GilderNewsletter

Views and News from the World of Gilderfluke & Co.

Sd-10 & Sd-25 Designs Updated (Already!)

The Sd-10 and Sd-25 only came out a few months ago, and quickly jumped to the status of our best-selling, most popular products ever!

They have been selling so well that we had to start new production runs within a month of their introduction. While getting both units CE and FCC certified, it gave us a good excuse for adding features that were requested by the end users and integrators.
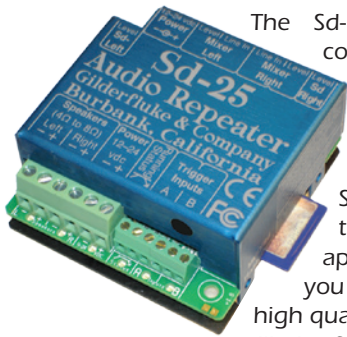
The Sd-10 and Sd-25 are complete stereo audio playback systems. They can be used in Store-Casting, Music-On-Hold, Museum, Safety, Haunt, Industrial or Entertainment applications. Anywhere you need a solid state, high quality audio system that will play for years.

Features of the Sd-25 and Sd-10 include:

▪ Stand alone stereo playback of standard Mp3 (all data rates) or .wav audio files (up to 48

All-New Br-miniBrick8

Just last year we introduced a smaller Show Controller with only four outputs, the Br-miniBrick4. In a little bit of déjà vu, it featured buttons on its top for programming without any computer at all. This is similar to some of the very earliest Animation Controllers we ever made!

We wanted to move some of these features to the Br-miniBrick8s too. The Br-miniBrick8 is a complete stand-alone Show Control System. It features two 'trigger' inputs, DMX-512 input, two airplane-style servo motor control outputs and eight high current outputs for driving solenoids, lights and relays.
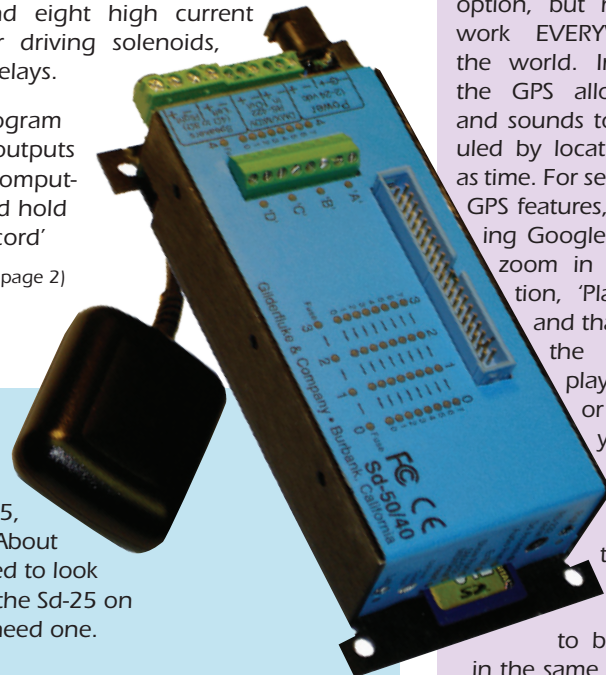
You can program the digital outputs without a computer. Press and hold the red 'Record'

"I Want That Amplifier!"

At the first two audio-oriented trade shows where we displayed the Sd-25, the response was overwhelming. About half of the contractors and installers who stopped to look at the Sd-25 either said that they could have used the Sd-25 on a recent job, or have an upcoming job where they need one.

The other response was 'I want that amplifier!'

Not being too dense, we took the hint and made the stand-alone Amp-50. It is the same Class-D amplifier with output power equivalent to a 200 Watt linear amplifier as the Sd-25. It has two RCA line level inputs, two level controls, and screw terminals for attaching the speakers.

Because it generates very little heat, you can stick the Amp-50 almost anywhere for boardrooms, stores, video projectors, or anywhere you need to put a small, but extremely powerful amplifier.

The Sd-25, Sd-50, or Amp-50 will work with most speakers that are rated at four to eight ohms. Its output can be 'bridged' to feed all of its power into a single speaker. ~G
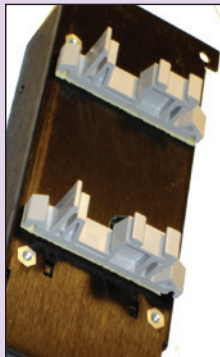
Sd-50 Gains Sense of Direction

The Sd-50s are 'all-in-one' Show Controller. They feature up to forty digital (on/off) outputs, Audio repeater using a standard MMC/Sd flash card, 100 Watts of Class-D amplification that has the power of a 400 Watt linear amplifier, and DMX-512 lighting control. We are in the process of adding support for GPS receivers.

The GPS will allow the same 'Atomic' clock-accurate scheduling of sounds and shows that you get with the 'Atomic' clock option, but now it will work EVERYWHERE in the world. In addition, the GPS allows shows and sounds to be scheduled by location as well as time. For setting up the GPS features, we are using Google Earth. Just zoom in on a location, 'Placemark' it, and that is 'where' the Sd-50 will play the show or sound. If you 'angle' the 'camera', it tells the Sd-50 that you only want the sound to be triggered in the same direction as the view in the placemark you created. ~G

Gilderfluke & Co
ROBOTICS & SOUND SYSTEMS

Rollercoaster Sound Systems

The back of a rollercoaster is not the sort of place you want to put any electronics gear. It regularly pulls heavy G-forces and vibrates enough to shake your fillings loose. Nine G's have been measured where the electronics sits on one Florida attraction! And yet, this is where several parks are now installing our Sd-25s. One integrator has even run a Sd-25 on the back of a major rollercoaster for months as a test, and sent other units to a lab where it passed accelerated vibration and G-force testing to simulate long term rollercoaster riding.

Typical installs of our earlier Mp3 players used a single player with an aftermarket car stereo amplifier feeding speakers at each row of seats. Power comes from either an array of super capacitors or batteries, which are charged by hot shoes or an inductively coupled transformer each time the train comes into the station.

Recent installations are taking advantage of the Sd-25's amplifier. To reduce the possibility of something breaking that forces a whole train to be parked for repairs, each row of seats has its own Sd-25. If something goes wrong with a row, it will only affect that one row, and the train can continue to run.

Typically two retro-reflective sensors are used on each train, bouncing IR beams off reflective targets on the track. The first sensor is triggered only when the train is at the station to reset all the Sd-25s back to the first sound. The other sensor is tripped several times during the ride to tell all the Sd-25s to 'play next SoundFile' at the proper points along the track.

Although our IR-Tx/Rx are made to trigger sounds on slower moving vehicles like trains and trams, rollercoasters tend to be moving a bit too quickly for reliable IR-Tx/Rx triggering. ~G

All-New Br-miniBrick8

button until the first output flashes. Press again to step to the output you want to record. When you are ready to record, press the green 'Go' button. Any previously recorded data will play back. While you press and hold the 'Record' button, anything you do on the blue 'Data' button is recorded on this one output while the other outputs continue to play back. The Br-miniBrick8 will remember exactly what you did and precisely when you did it. You repeat this until you have all eight outputs programmed just the way you want them.
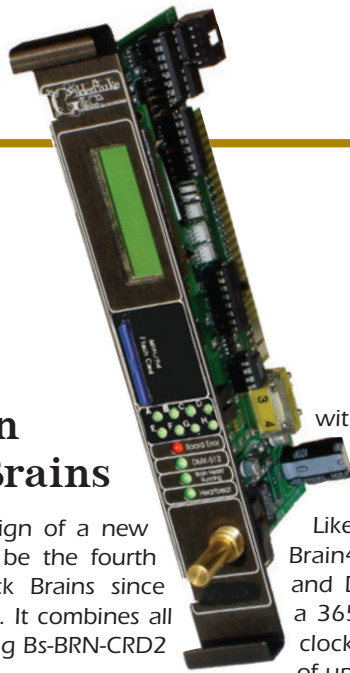
To program the Br-miniBrick8 using a computer, you can draw the sequence you need on the screen of your computer using our included PC▪MACs software. With the optional PC▪MACs 'RealTime' license, you can program in RealTime using the PC's mouse/keyboard. PC▪MACs will remember exactly what you do and precisely when you did it. When you have all your shows completed, you can send them to the Br-miniBrick8 through the serial port. The PC can then go away. The Br-miniBrick8 will run by itself.

Features of the Br-miniBrick8 include:

- Automatic 'program in place' download through the standard serial port on your PC and the included PC▪MACs software. It takes about twenty seconds to download a fifteen minute show..

- Each Br-miniBrick8 has a single channel show capacity of over thirty-six minutes at thirty updates per second! Once programmed, shows are saved for approximately forty years, with or without power applied.

- Two optoisolated inputs are used to trigger from push buttons, motion sensors, or any other type of switch.

- Supports up to 255 shows at a time (from serial). You can loop a single show or build 'chains' of shows.

- Each of the four outputs is rated for a continuous load of 150 ma., or 500 ma. peak at 24 VDC. This is enough to drive small solenoid valves, relays, lights, and similar loads. LEDs show all output activity.

- Runs on anything from 9 to 24 vdc, including batteries. Sturdy metal case mounts in 2.75" 'Snap Track' or on standoffs. ~G

4th Generation Smart Brick Brains

We are well into the design of a new Smart Brick Brain. It will be the fourth generation of Smart Brick Brains since their introduction in 1990. It combines all the functions of the existing Bs-BRN-CRD2 with those of the Br-SmartMedia. This makes it the first Smart Brick Brain to hold show data as well as show configurations.

Like the earlier Smart Brick Brains, the Bs-Brain4 will lock to Smpte timecode, laserdisc, and DVD players, and can be triggered from a 365 day schedule controlled by an 'Atomic' clock. It supports up to 255 shows with lengths of up to one million frames.

From the Br-SmartMedia, the Bs-Brain4 gets the ability to output DMX-512 data from a removable flash memory card. The SmartMedia memory card has been traded for a MMC/Sd flash card (with support for four GBytes and beyond). The DMX-512 has been upgraded from 256 channels in one universe to 2048 DMX-512 channels in four full universes (Can you guess what changes are coming to PC▪MACs soon?). Within the DMX streams, eight completely independent time lines can be run simultaneously. This allows the control of eight completely independent shows with up to 16,384 digital outputs from just one Bs-Brain4! **~G**

TIP!
'Free' Outputs for Audio Starts

It is normal to use one or more digital outputs from the Animation Control System to trigger the audio system. This allows you to start the audio exactly where you need it in your show. Most larger systems have more than a few spare digital outputs for triggering the audio. It is on smaller systems, shows that are run by a Br-miniBrick4 or Br-miniBrick8, that might not have an output to spare for the audio triggering.

A solution to this is to use one output for both animation control AND triggering the audio.

Just pick an output that won't be needed until just before the audio will need to start. Wire this one output to both the input of the Sd-10 or Sd-25 you are using for your audio, AND the solenoid valve, relay or whatever else this output is controlling. If you are controlling a figure which is to speak, this shared output could be the one that controls the mouth. It won't usually be needed until after the sound has been started anyway. Configure the Sd-10 or Sd-25 for 'non-steppable' operation.
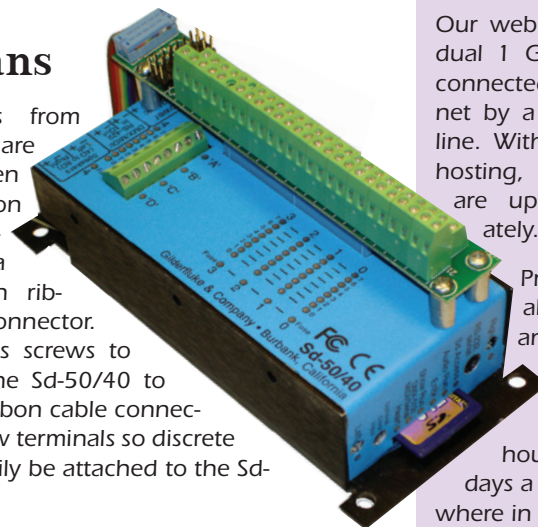
When you program your show, don't trigger the combined audio/control output and output until you need to start the sound playing. On the first activation, the sound will start (and whatever this output is controlling will move too). Now for as long as the sound is playing you can freely use the output to trigger the animation as needed. Because the Sd-10 or Sd-25 has been set to ignore additional trigger inputs on this input, they won't have any effect on the sound. **~G**

C-50trans

The outputs from a Sd-50/40 are through a ten position ribbon cable connector and a forty position ribbon cable connector. The C-50trans screws to the top of the Sd-50/40 to turn these ribbon cable connectors into screw terminals so discrete wires can easily be attached to the Sd-50/40.

If you are using the fourth output channel for controlling eight ServoMotors, a header for plugging in your servomotors is also included on the C-50trans.

The C-50trans will be included as a part of the 'starter kit' for the Sd-50/40s. **~G**

Classes Anyone?

The spacious quarters at Gilderfluke Towers has a permanent display area where we offer classes in GilderTechnology. We know that our stuff is pretty easy to learn to operate, but if you would like formal classes, they can be scheduled.

If you are interested in training on Gilderfluke & Co. equipment, please contact Carolyn Rowley (carolyn@gilderfluke.com) in our California GilderOffice. **~G**

Gilder WEB Page

Our web site lives on a dual 1 GHz G4 xServe, connected to the Internet by a dedicated DSL line. With in-house web hosting, all documents are updated immediately.

Price lists, Manuals, Cut Sheets and even these newsletters are available twenty-four hours a day, seven days a week from anywhere in the world at:

www.gilderfluke.com

Send us your Projects' KMZs!

Gilderfluke Towers:
34°10′35.88″N/118°18′39.79″W

Gilderfluke East:
28°27′39.22″N/ 81°27′18.76″W

There are literally tens of thousands of installations of Gilderfluke & Company equipment all around the world. Since we only rarely go out onto installations or hear from our equipment once it is installed, we would like to find out where it is going.

Locate your past and current projects using Google Earth, add a Placemark for it. Put a descriptive name and put what you did on the project into the comments field. Once you have this entered, use the 'File/Email/Email Placemark….' to send the resulting KMZ to us here at:

GilderTour@Gilderfluke.com.

Once we get a pile of placemarks, we will post a 'tour' of installations on our web site and make a movie of the flying GilderTour. ~G

Sd-10 & Sd-25   (cont. from page 1)

K/16 bit). Up to 255 different AudioFiles can be stored. Capacity is limited only by the size of your flash card.

- Audio is stored on standard MultiMedia (MMC) or Secure Digital (Sd) flash cards.

- Two non-polarized optically isolated trigger inputs with LED indicators. Easily attached to PLCs, pushbuttons, motion detectors, foot pads, IR sensors, alarm systems, and other controllers. These inputs can be configured to ramp the audio to preset levels or to select and play specific sounds round-robin or randomly. StoreCasting and Music-On-Hold modes can play an announcement between each music track. Triggered SoundFiles can be set to accept or ignore additional requests once started.

- All configuration is done using a DipSwitch. No software or drivers are ever needed.

- Runs   on any voltage from 12 to 24 vdc. Batteries or solar cells can be used where line power is unavailable.

The Sd-25 also features:

- An amazing fifty Watt Class-D stereo amplifier packs the power of most 200 Watt amps! Works with most four to eight ohm speakers. The amplifier can be bridged for a single 50 watt mono output into four ohms

- One optically isolated 'running' status output. This output becomes active whenever the Sd-25 is playing a triggered SoundFile. It can be used to turn on lights, relays, audio ducking mixers, etc..

Operationally, you will find the latest and earliest Sd-10s and Sd-25s almost indistinguishable. The new features are:
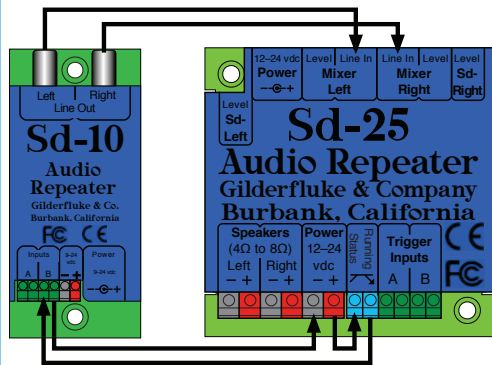
- CE and FCC certified. RoHS (lead-free) production. These certifications are accepted almost anywhere in the world.

- Bigger DipSwitches. We have doubled the size of the DipSwitch to help those of us whose eyes aren't what they used to be.

- User installed RS-232 Serial Port Upgrade. It's easy to add serial!

- We reversed the line level outputs to make them into 'mixer' inputs. Any line level audio signal that is fed into these two RCA jacks can be mixed into the Sd-25's amplified output. This input can be used for audio from a live microphone or other audio source, such as a Sd-10.

- Bigger screw terminals for speakers and power supply connections on the Sd-25s. Big enough for wires gauges up to #12.

- To make room for bigger screw terminals and mixer inputs, we removed two of the four mounting holes on the Sd-25s. ~G

Keep fingers clear as we shoot +/- 4000 volts into an unsuspecting Sd-25

CE and FCC Certification

The European standards for electronic equipment are among the toughest in the world. Most countries will accept the CE mark in place of their own standards. Here in the US, the only requirements for low voltage equipment are the FCC interference standards, and these are largely toothless.

All our major products are now, or soon will be CE and FCC certified. The testing includes:

- RF emissions up through 1 GHz
- Zapping the case and surroundings with up to +/-4000 volts
- Zapping all the inputs and outputs with +/-500 volts
- Sending +/-500 volt spikes into the 24 vdc power supply inputs
- Listening for conducted emissions through all connections
- Immunity to high powered radio signals sent into the units
- Audio frequency emissions
- Immunity to magnetic fields

All in all, the CE gauntlet takes about three to five days on each piece of equipment. The equipment is then CE certified. Since the FCC and Canadian emissions testing are less strict, it automatically gains these certifications too.

A more recent requirement for Europe went into effect this past July. It is already scheduled to be adopted in China, and doubtless many other markets as will adopt this standard as well. It requires all products to eschew lead (and a few other substances). This is known as RoHS (for Reduction of Hazardous Substances). It is pronounced 'Rose' or 'Ro-Hoss'.

All current production from Gilderfluke and Co. is already RoHS compliant. We do have stock on many items that do not meet RoHS standards. As these products are restocked, any new production will certainly be RoHS compliant.

As of this writing, the following GilderEquipment has been certified as CE and FCC compliant:

- Sd-10
- Sd-50
- Br-miniBrick4
- Sd-25
- Amp-50
- Br-miniBrick8

Amplifier & Speaker Ratings

The Amp-50, Sd-25 and Sd-50's amplifiers are all 'Class-D' designs. Their efficiency is near 90%. If you feed fifty Watts of 24 vdc into a Class-D amplifier, you will get almost fifty Watts into your speakers. The supply current into a Class-D amplifier follows the sound exactly. If the sound is quiet, the supply current drops almost to zero (ideal for battery use!).

'Linear' amplifiers have only about 20% efficiency. Fully 80% of the power you put into them goes into the heatsink as waste heat. A fifty Watt linear amplifier only feeds about ten Watts of power into your speakers, and forty Watts into the heatsink, whether or not there is any sound being fed through the amp!

This makes the Amp-50 or Sd-25's amplifier roughly equivalent to what would be a 200 Watt linear amplifier! A Sd-50's amplifier is roughly equivalent to a 400 Watt linear amplifier!

Speaker manufacturers' ratings match those of linear amplifiers. They assume that if you are running a fifty Watt amplifier, only 10 Watts will actually be getting to their speaker, so they rate the speaker at '50 Watts', even though it will actually only handle ten Watts. Speakers will also have a 'peak' and 'continuous' ratings. These are to indicate how much heat will build up in the speaker at a certain wattage over time. Use the 'continuous' ratings when comparing speakers.

We were sent some small bookshelf speakers for evaluation. Although the ratings on these speakers indicated that they could handle a '50 Watt' amplifier, we made smoke come out of the grills within seconds of turning the volume up a bit. Great for entertainment value, but smoke coming out from your speakers would not bode well for longevity.

If you are running your speakers at high SPLs (sound professional-speak for 'turning it way up'), you will need to select speakers that can handle at least a 100 Watts or more of continuous power. Smaller speakers may clip as the cones hit their mechanical limits if run at too high an output power level.

Our Class-D amplifier outputs can be used with speakers of four to eight ohms impedance. As with any amplifier, you can series/parallel several speakers, as long as the overall impedance remains within limits.

These Class-D amplifiers are well protected from short circuits and overheating, and will go back

TIP!
Sd-25's Mixer with a Microphone

The Sd-25 can be used for live announcements as well as playing 'canned' SoundFiles stored as .wav or Mp3s on a MMC/Sd card. Just attach the output of a wireless or other pre-amplified microphone into the mixer inputs.

The Sd-25's repeater can be used for background or foreground audio. The background audio could be music or other ambient sound that form a backdrop to the 'live' audio from the microphone. Foreground audio can be a triggered sound in installations where the microphone isn't normally used. This could be a show or 'canned' tour, where the microphone is reserved for special occasions, or even emergency use.
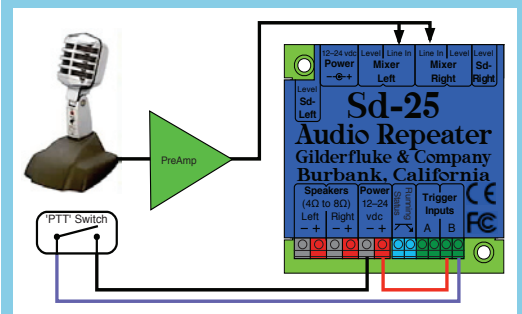
If the microphone 'push to talk' button/switch is wired into one of the inputs to the Sd-25, the sound from the repeater can be configured to mute (or duck) whenever a live announcement is being made.

Sd-25 sound systems like this can be used for both stationary sound systems or for tour buses, boats, trams, trains and similar mobile applications. ~G
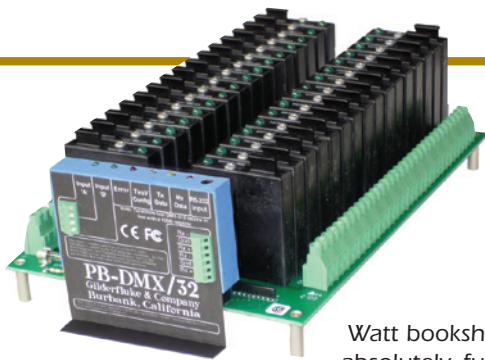
Pb-DMX32

Fountains tend to have a lot of high current digital outputs for valves and lighting. The bigger the fountain, the more outputs it will have. With lots of outputs comes lots of wiring. To help reduce the primary side wiring, we have designed the new Pb-DMX32. It is a show controller that plugs right onto Grayhill brand 'G5' relay modules.

The Pb-DMX32 has a small onboard memory that will allow local storage of sequences of up to about 10 minutes (for 32 outputs at 30 FPS). Shows can be triggered through two optically isolated inputs.

For most larger installations, DMX-512 is fed to the Pb-DMX32 from PC∙MACs or a centralized data storage board like the Br-SmartMedia or the new Bs-Brain4. The Pb-DMX32 reduces the number of primary side wires to controlling up to 4096 relays from thousands down to a single twisted pair!

The 'Pb-' relay mounting boards for the Pb-DMX32 come in eight, sixteen, twenty-four, and thirty-two relay output sizes. ~G

Wire Resistance vs. Length

What wire should be used between the amplifier and the speakers? Now that we have bodacious amplifiers in the Sd-25, Amp-50 and Sd-50, we are getting this question more and more often. The answer is (of course): 'That depends……'

GAUGE #	Ohms per foot	Ohms per 10 feet	Ohms per 100 feet
12	0.001588	0.015880	0.15880
14	0.002525	0.02525	0.2525
16	0.00402	0.0402	0.402
18	0.00639	0.0639	0.639
20	0.01015	0.1015	1.015
22	0.01614	0.1614	1.614
24	0.02567	0.2567	2.567
26	0.04081	0.4081	4.081
28	0.06490	0.6490	6.490
30	0.10320	1.0320	10.320

The folks who sell de-oxygenated 'Frankenstein' cables have done a great job convincing everybody that you need to a wire that is as big around as your thumb for a five foot run to a ten Watt bookshelf speaker. If you aren't running at absolutely full volume, a little extra wire resistance can be compensated for by simply turning the amp up a tad higher.

How much resistance? You must always compare the resistance of the wire to the impedance of the speaker. If your speaker is ten feet from the amplifier, 18 gauge wire would contribute .0639 ohms. With an eight ohm speaker, the formula $0.639\Omega/8\Omega=0.0079875$ tells us that the wire will make less than a 1% difference to the speaker level. Compared to an eight ohm speaker, this is nothing.

If the wire run is increased to 100 feet, then the wire resistance is now 0.639 ohms. Now the wire loss will be just shy of 8%. Unless you are already within 8% of the maximum volume level the amp is capable of, turning it up 8% would compensate for the wire loss.

If the wire gauge is increased to a 12 gauge, the wire loss is then just shy of 2%. Not really too much of a change from the 18 gauge wire. If the amplifier will be run at full volume, then the extra cost for the heavier gauge wire may be worth it. If you are not running at full volume, it will almost certainly be more cost-effective to use the lighter gauge wire and just turn up the amp a hair higher. ~G

Ratings (cont. from page 6)

to work a moment after a fault is removed. If the speaker impedance is too low and you are running at a high volume level, the amplifier may start to cut out. If you hear this, check the power supply voltage. If it is dropping, you might simply be drawing too much power and a larger power supply may fix your problem. If the power supply is OK, and you can't increase the speaker impedance, then you might simply be asking too much of the amplifier and need to decrease the volume a tad.

To comply with FCC and CE standards for radio frequency emissions, you should use shielded speaker wires with our Class-D amplifiers. The shield should be attached to the power supply 'negative' terminal. This will not affect the sound quality from the amplifier, but will make the FCC and CE folks happy. Shielded speaker lines were used during all CE/FCC testing. ~G

Greatest Hits On CD

We distribute all of our printed material and software on a single CD-ROM. Every manual, cut sheet, and piece of software we offer is all on one disk. These are available with most purchases, or for a nominal charge. ~G

Our Two Most Asked Questions

In over twenty five years we have been in business, the second most commonly asked question is where our company name came from.

Eli Gilderfluke was a cartoon character who appeared in railroading trade magazines in the middle of the 19th century. More or less a precursor of Rube Goldberg, he developed strange inventions for steam trains. These were things like a big scoop to catch the exhaust coming out of the smoke stack and feed it back into the engine's firebox.

The answer to the most commonly asked question is: 'No, we don't build animated figures'. ~G

Who Are We?

Gilderfluke & Company was founded in 1983 to build Animation & Show Control Systems for theme parks, museums, and other entertainment venues. In 1988 we added audio systems to our product line, and became the first company to be able to provide the entire electronics package for your animated show or attraction.

We currently deliver an average of more than one Animation & Show Control System a day. We are the only company that delivers complete, off-the-shelf Animation & Show Control Systems from stock. Most systems are bought by Animation Manufacturers for incorporation into their shows. They are simple enough to be installed by anyone.

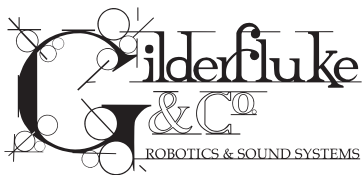Our PC▪MACs Animation & Show Programming Systems were the first to run under Microsoft's Windows. It is still the technological leader among Animation Programming Systems. Our 'Brick' Show Control Systems are the largest selling Animation & Show Control Systems in the world. These are modular systems which can be used to control any size show you can imagine.

Our Digital Audio Systems are led by our Sd-10, Sd-25 and Sd-50 Industrial-Strength Mp3 players. These store audio on standard MMC/SD Flash cards for any installation where you need a sound to play reliably and with zero maintenance; forever. All of our systems are modular. Systems with two to thousands of outputs are can be made using our repeaters.

Sd-50 players are also available with an option that adds eight or forty digital Show Control outputs, DMX-512, MIDI and serial ports to them. This turns them into a total Audio and Show Control playback solution. The 'Atomic Clock' and GPS options allows shows/sounds to be scheduled. ~G

Gilderfluke & Co.
ROBOTICS & SOUND SYSTEMS