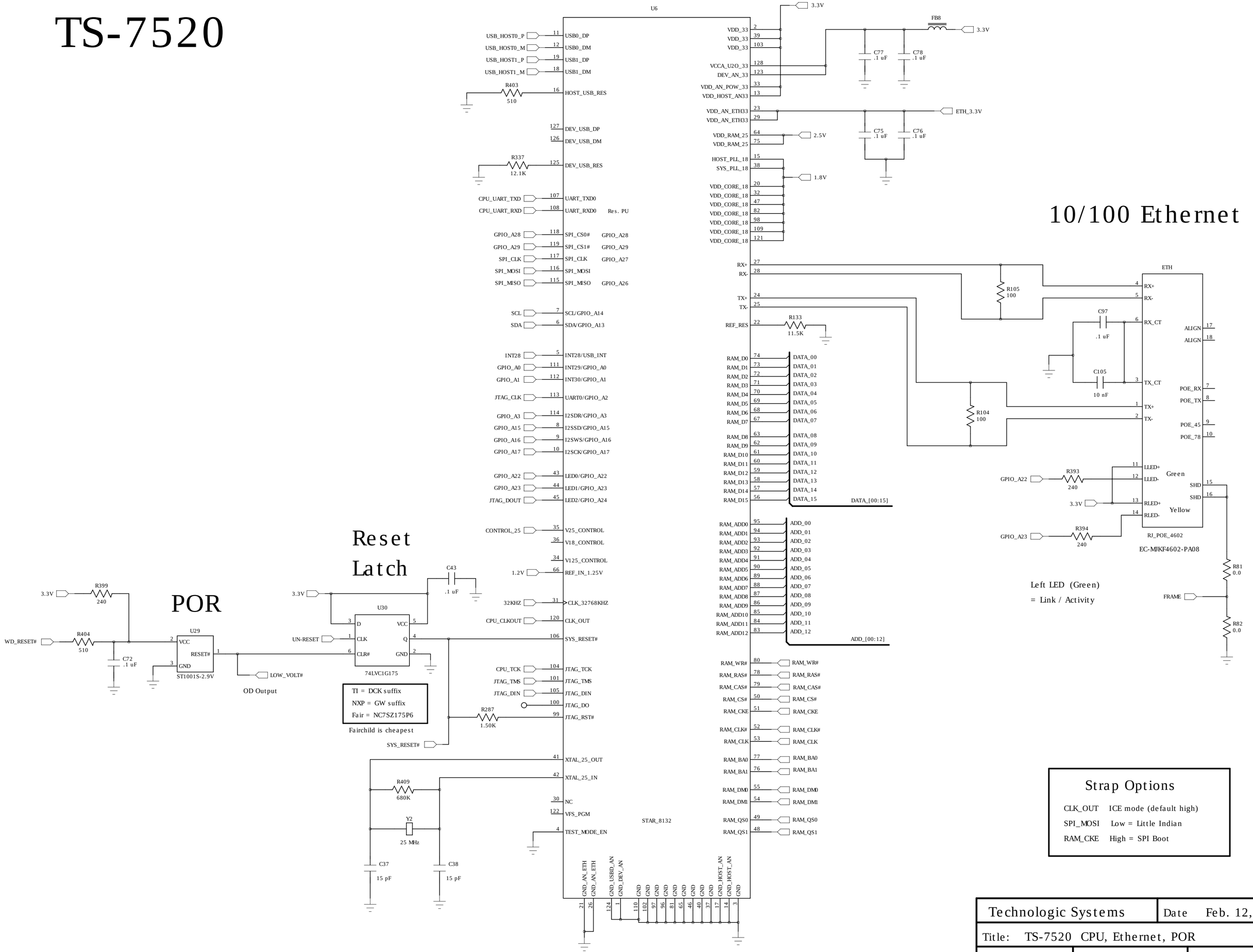
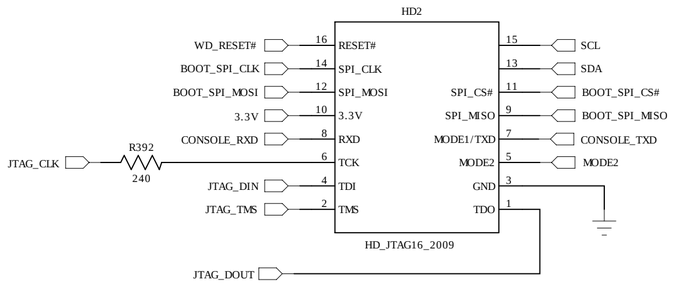
TS-7520



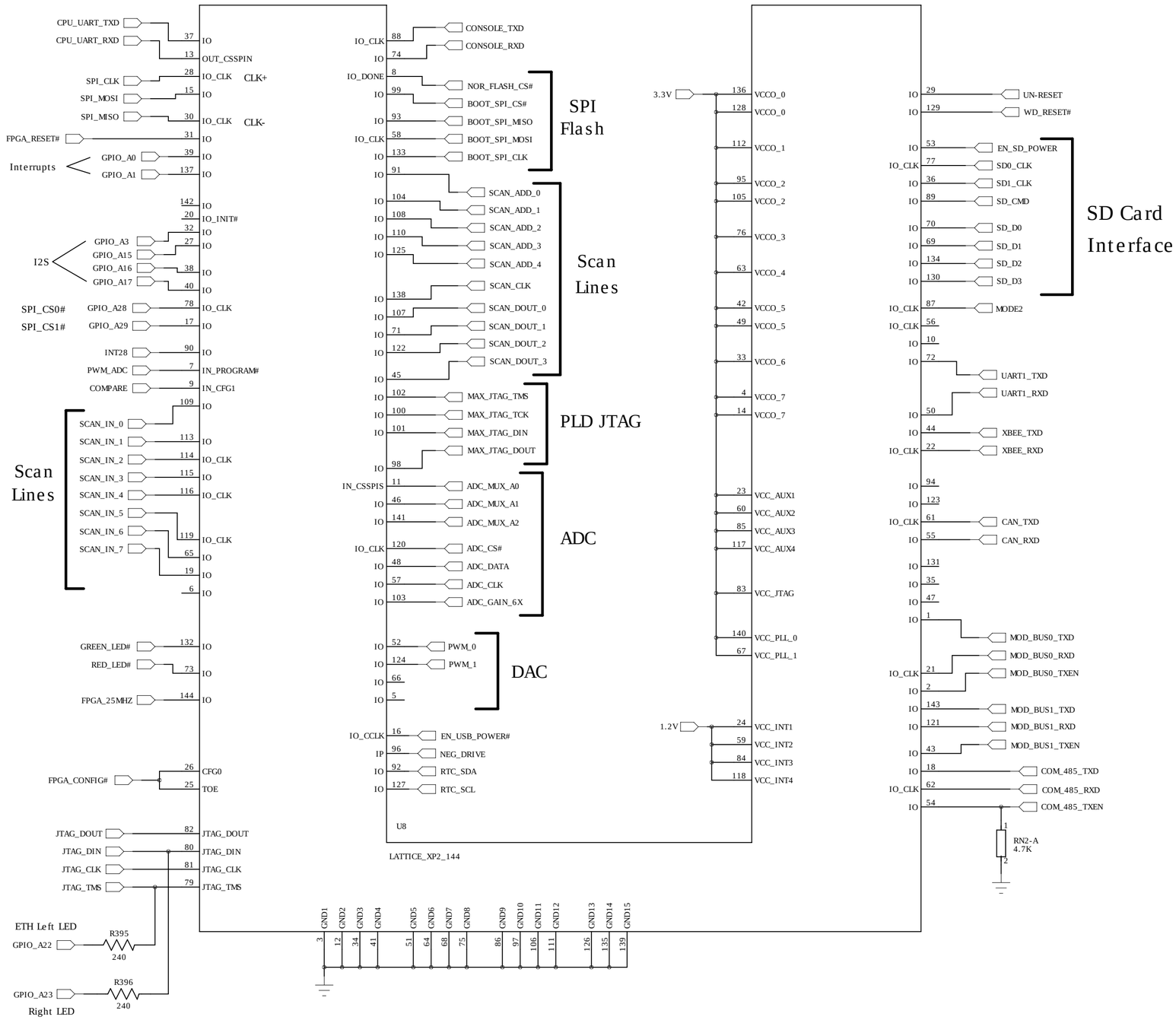
Technologic Systems	Date Feb. 12, 2012	
Title: TS-7520 CPU, Ethernet, POR		
Rev: B	Designer	Sheet 1 of 21

JTAG 16-pin Header



FPGA with 8000 LUTs

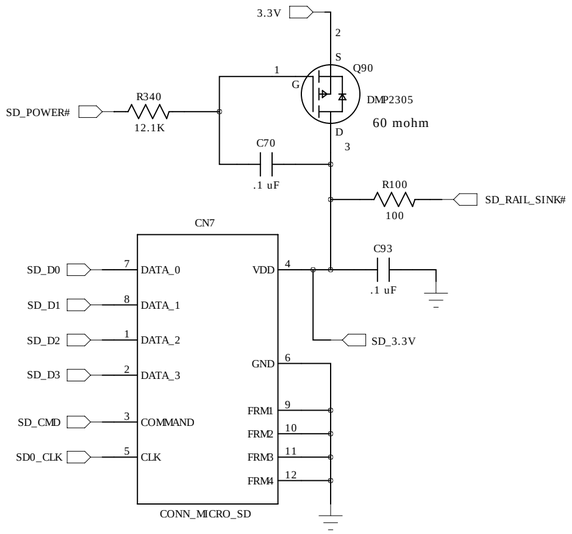
XP2-5 has:
5K LUTS 2 PLLs
9 blocks of 1Kx18 Block RAM
12 18x18 Multipliers
100 I/O with 144 pin package
"instant ON" = about 1.5 mS
input PLL clock = 10 MHz min



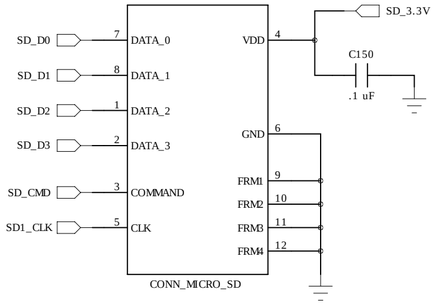
Pull-up and pull-down resistors are 6 to 30K ohms

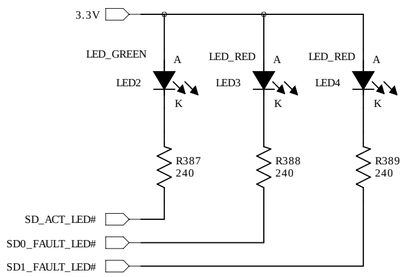
Technologic Systems	Date Feb. 12, 2012	
Title: TS-7520 FPGA, JTAG Header		
Rev: B	Designer RLM	Sheet 2 of 21

Micro SD Card Socket #0

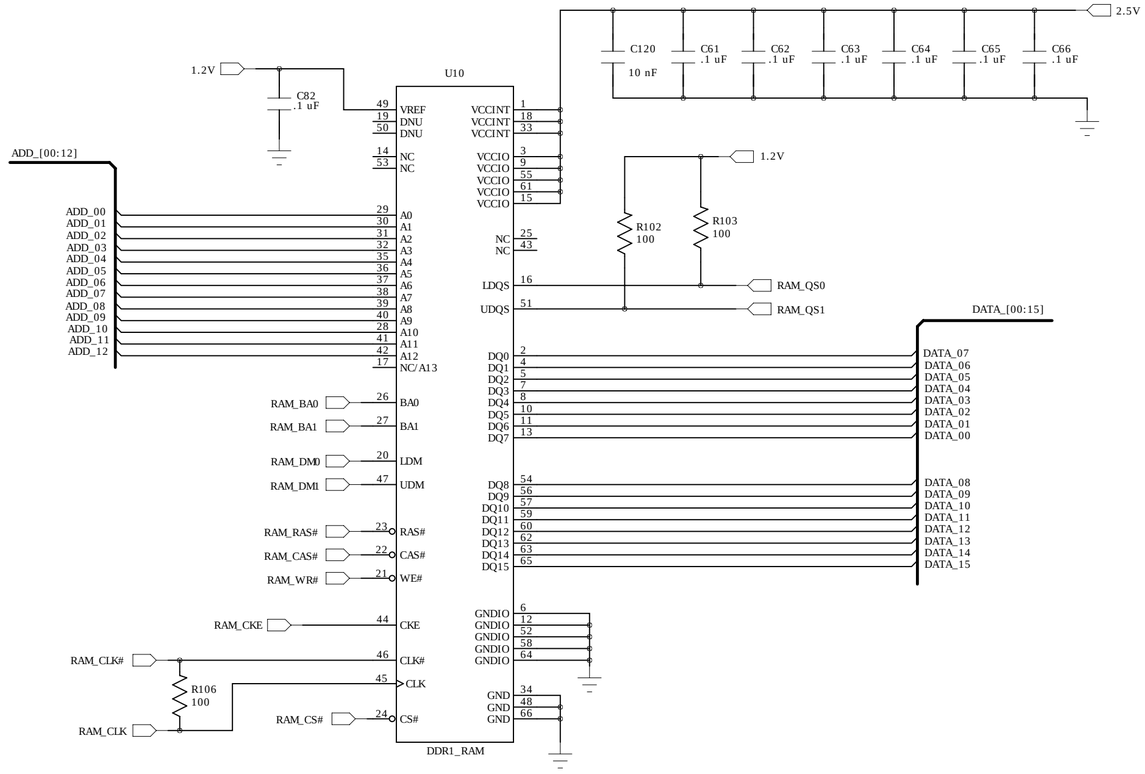


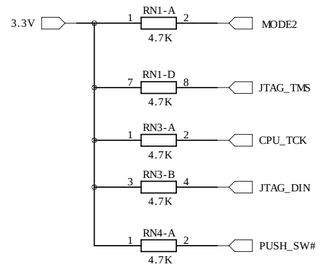
Micro SD Socket #1



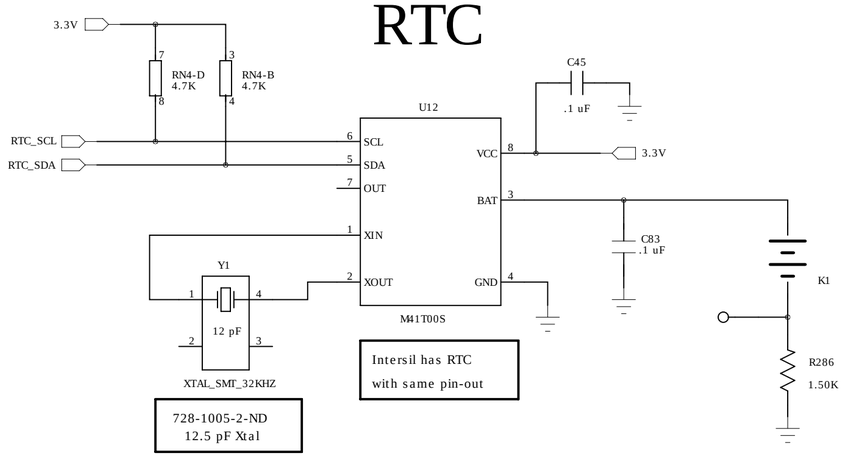


64 Mbyte DDR1 SDRAM



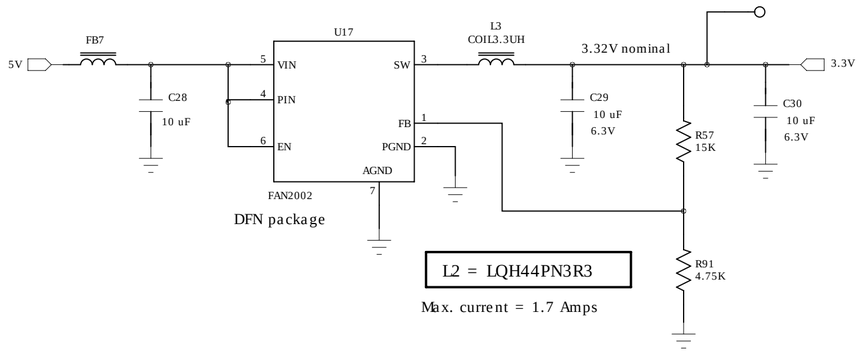


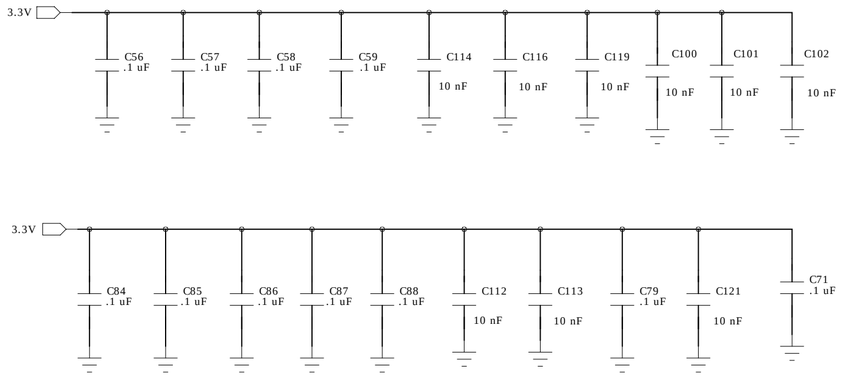
RTC



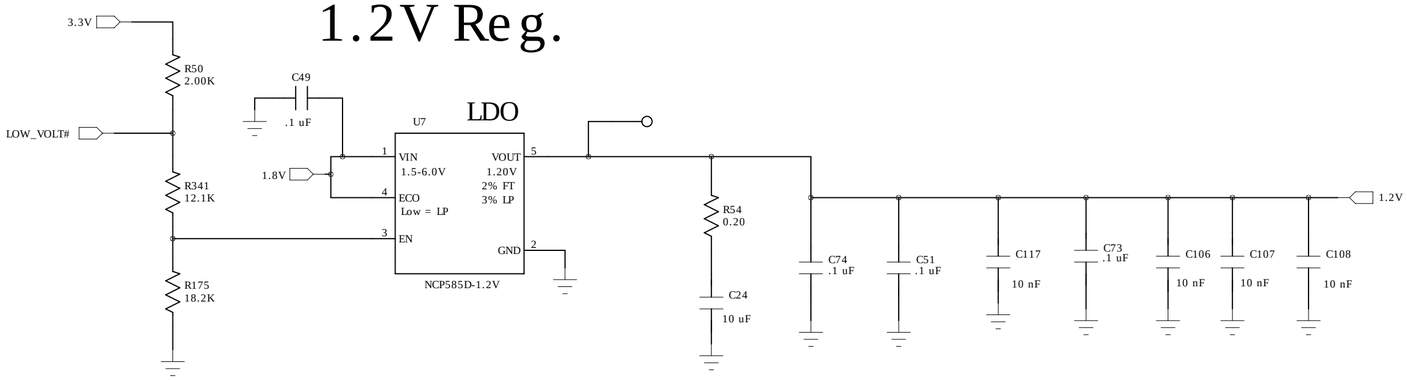
Technologic Systems	Date Feb. 12, 2012	
Title: TS-7520 RAM, RTC, SD cards		
Rev: B	Designer	Sheet 3 of 21

3.3V Regulator

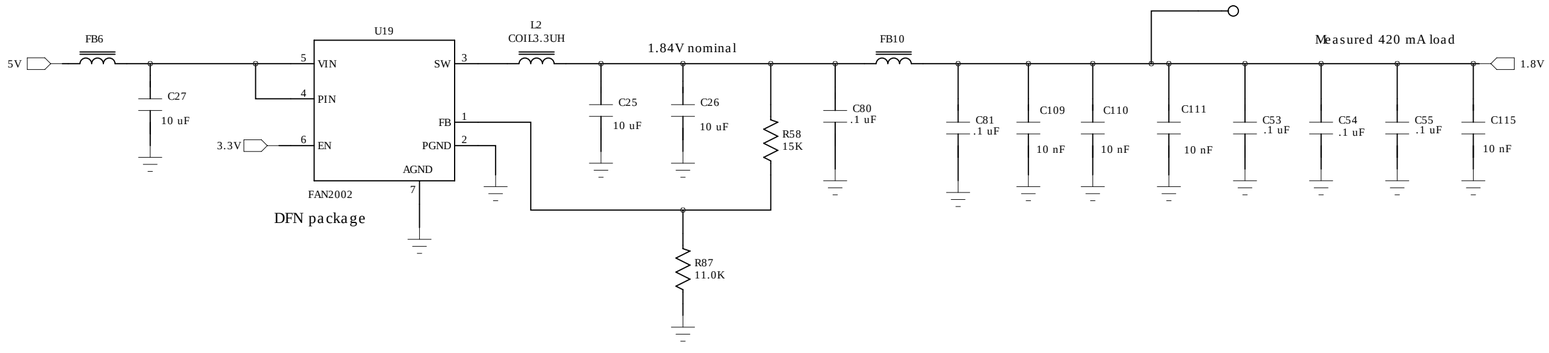




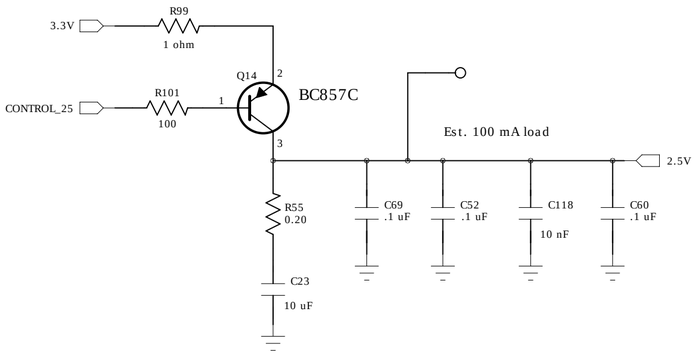
FPGA Core 1.2V Reg.



1.8V Regulator



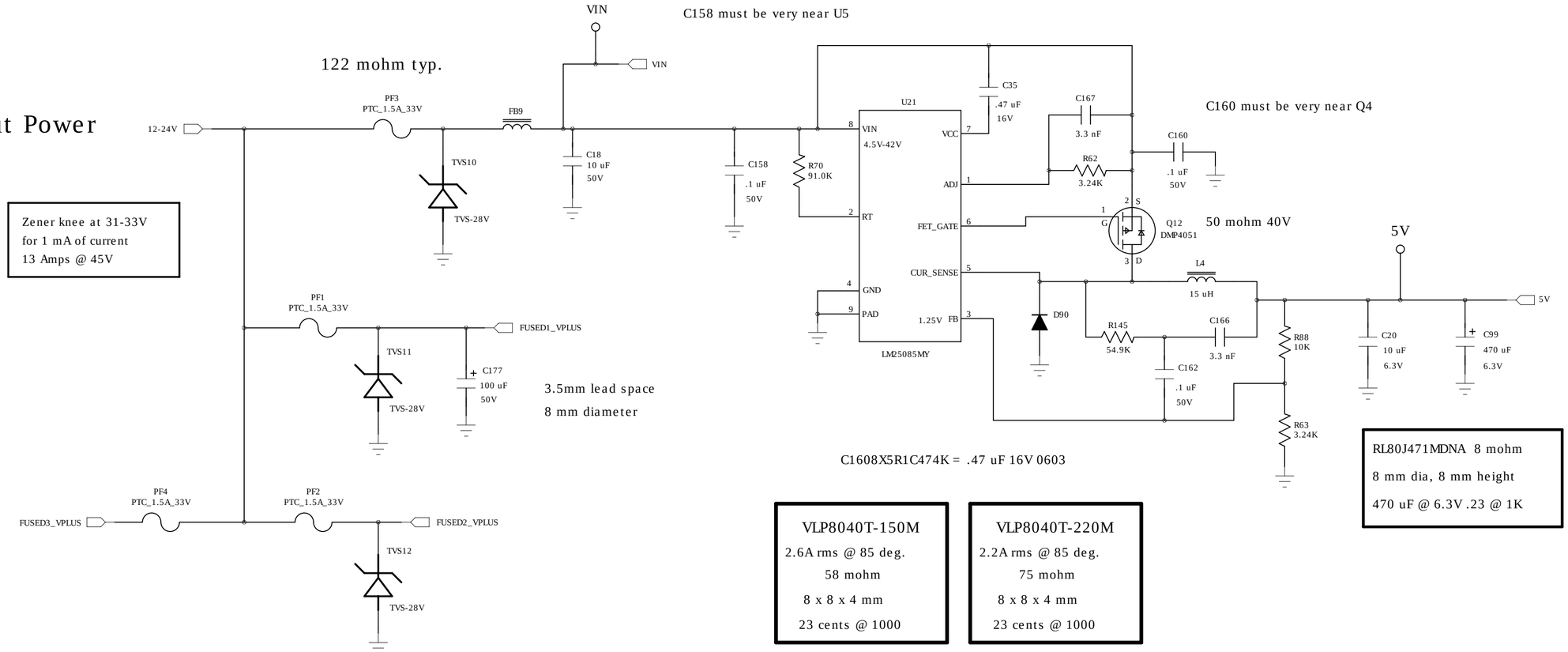
2.5V Regulator



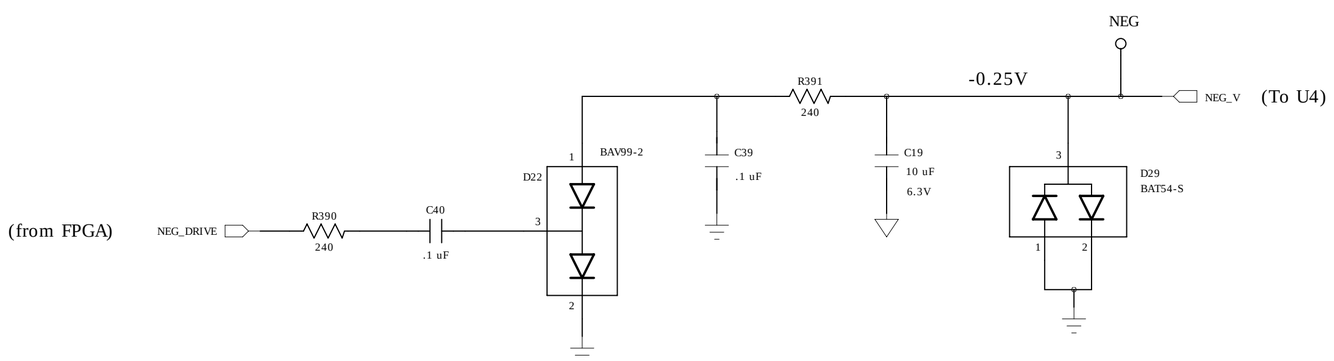
Technologic Systems		Date Feb. 12, 2012
Title: TS-7520 Power Supplies		
Rev: B	Designer RLM	Sheet 4 of 21

5V Power Supply (2.0 Amps)

Input Power

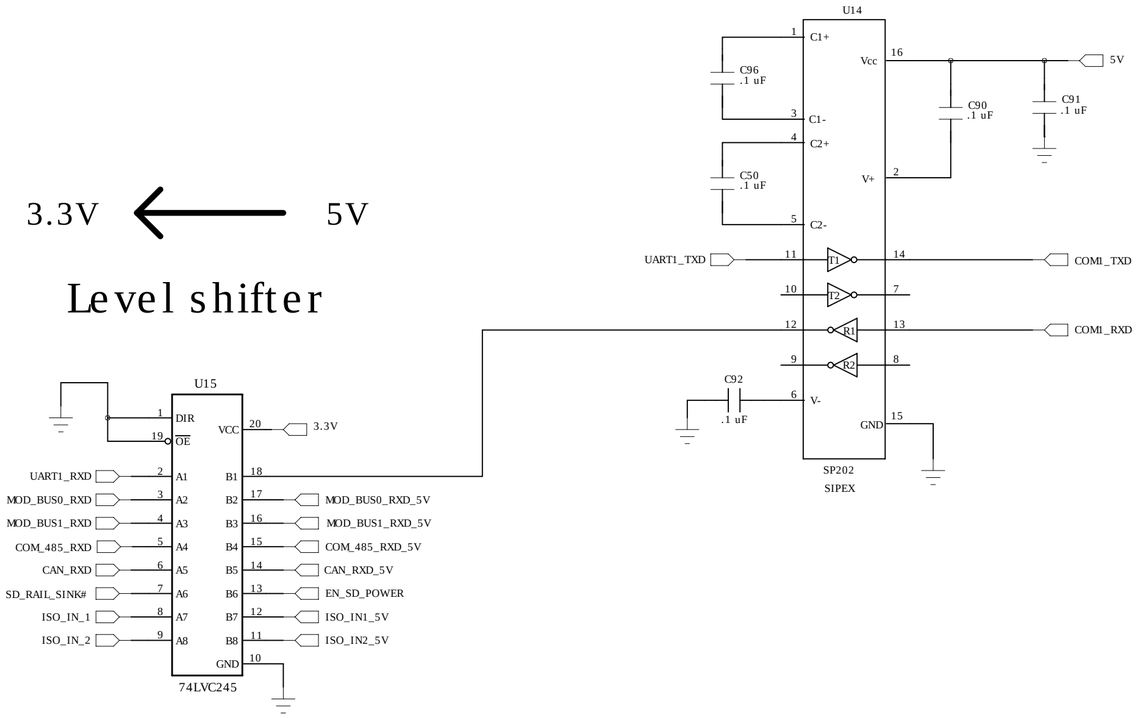


Negative Rail for ADC Op Amp

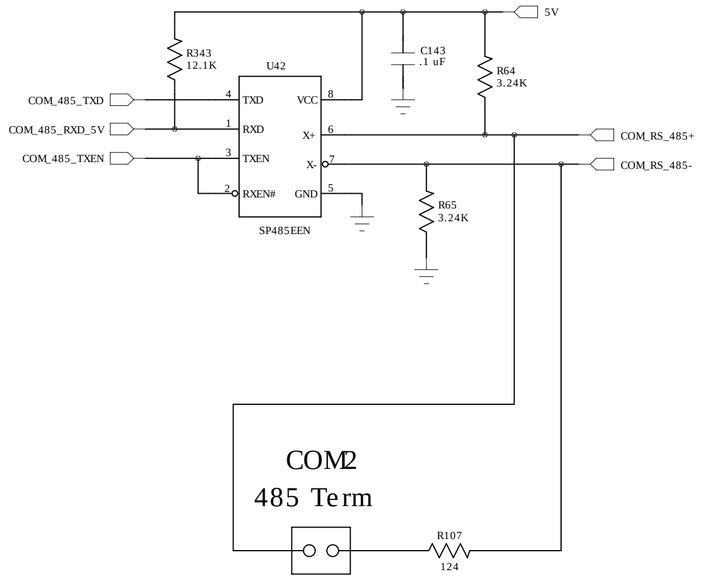


Technologic Systems	Date: Feb. 12, 2012	
Title: TS-7520 5V Power and Neg. Rail		
Rev: B	Designer	Sheet 5 of 21

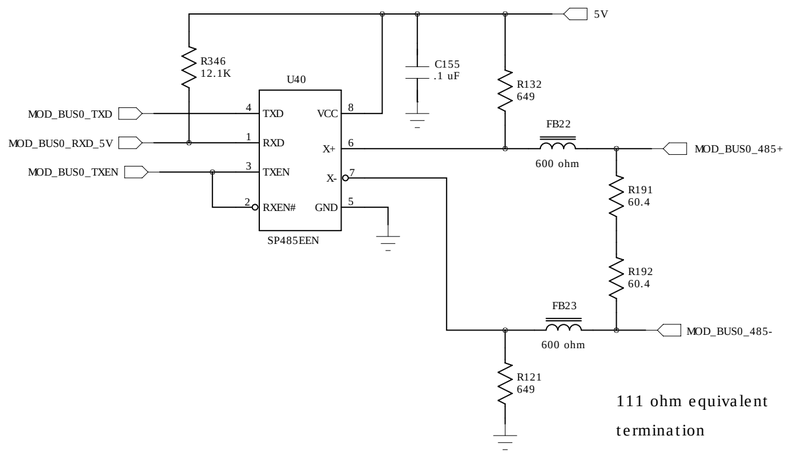
RS-232 Transceiver



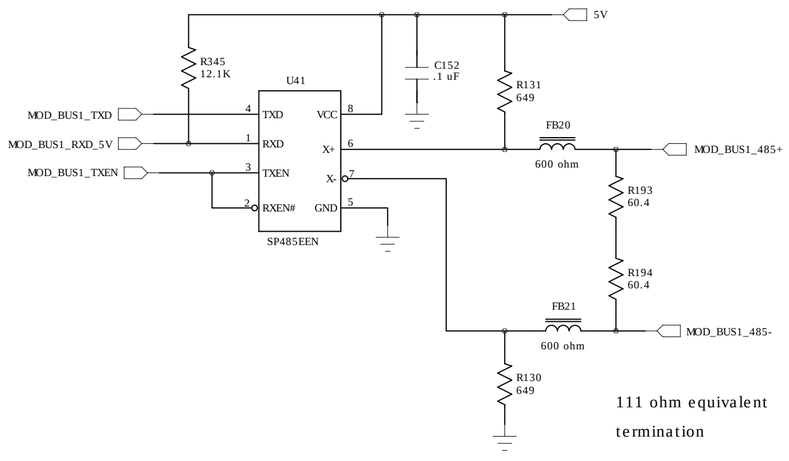
COM Port
RS-485 Driver



MOD Bus 0
RS-485 Driver

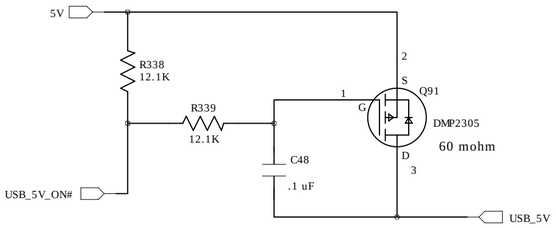


MOD Bus 1
RS-485 Driver



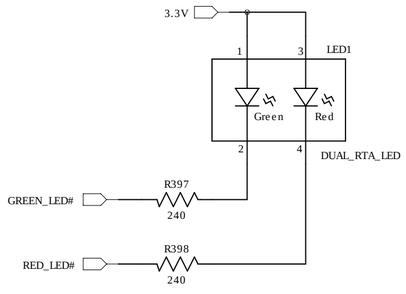
Technologic Systems	Date Feb. 12, 2012	
Title: TS-7520 COM port, CAN, RS-485		
Rev: B	Designer RLM	Sheet 6 of 21

USB Power Switch

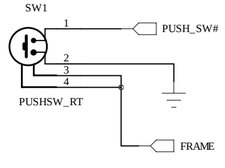


Front Panel

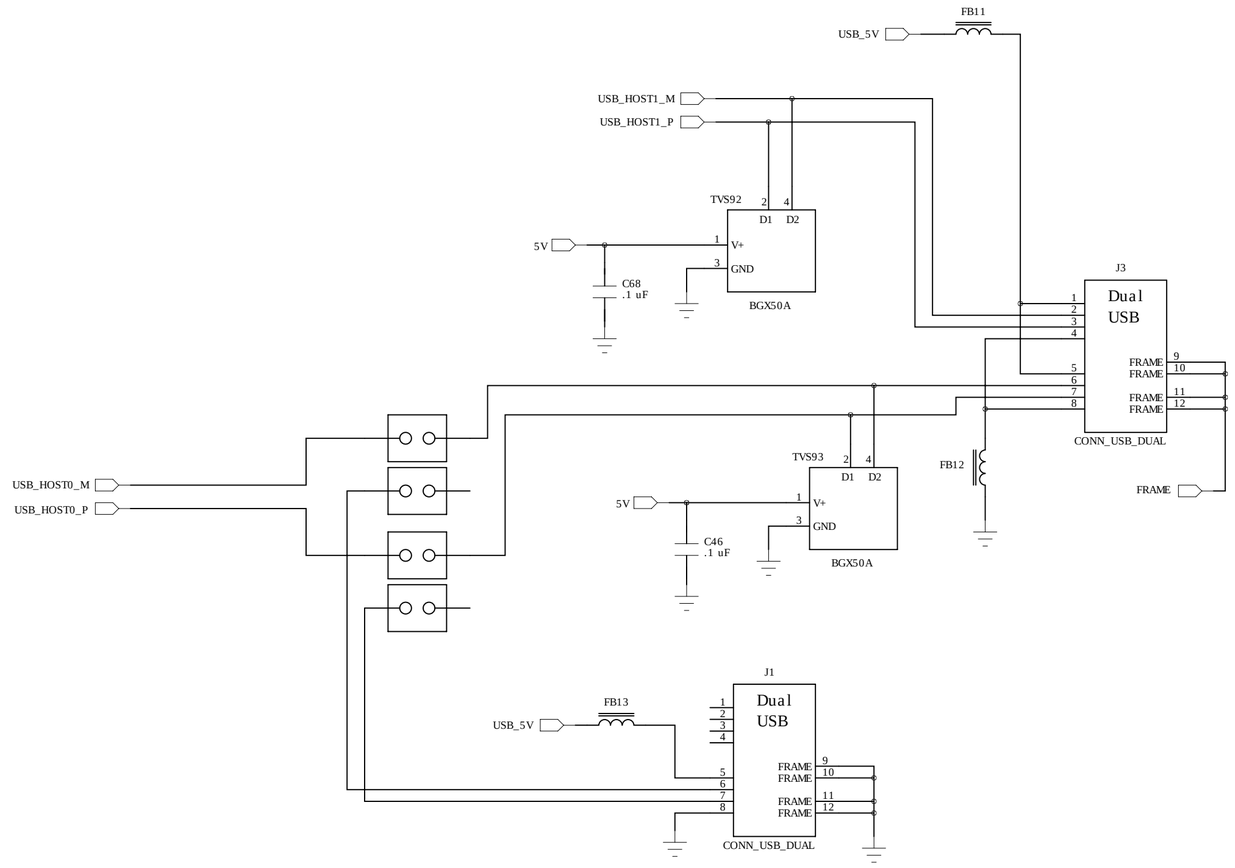
LEDs



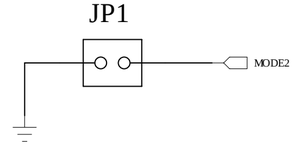
Push Switch



Dual USB Host



Force Boot to SD card



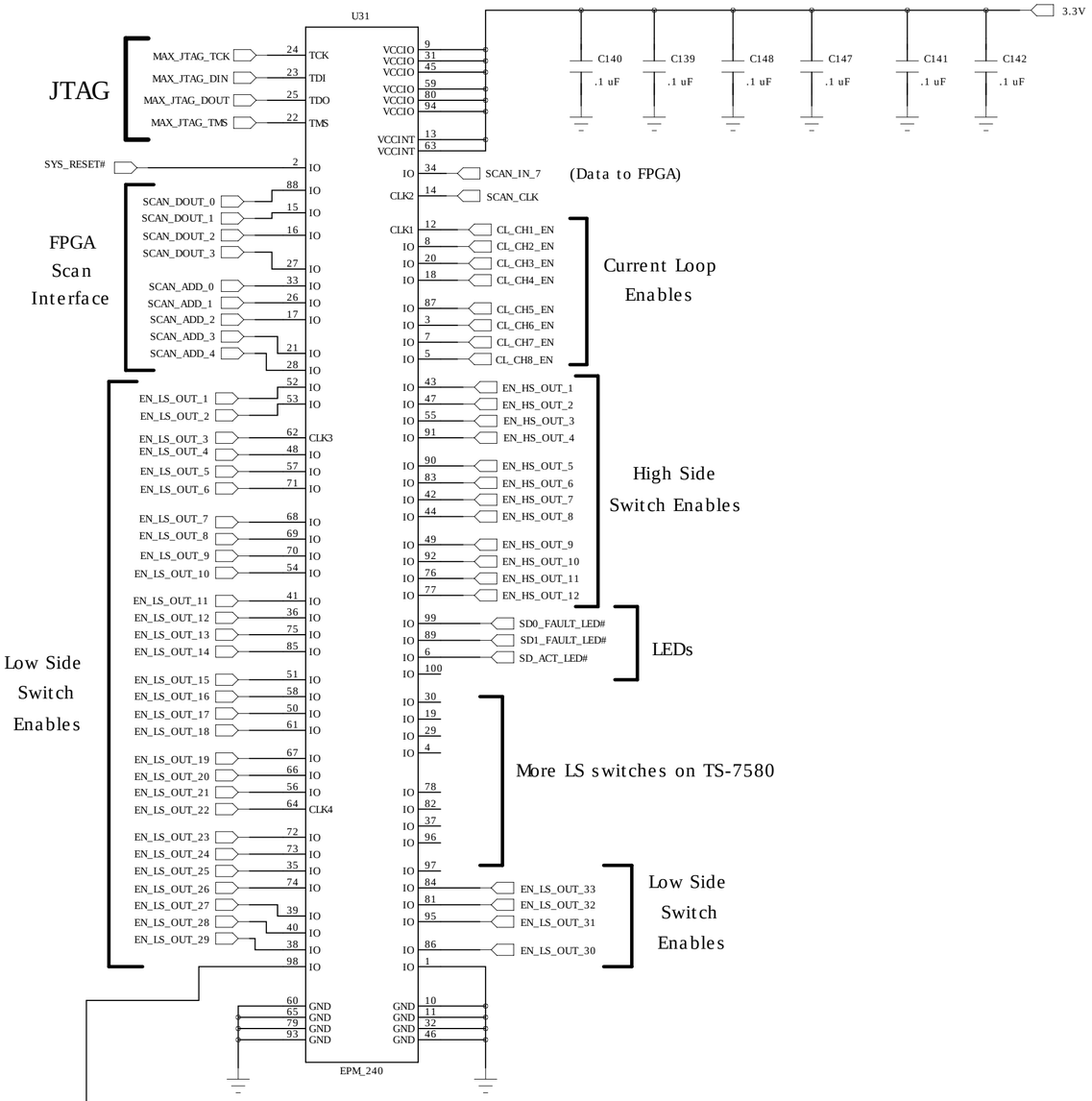
Technologic Systems	Date Feb. 12, 2012	
Title: TS-7520 USB, Temp Sensor, Flash		
Rev: B	Designer RLM	Sheet 7 of 21

PLD

SYS_RESET# sets all Outputs deasserted except for RED_LED#

Does not affect NV Flag

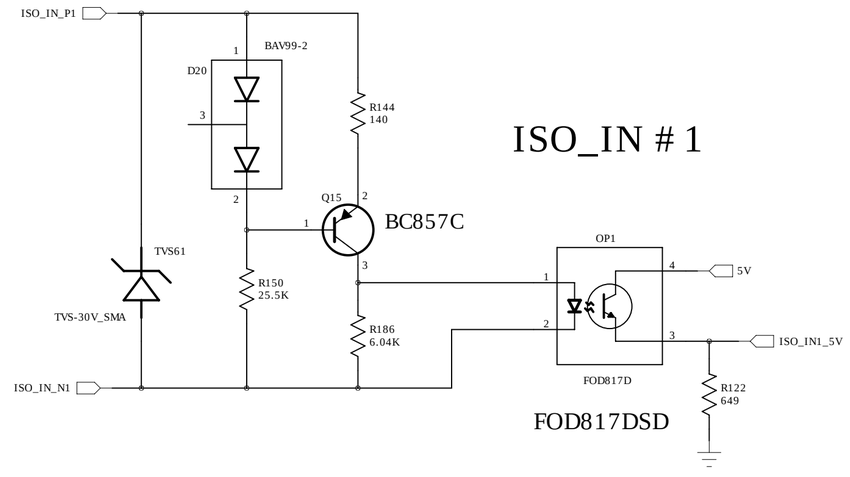
Power Cycle clears NV Flag

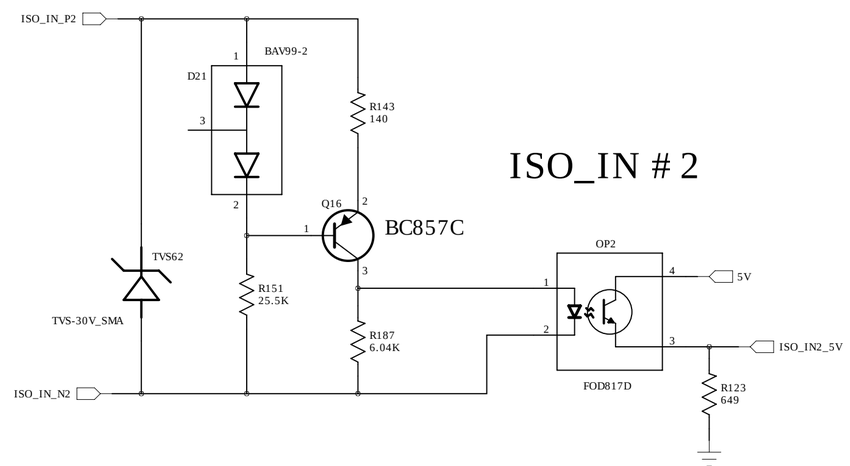


2 Isolated Inputs

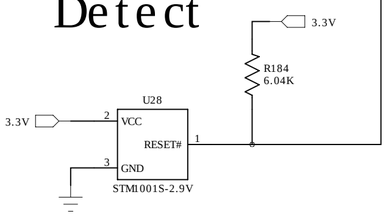
50 KHz Bandwidth

32V tolerant





Power Cycle Detect



Zeros out ReBoot Flag

66 Outputs to write

8 Inputs to read

8 bits of Input =

6 PLD Version

2 NV ReBoot Flag

ReBoot Flag

0 = Power Cycle

1 = Soft Reset

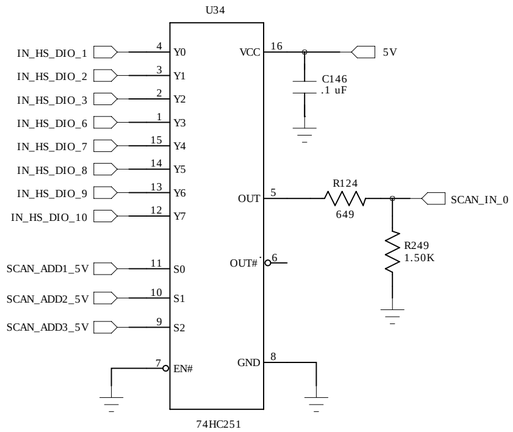
2 = WatchDog

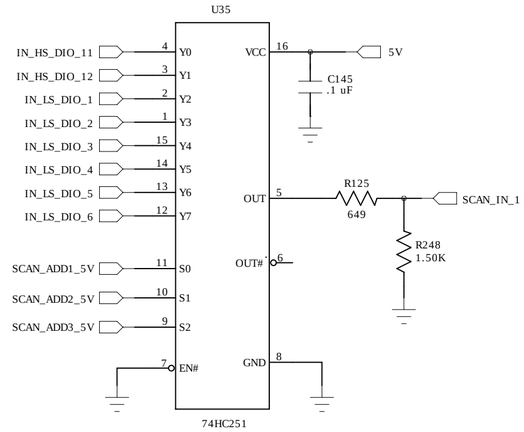
3 = ?

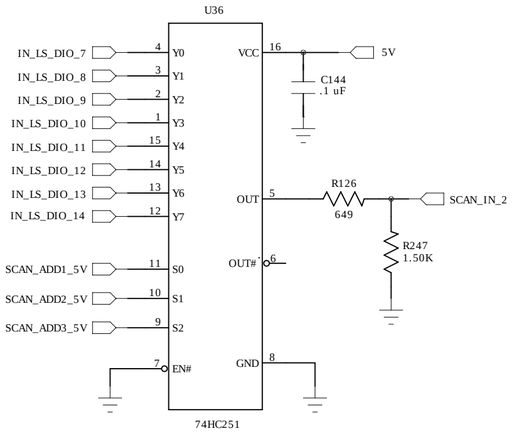
Reg. = 66 + ReBoot Flag = 68 bits total

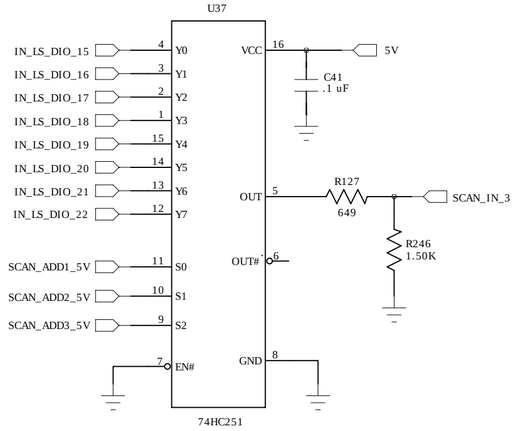
Technologic Systems	Date: Feb. 12, 2012	
Title: TS-7520 PLD and Isolated Dig. Inputs		
Rev: B	Designer	Sheet 8 of 21

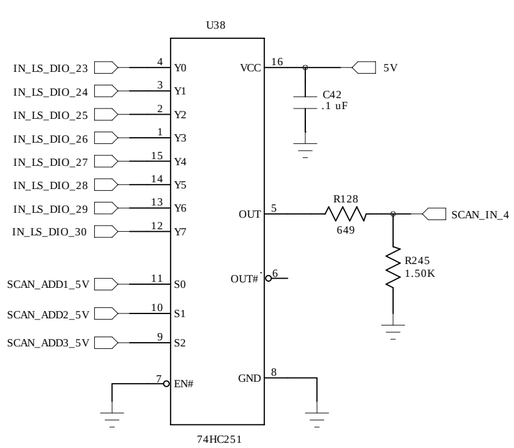
MUX Expansion for Inputs

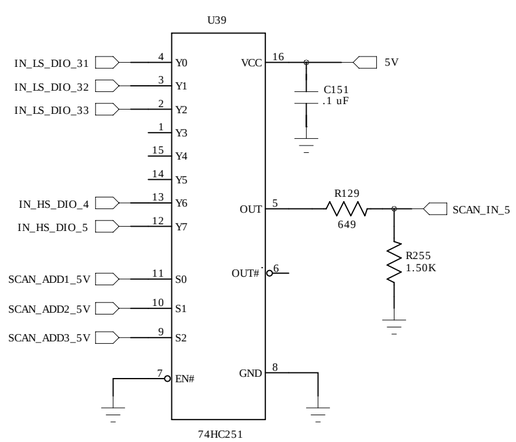


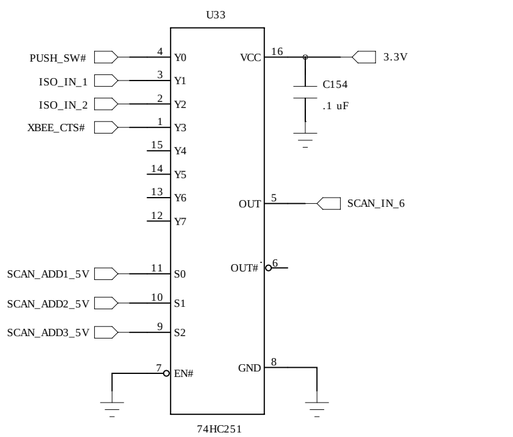






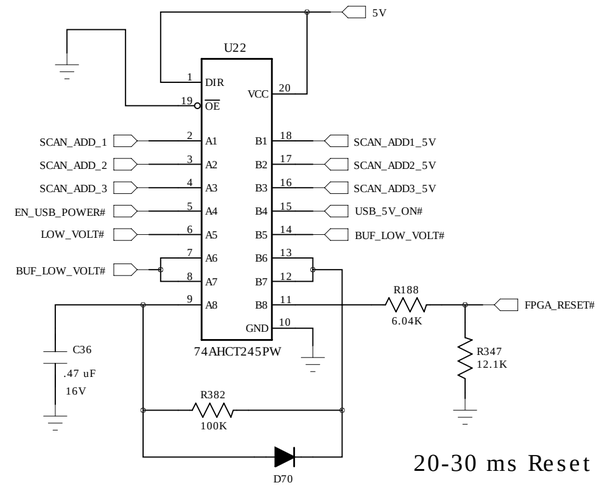






3.3V ⟶ 5V

Level shifters



20-30 ms Reset

U22 has Schimtt-trigger Inputs

Technologic Systems		Date Feb. 12, 2012
Title: TS-7520 I/O Expander (Inputs)		
Rev: B	Designer	Sheet 9 of 21

8 Channels of 12-bit A/D

ADC notes

Input Imedance = 70 Kohm

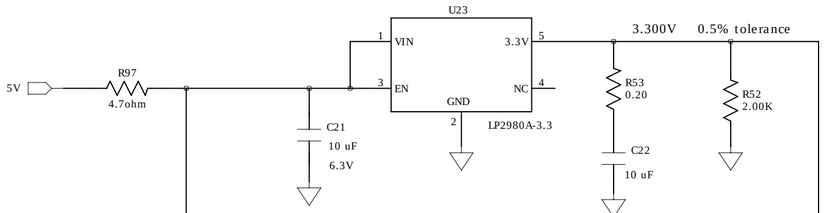
TVS adds 1000-3000 pF

typ. MUX ON resistance = 120 ohm

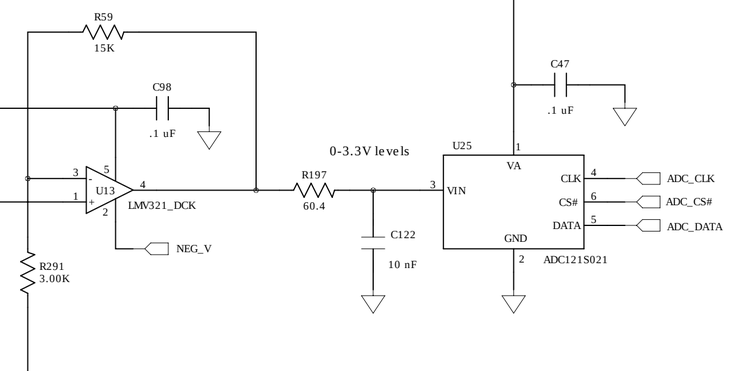
typ. Delta between chan = 10 ohm

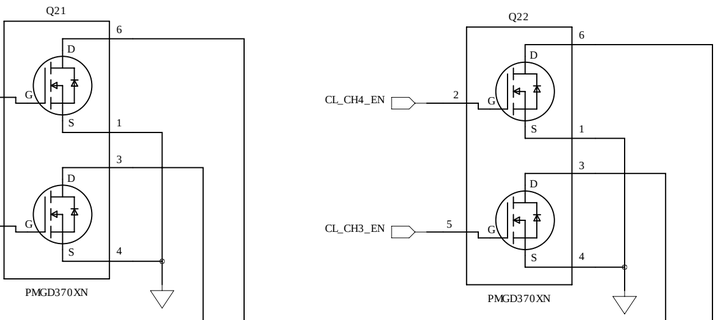
Reading channel 0 allows calibrating out most error

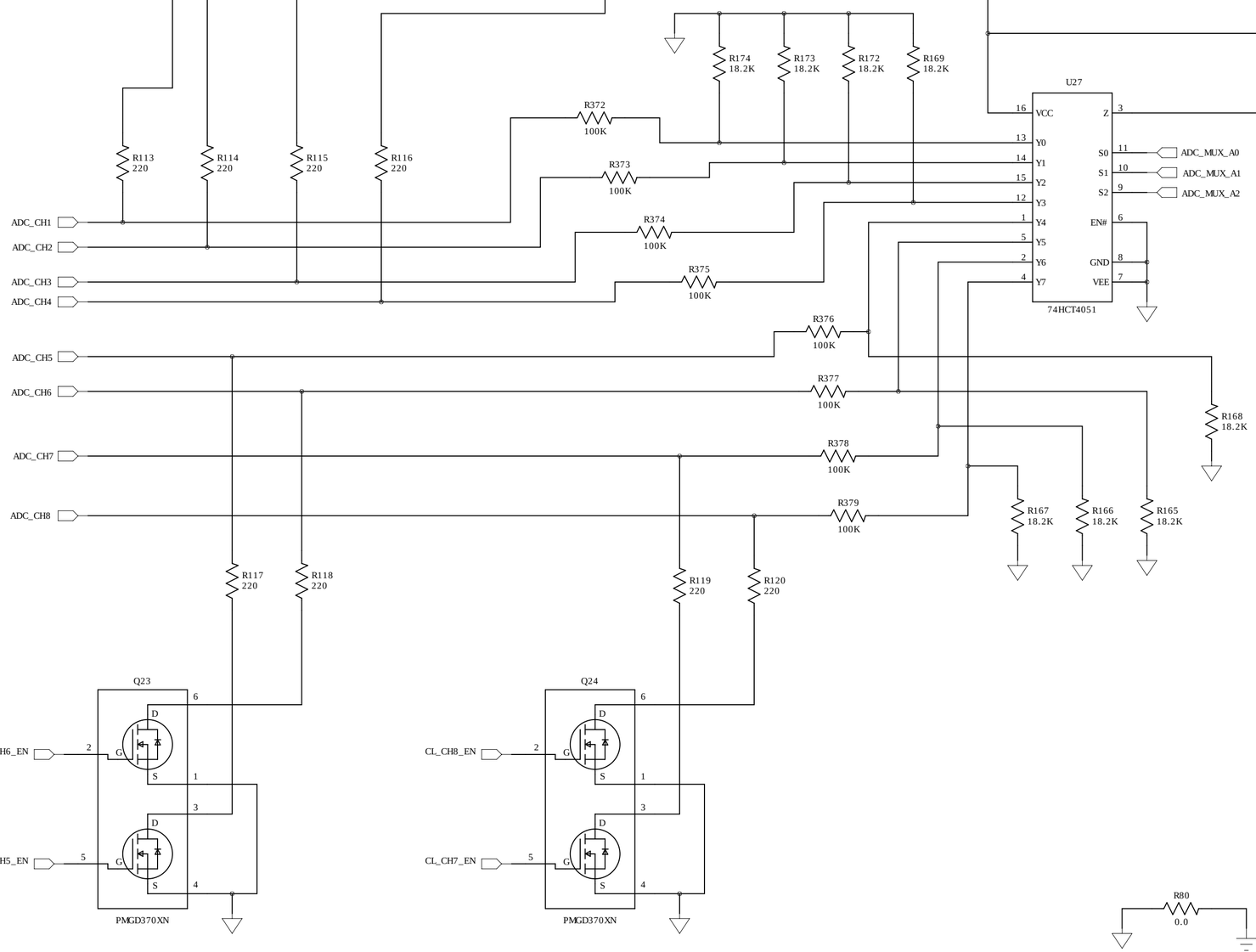
Precision 3.3V Reg.

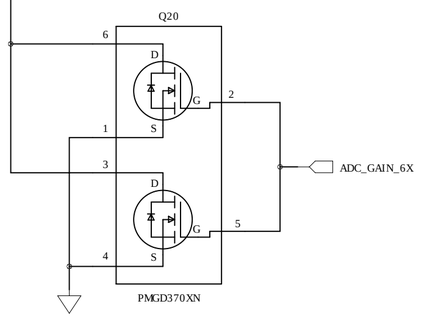


12-bit ADC









Op Amp gain = 1 or 6

Gain = 6 for 0-5V range

U27 has typ. 25 pF on common

and 5 pF typ. on each Input

Assuming 100 pF max (op amp too)

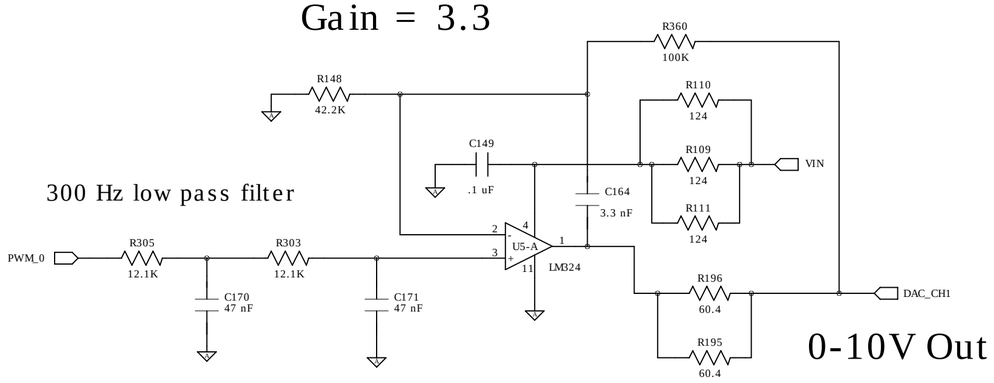
This limits max sampling rate to

50K/sec due to 2 uS time constant

Technologic Systems	Date: Feb. 12, 2012	
Title: TS-7520 ADC		
Rev: B	Designer	Sheet 10 of 21

10-bit DAC Outputs

Gain = 3.3

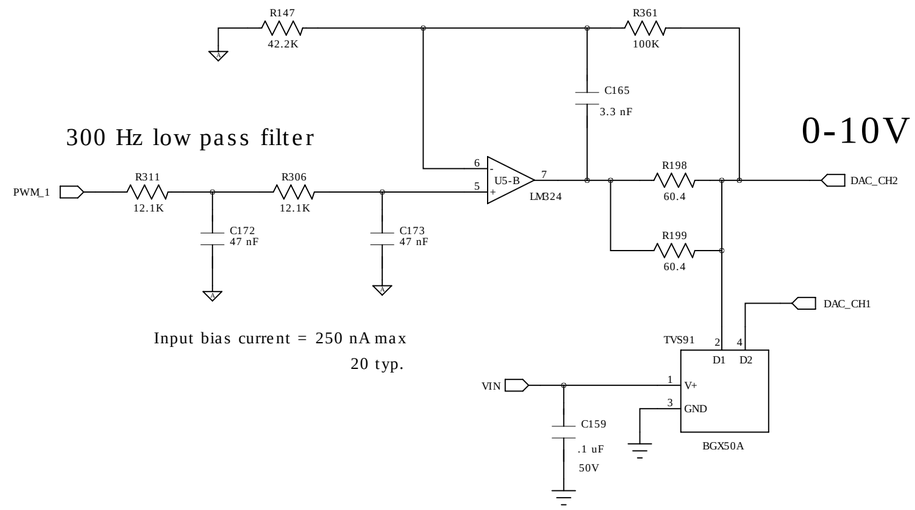


0-10V Out

Input bias current = 250 nA max
20 typ.

LM324 has 32V supply range
Needs 2V head room on top rail
Sink/Source 20 mA

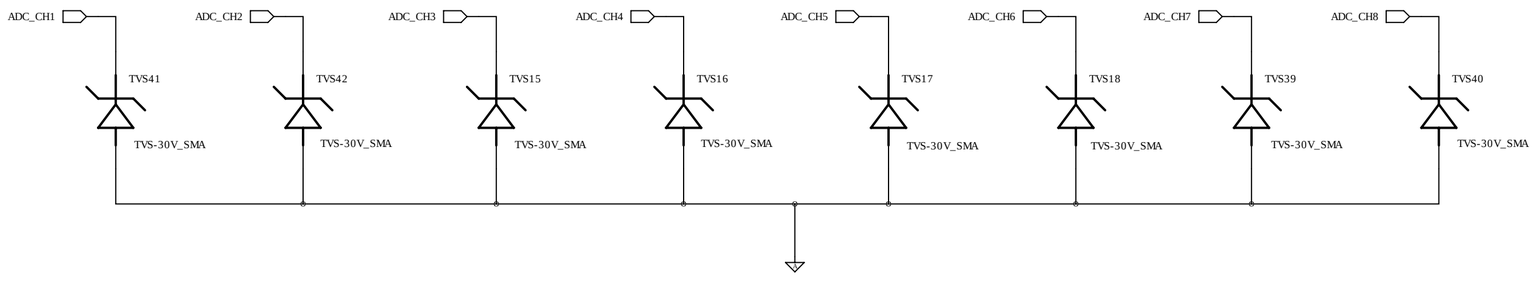
Gain = 3.3



0-10V Out

Input bias current = 250 nA max
20 typ.

Analog IN TVS Protection

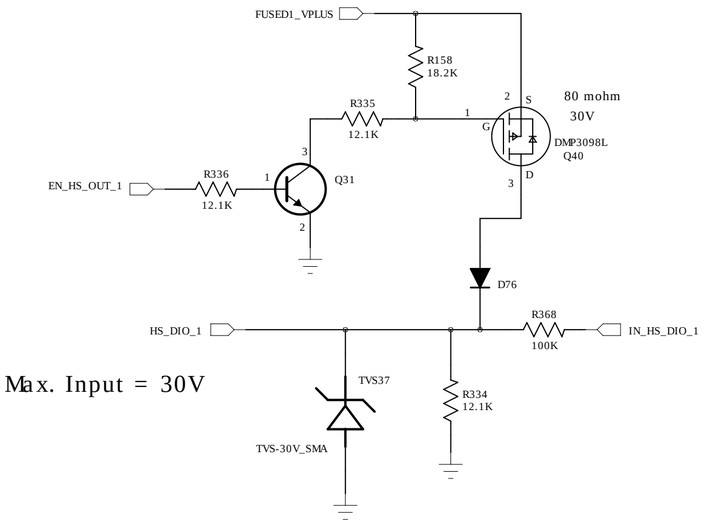


Technologic Systems		Date Feb. 12, 2012
Title: TS-7520 DAC		
Rev: B	Designer	Sheet 11 of 21

High Side Switches

High-Side Switch

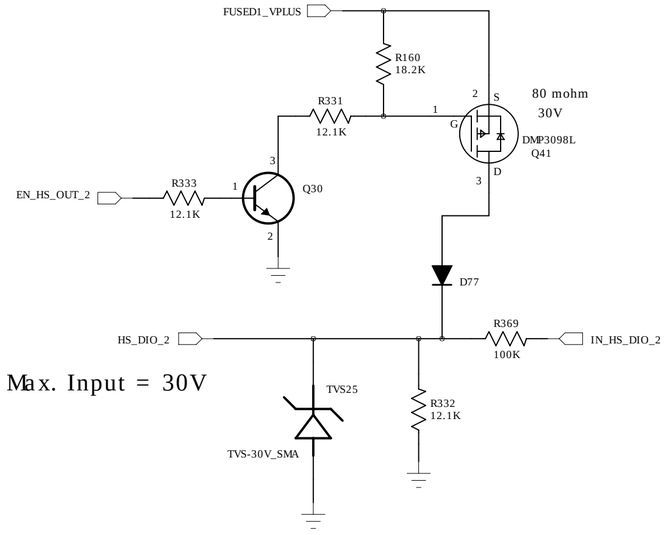
Source 500 mA



Max. Input = 30V

High-Side Switch

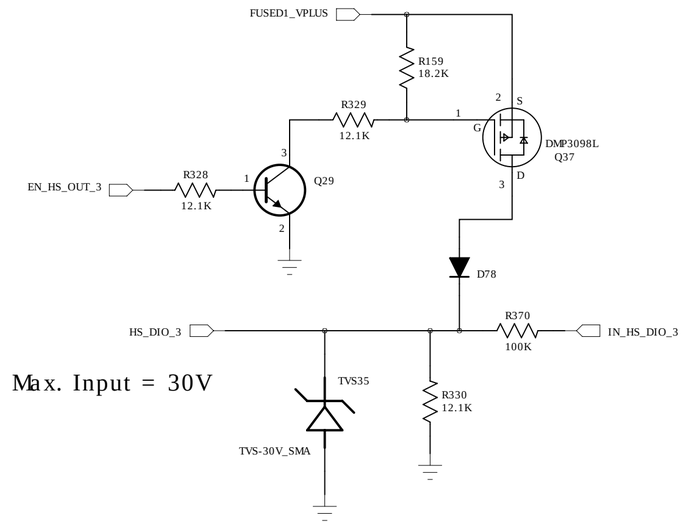
Source 500 mA



Max. Input = 30V

High-Side Switch

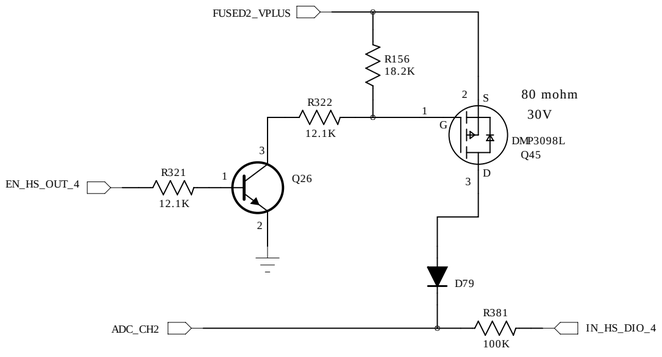
Source 500 mA



Max. Input = 30V

High-Side Switch

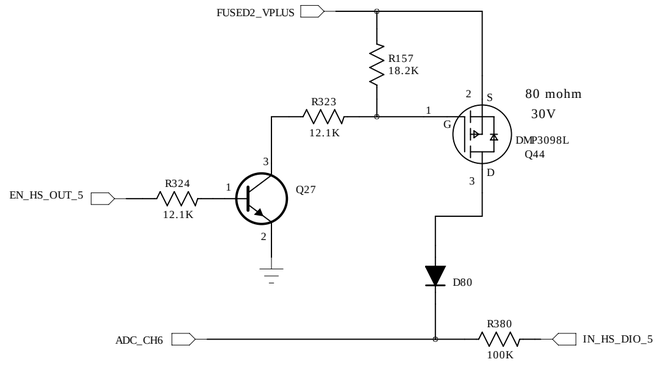
Source 500 mA



Max. Input = 30V

High-Side Switch

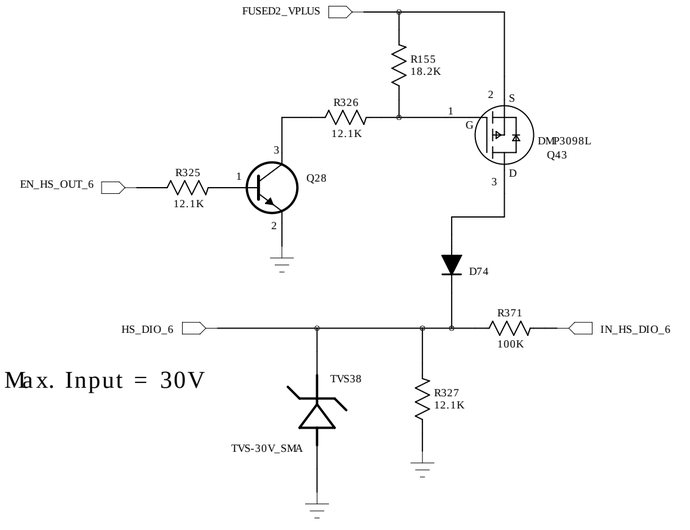
Source 500 mA



Max. Input = 30V

High-Side Switch

Source 500 mA



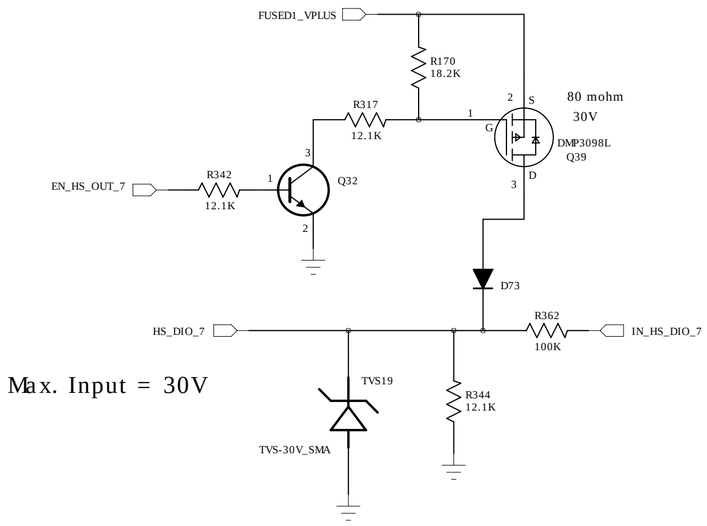
Max. Input = 30V

Technologic Systems		Date Feb. 12, 2012
Title: TS-7520 High Side Switches		
Rev: B	Designer	Sheet 12 of 21

High Side Switches

High-Side Switch

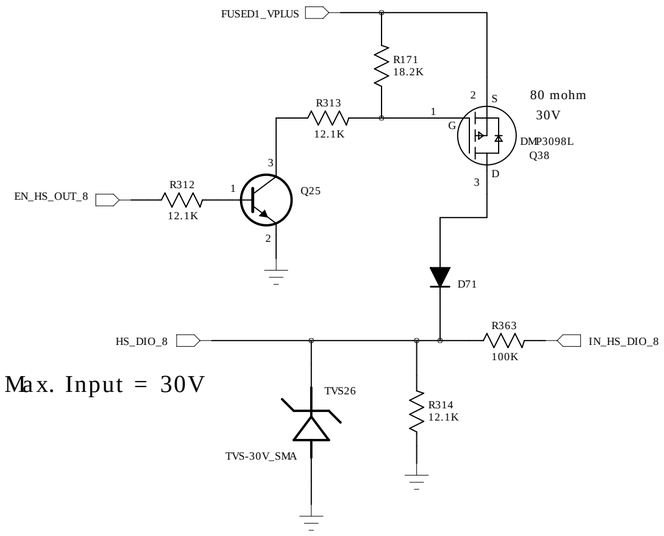
Source 500 mA



Max. Input = 30V

High-Side Switch

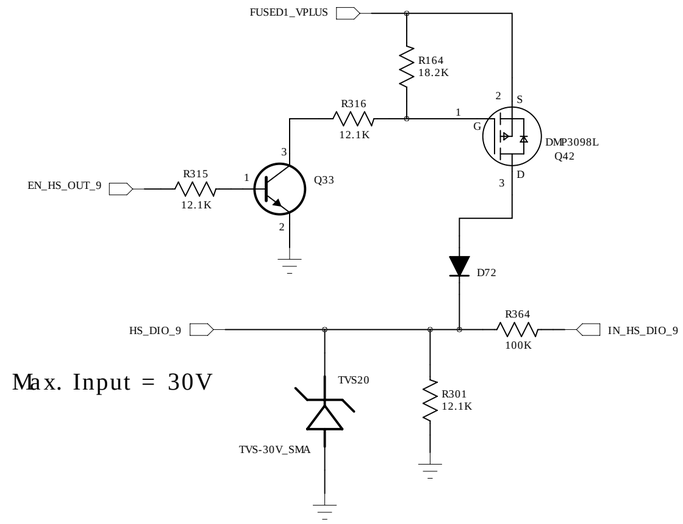
Source 500 mA



Max. Input = 30V

High-Side Switch

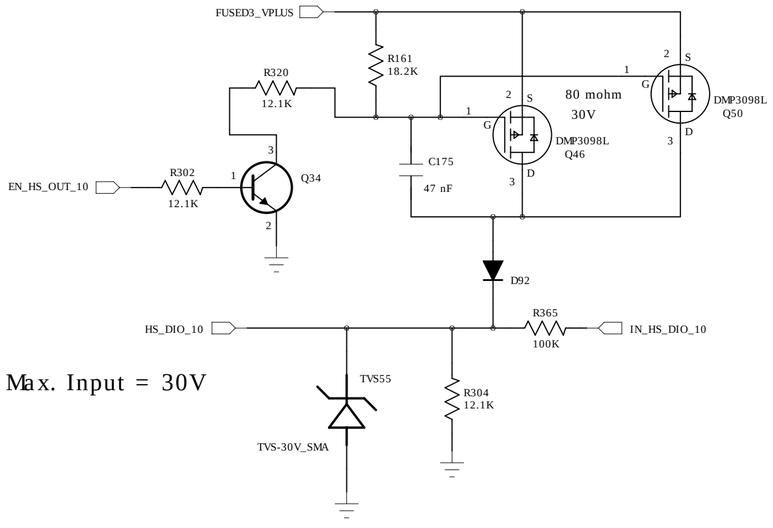
Source 500 mA



Max. Input = 30V

High-Side Switch

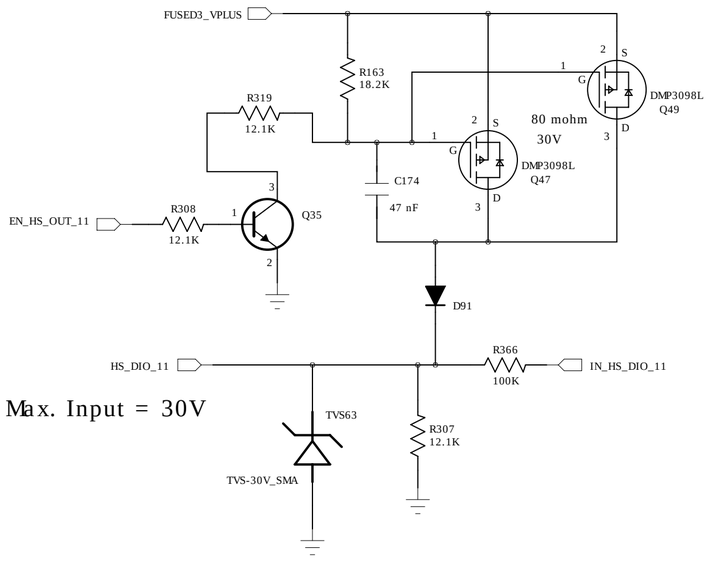
Source 1000 mA



Max. Input = 30V

High-Side Switch

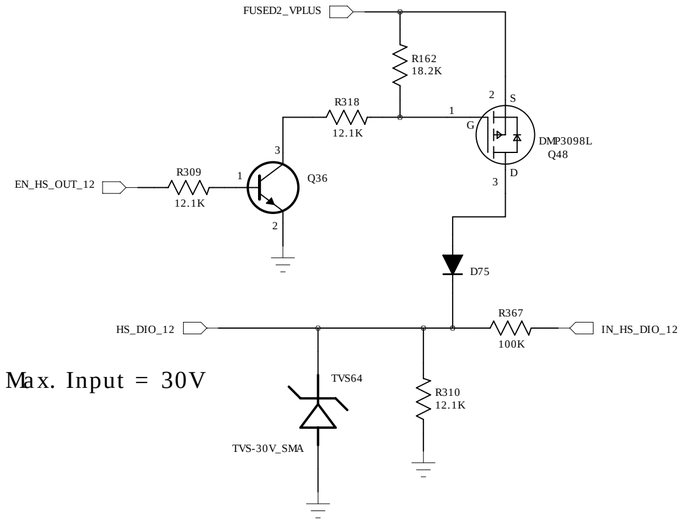
Source 1000 mA



Max. Input = 30V

High-Side Switch

Source 500 mA



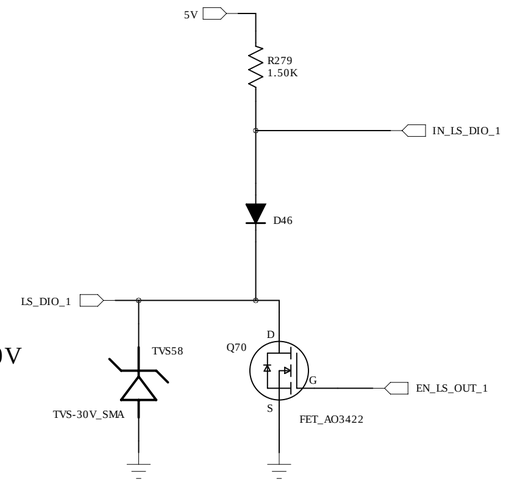
Max. Input = 30V

Technologic Systems		Date Feb. 12, 2012
Title: TS-7520 High Side Switches		
Rev: B	Designer	Sheet 13 of 21

Low Side Switches

Low-Side Switch

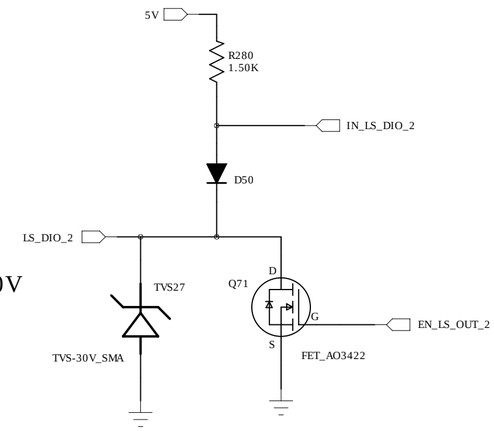
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

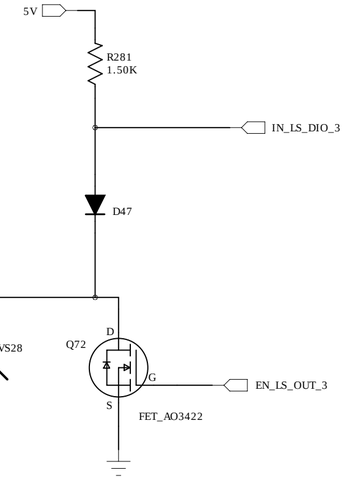
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

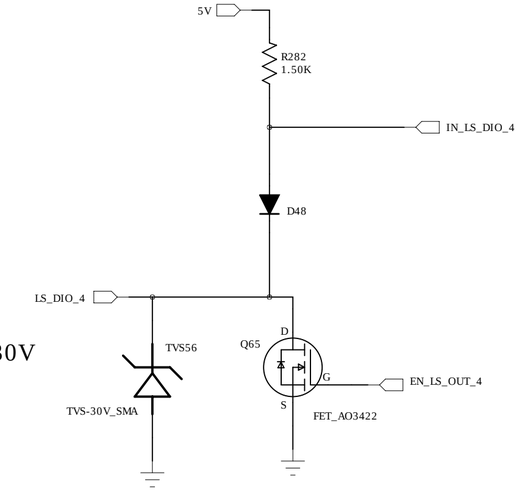
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

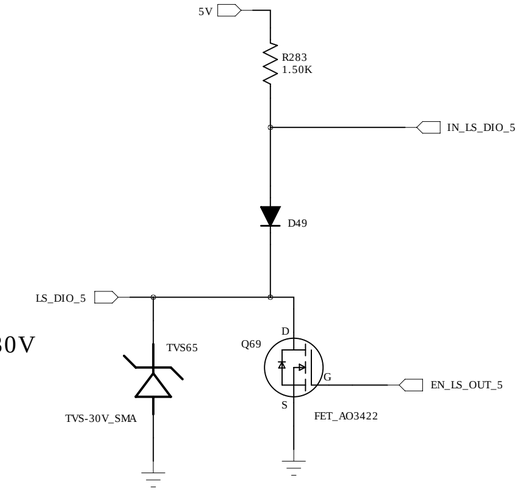
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

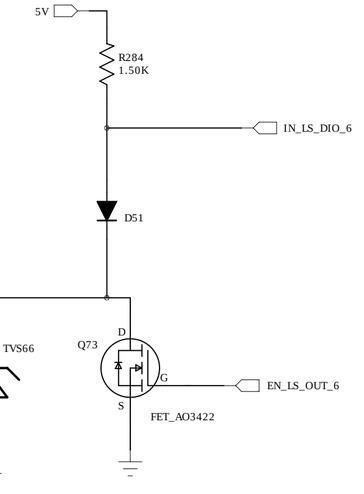
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

Sinks 500 mA



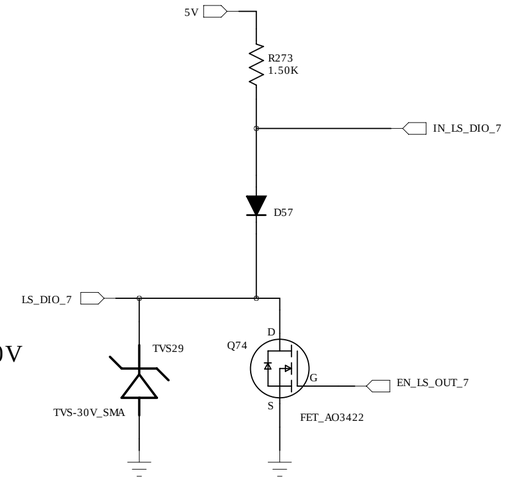
Max. Input = 30V

Technologic Systems		Date Feb. 12, 2012
Title: TS-7520 Low Side Switches		
Rev: B	Designer	Sheet 14 of 21

Low Side Switches

Low-Side Switch

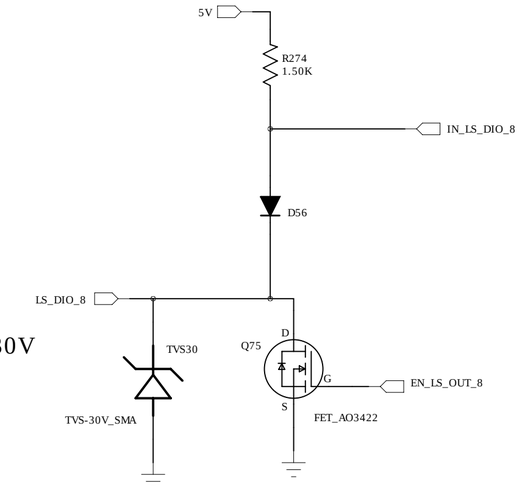
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

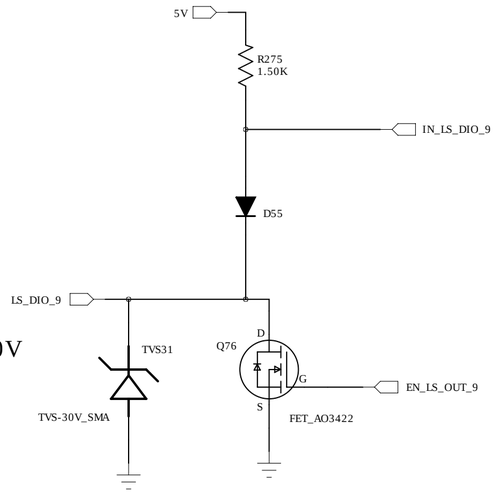
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

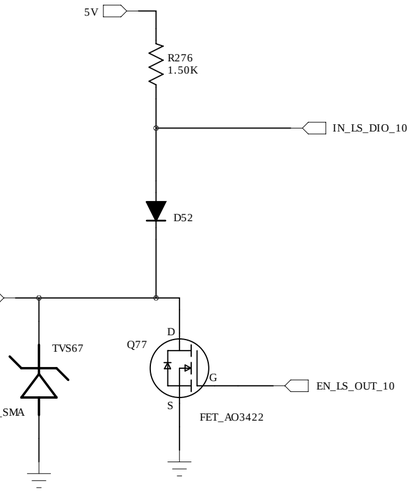
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

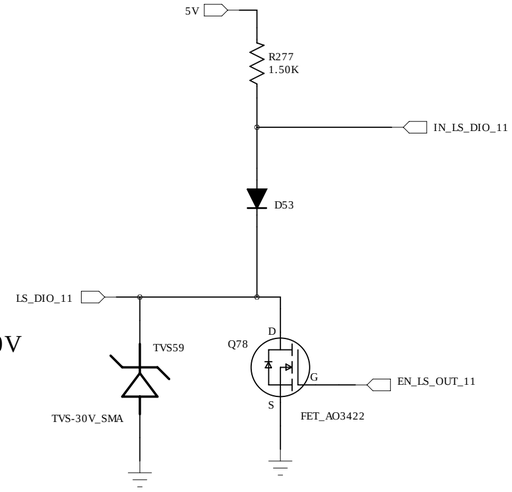
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

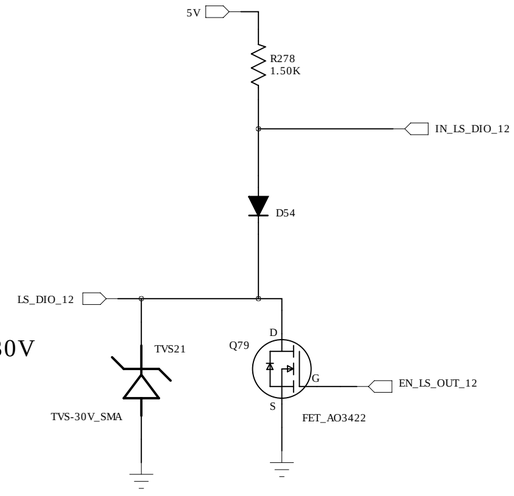
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

Sinks 500 mA



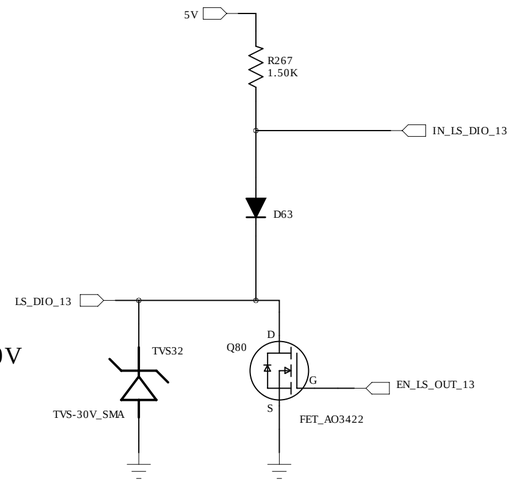
Max. Input = 30V

Technologic Systems	Date Feb. 12, 2012	
Title: TS-7520 Low Side Switches		
Rev: B	Designer	Sheet 15 of 21

Low Side Switches

Low-Side Switch

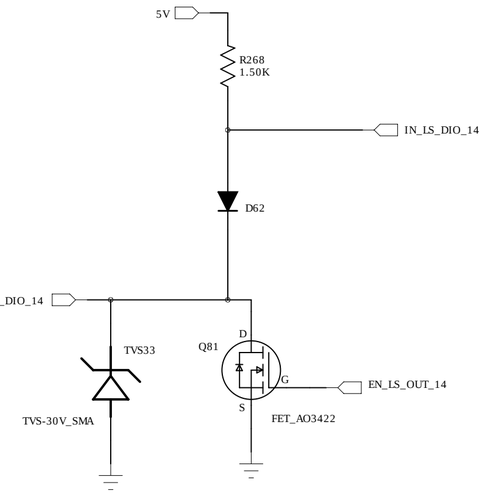
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

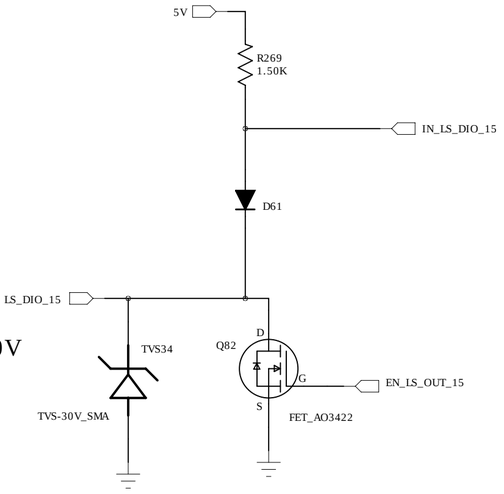
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

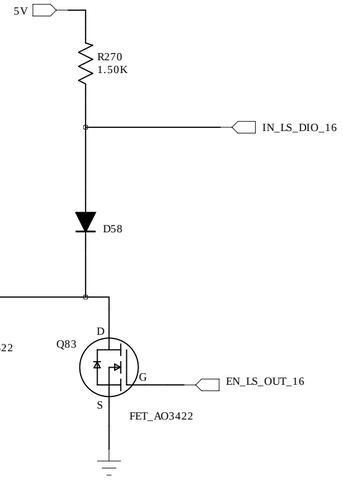
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

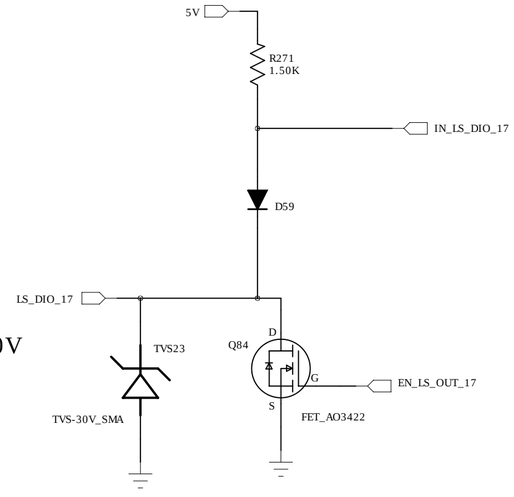
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

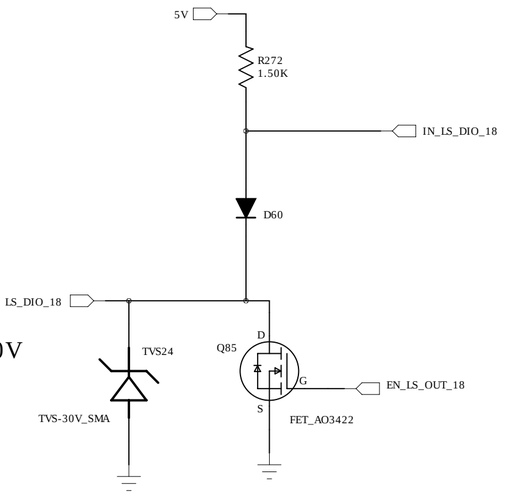
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

Sinks 500 mA



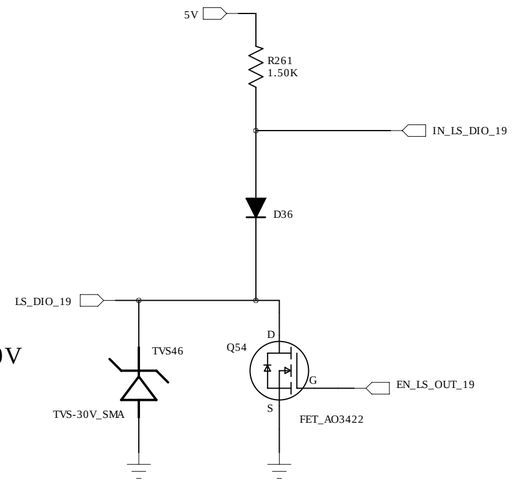
Max. Input = 30V

Technologic Systems		Date Feb. 12, 2012
Title: TS-7520 Low Side Switches		
Rev: B	Designer	Sheet 16 of 21

Low Side Switches

Low-Side Switch

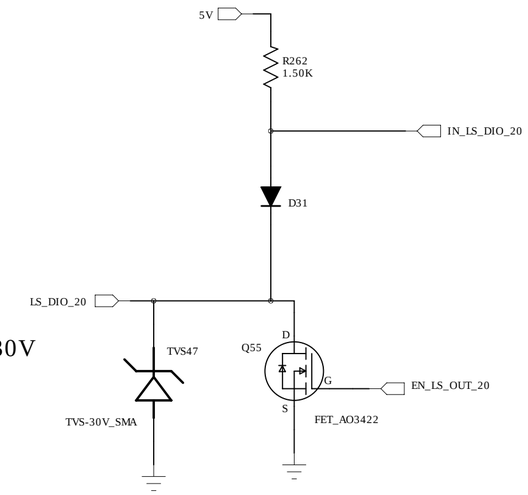
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

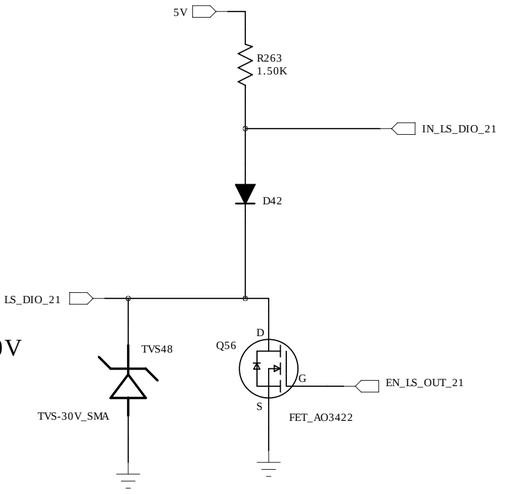
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

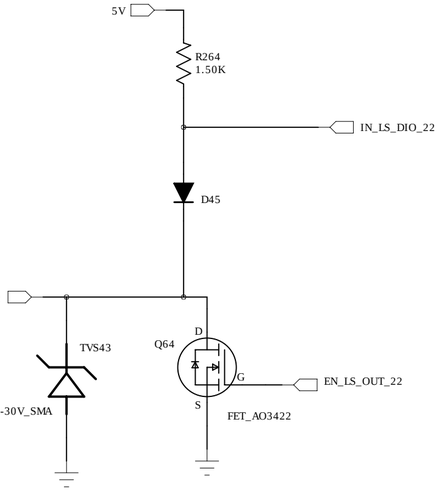
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

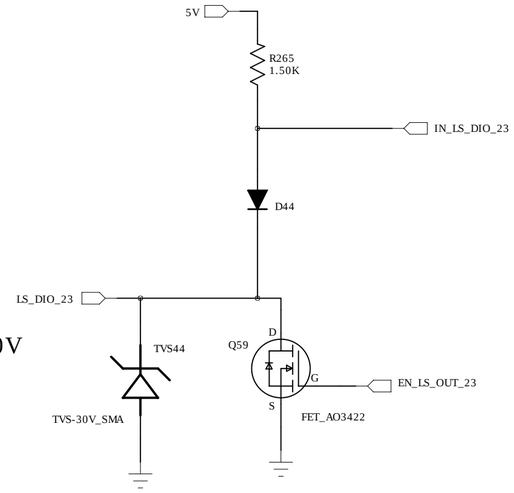
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

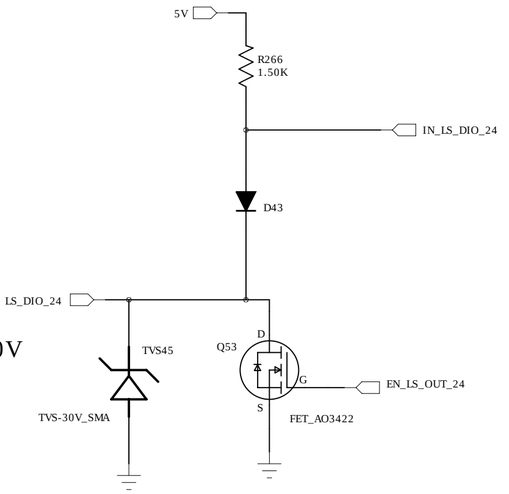
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

Sinks 500 mA



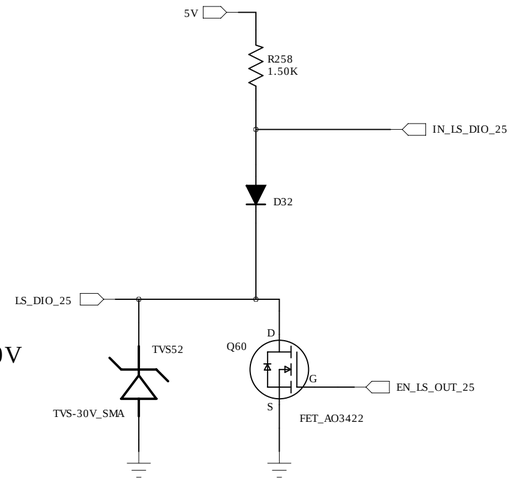
Max. Input = 30V

Technologic Systems		Date Feb. 12, 2012
Title: TS-7520 Low Side Switches		
Rev: B	Designer	Sheet 17 of 21

Low Side Switches

Low-Side Switch

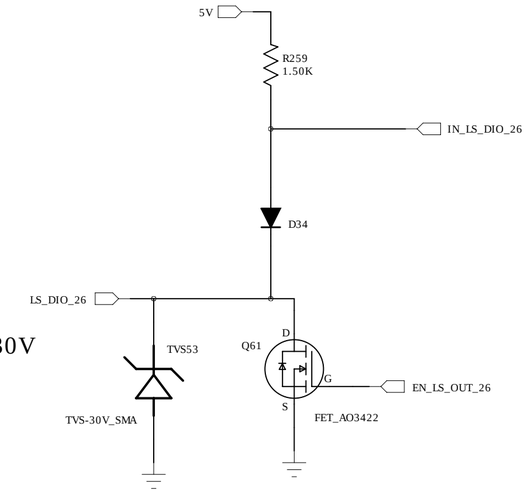
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

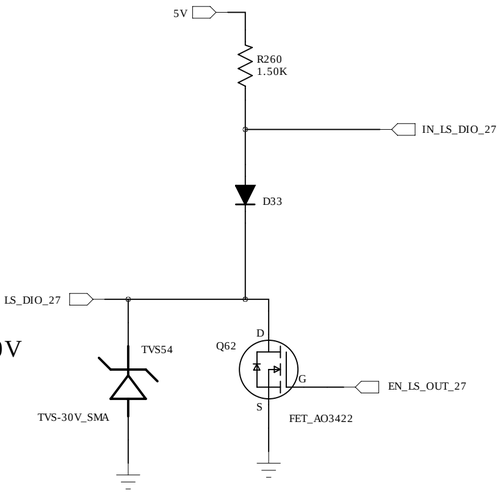
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

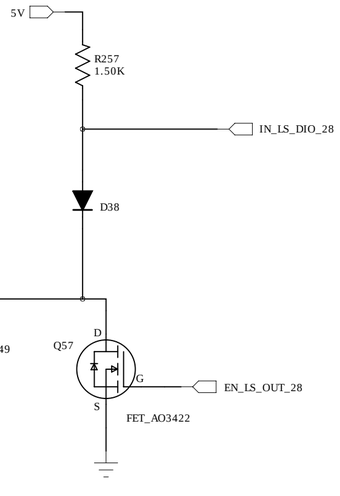
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

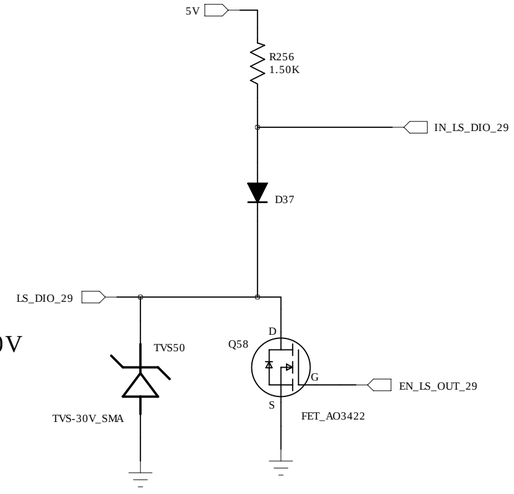
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

Sinks 500 mA



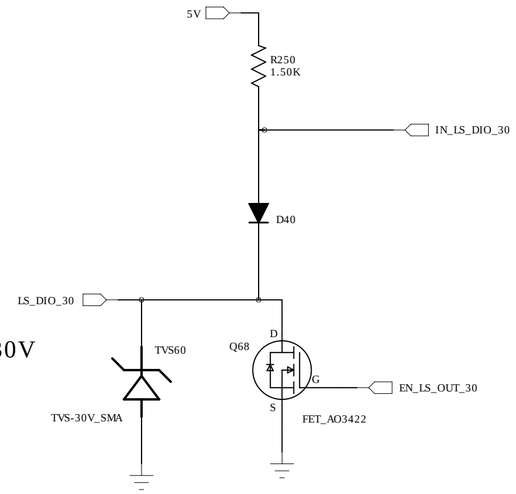
Max. Input = 30V

Technologic Systems		Date Feb. 12, 2012
Title: TS-7520 Low Side Switches		
Rev: B	Designer	Sheet 18 of 21

Low Side Switches

Low-Side Switch

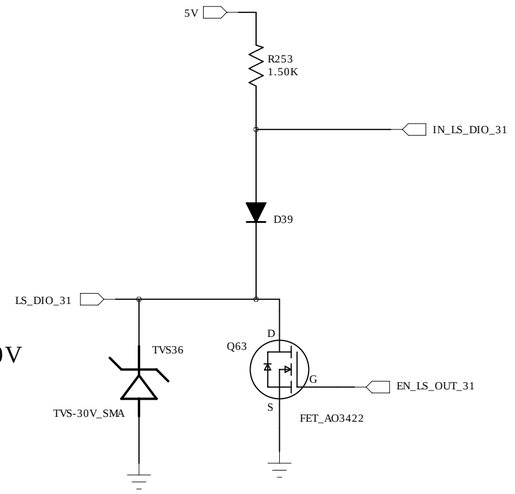
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

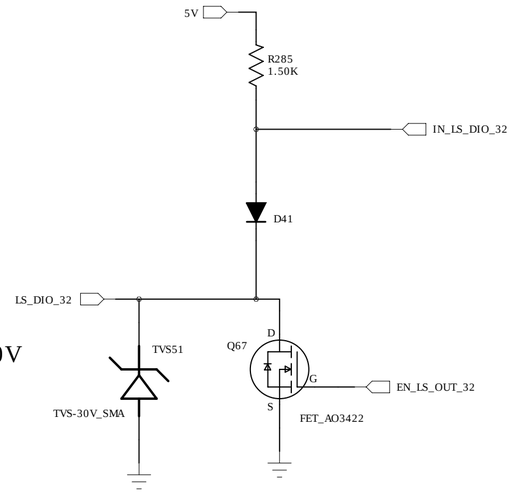
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

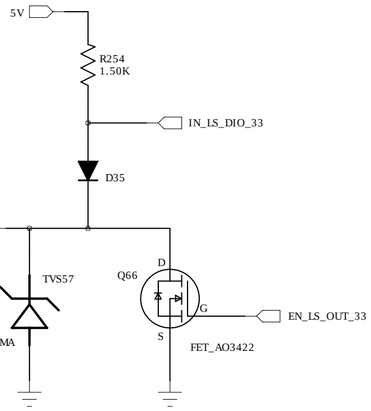
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

Sinks 500 mA

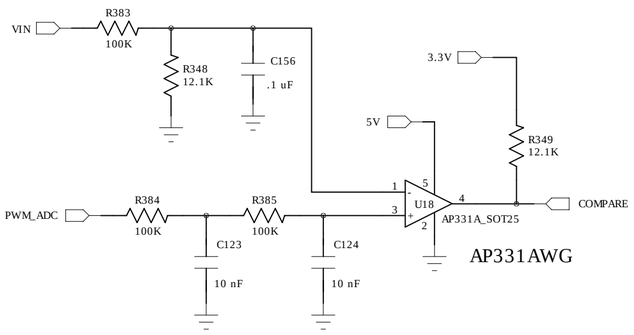


Max. Input = 30V

LS and HS Outputs can be "short proof" by FPGA polling Inputs

Technologic Systems	Date Feb. 12, 2012	
Title: TS-7520 Low Side Switches		
Rev: B	Designer	Sheet 19 of 21

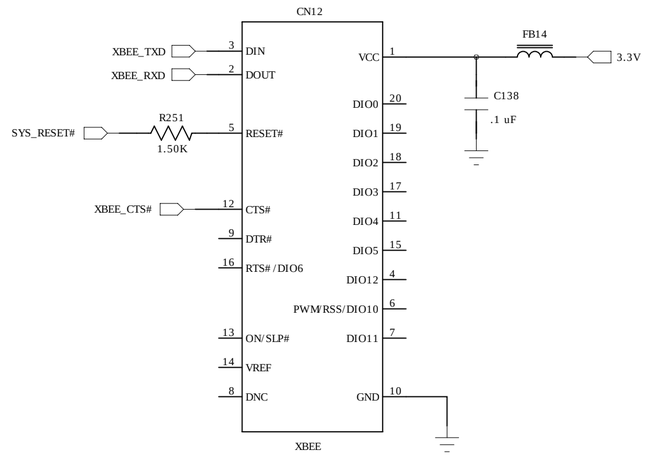
A/D Converter



Xbee Radio

Digi/MaxStream

ZigBee Radio



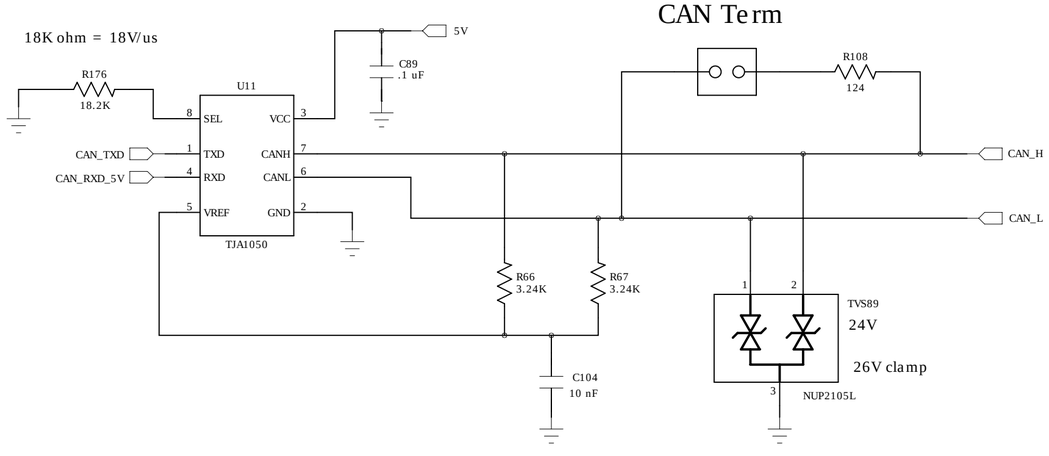
10-pin 2mm socket
S5751-10-ND
56 cents / 100

CTS# is an output
that can be used for
hardware flow control

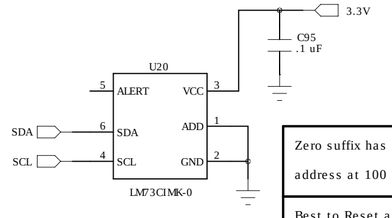
Baud rates up to
230.4K supported

Reset# must be driven
with Open drain

CAN Tranceiver



Temp Sensor



Zero suffix has
address at 100 1001

Best to Reset after
all power cycles
Set PD bit, Wait 50 mS
Then clear PD bit

Technologic Systems	Date Feb. 12, 2012	
Title: TS-7520 Low Side Switches		
Rev: B	Designer	Sheet 20 of 21

RJ45 2x6 Array

RJ45 2x6 Array

Tab Up	8 1 A	B	C	D	E	F
Tab Down	1 8 G	H	J	K	L	M

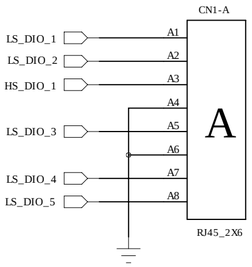
ECE quote Sept. 21 = $5.19

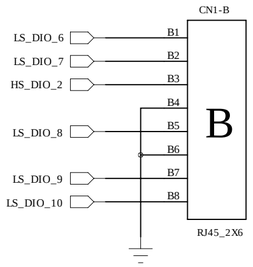
OST = $4.47

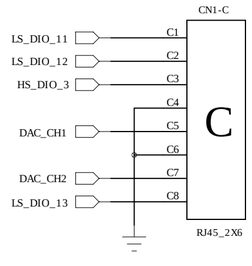
OST# GJS600-8P8C66-S

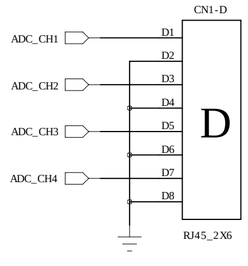
Samtec# MODM-B-12-8P8C-U-S4-ND

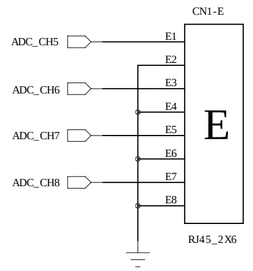
ECE# EC-MJK731-Pa881GfSb-12S

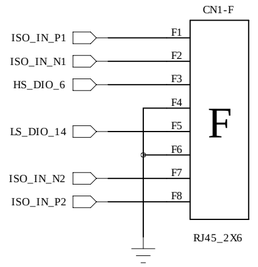


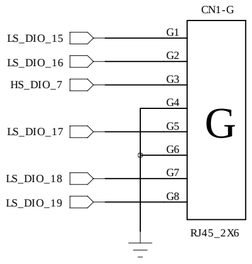


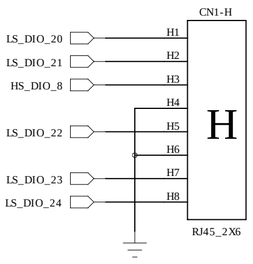


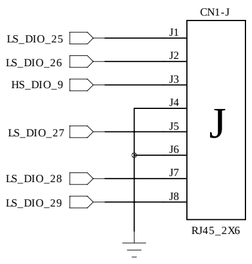


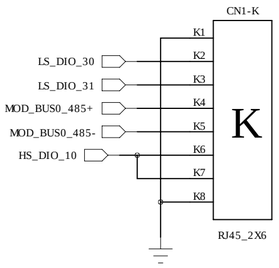




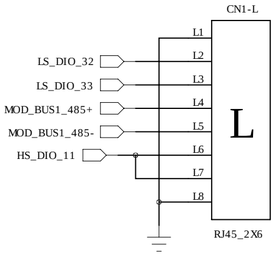




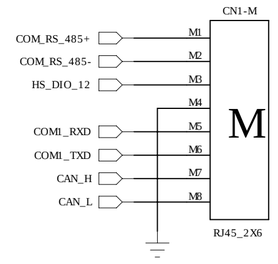




MOD Bus 0



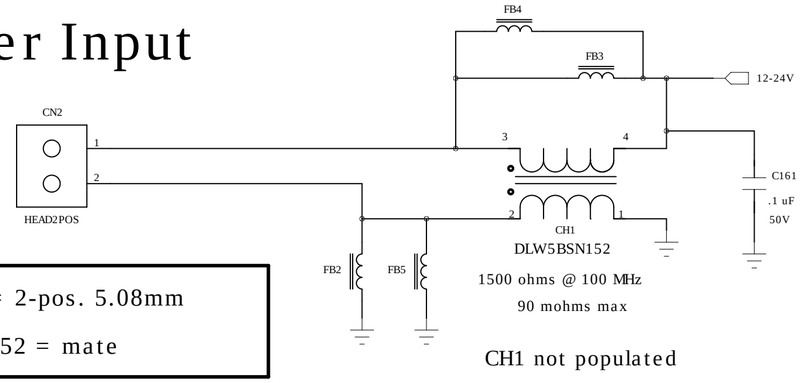
MOD Bus 1



COM Port

10-28 VDC Power Input

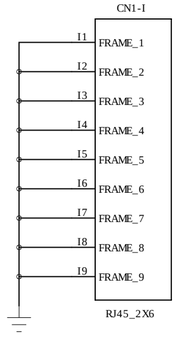
20.3 mm width



OSTOQ025551 = 2-pos. 5.08mm

OSTTJ025152 = mate

CH1 not populated



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Title: TS-7520 RJ45 Conn and Power		
Rev: B	Designer	Sheet 21 of 21