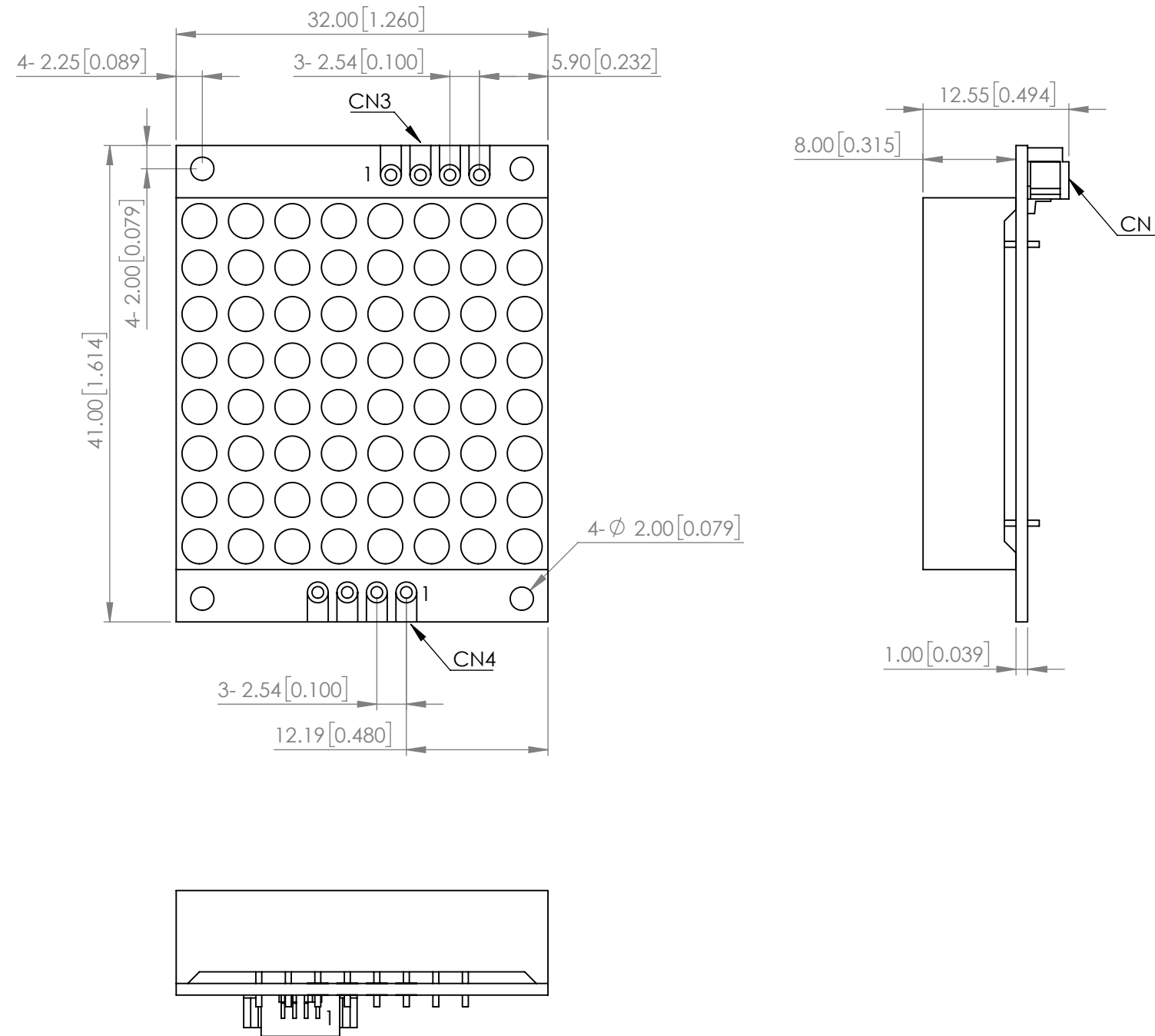


**PRELIMINARY**



**ELECTRO-OPTICAL CHARACTERISTIC TA=25°C PER DOT**

PARAMETER	MIN	TYP	MAX	UNITS	TEST COND
PEAK WAVELENGTH	-	660	-	nm	If=10mA
FORWARD VOLTAGE	-	1.8	2.0	Vf	If=10mA
REVERSE CURRENT	-	-	100	uA	VR=5V
LUMINOUS INTENSITY	-	5	-	mcd	If=10mA
EMITTED COLOR	RED				
FACE COLOR	BLACK				
SEGMENT COLOR	MILKY WHITE DIFFUSED				

**ABSOLUTE MAXIMUM RATINGS TA=25°C PER DOT**

PARAMETER	MAX	UNITS
PEAK FORWARD CURRENT)*	100	mA
FORWARD CURRENT	15	mA
POWER DISSIPATION	30	mW
REVERSE VOLTAGE	5	V
STORAGE TEMPERATURE	-35 TO +85	°C
OPERATING TEMPERATURE	-35 TO +85	°C

\* 1/8Duty, 10kHz

**PIN ASSIGNMENT**

CONNECTOR	PIN	DESCRIPTION
CN1	1	TX1
	2	RX1
	3	3.3V
	4	VSS
CN3	1	TX1
	2	RX1
	3	3.3V
	4	VSS
CN4	1	VSS
	2	TX1
	3	RX1
	4	5V

**UART CONFIGURATION**


ITEM	DESCRIPTION
BAUD RATE	115200
DATA BIT	8
STOP BIT	1
PARITY BIT	NONE
FLOW CONTROL	NONE

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## ezDisplay 8x8 DOT MATRIX LED DISPLAY COMMAND LIST

Code	Function	Instruction of AT Command mode	API for C ( using STM32F030 as an example)
N/A	Send a text or string to 8x8 LED Display	1. type a Text or String 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms	printf("2") while (USART_ReceiveData(UART1) != 'E') {} or printf("012345678ABCD") while (USART_ReceiveData(UART1) != 'E') {}
N/A	Send Image 8x8 (8x8 332/RGB bitmap ) to LED Display (An array consist of 64 bytes bitmap)	1. A ""for"" loop to send 64 bytes user define display information 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms	for (i = 0 ; i < 64; i++) { USART_Write(User_define_array[i]); } while (USART_ReceiveData() !='E') {}
N/A	Send Image 128x16 (128x16 332/RGB bitmap) to LED Display (An array consist of 2048 bytes bitmap)	1. A ""for"" loop to send 2048 bytes user define display information 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms	for (i = 0 ; i < 2048; i++) { USART_Write(User_define_array[i]); } while (USART_ReceiveData(UART1) != 'E') {}
0x80	Write a 5X7 Character	1. AT80=(line,column,Character) 2. Wait until receive a module available byte ('E') from ezDisplay <example> AT80=(0,0,A)	printf("at80=(%d,%d,%d)",Line,Column,Character); while (USART_ReceiveData(UART1) != 'E') {} or input directly printf("at80=(0,0,A)"); while (USART_ReceiveData(UART1) != 'E') {}
0x81	Write a 5X7 String	1. AT81=(line,column,String) 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> AT81=(0,0,ABCD1234)	printf("at81=(%d,%d,%s)",Line,Column,String); while (USART_ReceiveData(UART1) != 'E') {} or printf("at81=(%d,%d,%d)",Line,Column,Value); while (USART_ReceiveData(UART1) != 'E') {} or printf("at81=(%d,%d,%f)",Line,Column,Value); while (USART_ReceiveData(UART1) != 'E') {} or input directly printf("at81=(0,0,ABCD9876%\$)"); while (USART_ReceiveData(UART1) != 'E') {}
0x84	Dsisplay a 8X8 pattern	1. AT84=(X position,Y position, pattern ID) 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> AT84=(16,32,1)	printf("at84=(16,32,1)"); while (USART_ReceiveData(UART1) != 'E') {}


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 <p>425 N. GARY AVE. CAROL STREAM, IL 60188 PHONE : 800-278-5666 FAX : 630-315-2150 WEB : WWW.LUMEX.COM</p>	41.0(L)*32.0(W)*12.55(H)mm, 1.3"/8*8 DOT MATRIX LED DISPLAY, 660nm RED, BLACK FACE WITH MILKY DOTS, 64 GRAY LEVELS, UART INTERFACE	DATE : 2021.03.16	DRAWN BY : E.C.	
	**THE SPECIFICATIONS MAY CHANGE AT ANY TIME WITHOUT NOTICE.**	PAGE : 2 OF 9	CHKD BY : E.C.	
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## ezDisplay 8x8 DOT MATRIX LED DISPLAY COMMAND LIST

Code	Function	Instruction of AT Command mode	API for C ( using STM32F030 as an example)
0x85	Dsisplay a 8X16 pattern	1. AT85=(X position,Y position,pattern ID) 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> AT85=(16,32,1)	printf("at85=(16,32,1)"); while (USART_ReceiveData(UART1) != 'E') {}
0x90	Draw a line	1. AT90=(X0 position,Y0 position,X1 position,Y1 position,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT90=(1,4,54,4,4) : '4' green color	printf("at90=(%d,%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,Xcoordinate2,Ycoordinate2,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at90=(1,4,54,4,4)"); while (USART_ReceiveData(UART1) != 'E') {}
0x91	Draw a Rectangle	1. AT91=(X0 position,Y0 position,X1 position,Y1 position,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT91=(0,0,55,7,2) : '2' blue color	printf("at91=(%d,%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,Xcoordinate2,Ycoordinate2,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at91=(0,0,55,7,2)"); while (USART_ReceiveData(UART1) != 'E') {}
0x92	Draw a filled Rectangle	1. AT92=(X0 position,Y0 position,X1 position,Y1 position,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT92=(1,1,54,6,32) : '32' red color	printf("at92=(%d,%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,Xcoordinate2,Ycoordinate2,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at92=(0,0,55,7,2)"); while (USART_ReceiveData(UART1) != 'E') {}
0x93	Draw a Square	1. AT93=(X position,Y position,Width,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT93=(48,1,4,2) : '2' blue color	printf("at93=(%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,Width,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at93=(48,1,4,2)"); while (USART_ReceiveData(UART1) != 'E') {}
0x94	Draw a Circle	1. AT94=(X position,Y position,Radius,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT94=(48,4,3,2) : '2' blue color	printf("at94=(%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,Radius,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at94=(48,4,3,2)"); while (USART_ReceiveData(UART1) != 'E') {}


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 <p>425 N. GARY AVE. CAROL STREAM, IL 60188 PHONE : 800-278-5666 FAX : 630-315-2150 WEB : WWW.LUMEX.COM</p>	41.0(L)*32.0(W)*12.55(H)mm, 1.3"/8*8 DOT MATRIX LED DISPLAY, 660nm RED, BLACK FACE WITH MILKY DOTS, 64 GRAY LEVELS, UART INTERFACE	DATE : 2021.03.16	DRAWN BY : E.C.	
	**THE SPECIFICATIONS MAY CHANGE AT ANY TIME WITHOUT NOTICE.**	PAGE : 3 OF 9	CHKD BY : E.C.	
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## ezDisplay 8x8 DOT MATRIX LED DISPLAY COMMAND LIST

Code	Function	Instruction of AT Command mode	API for C ( using STM32F030 as an example)
0x95	Draw a filled Circle	1. AT95=(X position,Y position,Radius,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT95=(48,4,3,4) : '4' green color	<pre>printf("at95=(%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,Radius,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at95=(48,4,3,4)"); while (USART_ReceiveData(UART1) != 'E') {}</pre>
0x96	Draw a tip upward Triangle	1. AT96=(X position,Y position,Height,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT96=(48,1,3,4) : '4' green color	<pre>printf("at96=(%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,height,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at96=(48,1,3,4)"); while (USART_ReceiveData(UART1) != 'E') {}</pre>
0x97	Draw a filled tip upward Triangle	1. AT97=(X position,Y position,Height,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT97=(48,1,3,32) : '32' red color	<pre>printf("at97=(%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,height,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at97=(48,1,3,32)"); while (USART_ReceiveData(UART1) != 'E') {}</pre>
0x98	Draw a tip downward Triangle	1. AT98=(X position,Y position,Height,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT98=(48,6,3,4) : '4' green color	<pre>printf("at98=(%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,height,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at98=(48,1,3,4)"); while (USART_ReceiveData(UART1) != 'E') {}</pre>
0x99	Draw a filled tip downward Triangle	1. AT99=(X position,Y position,Height,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT99=(48,6,3,4) : '4' green color	<pre>printf("at99=(%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,height,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at99=(48,1,3,4)"); while (USART_ReceiveData(UART1) != 'E') {}</pre>
0x9a	Draw a tip leftward Triangle	1. AT9a=(X position,Y position,Width,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT9a=(48,4,2,4) : '4' green color	<pre>printf("at9a=(%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,height,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at9a=(48,1,3,4)"); while (USART_ReceiveData(UART1) != 'E') {}</pre>


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		UNIT : mm [INCH]		Ⓢ

## ezDisplay 8x8 DOT MATRIX LED DISPLAY COMMAND LIST

Code	Function	Instruction of AT Command mode	API for C ( using STM32F030 as an example)
0x9b	Draw a filled tip leftward Triangle	1. AT9b=(X position,Y position,Width,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT9b=(48,4,2,4) : '4' green color	<pre>printf("at9b=(%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,height,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at9b=(48,1,3,4)"); while (USART_ReceiveData(UART1) != 'E') {}</pre>
0x9c	Draw a tip rightward Triangle	1. AT9c=(X position,Y position,Width,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT9c=(48,4,2,4) : '4' green color	<pre>printf("at9c=(%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,height,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at9c=(48,1,3,4)"); while (USART_ReceiveData(UART1) != 'E') {}</pre>
0x9d	Draw a filled tip rightward Triangle	1. AT9d=(X position,Y position,Width,Color_code) Color_code : MONO color->0~64 RGB color-> 0~255 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <RGB LED example> AT9d=(48,4,2,4) : '4' green color	<pre>printf("at9d=(%d,%d,%d,%d)",Xcoordinate1,Ycoordinate1,height,Color_code); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at9d=(48,1,3,4)"); while (USART_ReceiveData(UART1) != 'E') {}</pre>
0x9e	Set a Pixel as default Color	1. AT9e=(X position,Y position) 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> AT9e=(120,32)	<pre>printf("at9e=(%d,%d)",Xcoordinate1,Ycoordinate1); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at9e=(12,8)"); while (USART_ReceiveData(UART1) != 'E') {}</pre>
0x9f	Clear a Pixel	1. AT9f=(X position,Y position) 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> AT9f=(32,32)	<pre>printf("at9f=(%d,%d)",Xcoordinate1,Ycoordinate1); while (USART_ReceiveData(UART1) != 'E') {}  or input directly  printf("at9f=(12,8)"); while (USART_ReceiveData(UART1) != 'E') {}</pre>
0xa	Shift eight row up	1. ATab=() 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATab=()	<pre>printf("atab=()"); while (USART_ReceiveData(UART1) != 'E') {}</pre>


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 <b>LUMEX</b> Creating LED and LCD Solutions Together™	425 N. GARY AVE. CAROL STREAM, IL 60188 PHONE : 800-278-5666 FAX : 630-315-2150 WEB : WWW.LUMEX.COM	41.0(L)*32.0(W)*12.55(H)mm, 1.3"/8*8 DOT MATRIX LED DISPLAY, 660nm RED, BLACK FACE WITH MILKY DOTS, 64 GRAY LEVELS, UART INTERFACE	DATE : 2021.03.16	DRAWN BY : E.C.	
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## ezDisplay 8x8 DOT MATRIX LED DISPLAY COMMAND LIST

Code	Function	Instruction of AT Command mode	API for C ( using STM32F030 as an example)
0xac	Shift one row up	1. ATac= 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATac=()	printf("atc="); while (USART_ReceiveData(UART1) != 'E') {}
0xad	Shift one row down	1. ATad= 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATad=()	printf("atd="); while (USART_ReceiveData(UART1) != 'E') {}
0xae	Shift one column left	1. ATae= 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATae=()	printf("atae="); while (USART_ReceiveData(UART1) != 'E') {}
0xaf	Shift one column right	1. ATaf= 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATaf=()	printf("ataf="); while (USART_ReceiveData(UART1) != 'E') {}
0xd0	Clear display	1. ATd0= 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATd0=()	printf("atd0="); while (USART_ReceiveData(UART1) != 'E') {}
0xd1	Show the data in the display memory	1. ATd1= 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATd1=()	printf("atd1="); while (USART_ReceiveData(UART1) != 'E') {}
0xd2	Scroll the whole display upward	1. ATd2=(shif time in ms) 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATd2=(20)	printf("atd2=(30)"); while (USART_ReceiveData(UART1) != 'E') {}
0xd3	Scroll the whole display downward	1. ATd3=(shif time in ms) 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATd3=(20)	printf("atd3=(30)"); while (USART_ReceiveData(UART1) != 'E') {}


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		UNIT : mm [INCH]		

## ezDisplay 8x8 DOT MATRIX LED DISPLAY COMMAND LIST

Code	Function	Instruction of AT Command mode	API for C ( using STM32F030 as an example)
0xd4	Scroll the whole display leftward	1. ATd4=(shif time in ms) 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATd4=(20)	printf("atd4=(30)"); while (USART_ReceiveData(UART1) != 'E') {}
0xd5	Scroll the whole display rightward	1. ATd5=(shif time in ms) 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATd5=(20)	printf("atd5=(30)"); while (USART_ReceiveData(UART1) != 'E') {}
0xf0	Turn display Off	1. ATf0=() 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATf0=()	printf("atf0=()"); while (USART_ReceiveData(UART1) != 'E') {}
0xf1	Turn display On	1. ATf1=() 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATf1=()	printf("atf1=()"); while (USART_ReceiveData(UART1) != 'E') {}
0xf2	Set the brightness of RGB LED Display	1. ATf2=(level of brightness 0~11) 2. Wait until receive a module available byte ('E') from ezDisplay or delay 10 ms <example> ATf2=(3)	printf("atf2=(8)"); while (USART_ReceiveData(UART1) != 'E') {}


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COLOR CODE TABLE

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111

\*UNLESS OTHERWISE SPECIFIED TOLERANCES PER DECIMAL PRECISION ARE: X=±1 (±0.039), X.X=±0.5 (±0.020), X.XX=±0.25 (±0.010), X.XXX=±0.127 (±0.005). LEAD SIZE=±0.05 (±0.002), LEAD LENGTH=±0.75 (±0.030). MIN= <sup>+DECIMAL PRECISION</sup> -0.00 MAX= <sup>+0.00</sup> -DECIMAL PRECISION

 <p>425 N. GARY AVE. CAROL STREAM, IL 60188 PHONE : 800-278-5666 FAX : 630-315-2150 WEB : WWW.LUMEX.COM</p>	41.0(L)*32.0(W)*12.55(H)mm, 1.3"/8*8 DOT MATRIX LED DISPLAY, 660nm RED, BLACK FACE WITH MILKY DOTS, 64 GRAY LEVELS, UART INTERFACE		DATE : 2021.03.16	DRAWN BY : E.C.	
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				UNIT : mm [INCH]	(No)



## ASCII CODE OF 5X7 FONTS AND 8X16 FONTS

HEX	SYMBOL	HEX	SYMBOL	HEX	SYMBOL
0x20		0x40	@	0x60	`
0x21	!	0x41	A	0x61	a
0x22	"	0x42	B	0x62	b
0x23	#	0x43	C	0x63	c
0x24	\$	0x44	D	0x64	d
0x25	%	0x45	E	0x65	e
0x26	&	0x46	F	0x66	f
0x27		0x47	G	0x67	g
0x28	(	0x48	H	0x68	h
0x29	)	0x49	I	0x69	i
0x2a	*	0x4a	J	0x6a	j
0x2b	+	0x4b	K	0x6b	k
0x2c	,	0x4c	L	0x6c	l
0x2d	-	0x4d	M	0x6d	m
0x2e	.	0x4e	N	0x6e	n
0x2f		0x4f	O	0x6f	o
0x30	0	0x50	P	0x70	p
0x31	1	0x51	Q	0x71	q
0x32	2	0x52	R	0x72	r
0x33	3	0x53	S	0x73	s
0x34	4	0x54	T	0x74	t
0x35	5	0x55	U	0x75	u
0x36	6	0x56	V	0x76	v
0x37	7	0x57	W	0x77	w
0x38	8	0x58	X	0x78	x
0x39	9	0x59	Y	0x79	y
0x3a	:	0x5a	Z	0x7a	z
0x3b	;	0x5b	]	0x7a	{
0x3c	<	0x5c	\	0x7a	
0x3d	=	0x5d	[	0x7a	}
0x3e	>	0x5e	^	0x7a	~
0x3f	?	0x5f	_	0x7a	<-

## ASCII CODE OF 16X16 FONTS

HEX	SYMBOL
0x30	0
0x31	1
0x32	2
0x33	3
0x34	4
0x35	5
0x36	6
0x37	7
0x38	8
0x39	9

## NO. OF 8X16 PATTERN

No.	Symbol
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

## NO. OF 8X8 PATTERN

No.	Symbol
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

## NO. OF 16X16 PATTERN

No.	Symbol
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

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DATE : 2021.03.16

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PAGE : 9 OF 9

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SCALE : NTF

APRVD BY : --

UNIT : mm [INCH]

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