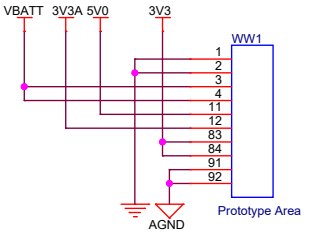
RENESAS DEVELOPMENT KIT FOR RL78G14

REVISION HISTORY

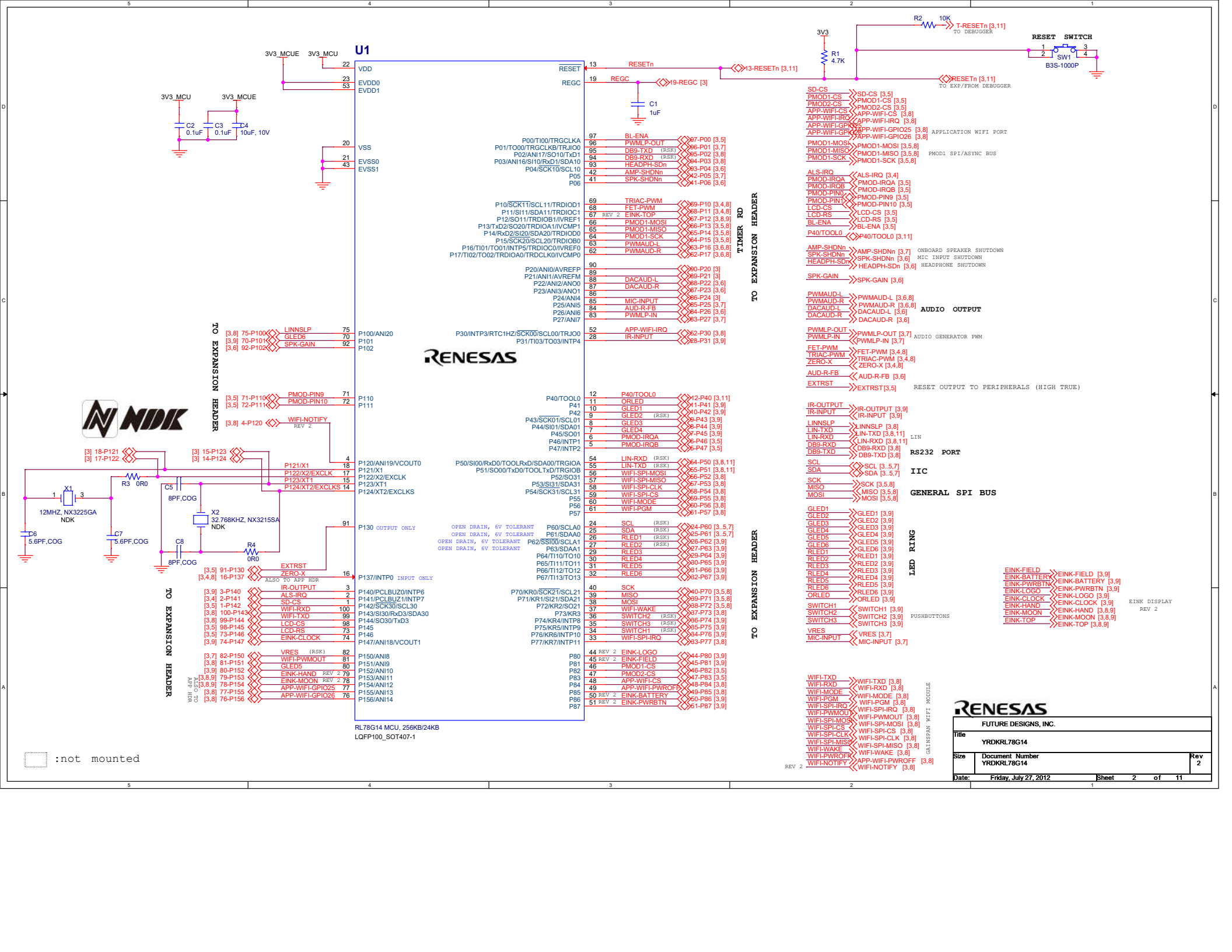
REV 1.0	04/23/2012	INITIAL RELEASE
REV 1.1	07/18/2012	EINK REWORK AND TRIAC RESISTOR CHANGE
REV 2.0	07/27/2012	CHANGE EINK TO PARALLEL CHANGE GAINSPAN POWER CONTROL ADD PWR JUMPER FOR 3V3_MCUE

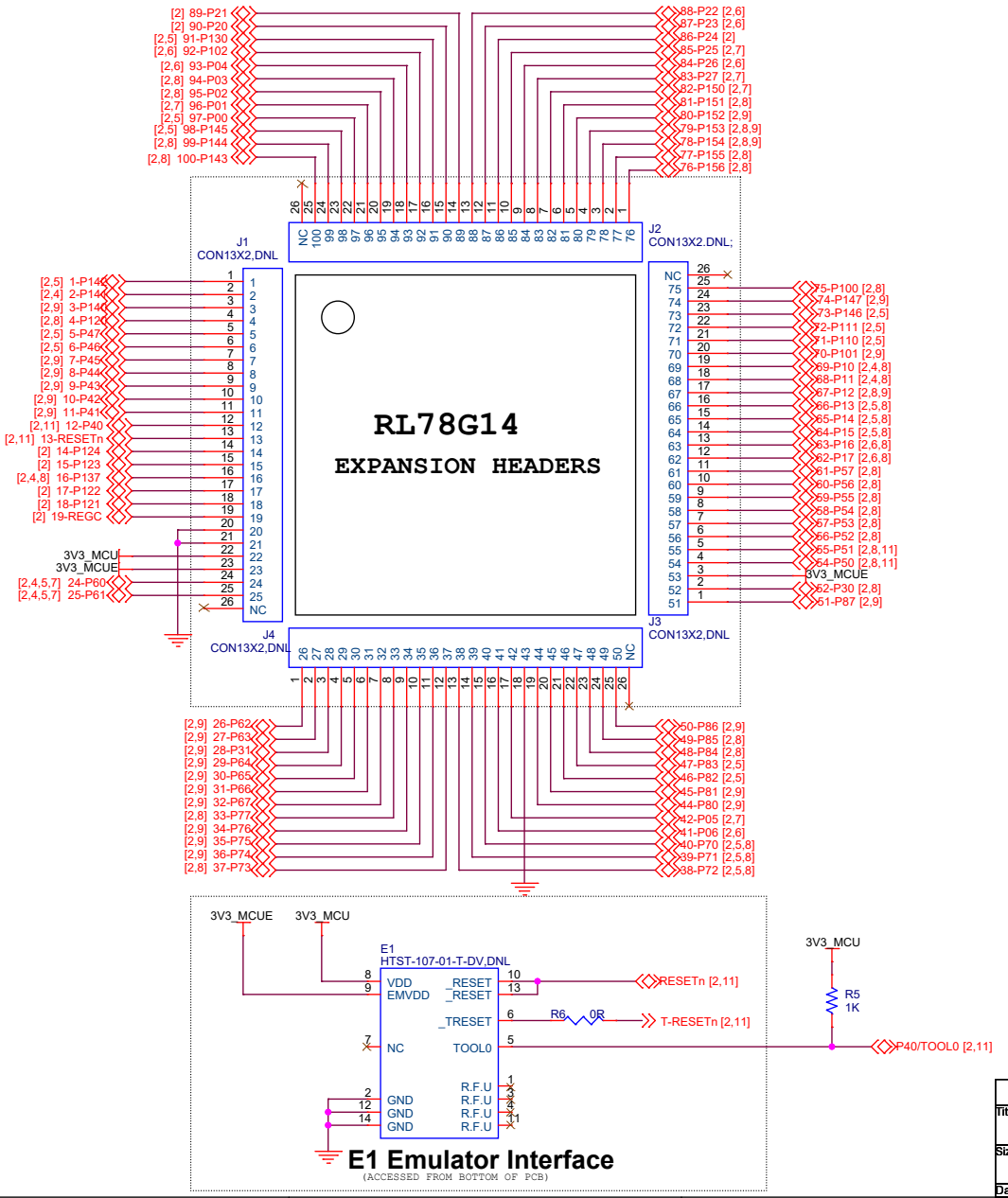
PAGE	DESCRIPTION
1	INDEX
2	RL78G14 MCU
3	EXPANSION/E1
4	FET/TRIAC/EEPROM/ALS
5	LCD/BEAGLE/MICROSD/IR/PMOD
6	AUDIO OUTPUT (HEADPHONE/SPKR)
7	MICROPHONE/ACCEL/TEMP/FILTER/POT
8	RS232, LIN, RF SOCKET, & GAINSPAN
9	LEDS, PUSHBUTTONS, IR IN/OUT, EINK
10	POWER INPUT, ISOLATION, TEST POINT
11	USB DEBUGGER

NOTE:
R : FIXED RESISTOR
VR : POTENTIOMETER
U : INTEGRATED CIRCUIT
X : CRYSTAL
SW : PUSHBUTTON/DIP SWITCH
LED : LIGHT EMITTING DIODE
J : CONNECTOR, JUMPER
L : FERRITE BEAD/INDUCTOR
D : DIODE



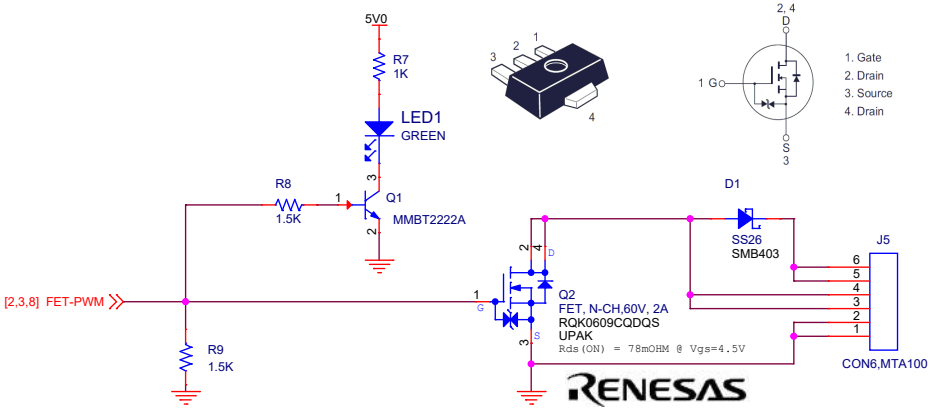
FUTURE DESIGNS, INC.		
Title: YRDKRL78G14		
Size: B	Document Number: YRDKRL78G14	Rev: 2
Date: Friday, July 27, 2012	Sheet 1 of 11	


U1
RL78G14 MCU, 256KB/24KB
LQFP100_SOT407-1
RENESAS
NDK
12MHZ, NX3225GA
NDK
32.768KHZ, NX3215SA
NDK
RESET SWITCH
SW1
B3S-1000P
T-RESETn [3,11]
TO DEBUGGER
RESETn [3,11]
TO EXP/FROM DEBUGGER
TO EXPANSION HEADER
TIMER RD
LED RING
AUDIO OUTPUT
RS232 PORT
IIC
GENERAL SPI BUS
RESET OUTPUT TO PERIPHERALS (HIGH TRUE)
APPLICATION WIFI PORT
PMOD1 SPI/ASYNC BUS
ONBOARD SPEAKER SHUTDOWN
MIC INPUT SHUTDOWN
HEADPHONE SHUTDOWN
AUDIO GENERATOR PWM
LIN
PUSHBUTTONS
EINK DISPLAY
REV 2
GAINSPAN WIFI MODULE
:not mounted
FUTURE DESIGNS, INC.
YRDKRL78G14
Document Number
YRDKRL78G14
Rev 2
Date: Friday, July 27, 2012
Sheet 2 of 11



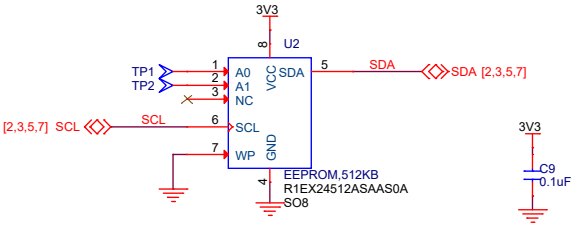
:not mounted

Title	YRDKRL78G14		
Size B	Document Number YRDKRL78G14		Rev 2
Date: Friday, July 27, 2012	Sheet 3 of 11		



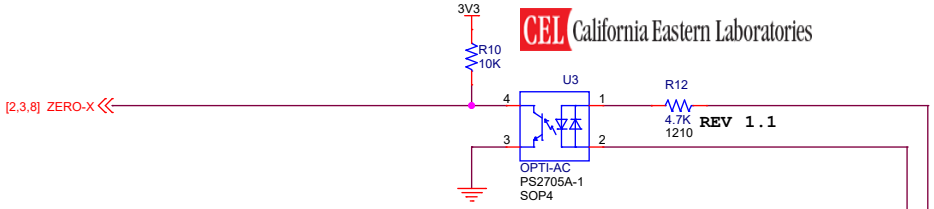
FET/DRIVER CIRCUIT

WARNING!
MAXIMUM VOLTAGE = 40VDC
MAXIMUM CURRENT = 6A

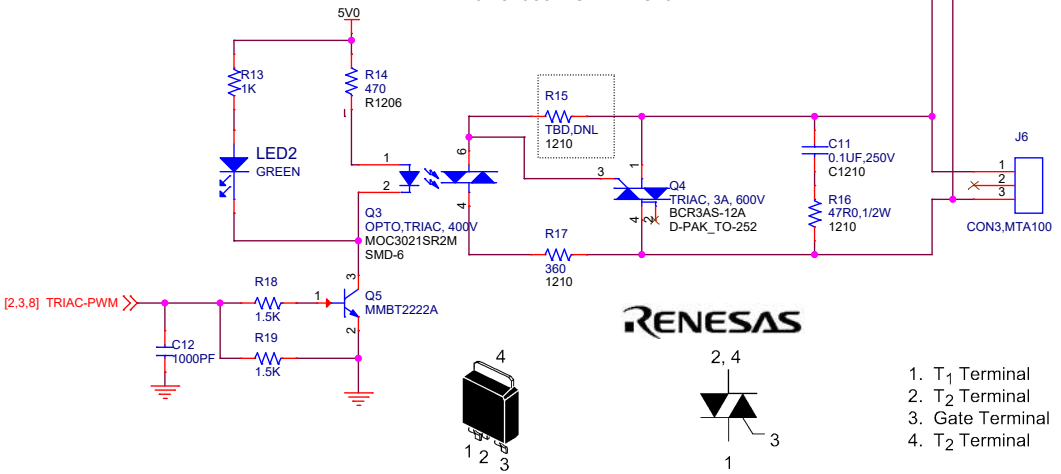


SERIAL EEPROM STORAGE

I2C ADDR = 0xA0 (1010aaxr)
aa = A2:A1 I2C address
x = A16 of memory address
r=R/Wn, Read/Write



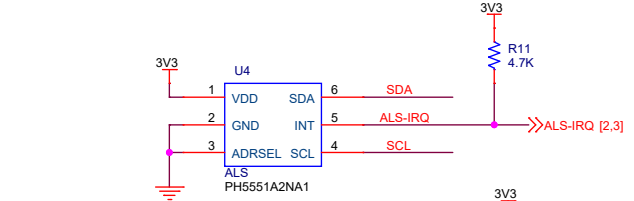
ZERO CROSSING DETECTOR



WARNING!
MAXIMUM VOLTAGE = 48VAC
MAXIMUM CURRENT = 3A

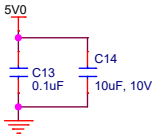
1. T_1 Terminal
2. T_2 Terminal
3. Gate Terminal
4. T_2 Terminal

TRIAC CIRCUIT



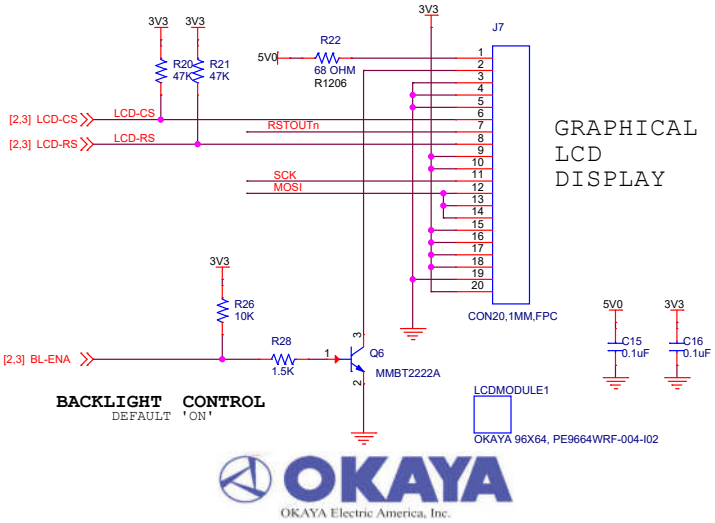
AMBIENT LIGHT SENSOR

DEFAULT I2C ADDR = 0x72 (0111001r)
r=R/Wn, Read/Write

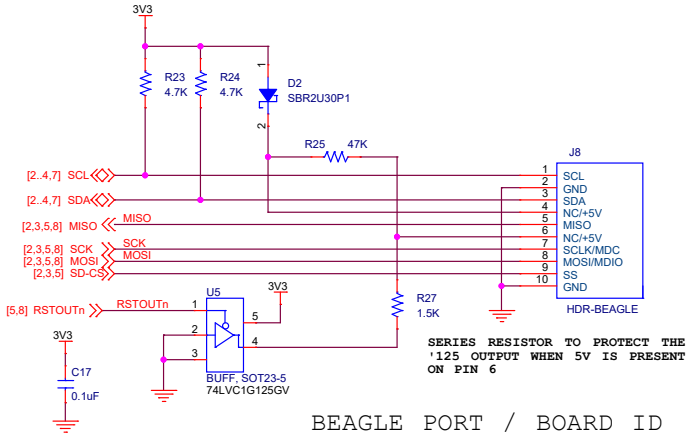


:not mounted

FUTURE DESIGNS, INC.		
Title: YRDKRL78G14		
Size	Document Number: YRDKRL78G14	Rev: 2
Date: Friday, July 27, 2012	Sheet 4 of 11	

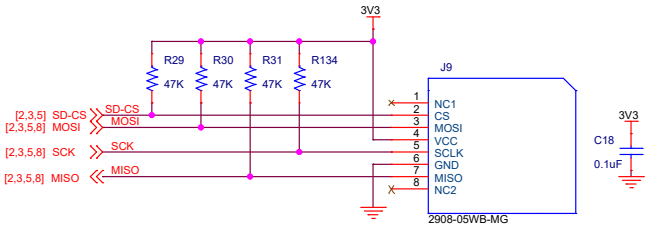


OKAYA Electric America, Inc.

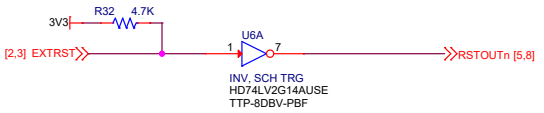


BEAGLE PORT / BOARD ID

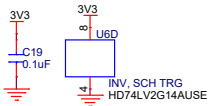
TOTALPHASE

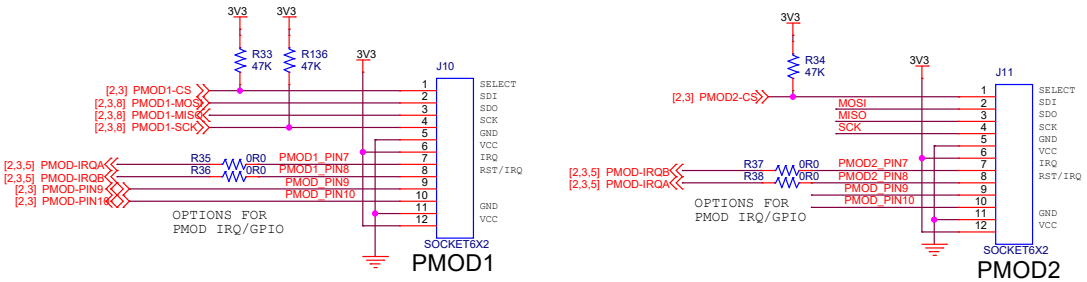


MICRO SD



PERIPHERAL RESET BUFFER



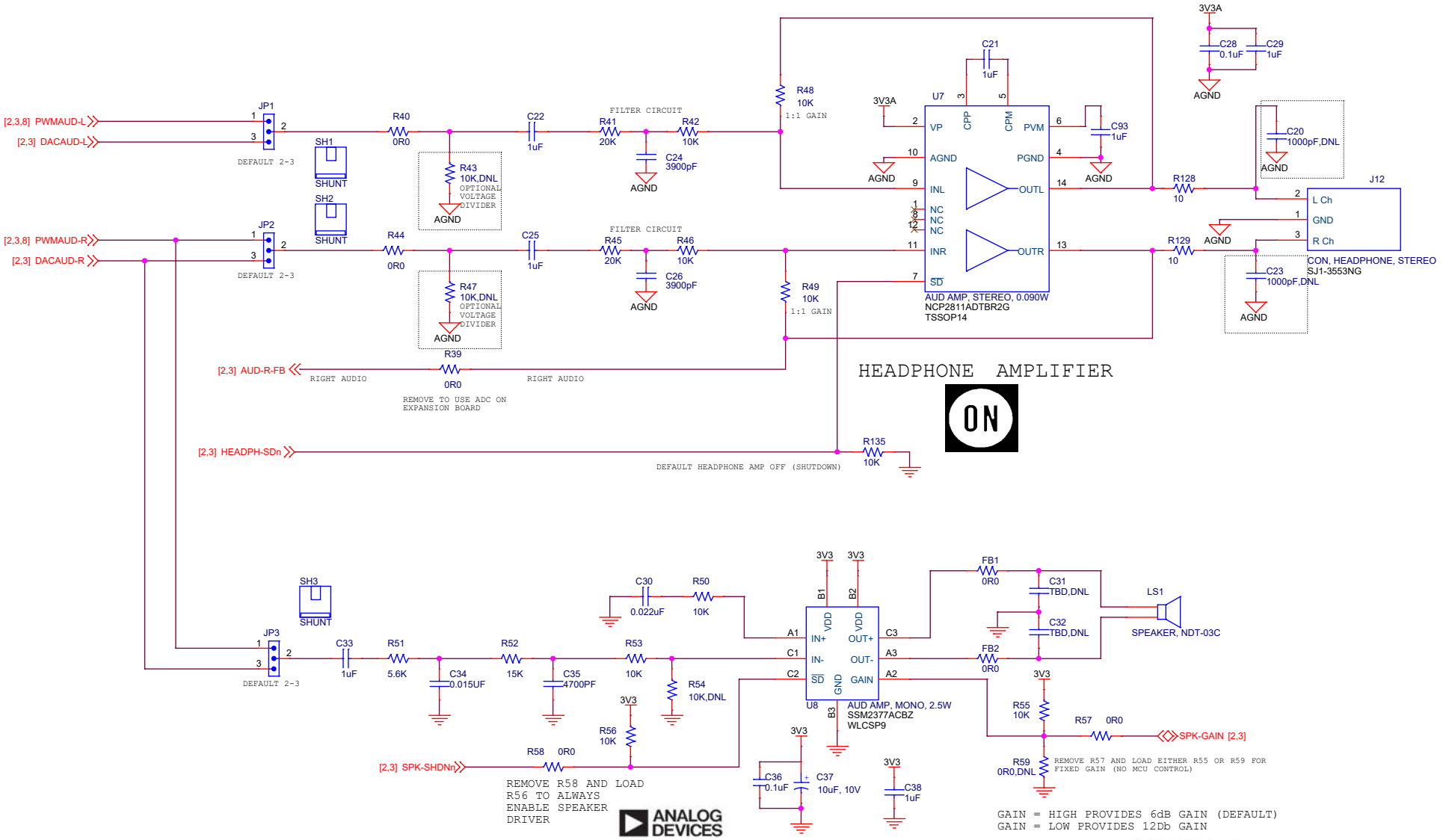


PMOD CONNECTORS

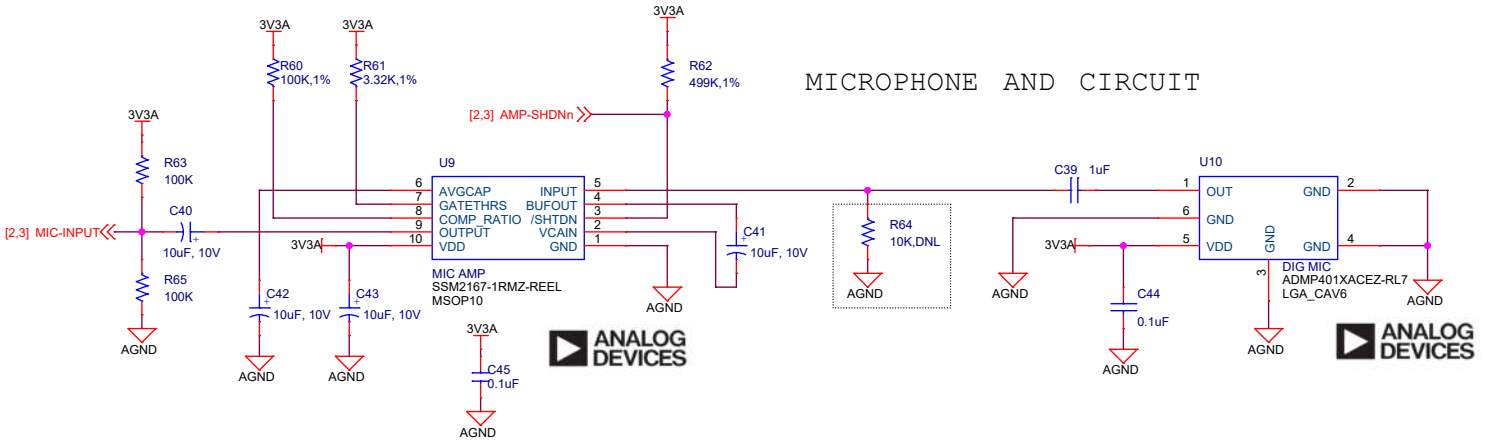
:not mounted

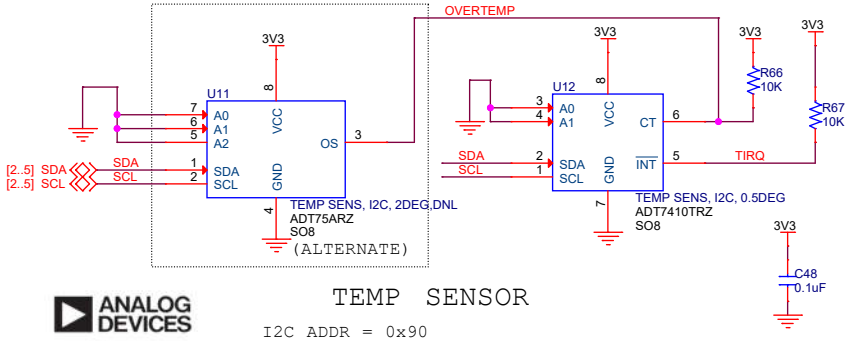
RENESAS

FUTURE DESIGNS, INC.		
Title: YRDKRL78G14		
Size	Document Number: YRDKRL78G14	Rev: 2
Date: Friday, July 27, 2012	Sheet 5 of 11	



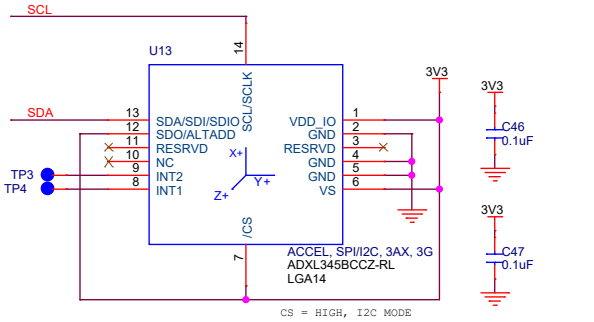
RENESAS	FUTURE DESIGNS, INC.	
Title	YRDKRL78G14	
Size B	Document Number YRDKRL78G14	Rev 2
Date: Friday, July 27, 2012	Sheet 6 of 11	





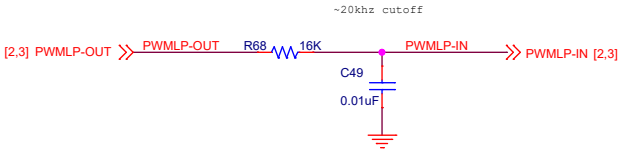
TEMP SENSOR

I2C ADDR = 0x90
ADT75 = (1001aaar), aaa = A2:A1:A0, r=R/Wn
ADT7410 = (10010aar), aa = A1:A0, r=R/Wn

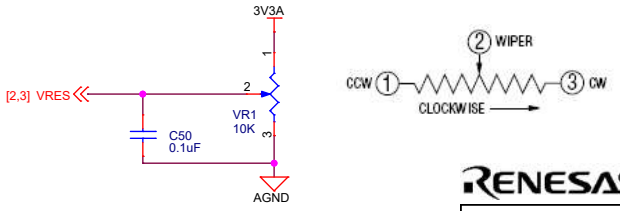


ACCELEROMETER

I2C ADDR = 0x3A
(0011101r), r=R/Wn



AUDIO FILTER



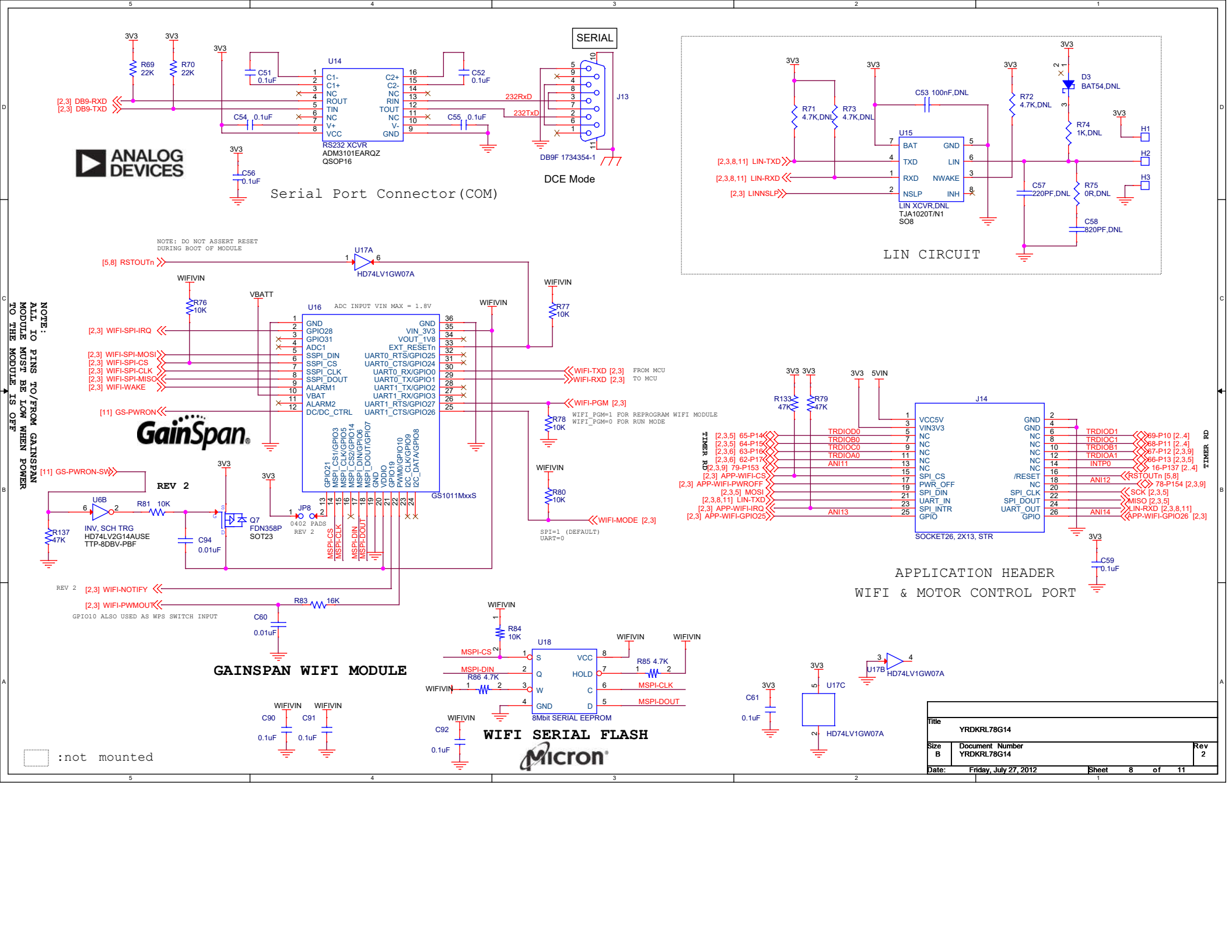
POTENTIOMETER

:not mounted

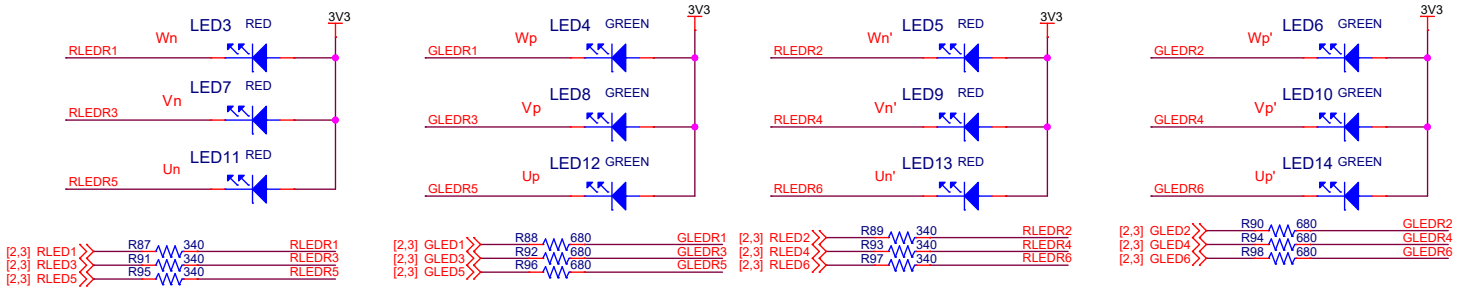
VCC 3V3

RENESAS

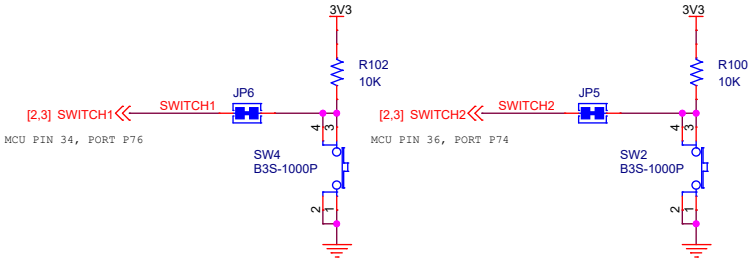
FUTURE DESIGNS, INC.		
Title: YRDKRL78G14		
Size: B	Document Number: YRDKRL78G14	Rev: 2
Date: Friday, July 27, 2012	Sheet 7 of 11	



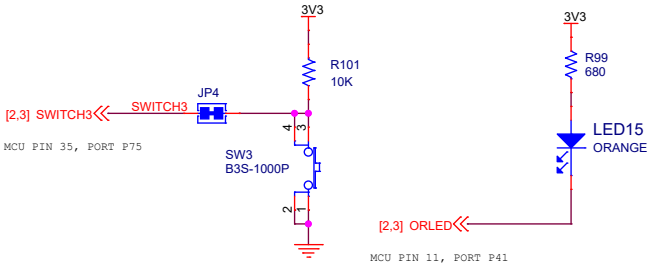
Title	YRDKRL78G14
Size	B
Document Number	YRDKRL78G14
Rev	2
Date:	Friday, July 27, 2012
Sheet	8 of 11

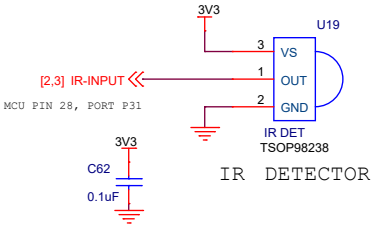


LED RING

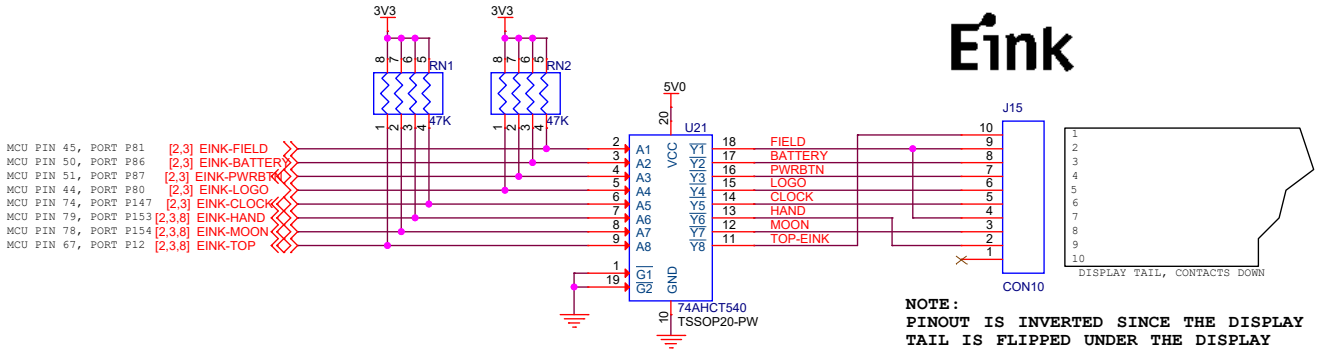


USER PUSHBUTTONS





IR DETECTOR

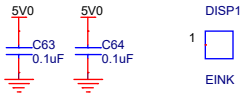


Eink

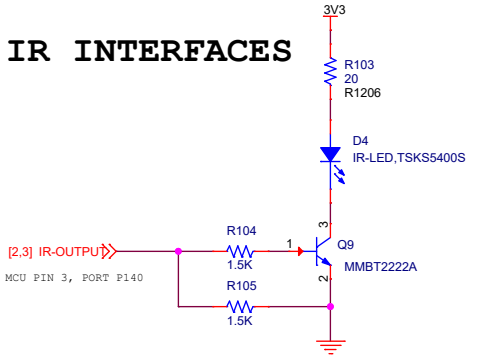
NOTE:
PINOUT IS INVERTED SINCE THE DISPLAY TAIL IS FLIPPED UNDER THE DISPLAY AND INSERTED INTO THE CONNECTOR, PIN 1 TO PIN 10, ETC.

EINK DISPLAY

REV 2

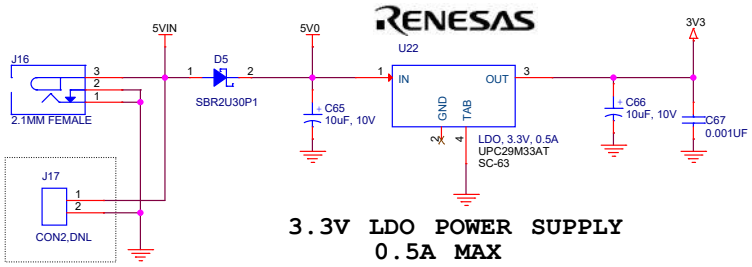


IR INTERFACES



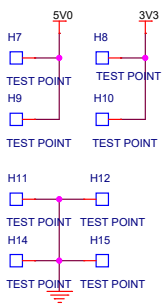
IR EMITTER

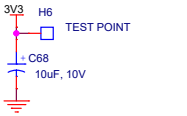
Title: YRDKRL78G14		
Size: B	Document Number: YRDKRL78G14	Rev: 2
Date: Friday, July 27, 2012	Sheet 9 of 11	

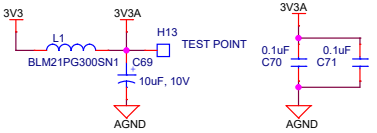


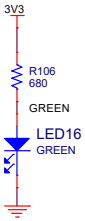
3.3V LDO POWER SUPPLY
0.5A MAX

POWER TEST PIN

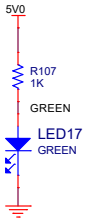






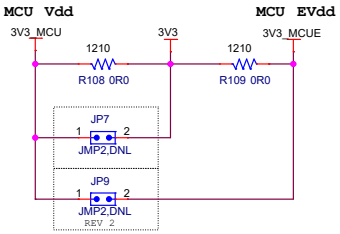


3.3V
Power LED

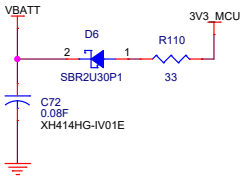


5V (USB/WALL)
Power LED

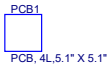
GND - AGND

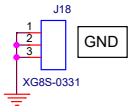


MCU CURENT MEASUREMENT
NOTE RL78 Vdd REQUIREMENTS:
1.6V <= EVdd <= Vdd <= 5.5V

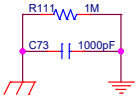


RTC BACKUP SOURCE
SUPERCAP





SCOPE GROUND POINT



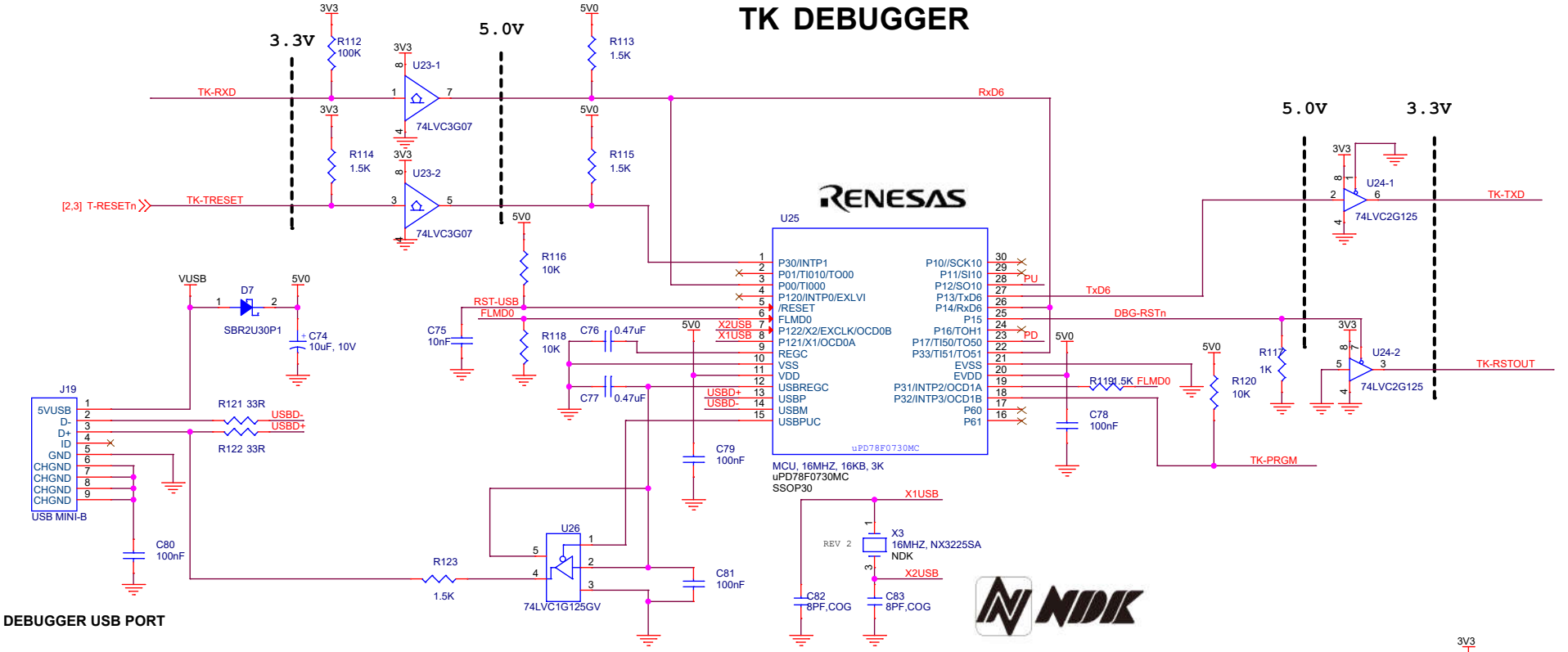
EARTH/CHASSIS GROUND
TO DIGITAL GROUND
COUPLING

:not mounted

RENESAS

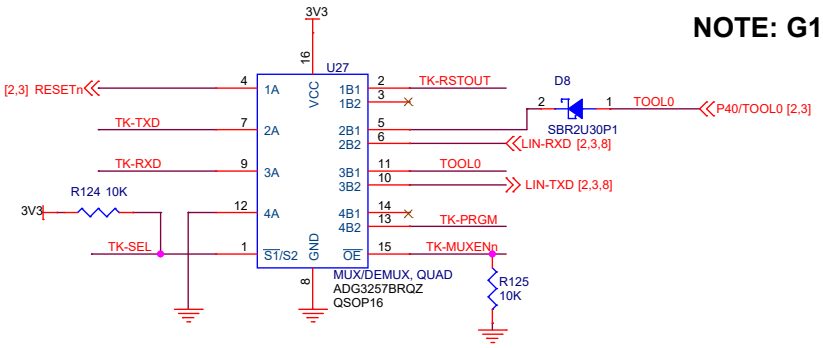
	FUTURE DESIGNS, INC.
Title	YRDKRL78G14
Size	Document Number YRDKRL78G14 — Rev 2
Date:	Friday, July 27, 2012 — Sheet 10 of 11

TK DEBUGGER

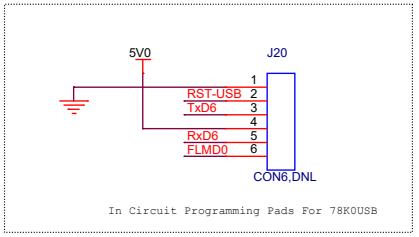


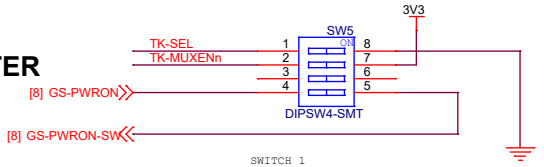
DEBUGGER USB PORT

NOTE: G14 REQUIRES V7.12 FIRMWARE OR LATER

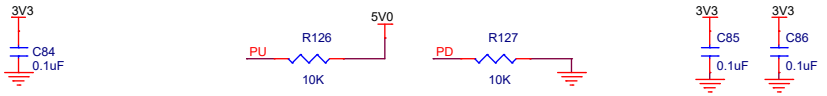


DEBUGGER MUX





SWITCH 1
OFF = VIRTUAL COM PORT MODE
ON = TK DEBUGGER MODE
SWITCH 2
OFF = ENABLE MUX
ON = DISABLE MUX
SWITCH 3 UNUSED
SWITCH 4
OFF = GAINSPAN POWERED DOWN
ON = GAINSPAN POWER CONTROLLED BY MODULE



:not mounted

Title	YRDKRL78G14	
Size B	Document Number YRDKRL78G14	Rev 2
Date: Friday, July 27, 2012	Sheet 11 of 11	