"I am proud of the fact that I never invented weapons to kill"
- Thomas Edison

All the GilderNews we could jam into a little under 8 pages
- Eli the Mule, CEM

GilderNewsletter

Views and News from the World of Gilderfluke & Co.

GilderHeadquarters ▪ 205 South Flower Street ▪ Burbank, California 91502-2102 ▪ 818/840-9484 ▪ 800/776-5972 ▪ FAX: 818/840-9485

Serving the Entertainment Industry for 34+ Years!

New Radios for Bt-Servos and Bt-DMX

The **Bt-DMX** and **Bt-Servo** were originally designed to enable Trey Parker and Matt Stone to make the movie 'Team America'. The initial test shots which were used to 'sell' the project to the studio used our wired **SER-DMX**.

Once the film was 'green-lit', we very quickly designed the wireless version that became the **Bt-DMX** base station and **Bt-Servo** controller.

The **Bt-DMX** and **Bt-Servo** were used in virtually every frame of the film. In some crowd shots, we ran as many as 900 servos wirelessly with no interference or cross talk. Since then, these units have been used on many other film productions, live shows, and theme park projects.

The **Bt-DMX** and **Bt-Servo** have been redesigned using new radio modules. These radios are FCC (and other international agencies) pre-approved. As with the previous radio upgrades, the modules plug into the **Bt-DMX** and **Bt-Servo**. Older **Bt-DMXs** and **Bt-Servos** can be factory-upgraded to use these new radios too.

These new radios have an output power rated at about 250 mW. This is quite a bit more than the 100 mW rating of the previous radio modules. The new **Bt-DMX** and **Bt-Servo** have considerably greater radio range. The quarter-wave antennae that come with the **Bt-DMX** and **Bt-Servo** are socketed. You can plug in a different antenna to match your project.

The **Bt-DMX** and **Bt-Servo** use a bidirectional 900Hz radio link. You can wirelessly configure

Bt-DMX & Bt-Servo continued on p.4...

Guaranteed Cure Found for Insomnia!

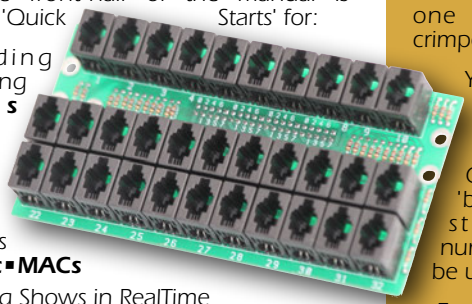
We understand that most GilderUsers just look at a few of our training videos and dive in. For the lucky few that actually want to read, our manuals are all available from the GilderWebsite.

A completely rewritten **Pc▪MACs** manual is now downloadable from www.gilderfluke.com..

Over the last several years we have been adding so many features to our **Pc▪MACs** show programming software that the manual was woefully out of date. Although we are still adding even more new features, we took a break to bring the manual up to speed.

The new **Pc▪MACs** manual, which weighs in at a soporific 300+ pages, is organized into two main sections:

The front half of the manual is made up of 'Quick Starts' for:



- Downloading and Installing **Pc▪MACs** Software
- Creating Shows
- Opening older shows with new **Pc▪MACs**
- Programming Shows in RealTime
- Graphical Editing of your Shows
- Drag-n-Drop triggers for Audio/Video
- AutoDownloading your shows to the permanent Show Control System.

In the QuickStarts, most of the major

Pc▪MACs manual continued on p.4...

New! LED Strobes

In last year's GilderNewsletter we described how to build LED multi-strobe lights. The client we had developed these for didn't want to build them themselves. As a result, we now have a new line of LED strobe lights.

To make the installation as simple as possible, we mounted the strobes on a ¾" diameter PCB, with removable 'ears' for mounting them.

To make the wiring foolproof and reliable, we used 30µ gold plated modular connectors. The cables will work even if one or both ends are crimped on backwards.

You can use a Z-Brick, **Br-miniBrick8**, **Sd-50/40** or any other digital output Gilderfluke & Co. 'brick' to run these strobe lights. Any number of strobes can be used in an installation.

For each 32 LED Strobes, you need one breakout. It can be used with any Gilderfluke & Co. digital outputs, or can be plugged into the back of a 19" **Br-CC09** card cage. -G

BrightSign Video Players' Receive Their Annual Design Updates

This Fall has brought major changes in BrightSign video players. The entire BrightSign line has been updated for 2017 with faster processors, smaller cases. and 4K UHD extended into the mid-range v-XD line. Full UHD 3840 x 2160 60p playback now starts at only $450!

Updated BrightSign continued on p.3...

v-Xt: HD and Ultra High Definition	v-Xd: HD and Ultra High Definition	v-Hd & v-Ls: 1080p High Definition
v-Xt1143 w/HDMI In & Out, GPIOs, dual USB (A & C), RS-232, mSATA, Ethernet, Analog/Digital Audio out, IR in/out	**v-Xd1033** w/GPIOs, dual USB (A & C), RS-232, mSATA interface, Ethernet, Analog/Digital Audio out, IR in/out	**v-Hd1023** w/GPIOs, USB A, RS-232, Ethernet, Analog/Dig Audio out, IR in/out
v-Xt243 w/GPIOs, mSATA, Ethernet, Analog/Digital Audio out, IR in/out	**v-Xd233** w/GPIOs, mSATA, Ethernet, Analog/Digital Audio out, IR in/out	**v-Hd223** w/GPIOs, Ethernet, Analog/Digital Audio out, IR in/out
		v-Ls423 w/USB C, 100baseT Ethernet

GilderGear Comparison Chart

GilderGear Name	Show Control	Audio Player	Show Control Outputs	DMX-512 Input	DMX-512 Output	Other Features	Trigger Inputs	Clock/Calendar Schedules	Serial Port(s)	Memory	Flash Card	Starter Kits	Notes
Sd-10		Yes (stereo)				Line Level Out	Two Opto + Serial		Rs-232 (optional)	Sd Cards up to 32 GBytes	removable Sd or SdHC	Yes	CD player Replacement
Amp-50						50 Watt Digital Class-D Amp							Amplifier is equivalent to a 200-250 Watt Linear Amp
Sd-25 w/DMX		Yes (stereo)	1 Status Output	1 Universe (512 Chan.)		50 Watt Amp Mixer Input, Line Level Output	Two Opto + Serial		Rs-232/422 (optional)	Sd Cards up to 32 GBytes	removable Sd or SdHC	Yes	Amplifier is equivalent to a 200-250 Watt Linear Amp
Sd-50/0		Yes (stereo)				100 Watt Digital Amp	Eight Opto + Serial		Rs-232	Sd Cards up to 32 GBytes	removable Sd Card	Yes	Amplifier is equivalent to a 400-500 Watt Linear Amp
Sd-50/8	Yes	Yes (stereo)	Up to 8 Digital	1 Universe (512 Chan.)	1 Universe (512 Chan.)	100 Watt Amp 8 ServoMotors*	Four+Eight* + Serial	Yes (GPS Optional)	1) Rs-232 1) Rs-422	Show: 8 MBytes	removable Sd Card	Yes	* Uses 8 Show Control Outputs
Sd-50/40	Yes	Yes (stereo)	Up to 40 Digital	1 Universe (512 Chan.)	1 Universe (512 Chan.)	100 Watt Amp 8 ServoMotors*	Four+Eight* + Serial	Yes (GPS Optional)	1) Rs-232 1) Rs-422	Show: 8 MBytes	removable Sd Card	Yes	* Uses 8 Show Control Outputs
Br-miniBrick4	Yes		Four Digital				One Opto		Optional	8 KBytes			Our smallest controller
Br-miniBrick8	Yes		8 Digital 2 Servo	1 Universe (512 Chan.)	64 DMX-512 Channels*	Two PCM ServoMotor Outputs	Two Opto + Serial		Rs-232	64 KBytes			* DMX-512 outs eat up Memory
Z-Brick (Br-Br-ZBR)	Yes		32 Digital	1 Universe (512 Chan.)	1 Universe (512 Chan.)		Four Opto + Serial		Rs-422	Sd Cards up to 32 GBytes	removable Sd or SdHC		Combines functions of Br-multiBrick32 and Z-Brick
Br-ANA	Yes		16 Analog	1 Universe (512 Chan.)	1 Universe (512 Chan.)		Four Opto + Serial		Rs-422	Sd Cards up to 32 GBytes			DMX-512 to Analog Card
DAC-Quad	Yes		Four Analog	1 Universe (512 Chan.)	1 Universe (512 Chan.)	Four PCM ServoMotor Outputs	Two Opto + Serial		Rs-232	micro Sd up to 32 GBytes	removable µSd		DMX-512 to Analog Card
Br-Brain4	Yes			1 Universe (512 Chan.)	4 Universes (2048 Chan.)	Smpte Reader, sends serial strings, MIDI, etc.	Ten Opto + Serial	Yes (GPS Optional)	2) Rs-422	Sd Cards up to 32 GBytes	removable Sd or SdHC		Plays 8 asynchronous shows, PopOut Shows, LCD on front displays status, shows, etc.
Pb-DMX/8, /16, /24 or /32	Yes		up to 32 3.5 amp Relays	1 Universe (512 Chan.)	300 DMX-512 Channels*	3.5 Amp AC or DC Relays.	Two Opto + Serial		Rs-232	4 or 8 MBytes			* DMX-512 outs eat up Memory
Br-EFB	Yes		4 Closed Loop Analogs	1 Universe (512 Chan.)	1 Universe (512 Chan.)	Built-in Web page for Config. & Control	Two Opto + Serial +Ethernet		Ethernet Rs-422	µSd Cards up to 2 TBytes	µSd, µSdHC or µSdXc cards		Four Self Tuning PID Loops for Pneumatic, Hydraulic or Electric servo loops
Br-SDC						Serial Device Controller	Ten Opto		1) Rs-232 or Rs-422				Runs DVD players in kiosks, etc.
Br-SDC8						Serial Device Controller/Mux.	Ten Opto + Serial		8) Rs-232 1) 232/422				Controls up to 8 DVD players or other serial gear
SER-DMX	Yes		16 PCM Outputs	1 Universe (512 Chan.)	1 Universe (512 Chan.)	16 PCM Servo-Motor Outputs	Two Opto + Serial		Rs-232	micro Sd up to 32 GBytes	removable µSd		DMX-512 to PCM ServoMotors
Bt-DMX Bt-Servo			16 PCM Outputs	1 Universe (512 Chan.)		Wireless Control of ServoMotors			USB Rs-422				Bt-DMX = Base Station, Bt-Servo = output cards. Bidirectional RF Link.
BrightSign HD/UHD Video		Yes (stereo)		1 Universe (optional)		4K UHD & 1080p HD Players	Eight TTL (select models only)	Option on some models	Rs-232	µSd Cards up to 2 TBytes	µSd, µSdHC or µSdXc cards	Yes	Up to 1080p, MPEG-2, H.264/MPEG-4
LG-DMX/DC				1 Universe (8 Chan.)		12-24 vdc DMX-512 Dimmer							DMX-512 to DC Dimmer
DP-DMX20L				1 Universe (4 Chan.)		115 vac DMX-512 Dimmer							Other dimmer sizes available

v-Xt1143 and v-Xt243

HD (1920 x 1080)
UHD (3840 x 2160)

v-Xd1033 and v-Xd233

HD (1920 x 1080)
UHD (3840 x 2160)

v-Hd1023 and v-Hd223

HD (1920 x 1080)

v-Ls423

HD (1920 x 1080)

Updated Video continued from p.1

Two models have gone away (v-4K1042 and v-Xd1230), leaving seven BrightSign models. The 'v-4k' players are now named 'v-Xt', and the model numbers have all been incremented by one.

The **v-Ls422** has been incremented to a '**v-Ls423**', but it has lost its GPIO port. It can no longer be triggered by simple switch closures, the v-Hd-to-DMX, or v-Hd-to-1/4J6 adapter.

Common features of all BrightSign players include:

- All BrightSign players now use µSd flash cards. Gilderfluke & Co. carries both commercial grade, and the more robust industrial grade µSd cards.
- HDMI 2.0a video output on all models
- M.2 (E) keyed connector for Optional WiFi/Bluetooth Wireless Cards on all models
- Full HD (1920 x 1080, 24p, 25p, 29.92p, 30p, 50p, 59.94p, 60p) video decoding of H.264 and H.265, MPEG-2, and MPEG-1 in .ts, .mpg, .vob, .mov, .mp4, .m2ts, and .wmv containers
- Firmware versions 6.1 and later support the MPCDI specification for warping and edge blending. (v-Xt players are recommended for use with warping and edge blending)
- HTML5 support
- Completely solid state. No fans, discs or moving parts to wear out or break. Built for years of 24/7, 365 days a year operation.
- Universal power supply included

Features of v-Xt1143 and v-Xt243 (formerly 'v-4K') BrightSign players include:

- Full HD (1080p60) and UHD video (3840 x 2160 24, 25, 30, 50 60p) decoding of H.265 in .ts, .mov, .mp4, .mkv containers
- Ability to decode two video streams simultaneously, one of which can be UHD
- Upscales lower resolution videos to 3840 x 2160 UHD
- **v-Xt1143** has a HDMI input to allow blending live video feeds into your screens
- M.2 interface for adding internal Solid State Drives (80 mm modules recommended)
- 179.9mm W x 21.9mm H x 204.2mm D
  7.1" W x 0.86" H x 8.0" D

Features of v-Xd1033 and v-Xd233 BrightSign players include:

- Full HD (1080p60) and UHD video (3840 x 2160 24, 25, 30, 50 60p) decoding of H.265 in .ts, .mov, .mp4, .mkv containers
- Ability to decode two 1080p HD video streams simultaneously,
- Upscales lower resolution video to 3840 x 2160 UHD
- M.2 interface for adding internal Solid State Drives (80 mm modules recommended)
- 179.9mm W x 21.9mm H x 204.2mm D
  7.1" W x 0.86" H x 8.0" D

Features of v-Hd1023 and v-Hd223 BrightSign players include:

- Full HD (1920 x 1080, 24p, 25p, 29.92p, 30p, 50p, 59.94p, 60p) video playback
- 159.9mm W x 22mm H x 144.2mm D
  6.3" W x 0.87" H x 5.7" D

Features of the v-Ls423 BrightSign player include:

- Full HD (1920 x 1080, 24p, 25p, 29.92p, 30p, 50p, 59.94p, 60p) video playback
- Smallest, lowest cost BrightSign player
- This model DOES NOT have a GPIO port
- 96.8mm W x 23.7mm H x 144.3mm D
  3.8" W x 0.9" H x 5.7" D ~ G

Read Fatigue

Industrial Strength Flash Cards Available

In addition to standard Commercial grade MLC cards, Gilderfluke & Co. is now offering a range of Industrial grade Sd and µSd flash cards.

All the 'Industrial grade' cards are built with 'Single Level Cells' (SLC) for maximum long term reliability. They don't have as large of a capacity as a commercial-grade 'Multi Level Cell' (MLC) cards, but will be more reliable in continuous play applications.

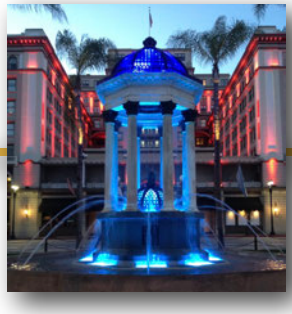
A memory cell can be thought of as a small capacitor. When the memory cell is written, it is charged to a certain voltage to represent a 'one' or a 'zero'.

Each time a memory cell is read, a few electrons are drawn off. This was rarely a problem when memory cells were large and chock-a-block full of electrons.

As the capacity of flash memory cards has increased, the size of each individual memory cell has gotten smaller, so each cell simply holds fewer electrons.

To make matters worse, individual memory cells are now used to hold multiple bits of memory. Instead of being charged to one of two levels, each memory cell might have four, eight or more charge levels, each cell representing the state of

Continued on next page...



Horton Plaza,
San Diego, CA
c.1905 vs. 2016

Read Fatigue

Read Fatigue: from p.3

several bits of memory. This is called a 'Multi Level Cell', and virtually all commercial grade flash cards are now built in this way. Far fewer electrons need to be drawn away to cause the value of the cell to flip.

For typical Sd cards in a camera or cell phone, MLC cards work just fine. The data is only written or read from them sporadically. The card spends the overwhelming majority of its time powered down.

For continuous read applications like audio, video or show playback, MLC flash cards can have problems. After months or years of reading the same memory cells thousands of times each day, they may start flipping to different values.

You may experience this when an installation which has been playing reliably for years suddenly starts behaving erratically. Usually cycling power, or reformatting and reloading the flash card will bring it back to reliability, but the time until the card gets flakey again will usually decrease each time the card is cycled or reloaded.

This is called 'Read Fatigue'. Replacing the MLC card with a SLC card is the best long term fix.

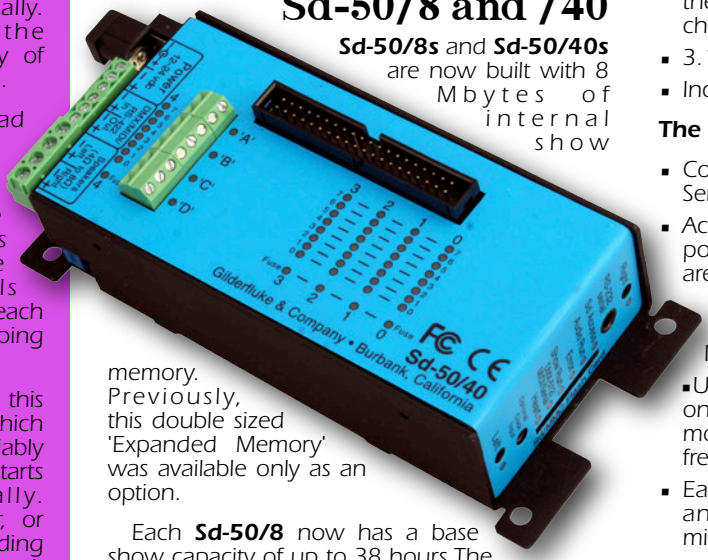
Read Fatigue can be delayed by making your file longer, or using multiple copies. In this way, the same little stretch of memory isn't read quite so often. If a short file exhibited Read Fatigue after a year, making the file 100 times longer (or storing 100 copies of the same file) should delay the onset of Read Fatigue by about 100 times. ~ G

Pc▪MACs manual: continued from p.1

commands are covered in a pithy paragraph or two. Illustrations show the menus and dialogs, as well as the 'before' and 'after' for all the editing commands.

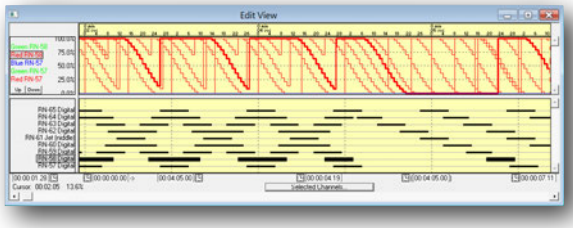
The second half of the manual is for the true nerds among us. It gets into the sleep-inducing details on every option and command available to you in **Pc▪MACs**. ~ G

Double the Memory for Sd-50/8 and /40



Sd-50/8s and ***Sd-50/40s*** are now built with 8 Mbytes of internal show memory. Previously, this double sized 'Expanded Memory' was available only as an option.

Each ***Sd-50/8*** now has a base show capacity of up to 38 hours.The ***Sd-50/40*** has a base show capacity of up to nearly 13 hours. ~ G



New in Pc•MACs

When pasting from analogs to digitals, the 'Cut/Paste' options can be applied to each digital as it is pasted into the analog channels. This allows you to paste with ramps at the start and/or end of each digital, as shown above.

The **Pc▪MACs** installer will determine whether your computer is running a 32 or 64 bit version of Windows, and automatically install the **Pc▪MACs** version to match your OS. ~ G

Bt-DMX & Bt-Servo: Continued from p.1

the **Bt-Servo** cards, or check the temperature, battery levels or **Bt-Servo** card status.

The Bt-DMX Base Station features include:

- Six software selectable, non-interfering frequency hopping channels
- Each **Bt-DMX** transmits data for up to 128 ServoMotors
- Nine indicator LEDs show data updates, power, configuration status, etc..
- Configured through a USB port from any PC. Once talking to a **BT-DMX**, you can talk wirelessly to any **Bt-Servo** cards that are on the same radio channel to configure them, check battery levels, temperatures, etc..
- 3.1" x 4.5" x 1.7"
- Includes a universal power supply

The Bt-Servo features include:

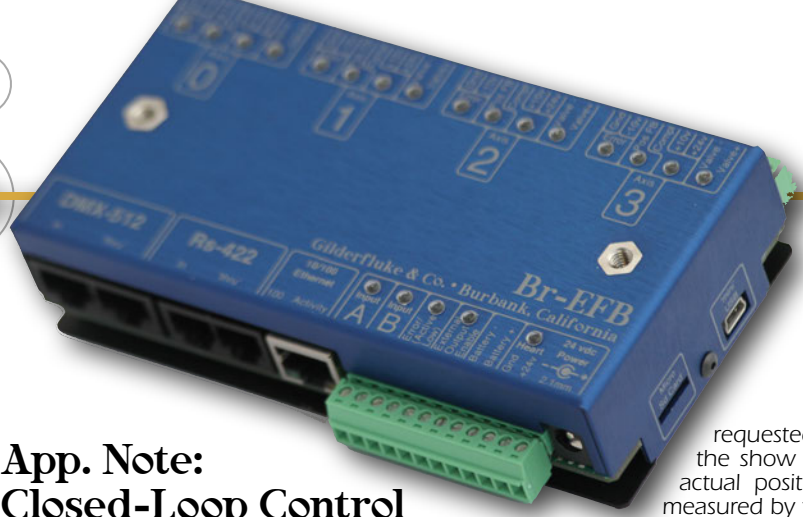
- Controls up to sixteen remote control-style ServoMotors from each **Bt-Servo**.
- Accepts eight or twelve bit resolution position commands. ServoMotor positions are oversampled and calculated in sixteen bits for smoothness.
- Automatic Ease-In when DMX-512 or RF update signals start or stop.
- Up to 128 servos (at 8 bits of resolution) on each frequency spread across eight or more **Bt-Servo** cards. Up to 85 servos per frequency at 12 bits.
- Each ServoMotor's ends of travel can be set anywhere between .759 and 2.241 milliseconds. Endpoints do not interact.
- Two indicator LEDs show data updates, errors in received data, etc..
- Runs from 5 to 12 vdc servo power. Automatic servo shutoff if voltage drops below a user-preset level, or when Rf updates are not received.
- 2.025" tall x 1.025" wide x .425" thick. About the size of a 9 volt battery! ~ G

Updated GilderWebsite

Gilderfluke.com has a new look this year. The simplified webpage layout has been designed to work equally well on your tablet, cell phone, laptop or desktop computer. ~ G

Made in the USA

All equipment which is designed and built by Gilderfluke & Co. is manufactured in the United States of America. ~ G



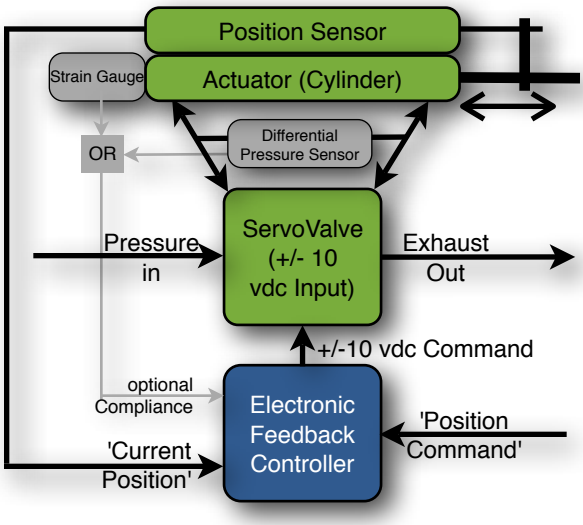
Las Cruces Plaza
Las Cruces, NM

App. Note: Closed-Loop Control of Analog Actuators

An actuator is a mechanical device that moves something. It doesn't matter if the actuator is powered by hydraulic or air pressure, or directly from an electric motor.

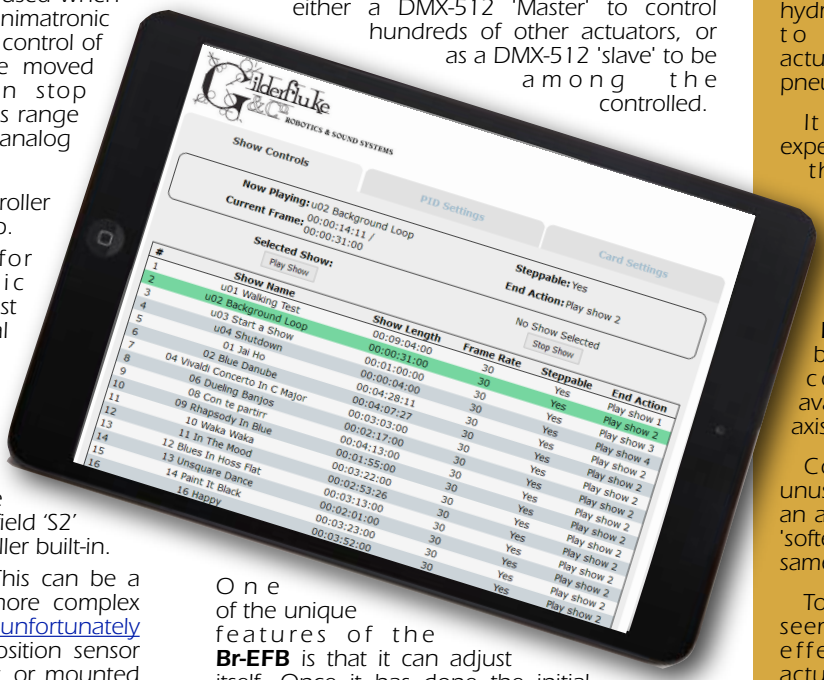
Analog control of actuators is used when you want to create truly lifelike animatronic effects. This requires closed-loop control of the actuator, so that it can be moved slowly or quickly, and can stop repeatably at any point within its range of movement. A closed loop analog movement requires:

- An 'Electronic FeedBack Controller (EFB) for closing the servo loop.
- An analog ServoValve for pneumatic or hydraulic actuators. In either case, it must be capable of bidirectional control. The most common command signal for these is +/-10 VDC. The positive or negative polarity controls the direction or the movement, and the further away from zero, the more the valve opens. Note that the Enfield 'S2' ServoValve has the EFB controller built-in.
- A feedback position sensor. This can be a simple potentiometer or a more complex electronic device like (the unfortunately named) 'Sick' sensors. The position sensor can be built into the actuator, or mounted on its outside.



The EFB controller's job is to compare the requested actuator position from the show control system with the actual position of the actuator (as measured by the position sensor). The EFB Controller will then open or close the valve a little or a lot (as needed) to send the actuator towards the requested position.

Our new **Br-EFB** is just such a controller. Like most other GilderGear, it can be run as a stand-alone controller, or networked together with other GilderGear and third party gear as either a DMX-512 'Master' to control hundreds of other actuators, or as a DMX-512 'slave' to be among the controlled.



One of the unique features of the **Br-EFB** is that it can adjust itself. Once it has done the initial adjustments for an actuator, the **Br-EFB** can divide the stroke of the actuator into many small segments, and then continuously adjust the settings for each of these segments individually. This allows the **Br-EFB** to control uneven loads, or unbalanced loads that go over fulcrum. Even if the load changes over time (the actuator bore gets smoother, the hydraulic fluid gets thinner as it gets hotter, or the motion base is loaded with a bunch of 300 pound football players), the **Br-EFB** can compensate for this.

The **Br-EFB** is set up over ethernet using its built in web server and just about any browser on any tablet, smartphone or computer. You can also use its textual menu and GilderTerm.

You can configure the **Br-EFB** using the PID Setup Wizard or manually. The first thing you need to tell the **Br-EFB** is the range of voltage expected on the position and compliance inputs for the axis. Set these to match the expected outputs from your position and compliance sensors. If you are using potentiometers, you will probably be using the **Br-EFB's** +/10 vdc

Explanation

What is Compliance?

Compliance is a technique that was first proposed in several scientific papers as a way to make pneumatic actuators 'stiffer' (like hydraulic actuators), and to make hydraulic actuators 'spongier' (like pneumatic actuators).

It was first seen in experimental animatronics that were built for Disney by the late Dr. Stephen Jacobsen of The University of Utah and Sarcos.

The Gilderfluke & Co. **Br-EFB** controller has been designed with compliance inputs available on all four of its axis.

Compliance has the unusual effect of making an analog movement both 'softer' and 'stiffer' at the same time.

To accomplish these two seemingly contradictory effects, a compliant actuator needs a strain gauge or differential pressure sensor to 'feel' the force being applied by the actuator.

A strain gauge works best, but must be built into the figure. A differential pressure sensor will have a slight 'lag', but is far less expensive and is easily mounted near the ServoValve.

Other than the addition of a differential pressure sensor or strain gauge, a compliant actuator is plumbed just like any other closed-loop actuator.

Even if it is strong enough to throw you across the room, as you

Continued on next page

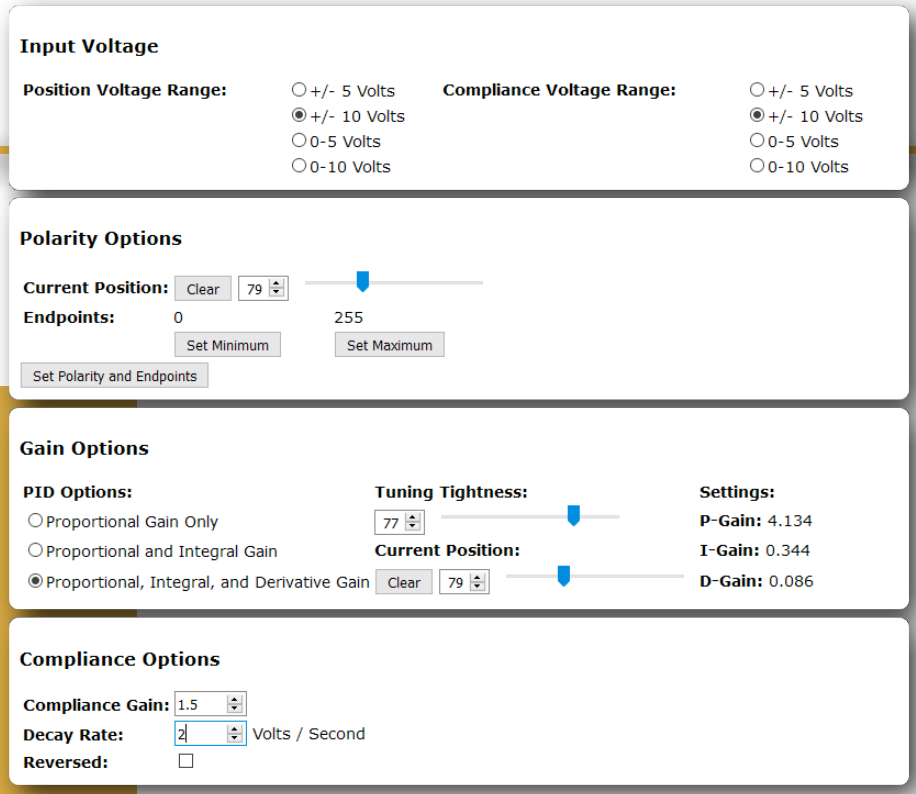
push on a compliant actuator, the force on the cylinder will be sensed. The EFB controller will open the valve to move the actuator out of your way. This makes it seem like the movement is 'softer', but the effect is only temporary. If you continue holding the actuator in a displaced position, it will soon begin to fight you to move the actuator back to the original position using all its strength.

If any actuator in a compliant figure is moved, the other actuators will feel the changes in their loads and move in sympathy. This makes for a much more 'lifelike' animatronic.

If you tell a compliant actuator to start moving sharply, the acceleration inertia of the actuator will be sensed, and the EFB controller will open the valve more than just the positional error would have caused. This accelerates the actuator more quickly.

Conversely, when the actuator is stopped abruptly, the deceleration inertia is sensed, and this can cause the valve to close, or even open the valve in the reverse direction to provide active braking to the actuator.

The net result is that the actuator will move when you push on it, making it seem 'softer', but can accelerate and decelerate more quickly than a non-compliant actuator making it 'stiffer'. ~G



reference outputs, and will set the inputs to match.

The next step is to tell the **Br-EFB** where the ends of the actuator's travel are located. If the actuator can safely be moved to both its mechanical stops, then the **Br-EFB** can find the endpoints for you. The **Br-EFB** will then back off slightly to set the normal range of movement to just short of the ends of the actuator. Otherwise, you can use the web menu to jog the actuator to where you want to place each end of the actuator's stroke, and then lock them in. Once the endpoints have been set, the **Br-EFB** will do its best to keep the actuator within this range of movement.

As you are setting the endpoints, the **Br-EFB** is detecting the 'phase' of the actuator and feedback hardware, and automatically correcting for any phase-flipped wires or hoses.

At this point, you can manually set the 'Positional' ('P'), Integral ('I') and 'Derivative' ('D') gains for the axis, or let the **Br-EFB** do this for you.

If you opt for the automatic tuning, the **Br-EFB** will move the actuator to roughly mid-stroke, and perform a series of short movements at gradually increasing speeds. If it was successful, the **Br-EFB** will set the P, I and D to the optimal settings for the actuator. Since you don't always want the axis too stiff, a slider lets you select between a soft and hard tune for the actuator.

If the **Br-EFB** is unsuccessful in automatically setting the PID, you will need to manually adjust these settings as needed.

The next step is to enable the continuous automatic tuning, if desired. This also uses the setting for the tuning tightness', so it doesn't over tune the actuator over time.

Br-EFB's PID Setup Wizard

If compliance is to be used, it is enabled and adjusted 'to taste'. Each axis has a 'Gain' and 'Decay' setting. These set how much of an effect the compliance has on the actuator, and how long this effect lasts.

The plumbing for a closed loop actuator is not complicated. Air or hydraulic pressure comes into the ServoValve and two hoses connect the ServoValve to the actuator. The position feedback and command input go into the EFB controller. After comparing the Command and Actuator positions, the EFB controller sends the command voltages that are used to open and close the valve as needed (typically +/-10 vdc).

The speed of an electric actuator is set by the voltage for the actuator's motor (if the actuator runs from DC current), or frequency of the current (if the actuator runs from AC current).

A Brushless DC (BLDC) controller or Variable Frequency Drive (VFD) can be used to control the speed and direction of motors by controlling the frequency of the current the motor receives. BLDC motors are typically used to control motors from a DC power source (they are what make electric cars go), while VFDs are used to run motors from an AC 'mains' source (they are what make elevators go up and down).

To control an electric actuator, the ServoValve is simply replaced by a VFD or BLDC controller. that accepts the +/- 10 vdc as the speed and direction command ~G

Machao Orphanage

Along with her work helping people with Sickle Cell Disease, Dr. Carolyn Rowley, our VP and CFO, has been the primary U.S. organizer and fundraiser for the Machao Orphanage in Makueni, Kenya.

While our past projects have included essential improvements to the living facilities and irrigation system that support MACHAO's sustainable future, education is what the children express their need for most. "Tuition is desired over everything as without school, we have no future." This is a direct quote from the

State Capital

Harrisburg, PA

children during this year's service trip visit to the orphanage.

If you would like to help support any of the kids directly with school tuition, the facility, or other aid, more information can be found at www.machaoorphanage.org. ~ G

Greatest Hits on a GilderThumbDrive

We distribute all our printed material and software on a USB GilderThumbDrive. Every video, manual, cut sheet, and piece of software we offer is all on each GilderThumbdrive. These are available for a nominal charge. ~ G

GilderSwag Available for Ordering

As everyone knows, there is no human being more fashionable on this planet than your typical Gilderfluke & Co. Employee.

Now you too can dress just like one!

GilderShirts, GilderChocolates, GilderMousePads and other great GilderSwag are now available from our online web store. ~ G

Classes Anyone?

The spacious quarters at Gilderfluke Towers has a permanent display area where we offer classes in GilderGear. 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 GilderGear, please contact Carolyn Rowley in our California GilderOffice: Carolyn@Gilderfluke.com. ~ G

Custom Design Work

As time allows, we do custom design work. Most jobs are for clients that need a product to do a specific job that none of our off-the-shelf boards will do. Usually, these have been incorporated into products produced by our clients.

We can also custom-brand GilderGear, if you prefer to start with an off-the-shelf design.

If you are interested in custom-designed equipment, please contact Doug Mobley (doug@gilderfluke.com). ~ G

Field Installation & Service

Gilderfluke technicians are available for installations worldwide. You will need to pay all the usual transportation expenses (business class or better airfare, hotel, food, and per diem) in addition to the fee for the technician.

If you are interested in field support and installation of Gilderfluke & Co. equipment, contact Carolyn Rowley in our California GilderOffice.: (Carolyn@Gilderfluke.com) ~ G

Gilderfluke Show Plans

We are scheduled to exhibit at the following trade shows in the upcoming year. Most of the equipment described in this newsletter will be on display at these shows. We have free passes for many of them, so contact us if you would like to attend.

November 15-18, 2016

Booth #1651

International Association of Amusement Parks & Attractions (IAAPA), Orange County Convention Center, Orlando, Florida

March 23-26, 2017

Booth #931

Transworld's Halloween & Attractions Show, America's Center, Saint Louis, Missouri

June 14-16, 2017

Booth #5453

InfoComm International, Orange County Convention Center, Orlando, Florida

November 14-17, 2017

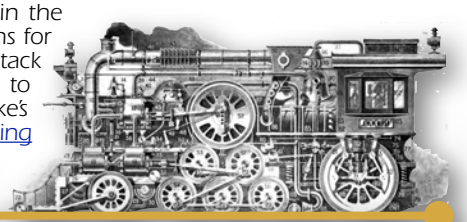
Booth #t.b.d.

International Association of Amusement Parks & Attractions (IAAPA), Orange County Convention Center, Orlando, Florida

Our Two Most Asked Questions

In the more than thirty-four+ years we have been in business, the second most commonly asked question is where our company's unusual name came from.

Eli Gilderfluke was an 'inventor' whose illustrations appeared in railroading trade magazines in the 19th Century. A precursor of Rube Goldberg in the 20th Century, 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 verb "to Gilderfluke" something eventually came to mean improvised repairs (i.e.: "Jerry-Rigging") on a piece of machinery. To the right is 'Gilderfluke's Perfected Locomotive' from the December 1897 issue of Railway and Locomotive Engineering Magazine.



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

• You can follow us on:

Who Are We?

For over 30 years Gilderfluke & Company has been building Animation & Show Control Systems for theme parks, museums, and other entertainment venues. In 1988 we added Digital Audio Playback 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 four or five systems 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. Our systems are modular. Systems with two to thousands of outputs are can be made with our repeaters.

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

In this issue...

Gilderfluke & Co. ROBOTICS & SOUND SYSTEMS

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