



5A DC ECH20 MODULE BOARD

DROP-IN REPLACEMENT FOR 1215294

Changelog:

Rev A:

- Initial Release.
- Design is a melding of T300 EC water boards and DC driver circuit.
- PCB Q25079-001
- Mule board.

Rev B:

- HARDWARE REV BITS SET TO 5.
- ADD RTC BACK IN.
- PCB Q25079-002.
- ELIMINATE SECOND WCM PUMP
- CONNECTOR PINOUTS CHANGED TO BE 100% COMPATIBLE WITH CHIMNEY SWIFT.
- CHANGE CONNECTORS BACK TO AMP. MOLEX COMPATIBLE BUT NO MOUNTING TAB.
- ADD LEGACY MODE BACK IN FOR T5: ENABLE AND MODE INPUTS AND EXTERNAL LED DRIVERS ON CAN LINES.
- CONNECT PH1 TO PWM INPUT.
- REVISED COMPONENT VALUES ON CELL DRIVER.
- DUAL CURRENT AMPLIFIERS TO CAPTURE CURRENT WHEN RECIRCULATING.
- P1 BOARD.

Rev C:

- Production Release.
- Change FET drive C113,C97,C128,C79 values.
- Change snubber R123,R61,C132,C65 values.
- Change R2 value, was 121 Ohm.
- PCB Q25079-002

ASSUMPTIONS:

- DROP-IN REPLACEMENT FOR CHIMNEY SWIFT BOARD.
- BOARD OUTLINE SAME AS OLD CHIMNEY SWIFT BOARD.
- CONNECTORS COMPATIBLE WITH OLD BOARD.
- UP TO 5A AVERAGE CURRENT CAPABILITY, PROGRAMMABLE.
- NO VALVES TO DRIVE.

REFERENCE PART NUMBERS:
ASSEMBLY 1239243

x	FIDUCIAL/A
x	FIDUCIAL/A
x	FIDUCIAL/A
x	FIDUCIAL/A
x	FIDUCIAL/A

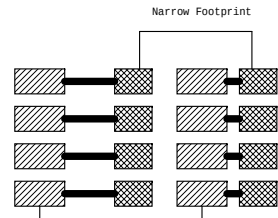
FW1
FIRMWARE Q30091-002

PCB1
PCB Q25079-002

SCHEMATIC1
SCHEMATIC Q26029-001

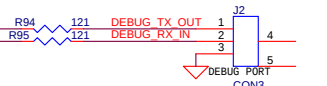
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DC ECH20 MODULE		
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FLASH NARROW / WIDE footprints.



SERIAL DEBUG PORT USE ONLY 5V LEVEL CABLE

A JST PH SERIES SMT CONNECTOR
2MM PITCH STRAIGHT UP HEADER



5V TOLERANT INPUTS EXCEPT PB0, PB1

SPD0 HAVE SCHMATT TRIGGER INPUTS
SPD0 DEFAULT: PULLDOWN OFF, PULLUP OFF.
TESTING: INPUT
PULLDOWN: PULLDOWN ON, PULLUP OFF.
PULLUP: PULLUP ON, PULLDOWN OFF.
PULLUP: PULLUP ON, PULLDOWN ON.
PULLDOWN: PULLDOWN ON, PULLDOWN ON.
PULLUP: PULLUP ON, PULLDOWN ON.
PULLDOWN: PULLDOWN ON, PULLDOWN ON.
PULLUP: PULLUP ON, PULLDOWN ON.
PULLDOWN: PULLDOWN ON, PULLDOWN ON.
PULLUP: PULLUP ON, PULLDOWN ON.
PULLDOWN: PULLDOWN ON, PULLDOWN ON.

DEBUG RX
DEBUG TX

TEL_FLASH_CLK
TEL_FLASH_CS
TEL_FLASH_RX
TEL_FLASH_TX
TEL_FLASH_WP

FLASH

AT45DB081E/SU

AT45DB081D/SOIC_NARROWANDWIDE

ONLY CHARGES BATTERY
WHEN MACHINE IS
RUNNING.
ONLY USES BATTERY
WHEN MAIN BATTERY IS
DISCONNECTED.

TP24

FB3

RESET

OSC0

OSC1

XOSC1

XOSC0

GND1

GND2

GND3

GND4

GND5

GND6

GND7

GND8

GND9

GND10

GND11

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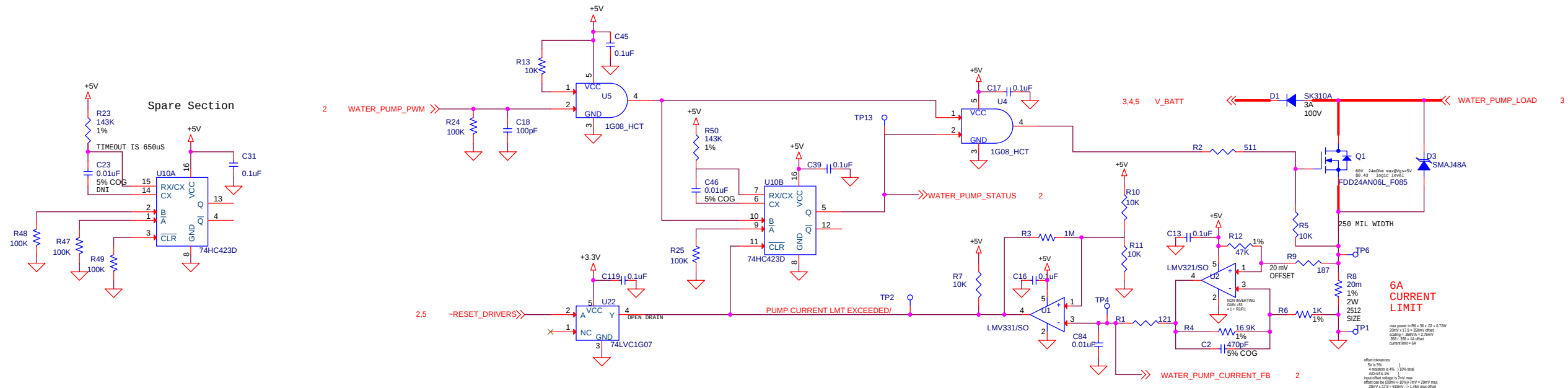
GND291

GND292

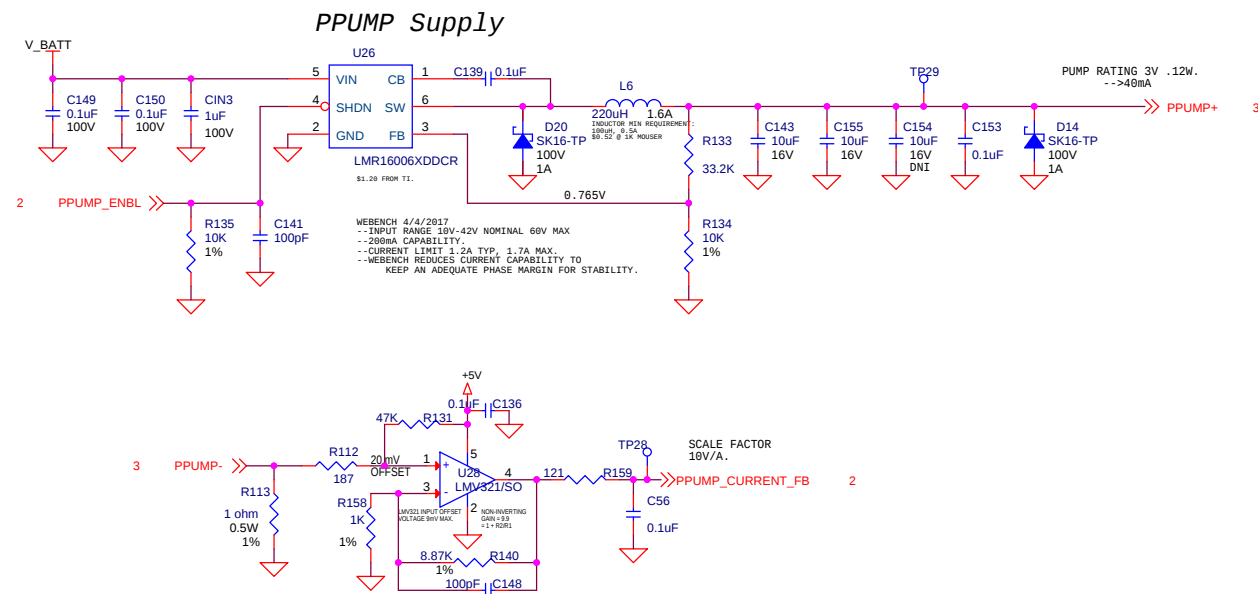
GND293

GND294

EC WATER PUMP DRIVER



P PUMP DRIVER



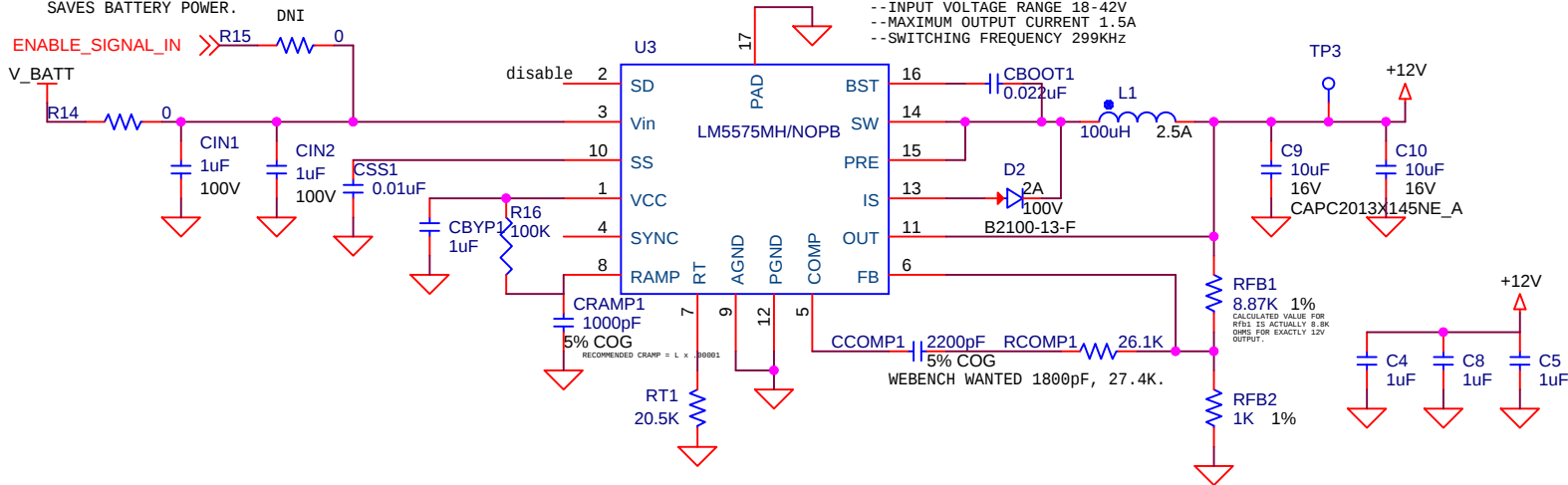
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POWER SUPPLIES

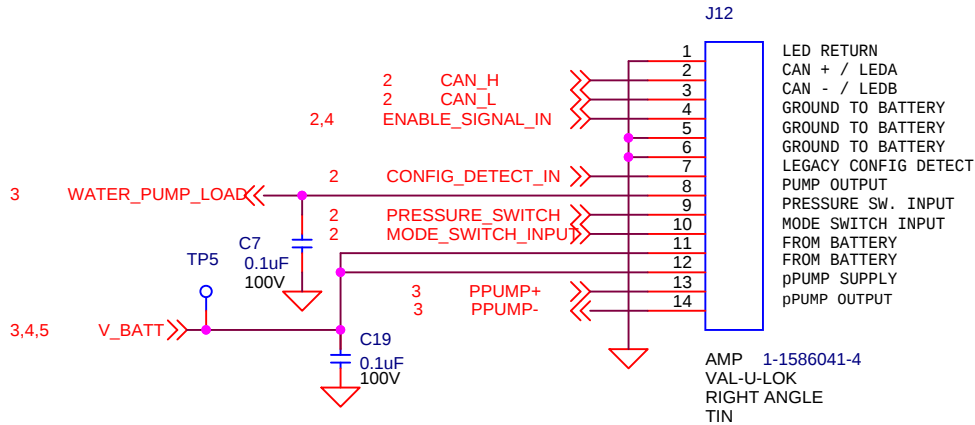
OPTION IS FOR IF WE HAVE ENABLE COMING FROM KEYSWITCH AND VBATT IS UNSWITCHED. THIS SAVES BATTERY POWER.

+12V Supply

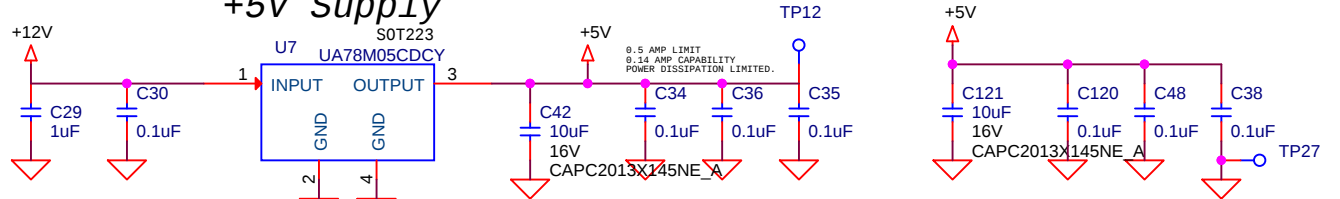
REVISED DESIGN 12-08-2016 WEBENCH SPECIFICATIONS:
--INPUT VOLTAGE RANGE 18-42V
--MAXIMUM OUTPUT CURRENT 1.5A
--SWITCHING FREQUENCY 299KHz



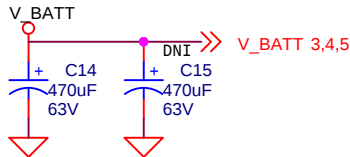
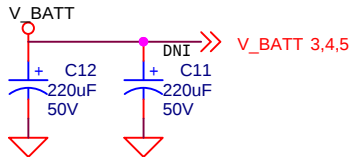
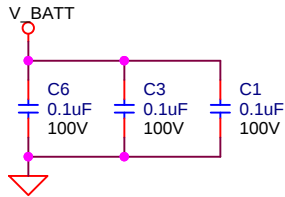
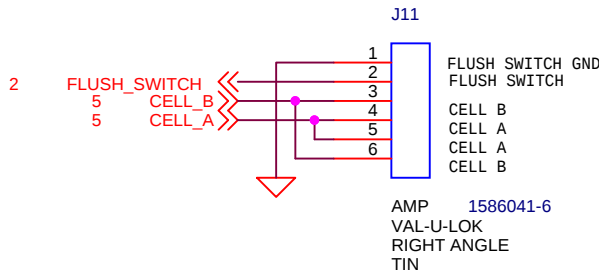
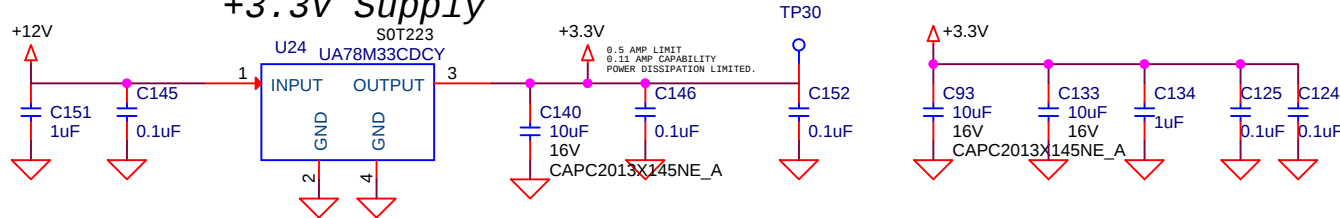
CHIMNEY SWIFT COMPATIBLE



+5V Supply



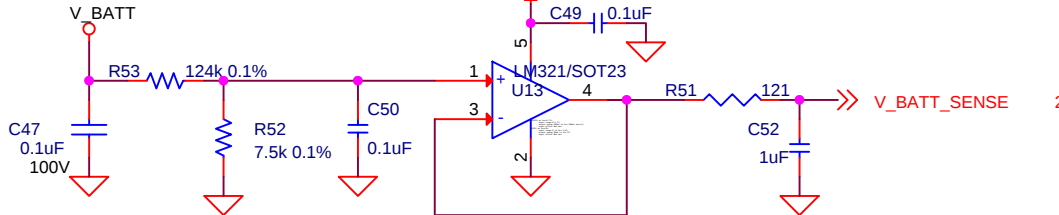
+3.3V Supply



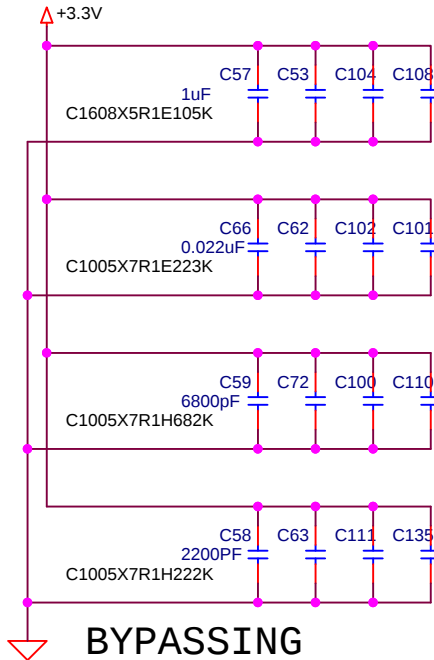
preferred due to height, use 2:
United Chemi Con EKZE500ELL221MJ16S
220uF 50V
10mm DIA
16mm TALL
42mOhm each
1.37A ripple RMS each
\$.21 @ Digikey @ 1Kpcs

16mm DIA
20mm TALL
32mOhm
2.0A ripple RMS
\$.59 @ Digikey @ 1Kpcs

BATTERY VOLTAGE MONITOR 36V
2.977V OUT = FULL SCALE OCCURS AT 52.2V IN.
Theoretical MAX V (18 cells * 2.9V/cell = 52.2V)



THIS IS ON THE 1215294 BOARD.
IS IT ACTUALLY USED?



POWER

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DC ECH20 MODULE			
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