ATMEGA 16M1

ATMEGA16M1 U2

+5V

C_0.1uF C2
R1 R_100
C_100pF C3
GND

- 4 VCC
- 19 AVCC
- 21 AREF(ISRC)
- 20 AGND
- 5 GND

(PCINT0/MISO/PSCOUT2A)PB0 — 8 LED_0
(PCINT1/MOSI/PSCOUT2B)PB1 — 9 LED_1
(PCINT2/ADC5/INT1/ACMPN0)PB2
(PCINT3/AMP0-)PB3 — 23 CAN_STBY
(PCINT4/AMP0+)PB4 — 26 2A_in
(PCINT5/ADC6/INT2/ACMPN1/AMP2-)PB5 — 24 LED_2
(PCINT6/ADC7/PSCOUT1B)PB6 — 27 2A_out
(PCINT7/ADC4/SCK/PSCOUT0B)PB7 — 28 RELAY
CURRENT_SENSE_IN

(PCINT8/INT3/PSCOUT1A)PC0 — 30 LED_3
(PCINT9/PSCIN1/OC1B/SS_A)PC1 — 6 CAN_TX
(PCINT10/T0/TXCAN)PC2 — 7 CAN_RX
(PCINT11/T1/ICP1B/RXCAN)PC3
(PCINT12/ADC8/ACMPN3/AMP3-)PC4 — 17
(PCINT13/ADC9/ACMP3/AMP3+)PC5 — 18
(PCINT14/ADC10/ACMP1/ACMPN2)PC6 — 25
(PCINT15/D2A/AMP2+)PC7

(PCINT16/PSCOUT0A)PD0
(PCINT17/CLKO/PSCIN0)PD1 — 32
(PCINT18/PSCIN2/OC1A/MISO_A)PD2 — 1 MISO
(PCINT19/TXD/TXLIN/OC0A/SS_A/MOSI_A)PD3 — 2 MOSI
(PCINT20/ADC1/RXD/RXLIN/ICP1A/SCK_A/ADV)PD4 — 3 SCK
(PCINT21/ADC2/ACMP2)PD5 — 13
(PCINT22/ADC3/INT0/ACMPN2)PD6 — 15
(PCINT23/ACMP0)PD7

(PCINT24/OCD/RESET)PE0 — 31 RESET
(PCINT25/OC0B/XTAL1)PE1 — 10
(PCINT26/ADC0/XTAL2)PE2 — 11

level triggered external interrupt to wake uC from sleep

MOSI, MISO, and SCK must stay connected to the _A pins for programming.

R3 R_10K +5V

Y1 Crystal_SMD
16 MHz CRYSTAL
C4 C_30pF C5 C_30pF
GND

Programming LEDs

LED_0 R? LED_0805_Red R_200 D?
LED_1 R? LED_0805_Red R_200 D?
LED_2 R? LED_0805 R_200 D?
LED_3 R? LED_0805 R_200 D?
GND

thermistor mux

VREF2
R15 R16 R17 R29 R2 R30

U5 LTC1380IGN

- T0 1 S0 VCC 16
- T1 2 S1 SCL 15 SCL
- T2 3 S2 SDA 14 SDA
- T3 4 S3 A0 13
- T4 5 S4 A1 12
- T5 6 S5 GND 11
- 7 S6 VEE 10
- 8 S7 D0 9

VREG
C15 C_0.1uF

analog I2C mux with current buffer

VREG
MCP6001T-I-LT U8
R31 R_100 TEMP_SENSE
C14 C_0.1uF
GND GND

CAN TRANSCEIVER

+5V
C_0.1uF C1
GND

U1 MCP2561-E_SN
- CAN_TX 1 TXD CANH 7 — R2 R_120_DNP — CAN_+
- CAN_RX 4 RXD SPLIT 6
- VDD CANL 5 — CAN_-
- 8 STBY VSS 2
CAN_STBY
R3 R_100K
GND

16M1 PROGRAMMING HEADER

J1 +5V
- MISO 1 2
- SCK 3 4 MOSI
- RESET 5 6
CONN_02X03 GND

LTC6810-1

R9 R_100 Test_Point_SMD TP1

- batt_4 R4 356030RF1 R_100 C6 C_10nF
- batt_3 R5 356030RF1 R_100 C7 C_10nF
- batt_2 R6 356030RF1 R_100 C8 C_10nF
- batt_1 R7 356030RF1 R_100 C9 C_10nF
- batt_0 R8 356030RF1
- V- C10 C_10nF
GND

U3 LTC6810HG-1

- V- 1 V- V- 44
- V- 2 NC V- 43 +5V-power
- batt_4 3 V+ V- 42 R? — batt_4 R14 R_100
- 4 C6 WDT 41 MOSI
- 5 S6 SDINC 40 MISO
- 6 S5 SDONC 39
- 7 C5 IPB 38 SCK C13 C_0.1uF
- 8 S4 IMB 37 CSB
- 9 C4 SCKIPA 36
- 10 S3 CSBIMA 35 Q1 GND
- 11 C3 ICMP 34 TP3
- 12 S2 IBIAS 33 VREG
- 13 C2 DRIVE 32 VREG Test_Point_SMD
- 14 S1 VREG 31
- 15 C1 VREF2 30
- 16 S0 VREF1 29
- 17 V- V- 28 C11 C_1uF C12 C_1uF
- TEMP_SENSE 18 L- V- 27
- 19 GPIO1 ISOMD 26 U4 MCP6001T-I-LT VREF2
- SDA 20 GPIO2 DTEN 25
- 21 GPIO3 GPIO4 24 SCL
- V- 22 V- V- 23
GND GND

BUCK CONVERTER

batt_4
F_500mA_16V F101
Protection
D_Zener_18V D101
12V Indicator LED_0805 D102
GND

Input Capacitors
C_0.1uF C101 C_2.2uF C102
R101 R_1K

U101 TPS560430YF
- 5 VIN CB 1
- 4 EN SW 6
- GND FB 3
- 2
GND

Bootstrap Capacitor
C_0.1uF C103
Inductor
L101 100uH

Output Capacitors
COUT101 C_22uF COUT102 C_33uF COUT103 C_47uF
GND

VCC Jumper +5V
R_0_2512 R104 Test_Point_SMD TP2
R105 R_200
D103 LED_0805
5V Indicator
GND

Feedback Divider
R_25K R102 R_100K R103
GND

connectors

J2 NanoFit_RA_TH_06
- 1 1 batt_0
- 2 2 batt_1
- 3 3 batt_2
- 4 4 batt_3
- 5 5 batt_4
- 6

thermistor - side
J4 NanoFit_RA_TH_06
- 1 1 V-
- 2 2 V-
- 3 3 V-
- 4 4 V-
- 5 5 V-
- 6 6 V-

TP6 Test_Point_SMD
RELAY_GND
RELAY Q2 MMBF170
GND

J3 NanoFit_RA_TH_06 +5V-power
- 1 1
- 2 2
- 3 3 CURRENT_SENSE_IN
- 4 4 RELAY_GND
- 5 5
- 6 6
GND

thermistor + side
J5 NanoFit_RA_TH_06
- 1 1 T0
- 2 2 T1
- 3 3 T2
- 4 4 T3
- 5 5 T4
- 6 6 T5

current measurement thermistors

compartors @ > 2.6V | < 2.4V +- 2A for powering BMS system on

+5V-power
R25 R_1K
R26 R_1K
R27 R_22K
R28 R_25K
+5V-power
U6 TLV3701QDBVRG4Q1
CURRENT_SENSE_IN 3 — 2A_out TP4 Test_Point_SMD
GND

R29 R_1K
+5V-power
R_25K R18
R_1K R19
R_1K R20
R_1K R21
R_22K R22
+5V-power
U7 TLV3701QDBVRG4Q1
CURRENT_SENSE_IN 4 — 2A_in TP5 Test_Point_SMD
GND

POWER FLAGS

PWR_FLAG PWR_FLAG PWR_FLAG
12V +5V GND