-6 = 127 SoundFiles
8	0-7 = 255 SoundFiles

It is pointless to assign more bits than you have SoundFiles. i.e.: If you have 12 SoundFiles, don't assign any bits numbers above '3'.

When a group of inputs are acting as binary selects, any change in the inputs is considered a 'closing'. All of the inputs going to 'zero' value simultaneously is considered an 'opening'.

Any input can be used as any bit number. You are not limited to assigning input '3' as bit '3' in the binary input pattern. This allows you to do miswire the inputs, and correct it in the configuration.

As a shortcut, buttons are available to quickly set the inputs as 'All unused', 'All Independent' or 'All Binary'. If any bits are assigned as binary bits, these will be shown below these buttons.



For each independent input, you can set a different action for the 'closing' edges (when power starts flowing through the optoisolators on the inputs) and 'opening' edges (when current stops flowing through the optoisolators).

Playback Level: This popup allows you to select a change in audio level on the outputs on this input/edge. Your options

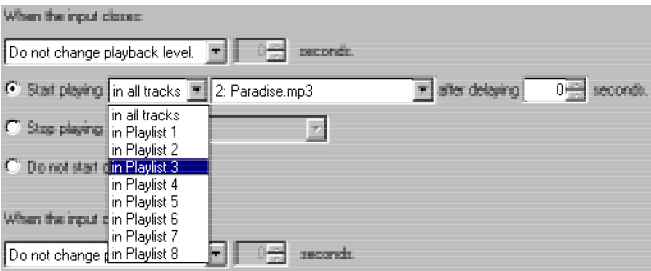
are:

- 1) **Do not change Playback Level:** This leaves the audio levels where they were before.
- 2) **Fade to Full In:** This ramps the audio towards the 'full' level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds. The audio level is set on the Audio tab, or by the RealTime level control, if this option has been selected.



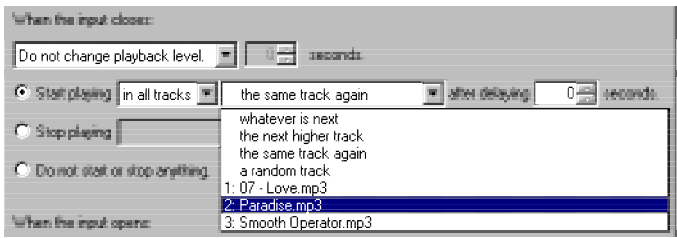
- 3) **Fade to Zero In:** This ramps the audio back towards the a fully muted level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds.
- 4) **Fade to 'Half Mute' In:** This ramps the audio towards the level which has been set for the 'half muted' level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds. The audio level is set on the Audio tab, or scaled from the RealTime level control, if this option has been selected.

Start Playing: This series of popups allows you to select and play an AudioFile on this input/edge. The tracks can me selected form all of those on the SmartMedia card, or from one of the eight PlayLists:



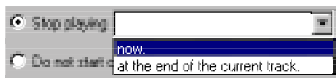
Within the PlayList or SmartMedia card you selected in the last

step, you can select:



- 1) **Whatever is Next:** This plays what the current/last AudioFile has set as the 'next' AudioFile to play at its end. This is set on the Track Setup tab. This selection ignores the 'on SmartMedia Card/From PlayList' settings. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.
- 2) **Next Higher Track:** This plays the next AudioFile sequentially. This settings is used to play tracks 'round robin'. You can choose if the next track will be selected from all the AudioFiles loaded on the SmartMedia card, or from one of the eight track lists. At the end of the list, the first track will be played again. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.
- 3) **The Same Track Again:** The audio track which just played is started again. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.
- 4) **A Random Track:** This plays an AudioFile picked at random from the entire card or one of the eight track lists. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.
- 5) **Specific AudioFile:** This selects and plays a specific AudioFile. This selection ignores the 'on SmartMedia Card/From PlayList' settings. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.

Stop Playing: This popup allows you to stop an AudioFile playing on this input/edge.



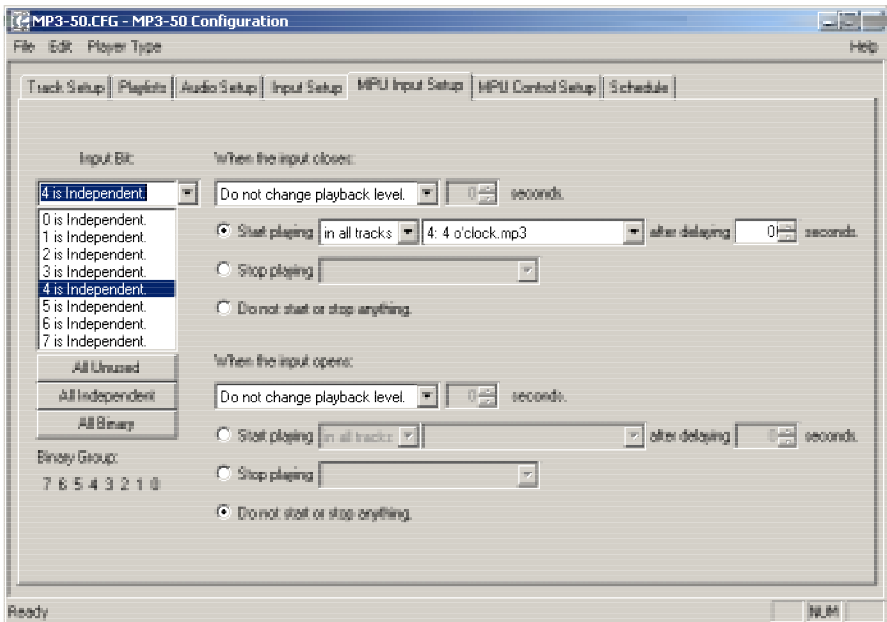
Your options are:

- 1) **Stop Now:** This immediately stops any AudioFile playing this input/edge.
- 2) **Stop at End:** The current audio file plays through to its end normally. At the end of this AudioFile, the **Mp3-50, Mp3-50/8 or Mp3-50/40** will stop and wait for the next command before it plays the next AudioFile. Any track which would have been played automatically will be ignored. This is used to stop a looping track gracefully. It can be combined with a fade out to stop an audio track without the abrupt cutoff that a **Stop Now** command would have.

Mp3-50 Configurator: MPU Input Setup

(Mp3-50/8, and Mp3-50/40)

The **Mp3-50/8** and **Mp3-50/40** have eight 'hidden' outputs which can be sent to the **Mp3 Player** to trigger and control it. These are in addition to the eight optically isolated inputs the **Mp3 Player** has on its own. In most cases, you will disable the **Mp3 Players'** optically isolated inputs and use these inputs instead to trigger and control the **Mp3 Player** from the Show Control side of the Mp3-50/8 or **Mp3-50/40**.



You can set any of the eight inputs as unused, an independent control, or part of a binary address:



A Binary Select pattern can be used to directly access all possible 255 SoundFiles which can be loaded onto a **Mp3-50/8** or **Mp3-50/40**. If you are assigning inputs as part of a binary address, you should start by assigning 'bit 0'. It is on this input that you will be able to tell the **Mp3-50/8** or **Mp3-50/40** to start, stop, or change volumes (fade in or out). The other inputs can then be assigned as binary bits '1', '2', '3' etc.. The number of bits used will determine how many SoundFiles can be directly selected through the inputs:

# of binary bits	Bit#	
1	0	= 1 SoundFile
2	1	= 3 SoundFiles
3	2	= 7 SoundFiles
4	3	= 15 SoundFiles
5	4	= 31 SoundFiles
6	5	= 63 SoundFiles
7	6	= 127 SoundFiles
8	7	= 255 SoundFiles

It is pointless to assign more bits than you have SoundFiles. i.e.: If you have 12 SoundFiles, don't assign any bits numbers above '3'.

When a group of inputs are acting as binary selects, any change in the inputs is considered a 'closing'. All of the inputs going to 'zero' value simultaneously is considered an 'opening'.

Any input can be used as any bit number. You are not limited to assigning input '3' as bit '3' in the binary input pattern. This allows you to do miswire the inputs, and correct it in the configuration.

As a shortcut, buttons are available to quickly set the inputs as 'All un-used', 'All Independent' or 'All Binary'. If any bits are assigned as binary bits, these will be shown below these buttons.



For each independent input, you can set a different action for the 'closing' edges (when power starts flowing through the optoisolators on the inputs) and 'opening' edges (when current stops flowing through the optoisolators).

Playback Level: This popup allows you to select a change in audio level on the outputs on this input/edge. Your options

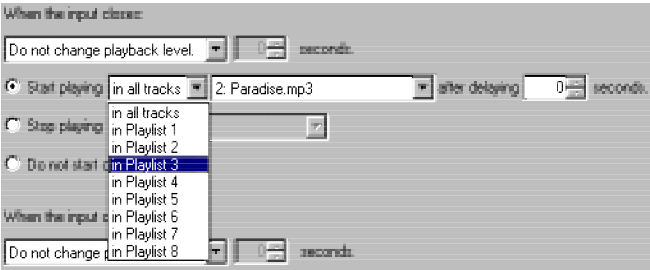
are:

- 1) **Do not change Playback Level:** This leaves the audio levels where they were before.
- 2) **Fade to Full In:** This ramps the audio towards the 'full' level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds. The audio level is set on the Audio tab, or by the RealTime level control, if this option has been selected.



- 3) **Fade to Zero In:** This ramps the audio back towards the a fully muted level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds.
- 4) **Fade to 'Half Mute' In:** This ramps the audio towards the level which has been set for the 'half muted' level. The 'In' in the command refers to the time it will take to ramp to the selected level. Ramp rates available are between 0 and 9.9 seconds. The audio level is set on the Audio tab, or scaled from the RealTime level control, if this option has been selected.

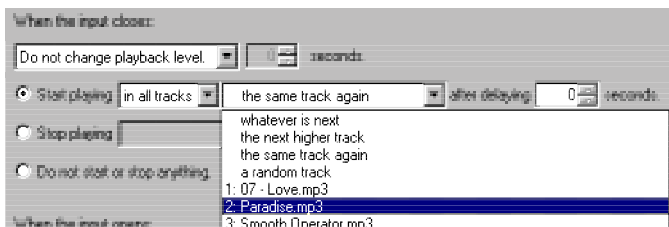
Start Playing: This series of popups allows you to select and play an AudioFile on this input/edge. The tracks can me selected form all of those on the SmartMedia card, or from one of the eight PlayLists:



Within the PlayList or SmartMedia card you selected in the last

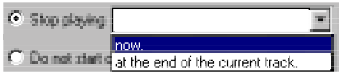
step, you can select:

- 1) **Whatever is Next:** This plays what the current/last AudioFile has set as the 'next' AudioFile to play at its end. This is set on the Track Setup tab. This selection ignores the 'on SmartMedia Card/From PlayList' settings. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.



- 2) **Next Higher Track:** This plays the next AudioFile sequentially. This settings is used to play tracks 'round robin'. You can choose if the next track will be selected from all the AudioFiles loaded on the SmartMedia card, or from one of the eight track lists. At the end of the list, the first track will be played again. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.
- 3) **The Same Track Again:** The audio track which just played is started again. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.
- 4) **A Random Track:** This plays an AudioFile picked at random from the entire card or one of the eight track lists. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.
- 5) **Specific AudioFile:** This selects and plays a specific AudioFile. This selection ignores the 'on SmartMedia Card/From PlayList' settings. As an option, you can delay the start of the audio from 0 to 999.9 seconds (16.65 minutes) before it plays.

Stop Playing: This popup allows you to stop an AudioFile playing on this input/edge.



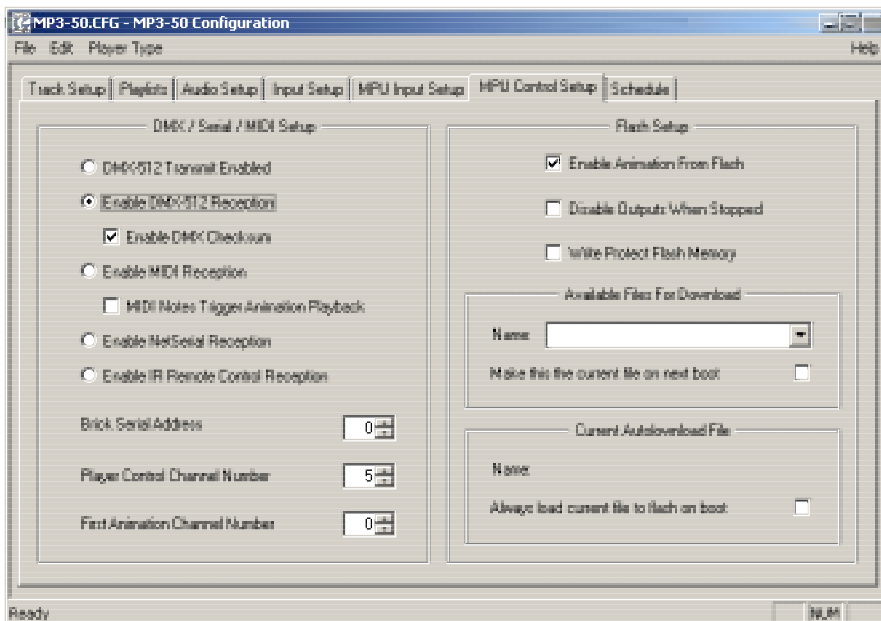
Your options are:

- 1) **Stop Now:** This immediately stops any AudioFile playing this input/edge.
- 2) **Stop at End:** The current audio file plays through to its end normally. At the end of this AudioFile, the **Mp3-50/8** or **Mp3-50/40** will stop and wait for the next command before it plays the next AudioFile. Any track which would have been played automatically will be ignored. This is used to stop a looping track gracefully. It can be combined with a fade out to stop an audio track without the abrupt cutoff that a **Stop Now** command would have.

Mp3-50 Configurator: MPU Control Setup **(Mp3-50/8, and Mp3-50/40)**

This window is used to setup:

- 1) Modes for the DMX-512/MIDI serial port.
- 2) RS-232 Serial Port Address.
- 3) Show Control Channel used for the MPU Control Channel.
- 4) First Show Control channel sent out the Show Control Outputs.
- 5) Settings for the Show Control Flash Memory.
- 6) Show Control file to send to the flash, and when it should be sent.



DMX/MIDI/Serial Setup: The DMX-512/MIDI serial port is used by the Show Control side of the **Mp3-50/8** or **Mp3-50/40**. It can be set up to receive data, or transmit data, but not to do both at the same time. If receiving data, the DMX-512/MIDI serial port output will buffer and repeat whatever is received on the input.

Enable DMX-512 Transmission: *Turning this mode on disables DMX-512, MIDI, IR Triggers and Net Serial input on the DMX-512/MIDI serial port.*

Data for this DMX-512 output stream comes from either the RS-232 serial port if the **Mp3-50/8** or **Mp3-50/40** is

being fed RealTime update messages, or the Show Control flash memory, if shows have been programmed into the **Mp3-50/8** or **Mp3-50/40**.

DMX-512 transmission is limited to sixteen, eight bit wide channels. The addresses of these DMX-512 channels are set in one of two ways:

- a) If running from RealTime updates through the RS-232 serial port, the DMX-512 data will always start with channel '0' (which is channel '1' on most dimmers). Data after the first channel will be padded with '0' values through the 256th byte, and then followed by two checksum bytes.

The Show Control Outputs, Audio Level Control, And Repeater Control channels typically overlap with some of the lighting control channels when operated in this mode.

- b) If running from a show file which has been AutoDownloaded to the **Mp3-50/8** or **Mp3-50/40**'s Flash memory, the 'First address' of the downloaded data will be the first DMX-512 channel to have your programmed data in it. Channels before and after these sixteen channels will be padded with '0' values up until the 256th bytes sent, then followed with a two byte checksum.

The Show Control Outputs, Audio Level Control, And Repeater Control channels often overlap with some of the lighting control channels when operated in this mode. If you don't want to do this, you can actually use all sixteen DMX-512 channels for lighting control if you address your Show Control Outputs, Audio Level Control, and Repeater Control channels *after* the sixteen lighting control channels. Of course this will eat up your Flash memory capacity mightly quickly

Enable DMX-512 Reception: *Turning this mode on disables MIDI, IR Triggers and Net Serial input on the DMX-512/MIDI serial port. Data output from the DMX-512/MIDI serial port will be buffered and repeated, but otherwise an unaltered version of what is received on the input.*

When this mode is enabled, any valid DMX-512 will take

over the Show Control side of the **Mp3-50/8** or **Mp3-50/40**. Show Control outputs can be controlled, start and level control signals sent to the **Mp3 Player** through the incoming DMX-512.

DMX-512, when enabled, has the highest priority of all inputs to the Show Control side of the **Mp3-50/8** or **Mp3-50/40**. DMX-512 arriving will override the Show data stored on the flash and serial RealTime updates.

If the DMX-512 signal drops out, the **Mp3-50/8** or **Mp3-50/40** will return to normal operations after a delay of ten seconds.

Enable DMX-512 Checksums: When this checkbox is enabled, DMX-512 addresses are limited to 256 channels. Valid channel addresses are numbered from 0 through 255. Any frame of data will be checked for validity before it is sent to the outputs by comparing a sixteen bit checksum located in bytes 256 and 257 of the DMX-512 data stream. If being controlled by any Gilderfluke & Company equipment, you should always keep the DMX-512 checksums enabled.

If DMX-512 Checksums are OFF, then the full 512 channels of DMX-512 can be received by the **Mp3-50/8** or **Mp3-50/40**. Valid address ranges are from 1 to 512,

Enable MIDI Reception: *Turning this mode on disables DMX-512, IR Triggers and Net Serial input on the DMX-512/MIDI serial port. Data output from the DMX-512/MIDI serial port will be buffered and repeated, but otherwise an unaltered version of what is received on the input.*

This window is used to set the few settings for MIDI reception through the DMX-512/MIDI serial port. MIDI input has a lower priority than RealTime updates received through the RS-232 serial port. If the 'MIDI Notes Trigger Animation Playback' checkbox is OFF, then MIDI takes precedence over Show Control data stored in the Flash memory.

When this mode is enabled, any valid MIDI will take over the Show Control side of the **Mp3-50/8** or **Mp3-50/40**. Show Control outputs can be controlled, start and level control signals sent to the **Mp3 Player** through the incoming MIDI.

If the MIDI signal drops out, the **Mp3-50/8** or **Mp3-50/40** will return to normal operations after a delay of ten seconds.

MIDI Notes Trigger Animation Playback: MIDI has two different modes of operation on the **Mp3-50/8** or **Mp3-50/40**:

- 1) The first, selected if this checkbox is NOT checked, is used if you want to use the **Mp3-50/8** or **Mp3-50/40** as an output device wholly controlled by the MIDI coming in. Once a valid MIDI note has been received, the DMX/MIDI/Serial LED will light and stay lit until ten seconds after the MIDI has gone away. Starting with the first MIDI note set by the 'Animation First Note Number':
 - a) The first eight (for a **Mp3-50/8**) or forty (**Mp3-50/40**) MIDI notes are sent to the Show Control Outputs.
 - b) The next eight notes are sent to the 'MPU Control' Channel. These can be used to start and stop Mp3 audio playback, and ramp the audio output between normal, muted and half muted levels.
 - c) The remaining notes are used to select AudioFiles on the **Mp3 Player** directly. The first of these notes selects the first Mp3 AudioFile, and so on. If RealTime Audio Level Controls have been enabled, the 'Note On' velocity is used to set the audio playback level. The MIDI 'Note On' velocity of 1 through 127 translates to volume levels from 0% through 100%.
 - d) Notes after the last AudioFile are ignored.
- 2) The second mode, selected when this checkbox has been checked, uses MIDI to trigger pre-programmed animated shows stored in the Show Control Flash memory. The shows are programmed normally, using **PC-MACs**, and downloaded to the **Mp3-50/8** or **Mp3-50/40**

before this mode will work. Each time a show is started, the DMX/MIDI/Serial LED fill flash for an instant. Starting with the first MIDI note set by the 'Animation First Note Number':

- a) The very first 'Note' will trigger the Show Control side of the **Mp3-50/8** or **Mp3-50/40** with a 'whatever is next' show request. The 'Whatever is Next' is set for each show at the time the show files are downloaded from **PC-MACs**.
- b) Each note will trigger a specific animated show. Up to 127 shows can be accessed in this way.
- c) Show numbers beyond the last show loaded on the **Mp3-50/8** or **Mp3-50/40** are ignored.

MIDI Channel Number: A MIDI data stream can be addressed to any of sixteen different addresses. These are typically set to choose which 'instrument' the data is being sent to. This sets which of these sixteen addresses the **Mp3-50/8** or **Mp3-50/40** will be sent to. Valid values are from 1 through 16. Potentially, up to sixteen **Mp3-50/8** or **Mp3-50/40** can be controlled on the same MIDI line.

MIDI First Note Number: Legal MIDI notes are numbered from 00h through 7Fh (0 through 127 in decimal numbers). The only problem is that if you are actually using a keyboard to access the **Mp3-50/8** or **Mp3-50/40**, no keyboards actually have all 128 keys. A *real* piano has only 88. 'Middle C' is located at 3Ch (or 60 in decimal numbers) on all MIDI keyboards. You can count to the South and North of 'Middle C' to determine what numbers your keyboard will actually generate.

Numbers below the value you set for the 'MIDI Note Offset' will be ignored. If you wanted to start accessing the features of the **Mp3-50/8** or **Mp3-50/40** at 'Middle C', you would set this offset to 3Ch (or 60 in decimal numbers).

Net Serial Mode: *Turning this mode on disables DMX-512, MIDI and IR Trigger input on the DMX-512/MIDI serial port. Data*

output from the DMX-512/MIDI serial port will be buffered and repeated, but otherwise an unaltered version of what is received on the input.

This enables a mode which sets the DMX-512/MIDI serial port to 9600 baud and parallels the data received with that from the RS-232 serial port. This mode allows just about any number of **Mp3-50/8** and **Mp3-50/40s** to be controlled in parallel off the same RS-422 serial port.

All the standard serial port commands are valid through the Net Serial port. Since it is only a networked 'receive' port, you will not get any echoes or response through the DMX-512/MIDI out port. If you do attach a RS-232 serial terminal to the normal RS-232 serial port, you will see all responses and menus displayed there just as if the commands had come in through the RS-232 serial port.

At 9600 baud, the input can use the optoisolated or RS-422 switch settings for the DMX-512/MIDI ports.

IR Trigger Mode: *Turning this mode on disables DMX-512, MIDI and Net Serial input on the DMX-512/MIDI serial port. Data output from the DMX-512/MIDI serial port will be buffered and repeated, but otherwise an unaltered version of what is received on the input.*

When this mode is enabled, it sets the DMX-512/MIDI port to 1200 baud, and listens for commands transmitted by the Gilderfluke & Company IR transmitter and receiver. The IR Remote is typically used to trigger an animation or sound system mounted on a vehicle, turntable, or other installation where wires can't be used.

The connections to the IR Remote Receiver are as follows (view is facing end of cable with latch up):

	<u>NAME</u>	<u>COLOR</u>	<u>SIGNAL FUNCTION</u>
LEFT	GROUND	WHITE	SIGNAL GROUND
	n/c	BLACK	no connection
	n/c	RED	no connection
	- TxD	GREEN	- DATA IN to Rack Smart Brick Brain
	+ TxD	YELLOW	+ DATA IN to Rack Smart Brick Brain
RIGHT	GROUND	BLUE	SIGNAL GROUND

In addition to these connections, the IR Receiver requires a 7 to 24 volt DC power supply connection. This is

normally attached to the two pads marked “+” and “-” on the receiver. A jumper option allows you to bring this in through the blue wire on the RJ-11 connector.

The IR Transmitter has an eight position dipswitch which sets which show it selects. The lower nibble of the address are set with the first four switches, and the upper nibble is set with the last four. Valid show numbers are 01h through FFh:

<u>SWITCH #1</u>	<u>SWITCH #2</u>	<u>SWITCH #3</u>	<u>SWITCH #4</u>	<u>LOWER NIBBLE OF ADDRESS</u>
OFF	OFF	OFF	OFF	x0h
ON	OFF	OFF	OFF	x1h
OFF	ON	OFF	OFF	x2h
ON	ON	OFF	OFF	x3h
OFF	OFF	ON	OFF	x4h
ON	OFF	ON	OFF	x5h
OFF	ON	ON	OFF	x6h
ON	ON	ON	OFF	x7h
OFF	OFF	OFF	ON	x8h
ON	OFF	OFF	ON	x9h
OFF	ON	OFF	ON	xAh
ON	ON	OFF	ON	xBh
OFF	OFF	ON	ON	xCh
ON	OFF	ON	ON	xDh
OFF	ON	ON	ON	xEh
ON	ON	ON	ON	xFh

<u>SWITCH #5</u>	<u>SWITCH #6</u>	<u>SWITCH #7</u>	<u>SWITCH #8</u>	<u>UPPER NIBBLE OF ADDRESS</u>
OFF	OFF	OFF	OFF	0xh
ON	OFF	OFF	OFF	1xh
OFF	ON	OFF	OFF	2xh
ON	ON	OFF	OFF	3xh
OFF	OFF	ON	OFF	4xh
ON	OFF	ON	OFF	5xh
OFF	ON	ON	OFF	6xh
ON	ON	ON	OFF	7xh
OFF	OFF	OFF	ON	8xh
ON	OFF	OFF	ON	9xh
OFF	ON	OFF	ON	Axh
ON	ON	OFF	ON	Bxh
OFF	OFF	ON	ON	Cxh
ON	OFF	ON	ON	Dxh
OFF	ON	ON	ON	Exh
ON	ON	ON	ON	Fxh

When in this mode the 'EARLY STARTS' should be set to 'IGNORE' on all of your shows. Any binary show number received by the serial port for more than ten times will trigger that show. Typically the transmitters are placed along the path of the vehicle's travel to trigger the appropriate animation and audio sequences at the appropriate times.

Brick Address: This sets the serial address which will be used to access the **Mp3-50/8** or **Mp3-50/40** through the serial port. Although it is often set to the same addresses the First Animation Channel, it can be set to any value form 0 to 255. If more than on **Mp3-50/8** or **Mp3-50/40** is on the same serial port, they must all have unique addresses. When accessing the **Mp3-50/8** or **Mp3-50/40** through GilderTerm, this is the value you enter for the 'Card Address'.

Repeater MPU Control Channel: This sets the address of the data which will be sent from the Show Control side of the **Mp3-50/8** or **Mp3-50/40** to the 'MPU Input' to control the **Mp3 Player**. Valid address ranges are from 0-255 if 'DMX Checksums' are ON. Addresses from 1-512 can be used if 'DMX Checksums' are OFF.

First Animation Channel: This sets the address of the data which will be sent out the Show Control outputs. Valid address ranges are from 0-255 if 'DMX Checksums' are ON. Addresses from 1-512 can be used if 'DMX Checksums' are OFF.

On a **Mp3-50/8**, the channel entered will be sent out the 1/4

J6 port on the back of the unit.

On a **Mp3-50/40**, the address entered will be sent out through channel '0' of the J6 connector. The next four consecutive channels will be sent out through the remaining J6 channels and the 1/4 J6 output

Flash Setup: The Flash memory on the **Mp3-50/8** or **Mp3-50/40** is used to store the Show Control data which is normally output on the Show Control Outputs, MPU Control channel, Audio Level control channels, and DMX-512 outputs. The show data is typically programmed using our **PC•MACs** software, and downloaded to the **Mp3-50/8** or **Mp3-50/40** through the RS-232 serial port or SmartMedia card.

Although the flash memory has a capacity for 256 channels of data to be stored on it, this would limit your show capacity to about one minute (at 30 updates per second). More typically, a **Mp3-50/8** (without DMX-512 output) will need one or two channels of data stored on it. This will give a capacity of 2-1/2 to 5 hours for show data storage in the Flash memory (at 30 FPS). A **Mp3-50/40** (without DMX-512 output) will need one to six channels of show data stored on it. This will give a capacity of about an hour for show data storage in the Flash memory (at 30 FPS). If you are using the DMX-512 outputs, this can add between one and sixteen more channels of data that need to be stored, and will reduce the available capacity accordingly.

Enable Animation From Flash: This checkbox is normally left 'checked'. If it is unchecked, it will disable the playback of animation data from the Flash memory.

Disable Outputs When Stopped: This checkbox is normally left 'unchecked'. If it is checked, it will disable the Show Control outputs if there is no show running on the Show Control side of the **Mp3-50/8** or **Mp3-50/40**. This feature is used if there is a chance that a show will be stopped in the middle, and it may damage something that the **Mp3-50/8** or **Mp3-50/40** is controlling if the outputs are left on for an extended period of time.

Write Protect Flash Memory: This checkbox allows you to 'lock' the Show Control Flash memory against accidental erasure. If this is checked, then any downloads or writes to the flash will be ignored.

Available Files for Download: When checked, the AutoDown-

load file found on the SmartMedia card will be downloaded to the Show Controller's Flash memory the next time the **Mp3-50/8** or **Mp3-50/40** is reset. The names of the last file downloaded to the Flash is shown, as well as the current name of the AutoDownload file found on the SmartMedia Card. The **Mp3 Configurator** will try to figure out if the AutoDownload file has changed in any way, and will automatically check this checkbox if it thinks that it has.

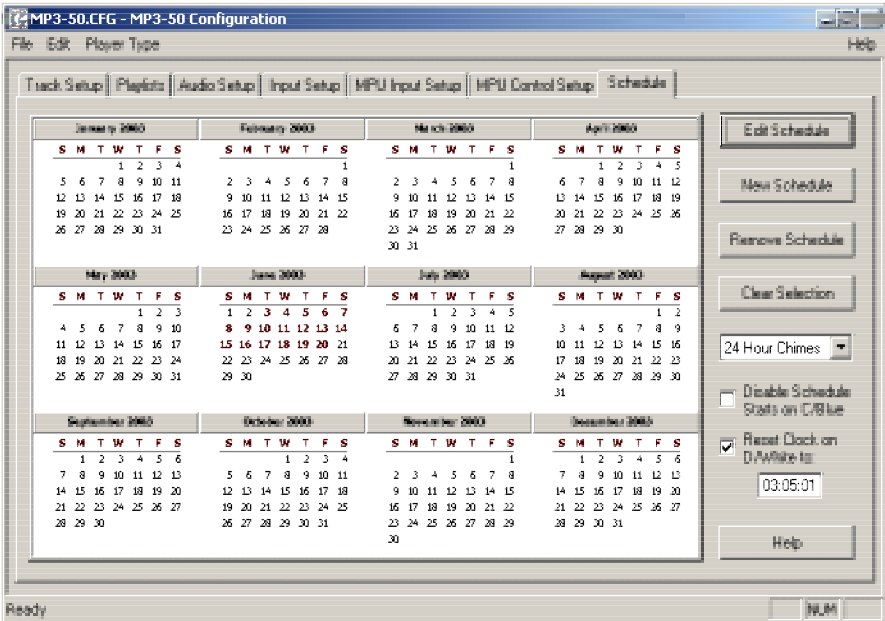
Always Download Current File to Flash on Boot: When checked, the AutoDownload file found on the SmartMedia card will be downloaded to the Show Controller's Flash memory EVERY time the **Mp3-50/8** or **Mp3-50/40** is reset. This will take an extra bit of time each time the **Mp3-50/8** or **Mp3-50/40** reboots for the download to take place. Since this usually only happens when power is first applied to a show, it shouldn't be too inconvenient in most cases. This checkbox is also used if you will be distributing a series of shows to multiple locations. Since the shows download on each reboot, swapping cards in and out of the **Mp3-50/8** or **Mp3-50/40** won't cause any problems.

Mp3-50 Configurator: 'Atomic' Clock Setup

(Mp3-50/8 or Mp3-50/40 with RealTime Clock)

The RealTime '**Atomic**' Clock is an option which is available on the **Mp3-50/8** and **Mp3-50/40**. This option consist on two parts:

- 1) A **Mp3-50/8** or **Mp3-50/40** which has had a Real Time Clock (RTC) added. A small lithium battery keeps this clock running, even when the **Mp3-50/8** or **Mp3-50/40** is powered down for months. Even without the '**Atomic**' Clock kick, this RTC is laser trimmed for an accuracy rated at +5/-10 PPM.
- 2) A commercially available '**Atomic**' Clock module. This is a 'radio controlled' clock which receives and locks to the signals broadcast from the Naval Observatory atomic clock in Colorado. This clock is accurate to within a second every billion years. Special modifications allow this clock to send a synchronizing signal to the **Mp3-50/8** or **Mp3-50/40** to keep them in sync. A rechargeable Ni-Cad battery keeps this clock running during power outages.



A single two conductor cable connects the '**Atomic**' Clock module to the **Mp3-50/8** or **Mp3-50/40**. This wire lands on the 'D'/White input to the **Mp3-50/8** or **Mp3-50/40** (the striped lead is the positive, bottom most termi-

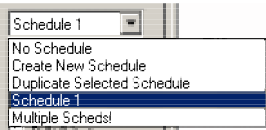
nal). The **Mp3-50/8** or **Mp3-50/40** is powered as you would normally. The **'Atomic' Clock** is powered by the included 12 VDC power supply.

As with just about everything on a **Mp3-50/8** or **Mp3-50/40**, the configuration for the **'Atomic' Clock** option is done through the **Mp3 Configurator** Program. The main screen for configuring this option appears as a 365 day calendar. This is used to access the schedules you have set up. There can be up to 255 different schedules. Any schedule can be set to play on one or more day (any specific date of the year), or on one or more days of the week (DOWs = Sunday through Saturday).

Any schedule which is set to play on a specific day of the year will take precedence over a schedule which is set to play on a specific weekday. This allows you to set a schedule which plays Monday through Friday, but set a special holiday schedules for Christmas, Fourth of July, and Cinco de Mayo. This pattern of schedules will repeat year in and year out until the configuration is changed to do something else.

Specific days (dates) or days of the week (DOWs) can be selected by simply clicking on them. If you want to select a range of days, just click+drag or shift+click on any other day. In the example screen above, the dates from June 3 through June 20th have been selected. If you shift+click on the weekdays, all of the same days of the week will be selected for all intervening months. The 'clear selection' button is used to deselect the date(s)/DOW(s).

In most cases, you will want to set most of your schedules to play using the DOWs, rather than specific dates. This allows you to set schedules which won't have to be reprogrammed each year. For example, for a school annunciator system, you will set the same schedule to play Monday through Friday for the months where school is in session. This same setup could play for years without modifications. If you were to select the specific days, all of these would need to be reprogrammed each year.



Once one or more date(s)/DOW(s) are selected, the popup at the right of the window will show the name of the schedule which is assigned to these date(s)/DOW(s), if there is one. If the selected date(s)/DOW(s) have been assigned to different schedules, 'multiple schedules' will be displayed in the popup. A schedule can be assigned to the selected date(s)/DOW(s) by popping up the desired schedule. You can also select 'none' to remove the schedule from the selected date(s)/DOW(s), or 'create new schedule' to

create a new schedule and assign it to the selected date(s)/DOW(s), or 'duplicate schedule' to create a new schedule using the current schedule as a base and assign it to the selected date(s)/DOW(s). If you are changing the schedule assignment for any date(s)/DOW(s), then a confirmation dialog will be displayed.

If a schedule is selected, but no date(s)/DOW(s) are selected, all of the date(s)/DOW(s) which use this schedule will be highlighted.

Once a schedule is selected, you can use the 'edit' button to modify it. You can also double click on any date(s)/DOW(s) which has a schedule assigned to it to edit that schedule. The following schedule shows the Westminster chimes on each quarter hour, with tolls on the full hours.

You can name any schedule anything you wish. Buttons are available to add a 'new entry', 'edit' and existing entry, or 'delete' an existing entry. Double clicking on any existing entry will also open it for editing.

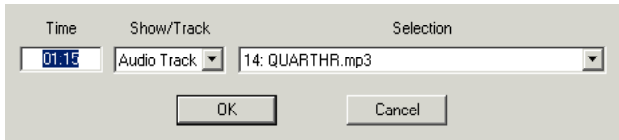
Schedule 1

UK

New EntryEdit EntryDelete EntryCancel

00:00	Start	Track 12: 12 o'clock.mp3
00:15	Start	Track 14: QUARTHR.mp3
00:30	Start	Track 15: HALFHOUR.mp3
00:45	Start	Track 16: 3QUART.mp3
01:00	Start	Track 1: 1 o'clock.mp3
01:15	Start	Track 14: QUARTHR.mp3
01:30	Start	Track 15: HALFHOUR.mp3
01:45	Start	Track 16: 3QUART.mp3
02:00	Start	Track 2: 2 o'clock.mp3
02:15	Start	Track 14: QUARTHR.mp3
02:30	Start	Track 15: HALFHOUR.mp3
02:45	Start	Track 16: 3QUART.mp3
03:00	Start	Track 3: 3 o'clock.mp3
03:15	Start	Track 14: QUARTHR.mp3
03:30	Start	Track 15: HALFHOUR.mp3
03:45	Start	Track 16: 3QUART.mp3
04:00	Start	Track 4: 4 o'clock.mp3
04:15	Start	Track 14: QUARTHR.mp3
04:30	Start	Track 15: HALFHOUR.mp3
04:45	Start	Track 16: 3QUART.mp3
05:00	Start	Track 5: 5 o'clock.mp3
05:15	Start	Track 14: QUARTHR.mp3
05:30	Start	Track 15: HALFHOUR.mp3
05:45	Start	Track 16: 3QUART.mp3
06:00	Start	Track 6: 6 o'clock.mp3
06:15	Start	Track 14: QUARTHR.mp3
06:30	Start	Track 15: HALFHOUR.mp3

The following simple dialog is used to enter or edit any schedule entry. The time is entered in hours and minutes (time is entered in '24 hour' 'military' time). As you are typing it in, you can use a space in place of the ':'. You have the choice of starting any specific audio track or show at the time selected.



This dialog lets you select any specific sound or show to play at any specific time. If you want to play a 'random' sound, configure one of the MCU inputs to play a 'random' sound, and instead of starting the sound directly, start a short 'show' which in turn triggers this request for the random sound through the MCU input.

You could use the same trick if you wanted some sounds to play at a 'half' muted level. Configure one of the MCU inputs to 'half mute' the sound. Then use the RTC to start a short 'show' which triggers this MCU input.

The last two settings available for the Mp3-50/8 or Mp3-50/40 with the **RealTime 'Atomic' Clock** option have to do with the optically isolated trigger inputs to the Show Control half of the unit.

Disable Schedule Starts on 'C'/Blue Input: This input can be used to disable scans of the RTC schedules when the input is opened. This can be used to stop sounds from playing automatically when they shouldn't. Examples of where this feature can be used are:

- a) In a church bell tower, where a simple switch closure can be used to temporarily disable bells from ringing during a service.
- b) In a Theme Park, where this input can be tied to the existing power management grid to disable tolling when the park is closed.
- c) If you have a show or sound which should not be interrupted by a scheduled event, or if schedule scans are causing glitches in your show playback. You can set the show/sound so that it 'can not' be stepped on, but if you have a particularly long schedule that must be scanned, it may cause a hesitation in the show which is running. By using a show control output wired into this input, you can control when schedule scans can and can not take place during different parts of the show.

Reset Clock on 'D'/White Input: This input is what is used to resynchronize the RTC with the external **'Atomic' Clock**. The time which has been entered must agree with the time set for the alarm on the **'Atomic' Clock**. In most cases, the reset time is set

about a second earlier than the 'alarm' time, to offset for the slight delays in starting a Mp3 playback.

We are using 3:05:01 as the default resynchronization time. The external **'Atomic' Clock MUST** be set so that the alarm goes off at 03:05:00. The extra second we are offsetting by is to allow for the 1 second lag before a Mp3 SoundFile starts playing after it is triggered. It is at 3:05 AM so that when daylight savings starts and ends, there will be no more than one hour before the **Mp3-50/8** or **Mp3-50/40** is resynchronized to the appropriate time. Any earlier, and the daylight savings transition might be missed until the next resynchronization time.

If used with an external **'Atomic' Clock**, then this feature **MUST** be enabled.

Care & Feeding of an 'Atomic' Clock

(Mp3-50/8 or Mp3-50/40 with RealTime Clock)

The **'Atomic' Clock** we are currently using is manufactured by Oregon Scientific. We have modified it to allow it to run from a wall mounted power supply, and output a resynchronizing pulse to the **Mp3-50/8** or **Mp3-50/40**. The internal battery on the clock module has been replaced by a Ni-Cad, which receives a trickle charge whenever the **'Atomic' Clock** module is powered up.

A single two conductor cable connects the **'Atomic' Clock** module to the **Mp3-50/8** or **Mp3-50/40**. This wire lands on the 'D'/White input to the **Mp3-50/8** or **Mp3-50/40** (the striped lead is the positive, bottom most terminal). The input to the **Mp3-50/8** or **Mp3-50/40** is optically isolated. If needed, you can stretch these wires for hundreds of feet, if needed.

The link between the **'Atomic' Clock** module and the **Mp3-50/8** or **Mp3-50/40** can be tested by pressing the 'snooze' button atop the **'Atomic' Clock**. This will light the back light on the LCD display, as well as the LED indicator for the 'D'/White input to the **Mp3-50/8** or **Mp3-50/40**. This will also set the RTC inside the **Mp3-50/8** or **Mp3-50/40** to the completely WRONG time, if the connection is working. You must manually set the time within the **Mp3-50/8** or **Mp3-50/40** after testing it in this way. If you don't want this to happen when testing this connection, power down the **Mp3-50/8** or **Mp3-50/40** before doing this test. The LED will light even with the **Mp3-50/8** or **Mp3-50/40** off. Power the **Mp3-50/8** or **Mp3-50/40** back up when you are finished testing.

To permanently prevent such accidental clock 'miss' settings after the **'Atomic' Clock** is installed, you can open the battery compartment and cut the wire which runs through it. This will disable the 'snooze' button, and thereby prevent it being hit accidentally in the future.

The **Mp3-50/8** or **Mp3-50/40** is powered as you would normally (12 or 24 VDC is normally used). The **'Atomic' Clock** is powered by the included 12 VDC 'wall wart' power supply.

The batteries in the **'Atomic' Clock** module and **Mp3-50/8** or **Mp3-50/40** are meant to be used as backups during power outages. These units should remain powered up 24 hours a day, once the installation is completed. If left unpowered for an extended period, remove the batteries.

The **'Atomic' Clock** should be placed as high as possible, preferably near a window which faces Colorado, and as far away from other sources of interference (computers, radios, televisions, etc.) as possible. This is a radio signal which varies in quality with the weather (and sunspots). It may

take some time, but it should eventually pick up anywhere in North America. Even under ideal conditions, it may take days for the **'Atomic' Clock** to pick up the signals from Colorado. Usually it will have picked up and locked to the Atomic clock in Colorado within 24 hours. A clock which has successfully locked will be shown by the small antenna symbol at the left of the LCD display being on solidly, with all five signal bars fixed ON. As it is searching for the radio signal, these signal bars will show the current signal level as the antenna mast flashes.

To force the **'Atomic' Clock** to start searching for the radio signal from Colorado, you can press and hold the 'up' arrow for about five seconds. The antenna mast will begin to flash and the signal bars will show the current signal strength as it searches.

The **'Atomic' Clock** must have a few things setup before it will operate properly. The first of these are the two alarms. Both of these should be set to 3:05 AM. To do this:

- 1) Press the 'alarm' button once, the upper 'weekday' alarm symbol should light.
- 2) If the alarm hasn't been set, then '-:--' will be displayed. Otherwise, the current time it is set to will be displayed. If it is already at 3:05 AM, you can skip to step 8.
- 3) Press and hold the 'alarm' button. The 'Hour' digit should begin flashing.
- 4) Use the 'up' and 'down' buttons to set the hour to 3 AM.
- 5) Press the 'alarm' button again. The 'minutes' digits should begin flashing.
- 6) Use the 'up' and 'down' buttons to set the minutes to 05.
- 7) Press the 'alarm' button again. The 'weekday' alarm should now be set to 3:05 AM.
- 8) Press the 'alarm' button once, the lower 'single' alarm symbol should light.
- 9) If the alarm hasn't been set, then '-:--' will be displayed. Otherwise, the current time it is set to will be displayed. If it is already at 3:05 AM, you can skip to step 15.
- 10) Press and hold the 'alarm' button. The 'Hour' digit should begin flashing.
- 11) Use the 'up' and 'down' buttons to set the hour to 3 AM.
- 12) Press the 'alarm' button again. The 'minutes' digits should

begin flashing.

- 13) Use the 'up' and 'down' buttons to set the minutes to 05.
- 14) Press the 'alarm' button again. The 'weekday' alarm should now be set to 3:05 AM.
- 15) Press the 'alarm' button again to return to displaying the current time.

If you press the 'mode' button three times, the **'Atomic' Clock** will display the time in Greenwich, England ('Zulu' time) and the offset to the local time zone. In North America:

- 1) West Coast time is -8
- 2) Mountain time is -7
- 3) Central time is -6
- 4) East Coast time is -5

If you need to change the current setting for your time zone:

- 1) Press & hold the 'mode' button. The offset from 'Zulu' time will start flashing.
- 2) Use the 'up' and 'down' buttons to set the offset as needed.
- 3) Press the 'alarm' button to return to displaying the current time (you can also press the 'mode' button again and manually set the date and time on the clock).

If you manually set the time on the **'Atomic' Clock** (press & hold the 'mode' button), you have the option of setting the time to display in 12 hour or 24 hour 'military' time. We usually set the **'Atomic' Clocks** for the latter, because the schedules are also set in 24 hour 'military' time.

Setting the date and time on the **Mp3-50/8** or **Mp3-50/40**: You must manually set the date and time in the **Mp3-50/8** or **Mp3-50/40** when it is first installed. This is because the signal from the **'Atomic' Clock** only sets the hour and minutes. The month day and year must be set manually through the serial port.

The serial cable for connecting the **Mp3-50/8** or **Mp3-50/40** is normally included as part of the **'Atomic' Clock** 'package'. If you ordered the **'Atomic' Clock** option separately as an upgrade, you may need to order the serial cable separately as well.

HEXadecimal to Decimal to Percentage

This chart shows decimal, HEXadecimal, and a few percentage equivalents to aid you when you need to convert between numbering bases:

decimal	HEX	ASCII	%	decimal	HEX	ASCII	%	decimal	HEX	ASCII	%	decimal	HEX	ASCII	%
00	00h	null	0%	64	40h	@	25%	128	80h	(null)	50%	192	C0h	(@)	75%
1	01h	soh/^A		65	41h	A		129	81h	(soh)		193	C1h	(A)	
2	02h	stx/^B		66	42h	B		130	82h	(stx)		194	C2h	(B)	
3	03h	etx/^C		67	43h	C		131	83h	(etx)		195	C3h	(C)	
4	04h	eot/^D		68	44h	D		132	84h	(eot)		196	C4h	(D)	
5	05h	eng/^E		69	45h	E		133	85h	(eng)		197	C5h	(E)	
6	06h	ack/^F		70	46h	F		134	86h	(ack)		198	C6h	(F)	
7	07h	bell/^G		71	47h	G		135	87h	(bell)		199	C7h	(G)	
8	08h	bs/^H		72	48h	H		136	88h	(bs)		200	C8h	(H)	
9	09h	ht/^I		73	49h	I		137	89h	(ht)		201	C9h	(I)	
10	0Ah	lf/^J		74	4Ah	J		138	8Ah	(lf)		202	CAh	(J)	
11	0Bh	vt/^K		75	4Bh	K		139	8Bh	(vt)		203	CBh	(K)	
12	0Ch	ff/^L		76	4Ch	L		140	8Ch	(ff)		204	CCh	(L)	
13	0Dh	cr/^M		77	4Dh	M		141	8Dh	(cr)		205	CDh	(M)	
14	0Eh	so/^N		78	4Eh	N		142	8Eh	(so)		206	CEh	(N)	
15	0Fh	si/^O		79	4Fh	O		143	8Fh	(si)		207	CFh	(O)	
16	10h	dle/^P		80	50h	P		144	90h	(dle)		208	D0h	(P)	
17	11h	dc1/^Q		81	51h	Q		145	91h	(dc1)		209	D1h	(Q)	
18	12h	dc2/^R		82	52h	R		146	92h	(dc2)		210	D2h	(R)	
19	13h	dc3/^S		83	53h	S		147	93h	(dc3)		211	D3h	(S)	
20	14h	dc4/^T		84	54h	T		148	94h	(dc4)		212	D4h	(T)	
21	15h	nak/^U		85	55h	U		149	95h	(nak)		213	D5h	(U)	
22	16h	syn/^V		86	56h	V		150	96h	(syn)		214	D6h	(V)	
23	17h	etb/^W		87	57h	W		151	97h	(etb)		215	D7h	(W)	
24	18h	can/^X		88	58h	X		152	98h	(can)		216	D8h	(X)	
25	19h	em/^Y		89	59h	Y		153	99h	(em)		217	D9h	(Y)	
26	1Ah	sub/^Z		90	5Ah	Z		154	9Ah	(sub)		218	DAh	(Z)	
27	1Bh	ESC		91	5Bh	[		155	9Bh	(ESC)		219	DBh	([)	
28	1Ch	FS		92	5Ch	\		156	9Ch	(FS)		220	DCh	(\)	
29	1Dh	GS		93	5Dh	]		157	9Dh	(GS)		221	DDh	(])	
30	1Eh	RS		94	5Eh	^		158	9Eh	(RS)		222	DEh	(^)	
31	1Fh	VS		95	5Fh	_		159	9Fh	(VS)		223	DFh	(_)	
32	20h	SP	12.5%	96	60h	`	37.5%	160	A0h	(SP)	62.5%	224	E0h	(`)	87.5%
33	21h	!		97	61h	a		161	A1h	(!)		225	E1h	(a)	
34	22h	"		98	62h	b		162	A2h	(")		226	E2h	(b)	
35	23h	#		99	63h	c		163	A3h	(#)		227	E3h	(c)	
36	24h	\$		100	64h	d		164	A4h	(\$)		228	E4h	(d)	
37	25h	%		101	65h	e		165	A5h	(%)		229	E5h	(e)	
38	26h	&		102	66h	f		166	A6h	(&)		230	E6h	(f)	
39	27h	'		103	67h	g		167	A7h	(')		231	E7h	(g)	
40	28h	(		104	68h	h		168	A8h	((		232	E8h	(h)	
41	29h	)		105	69h	i		169	A9h	((		233	E9h	(i)	
42	2Ah	*		106	6Ah	j		170	AAh	(*)		234	EAh	(j)	
43	2Bh	+		107	6Bh	k		171	ABh	(+)		235	EBh	(k)	
44	2Ch	,		108	6Ch	l		172	ACh	(,)		236	ECh	(l)	
45	2Dh	-		109	6Dh	m		173	ADh	(-)		237	EDh	(m)	
46	2Eh	.		110	6Eh	n		174	AEh	(.)		238	EEh	(n)	
47	2Fh	/		111	6Fh	o		175	AFh	(/)		239	EFh	(o)	
48	30h	0		112	70h	p		176	B0h	(0)		240	F0h	(p)	
49	31h	1		113	71h	q		177	B1h	(1)		241	F1h	(q)	
50	32h	2		114	72h	r		178	B2h	(2)		242	F2h	(r)	
51	33h	3		115	73h	s		179	B3h	(3)		243	F3h	(s)	
52	34h	4		116	74h	t		180	B4h	(4)		244	F4h	(t)	
53	35h	5		117	75h	u		181	B5h	(5)		245	F5h	(u)	
54	36h	6		118	76h	v		182	B6h	(6)		246	F6h	(v)	
55	37h	7		119	77h	w		183	B7h	(7)		247	F7h	(w)	
56	38h	8		120	78h	x		184	B8h	(8)		248	F8h	(x)	
57	39h	9		121	79h	y		185	B9h	(9)		249	F9h	(y)	
58	3Ah	:		122	7Ah	z		186	BAh	(:)		250	FAh	(z)	
59	3Bh	;		123	7Bh	{		187	BBh	(;)		251	FBh	({)	
60	3Ch	<		124	7Ch	}		188	BCh	(<)		252	FCh	(}	
61	3Dh	=		125	7Dh	~		189	BDh	(=)		253	FDh	(~)	
62	3Eh	>		126	7Eh	del		190	BEh	(>)		254	FEh	(del)	100%
63	3Fh	?		127	7Fh	del		191	BFh	(/)		255	FFh	(del)	100%