

Control

DMX 512 COMMUNICATION FORMAT - ST/SX SERIES

DMX 512 is a serial digital communication protocol created specially for controlling lights, and is specified by USITT standard. The data is transmitted asynchronously in a serial format using 422 differential pair data link. The standard provides for communicating with 512 channels (each having 8 bits). The data to each channel is transmitted sequentially starting with the first and ending with the last implemented (see Figure 2). This means that DMX 512 is of variable length and only the data that is needed is transmitted, therefore making the update time shorter if a smaller number of lights or channels is implemented.

In DMX 512 systems, the data is transmitted in 8-bit words preceded by a start-bit followed by two stop-bits. The Baud rate is 250 kilobits per second (250K Baud). The first 8 bits of data have special meaning, denoting the "start code." This code signifies one of 256 different start codes making the 512 data words to follow unique. The start code for dimmers is set to zero (0), leaving all other 255 start codes available. Using all of the start codes and all of the channels available, DMX 512 can implement a grand total of 131,072 total channels (256 start codes X 512 channels per start code). There is a "break" or silence for a period of 88.0 • Sec and then all the data is retransmitted.

The DMX 512 throughput varies with the number of lights implemented. Using the maximum number gives:

$$(11 \text{ bits/word})(512 \text{ words/block})(4.0 \text{ • Sec/bit})$$

$$+ (88.0 \text{ • Sec delay}) = 22.62 \text{ milliseconds/block}$$

$$[(8 \text{ bits})(512 \text{ words})] / (22.62 \text{ milliseconds/block})$$

$$= 181.1 \text{ KBaud of throughput}$$

ST/SX DMX PARAMETER ASSIGNMENTS

<u>DMX#</u>	<u>FUNCTION</u>	<u>NOTES</u>
Base	Pan Course	X
Base+1	Pan Fine	X1
Base+2	Tilt Course	Y
Base+3	Tilt Fine	Y1
Base+4	Dimmer	Mechanical Douser
Base+5	Focus	Mechanical Lamp Travel
Base+6	Color	Scroller
Base+7	Command Word	Commands (i.e., STRIKE)
Base+8	Command Execute	Reset, Sleep, and Wake-up

Figure 2:

<u>COMMAND</u>	<u>COMMAND WORD</u>		<u>COMMAND EXECUTE</u>	
	STEP 1	STEP 1	STEP 1	STEP2
Lamp Strike	43	86	86	171
Lamp Kill	85	86	86	171
Wake-up	127	86	86	171
Reset/Calibrate	169	86	86	171
Sleep	211	86	86	171

All numbers are true decimal values (0 through 255).

All Syncrolite units are addressed as a unit in a show. Their DMX starting numbers must meet the 9-channel setup. The starting DMX number for each unit cannot be picked at random. Please refer to the DMX card or the chart to find the starting DMX number for each unit address.

MX and SX SERIES 2 DMX PARAMETER ASSIGNMENTS

<u>DMX#</u>	<u>FUNCTION</u>	<u>NOTES</u>
Base	Pan Course	X
Base+1	Pan Fine	X1
Base+2	Tilt Course	Y
Base+3	Tilt Fine	Y1
Base+4	Dimmer	Mechanical Douser
Base+5	Focus	Mechanical Lamp Travel
Base+6	Color	Scroller
Base+7	Command Word	Commands (i.e., STRIKE)
Base+8	Command Execute	Reset, Sleep, and Wake-up
Base+9	Color 2	Scroller 2
base+10	Strobe	Electronic Lamp Strobe

Strobe inactive at 0 value, then proceeds from highest speed to lowest at max. DMX value.

<u>COMMAND</u>	<u>COMMAND WORD</u>		<u>COMMAND EXECUTE</u>	
	STEP 1		STEP 1	STEP 2
Lamp Strike	43		86	171
Lamp Kill	85		86	171
Wake-up	127		86	171
Reset/Calibrate	169		86	171
Sleep	211		86	171

All numbers are true decimal values (0 through 255).

Each Syncrolite head is addressed as a unit in a show. The DMX starting number for each unit cannot be picked at random but must meet the 11-channel setup standard. Please refer to the DMX card or the chart to find the starting DMX number for each unit address.

BASE ADDRESSES

Base address depends upon unit ID#.

For ST/SX Series, allow 9 channels per unit as follows:

<u>Unit #</u>	<u>Base Address</u>
1	1
2	10
3	19
4	28
5	37
6	46
7	55
8	64
etc.	

For MX and SX Series 2, allow 11 channels per unit as follows:

<u>Unit #</u>	<u>Base Address</u>
1	1
2	12
3	23
4	34
5	45
6	56
7	67
8	78
etc.	

For your convenience we are including a DMX chart. This chart has all of the channel numbers and command assignments for all Syncrolites.

SX/ST Series DMX Chart

INS#	PAN		TILT		Douser	Beam	Color	CW	CE
1	1	2	3	4	5	6	7	8	9
2	10	11	12	13	14	15	16	17	18
3	19	20	21	22	23	24	25	26	27
4	28	29	30	31	32	33	34	35	36
5	37	38	39	40	41	42	43	44	45
6	46	47	48	49	50	51	52	53	54
7	55	56	57	58	59	60	61	62	63
8	64	65	66	67	68	69	70	71	72
9	73	74	75	76	77	78	79	80	81
10	82	83	84	85	86	87	88	89	90
11	91	92	93	94	95	96	97	98	99
12	100	101	102	103	104	105	106	107	108
13	109	110	111	112	113	114	115	116	117
14	118	119	120	121	122	123	124	125	126
15	127	128	129	130	131	132	133	134	135
16	136	137	138	139	140	141	142	143	144
17	145	146	147	148	149	150	151	152	153
18	154	155	156	157	158	159	160	161	162
19	163	164	165	166	167	168	169	170	171
20	172	173	174	175	176	177	178	179	180
21	181	182	183	184	185	186	187	188	189
22	190	191	192	193	194	195	196	197	198
23	199	200	201	202	203	204	205	206	207
24	208	209	210	211	212	213	214	215	216
25	217	218	219	220	221	222	223	224	225
26	226	227	228	229	230	231	232	233	234
27	235	236	237	238	239	240	241	242	243
28	244	245	246	247	248	249	250	251	252
29	253	254	255	256	257	258	259	260	261
30	262	263	264	265	266	267	268	269	270
31	271	272	273	274	275	276	277	278	279
32	280	281	282	283	284	285	286	287	288
33	289	290	291	292	293	294	295	296	297
34	298	299	300	301	302	303	304	305	306
35	307	308	309	310	311	312	313	314	315
36	316	317	318	319	320	321	322	323	324
37	325	326	327	328	329	330	331	332	333
38	334	335	336	337	338	339	340	341	342
39	343	344	345	346	347	348	349	350	351
40	352	353	354	355	356	357	358	359	360
41	361	362	363	364	365	366	367	368	369
42	370	371	372	373	374	375	376	377	378
43	378	380	381	382	383	384	385	386	387
44	388	389	390	391	392	393	394	395	396
45	397	398	399	400	401	402	403	404	405
46	406	407	408	409	410	411	412	413	414
47	415	416	417	418	419	420	421	422	423
48	424	425	426	427	428	429	430	431	432
49	433	434	435	436	437	438	439	440	441
50	442	443	444	445	446	447	448	449	450
51	451	452	453	454	455	456	457	458	459
52	460	461	462	463	464	465	466	467	468
53	469	470	471	472	473	474	475	476	477
54	478	479	480	481	482	483	484	485	486
55	487	488	489	490	491	492	493	494	495
56	496	497	498	499	500	501	502	503	504

MX/SX Series 2 DMX Chart

INS#	PAN		TILT		Douser	Beam	Color 1	CW	CE	Color 2	Strobe
	1	2	3	4	5	6	7	8	9	10	11
1	1	2	3	4	5	6	7	8	9	10	11
2	12	13	14	15	16	17	18	19	20	21	22
3	23	24	25	26	27	28	29	30	31	32	33
4	34	35	36	37	38	39	40	41	42	43	44
5	45	46	47	48	49	50	51	52	53	54	55
6	56	57	58	59	60	61	62	63	64	65	66
7	67	68	69	70	71	72	73	74	75	76	77
8	78	79	80	81	82	83	84	85	86	87	88
9	89	90	91	92	93	94	95	96	97	98	99
10	100	101	102	103	104	105	106	107	108	109	110
11	111	112	113	114	115	116	117	118	119	120	121
12	122	123	124	125	126	127	128	129	130	131	132
13	133	134	135	136	137	138	139	140	141	142	143
14	144	145	146	147	148	149	150	151	152	153	154
15	155	156	157	158	159	160	161	162	163	164	165
16	166	167	168	169	170	171	172	173	174	175	176
17	177	178	179	180	181	182	183	184	185	186	187
18	188	189	190	191	192	193	194	195	196	197	198
19	199	200	201	202	203	204	205	206	207	208	209
20	210	211	212	213	214	215	216	217	218	219	220
21	221	222	223	224	225	226	227	228	229	230	231
22	232	233	234	235	236	237	238	239	240	241	242
23	243	244	245	246	247	248	249	250	251	252	253
24	254	255	256	257	258	259	260	261	262	263	264
25	265	266	267	268	269	270	271	272	273	274	275
26	276	277	278	279	280	281	282	283	284	285	286
27	287	288	289	290	291	292	293	294	295	296	297
28	298	299	300	301	302	303	304	305	306	307	308
29	309	310	311	312	313	314	315	316	317	318	319
30	320	321	322	323	324	325	326	327	328	329	330
31	331	332	333	334	335	336	337	338	339	340	341
32	342	343	344	345	346	347	348	349	350	351	352
33	353	354	355	356	357	358	359	360	361	362	363
34	364	365	366	367	368	369	370	371	372	373	374
35	375	376	377	378	379	380	381	382	383	384	385
36	386	387	388	389	390	391	392	393	394	395	396
37	397	398	399	400	401	402	403	404	405	406	407
38	408	409	410	411	412	413	414	415	416	417	418
39	419	420	421	422	423	424	425	426	427	428	429
40	430	431	432	433	434	435	436	437	438	439	440
41	441	442	443	444	445	446	447	448	449	450	451
42	452	453	454	455	456	457	458	459	460	461	462
43	463	464	465	466	467	468	469	470	471	472	473
44	474	475	476	477	478	479	480	481	482	483	484
45	485	486	487	488	489	490	491	492	493	494	495
46	496	497	498	499	500	501	502	503	504	505	506