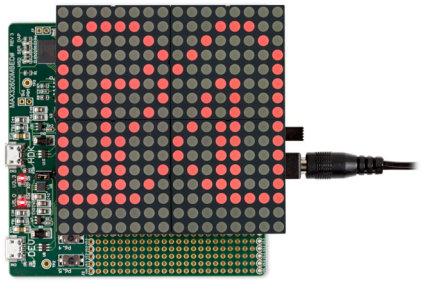
Maxim Integrated
MAXREFDES99
Display Driver Reference Design



Overview

Maxim's MAXREFDES99# is an Arduino® form-factor shield which drives a 16x16 LED array for signage applications. This design is ideal for anyone developing a display application. The board features Maxim's MAX7219, an LED driver that simplifies the process of controlling multiple LEDs in matrix or numeric display form. In MAXREFDES99#, four MAX7219 ICs are daisy chained to drive a full 256-LED array, which can display any international alphanumeric symbol. The board arrives complete with four 8x8 LED displays.

Code for the MAXREFDES99# is available on both Arduino and ARM® mbed™ platforms for quick prototyping with multiple platform boards. System demonstrations include the display of ASCII characters 'SPACE' through '~' and writing/scrolling string messages. Developers are encouraged to build upon and enhance the code base.

Features

- Flexible 16x16 Dot Matrix Display
- mbed.org library
- Arduino library
- Arduino form-factor shield

Competitive Advantages

- Portable
- Compact
- Flexible
- Cost Effective

Required equipment:

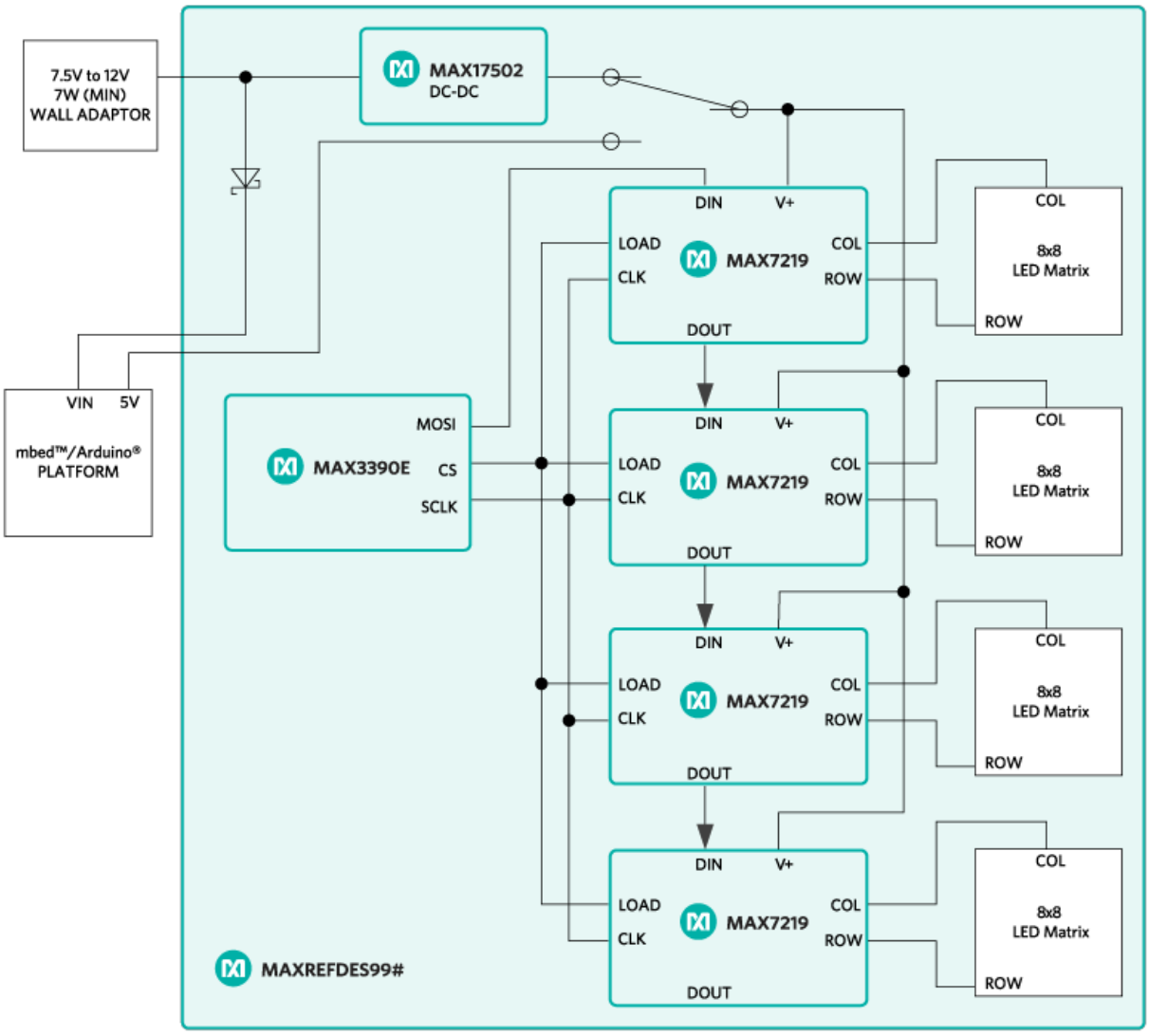
- Windows® PC with a USB port
- MAXREFDES99#
- MAX32600MBED or Arduino® UNO Development board
- 7W (min) Wall-Wart with 7.5VDC to 12VDC output

Procedure

This reference design is fully assembled and tested. Follow the steps below to verify board operation.

1. Connect MAXREFDES99# to the user supplied Mbed®/Arduino platform.
2. Connect wall-wart power adaptor to J1 of MAXREFDES99# and switch the sw1 to the arrow pointing position to turn on the display
3. Connect a USB cable from the PC to the platform.
4. Follow the appropriate instructions below:

1. Arduino
    1. Download the library from the GitHub repository
    2. Extract the MAXREFDES99-master.Zip library file
    3. Open the Arduino IDE, version 1.6.7 or later.
    4. In the tool bar, go to "Sketch" and select "Include Library"
    5. Select "Add .ZIP Library…"
    6. Go to the folder where you extracted the Library
    7. Open folder RD99_ARDUINO_V01_00 and select MAX7219
    8. Navigate to File/Examples/MAX7219/MAXREFDES99_example
2. Mbed
    1. If you have never used Mbed, setup an account and add your platform to your online compiler per the instructions on your platform's product page.
    2. If you are using Windows and have never used serial communications between your PC and your mbed platform, follow these instructions.
    3. Navigate your browser to **https://os.mbed.com/teams/Maxim-Integrated/code/MAXREFDES99_demo/**
    4. Click the 'Import this program' button and import the demo as a 'program'
3. Compile and download the resulting binary to your platform.
4. Open HyperTerminal, or your favorite terminal emulator, find the appropriate COM port for your platform, and configure the connection as following
    1. Arduino - 115200bps, 8-N-1 with no flow control
    2. Mbed - 9600bps, 8-N-1 with no flow control
5. Ensure your terminal settings are configured for 'Auto' on Receive and 'CR+LF' on transmit.
6. Press the reset button on your platform and exercise the demo.
7. When running endless loops on the display, press the reset button on the platform to stop the loop and return to the main menu


7.5V to 12V
7W (MIN)
WALL ADAPTOR
MAX17502
DC-DC
VIN
5V
mbed™/Arduino®
PLATFORM
MAX3390E
MOSI
CS
SCLK
DIN
V+
LOAD
CLK
MAX7219
COL
ROW
DOUT
8x8
LED Matrix
MAXREFDES99#

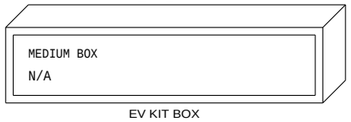
MAXREFDES99 BOM

Designation	Qty	Description
U1	1	IC REG BUCK 5V 1A SYNC 10TDFN MAX17502FATB+
U2	1	IC LVL XLTR LV 8MBPS 14-TSSOP MAX3390EEUD+
U3, U4, U5, U6	4	IC LED DISPLAY DVR 8DGT 24-SOIC MAX7219EWG+
H1, H3	2	CONN HEADER .100 SINGL STR 8POS PBC08SAAN
H2	1	CONN HEADER .100 SINGL STR 6POS PBC06SAAN
H4	1	CONN HEADER .100 SINGL STR 10POS PBC10SAAN
J1	1	CONN POWER JACK 2.1MM PJ-002A
SW1	1	SWITCH SLIDE DPDT 500MA 15V EG2219
D1	1	LED GREEN DIFFUSED 0805 SMD PG1112H-TR
D2	1	DIODE SCHOTTKY 20V 500MA SOD323F PMEG2005EJ,115
D3, D4, D5, D6	4	LED MATRIX 8X8 1.5" 565NM GN TC15-11GWA
C1	1	CAP ALUM 33UF 20% 25V SMD EEE-FT1E330AR
C2	1	CAP CER 2.2UF 100V X7R 1210 GRM32ER72A225KA35L
C3, C8	2	CAP CER 1UF 6.3V X7R 0603 GRM188R70J105KA01D
C4, C6, C7, C10, C12, C14, C16	7	CAP CER 0.1UF 6.3V X7R 0603 GRM188R70J104KA01D
C5	1	CAP CER 10UF 50V X7R 1210 GRM32ER71H106KA12L
C9, C11, C13, C15	4	CAP CER 10UF 10V X5R 0603 C1608X5R1A106K080AC
R1	1	RES SMD 3.3M OHM 1% 1/10W 0603 CRCW06033M30FKEA
R2	1	RES SMD 698K OHM 1% 1/10W 0603 CRCW0603698KFKEA
R3	1	RES SMD 100 OHM 5% 1/10W 0603 CRCW0603100RJNEA
R4	1	RES SMD 470 OHM 5% 1/10W 0603 CRCW0603470RJNEA
R5	1	RES SMD 100K OHM 5% 1/10W 0603 CRCW0603100KJNEA
R6, R7, R8, R9	4	RES SMD 27K OHM 1% 1/10W 0603 CRCW060327K0FKEA
L1	1	AEC-Q200 LPS6235 Series, 22 µH, ± 20%, Shielded, 0.145 ohm, 1.1 A LPS6235-223MRB
NA	1	AC/DC WALL MOUNT ADAPTER 9V 12W WSU090-1300

MECHANICAL

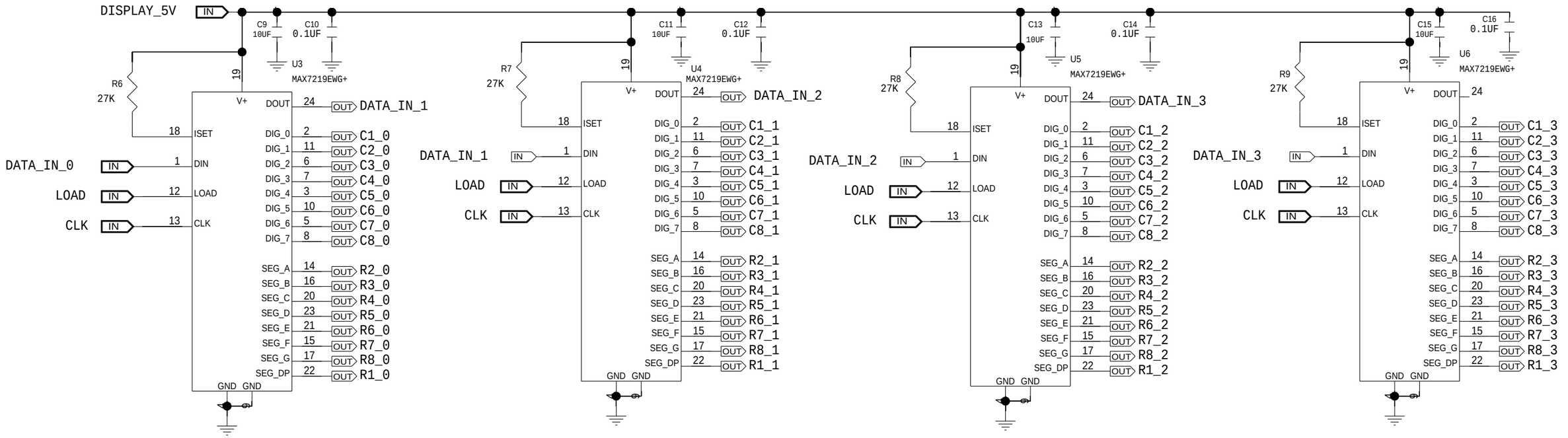
PLEASE SELECT ONE

EV_KIT_BOX2



EV KIT BOX

PROJECT TITLE: MAXREFDES99_APPS			
DRAWING TITLE:			
SIZE B	HARDWARE NUMBER: <HARDWARE_NUMBER>		DATE: 3/10/2016
ENGINEER: JUSTIN JORDON	DRAWN BY: OLIVIA LIAO		REV: C
	TEMPLATE REV: 1.5		SHEET 1 OF 3



DISPLAY ARRANGED AS BELOW:
D3D4
D5D6

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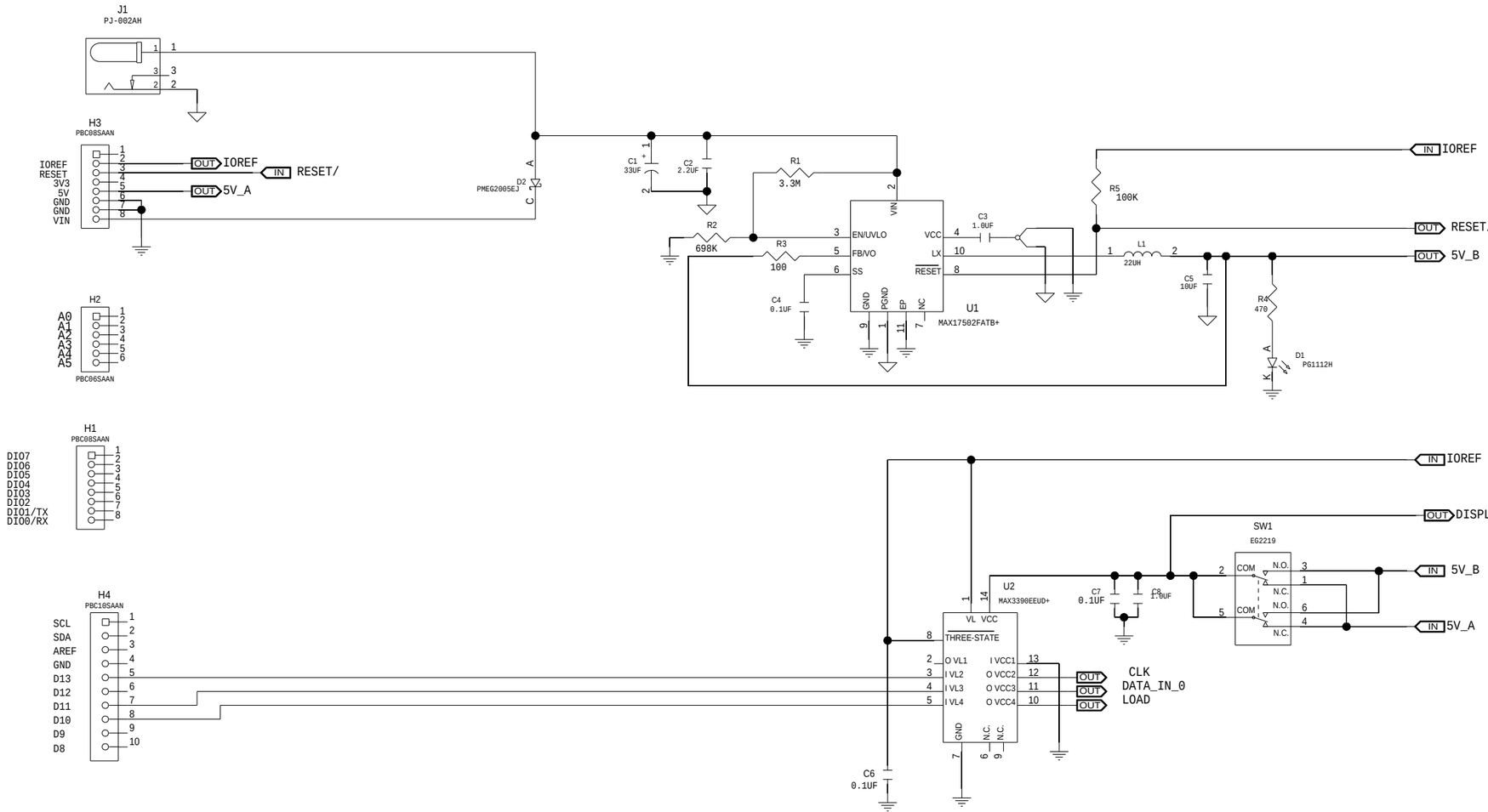
ENGINEER: JUSTIN JORDON	DRAWN BY: OLIVIA LIAO	REV: C
	TEMPLATE REV: 1.5	SHEET 2 OF 3



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SIZE: C	HARDWARE NUMBER: <HARDWARE_NUMBER>	DATE: 3/10/2016
ENGINEER: JUSTIN JORDON	DRAWN BY: OLIVIA LIAO	REV.: C
	TEMPLATE REV.: 1.5	SHEET 3 OF 3