



T600/T500 Caspian Scrub Board

Changelog:

REV A:

- Initial update based on 1229861 (Rhine/Paraguay scrub controller), ported from Orcad to Altium
- Orcad port indicators converted to nets or Altium ports
- Reassigned reference designators
- Updated signal names JTAG_TMS -> JTAG_TMS/SWDIO and JTAG_TCK -> JTAG_TCK/SWCLK
- Renamed "VAN_FAN_1_XXX" pins to "VAC_FAN_XXX" as follows:
 - o VAC_FAN_1_CURRENT_FB -> VAC_FAN_CURRENT_FB
 - o VAC_FAN_1_STATUS -> VAC_FAN_STATUS
 - o VAC_FAN_1_ENBL -> VAC_FAN_ENBL
 - o VAC_FAN_1_SPEED -> VAC_FAN_SPEED
 - o VAC_FAN_1_CURRENT_SET -> VAC_FAN_CURRENT_SET
 - o VAC_FAN_1_LOW -> VAC_FAN_LOW

REV B:

Page 1

- Removed JTAG_RESET_IN due to redundancy with RESET signal

Page 2

- Removed TM4C micro & related circuitry
- Added new STM32G473QBT6 micro
- Added Tag Connect + circuitry for UART Debug
- Added Tag Connect + circuitry for JTAG

Page 9

- Updated title block to “Vac Fan Half Bridge” from “Vac Fan 1 Half Bridge”
- Removed changelog

Page 10

- Removed current shunt amplifier
- Removed modem
- Updated title block to “Sensors Connector”

Page 12

- Removed page 12- Telemetry

Page 13

- Removed page 13- WiFi

REV C

- Updated title blocks
- Removed extra text, boxes, & highlights. Relevant technical information can be found in the Caspian T500/600 HDS document.
- Replaced V_BATT & KEYSWITCH_PWR ports with power ports
- Added various DNI variants
- Added no ERC's on unused pins
- Converted unnecessary net labels to plaintext
- Removed C150, C142, C136, C160, C179, C171, C186, C187, C195, C205, C229, C220, C232, C247, C256, C274, C261, C284, C298 (100pF caps were hotfix for TI chip-specific GPIO issue)

Page 2

- Added differential pair directive to U5 pins 6 and 7

Page 3

- Corrected RT1’s parameters to reflect correct QPL number (prev. Q10018-292, corrected to Q10015-292)
- Depopulate U17 & surrounding passives

Page 4

- Removed V- to GND and V+ to +5V connections from bottom right for net name consistency. Ground net is now named GND, 5V power net is named +5V.
- Replaced U21A/B with Tennant IC library component.

Page 5

- Removed 4-way ties on IDRIVE_AUX2_IN and IDRIVE_AUX3_IN lines

Page 6

- Corrected CHEMPUMP_LOW, KEYSWITCH_PWR, & CHEMPUMP_CURRENT_FB port tie points

Page 7

- Replaced U40A/B with Tennant IC library component, prev. part pins causing validation errors.

Page 8

- Replaced U45A/B with Tennant IC library component.

Page 9

- Replaced U53A/B with Tennant IC library component. C270 & C271 moved near U53C.
- Removed V- to GND and V+ to +5V connections from bottom right for net name consistency. Ground net is now named GND, 5V power net is named +5V.
- Corrected VAC_FAN_ENBL port tie point

Page 10

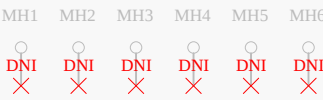
- Added missing no ERC on J13 pin 9

REFERENCE ONLY BOM ITEMS:

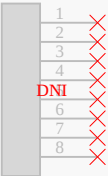
- MAIN FIRMWARE - U64 Q30067-00X
(U64 SAME FIRMWARE TELEMETRY VS. STANDARD VERSIONS)
- TELEMETRY FIRMWARE - U72 Q30076-00X
- WIFI FIRMWARE - U54 N/A
- PCB1 Q25058-004
- SCHEMATIC1 Q26033-002

LAYOUT FEATURES:

CORNER MOUNTING HOLES



HEATSINK MOUNTING HOLES

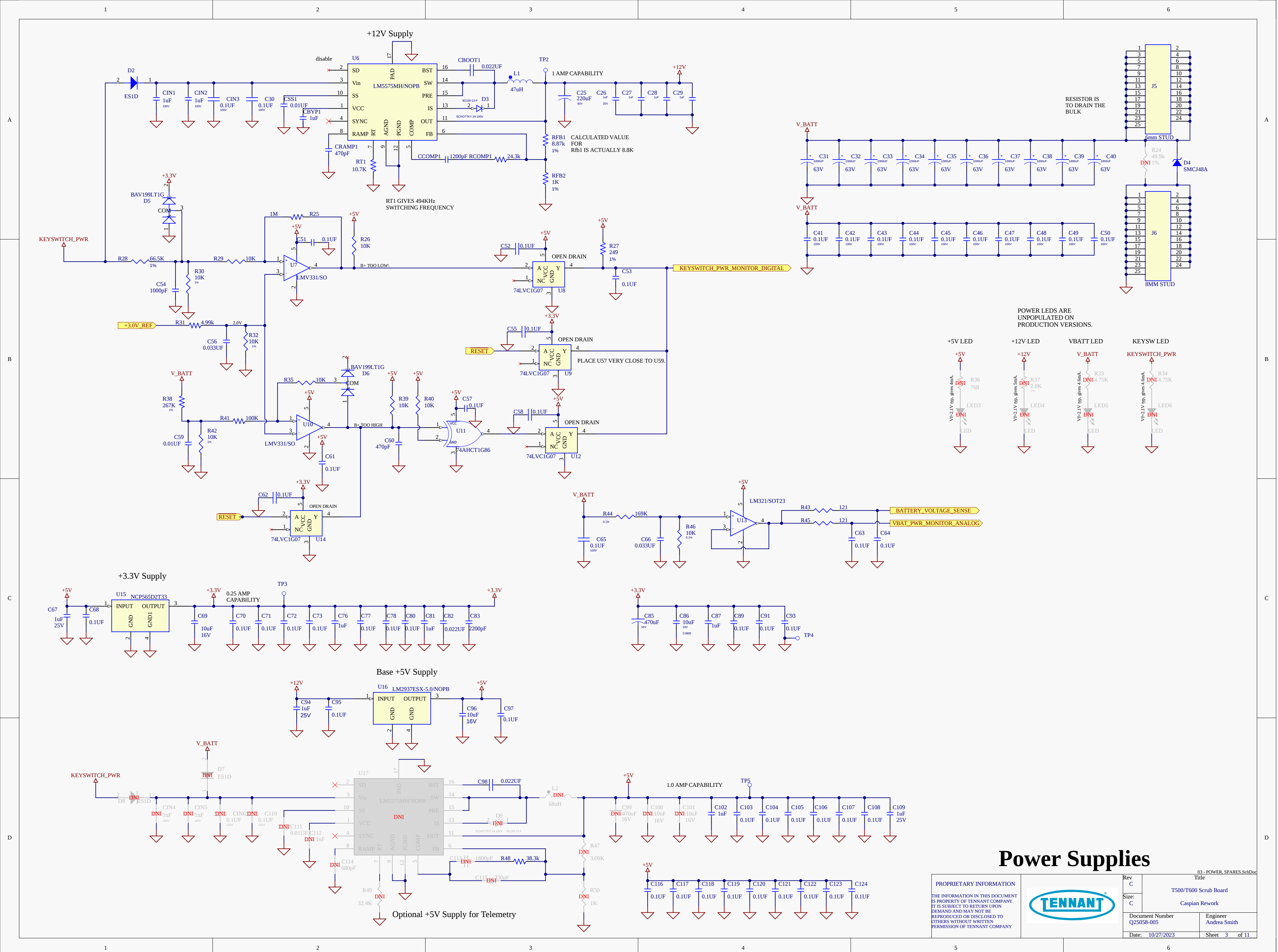


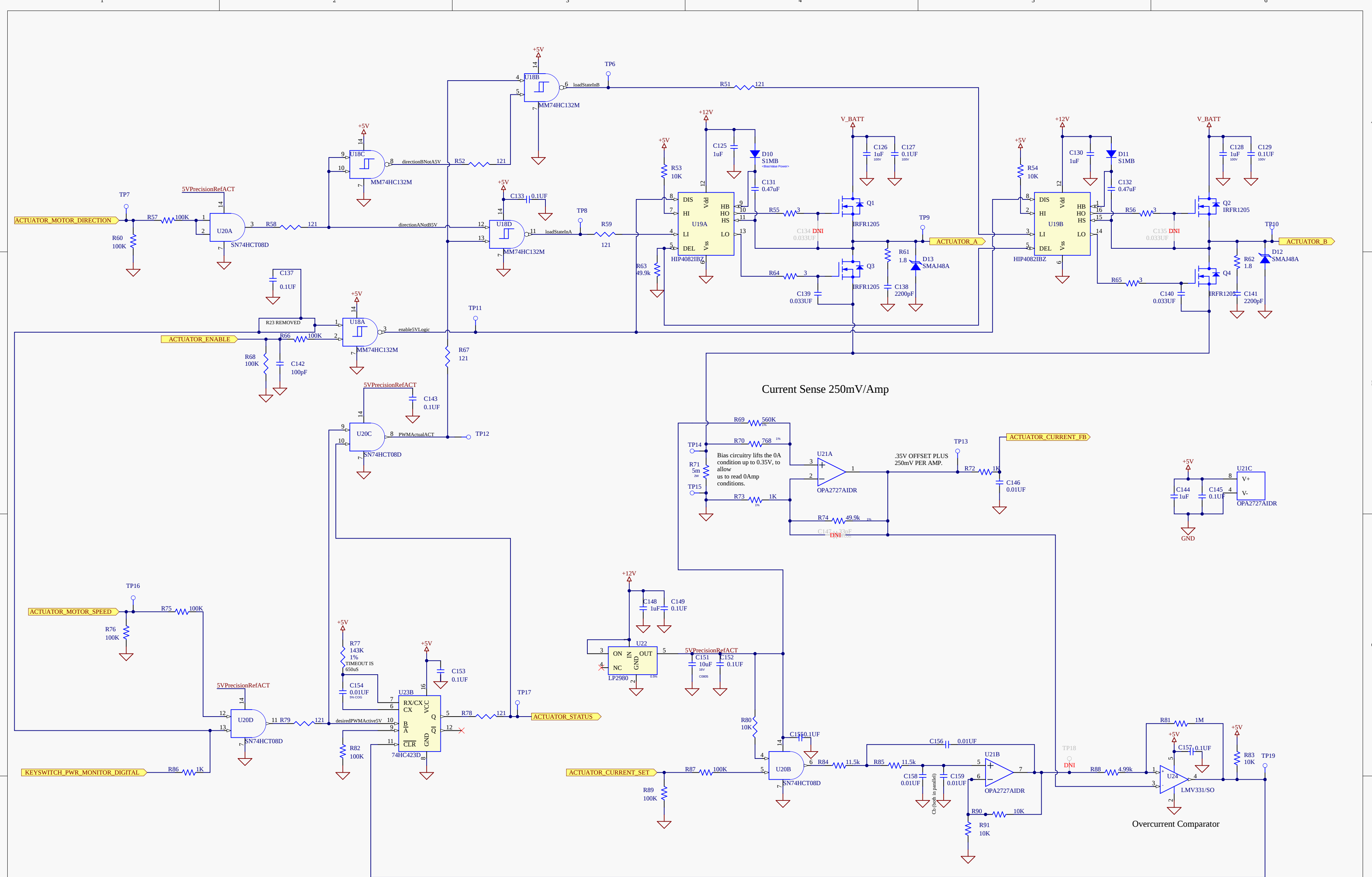
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				Size: C		T500/T600 Scrub Board Caspian Rework	
				Document Number Q25058-005		Engineer Andrea Smith	
				Date: 10/27/2023		Sheet 1 of 11	

Pin	Signal	Pin	Signal
PA0	ACTUATOR CURRENT FB	PG0	BOARD REVISION BIT 0
PA1	VAC_FAN CURRENT FB	PG1	BOARD REVISION BIT 1
PA2	WAND PUMP CURRENT FB	PG2	BOARD REVISION BIT 2
PA3	SCRUB_1 CURRENT FB	PG3	VALVE_STATUS
PA4	ACTUATOR STATUS	PG4	VALVE_DRIVE
PA5	SCRUB_2 SPEED	PG5	VALVE_DRIVE
PA6	ACTUATOR CURRENT SET	PG6	VALVE_DRIVE
PA7	DEBUG_TX	PG7	VALVE_DRIVE
PA8	DEBUG_RX	PG8	VALVE_DRIVE
PA9	ACTUATOR_ENABLE	PG9	VALVE_DRIVE
PA10	ACTUATOR_MOTOR_DIRECTION	PG10	VALVE_DRIVE
PA11	ITAG_TMS/SWDIO	PG11	VALVE_DRIVE
PA12	ITAG_TCK/SWCLK	PG12	VALVE_DRIVE
PA13	ITAG_TDI	PG13	VALVE_DRIVE
PA15	ITAG_TDO	PG14	VALVE_DRIVE
PB3	ITAG_TDO	PG15	VALVE_DRIVE
PB4	ITAG_TDO	PG16	VALVE_DRIVE
PC0	CHEMPUMP_POT_BUFFERED	PG17	VALVE_DRIVE
PC1	ACTUATOR_MOTOR_SPEED	PG18	VALVE_DRIVE
PC2	SCRUB_1_SPEED	PG19	VALVE_DRIVE
PC3	SCRUB_1_SPEED	PG20	VALVE_DRIVE
PC4	SCRUB_1_SPEED	PG21	VALVE_DRIVE
PC5	SCRUB_1_SPEED	PG22	VALVE_DRIVE
PC6	WAND PUMP STATUS	PG23	VALVE_DRIVE
PC7	SCRUB_HD_MAX_DF_SWITCH	PG24	VALVE_DRIVE
PC8	SCRUB_HEAD_MIDDLE_SWITCH	PG25	VALVE_DRIVE
PC9	SQUEEGEE_ON VACUUM SWITCH	PG26	VALVE_DRIVE
PC10	VAC_FAN_ENBL	PG27	VALVE_DRIVE
PC11	CHEMICAL_TANK_SWITCH	PG28	VALVE_DRIVE
PC12	WAND PUMP CB_READ	PG29	VALVE_DRIVE
PC13	VALVE_STROBE	PG30	VALVE_DRIVE
PE0	PARKING BRAKE_SWITCH	PG31	VALVE_DRIVE
PE1	IDRIVE_ENBL	PG32	VALVE_DRIVE
PE2	SCRUB_1_CURRENT_SET	PG33	VALVE_DRIVE
PE3	SCRUB_2_STATUS	PG34	VALVE_DRIVE
PE4	SCRUB_2_CURRENT_SET	PG35	VALVE_DRIVE
PE5	VAC_FAN_CURRENT_SET	PG36	VALVE_DRIVE
PE6	VAC_FAN_CURRENT_SET	PG37	VALVE_DRIVE
PE7	IDRIVE_AUX2_IN	PG38	VALVE_DRIVE
PE8	VBAT_PWR_MONITOR_ANALOG	PG39	VALVE_DRIVE
PE9	IDRIVE_AUX3_IN	PG40	VALVE_DRIVE
PE10	IDRIVE_AUX3_IN	PG41	VALVE_DRIVE
PE11	VALVE_CURRENT_FB	PG42	VALVE_DRIVE
PE12	VALVE_CURRENT_FB	PG43	VALVE_DRIVE
PE13	VALVE_CURRENT_FB	PG44	VALVE_DRIVE
PE14	VALVE_CURRENT_FB	PG45	VALVE_DRIVE
PE15	VALVE_CURRENT_FB	PG46	VALVE_DRIVE
PE16	VALVE_CURRENT_FB	PG47	VALVE_DRIVE
PE17	VALVE_CURRENT_FB	PG48	VALVE_DRIVE
PE18	VALVE_CURRENT_FB	PG49	VALVE_DRIVE
PE19	VALVE_CURRENT_FB	PG50	VALVE_DRIVE
PE20	VALVE_CURRENT_FB	PG51	VALVE_DRIVE
PE21	VALVE_CURRENT_FB	PG52	VALVE_DRIVE
PE22	VALVE_CURRENT_FB	PG53	VALVE_DRIVE
PE23	VALVE_CURRENT_FB	PG54	VALVE_DRIVE
PE24	VALVE_CURRENT_FB	PG55	VALVE_DRIVE
PE25	VALVE_CURRENT_FB	PG56	VALVE_DRIVE
PE26	VALVE_CURRENT_FB	PG57	VALVE_DRIVE
PE27	VALVE_CURRENT_FB	PG58	VALVE_DRIVE
PE28	VALVE_CURRENT_FB	PG59	VALVE_DRIVE
PE29	VALVE_CURRENT_FB	PG60	VALVE_DRIVE
PE30	VALVE_CURRENT_FB	PG61	VALVE_DRIVE
PE31	VALVE_CURRENT_FB	PG62	VALVE_DRIVE
PE32	VALVE_CURRENT_FB	PG63	VALVE_DRIVE
PE33	VALVE_CURRENT_FB	PG64	VALVE_DRIVE
PE34	VALVE_CURRENT_FB	PG65	VALVE_DRIVE
PE35	VALVE_CURRENT_FB	PG66	VALVE_DRIVE
PE36	VALVE_CURRENT_FB	PG67	VALVE_DRIVE
PE37	VALVE_CURRENT_FB	PG68	VALVE_DRIVE
PE38	VALVE_CURRENT_FB	PG69	VALVE_DRIVE
PE39	VALVE_CURRENT_FB	PG70	VALVE_DRIVE
PE40	VALVE_CURRENT_FB	PG71	VALVE_DRIVE
PE41	VALVE_CURRENT_FB	PG72	VALVE_DRIVE
PE42	VALVE_CURRENT_FB	PG73	VALVE_DRIVE
PE43	VALVE_CURRENT_FB	PG74	VALVE_DRIVE
PE44	VALVE_CURRENT_FB	PG75	VALVE_DRIVE
PE45	VALVE_CURRENT_FB	PG76	VALVE_DRIVE
PE46	VALVE_CURRENT_FB	PG77	VALVE_DRIVE
PE47	VALVE_CURRENT_FB	PG78	VALVE_DRIVE
PE48	VALVE_CURRENT_FB	PG79	VALVE_DRIVE
PE49	VALVE_CURRENT_FB	PG80	VALVE_DRIVE
PE50	VALVE_CURRENT_FB	PG81	VALVE_DRIVE
PE51	VALVE_CURRENT_FB	PG82	VALVE_DRIVE
PE52	VALVE_CURRENT_FB	PG83	VALVE_DRIVE
PE53	VALVE_CURRENT_FB	PG84	VALVE_DRIVE
PE54	VALVE_CURRENT_FB	PG85	VALVE_DRIVE
PE55	VALVE_CURRENT_FB	PG86	VALVE_DRIVE
PE56	VALVE_CURRENT_FB	PG87	VALVE_DRIVE
PE57	VALVE_CURRENT_FB	PG88	VALVE_DRIVE
PE58	VALVE_CURRENT_FB	PG89	VALVE_DRIVE
PE59	VALVE_CURRENT_FB	PG90	VALVE_DRIVE
PE60	VALVE_CURRENT_FB		

[illegible]

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			Rev C	T500/T600 Scrub Board
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ACTUATOR FULL BRIDGE DRIVE
EXACT COPY OF VOLGA DRY

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A

B

C

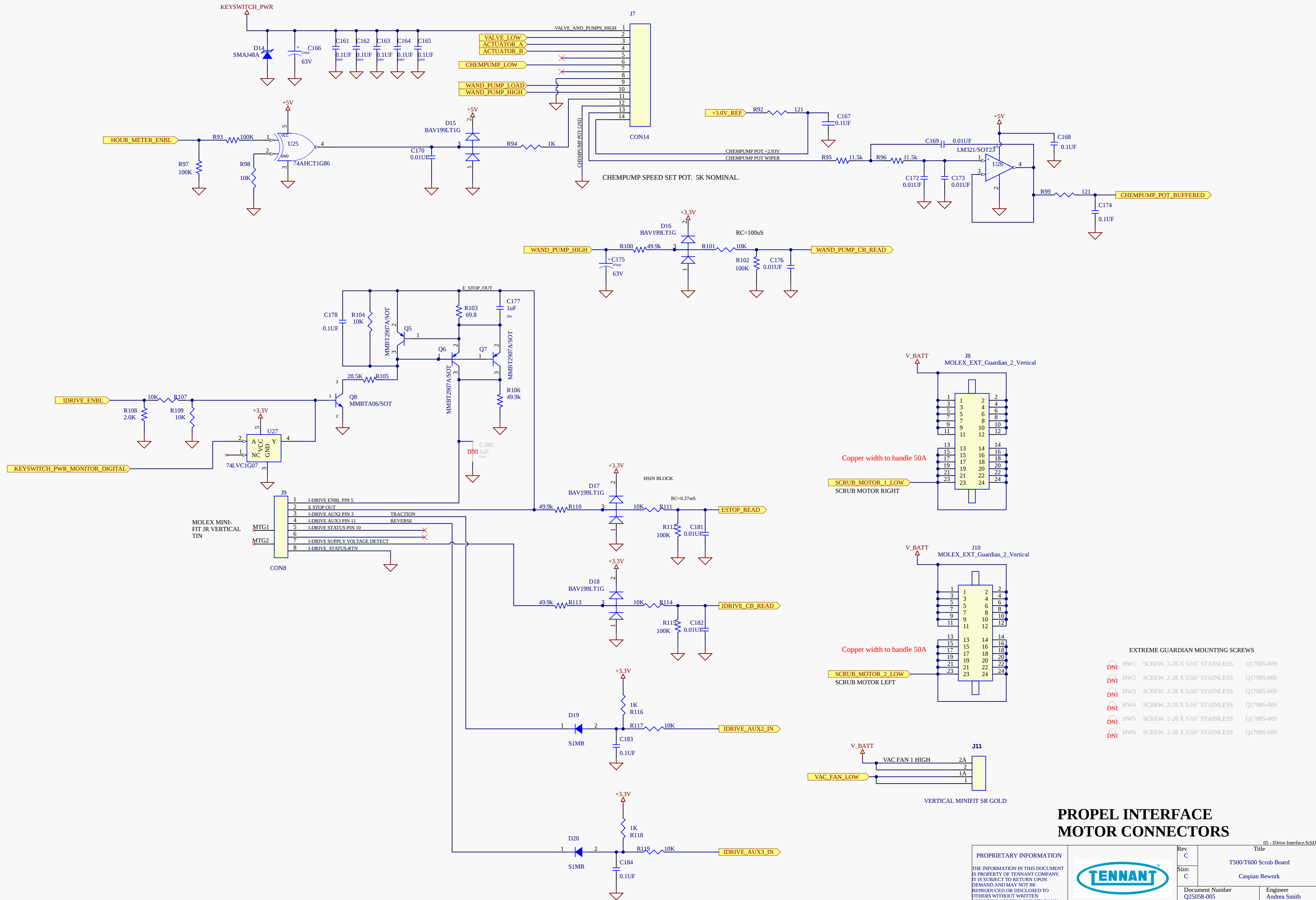
D

A

B

C

D



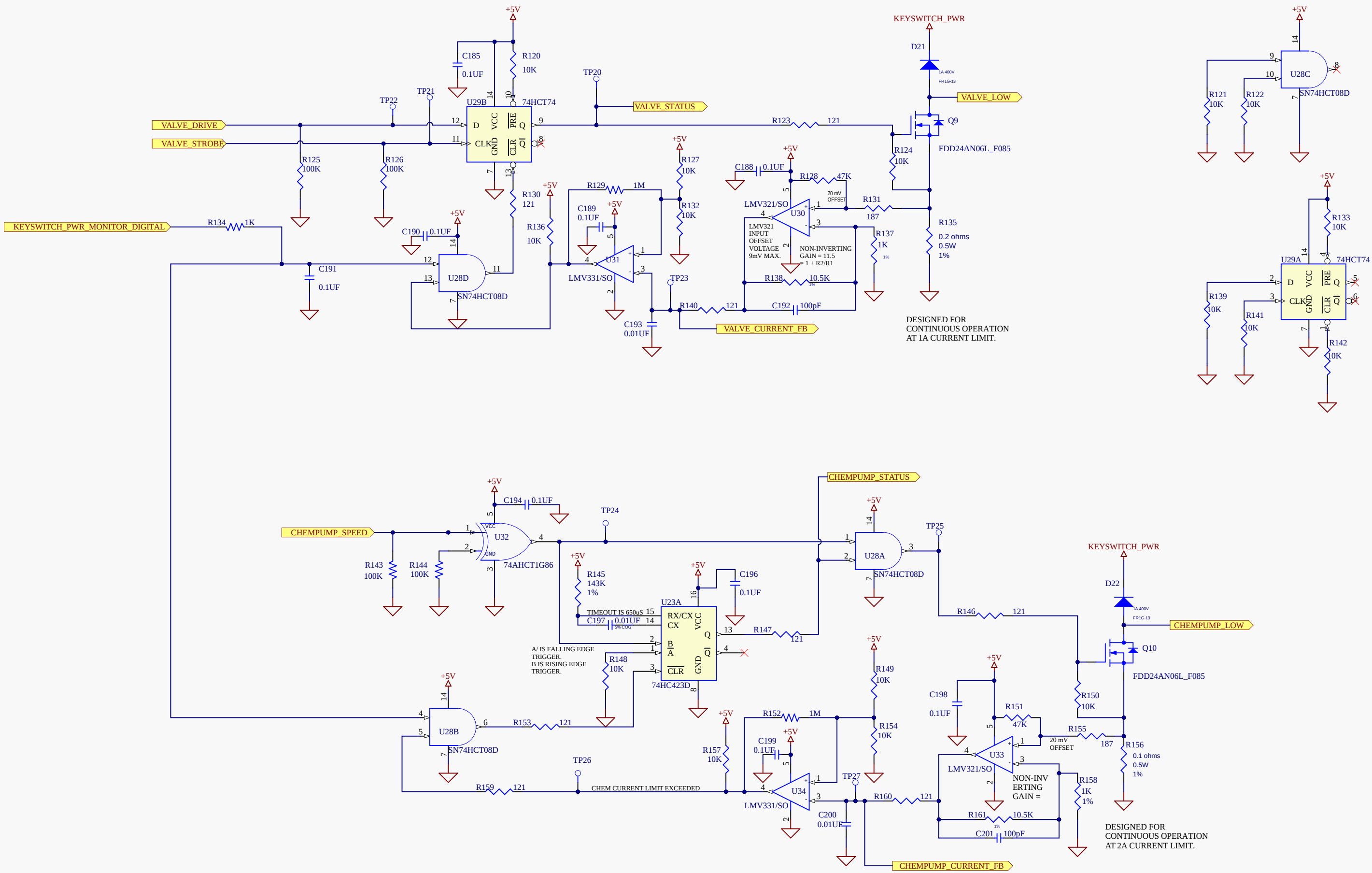
PROPEL INTERFACE MOTOR CONNECTORS



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05 - I-Drive Interface.SchDoc

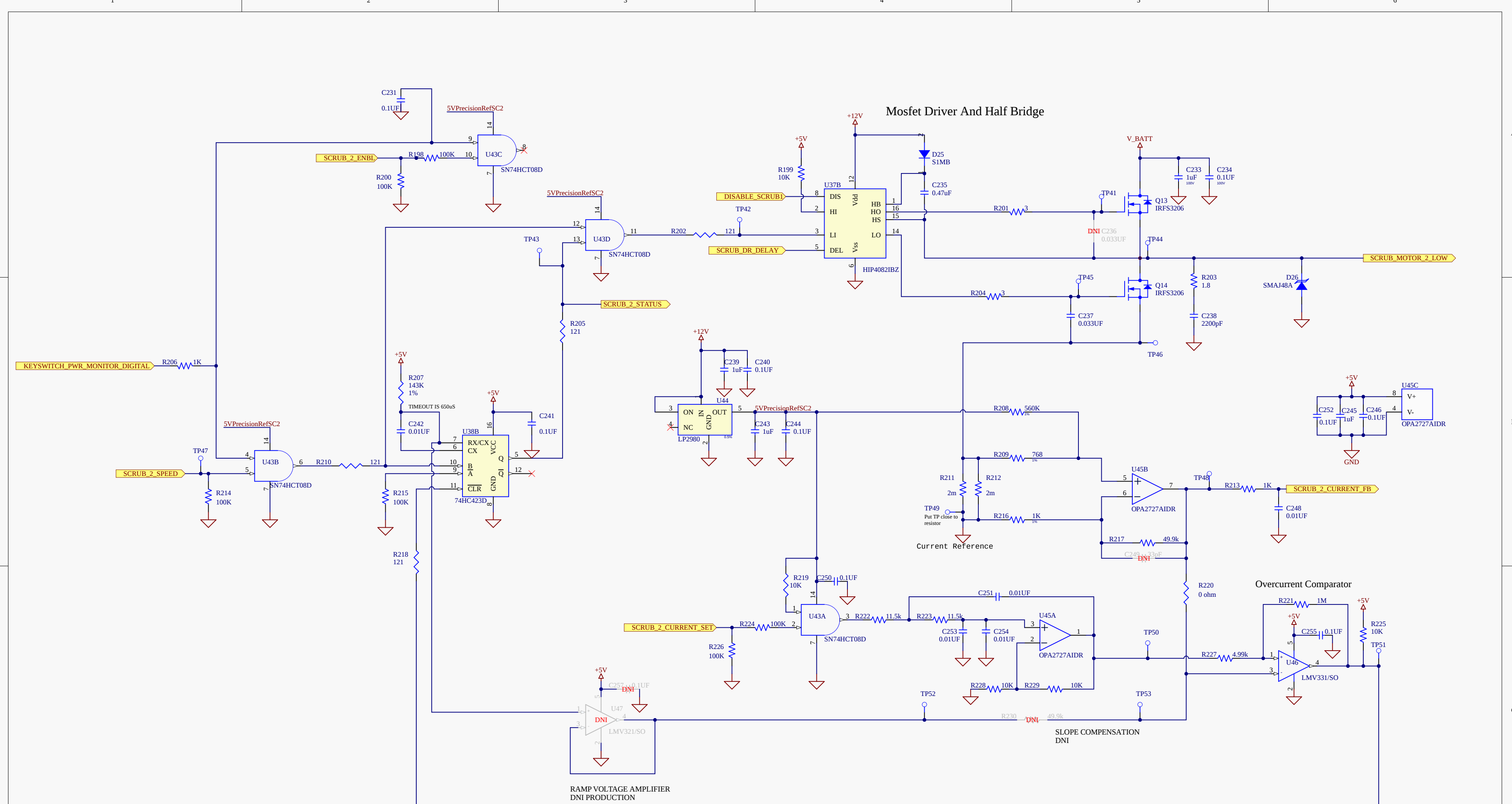


LOW SIDE DRIVERS

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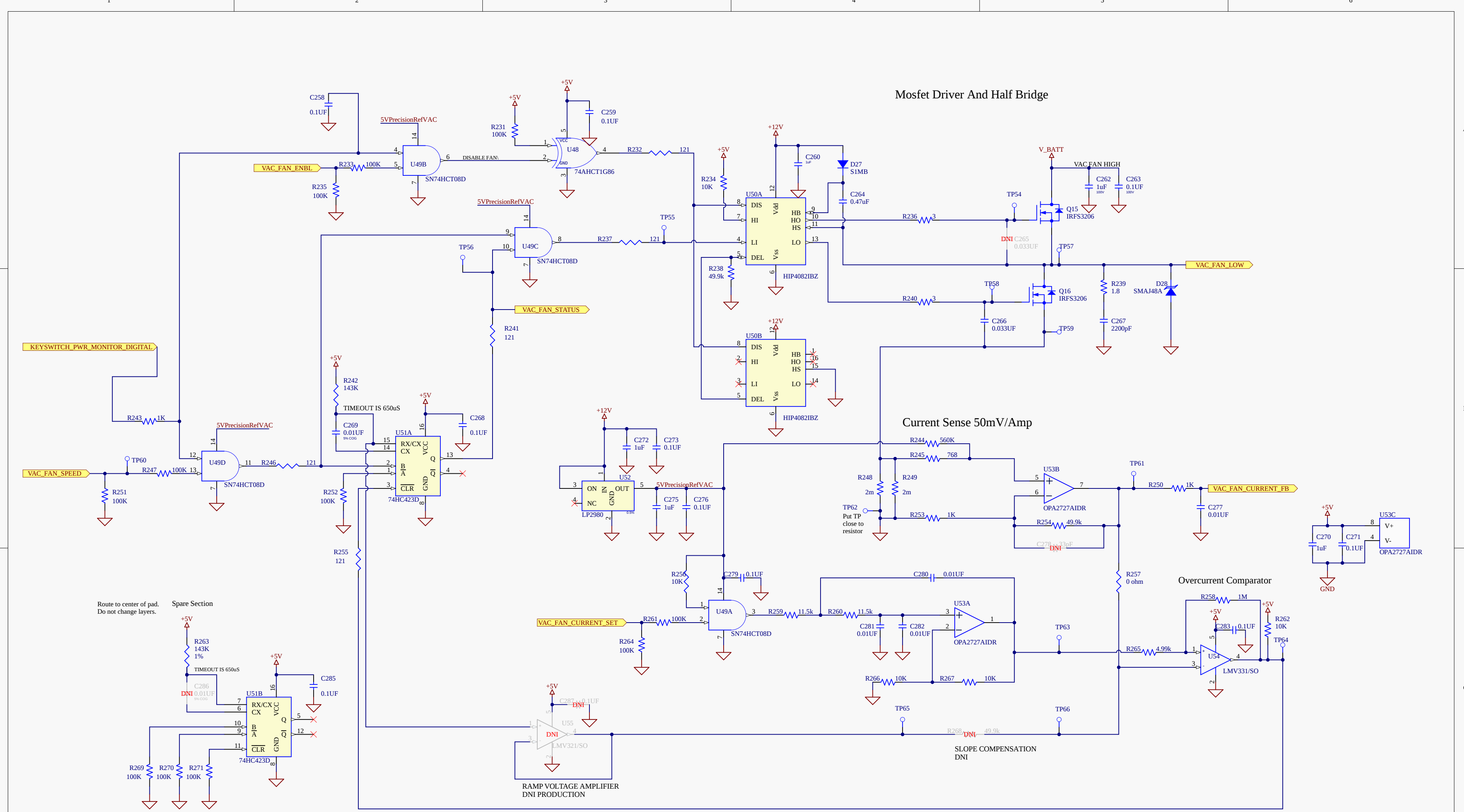


06 - Low side drivers.SchDoc



SCRUB MOTOR 2 HALF BRIDGE

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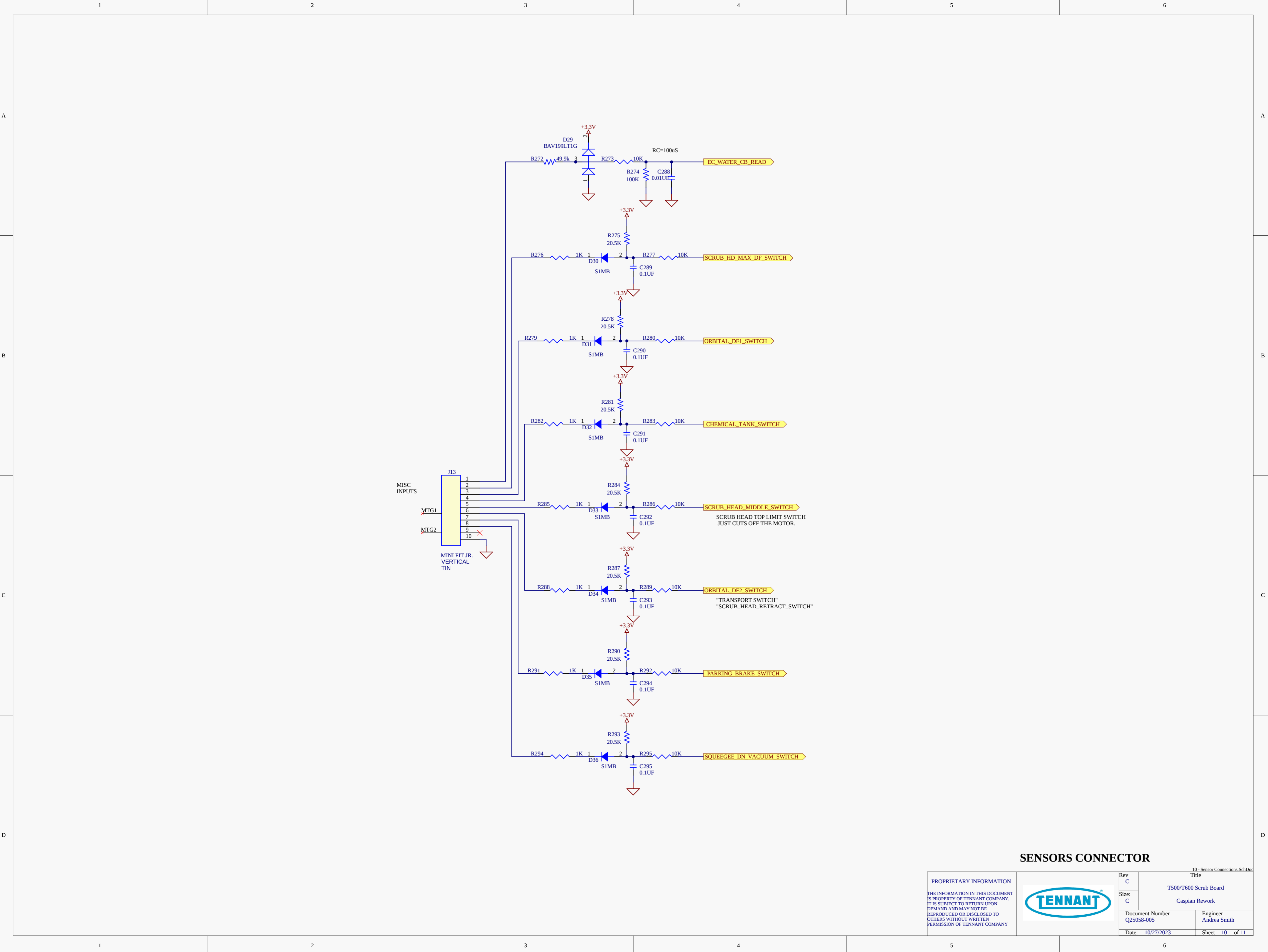


Current-sense resistor routing must be handled thusly:

VIAS TO GND

VAC FAN HALF BRIDGE

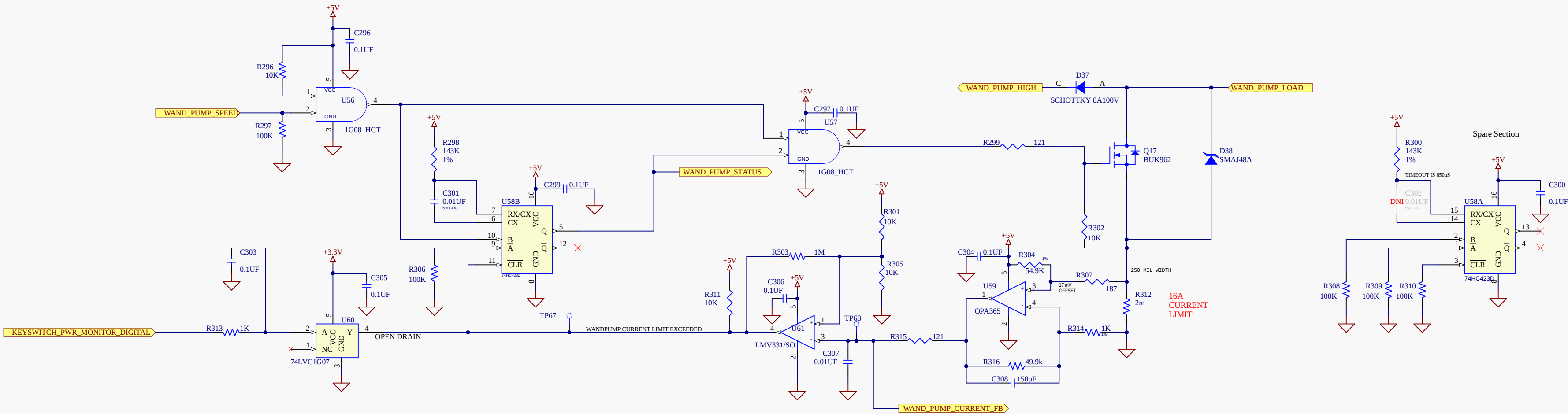
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SENSORS CONNECTOR

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WAND PUMP DRIVER

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