

Br-miniBrick4

Digital Output Show Control System



The **Br-miniBrick4** is a complete, stand-alone Show Control System. It features Four Digital (on/off) outputs and one trigger input. Once programmed, the **Br-miniBrick4** runs from onboard nonvolatile memory. No PC is needed. All you need to add is a 9-24 VDC power supply, whatever you want to control, and (optionally), a switch closure to tell it to start.

The **Br-miniBrick4** is normally programmed using the buttons on its top. You also have the option of programming a **miniBrick4** using our **PC•MACs** Show Control software. Once a program is 'drawn' using the **PC•MACs** software, data is sent to the **Br-miniBrick4** through a **USB-RS232/422** serial port adapter and **Br-miniBrick4/Cable**. The **Br-miniBrick4** can then be disconnected from the PC and it will run all by itself.

Safety Disclaimer: Any electronic or mechanical system has a potential to fail. Certain applications using Gilderfluke & Company equipment may involve potential risks of death, personal injury or severe property or environmental damage (“Critical Application”). Gilderfluke & Company equipment is not designed, intended, authorized or warranted to be suitable in life support applications, devices or systems or other critical applications. Inclusion of Gilderfluke & Company products in such applications is understood to be fully at the risk of the customer. In order to minimize risks associated with the customer's applications, adequate design and operating safeguards should be provided by the customer to minimize inherent or procedural hazards.

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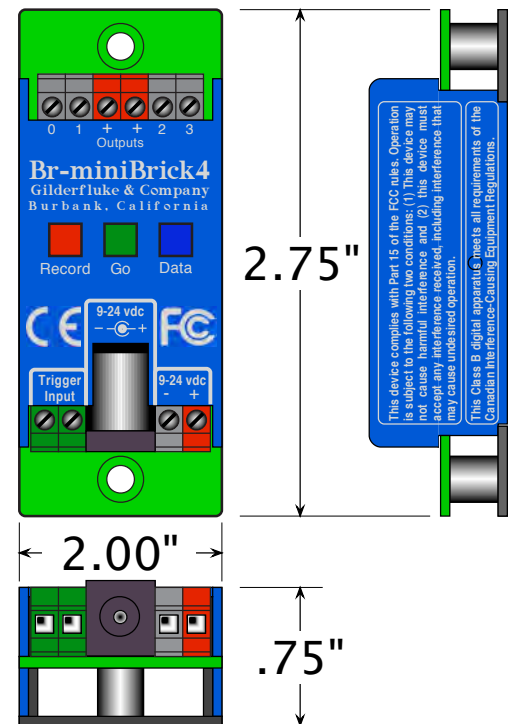
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Br-miniBrick4 Overview

The **Br-miniBrick4** can be used to control animated shows and displays, fountains, fireworks, lighting, sound systems, slide and movie projectors, fiber optics, window displays, motors, pneumatic and hydraulic systems, special effects, signs, machines and machine tools in process control, or anything else that can be controlled by an electrical signal.

The **Br-miniBrick4** is a complete stand-alone Show Control System. It can be used singly, or in combination with additional **Br-miniBrick4s**, **Br-miniBrick8s**, or any other control systems from Gilderfluke & Co.. To add sound, use a **Sd-10** or **Sd-25** Audio Repeaters. For more i/o, use the **Br-miniBrick8s** or **Br-MultiBrick32**. For a single unit with built in animation and lighting control, audio playback and amplification, use our **Sd-50** series of controllers. The **Sd-50s** are even available with 'Atomic' clock or GPS-based triggering based upon time or position on the globe.

You can program the digital outputs of a **Br-miniBrick4** without a computer. Press and hold the red 'Record' button until the first output flashes. Press again to step to the output you want to record. When you are ready to record, press the green 'Go' button. While you press (and **hold!**) the 'Record' button, anything you do on the blue 'Data' button is recorded on this one output. Anything previously recorded on the other outputs will play back as you record this output. The **Br-miniBrick4** will remember exactly what you do and precisely when you did it. You repeat this until you have all four outputs programmed just the way you want them.



An optional **USB-RS232/422** serial port adapter and **Br-miniBrick4/Cable** allow you to program the **Br-miniBrick4** using a computer, you can 'draw' the sequence you need on the screen of your computer using our **PC•MACs** software. When you have all of your shows completed (or just want to take a look at them), you can download them to a **Br-miniBrick4** in about ten seconds through the serial port on your PC. You can then make additional changes and download again and again until you are completely satisfied with your show. Once your show is perfect, the PC can then go away. The **Br-miniBrick4** will run by itself.

With the optional **PC•MACs** 'RealTime' license or **PC•MACs** hardware (**MACs-USB Smppte Card** and a programming console), you can program in RealTime. **PC•MACs** will remember exactly what you do and precisely when you did it. You can then use **PC•MACs**' editing tools to perfect the sequences you have programmed in RealTime.

When you have all of your shows completed, you can download them to a **Br-miniBrick4** through a **USB-RS232/422** serial port adapter and **Br-miniBrick4/Cable**. You can then make additional changes and download again and again until your show is perfect. The PC can then go away. The **Br-miniBrick4** will run by itself.

Features of the Br-miniBrick4 include:

- Each **Br-miniBrick4** has a show capacity of over four minutes at thirty updates per second! Once programmed, shows are retained for approximately forty years, with or without power applied.
- You can rewrite the memory approximately fifty thousand times.
- ‘Record’, ‘go’ and ‘data’ buttons for programming in RealTime without any computer at all.
- One non-polarized isolated input is used to trigger from push buttons, motion sensors, or any other kind of switch. LED shows all input activity.
- Each of the four outputs is rated for a continuous load of 300 ma., or 500 ma. peak at 24 vdc. This is enough to drive small solenoid valves, relays, lights, and similar loads. The LEDs show all output activity.
- Multiple **Br-miniBrick4s** can be triggered simultaneously or sequentially.
- High quality cage clamp-style screw terminals for all power, trigger, and output connections.
- Optional serial port adapter allows RealTime programming and ‘downloading in place’ through our easy-to-use PC•MACs software. This lets you program with greater accuracy, or program lots of **Br-miniBrick4s** identically! When downloaded, a **Br-miniBrick4** can hold up to 255 shows at one time and supports update rates from one frame per second to a maximum of one hundred frames per second. This allows you to program ‘delay’ shows that tick along at low frame rates between your main shows. The ‘Next’ show can be set for the end of any show, allowing you to build ‘chains’ of shows. Shows can be accessed sequentially or directly using the single input. The input can also be set to start, stop, pause, continue, or directly select a specific show.
- The **Br-miniBrick4** runs on anything from 9-24 VDC . **Br-miniBrick4s** can even be run from batteries or solar cells where AC power is unavailable.
- Sturdy 2.75” x 1.1” x .75” aluminum case.
- **Br-miniBrick4s** mount in standard Augat 2.75” ‘Snap Track’, velcro, or using a pair of screws.

Br-miniBrick4 LEDs, Switches and Connections

There are only a small number of connections on each **Br-miniBrick4**. You will need to attach a power supply, whatever you are controlling, and (optionally) a switch to start the **Br-miniBrick4**:

LEDs:

1. Four red LEDs show the status of the four outputs. They also flash in a fast, very bright 'double flash' to indicate that an individual channel is enabled for programming using the buttons on the **Br-miniBrick4**. These four LEDs flash in a back-and-forth chase to indicate that the **Br-miniBrick4** is in the 'clear all' mode, and that the buttons will be used to clear the memory of the **Br-miniBrick4**. During serial downloads, these four LEDs will chase in a sequential 'chase' pattern.
2. One green LED shows the status of the optically isolated input. This LED is located on the 'inside' of the optical isolator. It will operate if the input is receiving a signal, and it is getting to the **Br-miniBrick4's** microprocessor. While setting the 'operating mode' for the **Br-miniBrick4** using the buttons on its front, the green LED will flash in the same quick double-flash pattern as the red 'output' LEDs. When receiving DMX-512 or serial RealTime data, the **Br-miniBrick4** no longer needs the trigger input or their indicator LEDs:
 - a. The 'A' input's LED is borrowed to toggle on each frame received. If receiving DMX-512 data at 30 FPS, the LED will be flashing at 15 Hz.

'Record' button:

The 'record' button is used for programming the **Br-miniBrick4** without a computer. See the '**Programming without a Computer**' section of the manual for details on the use of this button. The red 'Record' button electronically locks the **Br-miniBrick4's** nonvolatile EEprom memory whenever it is released. Nothing in the programming can change unless this button is being held down. With the memory write protected, it should retain whatever has been programmed into the **Br-miniBrick4** for at least forty years.

'Go' button:

The 'go' button is used for programming the **Br-miniBrick4** without a computer. See the '**Programming without a Computer**' section of the manual for details on the use of this button. The green 'go' button will start the **Br-miniBrick4** as though the trigger input 'a' had been activated. Typically, this will start the first show playing.

'Data' button:

The 'data' button is used for programming the **Br-miniBrick4** without a computer. See the '**Programming without a Computer**' section of the manual for details on the use of this button. If not actually recording a show using the buttons on the **Br-miniBrick4**, this button can be used to cancel 'record' mode, or to stop a show which is playing by pressing it three times quickly.

TTL Level Serial Port:

This is a low voltage serial port connection. Do not connect it directly to a PC's serial port, as this is likely to damage the the **Br-miniBrick4**. A special serial adapter cable from Gilderfluke & Co. should be used to connect the **Br-miniBrick4** to your PC. This connection is used to download data to the **Br-miniBrick4**. It can also be used with any GilderTerm or any standard modem program to talk to the **Br-miniBrick4**.

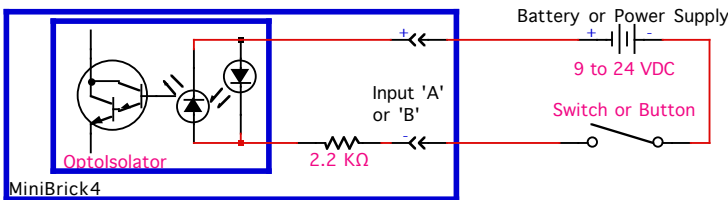
There is a trick to plugging the serial adapter to the **Br-miniBrick4**. The connector must be angled towards the **Br-miniBrick4** until the pins are inserted into the three holes at the edge of the **Br-miniBrick4**. It is then straightened up to a right angle to the **Br-miniBrick4** to latch the connector in place.

For instructions on programming the **Br-miniBrick4** using our **PC-MACs** software, please refer to the **Br-miniBrick8** manual. **PC-MACs** software programming on the **Br-miniBrick4** and the **Br-miniBrick8** are identical.

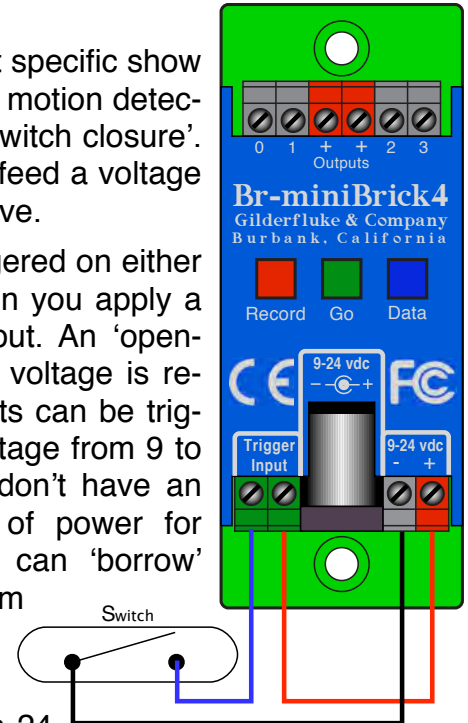
Trigger Input:

The trigger input can be used to start, stop, pause or select specific show sequences to play from any switch. This can be a pushbutton, motion detector, IR beam, step mat, or anything else that will give you a 'switch closure'. The trigger input is non-polarized and optoisolated. You must feed a voltage in to trigger it. The green LED lights when a trigger input is active.

When programmed from PC-MACs, any event can be triggered on either the 'closing' or 'opening' edge of the input. A 'closing' is when you apply a voltage to an input. An 'opening' is when that voltage is removed. The inputs can be triggered on any voltage from 9 to 24 VDC. If you don't have an external source of power for this inputs, you can 'borrow' some juice from



the **Br-miniBrick4's** power supply connections (as shown).



Power Supply:

The **Br-MiniBrick4** will run on any voltage from 9 through 24 VDC. Whatever voltage you use will also be used to run the relays, valves and whatever you will be controlling. If you are controlling 24 VDC loads, you will want to use a 24 VDC power supply. For 12 volt loads, use a 12 VDC supply. The **Br-MiniBrick4** itself uses very little current. Size your power supply so it will provide enough current to run all of your loads.

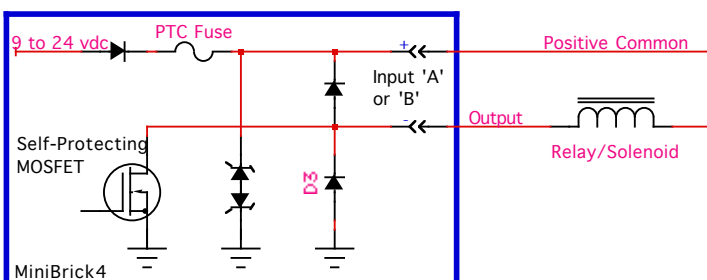
You can supply the power to the **Br-miniBrick4** through the 2.1 mm power jack, or through the screw terminals. These connections are paralleled internally.

The power supply connection is protected from reverse polarity connections. An idle **Br-miniBrick4** draws only about twenty-five milliamperes. It can run for days on just a single nine volt battery. The loads that the **Br-miniBrick4** is controlling will usually draw far more current than the **Br-miniBrick4** itself.

Digital Outputs:

Each **Br-miniBrick4** has four digital outputs (hence, the name). You can connect four things to the **Br-MiniBrick4**. These can be LEDs, small motors, Solenoid valves, relays, small lamps, or anything else that needs 9 to 24 VDC, at (or below) the rated current output.

The outputs are just like the standard outputs used on all Gilderfluke & Company Show Control Systems. We switch the

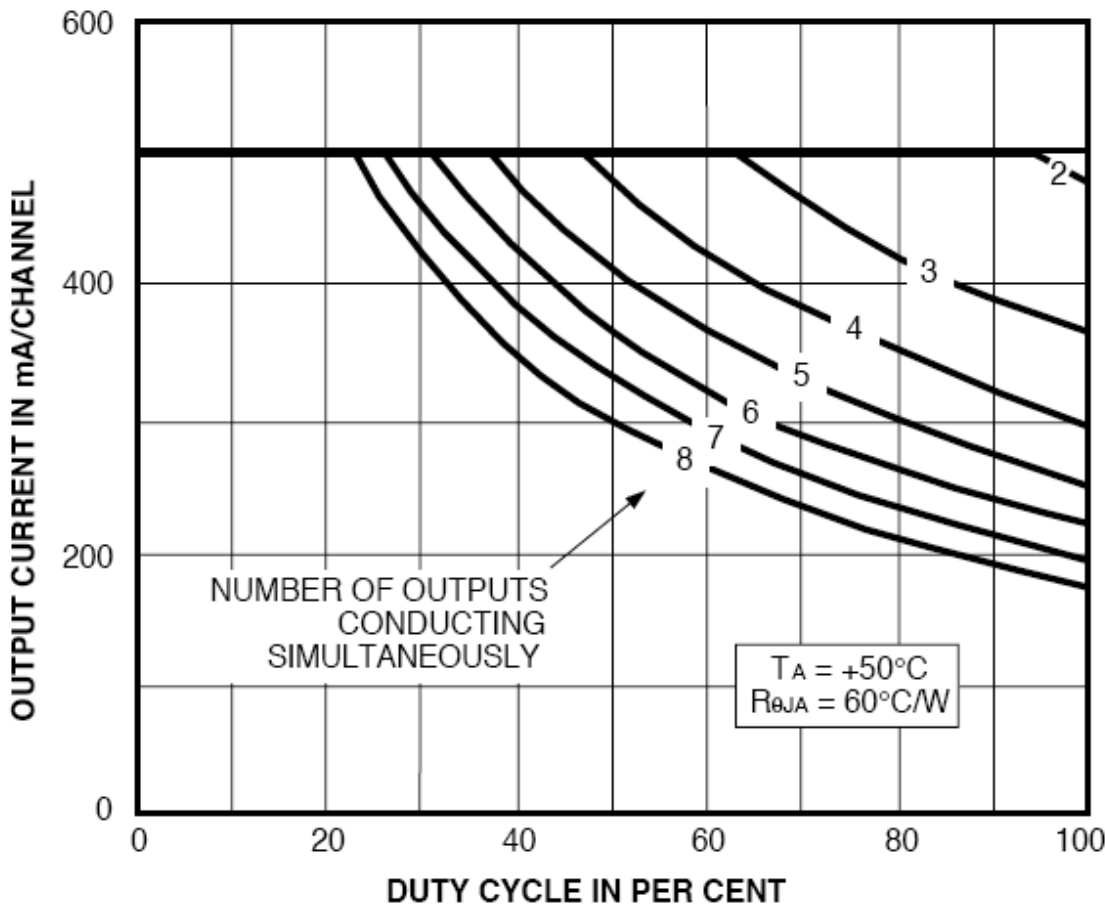
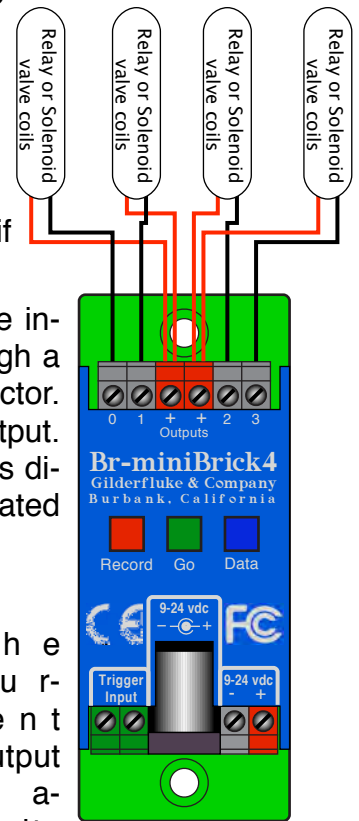


negative sides of the outputs. You connect the positive sides (usually the red wires) of the four things you controlling to either of the two positive 'common' terminals in the middle. The 'negative' sides of the four things you are controlling (usually the black wires) are connected individually to the four outputs. These are numbered 0 through 3.

There is no 'ground' screw terminal on the output 'end' of the **Br-miniBrick4**. You can pick up the ground at the power supply connection if needed.

All outputs are open collector switches to ground. Flyback diodes are included in the outputs for driving inductive loads. Power is supplied through a diode and a solid state circuit breaker to the common pin(s) on the connector. A safe level of current is 300 milliamperes simultaneously on each output. This is sufficient to drive most small relays, valves and other similar loads directly. If fewer than four outputs are on at one time, then the outputs are rated as follows:

The supply line for the outputs is PTC fused for 1 amp.



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

Since it is unusual to have more than 50% of the outputs on at any one time, you can usually assume the system has at least a 500 ma output current capacity. If you are going to be turning on lots of heavy loads at the same time, you should derate this to about 300

ma.. This is sufficient to drive the majority of loads which will be directly connected to the outputs of the animation system. If additional current capacity is needed, or if you need to drive higher voltage loads, you can connect relays as needed to the outputs of the animation system.

Programming without a Computer

The digital outputs of the **Br-miniBrick4** can be 'Programmed in Place' using only the buttons on its top, or by connecting a serial port adapter and using Gilderfluke & Co.'s **PC•MACs** software. The instructions in this section cover 'Programing-In-Place' using the buttons on the top of the **Br-miniBrick4**.

For instructions on programming the **Br-miniBrick4** using our **PC•MACs** software, please refer to the **Br-miniBrick8** manual. **PC•MACs** software programming on the **Br-miniBrick4** and the **Br-miniBrick8** are identical.

To enter programming mode:

Press and hold the red 'Record' button for three seconds. On the first press, the first output (Output '0') will begin flashing with a quick 'double flash' pattern. This indicates that only this one output is active for programming.

If the **Br-miniBrick4** immediately starts a 'back and forth' chase, it indicates that the **Br-miniBrick4** has had its memory cleared, and it has jumped right into the 'clear all' mode (see below).

On the next three presses of the red 'Record' button, outputs '1', through '3' are selected in turn.

On the fourth press, the 'clear all' mode is selected. This is indicated by a 'back-and-forth' chase on all four red output LEDs.

On the next four presses of the red 'Record' button, the 'operating mode' mode is selected. This is indicated by a two short / one long flash pattern on one of the output LEDs and the green 'trigger' LEDs. This mode is used to select whether the **Br-miniBrick4** is going to play the show once or loop, and whether the show can be 'stepped upon' once running.

On the next press, 'programming' mode is exited.

'Clear All' mode:

This is normally done as the first step in programming a show. This is how you set the length of your show. Press and hold the red 'Record' button. Press the red 'Record' button four more times, until you see a 'back and forth chase pattern on the output LEDs. Momentarily pressing the green 'Go' button (or if an external trigger is received) starts the **Br-miniBrick4** running (yellow LED flashes quickly). The length of the show is set by the length of time you hold down the red 'Record' button. When you release the red 'Record' button, the show length will be set. While in this mode, outputs '1' through '3' are cleared. Bit '0' can be programmed by pressing the green 'Go' button. By default, a new show is set to play once when triggered, and can't be stepped on.

'Record One' mode:

Once in 'Record' mode (entered by pressing the red 'Record' button until the first output LED starts doing the 'double flash. Press and release the red 'Record' button up to three more times, until you see the LED for the output you want to program doing the 'double flash.) Momentarily pressing the green 'Go' button (or if an external trigger is received) starts the **Br-miniBrick4** running (yellow LED flashes quickly). Any outputs which have previously been recorded will be played back. If the red 'Record' button is pressed and held, it will clear the selected output. Pressing the blue 'Data' button while the red 'Record' button is held down will record new data on the selected channel.

If a portion of your show is perfect, and you only want to re-record a small section, this is easily done with the **Br-miniBrick4**. Just release the red 'Record' button during the sections of the show you want to keep. The data will not be altered. When the red 'Record' button is pressed during the portions of the show you want to change, you can alter the data by pressing (or not) blue 'Data' button.

Setting Operating Modes:

Press and hold the red 'Record' button. Press the red 'Record' button five to eight more times, until you see the green 'trigger' LED and one of the four output indicators flashing a two short / one long pattern:

- a. Output 0 & 'trigger' LEDs: Play once, no step
- b. Output 1 & 'trigger' LEDs: Play once, steppable
- c. Output 2 & 'trigger' LEDs: looping, no step
- d. Output 3 & 'trigger' LEDs: looping, steppable

Press and hold the red 'Record' button for three seconds to lock in the desired operating mode.

A show that is set to 'play once' will only play when triggered, and then stop and wait for the next trigger. A 'looping' show will start playing at PowerUp, and loop back to itself at its end. It loops until powered down.

A show that is set to 'no step' will not allow another show to be started once it has been started. This is used to keep shows from being re-triggered repeatedly. It is used if your show is started by a step pad, motion sensor, or other device which will send additional 'start' pulses before the show has run its course.

A shortcut to stop the **Br-miniBrick4** playing or exit any 'programming' mode is to release the red 'Record' button and quickly press the blue 'Data' button three times. This stops any show which was playing.

FCC and CE Compliance:

Br-miniBrick4s which are hardware revision 1.0 or later have been tested to comply with FCC and CE requirements.

Because **Br-miniBrick4s** are low voltage DC devices, neither UL or CE require safety testing.

For fireproofing or additional radio frequency interference shielding, **Br-miniBrick4s** can be mounted in a fire rated metallic case. Typically, this would be a NEMA-rated electrical enclosure or 19" electrical rack.

FCC Instruction to User:

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment has been verified to comply with the limits for a class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

EC DECLARATION OF CONFORMITY

Friday, August 17, 2012

Application of Council Directives:

EMC Directive, 89/336/EEC

Manufacturer's Name:

Gilderfluke & Co., Inc.

Manufacturer's Address:

205 South Flower St., Burbank, California 91502 USA

Importer's Name:

Importer's Address:

Type of Equipment:

Entertainment and Lighting Control

Equipment Class:

Commercial and Light Industrial

Model:

Br-miniBrick4

Conforms to the following Standards:

EN 55103-1: 1996 and EN 55103-2: 1996

Year of Manufacture:

2006

I the undersigned, hereby declare that the equipment specified above conforms to the above directive(s) and standard(s).

Place: Burbank, California

Signature: (signed)

Date: August 1, 2006

Full Name: Doug Mobley

Position: CEO

HEXadecimal to Decimal to ASCII to Percentage

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

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