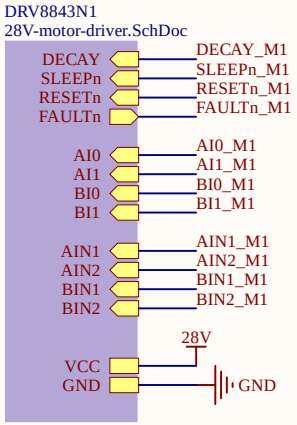
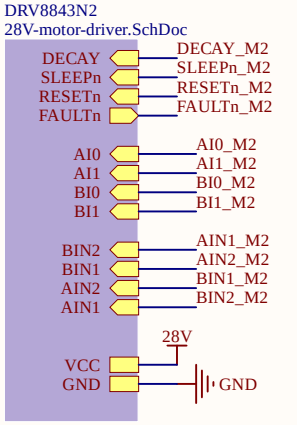
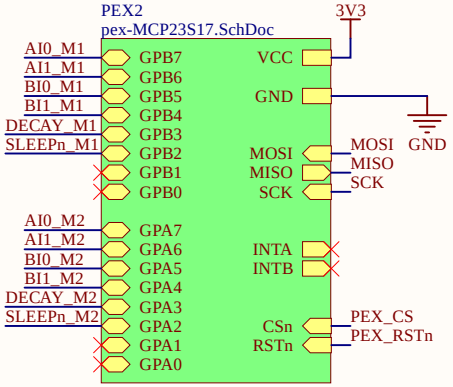
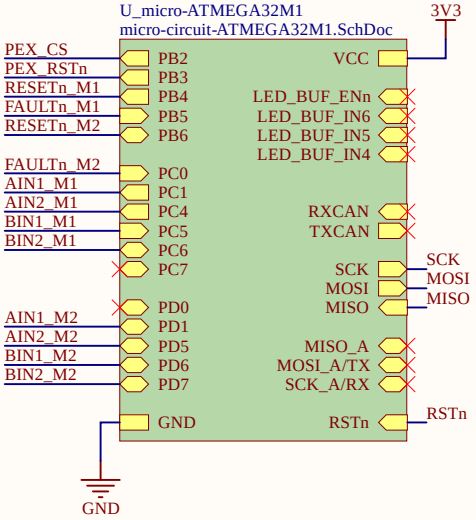
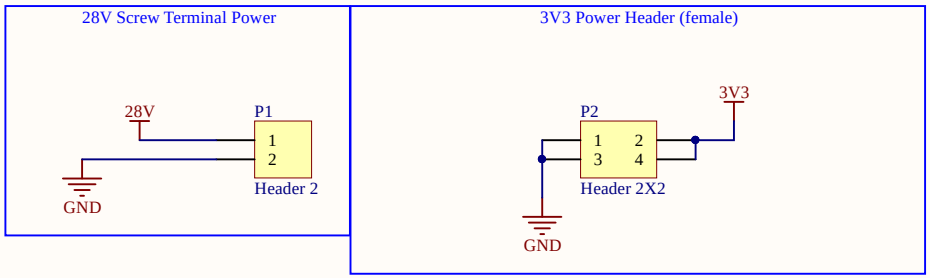
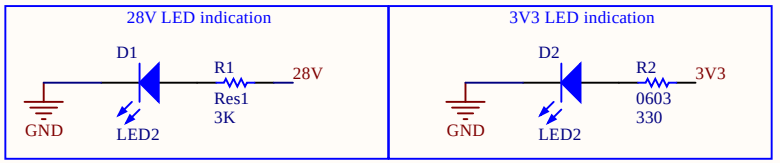




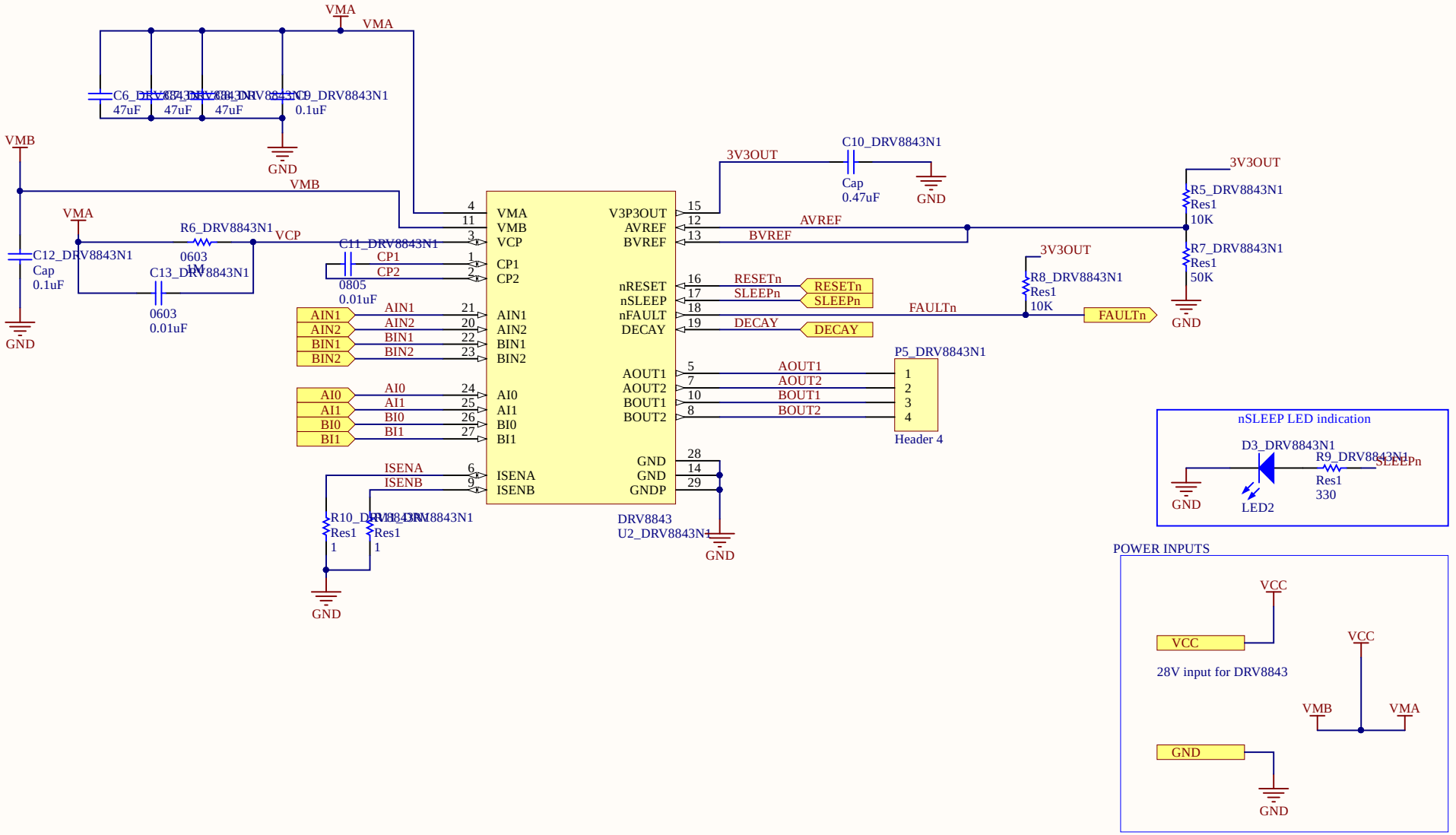




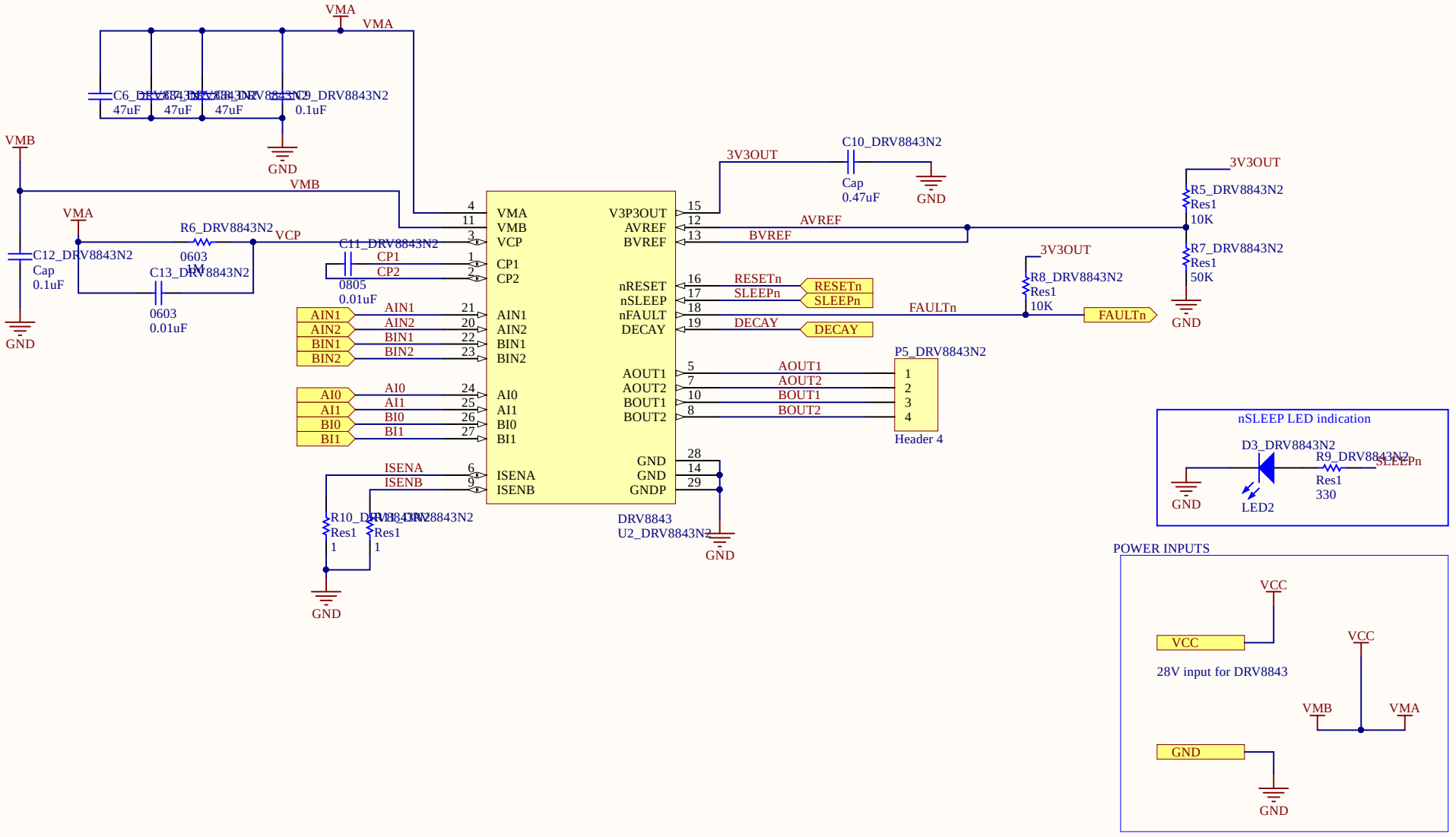




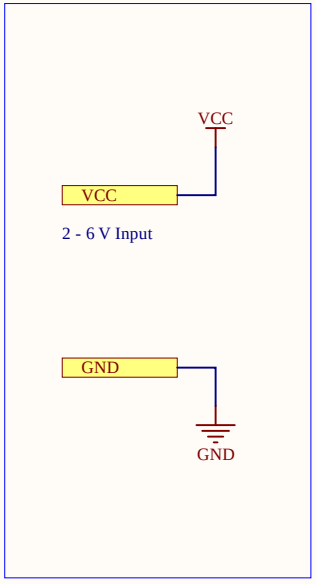
Title		
Size: A4	Number	Revision
Date: 6/3/2019	Sheet of	
File: C:\Users\..\pay-motors-prototype.SchDoc	Drawn By:	

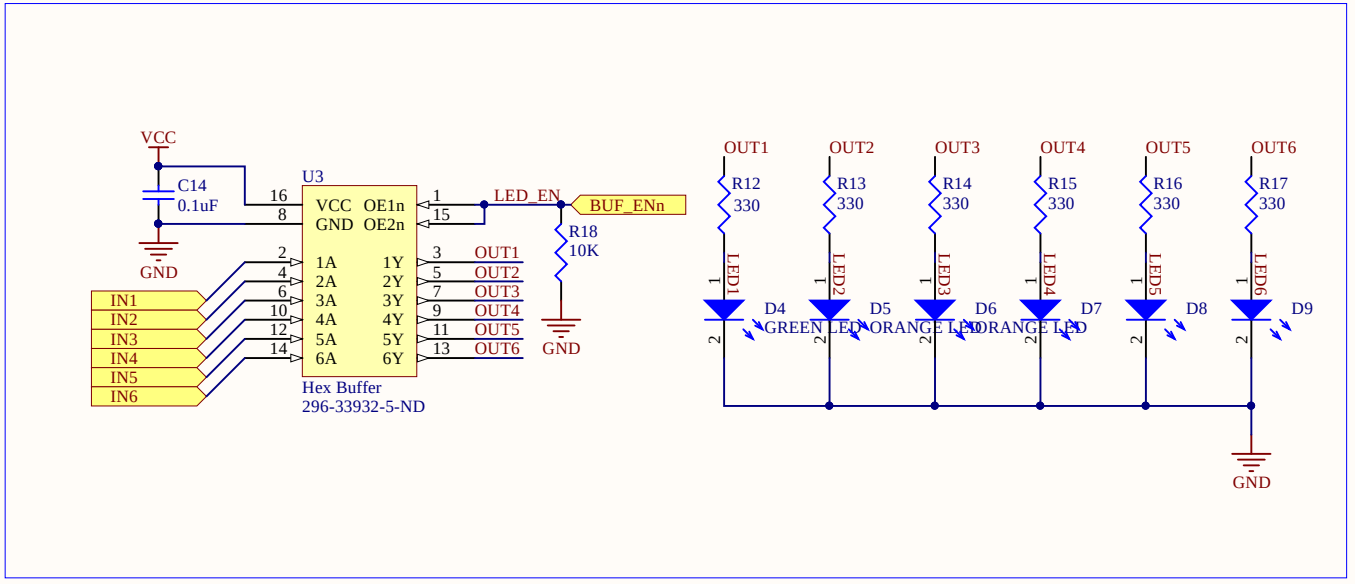


Title		
Size A4	Number	Revision
Date: 6/3/2019		Sheet of
File: C:\Users\..\28V-motor-driver.SchDoc		Drawn By:



Title		
Size A4	Number	Revision
Date: 6/3/2019		Sheet of
File: C:\Users\..\28V-motor-driver.SchDoc		Drawn By:



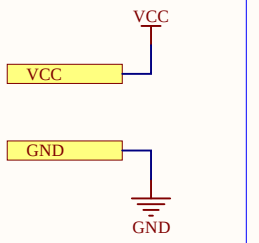


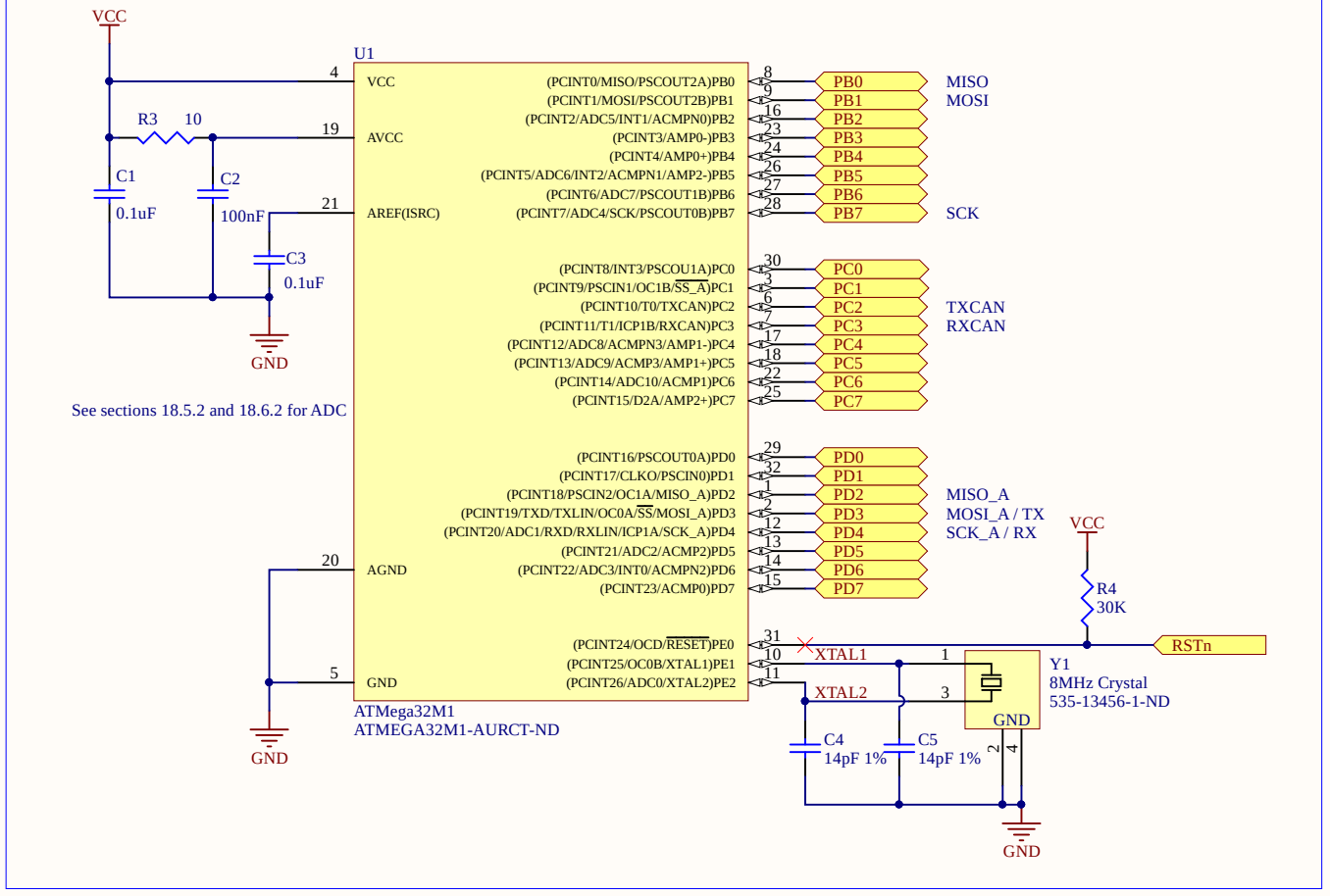
This schematic implements the SN74HC365PW non-inverting, tri-state hex buffer as an LED monitoring circuit. Connecting a signal to IN[1:6] will light up the corresponding LED on OUT[1:6].

- The BUF_ENn input can be connected to a mircocontroller to control the buffer. An input HIGH will set the outputs to high-impedance and disable the LEDs.
- In the schematic symbol which references this schematic sheet, parameters LED[1:6] can be added to specify the colour of each LED. See the micro-circuit common sheet for an example of this.
- Unconnected inputs should be grounded if you don't want random flickering of the LEDs.

Title: SN74HC365PW LED Monitoring		UTAT SS
Size: A4	Number: *	Revision: 1.0
Date: 6/3/2019	Sheet * of *	
File: C:\Users\..\led-monitoring-SN74HC365PW.SchDoc	Drawn By: Dylan Vogel	

POWER INPUT



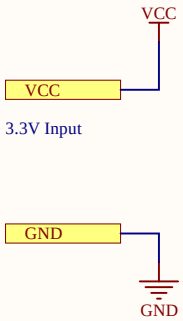


This schematic implements the ATMega32M1 microcontroller with a 8 MHz external crystal and necessary power connections.

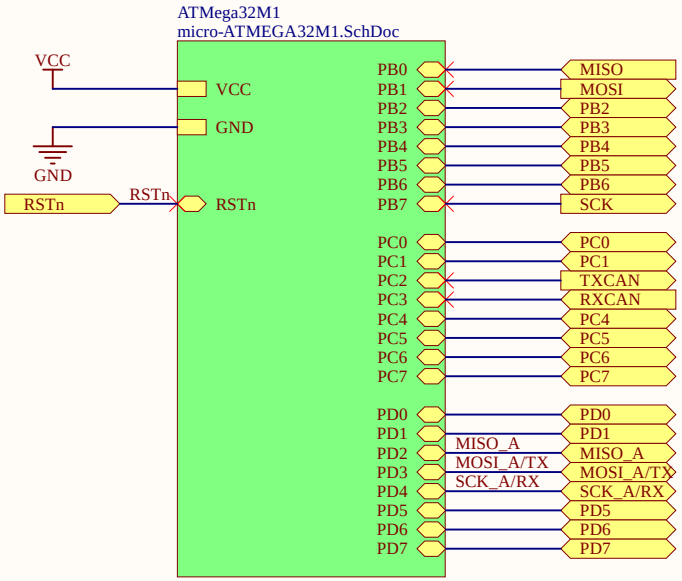
- Crystal is connected in a Pierce configuration, values of the capacitors were calculated based on the capacitance of the crystal and ESR.
- I would read through 18.5.2 and 18.6.2 of the complete 32M1 datasheet if you're interested in the motivation behind the ADC input connections. They recommend connecting AVCC through a RC lowpass network to minimize noise.
- If the ADC functionality of the device is used, either AVCC or the internal 2.56 V source can be seleted in software as the reference voltage.

Title: ATMega32M1		UTAT SS
Size: A4	Number: *	Revision: 1.0
Date: 6/3/2019	Sheet * of *	
File: C:\Users\..\micro-ATMEGA32M1.SchDoc	Drawn By: Dylan Vogel	

POWER INPUTS

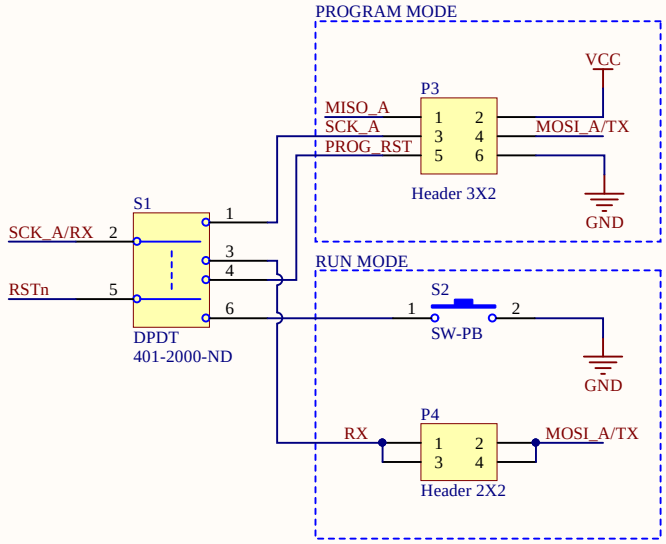


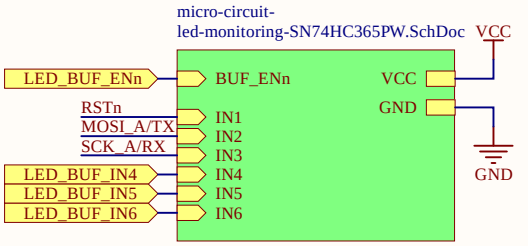
ATMEGA32M1



Specific No-ERCs placed for I/O Port and Bidirectional Sheet Entry

MODE SELECT CIRCUITRY



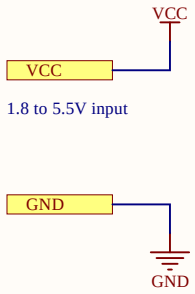


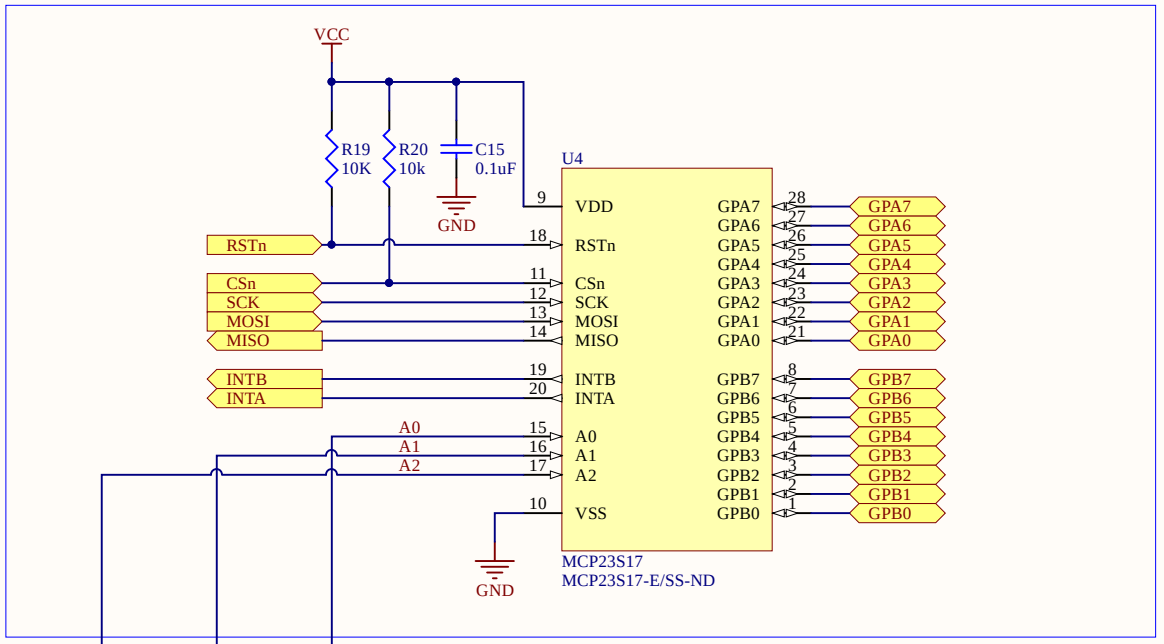
This schematic extends the functionality already included in the micro-ATMEGA32M1 schematc, adding a mode select switch, programming header, reset button and LED indication for TX, RX and RSTn.

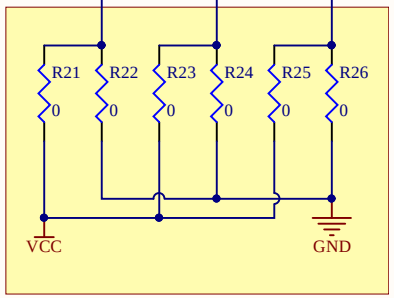
- IN[4:6] of the LED buffer have been left unconnected, but are broken out on ports LED_BUF_IN[4:6]. They can be connected in the schematic which includes this sheet to monitor up to an additional 3 lines. Highly recommend more blinking lights.

Title: ATMega32M1 Circuit		UTAT SS
Size: A4	Number: *	Revision: 1.0
Date: 6/3/2019	Sheet * of *	
File: C:\Users\..\micro-circuit-ATMEGA32M1.SchDoc	Drawn By: Dylan Vogel	

POWER INPUTS







CHANNEL SELECTION

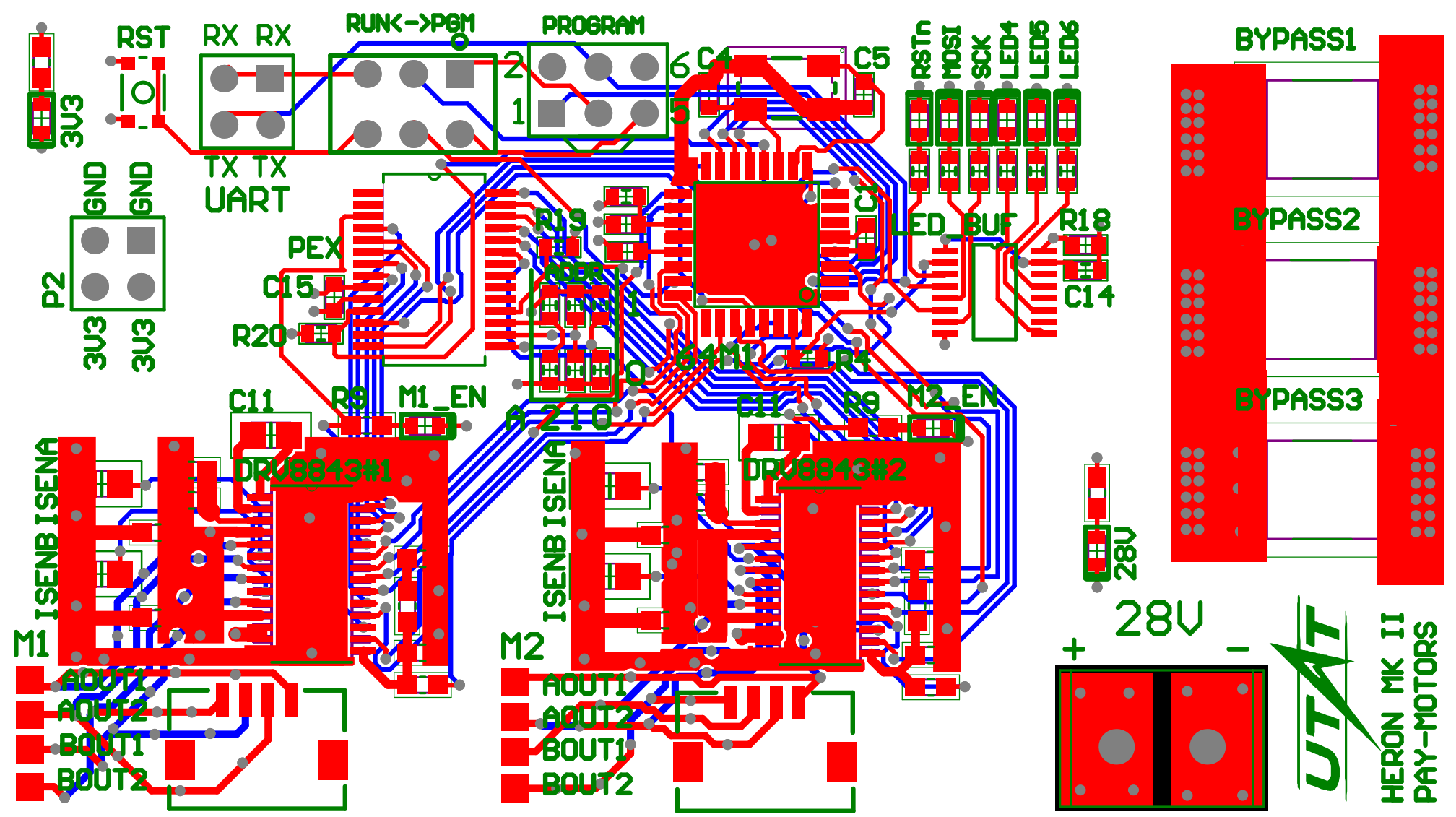
ONLY SOLDER ONE 0 OHM FROM EACH PAIR
PEX ADDRESS = A2 A1 A0
VCC == 1 GND == 0

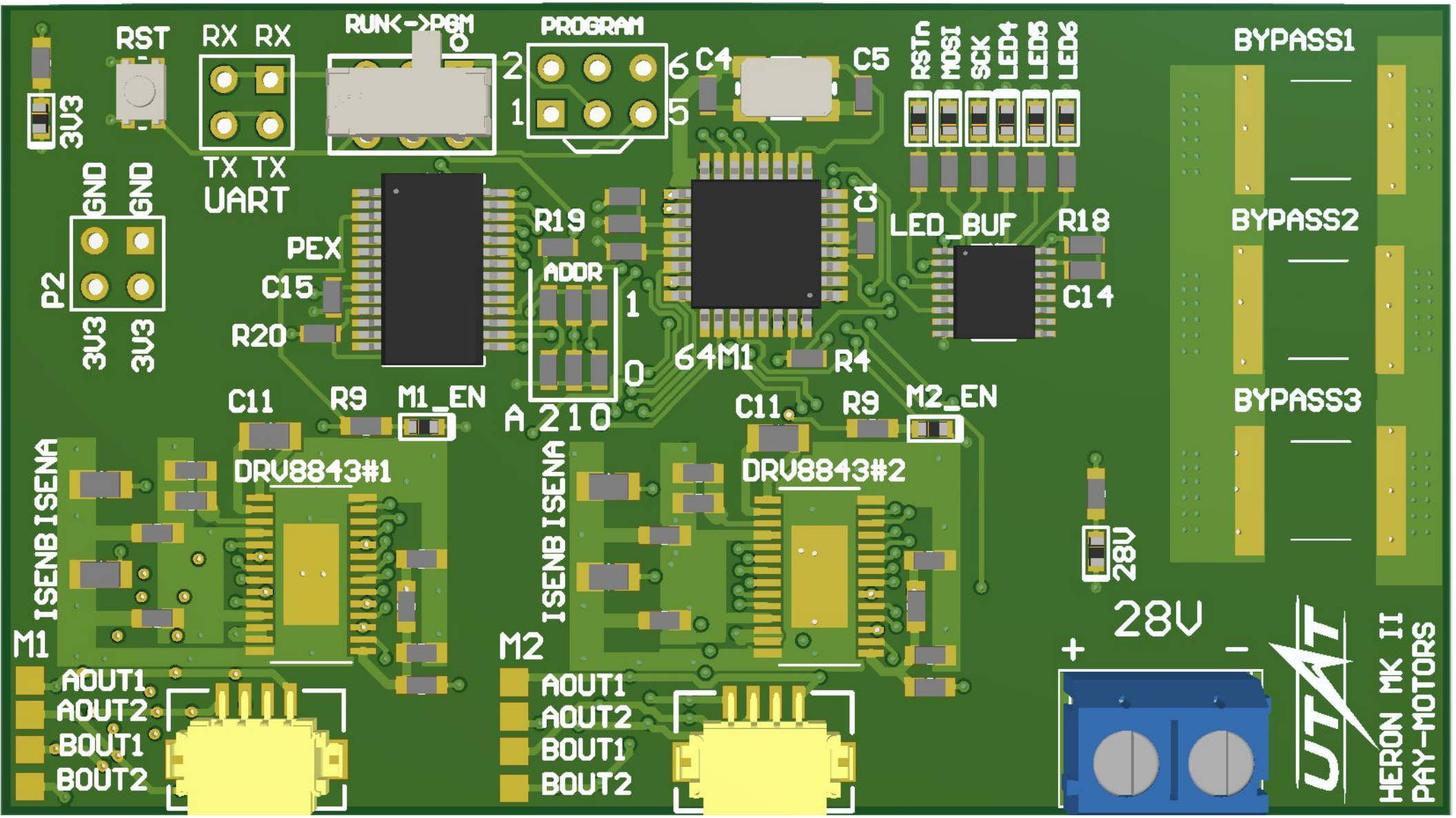
This schematic implements the MCP23S17 SPI port expander, and does some common-sense things like adding a bypass capacitor to the power supply and pull-up resistors to RSTn and CSn.

Multiple port expanders can be connected to the same CSn line, and accessed via a device address that is used during software communication. This address is set in hardware via the A2, A1 and A0 pins. Soldering a 0 ohm resistor to VCC will set that bit to 1, and soldering to GND will set that bit to 0.

In the schematic which includes this file, you should make some note of the relevant hardware address that should be soldered during manufacturing.

Title	MCP23S17		UTAT SS
Size	A4	Number *	Revision 1.0
Date:	6/3/2019	Sheet * of *	
File:	C:\Users\..\pex-MCP23S17.SchDoc	Drawn By:	Dylan Vogel


RST
RX RX
RUN<->PGM
PROGRAM
TX TX
UART
3V3
GND GND
P2
3V3 3V3
PEX
C15
R20
R19
ADDR
C4
C5
C1
RSTn MOSI SCK LED4 LED5 LED6
LED BUF
R18
C14
BYPASS1
BYPASS2
BYPASS3
64M1
R4
C11
R8
M1_EN
DRV8843#1
M1
ISENB ISENA
AOUT1
AOUT2
BOUT1
BOUT2
C11
R9
M2_EN
DRV8843#2
M2
ISENB ISENA
AOUT1
AOUT2
BOUT1
BOUT2
28V
28V
+
-
HERON MK II
PAY-MOTORS


RST
RX RX
TX TX
UART
RUN<->PGM
PROGRAM
2
6
1
5
C4
C5
RSTn
MOSI
SCK
LED4
LED5
LED6
BYPASS1
BYPASS2
BYPASS3
3V3
GND
GND
P2
3V3
3V3
PEX
C15
R20
R19
ADDR
1
0
A 2 1 0
64M1
C1
LED_BUF
R18
C14
R4
C11
R9
M1_EN
DRV8843#1
C11
R9
M2_EN
DRV8843#2
28V
28V
+
-
M1
ISENB ISENA
AOUT1
AOUT2
BOUT1
BOUT2
M2
ISENB ISENA
AOUT1
AOUT2
BOUT1
BOUT2
UTAT
HERON MK II
PAY-MOTORS