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APPLICATION NOTE 1131

Selecting Numeric and Alphanumeric Display Configurations for the MAX6954 and MAX6955 SPI and I²C LED Display Drivers

Abstract: This application note uses a web based Java program to allow an engineer to simulate the wide range of display configurations of the MAX6954 and MAX6955 serial interfaced LED display drivers. The tool enables the user to check which LED digit, character, discrete and combinations may be used.

This application note discusses connecting the MAX6954 and MAX6955 to a variety of LED display types. The MAX6954 and MAX6955 are 7-, 14- and 16-Segment LED display drivers that are controlled through a high-speed SPI (MAX6954) or I²C (MAX6955) serial interface.

Determining the Appropriate Connection Scheme for your Design

To aid in designing a MAX6954/MAX6955 controlled Display an online tool is available. This tool allows you to enter the display digit types you intend to use, and provides the corresponding connection scheme, as well as the Digit Type Register contents for the design. The MAX6954/MAX6955 Connection Scheme Tool requires a web browser that supports JavaScript. If you experience any problems with the tool, please contact Maxim Customer Applications and an engineer will be happy to help.

Electrical Connection of the MAX6954 or MAX6955 to LED Displays

Each MAX6954 or MAX6955 drives common-cathode mono-color digits (Table 1), or bi-color digits (Table 2). The multiplexing engine doesn't know or care whether mono-color or bi-color displays are used; bi-color digits are treated both electrically and in software as two mono-color digits.

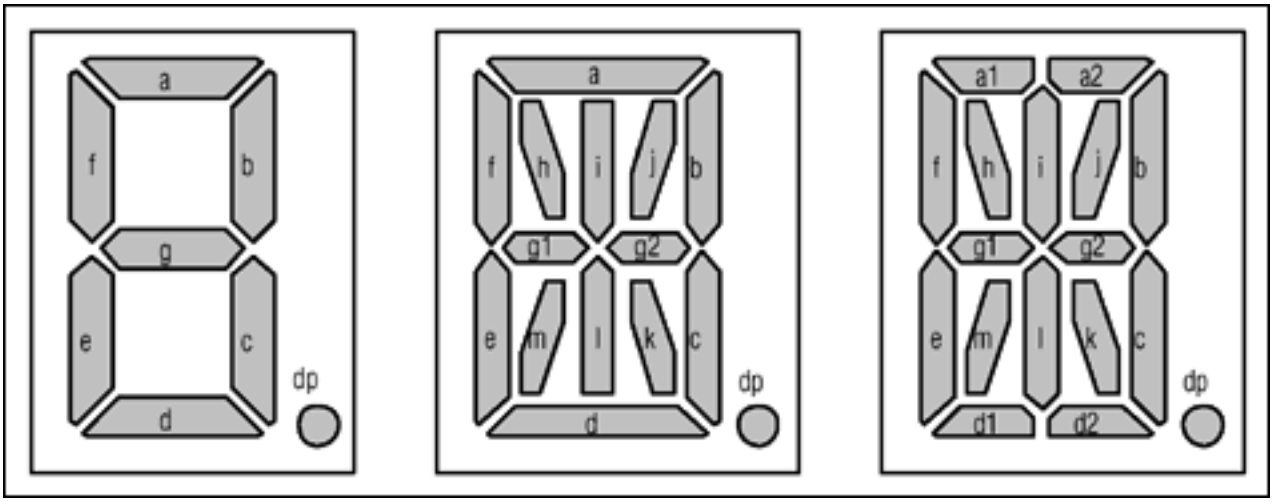

Figure 1. Segment labeling for 7-, 14-, and 16-segment displays.

Table 1. MAX6954 and MAX6955 Connection to 8 Monocolor 16-Segment Digits

Digit	O0	O1	O2	O3	O4	O5	O6	O7	O8	O8	O10	O11	O12	O13	O14	O15	O16	O17	O18
0	CC0		a1	a2	b	c	d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
1		CC1	a1	a2	b	c	d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
2	a1	a2	CC2		b	c	d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
3	a1	a2		CC3	b	c	d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
4	a1	a2	b	c	CC4		d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
5	a1	a2	b	c		CC5	d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
6	a1	a2	b	c	d1	d2	CC6		e	f	g1	g2	h	i	j	k	l	m	dp
7	a1	a2	b	c	d1	d2		CC7	e	f	g1	g2	h	i	j	k	l	m	dp

Table 2. MAX6954 and MAX6955 Connection to 4 Bicolor 16-Segment Digits

Digit	O0	O1	O2	O3	O4	O5	O6	O7	O8	O8	O10	O11	O12	O13	O14	O15	O16	O17	O18
0	CC0		a1	a2	b	c	d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
1		CC1	a1	a2	b	c	d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
2	a1	a2	CC2		b	c	d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
3	a1	a2		CC3	b	c	d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
4	a1	a2	b	c	CC4		d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
5	a1	a2	b	c		CC5	d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
6	a1	a2	b	c	d1	d2	CC6		e	f	g1	g2	h	i	j	k	l	m	dp
7	a1	a2	b	c	d1	d2		CC7	e	f	g1	g2	h	i	j	k	l	m	dp

Driving Multiple Digit Types using the MAX6954 or MAX6955

The Digit Type (0x0C) and Decode Mode (0x01) Registers can be used to configure the MAX6954/MAX6955 to drive multiple display types simultaneously. Using the connection scheme in Tables 3 and 4 the MAX6954/MAX6955 drive (1) 16-Segment Monocolor Digit, (1) 14-Segment Monocolor Digit, (1) 7-Segment Bicolor Digit, (3) 7-Segment Monocolor Digits, (1) 14-Segment Bicolor Digit, (8) Bicolor Discrete LEDs and (8) Monocolor Discrete LEDs. The corresponding Digit Type and Decode Mode Register values are contained in Tables 5 and 6.

Table 3. MAX6954 and MAX6955 Slot Assignments

Register Data									
SLOT 4				SLOT 3		SLOT 2		SLOT 1			
D7		D6		D5	D4	D3	D2	D1		D0	
(8) Disc. Bi. LEDs (Green 1/2)	7-Seg. Mono.	(8) Disc. Bi. LEDs (Red 1/2)	7-Seg. Mono.	14-Seg. Bi. (Green 1/2)	14-Seg. Bi. (Red 1/2)	16-Seg. Mono.	14-Seg. Mono.	7-Seg. Mono.	7-Seg. Bi. (Green 1/2)	(8) Disc. Mono. LEDs	7-Seg. Bi. (Red 1/2).

Table 4. Example MAX6954 and MAX6955 Connection Scheme

Digit	O0	O1	O2	O3	O4	O5	O6	O7	O8	O8	O10	O11	O12	O13	O14	O15	O16	O17	O18
0	CC0		1a		1b	1c	1d	1dp	1e	1f	1g	2a	2b	2c	2d	3e	2f	2g	2dp
1		CC1	1a		1b	1c	1d	1dp	1e	1f	1g	2a	2b	2c	2d	3e	2f	2g	2dp
2	a		CC2		b	c	d		e	f	g1	g2	h	i	j	k	l	m	dp
3	a1	a2		CC3	b	c	d1	d2	e	f	g1	g2	h	i	j	k	l	m	dp
4	a		b	c	CC4		d		e	f	g1	g2	h	i	j	k	l	m	dp
5	a		b	c		CC5	d		e	f	g1	g2	h	i	j	k	l	m	dp
6	1a		1b	1c	1d	1dp	CC6		1e	1f	1g	2a	2b	2c	2d	2e	2f	2g	2dp
7	1a		1b	1c	1d	1dp		CC7	1e	1f	1g	2a	2b	2c	2d	2e	2f	2g	2dp

Table 5. Example MAX6954 and MAX6955 Digit Type Register Contents (0x0C)

Register Data							
D7	D6	D5	D4	D3	D2	D1	D0
0	0	1	1	0	1	0	0

Table 6. Example MAX6954 and MAX6955 Decode Mode Register Contents (0x01)

Register Data							
D7	D6	D5	D4	D3	D2	D1	D0
0	0	1	1	1	1	0	0

Application Note 1131: http://www.maxim-ic.com/an1131

More Information

For technical questions and support: http://www.maxim-ic.com/support
For samples: http://www.maxim-ic.com/samples
Other questions and comments: http://www.maxim-ic.com/contact

Related Parts

MAX6954: QuickView -- Full (PDF) Data Sheet -- Free Samples

MAX6955: QuickView -- Full (PDF) Data Sheet -- Free Samples

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