Componant Ref #	T5 Value, QPL#	Prowler Value, QPL#	Gator Value, QPL#
R33	2.00K, Q10002-222	499, Q10002-164	499, Q10002-164
R38	1.0K, Q10002-193	499, Q10002-164	499, Q10002-164
R76	30.1K, Q10002-335	15.0K, Q10002-306	15.0K, Q10002-306
R77	64.9K, Q10002-367	30.1K, Q10002-335	30.1K, Q10002-335
Q1	IRFR3518, Q19033-005	IRFR3518, Q19033-005	STD35NF06, Q19033-007
Q19,Q20,Q21,Q46	NOT USED	NOT USED	IRF3205S, Q19033-002
R249,R216,R251,R250	NOT USED	NOT USED	45.3, Q10002-064
C203,C204	NOT USED	NOT USED	0.033UF, Q11003-008
J9, J10	NOT USED	42820-2212	NOT USED
J12, J14	42819-2212	NOT USED	NOT USED
J17, J18	NOT USED	NOT USED	39425-0002
J13	42819-4212, Q15020-004	NOT USED	NOT USED
J8	NOT USED	42820-4212, Q15020-001	42820-4212, Q15020-001

T7

MATERIAL SPECIFICATIONS: SEE NOTES
TREATMENTS AND FINISHES: NONE
SCALE: N/A DO NOT SCALE DWG
DWN: XXXXXX XXXXXXX
MDR: XXXXXX XXXXXXX
DES: XXXXXXX XXXXXX
PART NAME: PCB CIRCUITBOARD [PROWLER]
DATE: XX-XXX-XXXX
TOLERANCES UNLESS OTHERWISE SPECIFIED

	METRIC TOLERANCES	INCH EQUIVALENT
LINEAR	+/- X.XX	+/- X.XX
SLOT WIDTH	N/A	N/A
HOLE DIA	N/A	N/A
ANGULAR	N/A	N/A
MACH SURFACES	N/A	N/A

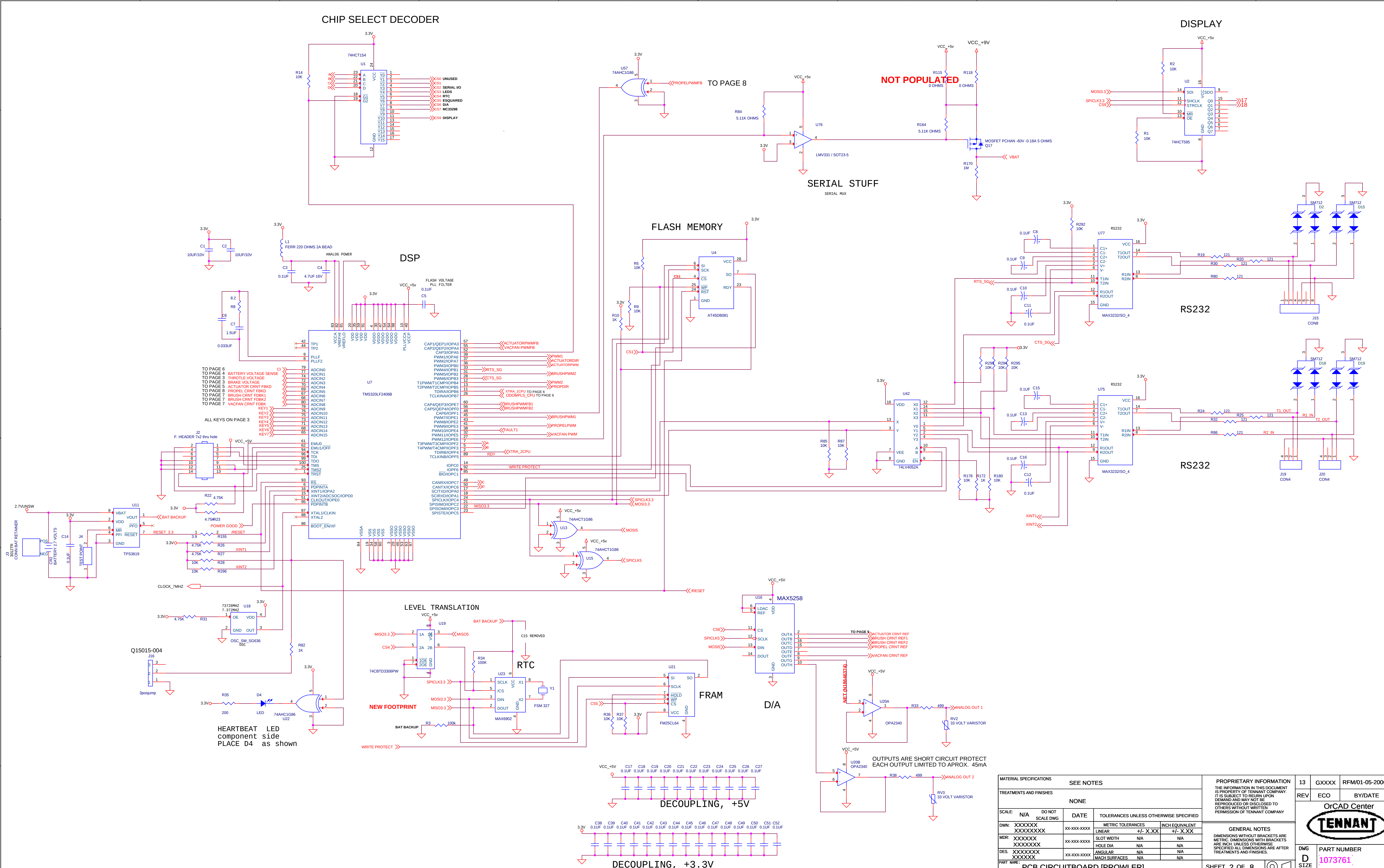
GENERAL NOTES
DIMENSIONS WITHOUT BRACKETS ARE METRIC. DIMENSIONS WITH BRACKETS ARE INCH. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE AFTER TREATMENTS AND FINISHES.

SHEET 1 OF 8

REV	ECO	BY/DATE
13	GXXXX	RFM/01-05-2006

OrCAD Center

DWG SIZE: D
PART NUMBER: 1073761


CHIP SELECT DECODER
74HCT154
UNUSED
SERIAL I/O
LEDS
RTC
ESQUARED
D/A
MC33298
DISPLAY
TO PAGE 8
NOT POPULATED
SERIAL STUFF
SERIAL MUX
LMV331 / SOT23-5
MOSFET PCHAN -60V -0.18A 5 OHMS
74HCT595
FLASH MEMORY
AT45DB081
DSP
TMS320LF2406B
FLASH VOLTAGE PLL FILTER
ANALOG POWER
FERR 220 OHMS 2A BEAD
TO PAGE 6
TO PAGE 4 BATTERY VOLTAGE SENSE
TO PAGE 3 THROTLE VOLTAGE
TO PAGE 3 BRAKE VOLTAGE
TO PAGE 5 ACTUATOR CRNT FBKD
TO PAGE 8 PROPEL CRNT FBKD
TO PAGE 7 BRUSH CRNT FDBK1
TO PAGE 7 BRUSH CRNT FDBK2
TO PAGE 7 VACFAN CRNT FDBK
ALL KEYS ON PAGE 3
F. HEADER 7x2 thru hole
RS232
MAX3232/SO_4
74LV4052A
TPS3619
OSC_SM_SG636
LEVEL TRANSLATION
74CBTD3306PW
NEW FOOTPRINT
C15 REMOVED
RTC
MAX6902
FSM 327
FRAM
FM25CL64
D/A
MAX5258
OPA2340
33 VOLT VARISTOR
OUTPUTS ARE SHORT CIRCUIT PROTECT
EACH OUTPUT LIMITED TO APROX. 45mA
HEARTBEAT LED
component side
PLACE D4 as shown
DECOUPLING, +5V
DECOUPLING, +3.3V
MATERIAL SPECIFICATIONS SEE NOTES
TREATMENTS AND FINISHES NONE
SCALE: N/A DO NOT SCALE DWG
DATE
TOLERANCES UNLESS OTHERWISE SPECIFIED
METRIC TOLERANCES
INCH EQUIVALENT
LINEAR +/- X.XX +/- X.XX
SLOT WIDTH N/A N/A
HOLE DIA N/A N/A
ANGULAR N/A N/A
MACH SURFACES N/A N/A
PROPRIETARY INFORMATION
THE INFORMATION IN THIS DOCUMENT IS PROPERTY OF TENNANT COMPANY. IT IS SUBJECT TO REURN UPON DEMAND AND MAY NOT BE REPRODUCED OR DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION OF TENNANT COMPANY
GENERAL NOTES
DIMENSIONS WITHOUT BRACKETS ARE METRIC. DIMENSIONS WITH BRACKETS ARE INCH. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE AFTER TREATMENTS AND FINISHES.
13 GXXXX RFM/01-05-2006
REV ECO BY/DATE
OrCAD Center
TENNANT
DWG SIZE D
PART NUMBER 1073761
PART NAME: PCB CIRCUITBOARD [PROWLER]
SHEET 2 OF 8

POWER SUPPLY +5V

5V / 1A SWITCHING SUPPLY

TO PAGE 4 **KEY INPUT**

D5 MBRD835L

RV1 V48MLA1210

C67 0.1UF

U24 LM2676S-5.0

C68 47uf / 35V

C69 0.1UF

C64 0.1UF

L2 33.0uH

D6 SCHOT 1A 60V

C70 100UF TANT 16V

VCC_+5V

POWER SUPPLY +3.3V

3.3V LOW DROPOUT LINEAR REGULATOR

TPS7133QPWP

U25 TPS7133QPWP

C65 0.1UF

R136 4.75K

R48 249K

C66 33uf

3.3V

POWER GOOD

POWER SUPPLY +9V

9V /1.5A SWITCHING SUPPLY

U26 LM2676S - ADJ

C71 0.1UF

1K R13

3.48K R15

3K R18

L3 68.0uH 2.4A

D7 SCHOT 1A 60V

C72 47uf / 35V

C73 0.1UF

C74 100UF TANT 16V

VCC_+9V

POLARITY PROTECTED KEY INPUT TO PAGE 6

3.3V

R61 R62 R63 R64 R39 R40 R65 10K

R46 2.0K KEY1
R47 2.0K KEY2
R49 2.0K KEY3
R50 2.0K KEY4
R51 2.0K KEY5
R52 2.0K KEY6
R53 2.0K KEY7

TO DSP, SHEET 2

BRAKE INPUT VOLTAGE

PROPEL INPUT VOLTAGE

VCC_+5V

F1 FUSE POLYSWITCH HOLD .35A / TRIP .7A

FUSED 5volts

TO PAGE 2

DA1 TVS DIODE ARRAY Semtech SM505C

DA2 TVS DIODE ARRAY Semtech SM505C

J5 HDR AMPLATCH 34 PIN

SPECS FOR F1
Holding Amps
0.35 @ 20C
0.27 @ 50C
0.25 @ 60C
0.20 @ 70C

Trip Time @ 20c
1 Amp @ 2sec.
3 Amp @ 0.03sec.

Resistance
Min = 0.3 Ohms
Max = 1.3 Ohms

LED DRIVERS

FROM DSP, SHEET2

MOSI3.3
SPICLK3.3
CS3

VCC_+5V

R61 10K

C76 0.1UF

U28 74HCT595

C77 0.1UF

U29 74HCT595

* 9-24-03 R134 4.75K

332 R57 R58 R59 R60 R62 R63 R64 R65 R66 R67 R68 R69 R70 R71 R73 R74

TO PAGE 2

17 332 R236

18 332 R130

BRAKE INPUT VOLTAGE

R72 15.0K

R125 30.1K

C114 0.1UF

C115 0.47UF

R133 2.43K

U50A OPA2340

C102 0.1UF

R135 332

BRAKE VOLTAGE TO PAGE 2

PROPEL INPUT VOLTAGE

TO PAGE 3 & 4

R76 15.0K

R77 30.1K

C81 0.1UF

C82 0.47UF

R131 2.43K

U50B OPA2340

C78 0.1UF

R75 332

THROTLE VOLTAGE TO PAGE 2

MATERIAL SPECIFICATIONS: SEE NOTES	PROPRIETARY INFORMATION: THE INFORMATION IN THIS DOCUMENT IS PROPERTY OF TENNANT COMPANY. IT IS SUBJECT TO REURN UPON DEMAND AND MAY NOT BE REPRODUCED OR DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION OF TENNANT COMPANY	13	GXXXX	RFM/01-05-2006
TREATMENTS AND FINISHES: NONE		REV	ECO	BY/DATE
SCALE: N/A DO NOT SCALE DWG	DATE	TOLERANCES UNLESS OTHERWISE SPECIFIED		
DWN: XXXXXX XXXXXXXX	XX-XXX-XXXX	METRIC TOLERANCES: LINEAR +/- X.XX; SLOT WIDTH N/A; HOLE DIA N/A; ANGULAR N/A; MACH SURFACES N/A	INCH EQUIVALENT: +/- X.XX; N/A; N/A; N/A; N/A	
MDR: XXXXXX XXXXXXX	XX-XXX-XXXX			
DES: XXXXXXX XXXXXX	XX-XXX-XXXX			
PART NAME: PCB CIRCUITBOARD [PROWLER]		GENERAL NOTES: DIMENSIONS WITHOUT BRACKETS ARE METRIC. DIMENSIONS WITH BRACKETS ARE INCH. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE AFTER TREATMENTS AND FINISHES.		
SHEET 3 OF 8				

OrCAD Center

TENNANT

DWG D SIZE

PART NUMBER 1073761

See Document :REV-013 layout mark up.pdf

MUST WIDEN TRACES
* "FLYBACK / FUSED POWER"
* "VBAT"

If output is used for Main Contactor, D16 must be used.

*Use D16 for flyback, when high side of load is connected to "1AMP LOWD"
*Use D21 for flyback, when high side of load is connected to "FLYBACK / FUSED POWER"

Locate C166 next to Q1, Q2, Q3.
Locate C167 next to Q4, Q5, Q6.

Q19009-001
Q19001-001

Locate C121, C163 next to U34 PIN 28.
Ground side directly to Signal GND.

D21 NOT POPULATED

TO PAGE 2

NEW C121

(VCOMP) RANGE
(0.25 - 3.0 VOLTS)
MUST BE RELITIVE
TO SINGLE POINT GND.

TRACES FROM FETs Q1 - 12 DRAIN TO J6 MUST HAVE 10 AMP CAPACITY.

CONNECT TO POWER GROUND PLAIN
MOSFET'S SOURCE
PIN 15 OF U34 & 35
C85, C88, R91, R100

TO J6 -13 ON PAGE 4

FLYBACK / FUSED POWER

BATTERY POSITIVE INPUT
TO PAGE 6

GND_POWER

J6

NOT POPULATED

Grounding path for "SENSOR GROUND RETURN".
J5-35 through ferrite to power ground, instead of directly to SIGNAL GROUND.

NOT POPULATED

ORIGINAL Grounding path for "SIGNAL GROUND PLAIN".

GND_SIGNAL

Located on pin 35 side of J6

Located on pin 1 side of J6

MATERIAL SPECIFICATIONS	SEE NOTES
TREATMENTS AND FINISHES	NONE
SCALE: N/A DO NOT SCALE DWG	DATE
DWN: XXXXXX XXXXXXX	XX-XXX-XXXX
MDR: XXXXXX XXXXXXX	XX-XXX-XXXX
DES. XXXXXXX XXXXXX	XX-XXX-XXXX
PART NAME: PCB CIRCUITBOARD [PROWLER]	

TOLERANCES UNLESS OTHERWISE SPECIFIED	METRIC TOLERANCES	INCH EQUIVALENT
	LINEAR +/- X.XX	+/- X.XX
	SLOT WIDTH N/A	N/A
	HOLE DIA N/A	N/A
	ANGULAR N/A	N/A
	MACH SURFACES N/A	N/A

PROPRIETARY INFORMATION
THE INFORMATION IN THIS DOCUMENT IS PROPERTY OF TENNANT COMPANY. IT IS SUBJECT TO RETURN UPON DEMAND AND MAY NOT BE REPRODUCED OR DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION OF TENNANT COMPANY

GENERAL NOTES
DIMENSIONS WITHOUT BRACKETS ARE METRIC. DIMENSIONS WITH BRACKETS ARE INCH, UNLESS OTHERWISE SPECIFIED. ALL DIMENSIONS ARE AFTER TREATMENTS AND FINISHES.

SHEET 4 OF 8

11	GXXXX	RFM/08-09-2005
REV	ECO	BY/DATE

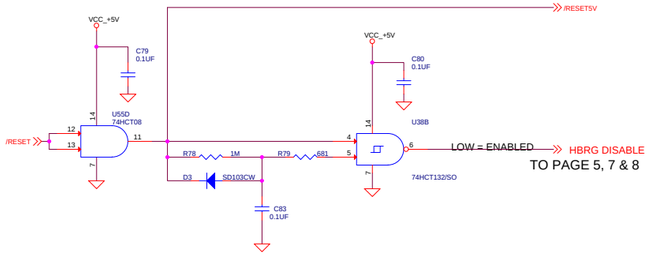
OrCAD Center

TENNANT

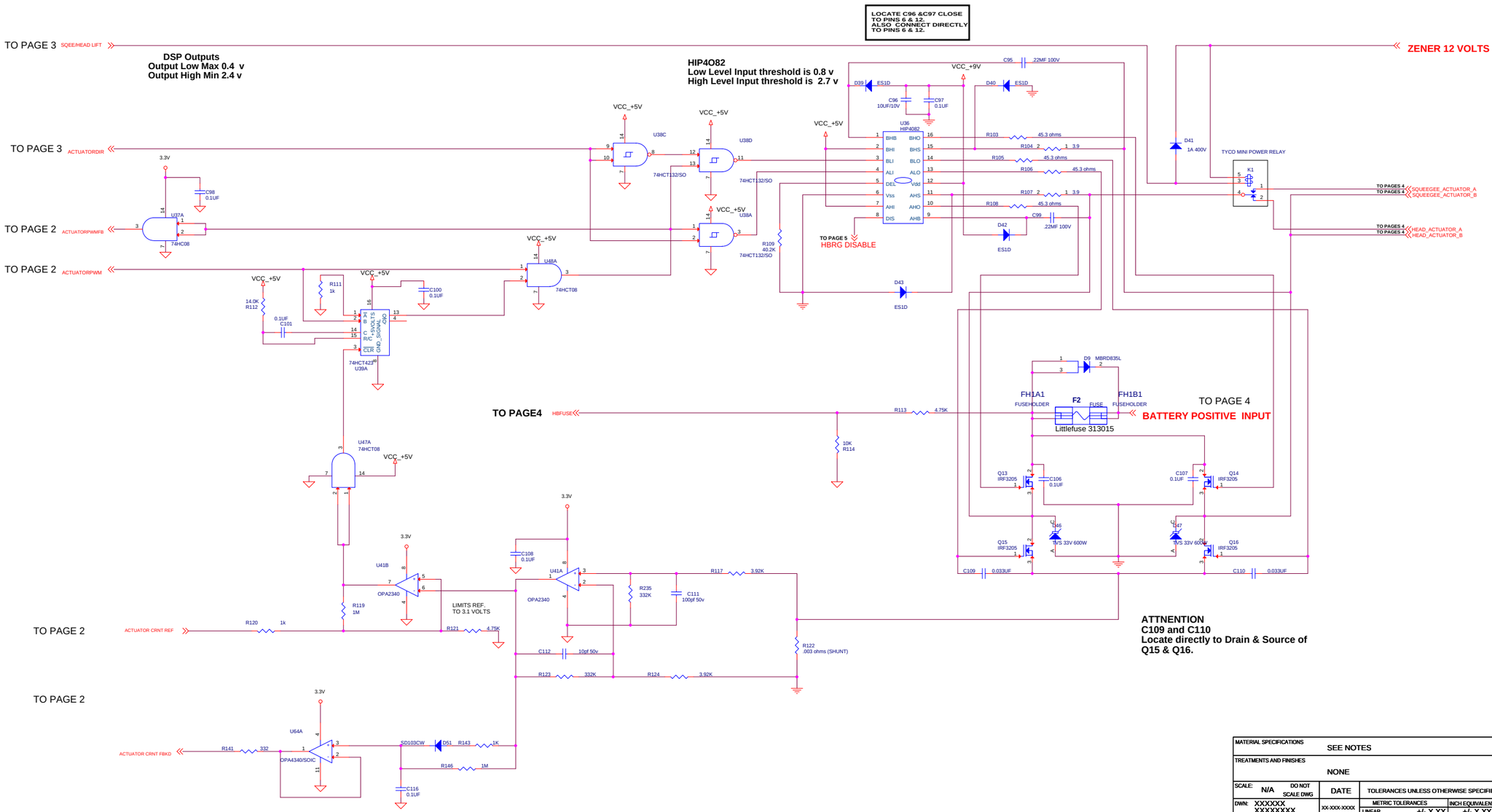
DWG D SIZE

PART NUMBER 1073761

5V RESET & H-BRIGE DISABLE



ACTUATOR LIFT /LOWER SQUEEGEE / BRUSH



MATERIAL SPECIFICATIONS: SEE NOTES	PROPRIETARY INFORMATION	13	GXXXX	RFM/01-05-2006
TREATMENTS AND FINISHES: NONE	THE INFORMATION IN THIS DOCUMENT IS PROPERTY OF TENNANT COMPANY. IT IS SUBJECT TO RETURN UPON DEMAND AND MAY NOT BE REPRODUCED OR DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION OF TENNANT COMPANY	REV	ECO	BY/DATE
SCALE: N/A DO NOT SCALE DWG	DATE	TOLERANCES UNLESS OTHERWISE SPECIFIED		
DWN: XXXXXX XXXXXXXX	XX-XXX-XXXX	METRIC TOLERANCES: LINEAR +/- X.XX; SLOT WIDTH N/A; HOLE DIA N/A; ANGULAR N/A; MACH SURFACES N/A	INCH EQUIVALENT: +/- X.XX; N/A; N/A; N/A	OrCAD Center TENNANT
MDR: XXXXXX XXXXXXX	XX-XXX-XXXX			
DES. XXXXXX XXXXX	XX-XXX-XXXX			
PART NAME: PCB CIRCUITBOARD [PROWLER]	GENERAL NOTES: DIMENSIONS WITHOUT BRACKETS ARE METRIC. DIMENSIONS WITH BRACKETS ARE INCH. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE AFTER TREATMENTS AND FINISHES.	SHEET 5 OF 8	DWG D SIZE	PART NUMBER 1073761

TO PAGE 5 ZENER 12 VOLTS

D8
DIODE AXIAL ZENER 12V 5W

BATTERY POSITIVE INPUT TO PAGE 4, 5 & 7

TO PAGE 3 POLARITY PROTECTED KEY INPUT

F3 POLYSWITCH

SWITCH, POLY 500mA, 60V, 0.7 OHMS

510 5% 1W R102
510 5% 1W R234
510 5% 1W R233
510 5% 1W R206

D80
ES1D

TO PAGE 2 BATTERY VOLTAGE SENSE

BATTERY VOLTAGE SENSE = .097 OF BATTERY VOLTAGE
BATTERY VOLTAGE SENSE = 3.3V @ 34 BATTERY VOLTS

R116 332
R128 4.75K
R127 332
C103 1.5UF
R281 5.11K OHMS
C91 1000uf 50v
C92 1000uf 50v
C93 1000uf 50v
C94 1000uf 50v
C170 0.1UF
C171 1000uf 50v
C172 1000uf 50v
C120 1000uf 50v
R280 5.11K OHMS

J11
6.5mm HOLE DIA.
M6-THREAD_25MM_LONG

J7
6.5mm HOLE DIA.
M6-THREAD_25MM_LONG

GND_POWER

3.3V
U78B
OPA2340

TO PAGE 2 XTRA_2CPU

3.3V
U78A
OPA2340
R283 1M
R278 1.0K
R248 10K
R297 200 1/2 W
R6 1.65k 1/2 W
R279 200 1/2W
C30 0.033UF

xtra_2in
KEY INPUT

TO PAGE 4 / J6-30

TO PAGE 2 XTRA_1CPU

3.3V
U66D
OPA4340/SOIC
R262 2.0K
R245 249K
R263 200
C29 0.033UF
R4 1.65k 1/2 W

xtra_1in

TO PAGE 4 / J6-2

TO PAGE 2 ODOMPLS_CPU

When "ODOMPLS_CPU" = 20V Then odompls3.3 = 2.16V
When "ODOMPLS_CPU" = 26V Then odompls3.3 = 2.80V

3.3V
U64D
OPA4340/SOIC
R83 332
R142 1M
C118 0.033UF
R255 200
R260 1.65k 1/2 W

odompls

TO PAGE 4 / J6-1

CI = 2.16V = B+ 20V, CHARGER INTERLOCK SWITCH WAS OPENED AND SCR IS NOT CONDUCTING.
CI = 2.80V = B+ 26V, CHARGER INTERLOCK SWITCH WAS OPENED AND SCR IS NOT CONDUCTING.
CI = 0 V = CHARGER INTERLOCK SWITCH IS OPEN DISCONNECTED FROM B+
.5 < CI < 1.6V = SCR IS CONDUCTING AND CHARGER INTERLOCK IS CONNECTED TO B+

TO PAGE 2 CI

TO PAGE 2 VBAT

3.3V
U64C
OPA4340/SOIC
R282 332
R244 1M
R242 14.7K
C104 1.0UF
Q52 SCR
R243 200
R241 1.65k 1/2 W

CHARGER INTERLOCK

TO PAGE4 / J6-18

SCR Q52
VTM = ON STATE VOLTAGE
VTM = 0.60 VOLTS @ APPROX. 13.5MA

MATERIAL SPECIFICATIONS: SEE NOTES	PROPRIETARY INFORMATION: THE INFORMATION IN THIS DOCUMENT IS PROPERTY OF TENNANT COMPANY. IT IS SUBJECT TO REURN UPON DEMAND AND MAY NOT BE REPRODUCED OR DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION OF TENNANT COMPANY	13	GXXXX	RFM/01-05-2006
TREATMENTS AND FINISHES: NONE		REV	ECO	BY/DATE
SCALE: N/A DO NOT SCALE DWG	DATE	TOLERANCES UNLESS OTHERWISE SPECIFIED		
DWN: XXXXXX XXXXXXX	XX-XXX-XXXX	METRIC TOLERANCES: LINEAR +/- X.XX; SLOT WIDTH N/A; HOLE DIA N/A; ANGULAR N/A; MACH SURFACES N/A	INCH EQUIVALENT: +/- X.XX; N/A; N/A; N/A; N/A	
MDR: XXXXXX XXXXXXX	XX-XXX-XXXX			
DES. XXXXXXX XXXXXX	XX-XXX-XXXX			
PART NAME: PCB CIRCUITBOARD [PROWLER]	SHEET 6 OF 8	GENERAL NOTES: DIMENSIONS WITHOUT BRACKETS ARE METRIC, DIMENSIONS WITH BRACKETS ARE INCH, UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE AFTER TREATMENTS AND FINISHES.	DWG SIZE: D	PART NUMBER: 1073761

OrCAD Center
TENNANT

TO PAGE 2 BRUSH CRNT FDBK1 R150 332 U66A OPA4340/SOIC 3.3V SD103CW D96 R258 1K R257 1M C198 0.1UF

TO PAGE 2 BRUSH CRNT REF1 R161 1k R162 4.75K LIMITS REF. TO 3.1 VOLTS R163 1M U46A OPA2340 VCC_+5V 74HCT08 U47B

TO PAGE 2 BRUSHPWM1 BRUSHPWMFB1 BRUSHPWMFB2 BRUSHPWM2 U37A U37B 74HC08 U44A 74HCT423 U48B 74HCT08 PWMB U48C PWMA R175 14.0K C146 0.1UF R177 1K C147 0.1UF R182 1K C149 0.1UF R184 14.0K C153 0.1UF U47C 74HCT08 U48B 74HCT423

TO PAGE 2 BRUSH CRNT REF2 R191 1k R192 4.75K LIMITS REF. TO 3.1 VOLTS R187 1M U51A OPA2340 3.3V

TO PAGE 2 BRUSH CRNT FDBK2 U66B OPA4340/SOIC R149 332 SD103CW D95 R256 1K R254 1M C197 0.1UF

TO PAGE 2 VACFAN PWMFB U37C 74HC08

TO PAGE 2 VACFAN PWM

MISSING PULSE DETECTOR
Changing C125 to 1.0uf allows.
Vac Fan motor to reach 100% duty cycle.

(t = 1.75ms) with R145 = 14k & C125 = .1uf
(t = 10.75ms) with R145 = 14k & C125 = 1.0uf

If GATOR C125 = Value, 1.0uf QPL, Q11003-004

C123 0.1UF R144 1k R145 14.0K C125 0.1UF U47D 74HCT08 U39B 74HCT423 U48D 74HCT08 C152 0.1UF PWMC

TO PAGE 2 VACFAN CRNT REF R153 1k R154 4.75K LIMITS REF. TO3.1 VOLTS R152 1M U45A OPA2340 U45B OPA2340 C132 0.1UF

TO PAGE 2 VACFAN CRNT FDBK U66C OPA4340/SOIC R147 332 SD103CW D94 R253 1K R252 1M C196 0.1UF

this point is
6 out of 1023
1023 = 3.3 volts

NEW COMPONANTS IN BOX

C135 10pf 50v R159 14.7K R158 100k R157 100k C193 100pf 50v Small MOSFET Q51 R284 14.7K

CHANGE R157, C193 & Q51 CONNECT TO U51 PIN4 NOT GROUND PLAIN

"LOCATION SENSITIVE TRACE" Connect R157, C193 & Q51 together. Then with one trace connect to U45 pin 4 before connecting to Signal Gnd Plain.

"LOCATION SENSITIVE TRACE" SINGLE AND DIRECT TRACE. TRACE CONNECTING R284 TO THE DRAINS OF Q34, Q35

"LOCATION SENSITIVE TRACE" SINGLE AND DIRECT TRACE. R159 MUST CONNECT TO THE PAD WHICH THE SOURCES OF Q34,Q35 ARE SOLDERD TO. PAD MUST HAVE 15 VIAS TO GND PLAIN.

Maxim
Q19045-004
IC SMD MAX944 COMP QUAD SO14
MAX944CSD
SO14

When gate is 6.84 volts
Neg Input is 2.31 volts.

R186 2 3.92K R193 2.0K MAX944/SO U74A VREF

TO PAGE 5 HBRG DISABLE

U49 HIP4086 BHB BHI BLI ALI AHI VSS RDEL UVLO RFSH DIS CLI CHI BHO BHS BLO ALO VDD CLO AHS AHO AHB CHS CHO CHB

C150 100pf 50v R176 40.2K C145 .22MF 100V D67 ES1D D68 ES1D R179 2 1 3.9 D70 ES1D R181 2 1 3.9 D72 ES1D C148 .22MF 100V R183 2 1 3.9 C151 .22MF 100V D73 ES1D D74 ES1D

C154, C155, C117, R290, R291 GROUP COMPONANTS NEXT TO U49.

NEW COMPONANTS

2.31 volts VREF

R290 2.0K C155 0.1UF R291 681 C117 4.7UF 16V C154 10UF/10V

ROUTE THIS TRACE DIRECT TO U49 PIN 20 VCC_+9V U49 PIN 20

ROUTE THIS TRACE DIRECT TO U49 PIN 6 U49 PIN 6

"LOCATION SENSITIVE TRACE" SINGLE AND DIRECT TRACE. TRACE CONNECTING R286 TO THE DRAINS OF Q30,Q32

R286 14.7K R197 100k C200 100pf 50v Small MOSFET Q53 R198 100k C164 10pf 50v R199 14.7K

CHANGE R197, C200 & Q53 CONNECT TO U51 PIN4 NOT GROUND PLAIN

"LOCATION SENSITIVE TRACE" Connect R197, C200 & Q53 together. Then with one trace connect to U51 PIN4 before connecting to Signal Gnd Plain.

"LOCATION SENSITIVE TRACE" SINGLE AND DIRECT TRACE. R199 MUST CONNECT TO THE PAD WHICH THE SOURCES OF Q30,Q32 ARE SOLDERD TO. PAD MUST HAVE 15 VIAS TO GND PLAIN.

R194 3.92K R201 2.0K MAX944/SO U74B VREF

"LOCATION SENSITIVE TRACE" SINGLE AND DIRECT TRACE. TRACE CONNECTING R288 TO THE DRAINS OF Q27,Q28

R171 100k C201 100pf 50v Small MOSFET Q54 R288 14.7K R173 100k C144 10pf 50v R174 14.7K

CHANGE R171, C201 & Q54 CONNECT TO U46 PIN4 NOT GROUND PLAIN

"LOCATION SENSITIVE TRACE" Connect R171, C201 & Q54 together. Then with one trace connect to U45 pin 4 before connecting to Signal Gnd Plain.

"LOCATION SENSITIVE TRACE" SINGLE AND DIRECT TRACE. R174 MUST CONNECT TO THE PAD WHICH THE SOURCES OF Q27,Q28 ARE SOLDERD TO. PAD MUST HAVE 15 VIAS TO GND PLAIN.

R225 3.92K R237 2.0K MAX944/SO U74C VREF

TO PAGE6 BATTERY POSITIVE INPUT

Q25 IRF3205 R160 45.3 ohms Q48 IRF3205 C136 0.1UF R238 45.3 ohms Q27 IRF3205 R165 45.3 ohms Q28 IRF3205 R169 45.3 ohms C142 0.033UF C143 0.033UF D10 TVS 16V 1500W D65 TVS 16V 1500W R247 1.0 1% 1W C202 .22MF 100V

"LOCATION SENSITIVE"

COMPONANTS; C136, D65, D10, R247, C202 ARE PLACED WITHIN HALF INCH OF MOSFETS; Q25, Q48, Q27, Q28.

SCRUBBING MOTORS

J8 J13 RIGHT ANGLE MOLEX 42820-4212 STAND-UP MOLEX 42819-4212

TO PAGE6 BATTERY POSITIVE INPUT

Q29 IRF3205 R189 45.3 ohms Q49 IRF3205 C156 0.1UF R239 45.3 ohms Q30 IRF3205 R188 45.3 ohms Q32 IRF3205 R190 45.3 ohms C159 0.033UF C160 0.033UF D11 TVS 16V 1500W D77 TVS 16V 1500W R246 1.0 1% 1W C195 .22MF 100V

"LOCATION SENSITIVE"

COMPONANTS; C156, D77, D11, R246, C195 ARE PLACED WITHIN HALF INCH OF MOSFETS; Q29, Q49, Q30, Q32.

VACUUM FAN MOTOR(S)

TO PAGE6 BATTERY POSITIVE INPUT

CHO CHS CLO Q33 IRF3205 R200 45.3 ohms R240 45.3 ohms Q50 IRF3205 C165 0.1UF Q34 IRF3205 R202 45.3 ohms R203 45.3 ohms Q35 IRF3205 C168 0.033UF C169 0.033UF D12 TVS 16V 1500W D90 TVS 16V 1500W R225 1.0 1% 1W C194 .22MF 100V

J17 MOLEX 39425-0002 Q15025-001 J9 J12 42820-2212 RIGHT ANGLE MOLEX 42819-2212 STAND-UP MOLEX

"LOCATION SENSITIVE"

COMPONANTS; C165, D90, D12, C194, R225. ARE PLACED WITHIN HALF INCH OF MOSFETS; Q33, Q50, Q34, Q35.

MAX944/SO U74D

MATERIAL SPECIFICATIONS: SEE NOTES	PROPRIETARY INFORMATION: THE INFORMATION IN THIS DOCUMENT IS PROPERTY OF TENNANT COMPANY. IT IS SUBJECT TO REURN UPON DEMAND AND MAY NOT BE REPRODUCED OR DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION OF TENNANT COMPANY	13	GXXXX	RFM/01-05-2006
TREATMENTS AND FINISHES: NONE		REV	ECO	BY/DATE
SCALE: N/A DO NOT SCALE DWG	DATE	TOLERANCES UNLESS OTHERWISE SPECIFIED		
DWN: XXXXXX XXXXXXX	XX-XXX-XXXX	METRIC TOLERANCES: LINEAR +/- X.XX; SLOT WIDTH N/A; HOLE DIA N/A; ANGULAR N/A; MACH SURFACES N/A	INCH EQUIVALENT: +/- X.XX; N/A; N/A; N/A; N/A	
MDR: XXXXXX XXXXXXX	XX-XXX-XXXX			
DES. XXXXXXX XXXXX	XX-XXX-XXXX			
PART NAME: PCB CIRCUITBOARD [PROWLER]		GENERAL NOTES: DIMENSIONS WITHOUT BRACKETS ARE METRIC. DIMENSIONS WITH BRACKETS ARE INCH. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE AFTER TREATMENTS AND FINISHES.		
SHEET 7 OF 8		OrCAD Center TENNANT		
DWG D SIZE	PART NUMBER 1073761			

PROPEL

BATTERY POSITIVE INPUT

"LOCATION SENSITIVE"

COMPONANTS; C173, C174, R210, D81, D13 ARE PLACED WITHIN HALF INCH OF MOSFETS; Q36, Q37, Q21, Q38, Q39, Q19

GATOR ONLY POPULATED

IMPORTANT!
Q38, Q39, Q19
EACH SOURCE MUST HAVE 12 VIAS CONNECT TO GROUND PLAIN

BATTERY POSITIVE INPUT

"LOCATION SENSITIVE"

COMPONANTS; C181, C184, R222, D87, D14 ARE PLACED WITHIN HALF INCH OF MOSFETS; Q40, Q41, Q46, Q42, Q43, Q20

IMPORTANT!
Q42, Q43, Q20
EACH SOURCE MUST HAVE 12 VIAS CONNECT TO GROUND PLAIN

FORWARD IS WHEN PROPDIR = LOW
REVERSE IS WHEN PROPDIR = HIGH

"LOCATION SENSITIVE"

C179 & C180 LOCATE NEXT TO U53 PINS 6 & 12. ALSO CONNECT DIRECTLY STAY ON ONE LAYER

WHEN DIR_A IS HIGH, PROPB IS AMPLIFIED.

WHEN DIR_B IS HIGH, PROPA IS AMPLIFIED.

CHANGE R197, C183 & Q31 CONNECT TO U51 PIN4 NOT GROUND PLAIN

"LOCATION SENSITIVE TRACE" SINGLE AND DIRECT TRACE R232 MUST CONNECT TO THE PLAIN WHICH THE SOURCES OF Q38, Q39, Q42, Q43. ARE SOLDERD TO.

LIMITS REF. TO 3.1 VOLTS

TO PAGE 2
TO PAGE 2
TO PAGE 2
TO PAGE 2
TO PAGE 2
TO PAGE 5 HBRG DISABLE

MATERIAL SPECIFICATIONS: SEE NOTES	PROPRIETARY INFORMATION: THE INFORMATION IN THIS DOCUMENT IS PROPERTY OF TENNANT COMPANY. IT IS SUBJECT TO RETURN UPON DEMAND AND MAY NOT BE REPRODUCED OR DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION OF TENNANT COMPANY	13	GXXXX	RFM/01-05-2006
TREATMENTS AND FINISHES: NONE		REV	ECO	BY/DATE
SCALE: N/A DO NOT SCALE DWG	DATE	TOLERANCES UNLESS OTHERWISE SPECIFIED		
DWN: XXXXXX XXXXXXXX	XX-XXX-XXXX	METRIC TOLERANCES: LINEAR +/- X.XX; SLOT WIDTH N/A; HOLE DIA N/A; ANGULAR N/A; MACH SURFACES N/A	INCH EQUIVALENT: +/- X.XX; N/A; N/A; N/A; N/A	
MDR: XXXXXX XXXXXXX	XX-XXX-XXXX			
DES. XXXXXXX XXXXXX	XX-XXX-XXXX			
PART NAME: PCB CIRCUITBOARD [PROWLER]		GENERAL NOTES: DIMENSIONS WITHOUT BRACKETS ARE METRIC, DIMENSIONS WITH BRACKETS ARE INCH, UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE AFTER TREATMENTS AND FINISHES.		
SHEET 8 OF 8				

OrCAD Center

TENNANT

DWG D SIZE

PART NUMBER 1073761