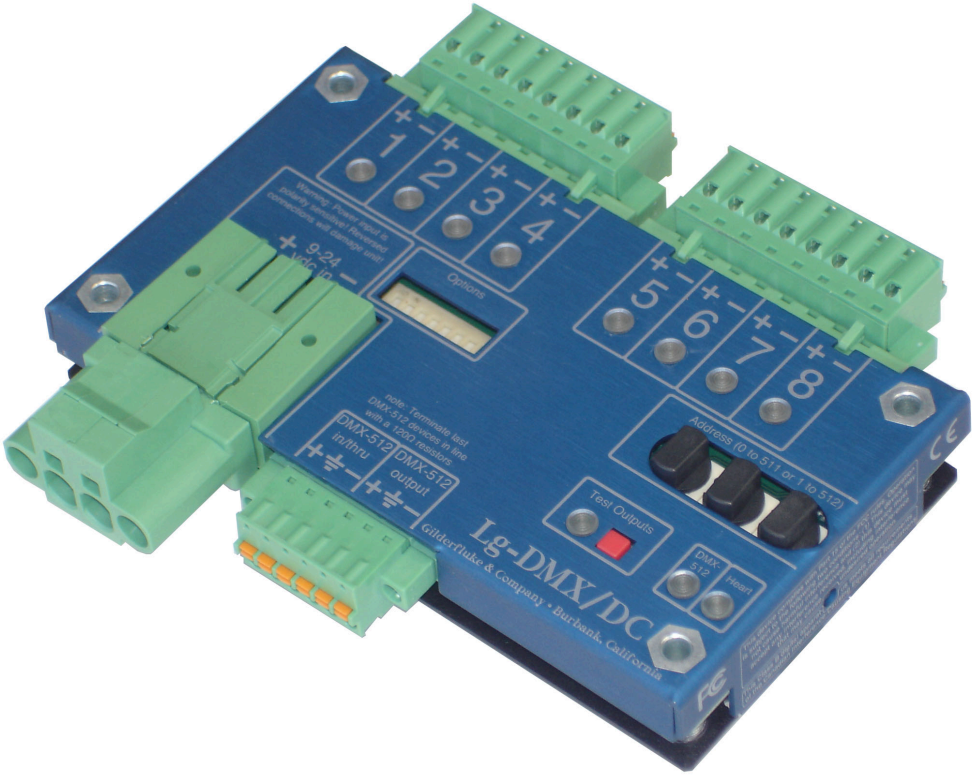
Lg-DMX/DC

DMX-512 to DC Dimmer Module v3.0



The Lg-DMX/DC is a complete DC in to DC out dimmer module. All you need to add is a 9-24 VDC power supply, whatever you want to control, and a source of DMX-512 to control it.

The Lg-DMX/DC can be used to control incandescent lamps, large LED arrays or DC motors. Anything that needs a 9 to 24 volt supply that adjusts between 0 and 100% of full supply voltage.

The eight pulse width modulated outputs of the Lg-DMX/DC use high current HEXFETs. These are conservatively rated for 5 amps of load on each output. Each output is protected by a 5 amp PTC 'fuse' and flyback diode.

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A note about this manual:

This manual covers the specifics of the Lg-DMX/DC.

Information and manuals for all other Gilderfluke & Company products can be downloaded from our web site at:

http://www.gilderfluke.com

Lg-DMX/DC Overview

The Lg-DMX/DC can be used to control any low voltage Direct Current (DC) load from a DMX-512 serial control signal. The DMX-512 can come from a Br-Brain4, Br-ANA, Br-miniBrick8, Sd-50/8, Sd-50/8 or any other Gilderfluke & Company card which transmits animation and lighting data through DMX-512. The DMX-512 can also come from any other source of DMX-512, including just about every lighting control board.

DMX-512 is a serial data protocol that has been defined by the USITT for control of dimmers, moving lights, strobes, smoke machines, fans and other theatrical devices. It is the standard that Gilderfluke & Company uses for transmitting data between most of the devices we make. DMX-512 consists of a 250 KBaud asynchronous data stream transmitted over a twisted pair of wires using RS-422 or RS-485 signal levels. The format of the data has been defined by the USITT.

The Lg-DMX/DC can be used to control not just incandescent lamps. Any low voltage device that can be run from 9 to 24 VDC and draws between zero and ten amps can be controlled. These include large arrays of LEDs and DC motors. Diodes built into each output will clamp any flyback voltage spikes created when controlling inductive loads.

AC power supplies can be used with the addition of a bridge rectifier, external to the Lg-DMX/DC.

Features of the Lg-DMX/DC include:

- Eight pulse width modulated high current outputs that can be dimmed between 0 to 100% in 256 even steps.
- Ten amps capacity on each output.
- Unique design that doesn't use a microprocessor of any kind. With no microprocessor, it can not crash.
- Does not require any heat sink or additional cooling in most applications.
- Accepts industry-standard DMX-512.
- Outputs are distributed across four 'phases' to distribute the power supply load.
- If powered up, the Lg-DMX/DC regenerates and retransmits DMX-512. If not attached to a power supply, directly connects the DMX-512 inputs to the outputs so it will not affect the DMX-512 daisy chain.
- Outputs can be addressed to any DMX-512 address between 1 and 512 (0 to 511 if using zero-based addressing).
- Each output is protected from over current conditions by a 'circuit breaker'.
- 'Test' button allows you to disable outputs, or turn on outputs, even without a DMX-512 signal.
- Output update rates adjustable from 61 Hz to 15.6 KHz.
- Can be set to turn off all outputs upon loss of the DMX-512 input, or hold the outputs at the last levels received.
- Each of the eight outputs is rated for a continuous load of ten amps. This is enough to drive a 60 watt incandescent lamp at 12 VDC, or a 125 watt incandescent lamp at 24 VDC.
- Removable spring block terminal inputs and outputs.
- The Lg-DMX/DC runs on anything from 9-24 VDC. Lg-DMX/DCs can even be run from batteries.
- Measures just 5" x 2.75". Lg-DMX/DCs mount in standard Augat 2.75" 'Snap Track', or on screw standoffs

Lg-DMX/DC ‘Test’ Button

The ‘Test’ button is used to manually turn on and off the outputs of the Lg-DMX/DC to test for wiring problems or check for burnt out lamps. Each time the ‘test’ button is pressed, it advances to the next test.

If DipSwitch 4 is ‘Off’, then all outputs will be turned off while any of the outputs are ‘under test’. If DipSwitch 4 is ‘On’, then all outputs that are not ‘under test’ will remain at the levels set by the incoming DMX-512.

On version 3.0+ Lg-DMX/DC, Dipswitches #5 and #6 set the level of brightness the tests are run at, or disable the ‘test’ function completely (both ‘on’).

On each sequential push of the ‘Test’ button:

1. ‘Test’ Button must be held for approximately three seconds on this initial push. All outputs are turned ‘Off’. ‘Test’ LED begins flashing. If the test won’t start, check that Dipswitches #5 and #6 are not both ‘on’. This will disable the ‘test’ function on v3.0+ Lg-DMX/DC.
2. Output #0 is turned on (v3.0+ output level depends on Dipswitches #5 and #6).
3. Output #1 is turned on (v3.0+ output level depends on Dipswitches #5 and #6).
4. Output #2 is turned on (v3.0+ output level depends on Dipswitches #5 and #6).
5. Output #3 is turned on (v3.0+ output level depends on Dipswitches #5 and #6).
6. Output #4 is turned on (v3.0+ output level depends on Dipswitches #5 and #6).
7. Output #5 is turned on (v3.0+ output level depends on Dipswitches #5 and #6).
8. Output #6 is turned on (v3.0+ output level depends on Dipswitches #5 and #6).
9. Output #7 is turned on (v3.0+ output level depends on Dipswitches #5 and #6).
10. All Outputs are turned on (v3.0+ output level depends on Dipswitches #5 and #6).
11. Outputs #0, #2, #4 and #6 are turned on (v3.0+ output level depends on Dipswitches #5 and #6).
12. Outputs #1, #3, #5 and #7 are turned on (v3.0+ output level depends on Dipswitches #5 and #6).
13. Test mode is ended and the Lg-DMX/DC is returned to normal operation. ‘Test’ LED stops flashing.

Lg-DMX/DC Indicators

Each Lg-DMX/DC has twelve LED indicators. These are:

1) Outputs:

Eight red LEDs show the status of each of the outputs. These dim and brighten as the each of the outputs is ramped up and down.

2) Test:

One LED flashes whenever the Lg-DMX/DC is in one of the twelve 'test' modes. If this LED is flashing, one or more of the outputs will be 'under test' and will not follow the DMX-512 commands coming in. Depending on the position of Dipswitch 4, all of the other outputs may be forced 'off'.

3) DMX-512:

This one green LED will flash on each DMX-512 packet received. If the DMX-512 is coming in quickly enough, the LED will appear to glow continuously.

4) Heart:

This one green LED will flash as long as the Lg-DMX/DC is operating properly.

Lg-DMX/DC Connections

There are only a small number of connections on each Lg-DMX/DC:

1) Power:

The Lg-DMX/DC will run on any DC voltage from about 9 volts up to 24 volts. This power can come from batteries or a DC power supply that is run from line current. The incandescent lamps, LEDs, motors, or whatever you are controlling also run from the same power supply. The voltage that these devices need to run will determine the voltage of the power supply you will be using.

The DC fed into the Lg-DMX/DC does not have to be filtered. If you are running incandescent lamps, a bridge rectifier can be used between a simple transformer and the Lg-DMX/DC to full wave rectify the AC.

If you use an unregulated power supply, you may see some variations in your controlled devices as the voltage sent into the Lg-DMX/DC wobbles. If your loads are going to be constantly changing levels (as on a light parade float or flicker flame effect), you will never see these variations. A regulated power supply will always give you more consistent lighting levels.

The power supply will have to be sized appropriately for the loads you are controlling. If you are simultaneously controlling ten amps on four outputs, you will need to use a minimum forty amp power supply! Most larger supplies these days are 'switching' types. Large linear power supplies are available, but less common. 'Brute Force' power supplies are basically a transformer, rectifier and capacitor. These are big and (relatively) cheap, but are unregulated. If you are on a budget, there are a lit of cheap 'battery eliminator' power supplies that are made to run auto accessories from a wall outlet. These put out 13.8 volts DC, and are available in either regulated or unregulated models.

Because incandescent lamps draw the greatest current when they are just turning on, you may need to allow additional current capacity for this. If you find that this causes a power supply voltage drop during an installation, you can 'warm' up the lamp filaments by setting them to 5 or 10% (bright enough to start glowing) for a second or two before turning them to a brighter level.

Because the power supply may be providing a great deal of current, you will need to wire the power supply to the Lg-DMX/DC using heavy gauge wires. The longer the wire runs are, then the heavier the wires will need to be. If your wires get warm, or you measure a large voltage drop between the power supply and the Lg-DMX/DC, then you need to use heavier wires.

The continuous current load on the Lg-DMX/DC should not exceed forty amps. This is the current rating for the power screw terminals.

If the voltage being fed to the Lg-DMX/DC ever drops below about five volts, it may cause the Lg-DMX/DC to reset. You will see this as a slight flicker on the outputs. The only solution to this is to use a larger power supply or heavier wires between the Lg-DMX/DC and power supply.

2) DMX-512 In/Out:

The two standard DMX-512 connections ('data +' and 'data -') are attached to these terminals, along with (optionally) the wire shield. If there is a chance that the Lg-DMX/DC will not be powered up, then the it is safest to also attach any downstream DMX-512 devices to the same set of terminals. In that way, an unpowered Lg-DMX/DC won't break the DMX-512 daisy chain.

If the wire runs are long, you may need to add a 120Ω (typically) termination resistor to the two extreme ends of the DMX-512 daisy chain.

3) Buffered DMX-512 Out:

If DMX-512 needs to be run to additional downstream DMX-512 devices, the two standard DMX-512 connections ('data +' and 'data -') are attached to these terminals, along with (optionally) the wire shield. The DMX-512 received through the DMX-512 In/Out terminals will be buffered and retransmitted on these terminals. If the Lg-DMX/DC is not powered up, then the signals applied to the DMX-512 In/Out terminals will NOT be retransmitted.

If the DMX-512 is buffered through the Ld-DMX/DC, these terminals will form the beginning of a new DMX-512 daisy chain. If the wire runs are long, you may need to add a 120Ω (typically) termination resistor to the two extreme ends of the DMX-512 daisy chain.

4) Outputs:

The eight output loads are attached to these terminals. If you are attaching incandescent lamps or other non-polarized loads, you don't need to worry about the '+' and '-' markers on each output. If you are controlling motors, LEDs, or other polarized loads, you will need to wire the positive lead to the '+' terminal, and the negative lead to the '-' terminal. Each output is protected by a flyback diode for driving inductive loads.

The outputs act like circuit breakers. When they are overloaded, they open up the circuit. When the short is removed, they return to normal operation. Short term 'hard' shorts should be avoided on the outputs, as the surge can damage the output HEXFETs before the circuit breakers have a chance to open.

The output HEXFETs are conservatively rated at ten amps. You can easily control ten amp loads on as many as four outputs simultaneously. The continious current load on the Lg-DMX/DC should not exceed forty amps. This is the current rating for the power screw terminals.

If you need additional current capacity or higher voltages must be controlled, you can use the Lg-DMX/DC outputs to drive larger off-board DC solid state relays. These are available with current capacities of 40 amps or more, with voltage capacities into the hundreds of volts.

Lg-DMX/DC Configuration

There are three rotary switches used set the DMX-512 address of the Ld-DMX/DC. You set the address by simply dialing in the DMX address of the first output to these three switches. You can use American-style (1-512) DMX addressing, or European-style (0-511) DMX-512 addressing, depending on the state of Dipswitch #7.

Th eight position DipSwitch is used to configure the other options on the Lg-DMX/DC:

1. DipSwitch 1: Update rate
2. DipSwitch 2: Update rate
3. DipSwitch 3: Update rate

The Lg-DMX/DC can be set to update the outputs at a variety of rates from about 60 Hz to about 15 KHz. You can adjust the frequency as needed to provide the best dimming and quietest output to your loads. Most light dimmers are updated at the line frequency of the local power. In most cases this is either 100 or 120 Hertz (update rate is twice the line frequency). The Lg-DMX/DC's higher frequency update rates can be used to keep LEDs from strobing, or to reduce audible interference to a nearby sound system.

DipSwitch 1	Dipswitch 2	Dipswitch 3	Update Frequency
off	off	off	61 Hz
on	off	off	122 Hz
off	on	off	244 Hz
on	on	off	488 Hz
off	off	on	977 Hz
on	off	on	1953 Hz
off	on	on	7812 Hz
on	on	on	15.625 KHz

4. DipSwitch 4: Disable Under Test

The Lg-DMX/DC can be set override the DMX-512 it receives when any output is being tested.

a) If off, then all outputs will be forced 'off' when any output is being tested. Any output(s) that are 'under test' will be forced to 100%.

b) If on, then the outputs will continue following the DMX-512 data that is being received. Any output(s) that are 'under test' will be forced to 100%.

5. DipSwitch 5: Output level when testing
6. DipSwitch 6: Output level when testing

On version 3.0+ Lg-DMX/DC, Dipswitches #5 and #6 set the level of brightness the tests are run at, or disable the 'test' function completely (both 'on').

DipSwitch 5	Dipswitch 6	Output under test goes to this level
off	off	100%
on	off	50%
off	on	25%
on	on	Disables ALL 'Tests'

7. DipSwitch 7: European (0-511) or USA (1-512) DMX-512 Addresses

On version 3.0+ Lg-DMX/DC, this switch allows you to select whether the DMX-512 addresses set on the three rotary switches are entered in the European (0-511) or American (1-512) ranges of numbers. The American DMX-512 channel '1' is the same as the European DMX-512 channel '0'. This feature was not available on previous versions of the Lg-DMX/DC.

a) If off, then DMX-512 addressing is from 0-511

b) If on, then DMX-512 addressing is from 1-512

Most GilderGear uses the European-style (0-511) addressing.

8. DipSwitch 8: Disable on loss of DMX-512

On version 3.0+ Lg-DMX/DC, The Lg-DMX/DC can be set turn off all the outputs when the DMX-512 input goes away. On previous versions of the Lg-DMX/DC, this feature was on Dipswitch #2-10

a) If off, then all outputs will be forced 'off' approximately ten seconds after the DMX-512 is lost.

b) If on, then the outputs will stay at the last level set by the DMX-512, even after the DMX-512 has gone away.

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	())		233	E9h	(i)	
42	2Ah	*		106	6Ah	j		170	AAh	(*)		234	EAh	(j)	
43	2Bh	+		107	6Bh	k		171	ABh	(+)		235	EBh	(k)	
44	2Ch	‘		108	6Ch	l		172	ACh	(‘)		236	ECh	(l)	
45	2Dh	-		109	6Dh	m		173	ADh	(-)		237	EDh	(m)	
46	2Eh			110	6Eh	n		174	AEh	(•)		238	EEh	(n)	
47	2Fh	/		111	6Fh	o		175	AFh	(/)		239	EFh	(o)	
48	30h	0		112	70h	p		176	B0h	(0)		240	F0h	(p)	
49	31h	1		113	71h	q		177	B1h	(1)		241	F1h	(q)	
50	32h	2		114	72h	r		178	B2h	(2)		242	F2h	(r)	
51	33h	3		115	73h	s		179	B3h	(3)		243	F3h	(s)	
52	34h	4		116	74h	t		180	B4h	(4)		244	F4h	(t)	
53	35h	5		117	75h	u		181	B5h	(5)		245	F5h	(u)	
54	36h	6		118	76h	v		182	B6h	(6)		246	F6h	(v)	
55	37h	7		119	77h	w		183	B7h	(7)		247	F7h	(w)	
56	38h	8		120	78h	x		184	B8h	(8)		248	F8h	(x)	
57	39h	9		121	79h	y		185	B9h	(9)		249	F9h	(y)	
58	3Ah	:		122	7Ah	z		186	BAh	(:)		250	FAh	(z)	
59	3Bh	;		123	7Bh			187	BBh	(;)		251	FBh	( )	
60	3Ch	<		124	7Ch			188	BCh	(<)		252	FCh	( )	
61	3Dh	=		125	7Dh	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%