



T600/T500 Scrub Controller Board

Changelog:
REV A--Initial concept.
REV B--Eliminate contactor driver and precharge.
--Q25058-001 Mule boards.

REV C--Change TVS on wand pump driver.
--Q25058-002 P1.5 boards.
--Delete MODEM_IN_RANGE signal from main micro.
--Add new multivibrator U78 for vac drive.
--Change bias pullups on current amps to 560K.
--Change gate drive resistors on half and full bridge drivers to 10 ohms,.

REV D--Change connection of Vbat pin to Vdd. Q25058-003 P2.5 board.
--R175 increased to 1K for more ESD protection.
--Change L1 to a larger size.
--Replace U42 with higher current part.
--Replace wand pump driver with higher 16A cpability driver.
--Some TVS diodes were 45V, some were 48V. Change them all to 48V in anticipation of using this board in a 36V machine.
--Add RC filter to SHUNT_CURRENT and SHUNT_REFERENCE.
--Add 470uF bulk capacitor to WAND_PUMP_HIGH.
--Add capacitor on I-drive enable output.

REV E--Q25058-003 Prod boards same PCB as P2.5..
--Update DNI items for generating production BOM.

REV F--Populate C434 with 150pF..

REFERENCE SCHEMATIC Q26008-001

Paraguay Changes: Q26033-001

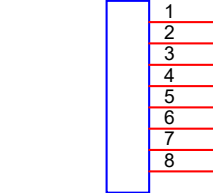
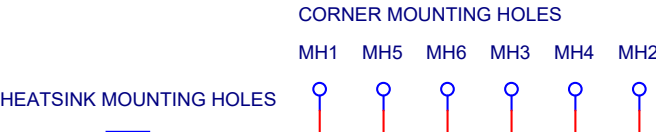
- REV A -
- REV BITS on both micros set to 010.
 - Bulk Capacitors set to 63V capacity with same footprint
 - TVS diodes verified to support higher VBATT
 - Resistors changed to accomodat higher VBATT:
 - R192 124K -> 169K
 - R199 44.2K -> 66.5K
 - R171 200K -> 267K

(REFERENCE ONLY) PCA VARIANTS:
STANDARD NO TELEMETRY 1229861
WITH TELEMETRY POPULATED 1229859

TELEMETRY	4G NA	1261075
TELEMETRY	4G EMEA	1261078

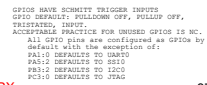
- REFERENCE ONLY
BOM ITEMS:
- ☐ MAIN FIRMWARE - U64 Q30067-00X
(U64 SAME FIRMWARE TELEMETRY VS. STANDARD VERSIONS)
 - ☐ TELEMETRY FIRMWARE - U72 Q30076-00X
 - ☐ WIFI FIRMWARE - U54 N/A
 - ☐ PCB Q25058-003
 - ☐ SCHEMATIC Q26033-001

LAYOUT FEATURES:

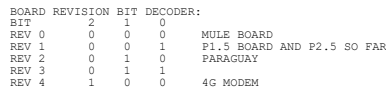


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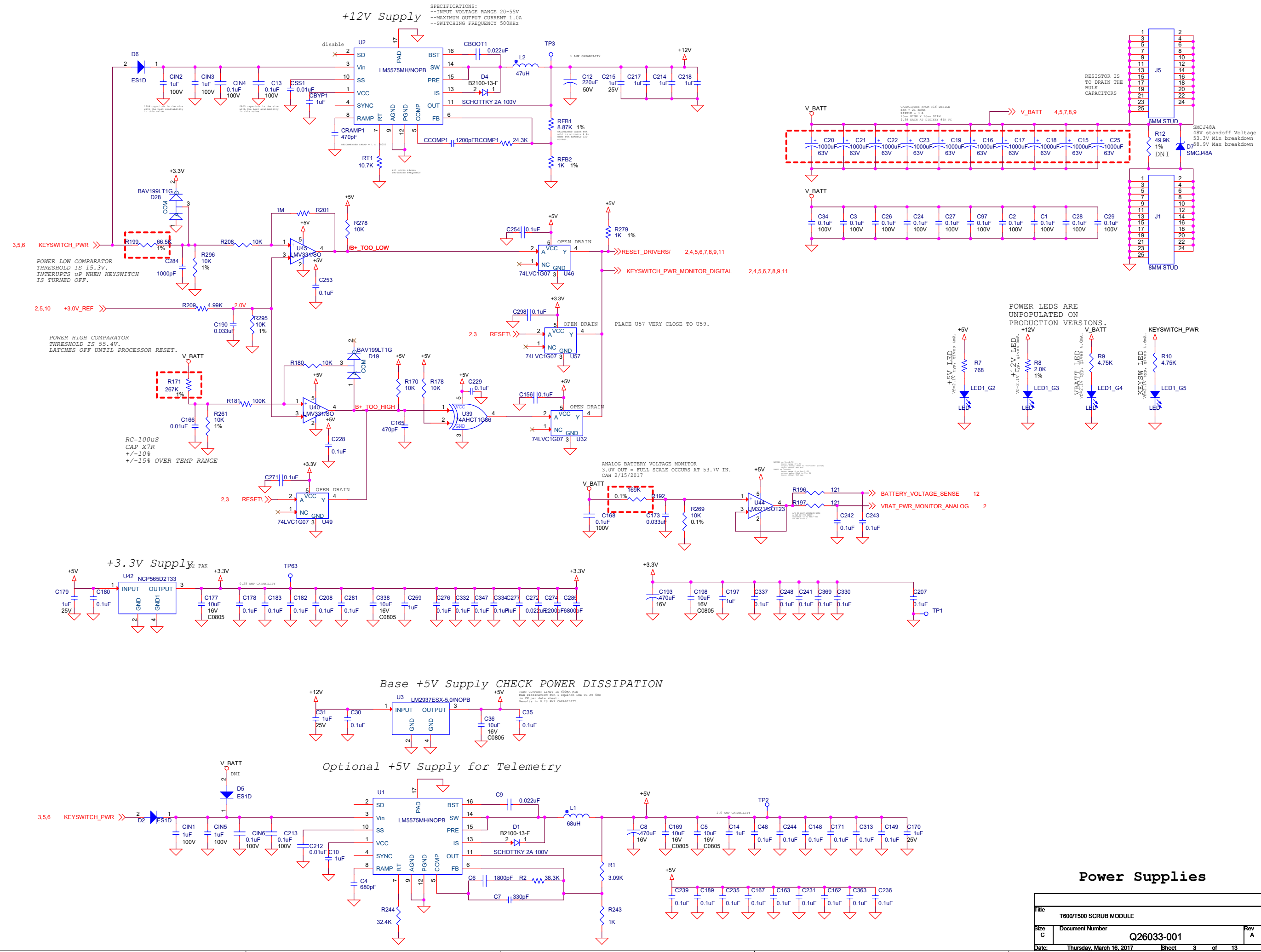
DNI
FOR
PRODUCTION



ELECTROSTATIC DISCHARGE PROTECTION
over Operating free-air temperature range
PARAMETER TEST CONDITIONS VALUE
IEC Contact Discharge IEC 61000-4-2 Bus terminals vs GND ±6 kV
Human Body Model JEDEC Standard 22,Test Method A114-C.01 Bus terminals vs GND ±8 kV
All pins ±4 kV
Field-Induced-Charged Device Model JEDEC Standard 22,Test Method C101 All pins ±1.5 kV
Machine Model ANSI/ESDS-5-2:1996 ±200 V

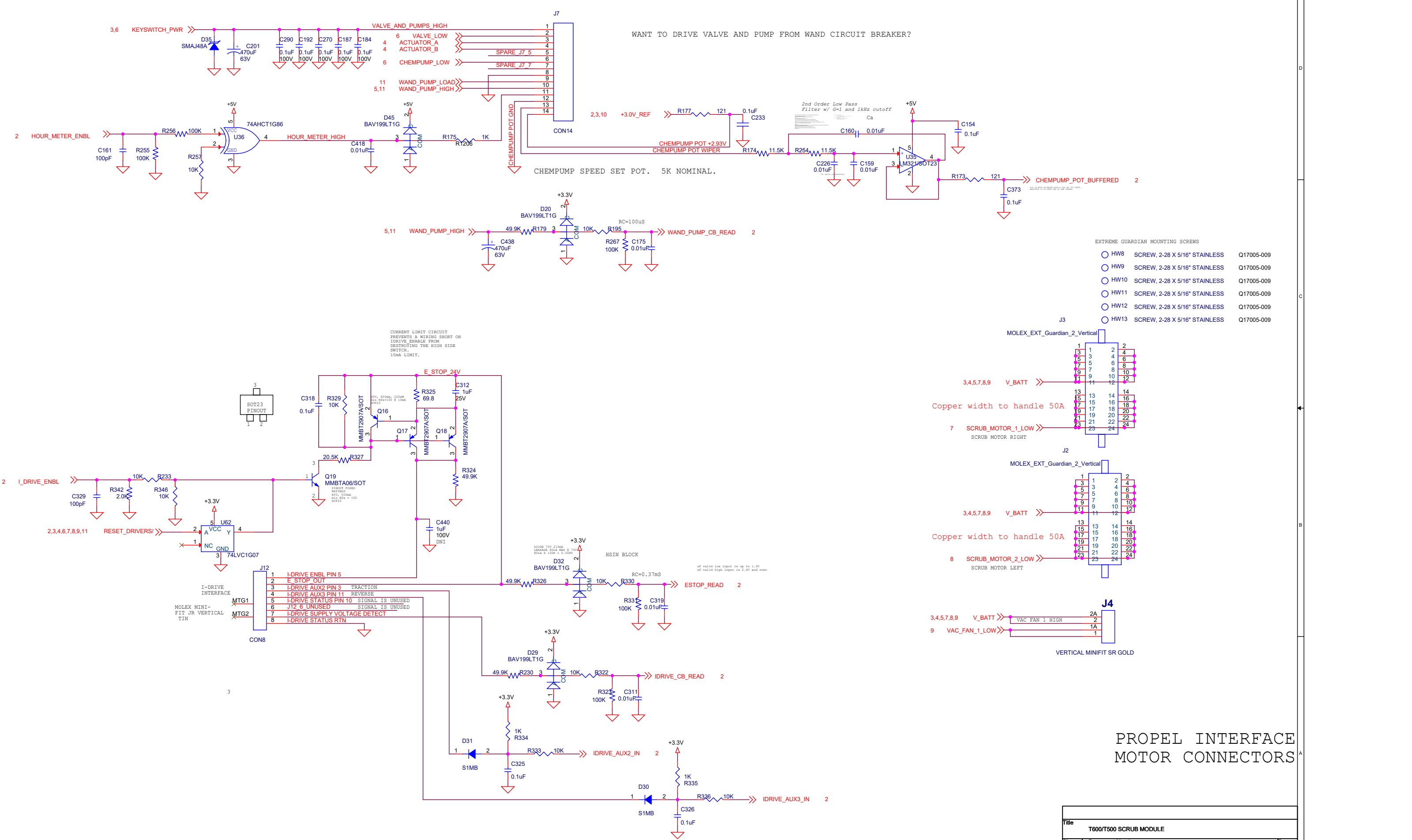


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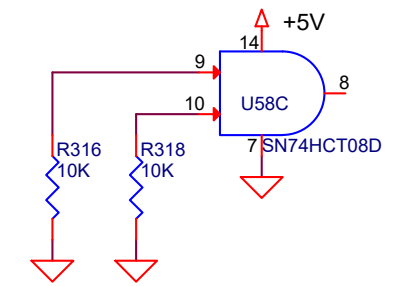
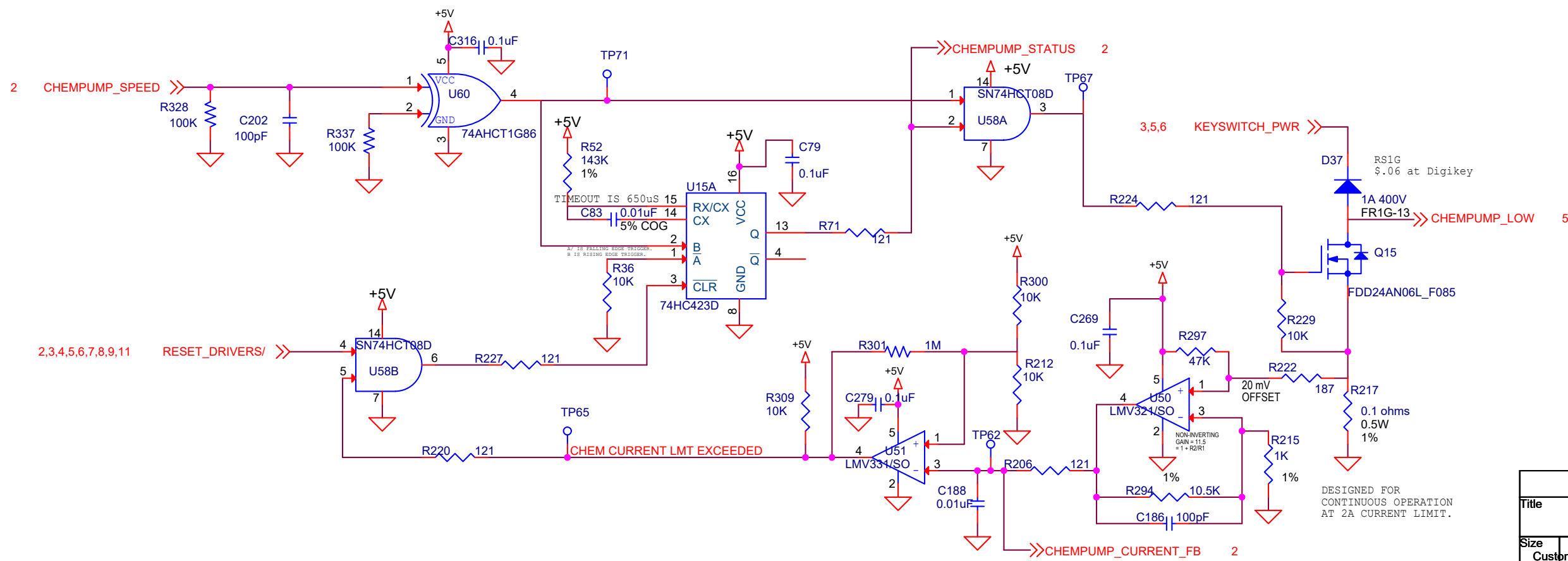
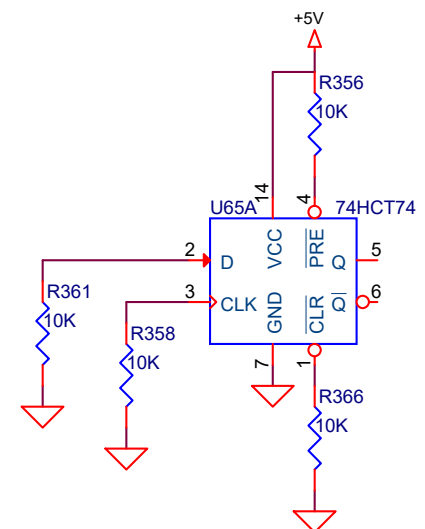
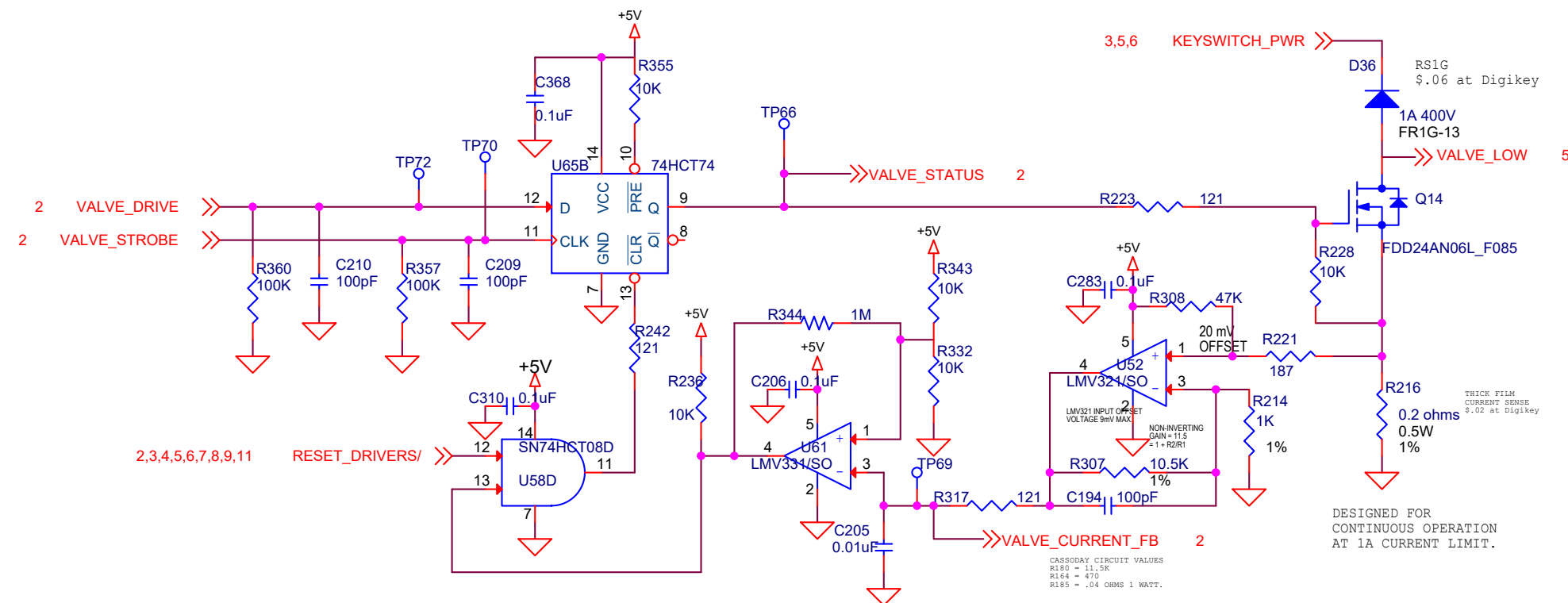
- EXTREME GUARDIAN MOUNTING SCREWS
- HW8 SCREW, 2-28 X 5/16" STAINLESS Q17005-009
 - HW9 SCREW, 2-28 X 5/16" STAINLESS Q17005-009
 - HW10 SCREW, 2-28 X 5/16" STAINLESS Q17005-009
 - HW11 SCREW, 2-28 X 5/16" STAINLESS Q17005-009
 - HW12 SCREW, 2-28 X 5/16" STAINLESS Q17005-009
 - HW13 SCREW, 2-28 X 5/16" STAINLESS Q17005-009

VERTICAL MINIFIT SR GOLD

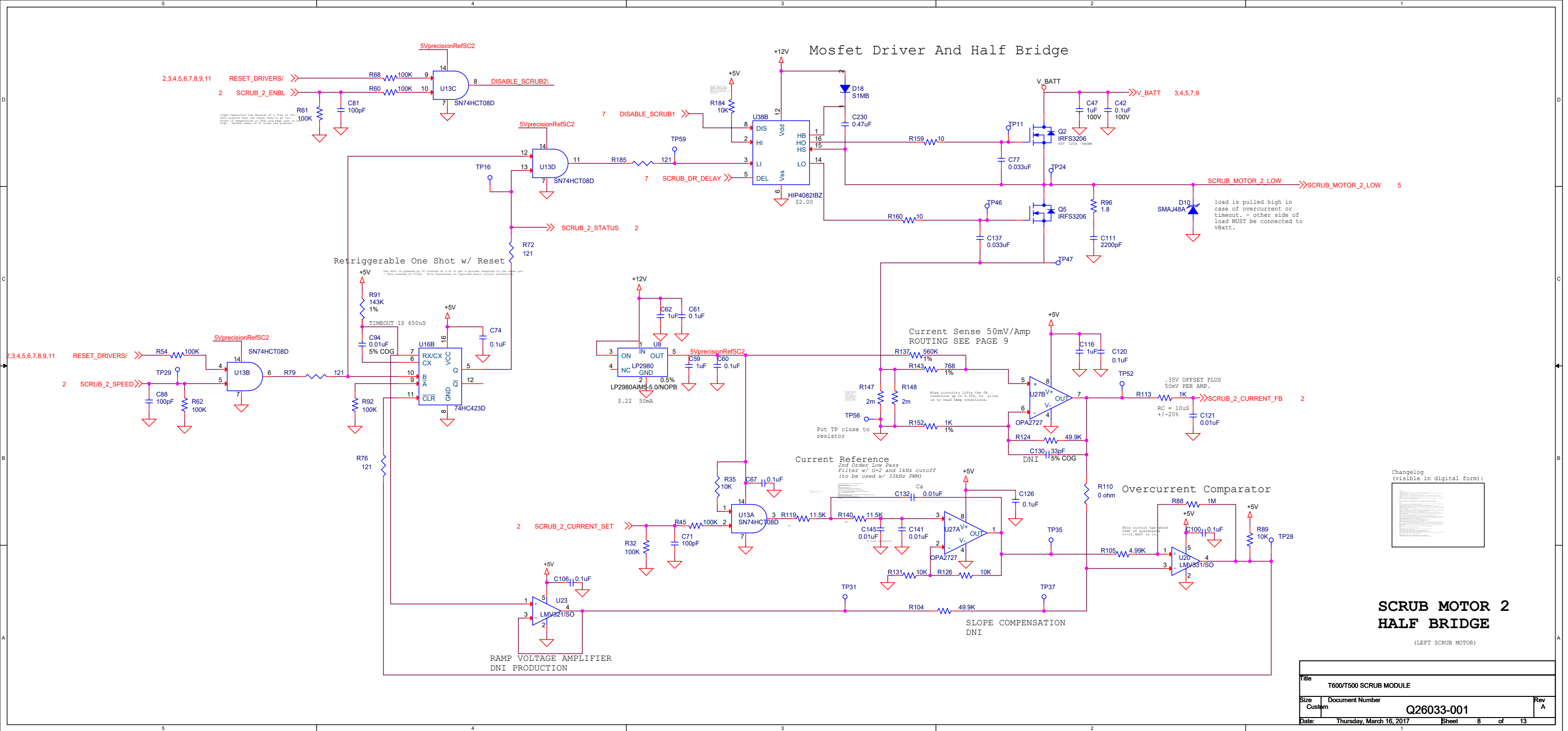
PROPEL INTERFACE MOTOR CONNECTORS

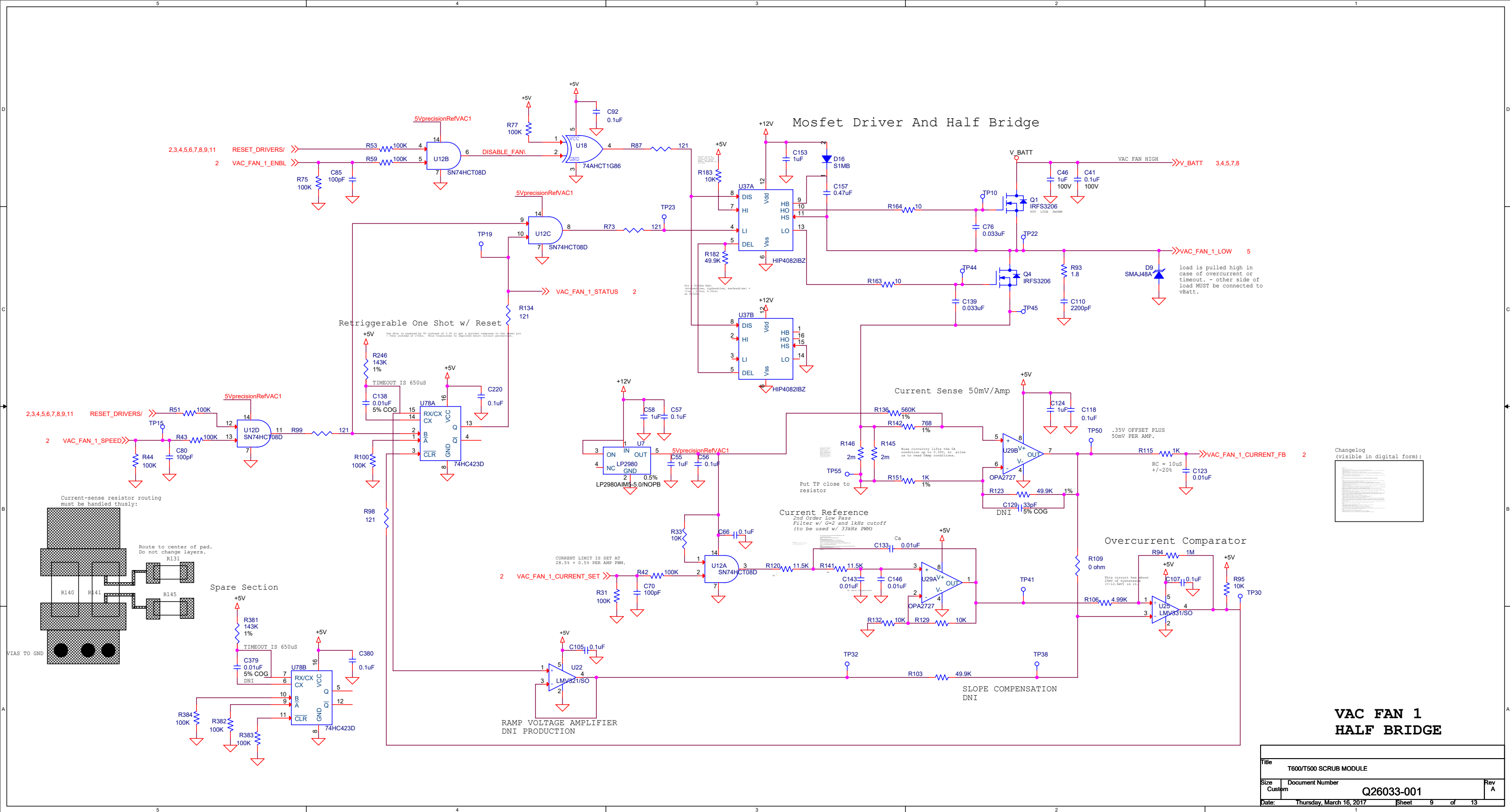
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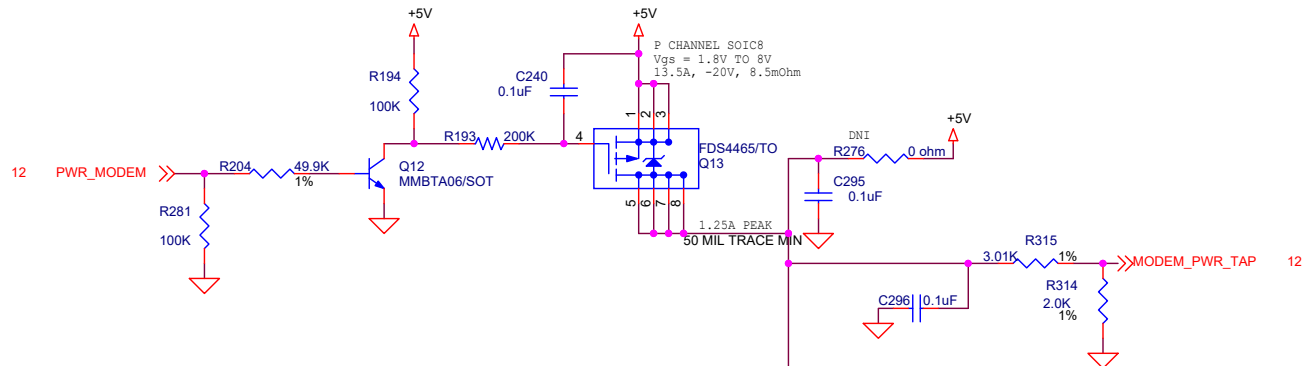
LOW SIDE DRIVERS



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Multi-Tech Connections

3G
3G NA

CURRENT CONSUMPTION AT 5V:
SLEEP 80mA
AVG 135mA
MAX 280mA
PEAK 1.25A

4G
4G NA

CURRENT CONSUMPTION AT 5V:
SLEEP 13mA
IDLE 20mA
MAX 400mA
PEAK 1.25A

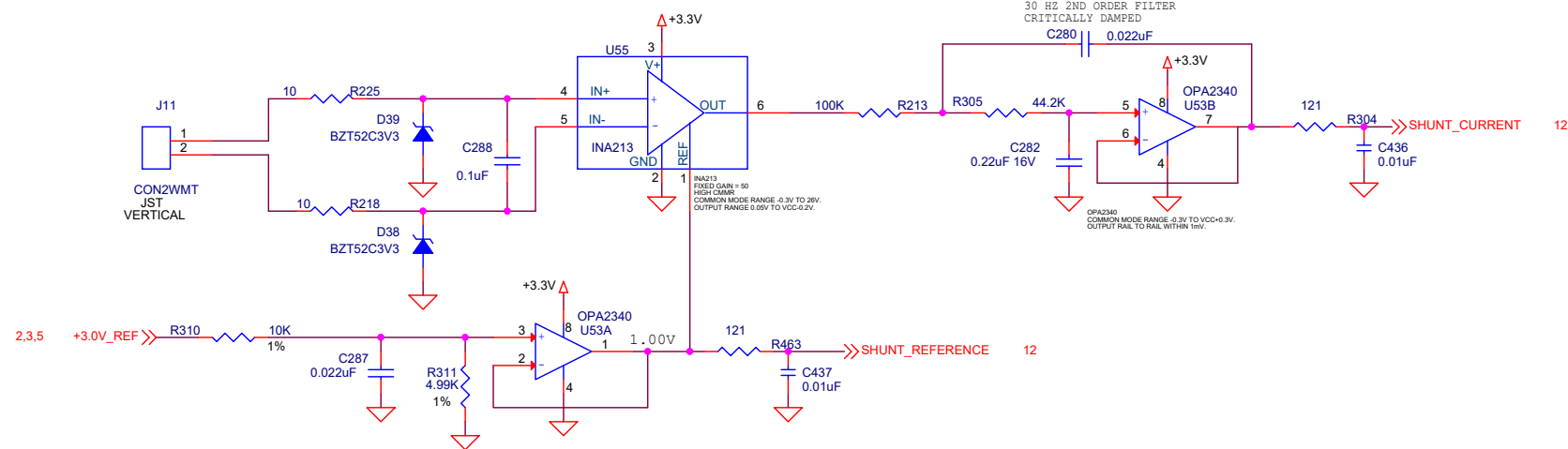
4G
4G EMEA

CURRENT CONSUMPTION AT 5V:
SLEEP 8mA
IDLE 13mA
MAX 747mA
PEAK 1.25A

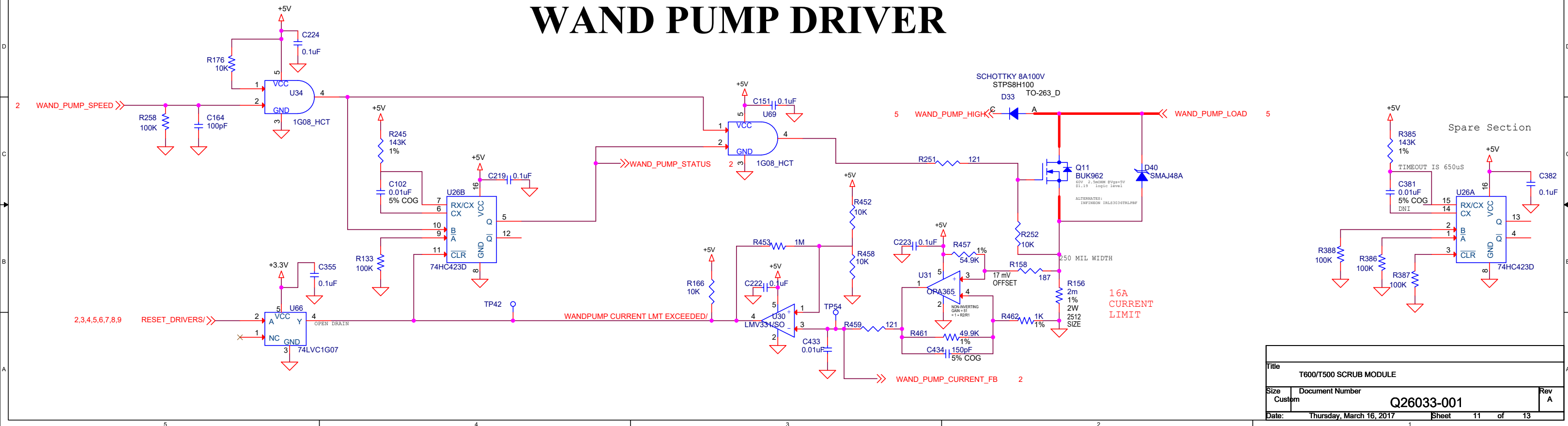
LAYOUT FEATURES AND MOUNTING HARDWARE:

- HW7 CELL MODEM MOUNTING HOLES/ STANDOFFS Q17008-006
- HW6 CELL MODEM MOUNTING HOLES/ STANDOFFS Q17008-006
- HW5 CELL MODEM MOUNTING HOLES/ STANDOFFS Q17008-006
- HW1 SCREW, M3 X 6MM TORX Q17005-007
- HW2 SCREW, M3 X 6MM TORX Q17005-007
- HW3 SCREW, M3 X 12MM TORX Q17005-008
- HW4 TIE WRAP SCREW MOUNTED Q17016-001
- ANTENNA CABLE 1070195

SHUNT SPECS 50mV AT 250A.
200 AMPS THRU SHUNT == 2.0 VOLT OUTPUT + 1.0V REF = 3.0V
-100 AMPS THRU SHUNT == -1.0 VOLT OUTPUT + 1.0V REF = 0V



WAND PUMP DRIVER

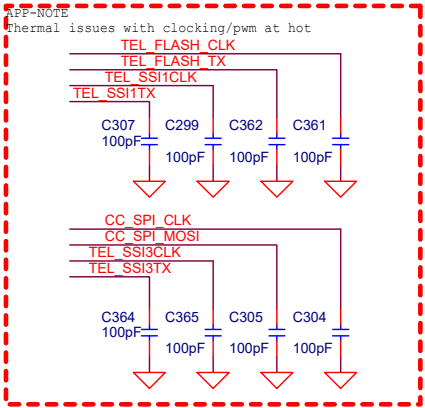


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GP10S HAVE SCHMITT TRIGGER INPUTS
GPIO DEFAULT: PULLDOWN OFF, PULLUP OFF,
TRISTATED, INPUT.
ACCEPTABLE PRACTICE FOR UNUSED GP10S IS NC.
All GPIO pins are configured as GP10S by
default with the exception of:
PA1:0 DEFAULTS TO UART0
PA5:2 DEFAULTS TO SS10
PB3:2 DEFAULTS TO I2C0
PC3:0 DEFAULTS TO JTAG

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JTAG

CAN COMMUNICATIONS

ALL COMPONENTS THIS PAGE:
ONLY POPULATED ON
CELLMODEM VARIANT .

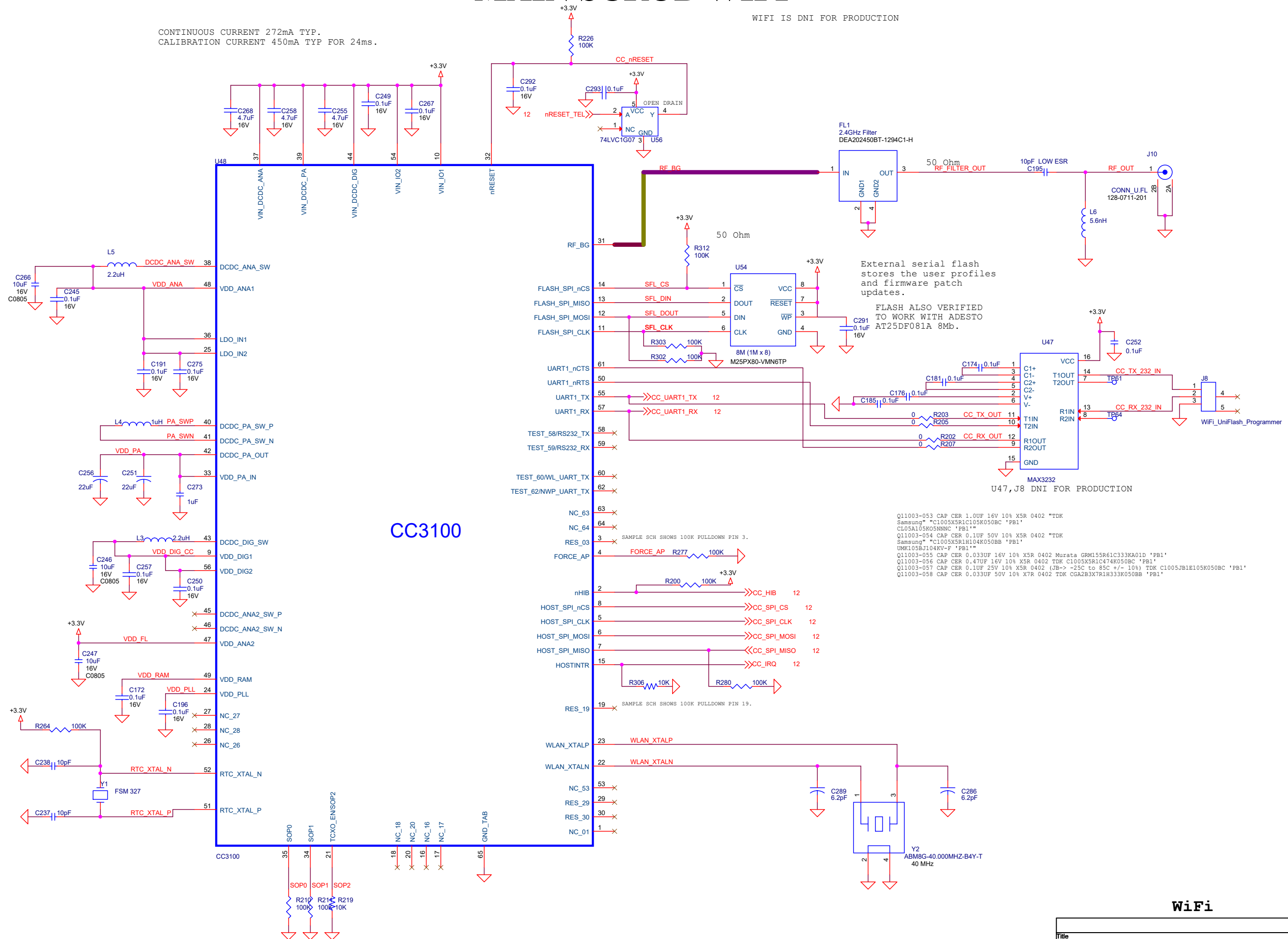
Telemetry Processor

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MAIN SCRUB WIFI

WIFI IS DNI FOR PRODUCTION

CONTINUOUS CURRENT 272mA TYP.
CALIBRATION CURRENT 450mA TYP FOR 24ms



WIF:

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