

Br-ANA

Sixteen Output Analog Card v4.nn

The Br-ANA is used when you need to control anything that needs a 0-10 vdc analog control voltage. These include animated shows, lighting, motion base simulators, pneumatic and hydraulic systems, special effects, signs, fountains, and more.

A Digital device is either on or off, like a light switch. An Analog device is on, off, or at any point between, like a light dimmer. The speed of the change is set by how fast you turn the knob. In animation, analog movements give the fluid, lifelike movements needed to bring an animated figure to life. They can move fast, slow or anywhere in between.

Br-ANA is a controller with sixteen 0-10 volt analog outputs, a full 512 channel universe of DMX-512 input and output and a legacy port for attaching Z-Bricks. The analog outputs are oversampled at four times the show's frame rate, so they are typically updated at 120 Hz for ultra smooth analog outputs.

For storing shows, the Br-ANA uses any standard Sd or SdHC flash card. These can hold months worth of shows! For triggering those shows, there are four optically isolated inputs, or the RS-422 networkable serial port can be used.

Br-ANAs can be used as standalone show controllers, as a 'master', controlling slaves attached to a DMX-512 network, or they themselves can be 'slaves', following data sent to them through a DMX-512 network.

The Br-ANA can also be used as a 'Smart' Brick, receiving time code information from a 'Smart' Brick Brain, and using this time code to access the shows stored on its local Sd- or SdHC flash card to update its outputs.



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A note about this manual:

This manual covers the specifics of the **Br-ANA**. To program the **Br-ANA** you will also want to refer to the **PC-MACs** manual sections that cover the **PC-MACs** software.

The **Br-ANA** is typically programmed in 'Software-only' or 'Hardwareless RealTime' mode. If you are using the **USB-DMX** for programming your **Br-ANA** through the DMX-512 inputs, 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>

Br-ANA Overview

The Br-ANA is an output card which has sixteen 0-10 volt analog outputs, DMX-512 input and output and a legacy port for attaching Z-Bricks¹. For storing up to 255 shows, it uses any standard Sd or SdHC flash card. For triggering those shows, there are four optically isolated inputs, or the RS-422 networkable serial port can be used.

The outputs on the Br-ANA can be set to use either eight or twelve bits of resolution. They are designed to be used as stand-alone show controllers, as a 'master' sending data to other devices that act as 'slaves' on a DMX-512 network, or as 'slaves' themselves, receiving DMX-512 data from a 'master' elsewhere on the DMX-512 network:

- 1) **Br-ANA running standalone or acting as a 'Master'**: In this mode of operation, data for the outputs is stored in the standard Sd or SdHC flash card.

The Br-ANA when running standalone or acting as a 'Master' can use one of two sources for the frame rate clock:

- a) **Br-ANA in 'Dumb' Brick Mode:**

Switch #4 must be in the 'Dumb' Brick position to operate as a 'Dumb' Brick. There should never be both 'Smart' and 'Dumb' Bricks in the same card cage. Damage may result if there are.

When in 'Dumb' Brick mode, the shows can be triggered by the four switch closure inputs, low speed RS-422 serial port inputs, or shows can be set to run continuously. The clock source for all shows once they are started is the high accuracy crystal oscillator (+/- 25 PPM) on the Br-ANA.

Multiple 'Dumb' bricks can be triggered simultaneously, but this is not generally recommended as a way to synchronize multiple units. The far better way of synchronizing is by sending data stored on the designated 'master' to all the 'slaves' attached to a DMX-512 network.

This Br-ANA acts just like any other Playback-Only 'Dumb' Brick, playing animation data from the Sd Flash card. The Br-ANA can be set to start and play a show at power up, or only play when triggered to do so. The Br-ANA then uses the show data stored in the Flash Memory to update its analog and DMX-512 outputs at the appropriate frame rate.

- b) **Br-ANA in 'Smart' Brick Mode:**

Switch #4 must be in the 'Smart' Brick position to operate as a 'Smart'

¹ The Z-Brick connector is a legacy connection. It is there just for backwards-compatibility on existing systems. It is highly recommended that you do not use the Z-Brick connector for attaching Z-Bricks. Instead, just send DMX-512 to them just as you would for any other GilderGear. The Z-Brick connector will likely not be installed unless specifically requested on new builds of Br-ANAs.

Brick. There should never be both 'Smart' and 'Dumb' Bricks in the same card cage. Damage may result if there are.

A 'Smart' Brick system is used when you need to synchronize any number of 'Bricks' together on a 'Smart' Brick Network under the control of a single 'Smart' Brick Brain. The Brain itself allows shows to be triggered at specific times of the day using a real time clock and the Brains' 365 day schedule, and locked (synchronized) to Smpte time code, LaserDisks and DVDs, or the Brains' own internal or external clock. A single Brain and 'Smart' Brick network can run a single time line at one time.

This Br-ANA acts just like any other Playback-Only 'Smart' Brick, playing animation data from Sd or SdHC flash cards. As a 'Smart' Brick, it requires a 'Smart' Brick Brain to run. The 'Smart' Brick Brain tells all the 'Smart' Bricks attached to it (including the Br-ANA) where in the show it is. The Br-ANA then uses this information to access the AutoDownload file stored on the Sd or SdHC flash card and play back the show.

2) **Br-ANA as a 'Slave'**: In this mode the Br-ANA receives data from an external source and uses this data to update its outputs. Data can come from:

- a) RealTime serial updates from a Pc•MACs programming system through the RS-422 serial port. Up to sixteen eight-bit wide channels of animation control data can be received through the serial port at 9600 baud. The Br-ANA can be addressed to use any address from 0 to 15 for RealTime serial data.
- b) DMX-512 data from a Pc•MACs programming system (or any other source of DMX-512). Up to 512 eight-bit wide channels of animation control data can be received through the DMX-512 port. The Br-ANA can be addressed to use any DMX-512 address from 0 to 511. The DMX-512 input allows the Br-ANA to be used as a permanent 'slave' as a part of a larger Control System. If the incoming DMX-512 contains GilderChecksums, the Br-ANA will automatically update only on valid data packets, and reject any frames with bad or missing checksums in it.

The animation sequence which is to be used on the Br-ANA is generated on a PC•MACs Animation Control System. During programming, the DMX-512 or serial port RealTime updates can be used so that you can see the animation sequence as it is programmed. Once programming is completed and your show(s) are saved to disk, the data is downloaded to the Sd/SdHC onboard the Br-ANA. It is generally much faster and

easier to save the completed shows' AutoDownload file to your computer's hard drive, then drag-n-drop the AutoDownload file onto the Sd/SdHC flash card which is then plugged into the Br-ANA. You may choose to also include the .SET, .SHO, .STE and other files on the flash card as well, but the only file the Br-ANA actually reads is the AutoDownload (.A00) file.

On the Br-ANA, sixteen channels of data are converted to the individual 0-10 volt analog outputs. If twelve bit resolution has been selected for the outputs, then twenty-four channels of DMX-512 data are converted to individual 0-10 volt analog values. The first 256 channels of data are also transmitted through the Z-Brick output ².

The analog outputs of the Br-ANA are oversampled for ultra-smooth outputs, typically to four times the current frame rate. This means that even with eight bit resolution data arriving at 30 FPS, the outputs will have four sub-frame outputs at 12 bit resolution at 120 Hz between each full frame of data that arrives.

The analog and PCM outputs' range can be scaled or even reversed without affecting the resolution of the outputs. For the analog outputs, this means that each end of the analog output can be limited to anywhere between zero and ten volts. This allows you to limit the range of travel of an analog movement, usually without losing any resolution on the output.

All 512 channels of data are transmitted through the DMX-512 output on a Br-ANA, including those channels it is using for its own analog outputs. The DMX-512 output can be used to control other GilderGear, light dimmers, automated spotlights, color changers, fog and wind machines, or any other pieces of equipment which will accept standard DMX-512. If there are less than 512 channels of data in the shows, channels past the last channel are sent as 'zeros'. If you are transmitting DMX-512 data with Gilder-Checksums, you will want to avoid addressing dimmers and other devices to the same addresses that are used for the checksums (257 and 258).

The Br-ANA can be mounted in one 1" wide slot in any of our Brick Card cages. The Br-ANA can be used in conjunction with any selection of 'Smart' Bricks, 'Smart' Brick Brains, Electronic FeedBack (EFB) 'Smart' Bricks and Z-Bricks in the same card cage. Card cages with one, two, three or sixteen slots are available. The card cages provide all the connections for power supply, control signals and outputs that any Brick card will need. Several different styles of output connectors are available on the one and two slot card cages. The sixteen slot card cage mounts in seven inches of standard 19" rack space (4-1/2 " of space behind the panel). In some applications you may need to mount

² The Z-Brick connector is a legacy connection. It is there just for backwards-compatibility on existing systems. It is highly recommended that you do not use the Z-Brick connector for attaching Z-Bricks. Instead, just send DMX-512 to them just as you would for any other GilderGear. The Z-Brick connector will likely not be installed unless specifically requested on new builds of Br-ANAs.

a single Br-ANA. This can be done by mounting the Br-ANA on standoffs, and connecting to the Br-ANA's edge connector with a mating connector. We usually recommend a sixty position insulation displacement connector for this type of installation.

Power requirements for Br-ANAs are 15 to 24 VDC. This is needed to allow some 'head room' for the circuitry to output the 0-10 volt levels. The actual current requirements are determined by the loads attached to the unit (up to 50 ma. per output). The Br-ANA itself draws approximately 200 ma..

The revision 4.nn Br-ANA is an upgrade from all earlier version of the Bs-ANA and Br-ANA. The chief differences are:

- 1) Standard removable Sd or SdHC flash cards are now used for show data storage.
- 2) Supports a full 512 channel DMX-512 universe on input or output
- 3) Supports v1.1 AutoDownload files
- 4) Automatic recognition and support for GilderChecksums
- 5) Field upgradable firmware. Updates can be installed by just putting the firmware file onto the Sd card and inserting it into the Br-ANA

Customized front panel artwork is available on all GilderGear, including the Br-ANA. These can be custom branded, or labeled for specific installation names. Please contact the Gilderfluke & Company factory for details on generating custom Br-ANA labels.

Br-ANA Panel Indicators

There are forty-six LED indicators on the front of the Br-ANA. They are used as follows:

A) Output Fuse Indicators

(Four Green LEDs)

These four LEDs are lit unless one of the four PTC fuses has been tripped by an overload on the J6/A output cable.

B) Output Level Indicators

(Sixteen Red LEDs)

These sixteen red LEDs show the output level on all sixteen of the 0-10 volt outputs. You will see these LEDs fade in and out as the signals on the outputs change.

Very low levels may not be indicated accurately on the LEDs:

- a) If the negative reference is tied to ground, the LEDs will not begin to glow until the output gets above about 1.75 volts.
- b) If the negative reference is not grounded, there may be a slight glow even when the outputs are sending out a zero voltage signal. There can also be a slight crosstalk in the LEDs as their neighbors brighten and dim. This is only on the indicators. The actual outputs do not cross talk.

C) J8 Input LEDs

(Four Green LEDs)

These LEDs indicate the status of the four optically isolated trigger inputs on the Br-ANA. They are on the isolated side of the optoisolators. If they are not on when you send a trigger to the Br-ANA, then there is an external wiring problem, the 'internal/external' power switch needs to be changed for your wiring setup, or the optoisolator has been damaged.

D) Busy LED

(One Red LED)

This LED turns on when the Br-ANA is writing to the Sd card. The Sd card, or power to the Br-ANA should not be removed if this LED is lit.

During firmware updates, the Read LED and Busy LED flash back and forth. The first stage is comparing the BRANA400.FRM file on the Sd card. It then flashes a little slower as it reads the BRANA400.FRM file in from the Sd card. It then flashes back and forth much more quickly as it reprograms the microcontroller in the Br-ANA. Under no circumstances remove power from

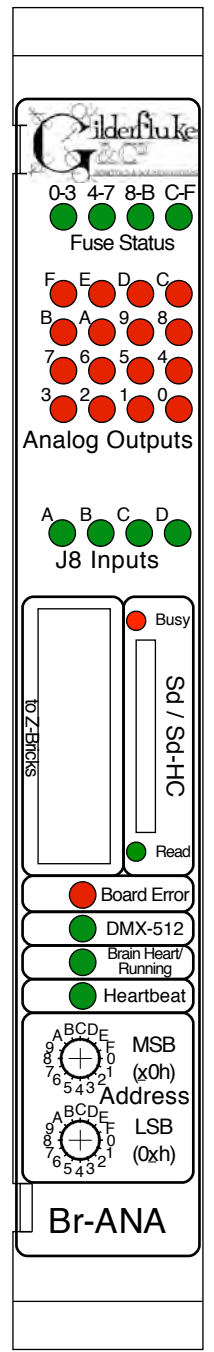
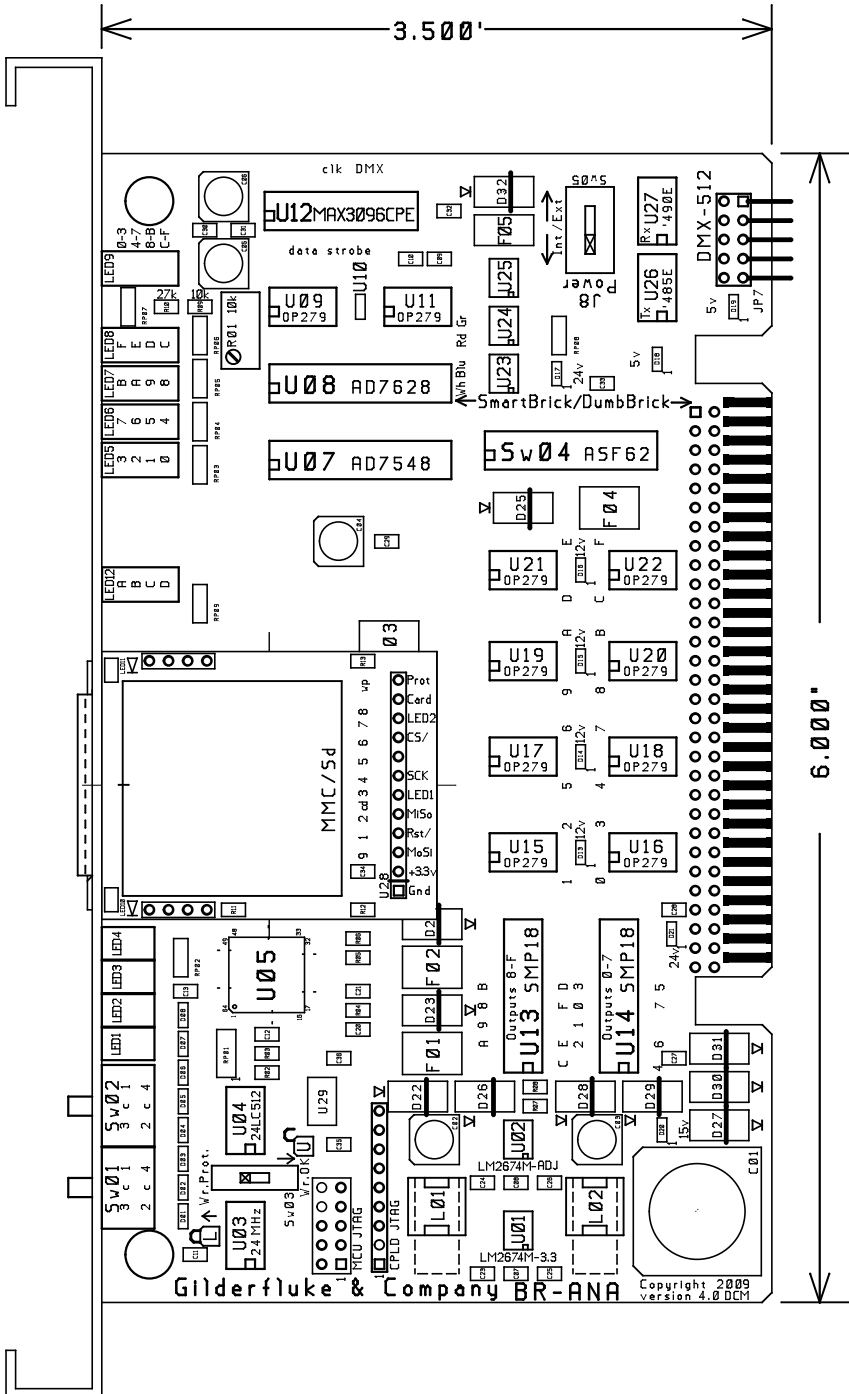
the Br-ANA while firmware is being updated. A partial firmware update may 'brick' the Br-ANA, and then it will need to be returned to the factory for reprogramming.

E) Read LEDs

(One green LED)

This LED turns on when the Br-ANA is reading data from the Sd card. If you have an AutoDownload file stored on the Sd card, this LED will be lit even when no shows are running. This is because there are always updates being made on the outputs, even when the shows are stopped.

During firmware updates, the Read LED and Busy LED flash back and forth. The first stage is comparing the BRANA400.FRM file on the Sd card. It then flashes a little slower as it reads the BRANA400.FRM file in from the Sd card. It then flashes back and forth much more quickly as it



reprograms the microcontroller in the Br-ANA. Under no circumstances remove power from the Br-ANA while firmware is being updated. A partial firmware update may 'brick' the Br-ANA, and then it will need to be returned to the factory for reprogramming.

F) Board Error LED

(One Red LED)

This LED will flash when:

- a) Br-ANA just booted (it stays on for a few seconds after booting as a 'lamp test'.
- b) An error is found in the DMX-512 data checksum
- c) An error is found in the 'Smart' Brick Network checksum

G) DMX-512 LED

(One Green LED)

This LED will be lit when the Br-ANA is receiving DMX-512 or RealTime updates via the RS-422 serial port.

During AutoDownloads of show data to the Br-ANA, this LED will flash alternately with the Brain Heart/Running LED to show that a AutoDownload is in process.

H) Brain Heart/Running LED

(One Green LED)

- a) 'Smart' Brick mode: The heartbeat from the 'Smart' Brick Brain is transmitted throughout the system over the 'Smart' Brick Network. The presence of a healthy heartbeat means that the data on the 'Smart' Brick Network is getting through cleanly. If it ever stutters or flashes erratically (or not at all), then there is a problem with the 'Smart' Brick Brain, the 'Smart' Brick Network, or the Br-ANA. As the DMX-512 takes precedence over the 'Smart' Brick Network, this LED will go dark whenever a DMX-512 signal is present.
- b) 'Dumb' Brick mode: This LED will be lit when the Br-ANA is running a show from its internal clock and Flash memory.

During AutoDownloads of show data to the Br-ANA, this LED will flash alternately with the DMX-512 LED to show that a AutoDownload is in process.

I) Heartbeat LED

(One Blue LED)

- a) This LED Flashes continuously while the CPU is running. If it ever stops for more than a fraction of a second, the 'Deadman' circuit in the Br-ANA will automatically reset the CPU. While performing an Ease-In, the heart rate will double.

Br-ANA Connectors

A) Z-Brick ³

(One Twenty Pin IDS Header)

This connector is used to control one or more Z-Bricks. When enabled, the Br-ANA outputs data from the DMX-512 input or onboard Flash Memory to this connector. The format of the data is as follows:

IDS pin #	SIGNAL
1	Data bit 0
2	Data bit 1
3	Data bit 2
4	Data bit 3
5	Data bit 4
6	Data bit 5
7	Data bit 6
8	Data bit 7
9	Address bit 0
10	Address bit 1
11	Address bit 2
12	Address bit 3
13	Address bit 4
14	Address bit 5
15	Address bit 6
16	Address bit 7
17	ground
18	ground
19	Strobe/
20	Reset/

When the address and data lines are valid, the rising edge of the Strobe line will latch the data into the addressed outputs.

³ The Z-Brick connector is a legacy connection. It is there just for backwards-compatibility on existing systems. It is highly recommended that you do not use the Z-Brick connector for attaching Z-Bricks. Instead, just send DMX-512 to them just as you would for any other GilderGear. The Z-Brick connector will likely not be installed unless specifically requested on new builds of Br-ANAs.

B) Sd/SdHC Flash Memory Card Slot

(One Sd/SdHC compatible socket)

This socket is compatible with both standard Sd flash cards and SdHC flash cards. It will support flash cards up to 32 GBytes in size. It will not currently support SdXC cards (64 GBytes and larger, as these require licensing from Microsoft).

C) Backplane Connector

(60 Position Edge Connector)

The BackPlane connection is through a sixty position double sided edge connector (thirty connections on each side on .1" centers). This is normally plugged into a card cage which brings out all the backplane connections to screw terminals, ribbon cable connectors, and other connectors. If needed, an Insulation Displacement Edge (IDE) connector or other discrete edge connector can be used to plug in the Br-ANA instead of one of our card cages.

The first ten positions of the sixty position backplane connector are used for the 'Smart' Brick Network and J8 connection ('Smart' Brick Network or optically isolated triggers, Depending on the position of Switch #4 the 'Smart/Dumb Brick Switch') and RS-422 Serial Port. They are normally bussed between all the cards in the card cage (although they can be separated by cutting the lines if desired). The card cages all bring the first ten positions of the 60 position backplane connector out to Rj-12/Rj-45 connectors.

The majority of connections are on the center forty pins of the backplane connector. What these are used for depends on the type of card that is plugged into the card cage slot. A Z-Brick or Br-MultiBrick32 uses them for 'J6' digital outputs. A Br-ANA uses these pins for its 'J6/A' analog outputs. A Br-ANA uses them for a combination of inputs and outputs. The card cages bring out these forty connections to either a forty position screw terminal block, a forty position ribbon cable connector, or both.

The last ten positions are used to provide power to the Br-ANA. These wires are ganged to provide a higher current carrying capacity, and brought out to screw terminals and/or 2.1mm power jacks on the card cages.

The pinout of the sixty position backplane connector is as follows:

output wire #	J6/A pin #	Edge pin #	color	wire function
J8/BrickNet Black		1	brown	J8 Common (black)/Smart Brick Net Data -
J8/BrickNet White		2	red	J8 'D' (white) input/'Smart' Brick Net Data +
J8/BrickNet Red		3	orange	J8 'B' (red) input/'Smart' Brick Net Clock +
Serial Port red #3		4	yellow	TxD + out from Br-ANA
J8/BrickNet Green		5	green	J8 'A' (green) input/'Smart' Brick Net Clock -
Serial Port Black #2		6	blue	TxD - out from Br-ANA
J8/BrickNet Yellow		7	violet	J8 Status (yellow) out/'Smart' Brick Strobe +
Serial Port Yellow #5		8	gray	Rx + in to Br-ANA
J8/BrickNet Blue)		9	white	J8 'C' (blue) input/'Smart' Brick Net Strobe -
Serial Port green #4		10	black	Rx -in to Br-ANA
J6/A #1	1	11	brown	circuit ground
J6/A #2	2	12	red	+ power output (protected to 1 amp)
J6/A #3	3	13	orange	Output 15 (0Fh) Positive Analog Output
J6/A #4	4	14	yellow	Output 15 (0Fh) Negative Reference
J6/A #5	5	15	green	Output 14 (0Eh) Positive Analog Output
J6/A #6	6	16	blue	Output 14 (0Eh) Negative Reference
J6/A #7	7	17	violet	Output 13 (0Dh) Positive Analog Output
J6/A #8	8	18	gray	Output 13 (0Dh) Negative Reference
J6/A #9	9	19	white	Output 12 (0Ch) Positive Analog Output
J6/A #10	10	20	black	Output 12 (0Ch) Negative Reference
J6/A #11	11	21	brown	circuit ground
J6/A #12	12	22	red	+ power output (protected to 1 amp)
J6/A #13	13	23	orange	Output 11 (0Bh) Positive Analog Output
J6/A #14	14	24	yellow	Output 11 (0Bh) Negative Reference
J6/A #15	15	25	green	Output 10 (0Ah) Positive Analog Output
J6/A #16	16	26	blue	Output 10 (0Ah) Negative Reference
J6/A #17	17	27	violet	Output 9 (09h) Positive Analog Output
J6/A #18	18	28	gray	Output 9 (09h) Negative Reference
J6/A #19	19	29	white	Output 8 (08h) Positive Analog Output
J6/A #20	20	30	black	Output 8 (08h) Negative Reference
J6/A #21	21	31	brown	circuit ground
J6/A #22	22	32	red	+ power output (protected to 1 amp)
J6/A #23	23	33	orange	Output 7 (07h) Positive Analog Output
J6/A #24	24	34	yellow	Output 7 (07h) Negative Reference
J6/A #25	25	35	green	Output 6 (06h) Positive Analog Output
J6/A #26	26	36	blue	Output 6 (06h) Negative Reference
J6/A #27	27	37	violet	Output 5 (05h) Positive Analog Output
J6/A #28	28	38	gray	Output 5 (05h) Negative Reference
J6/A #29	29	39	white	Output 4 (04h) Positive Analog Output
J6/A #30	30	40	black	Output 4 (04h) Negative Reference

output wire #	J6/A pin #	Edge pin #	color	wire function
J6/A #31	31	41	brown	circuit ground
J6/A #32	32	42	red	+ power output (protected to 1 amp)
J6/A #33	33	43	orange	Output 3 (03h) Positive Analog Output
J6/A #34	34	44	yellow	Output 3 (03h) Negative Reference
J6/A #35	35	45	green	Output 2 (02h) Positive Analog Output
J6/A #36	36	46	blue	Output 2 (02h) Negative Reference
J6/A #37	37	47	violet	Output 1 (01h) Positive Analog Output
J6/A #38	38	48	gray	Output 1 (01h) Negative Reference
J6/A #39	39	49	white	Output 0 (00h) Positive Analog Output
J6/A #40	40	50	black	Output 0 (00h) Negative Reference
		51	black	power supply ground
		52	black	power supply ground
		53	black	power supply ground
		54	black	power supply ground
		55	black	power supply ground
		56	red	+ power supply input
		57	red	+ power supply input
		58	red	+ power supply input
		59	red	+ power supply input
		60	red	+ power supply input

The card cages from Gilderfluke & Company are available in a variety of sizes to hold between one to sixteen cards. Some of these card cages are designed to be mounted in standard 19" electronics racks. Others are designed to be mounted standalone, on DIN rail or in Augat SnapTrak. The smaller card cages bring out the center forty connections of the sixty position backplane connector to either a forty position screw terminal block, a forty position ribbon cable connector, or both. The Br-CC16 (sixteen slot) and Br-CC09 (two slot) rack mounted card cages have only ribbon cable connectors on them, but we have cc-BR16BO spring blocks that can mount directly to the back of these card cages for attaching discrete wires. More commonly the ribbon cables are run to a rail at the back of the rack or a nearby 'break out box', and c-40trans ribbon cable-to-screw terminal connectors are mounted there allow discrete wires to be attached.

In all the animation systems made by Gilderfluke & Company, all Analog input and output cabling is through what we call 'J6/A' standard output ribbon cables ⁴. These are forty wire ribbon cables which are made up of four

⁴ Please note that the pinout of a J6 Digital output cable and a J6/A Analog output cable is completely different. Do not cross connect any analog and digital cables. Damage can (and probably will) result.

identical four channel wide cables of ten wire each. These split individual cables called 1/4 J6/A. Each 1/4 J6/A also includes a common power supply and ground wire which allow it to provide power for analog output accessories like Electronic FeedBack (EFB) controllers (these cards require a power supply of 18 volts be used for the Br-ANA).

To simplify wiring to any MACs Animation Control System, the connectors used on the J6/A cables are what are called 'insulation displacement connectors'. These simply snap on to an entire cable, automatically 'displacing' the insulation and making contact with the wires within. This means that an entire forty wire cable can be terminated in seconds. All connectors are polarized, to keep them from being plugged in backwards.

Analog loads are connected between each of the Positive outputs and its associated Negative reference. The output capacity of each output is 50 ma. The output voltage range can be adjusted from the Br-ANA to anywhere between 0 and 10 volts.

The negative reference is at a voltage of approximately 1.6 volts above the circuit ground. The negative references are all connected on the Br-ANA, but not to ground. On versions of the BS-ANA prior to 3.0, there could be no direct connections made between any of the negative references and the circuit grounds anywhere in the animation system. Starting with version 3.0 of the Br-ANA, connecting ground to the negative references is recommended unless you have an older EFB-Quad or PID-Quad that requires the negative reference.

The '+ unregulated power output' for each 1/4 J6/A is protected by a solid state circuit breaker (PTC Fuse) rated for 1 amp. You should treat each 1/4 J6/A as an individual, and not cross the outputs or power output lines from one 1/4 J6/A to the lines from another. Doing this won't cause any damage, but can reduce the protection for the outputs that the circuit breakers normally provide. The 'Output Fuse' LEDs on the front of the Br-ANA show the condition of each of the PTC fuses. Each of these is a LED and resistor between the ground (pin #1 brown) wire and power output (pin #2 red) wire. Each of these will be lit if the corresponding circuit breaker is OK. The resistor is 4.7 Kohms.

D) 'Smart' Brick Network (on Card Cage)

(RJ-12 or RJ-45 Connector)

If Switch #4 is in the 'Smart' Brick position, the Br-ANA will be operating

as a 'Smart' Brick. The 'Smart' Brick Network normally found on a 'Smart' Brick is brought out on the edge connector. When plugged into any Gilderfluke & Co. Brick card cage, this will be brought out on a RJ-12 (or RJ-45⁵) connector on the card cage. There should never be both 'Smart' and 'Dumb' Bricks in the same card cage. They share the same pins on the edge connector and backplane. Damage may result if both are installed in the same card cage.

The 'Smart' Brick Network signals to the Br-ANA are brought in through a six position RJ-12 (six position, six conductor modular telephone style connector) on the card cage. Facing either end of the cable with the release latch upwards, its pin out is as follows:

POSITION	WIRE #	COLOR	SIGNAL NAME:
LEFT	1	white	Smart Brick Net Data +
	2	black	Smart Brick Net Data -
	3	red	Smart Brick Net Clock +
	4	green	Smart Brick Net Clock -
	5	yellow	Smart Brick Net Strobe +
RIGHT	6	blue	Smart Brick Net Strobe -

E) 'J8' Inputs (on Card Cage)

(RJ-12 or RJ-45 Connector)

If Switch #4 is in the 'Dumb' Brick position, the Br-ANA will be operating as a 'Dumb' Brick. The trigger inputs and status output normally found on a 'Dumb' Brick are brought out on the edge connector. When plugged into any Gilderfluke & Co. Brick card cage, this will be brought out on a RJ-12 (or RJ-45)⁶ connector on the card cage. There should never be both 'Smart' and 'Dumb' Bricks in the same card cage. They share the same pins on the edge connector and backplane. Damage may result if both are installed in the same card cage.

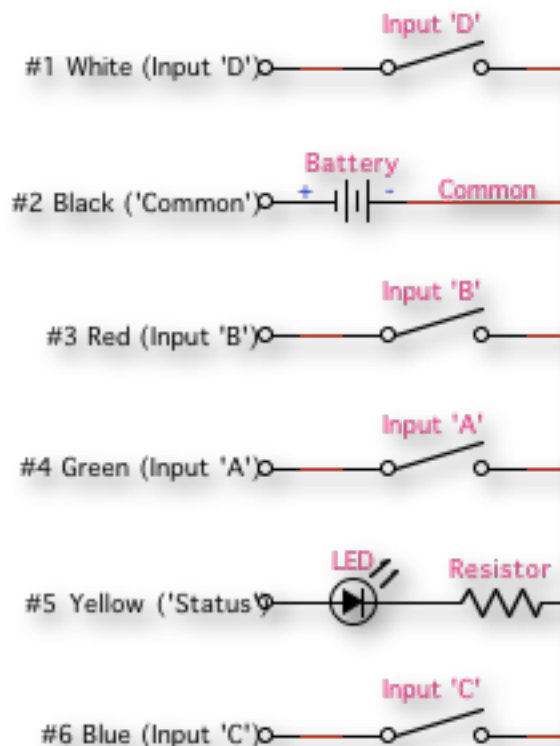
⁵ If the card cage has a RJ-45 connector, just ignore the outer two wires. The center six wires are wired as shown for the RJ-12 connector.

⁶ If the card cage has a RJ-45 connector, just ignore the outer two wires. The center six wires are wired as shown for the RJ-12 connector.

There are four optically isolated digital inputs which can be used to start, stop, pause or select specific show sequences to play. Facing the end of the wire, with the latch upwards, the pinout of a standard 'J8' cable is as follows:

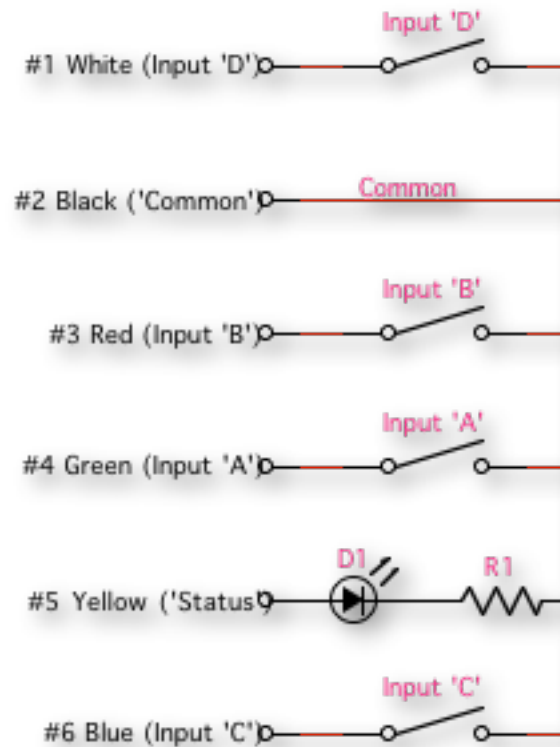
POSITION	WIRE #	COLOR	SIGNAL NAME:
LEFT	1	white	Input 'D'
	2	black	Common
	3	red	Input 'B'
	4	green	Input 'A'
	5	yellow	Status Out
RIGHT	6	blue	Input 'C'

Any event can be triggered on either the 'closing' or 'opening' edge of any input. A 'closing' is when a current starts flowing out of an input. An 'opening' is when that current stops. The inputs can be triggered on any voltage from 5 to 24 VDC. Although a battery is shown in the following drawing, you can use any type of power supply.



J8 with External Power

If you don't have an external source of power for these two inputs, you can 'steal' some juice from the Br-ANA's power supply connections by putting the 'J8 Power' switch in the 'Internal' position.



J8 with Internal Power

F) Power Supply (on Card Cage)

(Two Position Screw Terminals and/or 2.1mm Power Connector)

The last ten contacts of the Br-ANA's edge connector are used for the power supply connections. The Br-ANA can be run from any supply voltage from 17-24 VDC. Any lower than this and the card will not have the headroom when the outputs to reach all the way to 10 Volts. You can see the effects of a too low voltage power supply if the outputs do not reach all the way to 10 volts, or have an excessive ripple in them when they get near to 10 volts.

This input is protected from reversed polarity. An idle Br-ANA draws only about 150 milliamperes. The loads which the Br-ANA is controlling and the LEDs on its face will usually draw far more current than the Br-ANA itself.

G) RS-422 Serial Port (on Card Cage)

(RJ-12 or RJ-45 Connector)

This is used for configuration, uploading and downloading configurations, status enquiries, AutoDownloading show data to Flash memory, and serial port RealTime updates. It is compatible with all the RS-422 Serial Ports and protocols used on Gilderfluke & Company products.

The four active lines on this connector are bussed to the backplane of the card cage. This allows you to communicate to a whole card cage full of Br-ANAs, 'Smart' Brick Brains, Electronic FeedBack (EFB) 'Smart' Bricks and other cards through the connector on the card cage. They just need to be set to different addresses.

The serial data signals from the Br-ANA are brought out on a six position RJ-12 (six position, six conductor modular telephone style connector) on the card cage. Facing the end of the cable with the release latch upwards, its pin out is as follows:

POSITION	WIRE #	COLOR	SIGNAL NAME:
LEFT	1	white	Signal Ground
	2	black	- Serial data out from card
	3	red	+ Serial data out from card
	4	green	- Serial data in to card
	5	yellow	+ Serial data in to card
RIGHT	6	blue	Ground

Computers don't normally come with serial ports on them anymore. Instead, you use a USB-to-Serial ([USB-RS232/422](#) or [C-USB-RS232](#)) adapter, BlueTooth-to-Serial ([Bt-Rs232Rx](#) and [Bt-USBTx](#)), Ethernet-to-Serial ([Modem-Internet](#)) adapter, or WiFi-to-Serial ([Modem-Wi-Fly](#)) adapter. For the Br-ANA you will need one that provides a RS-422 connection, instead of the more common RS-232. These are available from a number of different sources, including Gilderfluke & Company. Our part number is [USB-RS232/422](#) for the USB-to-Serial adapter. It provides both RS-232 and RS-422 connections.

The Br-ANA expects to see the serial data in the following format:

**ONE START BIT
EIGHT DATA BITS
ONE STOP BIT**

Br-ANA responds appropriately to all commands which are used by other Gilderfluke & Co. serially controlled devices. These are used for configuration, uploading and downloading configurations, status enquiries, AutoDownloading show data to Flash memory, and serial port RealTime updates. It will ignore all commands which are not addressed to it, or not appropriate for it to respond to. This allows it to share the same RS-422 serial buss with additional Br-ANAs, Digital Audio Repeaters, 'Smart' Brick Brains and any other serially controlled devices. The only requirement is that each unit be addressed to a unique serial address. On the Br-ANA, the serial address is set using the two rotary switches on its front.

H) DMX-512 Data In/Out (on Card Cage)

(Ten pin Male header on Br-ANA)

(Five Position Screw Terminal)

DMX-512 is received through the ten pin male header on the Br-ANA. The card cage will route this from the five position screw terminal(s) on the card cage. This is identical to the DMX-512 reception on all other Gilderfluke & Company card cage mounted controllers.

The Br-ANA will stop listening to the 'Smart' Brick network and stop playing shows from the onboard Sd card memory whenever there is a DMX-512 signal present on this input. The DMX-512 input takes precedence over all other connections on the Br-ANA.

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.

All of the equipment on the DMX-512 network can be in one cabinet or control room, but are more commonly distributed throughout the installation. This allows the individual controllers to be prewired to whatever they are controlling and completely pretested before the installation even starts. During installation, instead of running hundreds (or thousands) of wires to each control point, a single DMX-512 network is daisy-chained through each local controller.

A DMX-512 network can be as long as a mile, or as short as a few inches. The DMX-512 network needs to be one long line, with no long side branches. If the network is longer than a few feet, you may need to provide a terminating resistor at the two far ends of the network (120Ω, ½ Watt is typically used). The resistors suppress ‘echos’ on the DMX-512 wires.

If the network runs throughout a facility, it is prudent to use some isolated splitters. These will keep an electrostatic zap or lightning hit on the network from damaging the entire network. An isolated splitter also allows you to run side branches on the network, since each isolated branch is treated as a separate DMX-512 network (daisy chained from DMX-512 ‘Slave’ to ‘Slave’, it can be run up to a mile, and may need its own termination resistors).

Addresses 256 and 257 are optionally used in GilderGear for transmitting a checksum. The Br-ANA 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. Most GilderGear will automatically start requiring GilderChecksums after receiving DMX-512 that has GilderChecksums in it. Once it starts requiring GilderChecksums, the only way to get the Br-ANA to stop requiring it is to cycle power on the Br-ANA.

Note that at higher frame rates, not all 512 channels can be transmitted through DMX-512. This is why it is unusual to run shows over 30 FPS.

The typical wires used for carrying a DMX-512 network are a single shielded twisted pair or wires. For short runs, just about any ‘microphone cable’ can be used. For longer runs, a low capacitance twisted pair is recommended. Recommended wires include:

Manufacturer	Part #	Gauge	Wire Stranding
Belden	3105A	22 AWG	7 x 30
Belden	3106A	22 AWG	7 x 30
Belden	9841	24 AWG	7 x 32
Belden	7200A	24 AWG	41 x 40 (high flexibility)
Proplex	PC222P	22 AWG	19 x 34
Dataplex	WDP222TBK	22 AWG	16 x 0.2mm

Recent revisions of the DMX-512 standards have included specifications for running raw DMX-512 signals through standard Cat-5 (or better) ethernet cables. The recommended pinout is as follows:

Pair	Wire #	Color	Function	DMX-512 Pin
Pair 2	1	White / Orange	Data 1+	DMX-512 Pin 3
	2	Orange	Data 1-	DMX-512 Pin 2
Pair 3	3	White / Green	no connection	no connection
	6	Green		
Pair 1	4	Blue		
	5	White / Blue		
Pair 4	7	White / Brown	Signal Common	DMX-512 Pin 1
	8	Brown		
Shield		Drain		

The DMX-512 standard calls out a 5 pin XLR connector or screw terminals for all connections. All card cages will provide either screw terminals or other appropriate connection for attaching the DMX-512 input and output.

Br-ANA Hardware Configuration

There are only a hand full of switches and a single trimpot which can be used to configure the Br-ANA. Once these are set, you will probably never need to adjust them again. Most of the configuration is done through the Software Configuration, which is described in the following section.

A) Address

(Two Rotary Switches)

These two rotary switches on the front of the Br-ANA are used to set the DMX-512 address for the outputs and the location on the RS-422 serial port where this card will be found. Normally, only one Br-ANA (or other) card is set to use any one address. If more than one card is set to the same address, then the serial ports cannot be attached to the same RS-422 multi-drop network at the same time. Overlapping addresses won't cause any damage, but you will get garbled data as both cards try to respond to the same configuration commands.

If no AutoDownload file has been sent to the Br-ANA, then the Br-ANA will default to using the address set by these switches as the DMX-512/Serial RealTime address for the outputs as well as the RS-422 serial address. Normally the DMX-512/Serial RealTime address of the outputs is set by the AutoDownload file which has been sent to the card.

An option under the configuration menu allows you to choose these switches, the address found in the AutoDownload file, or an arbitrary address you set for the address of the first output of the Br-ANA.

The RS-422 serial address for the Br-ANA is set using Hexadecimal numbers on these switches. The first digit of the Hexadecimal address is set on the upper of the two switches. The second digit of the hexadecimal address is set on the lower of the two switches. If you are not sure how these translate from decimal numbers, a chart at the end of every Gilderfluke & Company manual will show you the equivalent numbers.

B) Write Protect Switch

(Slide Switch)

When this switch is 'Write Protect' position, the Br-ANA will protect the onboard flash memory and configuration EEPROM from accidental altera-

tions. With the switch in the 'Write OK' position, reads and writes can take place normally. This switch must be in the 'Write OK' position for shows to be downloaded via the serial port to the Br-ANA. With the memory write protected, the Br-ANA should retain whatever has been programmed into it for at least forty years.

C) Smart' Brick/'Dumb' Brick Select

(Slide Switch)

This switch tells the Br-ANA whether the Br-ANA is going to be acting like a 'Dumb' Brick or a 'Smart' Brick'. When acting as a 'Dumb' Brick, the Br-ANA will be triggered to play shows by the four optically isolated 'J8' trigger inputs. When acting as a 'Smart' Brick, The Br-ANA will lock to and follow time code information send to it through the 'Smart' Brick Network from the 'Smart' Brick Brian.

A single card cage should not have both 'Smart' and 'Dumb' Bricks installed in the same card cage. Damage may result if there are.

This switch actually switches the six wires that connect to the backplane of the Br-ANA between the optoisolators used for 'Dumb' Bricks and the RS-422 receivers used for 'Smart' Bricks. If you plug a Br-ANA which has been configured to act as a 'Smart' Brick into a slot that has been configured for a 'Dumb' Brick, you risk damaging the RS-422 receivers.

The Br-ANA doesn't actually believe that it has been set to act as a 'Smart' Brick until it receives a valid message through the 'Smart' Brick Network. In the unlikely event that you switch from 'Smart' Brick to 'Dumb' Brick mode while a Br-ANA is running, there will be a delay of ten seconds or so before it starts acting as a 'Dumb' Brick.

D) J8 Power

(Slide Switch)

If the Br-ANA is acting as a 'Dumb' Brick, then this switch is used to select whether the 'J8' power for the optoisolators is provided by the same power supply as the Br-ANA, or is provided by an external isolated source. When operating as a 'Smart' Brick, this switch has no effect. See the ['J8' instructions](#) for more details on this.

E) Full Scale Adjust

(Ten Turn Trimpot)

The ten turn pot R1 is the one adjustment on the Br-ANA. It sets the gain for the Digital to Analog (D/A) converters on the board. It is set at the factory, and should never need any adjustment after that. To set it, pick any output and set the minimum and maximum scaling to their minimums and maximums through the configuration screen. When you send a full scale output command to this output, you should then be able to adjust it for 10.00 volts using The 10 turn pot R1. The adjustments for the endpoints on each of the sixteen outputs are individually set through the setup screen.

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Br-ANA Software Configuration

The Br-ANA can be accessed through the serial port from any computer running just about any modem or terminal program. We provide a free terminal program called GilderTerm that makes working with GilderGear through the serial port a little easier. The computer you are using doesn't even need to have any PC•MACs software installed on it.

Most Gilderfluke & Co products can be controlled through their RS-232 or RS-422 Serial ports. The Br-ANA has a single RS-422 serial port on it. 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 an WiFi or Ethernet 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.

If you don't have access to GilderTerm, typical modem programs you can use are Terminal.exe (which came with Windows 3.1) and HyperTerm.exe (which comes with later versions of Windows). The terminal program must support VT-52 commands to position the cursor and clear the screen.

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 clicking on the menus.

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. To talk to the Br-ANA, just configure your terminal program for 9600 baud, no parity, eight data bits, one stop bit and no flow control handshaking.

Computers don't normally come with serial ports on them anymore. Instead, you use a USB-to-Serial ([USB-RS232/422](#) or [C-USB-RS232](#)) adapter, BlueTooth-to-Serial ([Bt-Rs232Rx](#) and [Bt-USBTx](#)), Ethernet-to-Serial ([Modem-Internet](#)) adapter, or WiFi-to-Serial ([Modem-Wi-Fly](#)) adapter. For the Br-ANA you will need one that provides a RS-422 connection, instead of the more common RS-232. These are available from a number of different sources, including Gilderfluke & Company. Our part number is [USB-RS232/422](#) for the USB-to-Serial adapter. It provides both RS-232 and RS-422 connections.

If not using GilderTerm, your terminal emulation program must support VT-52 terminal emulation to do cursor positioning, clearing the screen, and a handful of other functions. 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 Br-ANA 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 Br-ANA and short between the Tx data out and Rx data in pins on your USB-to-Serial converter. For a RS-422 port, this means temporarily shorting the Rx+ to the Tx+, and Rx- to the Tx-, so two jumpers will be needed. On the USB-Rs232/422, the pinout is as follows:

POSITION	WIRE #	COLOR	SIGNAL NAME:
LEFT	1	white	Signal Ground
	2	black	Rx- data in to Converter
	3	red	Rx+ data in to Converter
	4	green	Tx- data out of Converter
	5	yellow	Tx+ data out of Converter
RIGHT	6	blue	Ground

While still running the modem program, anything you type should be shown on the screen while these jumpers are in place, while nothing will appear when you remove them. 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 Br-ANA. If you get characters on the screen even with the jumpers 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 press the 'configure' button on GilderTerm, or type the following if you are not using GilderTerm. The (address) is replaced by the HEX value set on the ADDRESS switches on the front of the Br-ANA:

m5AA5(address)

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

For eight bit resolution outputs, the menu will appear as follows. Decimal values have been selected for the numbers. At the top of the screen the size of the Animation Data

Flash Memory installed (if any) is shown. If the Animation Data Flash Memory isn't found, then 'not found' will appear in this space at the top of the screen.

```
Gilderfluke & Co., Inc. - BR-ANA Analog Card - version 4.10 - copyright 2012 DCM
Shows: 8, Ch: 123 @__0, ADL: AutoDownload_Filename
Serial Address- __0
__1 Show_FileName.sho looping @ frame ____1363
inputs: a/green: Y | b/red: Y      MSB      E minimum maximum "forced" PowerOn
        c/blue: Y | d/white: Y    address  I  scale  scale  position default
a) 1st addr: __0 (Autodownload)    0 (0) | | ____0__ | __255__ | _____ | ____0__ |
b) twelve bit resolution- no      -> 1 (1) | Y | ____0__ | __255__ | _____ | ____0__ |
c) sequencer enabled- yes        2 (2) | Y | ____0__ | __255__ | _____ | ____0__ |
d) DMX: Tx & Rx wo/CS, ^d) 1-based 3 (3) | Y | ____0__ | __255__ | _____ | ____0__ |
e) auto EaseIn- 1.00 seconds     4 (4) | Y | ____0__ | __255__ | _____ | ____0__ |
f) numbering- decimal/millisecond 5 (5) | | ____0__ | __255__ | _____ | ____0__ |
        6 (6) | | ____0__ | __255__ | _____ | ____0__ |
j) address to test & adjust- __1   7 (7) | Y | ____0__ | __255__ | _____ | ____0__ |
k) test output- none             8 (8) | Y | ____0__ | __255__ | _____ | ____0__ |
FigureName                       9 (9) | Y | ____0__ | __255__ | _____ | ____0__ |
OutputName                       10 (A) | Y | ____0__ | __255__ | _____ | ____0__ |
        11 (B) | Y | ____0__ | __255__ | _____ | ____0__ |
u) set min/max/forced using keypad 12 (C) | Y | ____0__ | __255__ | _____ | ____0__ |
q) force output to a value       13 (D) | | ____0__ | __255__ | _____ | ____0__ |
t) set PowerOn defaults         14 (E) | | ____0__ | __255__ | _____ | ____0__ |
w) set analog endpoints         15 (F) | | ____0__ | __255__ | _____ | ____0__ |
n) Next, l) Last, i) info, o) def., p) loop, h) Halt, r) save, v) Verify, x) Xit
Command-
```

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

All numeric values are entered in HEXadecimal (0-9, A through F) or Decimal numbers (0-9), as selected on the menu. Each number consist of one or more ASCII characters followed by a <RETURN> (<ENTER> on some keyboards). If more characters have been entered before the <RETURN> than are allowed, then the characters already entered will scroll to the left to make room for the new entries. Once a command has been invoked, characters can be erased one-by-one by using the <DELETE> key (<BACK-SPACE> on some keyboards). An entire entry can be erased by hitting the <ESC>ape key. A command can be canceled altogether by hitting the <RETURN> key (<ENTER> on some keyboards) or <ESC>ape key after all the characters have been erased or before any have been entered.

Once you have configured a Br-ANA, you can 'lock' the configuration by moving the 'Write Protect' switch to the 'Write Protected' position from the 'Write Enabled' position. This should protect your configuration from anything short of a lightning hit. The menu will change to show that the Flash Memory has been protected and warn you that you

can no longer make any changes. Configuration changes can be re-enabled at any time by moving the switch back to the 'Enabled' position.

If you want to keep a hard copy printout of the current configuration of the Br-ANA, you should use the <ESC>ape key to redraw the screen while 'saving to file' in the modem program running on your computer. This file can be printed out at any time, or spliced into the documentation package for your project.

A) First Address:

The front panel switches are always used for the RS-422 Serial Port Address. This toggle selects whether the outputs' address is set from:

- 1) Address stored in the AutoDownload file. This is the Default.
- 2) Address from the Serial Port Address switches on the front of the Br-ANA. This is the default if no AutoDownload file is loaded.
- 3) Addressed at a location you specify.

If twelve bit resolution has been selected, then any 'illegal'⁷ twelve bit address will be skipped.

B) Twelve Bit Resolution:

If using a v1.1 AutoDownload file generated with Pc•MACs version 2.02.212.xxx or later, this will be set automatically for you from data in the AutoDownload file.

When toggled ON, the output resolution will be twelve bits. This works out to a resolution of one part in 4096. With a 0-10 volt output, each step will be .00244 volts. If you are using 12 bit resolution analogs, you must carefully account for the locations and number of output channels you are using. Each 12 bit resolution input takes 1-1/2 eight bit channels. The Br-ANA won't let you set the first address for a 12 bit analog channel to any address that can be evenly divided by three (0, 3, 6, 9, etc.). This is because it uses these bytes for storing the least significant four bits of the next two 12 bit resolution channels. Any 12 bit resolution channel that is addressed at an address that can be divided evenly by three plus one (addresses 1, 4, 7, 10, etc.) will need to have the previous address sent (or burnt into the Flash Memory) so that its lowest four bit nibble isn't lobbed off. Any 12 bit resolution channel that is addressed at an address that can be divided evenly by three plus two

⁷ A twelve bit value cannot be addressed at any address that can evenly be divided by three (0, 3, 6, etc.).

(addresses 2, 5, 8, 11, etc.) will need to have the previous two addresses sent (or burnt into the Flash Memory) so that its lowest four bit nibble isn't lobbed off.

C) Sequencer Enabled:

This toggle enables and disables the Br-ANA to use the Animation Data Flash Memory. When it is OFF, nothing will be output from the AutoDownload file stored on the micro Sd/SdHC flash card. Any output data must come from either the DMX-512 or Serial Port inputs. If it is ON, then the data from the AutoDownload file on the micro Sd/SdHC flash card will be sent out.

D) DMX-512 mode:

If using a v1.1 AutoDownload file generated with Pc•MACs version 2.02.212.xxx or later, this will be set automatically for you from data in the AutoDownload file.

If there isn't a v1.1 AutoDownload file being used, this command is a toggle which can be used to enable and disable the DMX-512 reception and transmission, as well as the GilderChecksums.

The GilderChecksums allow GilderGear to recognize errors in DMX-512 data. With GilderChecksums, the outputs won't be updated when a bad data packet is received. GilderChecksums should be left ON whenever sending DMX-512 to other GilderGear.

The Br-ANA, and most other GilderGear will automatically sense when it is receiving GilderCheckSums. Once it does this, the GilderGear will have to be reset before it will accept DMX-512 data without GilderCheckSums.

^d) DMX-512 Zero-Based or One-Based:

If using a v1.1 AutoDownload file generated with Pc•MACs version 2.02.212.xxx or later, this will be set automatically for you from data in the AutoDownload file.

If there isn't a v1.1 AutoDownload file being used, this command is a toggle between displaying DMX-512 addresses as 0-511 numbers, or as 1-512 numbers.

E) Auto Ease-In:

If using a v1.1 AutoDownload file generated with Pc•MACs version 2.02.212.xxx or later, this will be set automatically for you from data in the AutoDownload file.

When enabled, this feature will keep all the selected channels from jumping at a high rate of speed if:

- 1) Incoming frame number received through the 'Smart' BrickNet jumps more than five frames. (This is typically caused by discontinuous time code being received by the 'Smart' Brick Brain, or when the 'Smart' Brick Brain jumps to a different show.)
- 2) The DMX-512 data starts being received.
- 3) The DMX-512 signal drops out for more than a second.
- 4) An output is forced to a specific value.
- 5) One or more outputs are put into or taken out of the internal test mode.
- 6) At boot up as the outputs assume their default values.

This command allows you to select the amount of time any output will take to ramp from one extreme to the other and which outputs will be using the Ease-In feature. The range of time available is:

- 1) Ease-In is disabled
- 2) ¼ second
- 3) ½ second
- 4) ¾ second
- 5) 1 second
- 6) 1-½ seconds
- 7) 2 seconds
- 8) 2-½ seconds
- 9) 3 seconds
- 10) 4 seconds
- 11) 5 seconds
- 12) 6 seconds
- 13) 7 seconds
- 14) 8 seconds
- 15) 9 seconds
- 16) 10 seconds

You can tell when an Ease-In is being performed by the Heartbeat jumping to a speed twice normal. Once all outputs have dropped out of Ease-In mode, the heartbeat will return to its regular rate.

Which outputs have been set to use the Ease-In Feature is shown under the column labeled 'EI'. Outputs which will be Eased In are shown by the letter 'Y'. All other channels will be unaffected by the Ease-In.

The Ease-In only affects the sixteen on-board analog outputs from the Br-ANA. All the data output on DMX-512 or Z-Buss port to the Z-Bricks are unaffected.

F) Numbering System:

This toggle is used to select between HEXadecimal, Decimal or percentage numbering systems for display and entries. When the Br-ANA prompts you for a numeric entry, you will need to enter a HEXadecimal or Decimal number, depending on this setting.

J) Output to Test & Adjust:

This command is used to set the output address that will be used by the 'Test Output', 'Set Analog Endpoints', 'Force output to a Value', 'set Min/Max/forced using keypad', and 'set PowerOn Defaults' commands. If the output address selected is one of the sixteen on the Br-ANA, then an arrow will appear to the left of it on the screen. In the eight bit resolution example screen above you can see this arrow pointing to output #1, which happens to be addressed at address '001'. Since some of the adjustments can affect channels that are only transmitted through the DMX-512 and Z-Brick outputs, the address can be set to anywhere between 0 and 511 (or 1-512).

If the AutoDownload file is a v1.1 or later, the FigureName and Output-Name will be displayed just below the 'Test Output' command.

K) Test Output:

When toggled to 'Test One Output', the single output selected by the 'Output to Test & Adjust' command will be ramped up and down. The ramp time is about 5 seconds. The time the output dwells at each extreme is about one second.

When pressed a second time, this command will toggle to 'Test All Outputs'. All the outputs will be ramped between their two extremes. The ramp

This will automatically force the output to the 'zero' position ⁸. For cylinders and electric actuators, this is usually the fully retracted position. You can adjust the analog output to anywhere between 0 and 10 volts. If you adjust the 'minimum' to a voltage that is higher than the 'maximum', this is perfectly acceptable, and is the easiest way to reverse the motion of an actuator.

The keys are used as follows:

- 1) decrements the 'minimum' position value
- 4) sets the 'minimum' position value to 128 (50%)
- 7) increments the 'minimum' position value

Use the '2', '5' and '8' keys to adjust the 'maximum' position the for the selected analog output. This sets the voltage that will be sent out from the Br-ANA when you give it a '100%' position command through the DMX-512 or AutoDownload file. The default analog output (when set to 255/0FFh) is 10 vdc. This will automatically force the output to the '100%' position ⁹. For cylinders and electric actuators, this is usually the fully extended position. You can adjust the analog output to anywhere between 0 and 10 volts. If you adjust the 'maximum' to a voltage that is lower than the 'minimum', this is perfectly acceptable, and is the easiest way to reverse the motion of an actuator.

The keys are used as follows:

- 2) decrements the 'maximum' position value
- 5) sets the 'maximum' position value to 128 (50%)
- 8) increments the 'maximum' position value

You can then use the '-', '+', '3', '6' and '9' keys to move the analog output over the full range of output (the full range is set by the values in the 'minimum' and 'maximum' columns). You can use these keys to test your adjustments. The Br-ANA does this by using these keys to adjust the 'forced' value. When you are done adjusting this output, you will want to make sure you clear the 'forced' value, or the analog output will remain locked at the last value set in the 'forced' column. You can do this by hitting the '-' key twice, or hitting the '3' (decrement forced value) one more time after it is already at zero.

⁸ This 'forcing' feature can be toggled on and off using the command '(a) toggle Auto force to 0% or 100%', or if you entered this mode while holding down the <control> key while you pressed the 'u' key.

⁹ This 'forcing' feature can be toggled on and off using the command '(a) toggle Auto force to 0% or 100%', or if you entered this mode while holding down the <control> key while you pressed the 'u' key.

If you have console or other way of moving the channel you are adjusting, you will probably not use this feature and use the console instead.

The keys are used as follows:

'-' sets the 'forced' position value to zero (a 2nd time clears 'forced')

'+' or '=' sets the 'forced' position value to 100%

2) decrements the 'forced' position value

5) sets the 'forced' position value to 128 (50%)

8) increments the 'forced' position value

When you are satisfied with your adjustments, just hit the <Carriage Return>. If you don't want to save your settings, hit the <ESC>ape key to restore the original values.

Q) Force Outputs to a Value:

This command is used to force an output to any value. This value can be written into EEprom Memory so that the output will never leave this value, even after the Br-ANA is reset. It can be used to 'lock down' a movement that has malfunctioned or needs to be positioned for servicing or adjustment. Any outputs which have been forced will be displayed in the 'Forced Output' column on the display.

Only the on-board 0-10 volt analog outputs can be forced. A new output address will be requested if the currently selected 'Output to Test & Adjust' is not one of the on-board ones.

T) Power On Defaults:

The Power On defaults are used by the Br-ANA only if there is no Auto-Download file found. If there is a AutoDownload file on the Sd/SdHC flash card in the Br-ANA, the first frame of the first show will automatically be loaded at power up. The power On defaults will have no effect.

This command allows you to set the value that will be output on any one of the 256 possible output addresses. This value will be sent out when the Br-ANA is first powered up. This command gives you the option of:

a) Capturing the current value as the default value for the currently selected output.

b) Capturing the current values as the default value for all outputs.

c) Entering a value as the default value for the currently selected output.

The PowerOn value for all outputs is displayed in the 'PowerOn Default' column on the display.

W)Set Analog Endpoints:

This command is used to adjust the endpoints of the sixteen analog outputs. The 'Set Min/Max/Forced using Keypad' is a much easier way of setting these values. Use it if you can.

The analog outputs normally sweep between 0 and 10 Volts DC. By using these commands you can set either endpoint to anywhere between 0 and 10 volts for a reduced or reversed analog output swing. If you want to invert the voltage swing of any output, all you need to do is set the lower limit to a higher level than the upper limit. The endpoints for all sixteen outputs is displayed in the 'Minimum Scale'/'Maximum Scale' columns on the display.

As an example of the use of the analog endpoint adjustments, if you wanted to set the voltages on a channel to sweep from 2.5 volts to 7.5 volts: Looking at the chart at the end of this manual, you can see that this would be from approximately 25% to 75% of full scale. From the chart you would see that the values that should be entered would be 64 (40h) and 192 (C0h).

To set the endpoints, first clear the endpoints to the two extremes (0%/0/00h). Then use a Togglodyte, Programming Console, or the 'Force Output to a Value' command to find what values set the proper endpoints for the output. You can then enter these numbers into the endpoints for this output.

The endpoints can only be set for the on-board 0-10 volt analog outputs. A new output address will be requested if the currently selected 'Output to Test & Adjust' is not one of the on-board ones.

N) Next:

This moves the 'Output to test & Adjust' arrow down by one line.

L) Last:

This moves the 'Output to test & Adjust' arrow up by one line.

I) Card Status:

This command displays information on the currently loaded AutoDownload file:

- a) FileName of this AutoDownload file (this is set during the AutoDownload process when you save the file to disk)
- b) Name of the Br-ANA card that this AutoDownload is intended for. This is set on the 'Device Settings' dialog. The 'Device Settings' dialog is accessed either by:
 - 1) Opening the Channels List, changing the 'Show by' to 'Show by Devices', and double clicking on the Br-ANA you will be downloading to
 - 2) Clicking on the 'Device Settings' button at the top of the AutoDownload dialog (next to where you select the target device)
- c) AutoDownload file version number (as of this writing, this will be 'v1.1')
- d) The number of sequencers in this AutoDownload file (this is set on the 'Device Settings' dialog, where between one and eight sequencers can be assigned to a single Br-ANA. The 'Device Settings' dialog is accessed either by:
 - 1) Opening the Channels List, changing the 'Show by' to 'Show by Devices', and double clicking on the Br-ANA you will be downloading to
 - 2) Clicking on the 'Device Settings' button at the top of the AutoDownload dialog (next to where you select the target device)
- e) The date and time when this AutoDownload file was created
- f) Number of DMX-512 channels per universe. This will normally be 512, unless the frame rate is set above 32 frames per second. Above about 44 frames per second, there is not enough time to send out all 512 channels. Higher speeds are not recommended for large shows on the Br-ANA without consulting Gilderfluke & Co. first.
- g) Range of DMX-512 channels in the AutoDownload file. This will normally start with universe 'a' channels, unless the 'first channel' on the AutoDownload has been offset to begin beyond the first universe.
- h) Smpte Error Count. This is the number of good consecutive frames of Smpte that the Br-ANA must receive before it believes it. Typically this set to around five. This is set on the 'Device Settings' dialog. The 'Device Settings' dialog is accessed either by:

- 1) Opening the Channels List, changing the 'Show by' to 'Show by Devices', and double clicking on the Br-ANA you will be downloading to
- 2) Clicking on the 'Device Settings' button at the top of the AutoDownload dialog (next to where you select the target device)
- i) The name of each sequencer, along with the show that each loads at startup and if it waits or plays the show. This is set for each sequencer during the AutoDownload
- j) The EaseIn Speed and EaseIn Threshold for each sequencer. These are set on the 'Sequencer Settings' dialog. The 'Sequencer Settings' dialog is accessed by:
 - 1) Opening the Channels List, changing the 'Show by' to 'Show by Sequencers', and double clicking on the sequencer you want to change
 - 2) Selecting the sequencer you would like to modify and clicking on the 'Sequencer Settings' button on the AutoDownload dialog (next to where you select the sequencer for the startup and input actions)
 - 3) Opening the 'Device Settings' dialog and pressing the 'Sequencer Settings' buttons
- k) If there is an attempt to start a show while another show which is unsteppable¹⁰ is already running, these 'early' starts can be 'banked'. This setting shows how deeply stored starts can be 'banked'. These are set on the 'Sequencer Settings' dialog. The 'Sequencer Settings' dialog is accessed by:
 - 1) Opening the Channels List, changing the 'Show by' to 'Show by Sequencers', and double clicking on the sequencer you want to change
 - 2) Selecting the sequencer you would like to modify and clicking on the 'Sequencer Settings' button on the AutoDownload dialog (next to where you select the sequencer for the startup and input actions)
 - 3) Opening the 'Device Settings' dialog and pressing the 'Sequencer Settings' buttons
- l) Show Names. This displays both the 'short' (DOS 8.3) names and the longer names saved in the v1.1 AutoDownload extended header
- m) v1.0 AutoDownload file header
- n) Each of the shows including:

¹⁰ Uninterruptible if a new show request arrives while this show is playing

- 1) Show's numeric position in the AutoDownload file
- 2) Show's 'short' (DOS 8.3) name
- 3) Offset to the 'start' of the show
- 4) Length of the show (in frames)
- 5) Under the 'S', whether the show is
 - 1) 'Steppable' (interruptible if a new show request arrives while this show is playing) is shown by a 'Y'
 - 2) 'non-Steppable' (uninterruptible if a new show request arrives while this show is playing) is shown by a 'N'
- 6) Under the 'L', whether the show is
 - 1) 'Loopable' (Plays to the end of the show, then performs the 'at end' actions as set on the AutoDownload dialog) is shown by a 'Y'
 - 2) 'non-Loopable' (Plays to the end of the show, and stops and waits for the next start command) is shown by a 'N'
- 7) The frame rate for the show
- 8) The 'next' show defined for the show during the AutoDownload
- o) the current output level of each analog/ServoMotor output:

O) Reload Defaults:

This command sets all the settings of the Br-ANA back to factory defaults. It asks you an extra time if you are really sure you want to do this before it does.

P) Play/Loop:

If operating as a 'Dumb' Brick, allows you to select and play a show.

H) Halt:

If operating as a 'Dumb' Brick, allows you to stop the currently playing show.

R) Save Configs:

This command is used to save the current configuration of the Br-ANA through the serial port to a file on your computer. This file can then be re-loaded into this, or any other Br-ANA. To use this command, you first invoke it, then following the instructions, you set your computer to receive a string of ASCII characters.

```
Gilderfluke & Co., Inc. - BR-ANA Analog Card - version 4.10 - copyright 2012 DCM
Shows: 8, Ch: 123 @___0, ADL: AutoDownload_Filename
Serial Address- __0
__1 Show_FileName.sho looping @ frame ____1363
```

Set your computer to save a stream of text to a file. The file should be 1043 bytes long. To reload this card, just send this file back to this screen.

Hit any key when ready.

Stop saving text and hit any key when the data has finished.

hit <ESC>ape key to cancel-

Enter Command-

You then press any key to tell the Br-ANA to send out it's configuration. When it has finished, you then tell your computer to stop saving characters, and then hit any key to tell the Br-ANA to redraw the screen.

V) Verify:

This command verifies the data stored in the Br-ANA's flash memory. This will take anywhere from a few seconds to several minutes, depending of the size of the AutoDownload file that must be tested.

X) eXit:

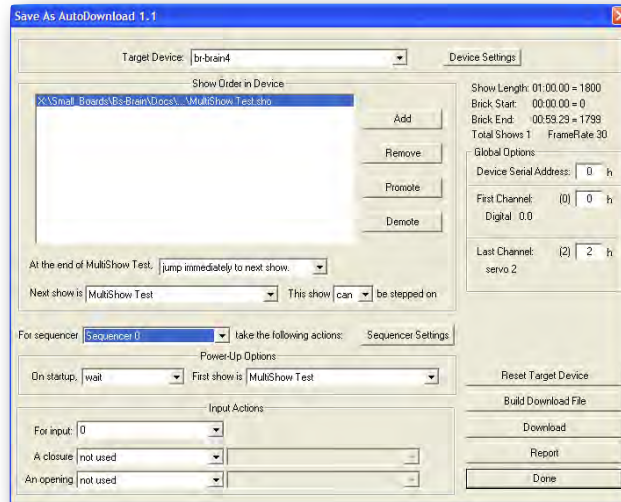
This exits the configuration mode and returns the Br-ANA to the command mode. When exiting you must enter a 'y' or 'n', to preserve compatibility with some other Gilderfluke & Company cards.

Optically Isolated Trigger Input Actions

The following Input Actions are used to start, stop, and generally control the Br-ANA through its four optically isolated trigger inputs. The optically isolated trigger inputs can be used as the sole method to control the Br-ANA, or as an adjunct to the Br-ANA's primary serial port.

You set what each of the Trigger Inputs will do on the AutoDownload dialog, (usually) after you have finished programming all of your shows and are ready to send them to the Br-ANA.

The Br-ANA has four Trigger Inputs. You can set different Input Actions for the 'closing Edge'¹¹ on the input and the 'opening Edge'¹². This allows you to do things like 'pause' a show on a closure of an input, and then 'continue' it on the opening of the same input.



Pc•MACs uses the 'Target Device' to know what options are available for the Trigger Inputs, number of sequencers available, and even the size of the AutoDownload memory available. It looks this up from the GilderGearList each time you do an AutoDownload, so if new features have been added to the Br-ANA since your last AutoDownload, you will be able to access them.

Some of the Input Actions require you to enter a second or third value from the drop downs just to their right. Typically these will be a show, or range of shows for the Input Action to use.

¹¹ The 'closing edge' is when current starts flowing through the optically isolated input, which is usually when an attached switch 'closes'. The status of all the Trigger Inputs can be seen on the Br-ANA's 'status' command and 'main' menu.

¹² The 'opening edge' is when current stops flowing through the optically isolated input, which is usually when an attached switch 'opens'. The status of all the Trigger Inputs can be seen on the Br-ANA's 'status' command and 'main' menu.

A) not used:

This is the default setting for all inputs. Leave any unused inputs as 'not used'

B) Start Show:

This is the most commonly used trigger input command. It tells the Br-ANA to start the selected show with the 'looping' flag set. On the LCD display and Br-ANA's menus, the show status will be shown as 'looping', to indicate that the show will check the 'at end' actions that have been set for the show when it completes playing.

Use the drop down to the right of the Input Action to select whether this Input Action will start playing 'whatever is next' in the AutoDownload list of shows, or a specific show. All the shows in the AutoDownload list will be shown in the drop down, and you can select the specific one you would like to start.

C) Stop Show:

This tells the Br-ANA to stop playing a show on a sequencer immediately. The show is frozen at the current frame, as are the analog and digital outputs. On the LCD display and Br-ANA's menus, the show status will be shown as 'STOPPED', to indicate that the show was not allowed to play to completion. On starting another show on this sequencer, all the analogs will be EasedIn to the new show.

D) Stop At End:

This is the Input Action you use when you want to stop a show which is playing on a sequencer, but allow it to play through to its natural end. On the LCD display and Br-ANA's menus, the show status will be shown as 'playing', to indicate that the show will NOT check the 'at end' actions that have been set for the show.

E) Pause Show:

This pauses the show playing on the selected sequencer immediately. The analog and digital outputs are frozen at their current states. On the LCD display and Br-ANA's menus, the show status will be shown as 'paused'.

F) Continue Show:

The opposite of the 'Pause' Input Action, this will allow a paused show to return to playing. On the LCD display and Br-ANA's menus, the show status will be shown as 'looping' or 'playing', depending on what its status was before the 'pause'.

G) E-stop Show:

This stops a sequencer playing immediately, and prevents the sequencer from being restarted until the 'Clear E-Stop' input action is received, or the Br-ANA is reset.

Use the drop down to the right of the Input Action to select whether this Input Action will freeze the outputs at the 'Current Frame' or outputs the first frame of a specific show (Analog outputs will be EasedIn so they don't jump). All the shows in the AutoDownload list will be shown in the drop down, and you can select the specific one you would like to use for E-Stops.

Freezing at the current frame is used when additional movements on the analog outputs is more hazardous than leaving them right where they are (which is often the case on motion bases).

Jumping to the first frame of a specified show allows you to define the E-Stop output levels for all analogs and digitals. Use this to turn on emergency lighting, open doors, and return all outputs to a safe 'home' position.

The E-Stop Input Action is most commonly used on the 'opening' edge input. This is so a wire break or other fault between the Br-ANA and an E-Stop button will 'fail safe' on the Br-ANA.

On the LCD display and Br-ANA's menus, the show status will be shown as 'E-Stop', to indicate that the sequencer has been locked up and will not be allowed to start any other shows until the E-Stop is E-Cleared.

H) Clear E-stop:

This just clears the lock that the E-Stop puts on a sequencer. This lock prevents it from starting any other shows until it has been cleared.

The 'Clear E-Stop' Input Action is most commonly used on the closing edge of the same input that triggers the E-Stop. This is so that pulling the E-Stop mushroom switch back to its 'ready' position will also clear the E-Stop lockout.

I) Sequential From List:

This input action can only be selected for the 'Closing' edge on an input. It allows you to define a range of shows that will be played when the input closes. The range can be as short as two shows up to all the shows that are loaded on the Br-ANA.

Use both of the drop downs to the right of the Input Action to select the 'first' and 'last' show to play from this Input ¹³. On the first activation of this input, the Br-ANA will play the 'first' show you selected. On subsequent activations it will select and play the shows until it plays the 'last' show you selected. On the next activation, it will start over by playing the 'first' show again.

It is possible to use the 'Sequential from List' and 'Random from List' Input Actions with overlapping ranges for multiple inputs. This is all legal to do, but there is only one 'already played' flag for each show. If one input has already played a show that is in a range that overlaps with another input, that other input will consider that show as 'already played' too.

You can tell the Br-ANA to reshuffle this list at any time by using the 'Reshuffle List' input action.

J) Random From List:

This input action can only be selected for the 'Closing' edge on an input. It allows you to define a range of shows that will be played when the input closes. The range can be as short as two shows up to all the shows that are loaded on the Br-ANA.

Use both of the drop downs to the right of the Input Action to select the 'first' and 'last' show to play from this Input ¹⁴. On each activation of this input, the Br-ANA will pick at random a show that falls between the shows you defined as 'first' and 'last' and play it. When it has played all the shows in this range (including the 'first' and 'last'), it will 'reshuffle' the list. On the next activation it will pick and play any show *except* the most recently played show.

It is possible to use the 'Sequential from List' and 'Random from List' Input Actions with overlapping ranges for multiple inputs. This is all legal to do, but there is only one 'already played' flag for each show. If one sequencer or

¹³ The range of shows shown on the drop downs will change to limit your selection to 'legal' ranges of shows.

¹⁴ The range of shows shown on the drop downs will change to limit your selection to 'legal' ranges of shows.

input has already played a show that is in a range that overlaps with another input or sequencer, that other input or sequencer will consider that show as 'already played' too.

You can tell the Br-ANA to reshuffle this list at any time by using the 'Reshuffle List' input action.

K) Reshuffle List:

This input action can only be selected for the 'Closing' edge on an input. It is used in conjunction with the 'Sequential from List' and 'Random from List' Input Actions to reset the 'already played' flags for a range of shows. The range can be as short as two shows up to all the shows that are loaded on the Br-ANA. The two drop downs to the right of the Input Action are used to select the 'first' and 'last' show have their 'already played' flags reset.

L) Analog Limit:

Normally the analog outputs will follow the complete range of motion you programmed in your shows, only limited by the analog endpoints you set on the Br-ANA 'minimum' and 'maximum' settings.

This feature can be used if you want to scale the analog outputs to limit them to a lower level when a switch is thrown. This is most commonly used to connect the switched 'threshold' outputs of anemometers used with fountain shows. If the wind level gets to the preset 'threshold', the anemometer 'closes' this input. This tells the Br-ANA to scale the analog outputs, and thereby the height that the fountain will squirt the water. When the wind level drops below the 'threshold, the anemometer opens this output and a 'Analog Limit' action on the 'opening' edge of the same input tells the Br-ANA to scale the outputs to 100%, and return the fountain to normal operation.

Use the drop down to the right of the Input Action to select the desired scaling value to use. A 'zero' value sets all of the outputs to the voltage set in the 'minimum' endpoint column. A value of 100% returns the Br-ANA to normal operation.

M) Binary Bit:

This Input Action allows you to use as many as four of the trigger inputs to select and play shows using a binary pattern of bits. This allows you to select and play up to 15 shows through the Optically Isolated Trigger Inputs. It is often used with our Kp-200 keypads.

You can define any of the inputs to any of the binary bits zero through seven. Each of the binary bits should only be used once.

When any of the inputs that are assigned as a binary bit changes, the entire binary byte is scanned. If the result is non-zero, the binary value is used to select and play a show. Care must be taken that all the binary bits are switched simultaneously. Some PLCs have an output update rate which is slower than the Br-ANA's input scan rate, which can result in unexpected shows being selected and played.

Serial Port Commands

The following commands are used to start, stop, and generally control the Br-ANA through its primary serial port. The serial port commands can be used as the sole method to control the Br-ANA, or as an adjunct to the Br-ANA's four optically isolated trigger inputs.

The Br-ANA's serial port can be accessed 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.

One of the easiest and most flexible types of operator interfaces for accessing the serial port are the many touch screen operator panels. These can be a part of an existing PLC or room automation system (including [AMX](#), [Crestron](#), etc.). Stand-alone touch screen operator panels with serial port outputs are available from a number of different suppliers ([Maple Systems](#) and [QSI Corp.](#), etc.). These will easily attach directly to the Br-ANA's (and other GilderGear's) four wire RS-422 serial network. Most of touch screens are sold with a Windows program that will allow you to 'draw' buttons and user interface icons on their screens, attach ASCII strings to these 'buttons', and then download the final configuration to the operator panel. They need no PC or other hardware once they are programmed.

Typical modem programs you can use with Gilderfluke & Co. equipment are Terminal.exe (which came with Windows 3.1) and HyperTerm.exe (which comes with later versions of Windows), or GilderTerm. The shareware Z-Term can be used on Macintosh computers.

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.

To use the Br-ANA with a terminal program, just configure it for 9600 baud, no parity, eight data bits, one stop bit and no handshaking. If you are using GilderTerm, all the settings are preset. All you will need to do is select the appropriate 'COM' port.

In all the following commands, the command (shown in "quotes") is the ASCII command. You can type these from your keyboard. The commands are all UPPER/lower case sensitive.

The "(card address)" is the serial address of the single card that the will respond to the command. In the Br-ANA, the serial address for a card is set using the two hexadecimal rotary switches on the Br-ANA's front. The '(card address)' for a Br-ANA represents a two digit ASCII hexadecimal number for the desired card. Valid characters are

“0” through “9”, and “A” through “F”. The chart on the back page of this manual will help you translate decimal card addresses into hexadecimal card addresses.

The “(show #)” is the desired show’s position in the AutoDownload list when the AutoDownload file is saved. The ‘(show #)’ represents a two digit ASCII hexadecimal number for the desired show. Valid characters are “0” through “9”, and “A” through “F”. The chart on the back page of this manual will help you translate decimal show numbers into hexadecimal show numbers.

1) Echo Commands:

“a”(card address)

Echo On:

“b”

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. In the following examples, the ‘echo’ responses are shown in bold italics:

If you send “a00”, on the card addressed at 00h the echo mode will be turned ON:

“card __0, echo mode”

If you send “*03A” to request a specific show on all cards:

“card __0, requested show __3 ShowName3”

If you send “t00A” to start the requested show playing on a specific card:

“card __0, starting show __3 ShowName3”

If you send “!00A” to start a show looping on a specific card:

“card __0, looping show __4 ShowName4”

If you send “uA” to stop all shows playing on all cards:

“card __0, stopped show __5 ShowName5”

Error messages will be returned whenever you ask the card to do something that it cannot do at the current time.

The ‘Echo OFF’ command turn off the echo mode on all the cards in the system. It does not echo anything.

2) Card Reset:

“j5AA5” (card address)

This command will erase the AutoDownload file on the Sd Flash Card on the Br-ANA. Needless to say, this command is only rarely used in a completed installation.

3) Card Status:

“i” (card address)

The status screen is a snapshot image of the current status of the Br-ANA. If you want to update the status information displayed, you must hit the ‘Card Status’ command again.

When the Br-ANA receives this command, it will respond with the following:

```
Gilderfluke & Co.  
Br-ANA  
v3.10 - copyright 2012 DCM  
Shows: 2, Ch: 123 @ __0, ADL: AutoDownload_FileName  
Br-ANA Name @ Serial Address: __0  
show #__1 Show_FileName looping @ frame _____38  
input A: open  
input B: open  
input C: open  
input D: open
```

Status Dump

The Status Dump shows:

- a) number of shows in the AutoDownload file
- b) number of channels in the AutoDownload file

- c) address offset of the first channel in the AutoDownload file
- d) name of the AutoDownload file
- e) name of the AutoDownload target device
- f) serial address of the AutoDownload target device
- g) for the show which is loaded:
 - a) show number the Br-ANA is playing
 - b) name of the show
 - c) playing status (looping, playing, stopped, paused, E-Stopped, etc.)
 - d) frame number into the current show
 - e) Total number of times each show has been played
- h) Status of both of the optically isolated trigger inputs

4) Start Commands:

“t” (card address)
“u”

Start Track:
Start Global:

Instead of the ‘start’ commands, the ‘loop’ commands are generally a better choice. The difference between the ‘start’ and ‘loop’ commands are that at the end of a show which is started with a ‘loop’, it will check to see if any actions were set for the end of the show. A show that is started with the ‘start’ command will play to the end and then just stop and wait for the next command.

These commands start the animation playing on the Br-ANA(s) addressed by the command. The shows will always start from the beginning (frame zero). If an addressed Br-ANA is looping shows, it will have the ‘LOOPING SHOWS’ flag reset.

If the Br-ANA 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 Br-ANA 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 Br-ANA, 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 Br-ANA is already playing a show which has this option set, it will ignore this command.

5) Stop Commands:

"x" (card address)

"y"

Stop Track:

Stop Global:

These commands stop the selected Br-ANA(s) unconditionally. The stop takes place at the current frame being played.

6) Loop Commands:

!" (card address)

" " "

Loop Track:

Loop Global:

Instead of using the 'start' commands, the 'loop' commands are generally a better choice. The difference between the 'start' and 'loop' commands are that at the end of a show which is started with a 'loop', it will check to see if any actions were set for the end of the show. A show that is started with the 'start' command will play to the end and then just stop and wait for the next command.

These command acts much like the START commands, except that they also set the 'LOOPING SHOWS' flag. With the 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 Br-ANA is told to stop.

7) Stop at End Commands:

"%" (card address)

"&"

Stop at End Track:

Stop at End Global:

These commands reset the 'LOOPING SHOWS' flag in the selected Br-ANA(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, instead of stopping in the middle. The STOP commands are used when you want to stop a show immediately.

8) Select Show Commands:

“)” (card address) (show#)

Select Show Track:

“*” (show#)

Select Show Global:

Up to two hundred fifty-five different animated shows can be stored on a single Br-ANA. These commands can be used to select an individual show on the selected Br-ANA(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.

9) Show Pause Commands:

“<” (card address)

Pause Show:

“>” (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.

Br-ANA Firmware Updates

The firmware in a Br-ANA can easily be upgraded at any time. To update the firmware:

- 1) Download the BRANA400.FRM file from the [Gilderfluke & Co.](#) website
- 2) Unzip the file (if needed)
- 3) Place the BRANA400.FRM file onto a formatted Sd/SdHC flash card
- 4) Power down (or disable) whatever the Br-ANA is controlling. You don't want your show to do anything unexpected during the update
- 5) While the Br-ANA is running, remove the Sd/SdHC flash card it is using
- 6) Replace it with the Sd/SdHC flash card that holds the BRANA400.FRM file
- 7) The Br-ANA will update itself
- 8) Once the firmware update has completed, remove the Sd/SdHC flash card that has the BRANA400.FRM file on it
- 9) Insert the the Sd/SdHC flash card with your shows on it
- 10) Power back up (or enable) whatever the Br-ANA is controlling.

During firmware updates, the Read LED and Busy LED flash back and forth.

The first stage is comparing the BRANA400.FRM file on the Sd card. It then flashes a little slower as it reads the BRANA400.FRM file in from the Sd card. It then flashes back and forth much more quickly as it reprograms the microcontroller in the Br-ANA.

Under no circumstances remove power from the Br-ANA while firmware is being updated. A partial firmware update may 'brick' the Br-ANA, and then it will need to be returned to the factory for reprogramming.

HEXadecimal to Decimal to Percentage

The following 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	00	null	0	64	40	@	25%	128	80	(null)	50%	192	C0	(@)	75%
1	01	soh/^A		65	41	A		129	81	(soh)		193	C1	(A)	
2	02	stx/^B		66	42	B		130	82	(stx)		194	C2	(B)	
3	03	etx/^C		67	43	C		131	83	(etx/)		195	C3	(C)	
4	04	eot/^D		68	44	D		132	84	(eot)		196	C4	(D)	
5	05	eng/^E		69	45	E		133	85	(eng)		197	C5	(E)	
6	06	ack/^F		70	46	F		134	86	(ack)		198	C6	(F)	
7	07	bell/^G		71	47	G		135	87	(bell)		199	C7	(G)	
8	08	bs/^H		72	48	H		136	88	(bs)		200	C8	(H)	
9	09	ht/^I		73	49	I		137	89	(ht)		201	C9	(I)	
10	0A	lf/^J		74	4A	J		138	8A	(lf)		202	CA	(J)	
11	0B	vt/^K		75	4B	K		139	8B	(vt)		203	CB	(K)	
12	0C	ff/^L		76	4C	L		140	8C	(ff)		204	CC	(L)	
13	0D	cr/^M		77	4D	M		141	8D	(cr)		205	CD	(M)	
14	0E	so/^N		78	4E	N		142	8E	(so)		206	CE	(N)	
15	0F	si/^O		79	4F	O		143	8F	(si)		207	CF	(O)	
16	10	dle/^P		80	50	P		144	90	(dls)		208	D0	(P)	
17	11	dc1/^Q		81	51	Q		145	91	(dc1)		209	D1	(Q)	
18	12	dc2/^R		82	52	R		146	92	(dc2)		210	D2	(R)	
19	13	dc3/^S		83	53	S		147	93	(dc3)		211	D3	(S)	
20	14	dc4/^T		84	54	T		148	94	(dc4)		212	D4	(T)	
21	15	nak/^U		85	55	U		149	95	(nak)		213	D5	(U)	
22	16	syn/^V		86	56	V		150	96	(syn)		214	D6	(V)	
23	17	etb/^W		87	57	W		151	97	(etb)		215	D7	(W)	
24	18	can/^X		88	58	X		152	98	(can)		216	D8	(X)	
25	19	em/^Y		89	59	Y		153	99	(em)		217	D9	(Y)	
26	1A	sub/^Z		90	5A	Z		154	9A	(sub)		218	DA	(Z)	
27	1B	ESC		91	5B	[		155	9B	(ESC)		219	DB	([)	
28	1C	FS		92	5C	\		156	9C	(FS)		220	DC	(\)	
29	1D	GS		93	5D	]		157	9D	(GS)		221	DD	(])	
30	1E	RS		94	5E	^		158	9E	(RS)		222	DE	(^)	
31	1F	VS		95	5F	_		159	9F	(VS)		223	DF	(_)	
32	20	SP	12.5%	96	60	`	37.5%	160	A0	(SP)	62.5%	224	E0	(`)	87.5%
33	21	!		97	61	a		161	A1	(!)		225	E1	(a)	
34	22	"		98	62	b		162	A2	(")		226	E2	(b)	
35	23	#		99	63	c		163	A3	(#)		227	E3	(c)	
36	24	\$		100	64	d		164	A4	(\$)		228	E4	(d)	
37	25	%		101	65	e		165	A5	(%)		229	E5	(e)	
38	26	&		102	66	f		166	A6	(&)		230	E6	(f)	
39	27	'		103	67	g		167	A7	(')		231	E7	(g)	
40	28	(		104	68	h		168	A8	(())		232	E8	(h)	
41	29	)		105	69	i		169	A9	(i)		233	E9	(i)	
42	2A	*		106	6A	j		170	AA	(*)		234	EA	(j)	
43	2B	+		107	6B	k		171	AB	(+)		235	EB	(k)	
44	2C	,		108	6C	l		172	AC	(,)		236	EC	(l)	
45	2D	-		109	6D	m		173	AD	(-)		237	ED	(m)	
46	2E	.		110	6E	n		174	AE	(.)		238	EE	(n)	
47	2F	/		111	6F	o		175	AF	(/)		239	EF	(o)	
48	30	0		112	70	p		176	B0	(0)		240	F0	(p)	
49	31	1		113	71	q		177	B1	(1)		241	F1	(q)	
50	32	2		114	72	r		178	B2	(2)		242	F2	(r)	
51	33	3		115	73	s		179	B3	(3)		243	F3	(s)	
52	34	4		116	74	t		180	B4	(4)		244	F4	(t)	
53	35	5		117	75	u		181	B5	(5)		245	F5	(u)	
54	36	6		118	76	v		182	B6	(6)		246	F6	(v)	
55	37	7		119	77	w		183	B7	(7)		247	F7	(w)	
56	38	8		120	78	x		184	B8	(8)		248	F8	(x)	
57	39	9		121	79	y		185	B9	(9)		249	F9	(y)	
58	3A	:		122	7A	z		186	BA	(:)		250	FA	(z)	
59	3B	;		123	7B			187	BB	(;)		251	FB	(;)	
60	3C	<		124	7C			188	BC	(<)		252	FC	(<)	
61	3D	=		125	7D	|		189	BD	(=)		253	FD	(|)	
62	3E	>		126	7E	~		190	BE	(>)		254	FE	(~)	
63	3F	?		127	7F	del		191	BF	(/)		255	FF	(del)	100%