J15
SIL-100-06
ICSP (Programming)

J7
SIL-100-05

U1
MCU
PIC - Microprocessor

J6
SIL-100-02

J8
SIL-100-05

J9
SIL-100-02
5V

U2
AND LOGIC

U3
AND LOGIC

U5
INV. BUFFER

U4
NON INV. BUFFER

C2
100nF

R6 1k8 0.25W
R7 1k8 0.25W
R1 1k8 0.25W
R5 1k8 0.25W
R4 1k8 0.25W
R3 1k8 0.25W
R2 1k8 0.25W
R29 1k8 0.25W

R14
1k8
0.25W

R8 270R 0.25W
R9 270R 0.25W
R10 270R 0.25W
R11 270R 0.25W
R12 270R 0.25W
R13 270R 0.25W

C3 100nF
C4 100nF
C5 100nF
C6 100nF
C7 100nF
C8 100nF

U6 OPTO-COUPLER
U7 OPTO-COUPLER
U8 OPTO-COUPLER
U9 OPTO-COUPLER
U10 OPTO-COUPLER
U11 OPTO-COUPLER

CCP1 [PWM]
PWM SIGNAL

HALL_S1 (Brown)
HALL_S2 (Blue)
HALL_S3 (Orange)

RC0 [COIL A+]
CCP1 [PWM]
RC3 [COIL B+]

Drawing:	BLDC Motor PWM Controller (Microcontroller)	0001-PWM-EL-001_Rev34.DSN	Labcenter Electronics
Originator:	Mike Suffolk		
Email:	suffolk.mike@gmail.com	Sheet 1 Of 5 REVISION 34 25 May 2019	

BLDC Motor PWM Controller (H-Bridge) — Schematic Sheet 2 of 5

Drawing: BLDC Motor PWM Controller (H-Bridge)

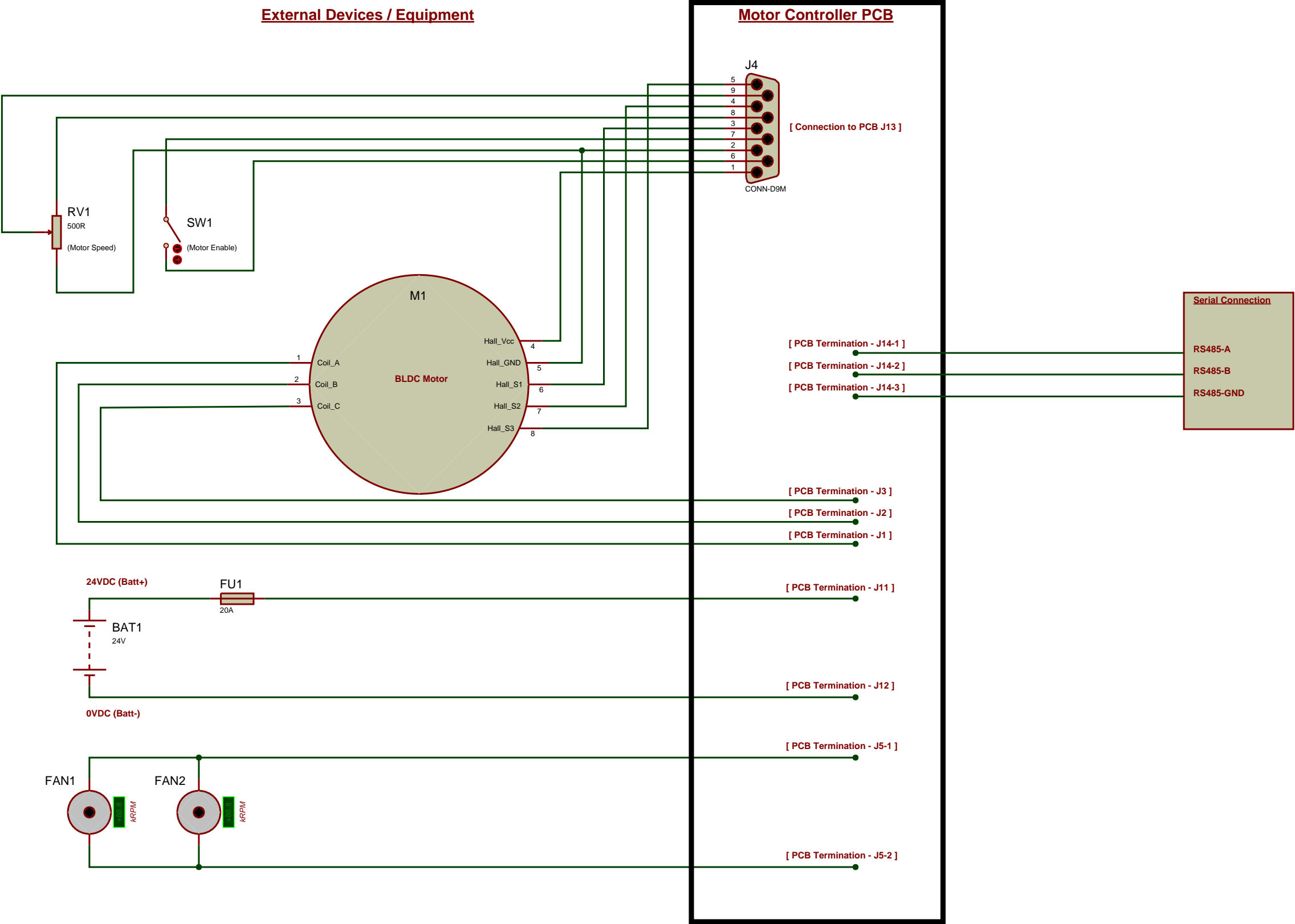Originator: **Mike Suffolk**

Email: **suffolk.mike@gmail.com**

0001-PWM-EL-001_Rev34.DSN

Labcenter Electronics

External Devices / Equipment

Motor Controller PCB

J4

5
9
4
8
3
7
2
6
1

[Connection to PCB J13]

CONN-D9M

RV1
500R
(Motor Speed)

SW1
(Motor Enable)

M1

BLDC Motor

1 Coil_A
2 Coil_B
3 Coil_C

Hall_Vcc 4
Hall_GND 5
Hall_S1 6
Hall_S2 7
Hall_S3 8

Serial Connection

[PCB Termination - J14-1]   **RS485-A**
[PCB Termination - J14-2]   **RS485-B**
[PCB Termination - J14-3]   **RS485-GND**

[PCB Termination - J3]
[PCB Termination - J2]
[PCB Termination - J1]

24VDC (Batt+)

FU1
20A

[PCB Termination - J11]

BAT1
24V

[PCB Termination - J12]

0VDC (Batt-)

[PCB Termination - J5-1]

FAN1   FAN2

kRPM   kRPM

[PCB Termination - J5-2]

Drawing:	**BLDC Motor PWM Controller (External Connections)**	*0001-PWM-EL-001_Rev34.DSN*		**L**abcenter
Originator:	**Mike Suffolk**			
Email:	**suffolk.mike@gmail.com**	*Sheet 3 Of 5*	*REVISION 34*	*25 May 2019*	*E l e c t r o n i c s*
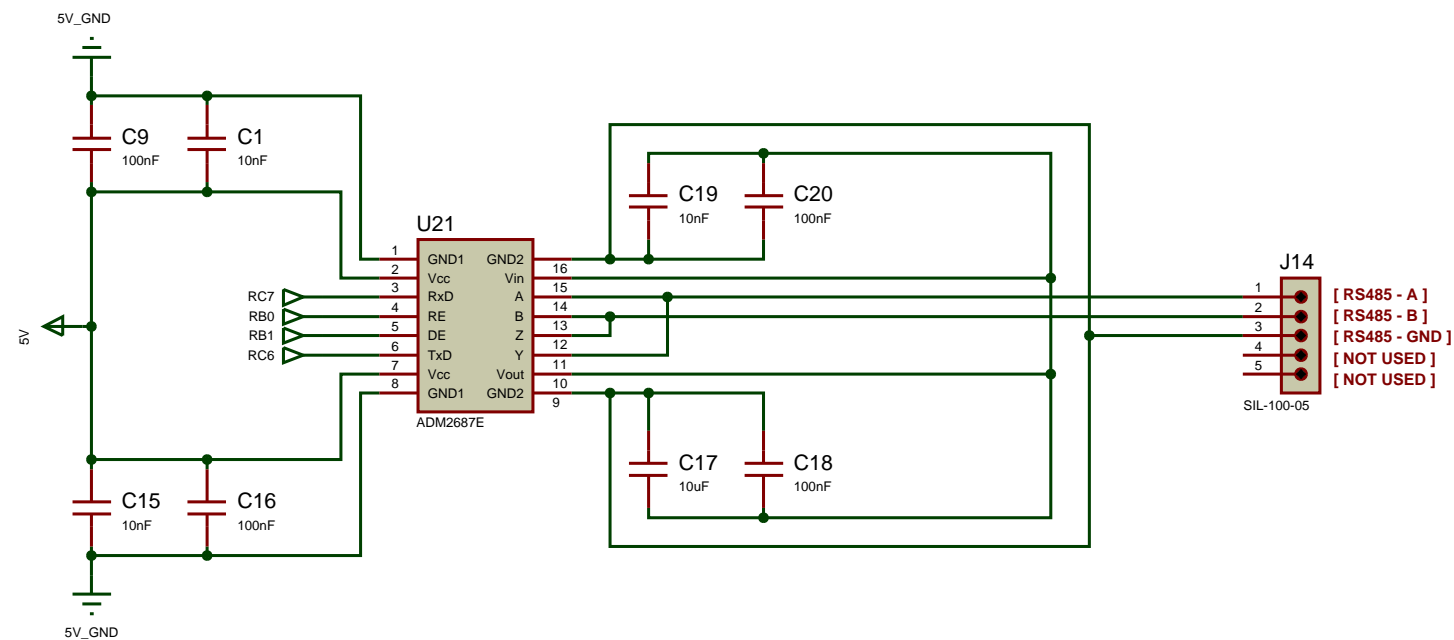
Drawing Notes.

1. PWM signal is used to switch high side (P-Channel) MOSFETs only.

2. Tantalum capacitors C10, C11, & C13 to be mounted as close to voltage regulators as possible.

3. Voltage Regulators (*2), MOSFETs (*6), & Diodes (*6) to be mounted on individual heatsinks.

4. Power wiring (24VDC) 18AWG minimum, all other wiring 24AWG minimum (Type 44).

5. 24VDC input to PCB must be fitted with fuse for over-current protection. (Max 20A.)

6. MCU programmed with application "Source_main_PWM_Controller.c" (Latest revision).

7. Drawing to be read in conjunction with Bill of Materials document "0001-PWM-EL-001 - BOM".

8. PCB Gerber/Layout files supplied separately.

9. Minimum 18AWG solid core wire soldered to legs of Q1-6 & D2-7 on PCB underside

   in accordance with wiring schematic to carry motor current.

10. RS485 serial interface provided for serial communication to MCU.

5V_GND

C9 100nF

C1 10nF

C19 10nF

C20 100nF

5V

U21
ADM2687E

1	GND1	GND2	16
2	Vcc	Vin	15
3	RxD	A	14
4	RE	B	13
5	DE	Z	12
6	TxD	Y	11
7	Vcc	Vout	10
8	GND1	GND2	9

RC7
RB0
RB1
RC6

J14

1	[RS485 - A]
2	[RS485 - B]
3	[RS485 - GND]
4	[NOT USED]
5	[NOT USED]

SIL-100-05

C15 10nF

C16 100nF

C17 10uF

C18 100nF

5V_GND

Drawing: **BLDC Motor PWM Controller (RS485 Interface)**

Originator: **Mike Suffolk**

Email: **suffolk.mike@gmail.com**

0001-PWM-EL-001_Rev34.DSN
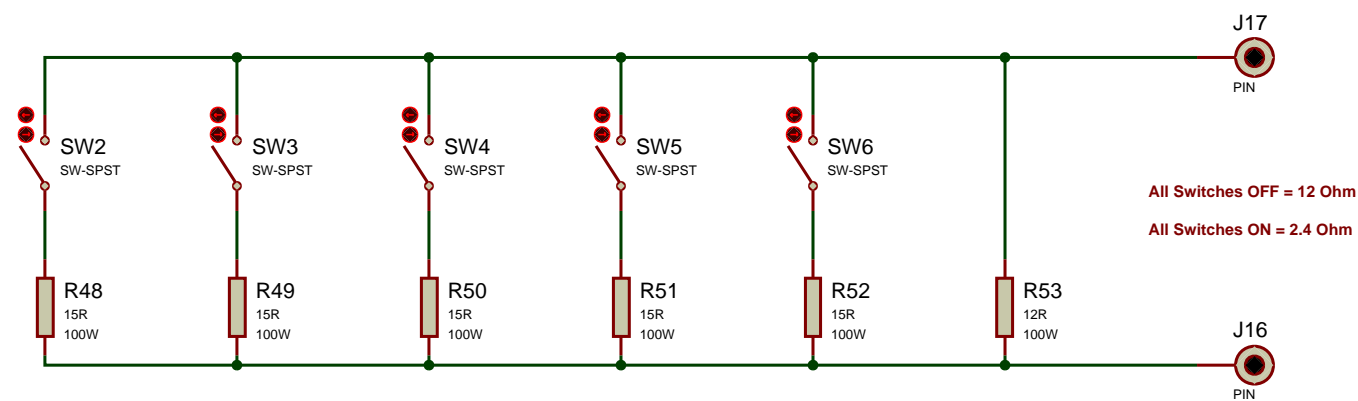
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Labcenter
Electronics

J17
PIN

SW2
SW-SPST

SW3
SW-SPST

SW4
SW-SPST

SW5
SW-SPST

SW6
SW-SPST

All Switches OFF = 12 Ohm

All Switches ON = 2.4 Ohm

R48
15R
100W

R49
15R
100W

R50
15R
100W

R51
15R
100W

R52
15R
100W

R53
12R
100W

J16
PIN