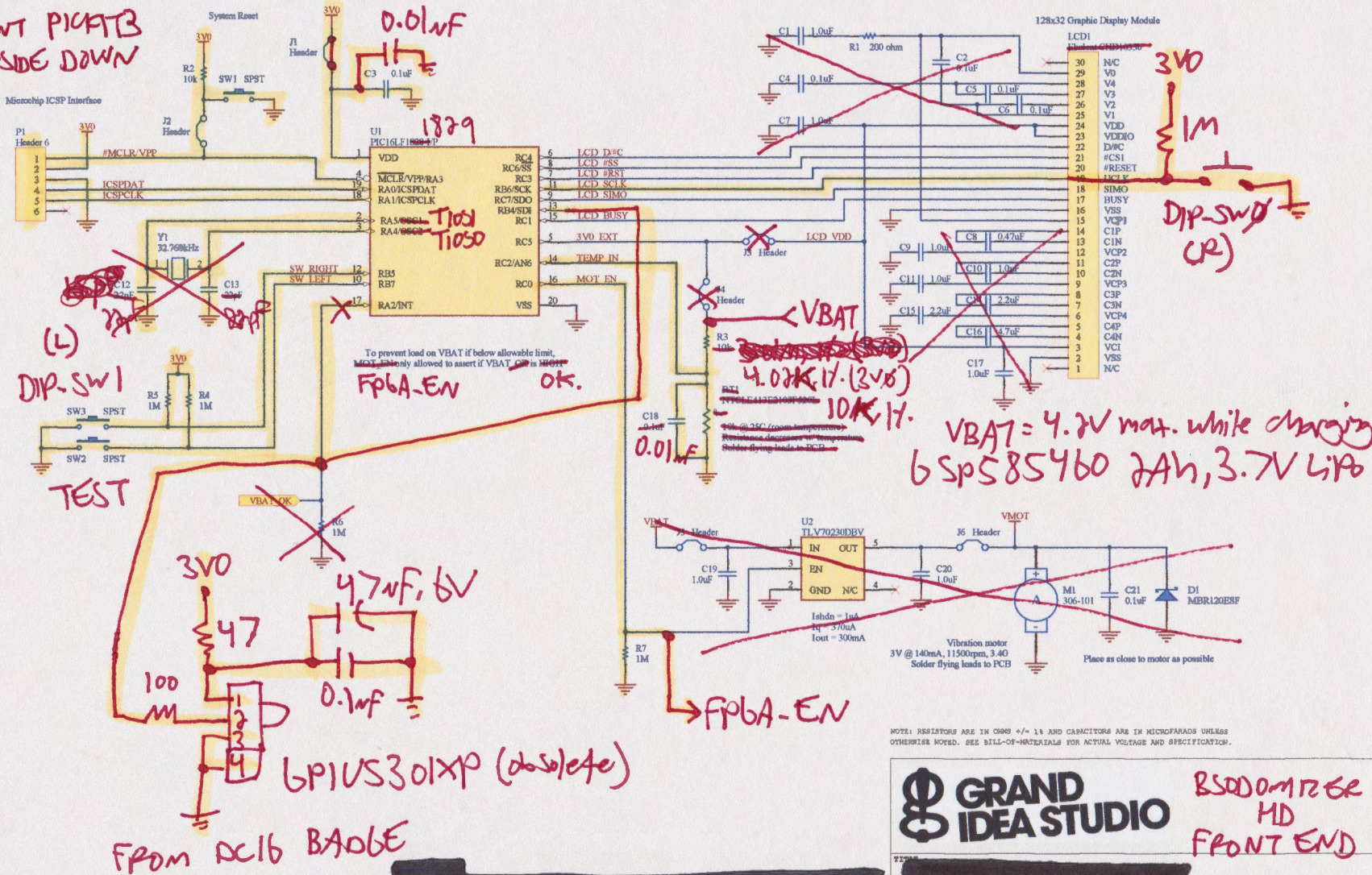


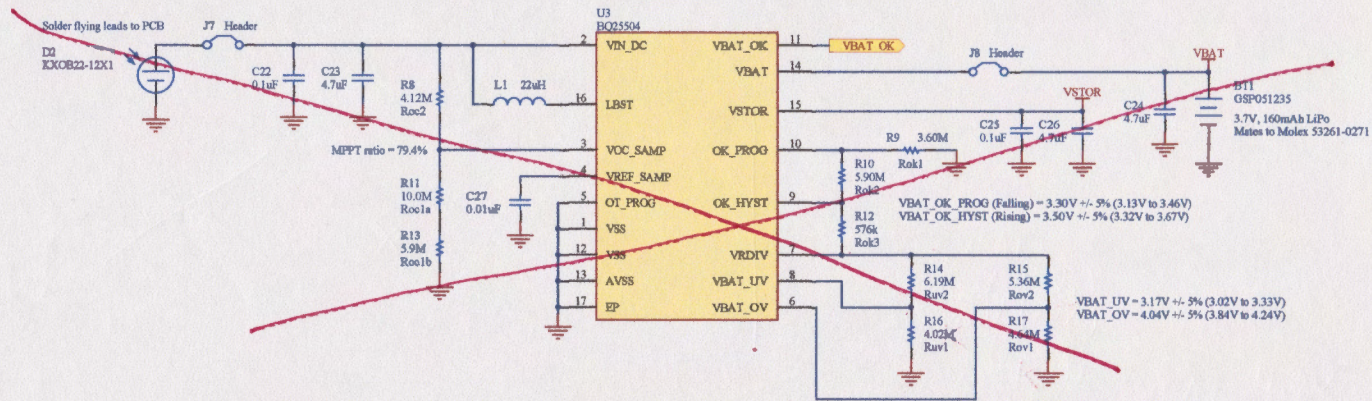
MOUNT PIC16F1829 UPSIDE DOWN



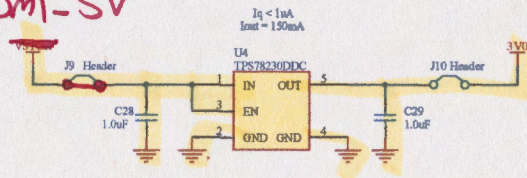
NOTE: RESISTORS ARE IN OHMS +/- 1% AND CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE NOTED. SEE BILL-OF-MATERIALS FOR ACTUAL VOLTAGE AND SPECIFICATIONS.

GRAND IDEA STUDIO  
B5000M72 ER  
MD  
FRONT END

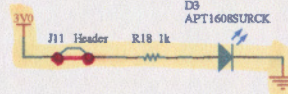
DATE	FILENAME	DESIGN	DRAWN BY	REV
		B SWZ 1 OF 2	Joe Grand	P1



HDMI-SV



3V0-OK



NOTE: RESISTORS ARE IN OHMS +/- 1% AND CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE NOTED. SEE BILL-OF-MATERIALS FOR ACTUAL VOLTAGE AND SPECIFICATION.

GRAND  
IDEA STUDIO

BSODOMIZER  
HD  
FRONT END

DATE	FILENAME	REV	DRAWN BY	REV
		B	Joe Grand	P1

3.3 Schematics

Figure 4 and Figure 5 show the EVM schematics.

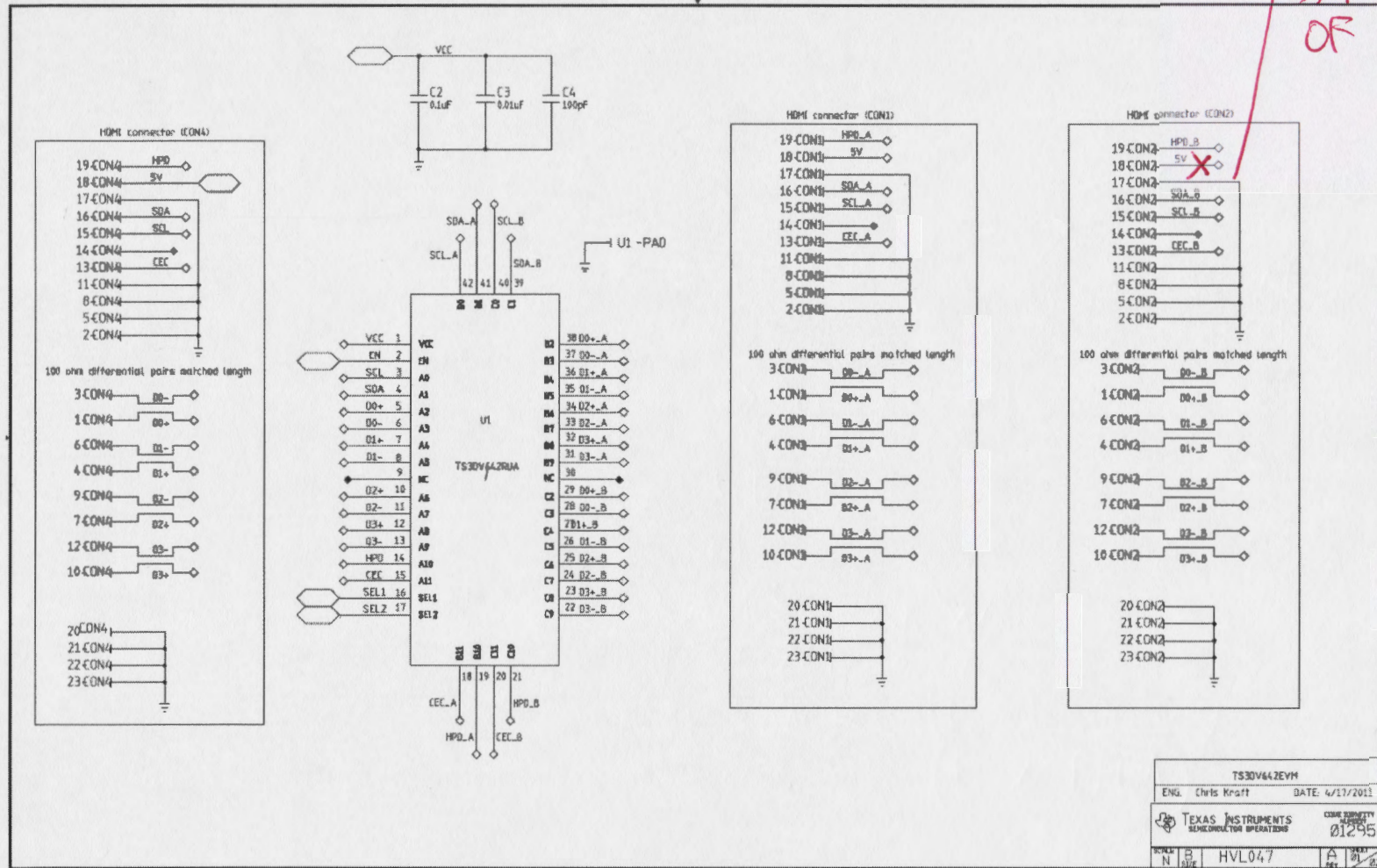


Figure 4. Schematic (1 of 2)

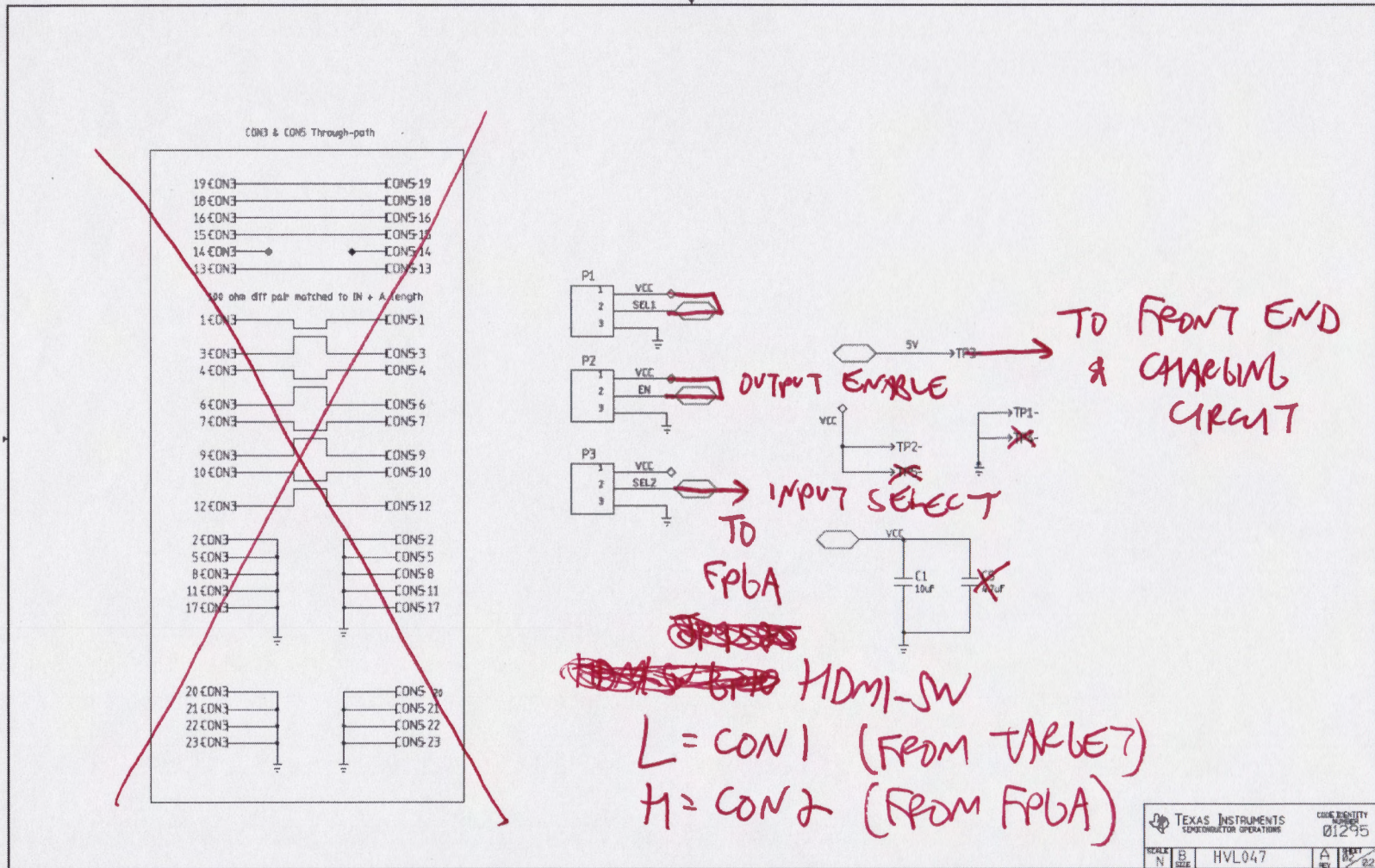
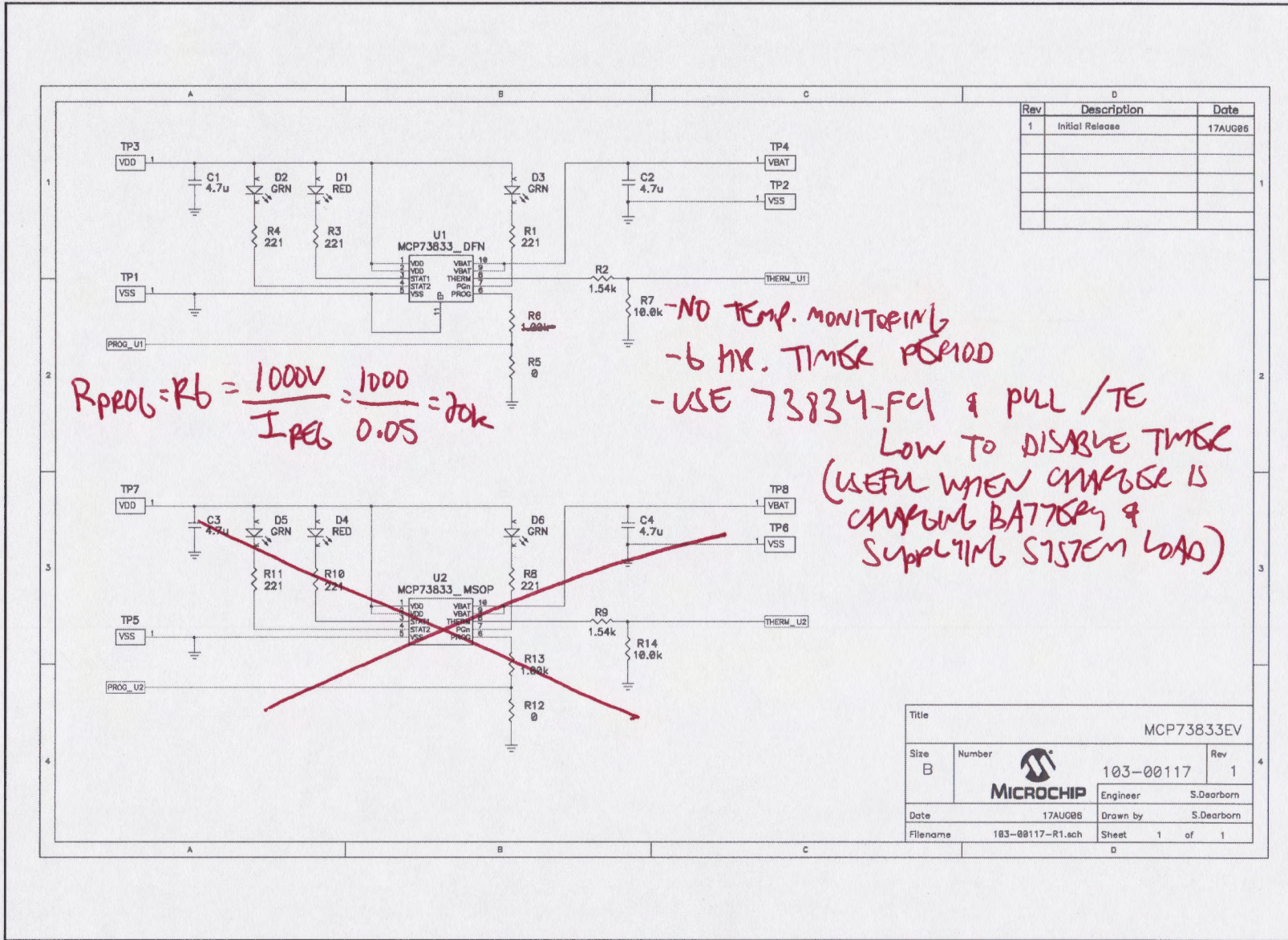


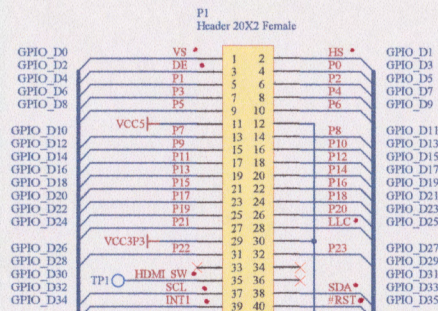
Figure 5. Schematic (2 of 2)

TEXAS INSTRUMENTS SEMICONDUCTOR OPERATIONS		CODE IDENTIFICATION NUMBER 01295
SCALE N	B REV	HVL047
		A REV 02



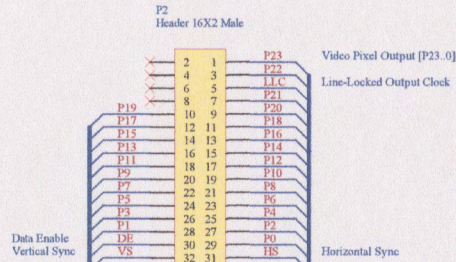
HDMI SPEC: SINK MUST NOT DRAW MORE THAN 50mA WHEN "OFF" =  
 AND 10mA WHEN "ON" =  
 BSOD HD CHARGES BATTERY WHILE IN PASSTHROUGH MODE ("OFF"),  
 BATTERY WILL PROVIDE POWER TO CIRCUIT WHILE "ON" (IF FULLY CHARGED)

Cyclone V GX Starter Kit  
GPIO Header JP9

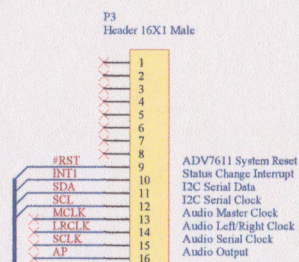


Mount on bottom side of PCB

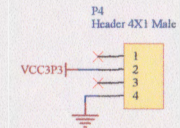
Papilio HDMI Receiver  
Bottom Header



Papilio HDMI Receiver  
Top Header



Papilio HDMI Receiver  
Power Rail



NOTE: RESISTORS ARE IN OHMS +/- 5% AND CAPACITORS ARE IN MICROFARADS, KTA UNLESS OTHERWISE NOTED. SEE BOM FOR ACTUAL VOLTAGE AND SPECIFICATION.

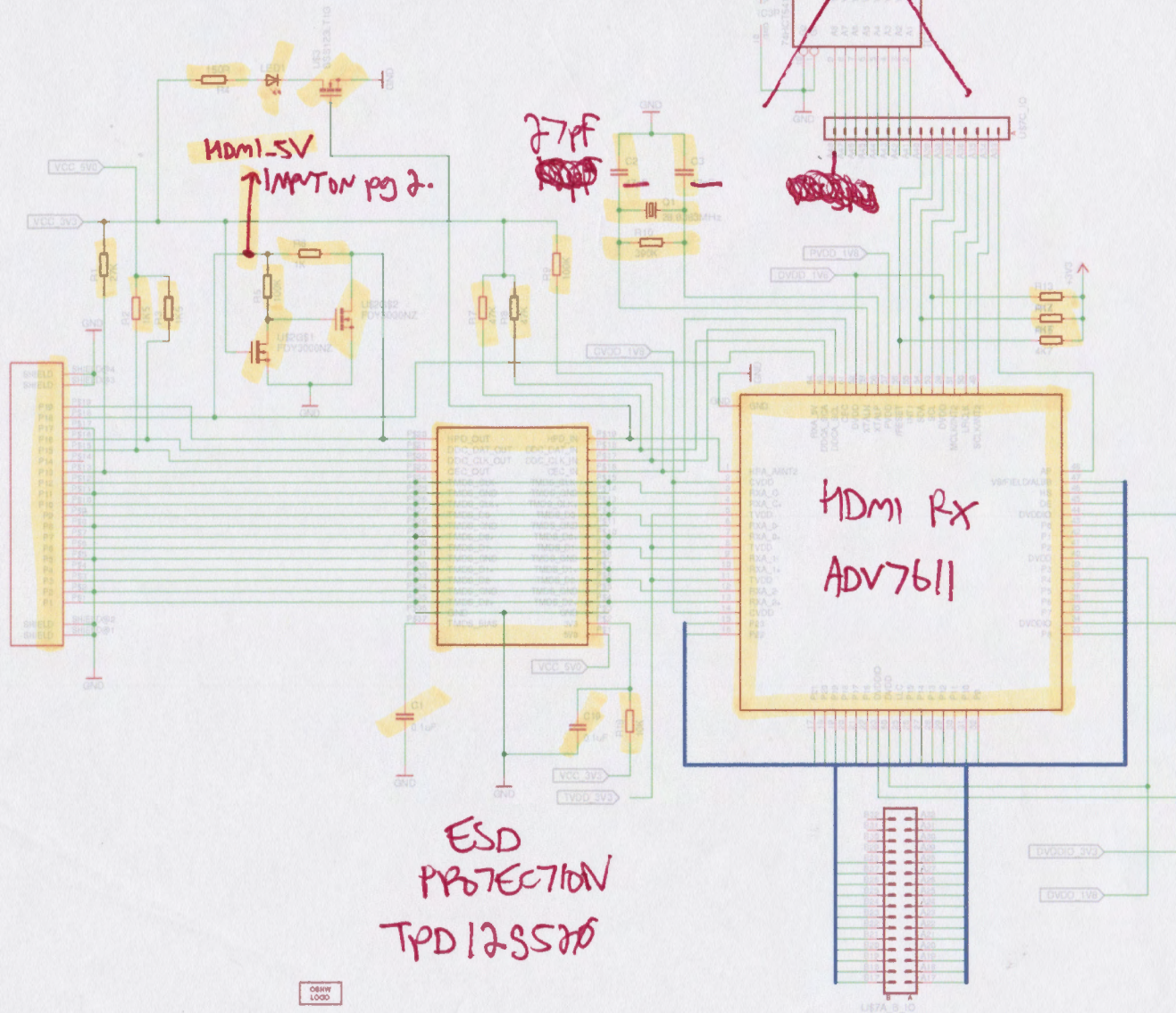
**KINGPIN**

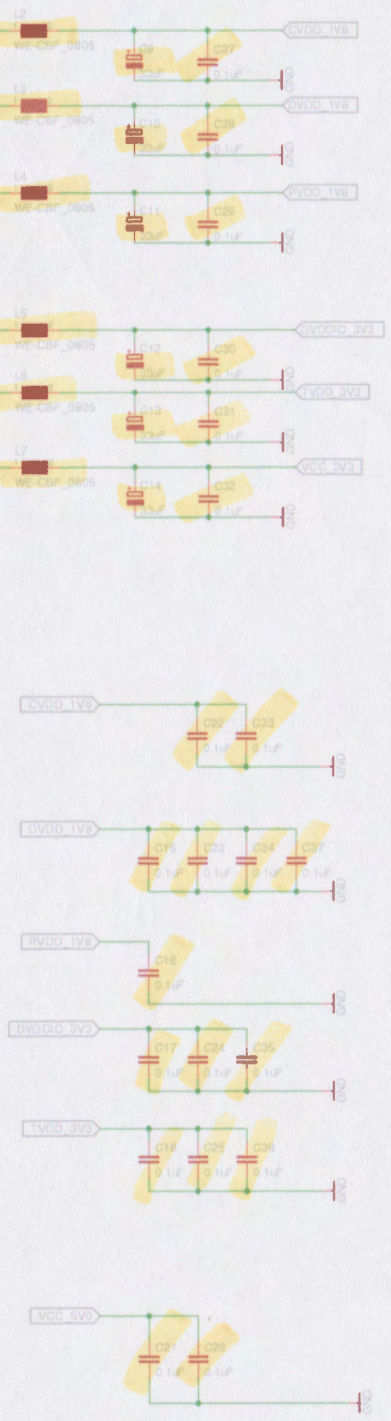
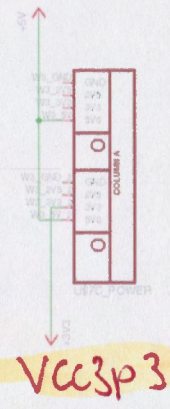
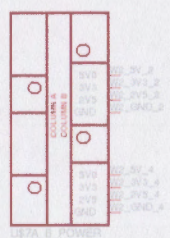
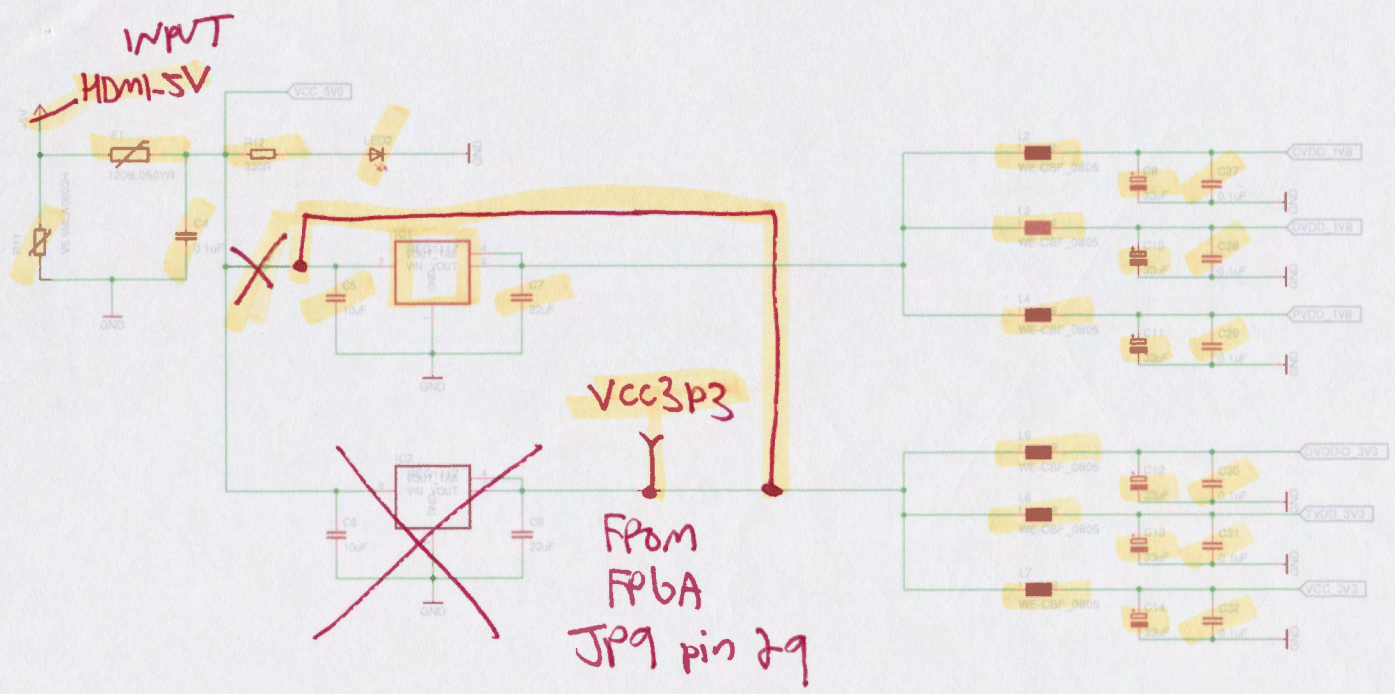
HWID  
HDMI Light v2 to Terasic C5G Interface Board

DATE	FILENAME	REV	DRAWN BY	REV
7/18/2016		B	JOE GRAND	1.0

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HDMI 4 BIT V2  
rev. 1.1  
pg. 1/2

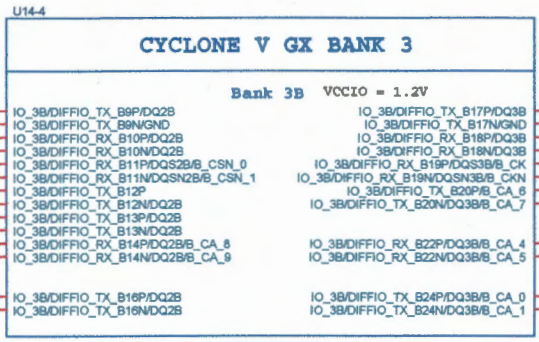




pg. 2/2

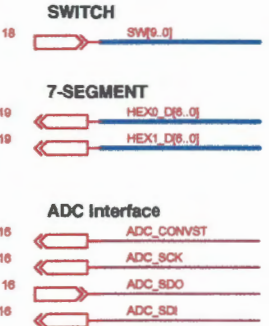
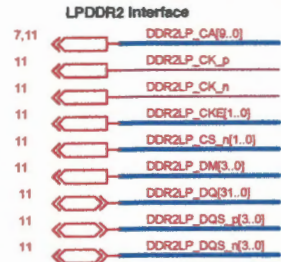


Qty	Value	Package	Parts	Supplier US
<b>Capacitors:</b>				
8	0.1uF	C0402	C15, C18, C23, C25, C34, C35, C36, C37	Mouser: 77-VJ0402V104ZXQPBC
16	0.1uF	C0603	C1, C4, C16, C17, C19, C21, C22, C24, C26, C27, C28, C29, C30, C31, C32, C33	Mouser: 77-VJ0603Y104JXJPBC
2	18pF	C0603	C2, C3	Mouser: 77-VJ0603A180JXACBC
2	22uF(PolarizedTant ESR <0.50hm)	C1206	C7, C8	Mouser: 80-T520A226M10ATE00
2	10uF	C1210	C5, C6	Mouser: 77-VJ1210V106ZXTBC
6	33uF(PolarizedSolidTant LowESR)	SMC_B	C9, C10, C11, C12, C13, C14	Mouser: 581-TP5B336K010R0250
<b>Resistors(all 5% or better):</b>				
1	0 <b>10K</b>	R0603	R16	<del>Mouser: 71-CRCW06030000Z0E0</del>
1	150R	R0603	R4	Mouser: 71-CRCW0603-150-E3
1	330R	R0603	R12	Mouser: 71-CRCW0603-330-E3
1	1K	R0603	R6	Mouser: 71-CRCW0603-1.0K-E3
2	1K5	R0603	R2, R3	Mouser: 71-CRCW0603-1.5K-E3
3	4K7	R0603	R13, R14, R15	Mouser: 71-CRCW0603-4.7K-E3
1	27K	R0603	R1	Mouser: 71-CRCW0603J-27K-E3
2	47K	R0603	R7, R8	Mouser: 71-CRCW0603-47K-E3
2	100K	R0603	R5, R9	Mouser: 71-CRCW0603-100K-E3
1	390K	R0603	R10	Mouser: 71-CRCW0603J-390K-E3
<b>Semiconductors:</b>				
1	ADV7611	TQFP64-10X10	U\$6	Digikey: ADV7611BSWZ-P-RL
1	TPD125520DBTR	TSSOP38	U\$4	Mouser: 595-TPD125520DBTR
<del>1</del>	<del>SN74HCT541DW</del>	<del>S0IC20</del>	<del>IC3</del>	Mouser: 595-SN74HCT541DWE4
1	BSS123LT1G	SOT23	U\$3	Mouser: 863-BSS123LT1G
1	REG1117A-1.8 (1.8V)	SOT223	IC1	Mouser: 595-REG1117A-1.8
<del>1</del>	<del>REG1117-3.3 (3.3V)</del>	<del>SOT223</del>	<del>IC2</del>	Mouser: 595-REG1117-3.3/2K5
1	FDY3000NZ	SC89-6	U\$2	Mouser: 512-FDY3000NZ
1	V5.5MLA0603H	CT/CN0603	R11	Mouser: 576-V5.5MLA0603H
1	LG R971-KN-1 (Green)	CHIP-LED0805	LED2	Mouser: 720-LGR971-KN-1
1	LH R974-LP-1 (Red)	CHIP-LED0805	LED1	Mouser: 720-LHR974-LP-1
<b>Miscellaneous:</b>				
1	1206L050YR	PTC-1206	F1	Mouser: 576-1206L050YR
1	28.63636MHz (18pF)	SM49	Q1	Mouser: 815-ABLS-28.63MF-T
6	WE-CBF_0805 (alternative): 9C-28.63636MEEJ-T Mostly NonStocked)	0805	L2, L3, L4, L5, L6, L7	Mouser: 81-BLM21PG220SH1D
<b>Connectors:</b>				
1	FCI_HDMI_SOCKET_10029449-001RCF	FCI_HDMI_SOCKET_10029449-001RCF	U\$1	Mouser: 649-10029449-001RLF



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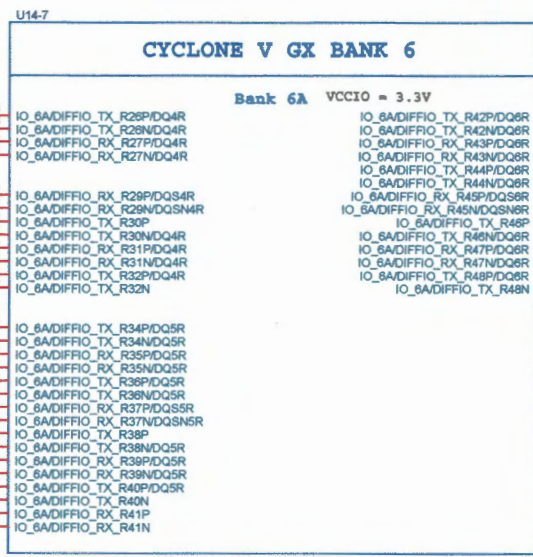
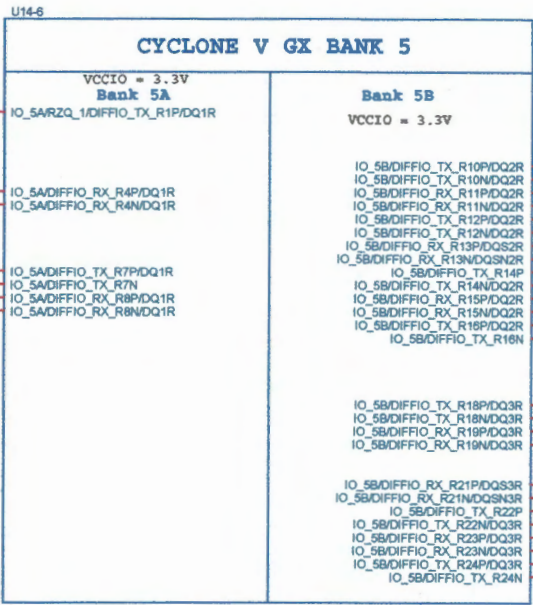
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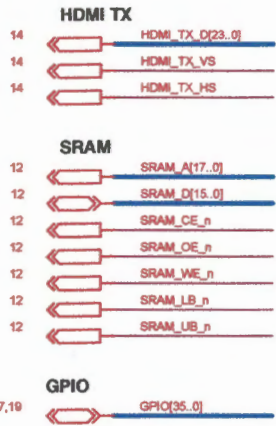
**Cyclone V GX Starter Kit**

File	Document Number	Rev
Size	FPGA BANK 3 & 4	B
Date:	Wednesday, August 14, 2013	Sheet 3 of 23



5CGXFC506F27C7N

5CGXFC506F27C7N



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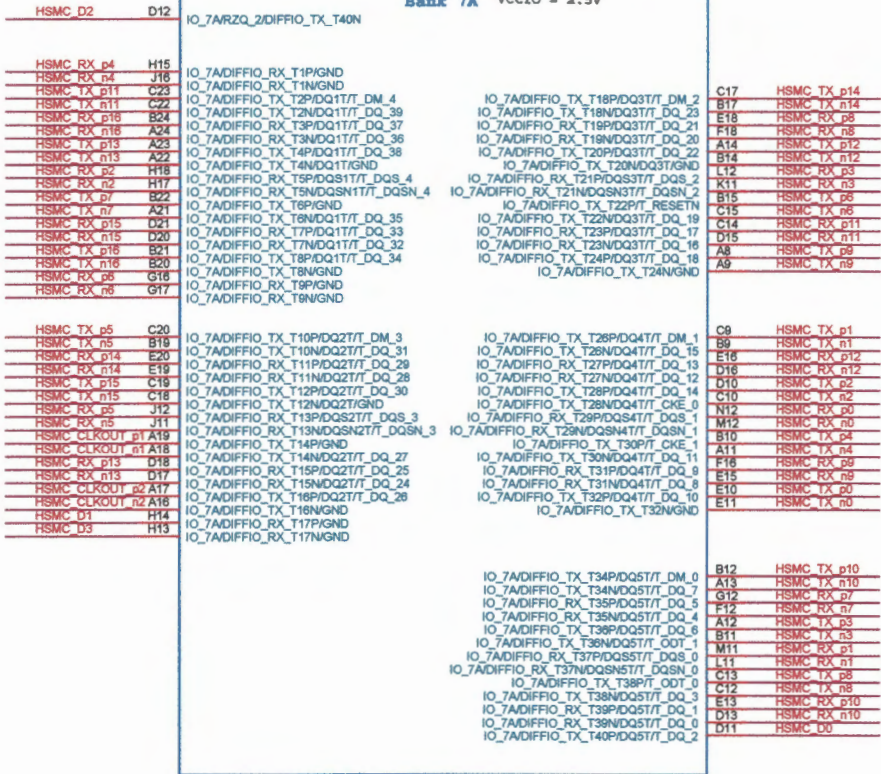
Size: B Document Number: FFGA BANK 5 & 6 Rev: B

Date: Wednesday, August 14, 2013 Sheet: 4 of 23

U14-8

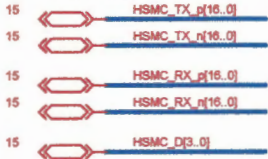
### CYCLONE V GX BANK 7

Bank 7A VCCIO = 2.5V



5CGXFC506F27C7N

#### HSMC Interface



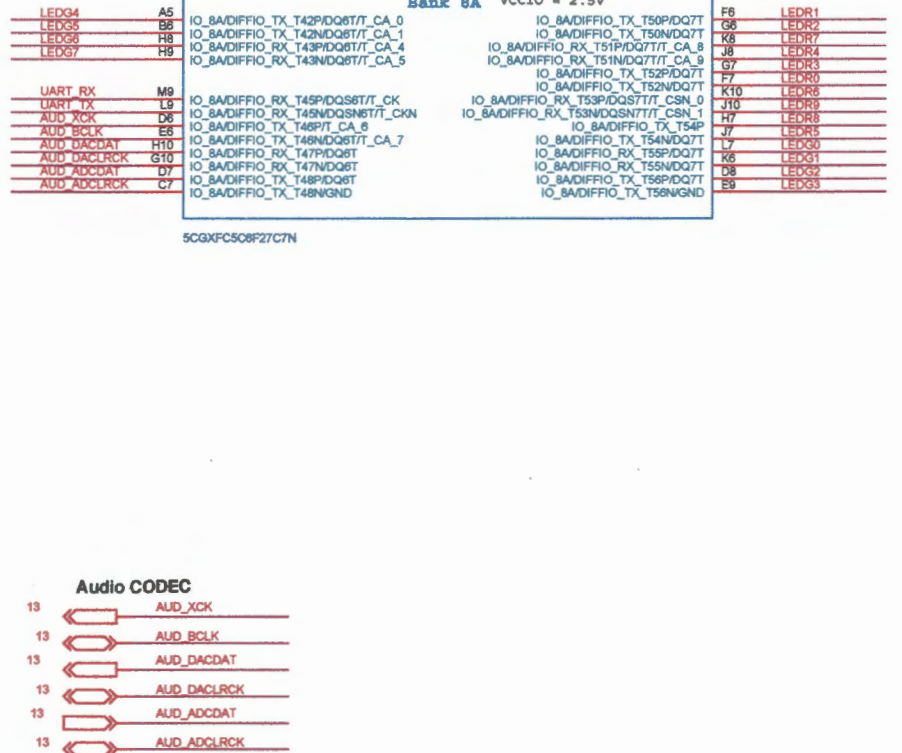
#### HSMC Clock output



U14-9

### CYCLONE V GX BANK 8

Bank 8A VCCIO = 2.5V

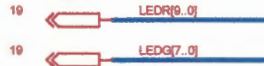


5CGXFC506F27C7N

#### Audio CODEC



#### LED



#### UART to USB



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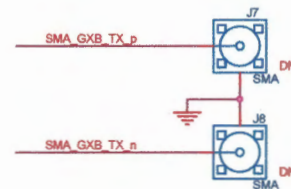
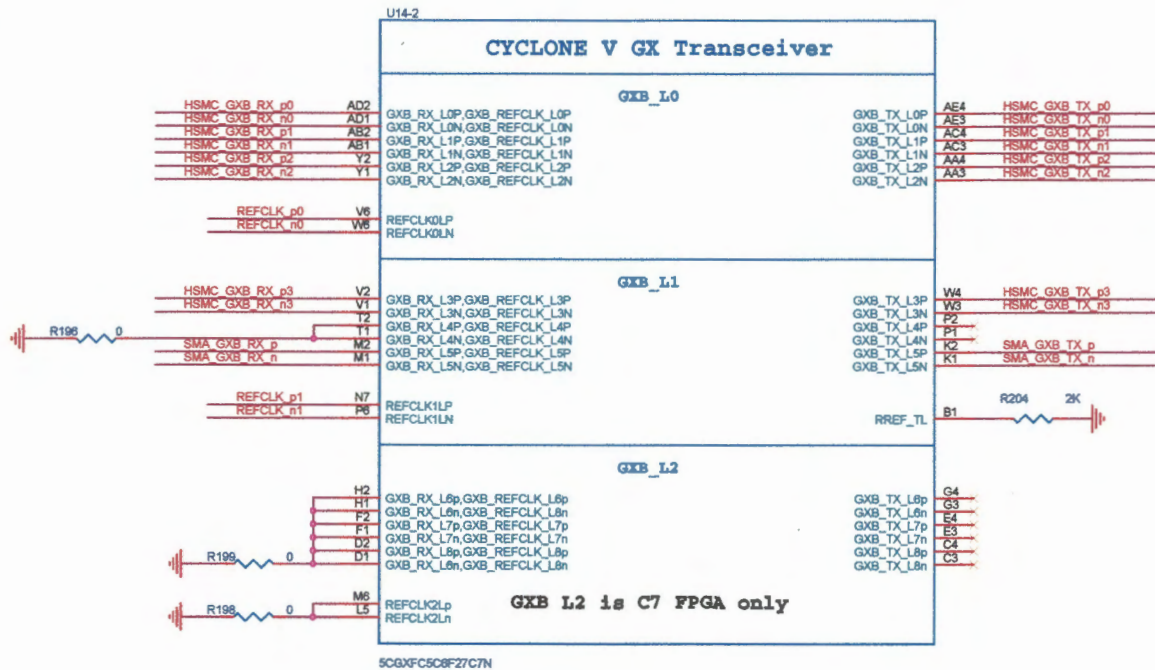
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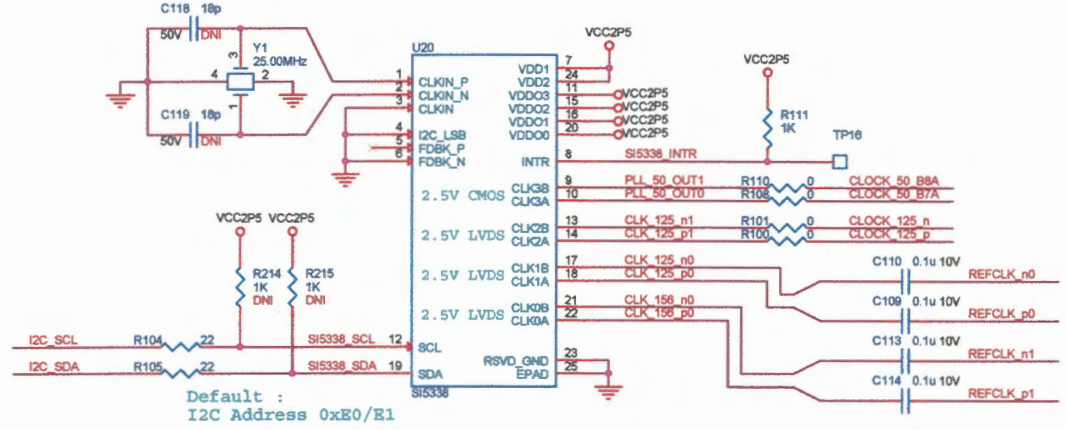
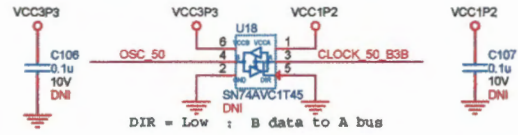
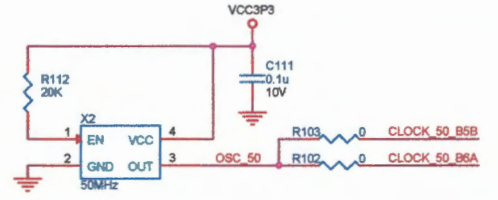
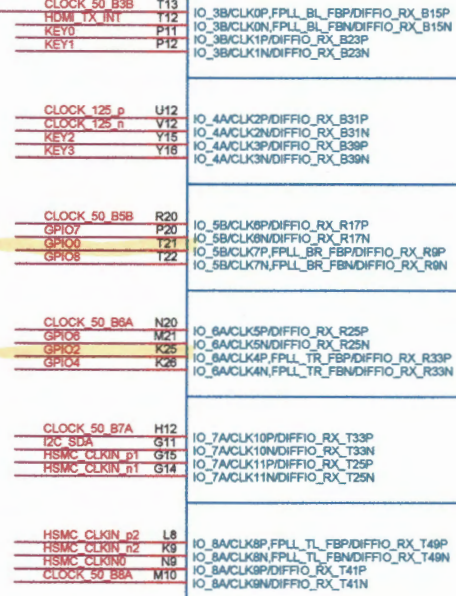
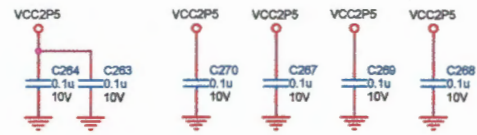
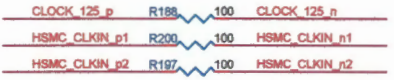
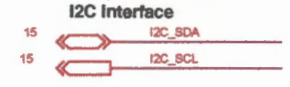
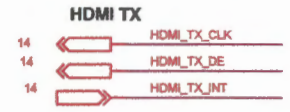
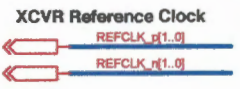
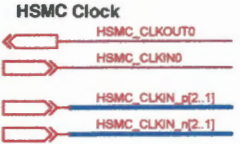
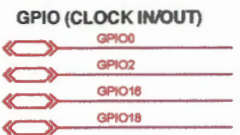
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Date: Wednesday, August 14, 2013	Sheet: 5 of 23	

**XCVR Reference Clock**



**HSMC Transceiver**

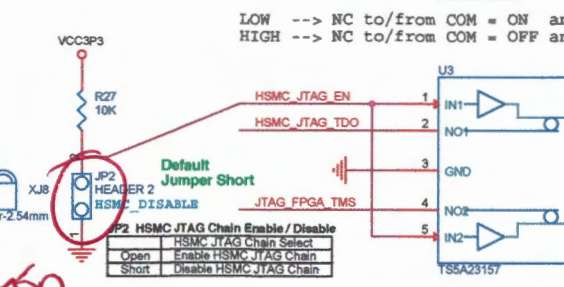
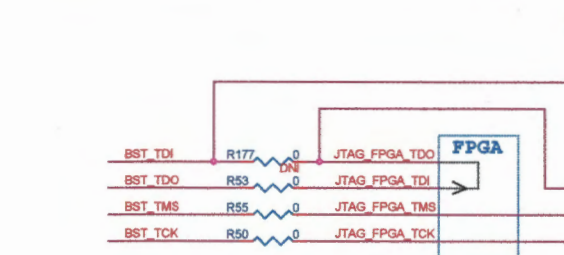
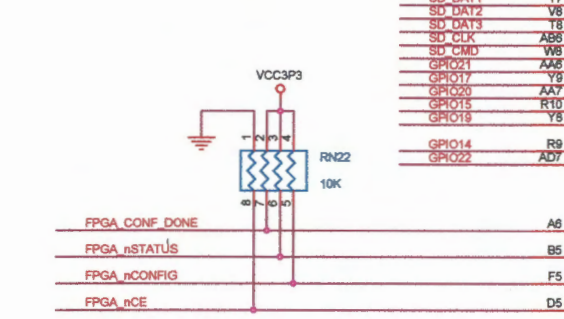
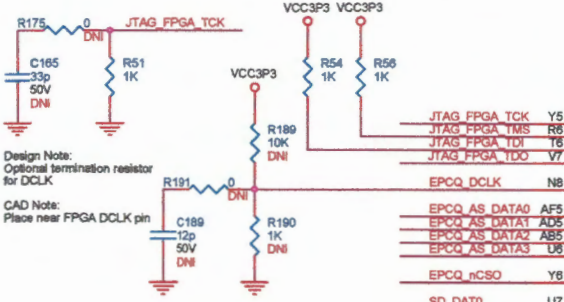
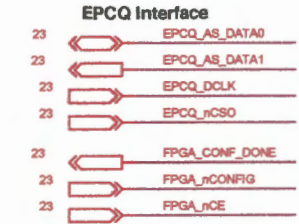
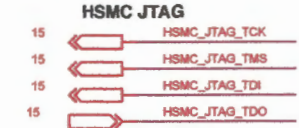
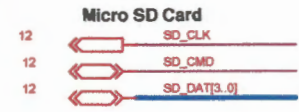
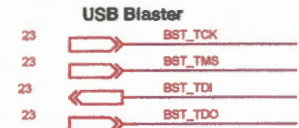




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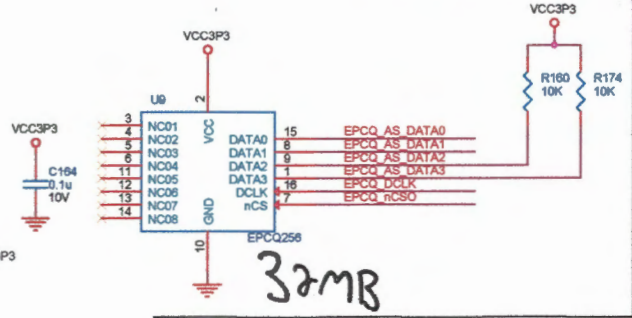
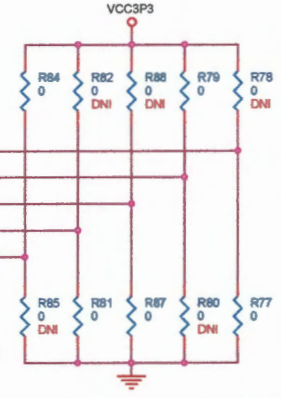
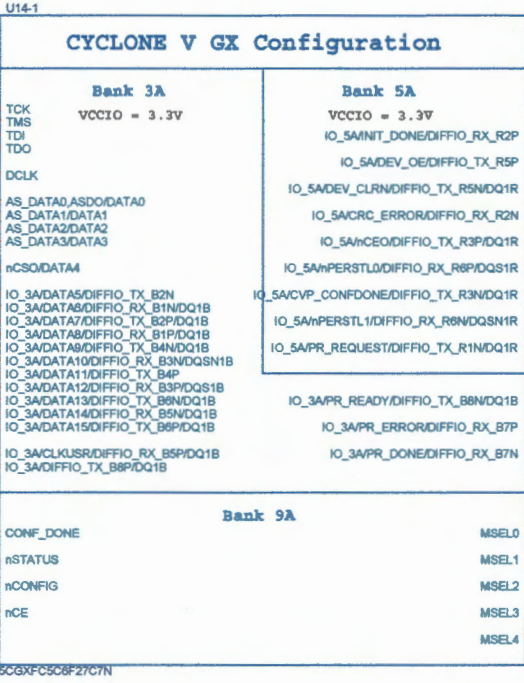
**Cyclone V GX Starter Kit**

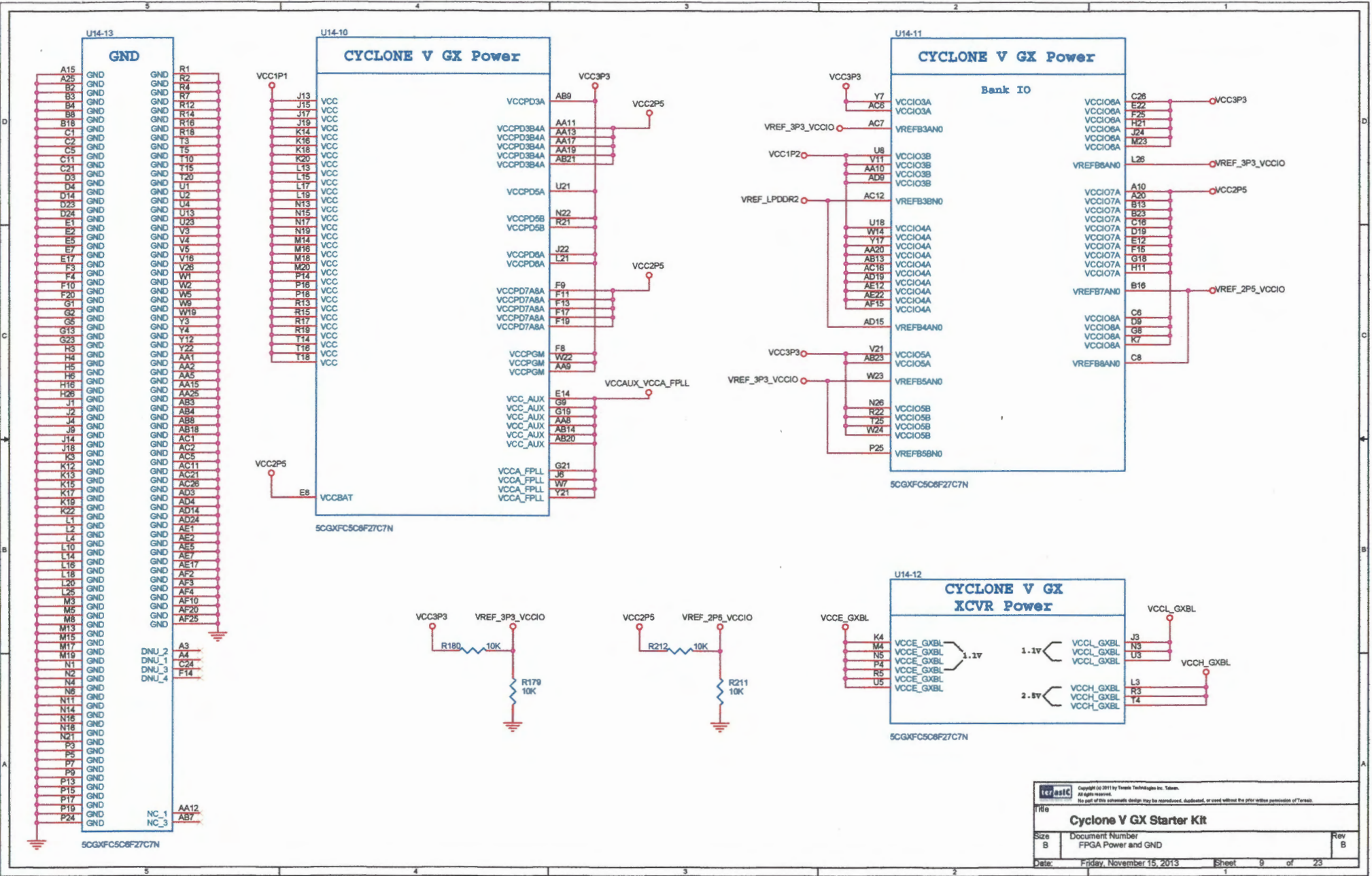
Size B	Document Number FPGA Clock	Rev B
Date:	Friday, November 15, 2013	Sheet 7 of 23



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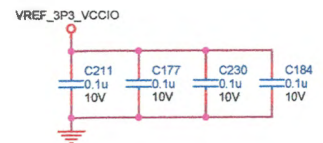
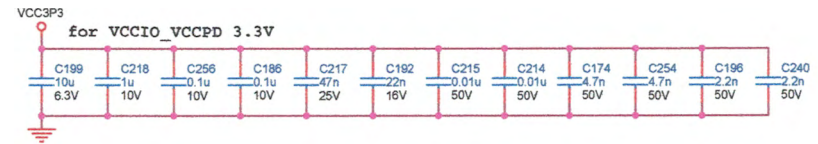
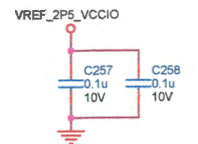
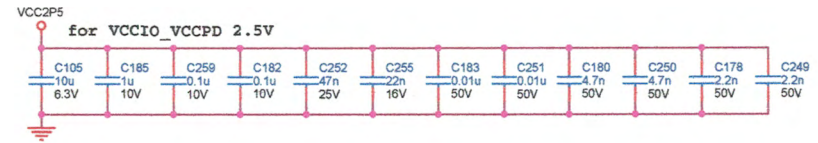
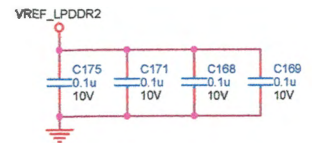
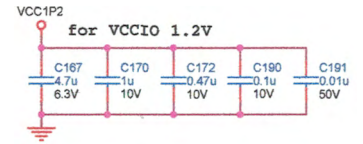
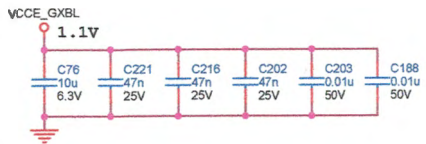
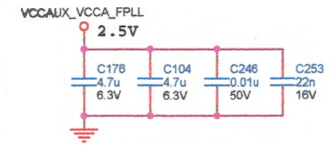
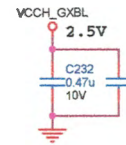
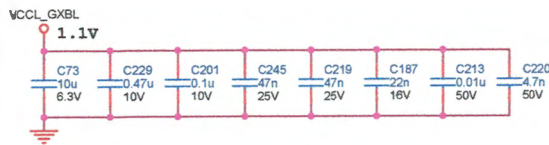
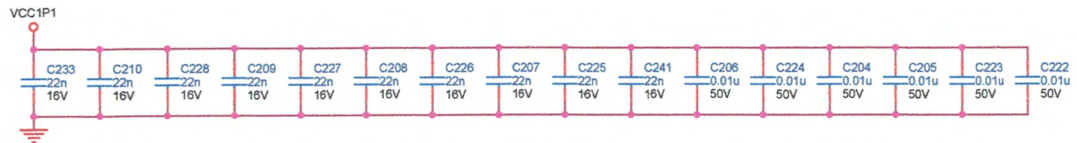
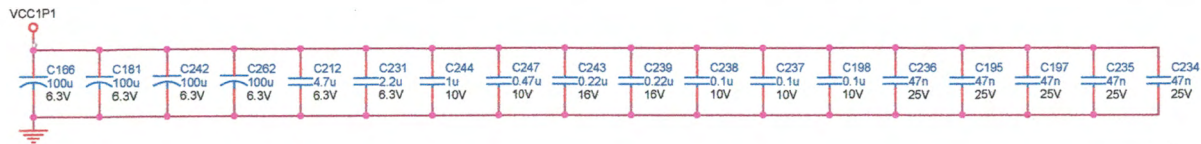
Default Jumper Short	
JP2 HEADER 2	HSMC_DISABLE
Open	Enable HSMC JTAG Chain
Short	Disable HSMC JTAG Chain





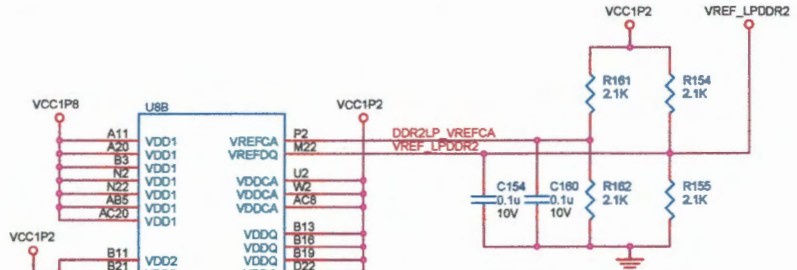
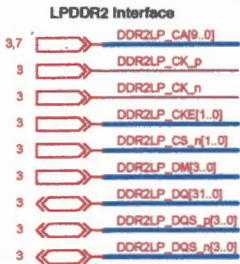
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<b>Title</b> Cyclone V GX Starter Kit			
<b>Size</b> B	<b>Document Number</b> FPGA Power and GND	<b>Rev</b> B	<b>Date:</b> Friday, November 15, 2013 <b>Sheet</b> 9 <b>of</b> 23



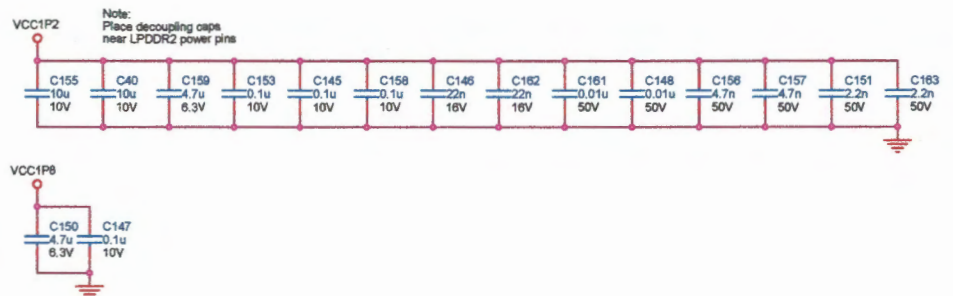


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Title	
<b>Cyclone V GX Starter Kit</b>	
Size	Document Number
B	FPGA Decoupling
Date:	Wednesday, August 14, 2013
Sheet	10 of 23
Rev	B

# LPDDR2 SDRAM (16M X 32 X 8 banks x 1 die)



Note: Place resistors and Capacitor near LPDDR2 VREFCA and VREFDQ pins

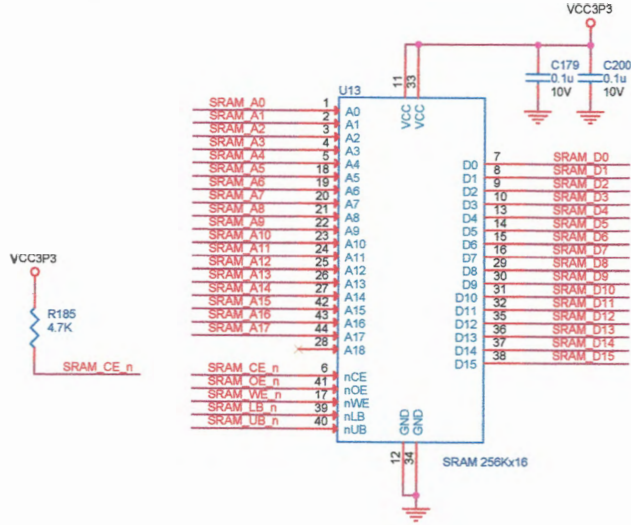
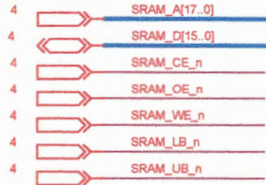


Note: Place decoupling caps near LPDDR2 power pins

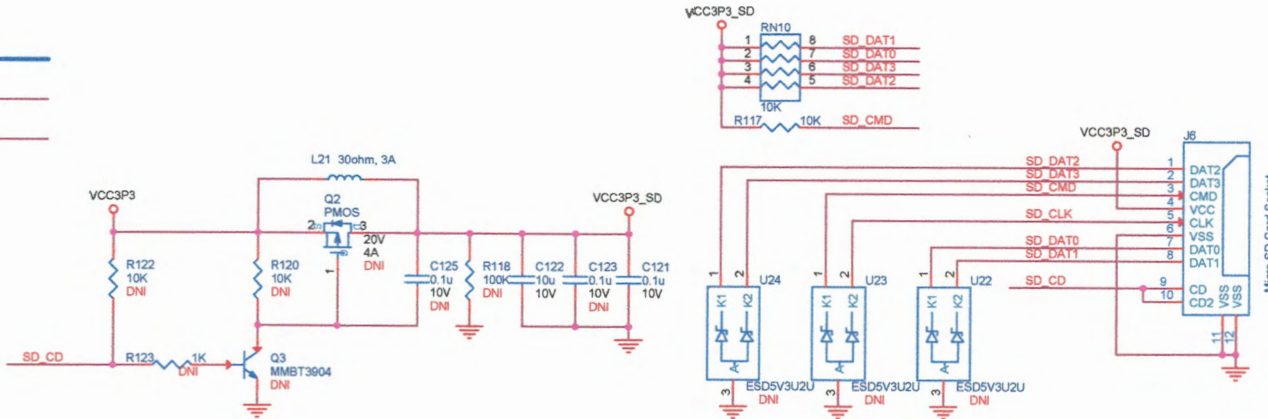
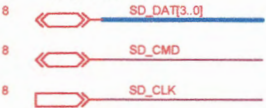
128M32  
16Mx32x8 banks  
512MB  
400MHz clock

lpddr2-pin-assignments.tcl  
After synthesis, before fitting

**SRAM**



**Micro SD Card**



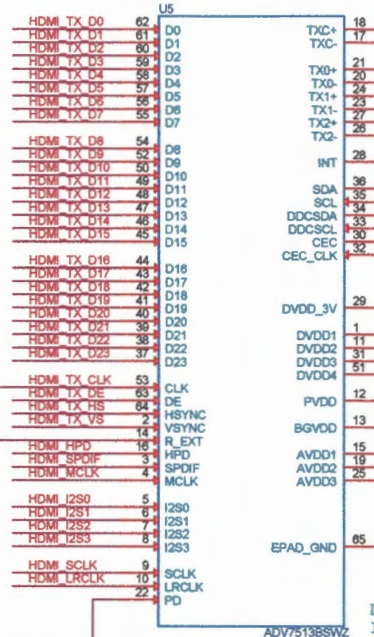
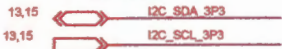
**HDMI TX**



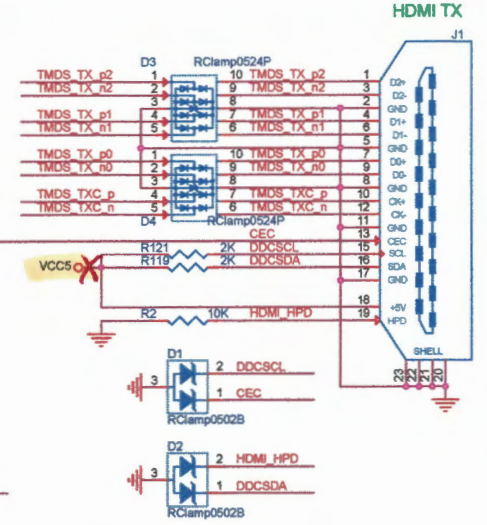
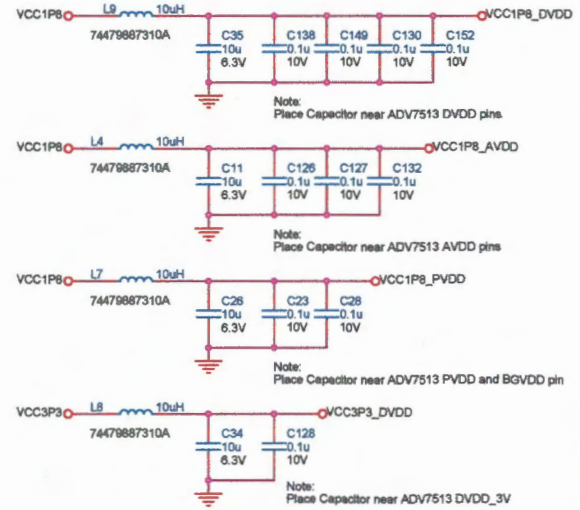
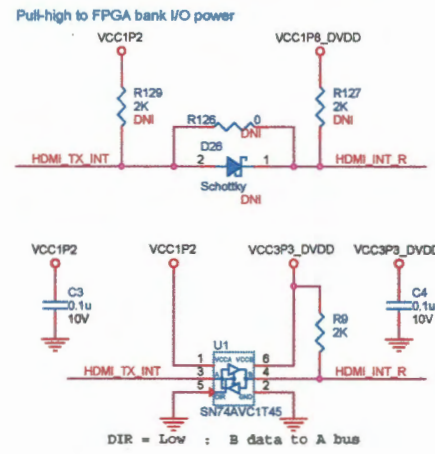
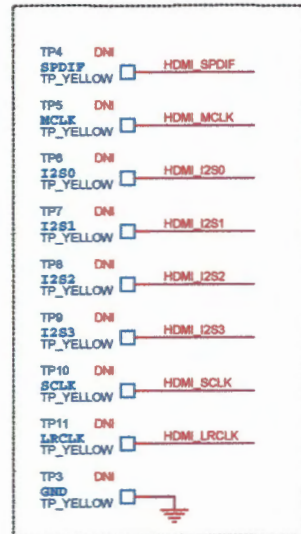
**From MAX**



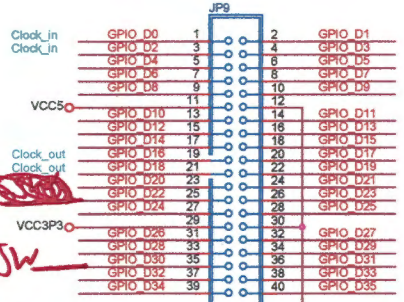
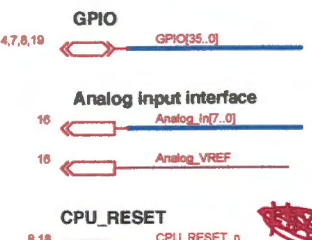
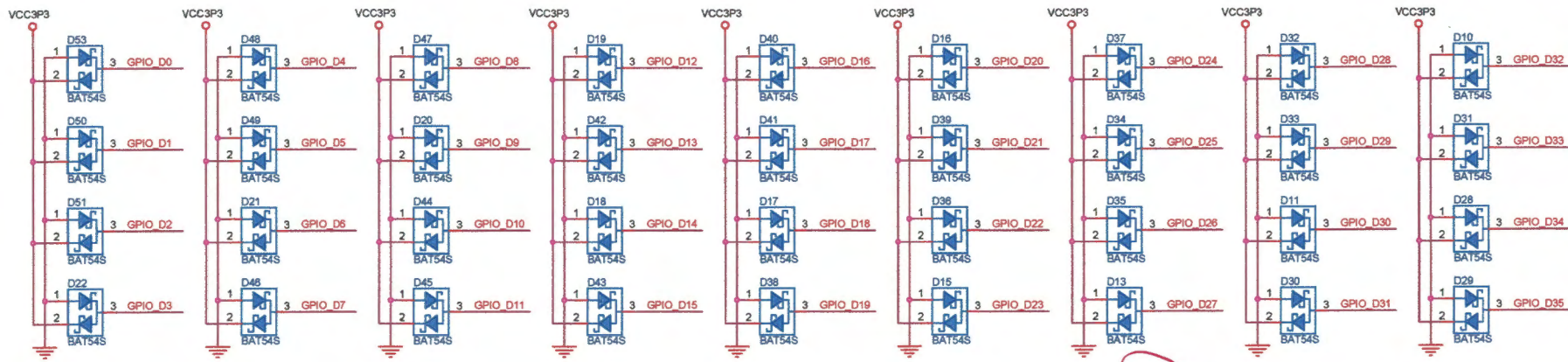
**I2C Interface**



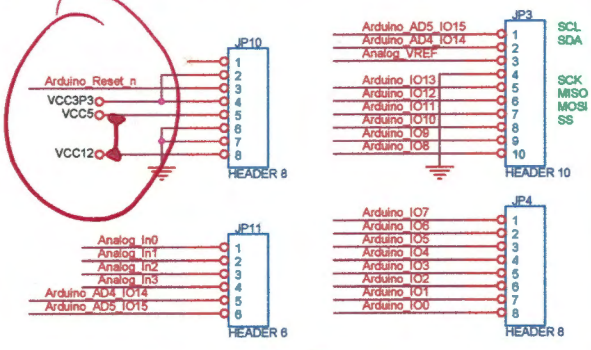
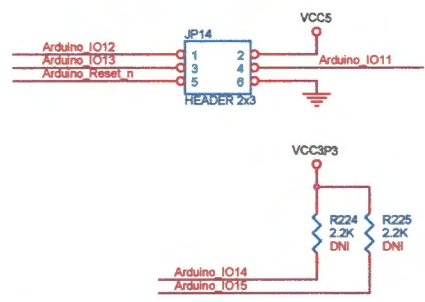
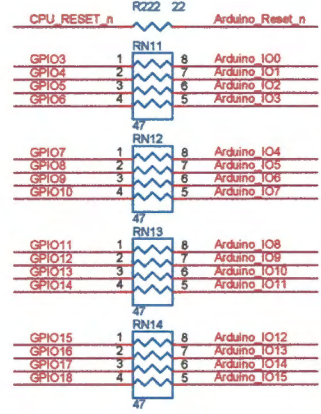
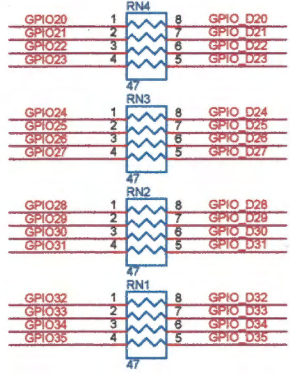
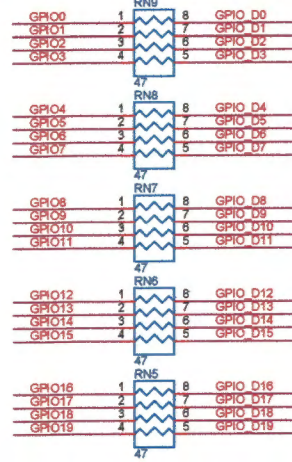
Default :  
I2C Address 0x72/0x73



**15V HDMI CONNECTION FROM TS3DV642 SWITCH BACK-POWERING G56. DISABLE 5V REGULATOR ON P2 J2**

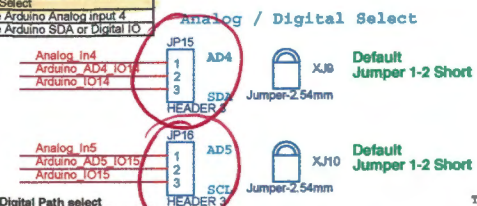


*HDMI SW*



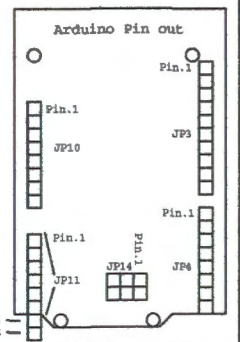
**JP15 Analog / Digital Path select**

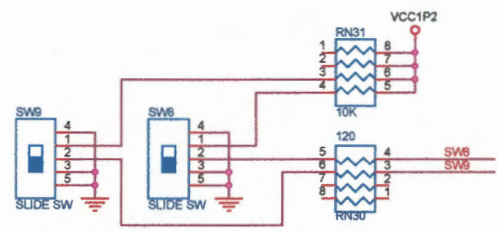
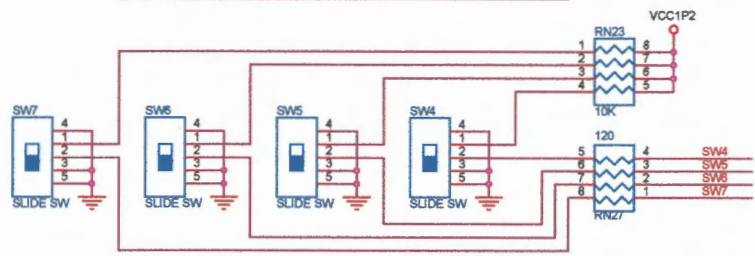
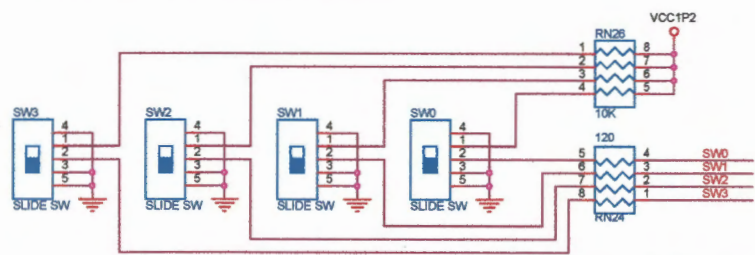
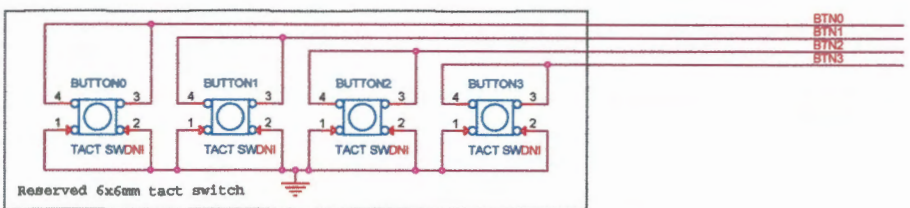
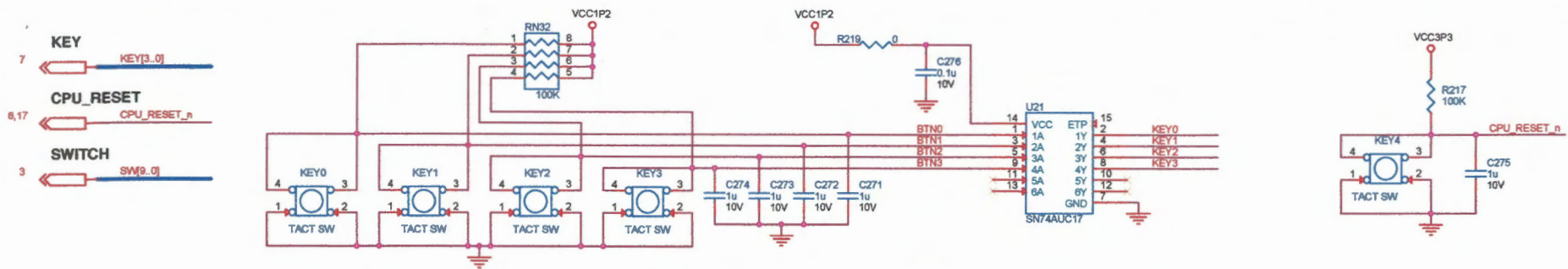
Open	No Select
1-2 Short	Use Arduino Analog input 4
2-3 Short	Use Arduino SDA or Digital IO



**JP16 Analog / Digital Path select**

Open	No Select
1-2 Short	Use Arduino Analog input 5
2-3 Short	Use Arduino SCL or Digital IO





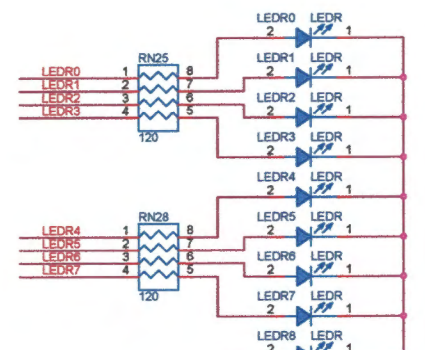
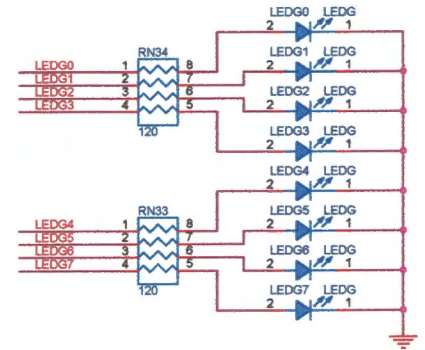
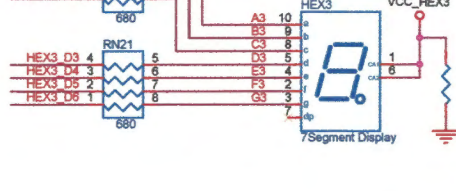
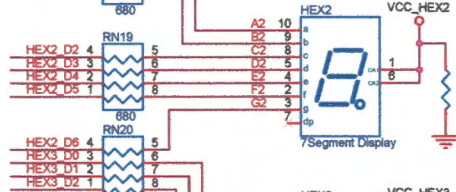
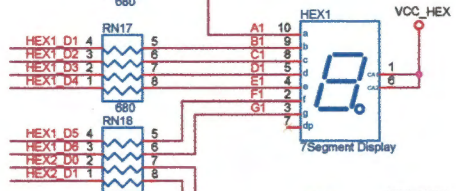
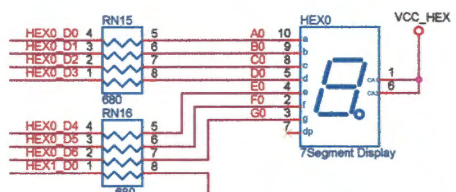
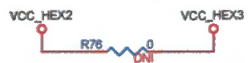
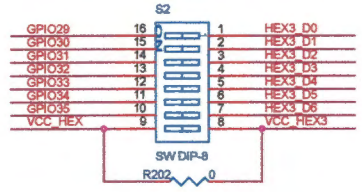
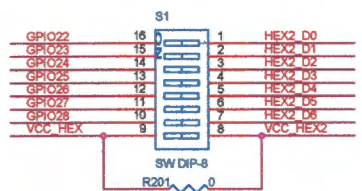
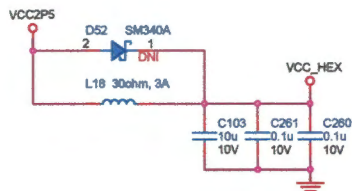
**7-Segment**



**7-Segment (share GPIO[35..22])**



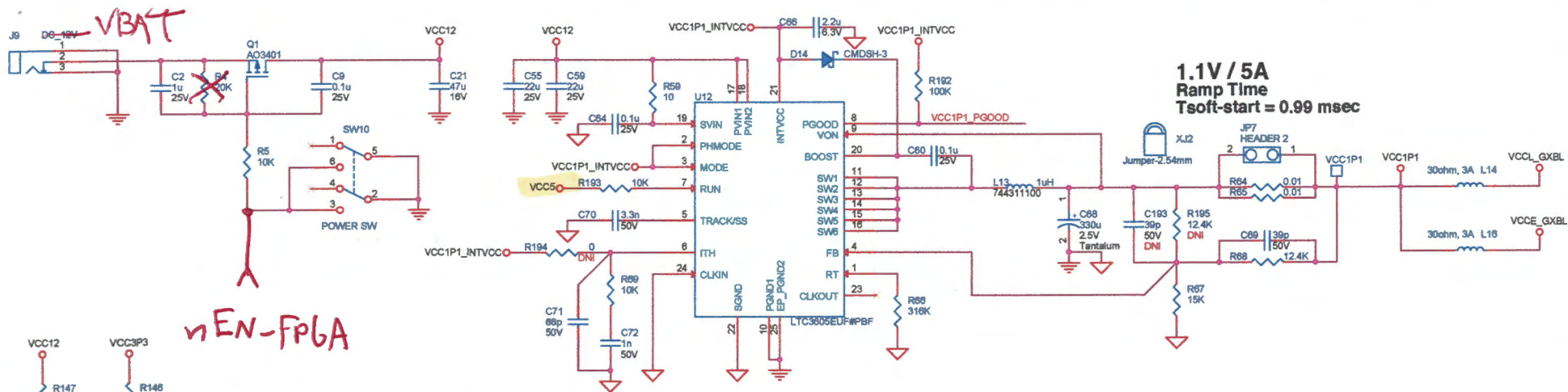
**LED**



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Title		
Cyclone V GX Starter Kit		
Size	Document Number	Rev
B	7-SEGMENT and LEDs	B
Date:	Friday, November 15, 2013	Sheet 19 of 23

4V MINIMUM INPUT VOLTAGE (FUNCTIONS TO 3.4V)

DOWN

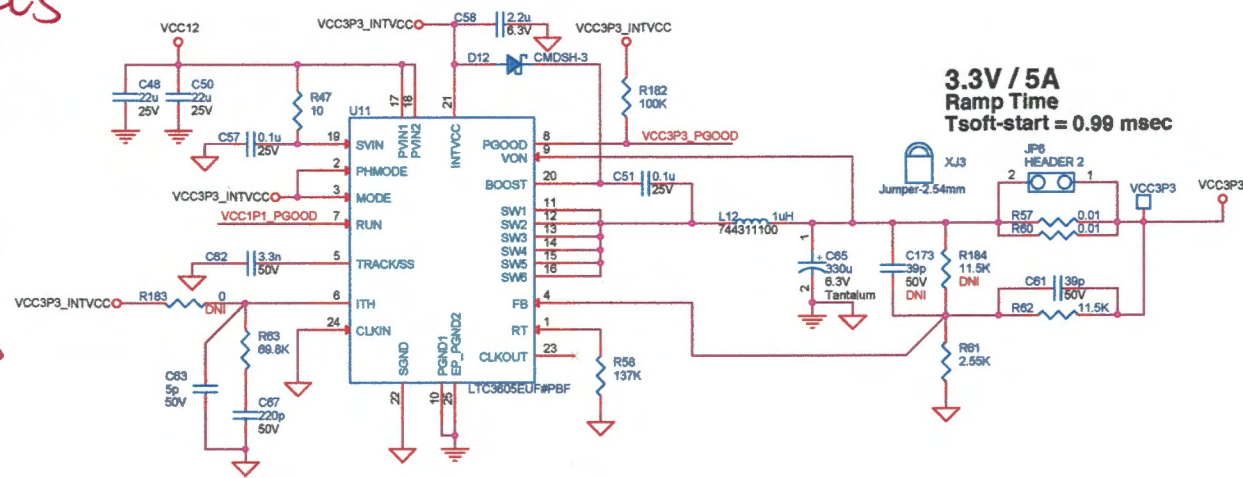


1.1V / 5A  
Ramp Time  
Tsoft-start = 0.99 msec

men-FPGA

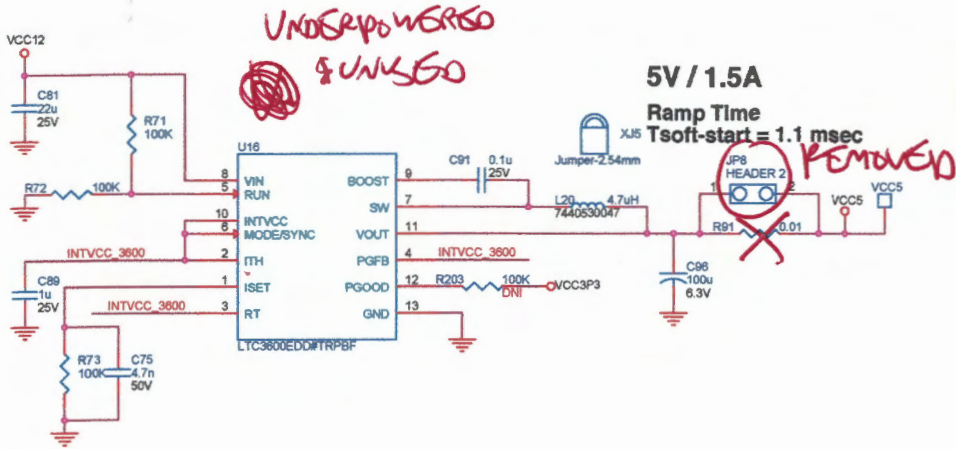
VCC12 VCC5

START TO  
ALLOW VBAT  
TO ENABLE  
REGULATORS



3.3V / 5A  
Ramp Time  
Tsoft-start = 0.99 msec

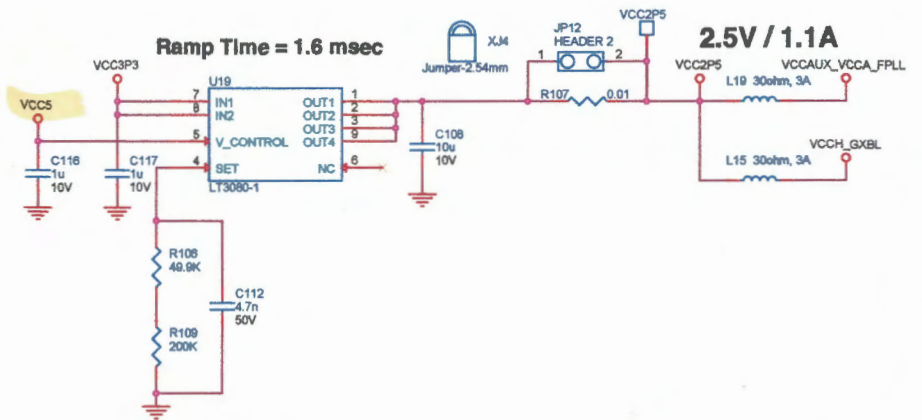




UNDERPOWERED  
& UNUSABLE

5V / 1.5A  
Ramp Time  
Tsoft-start = 1.1 msec

JP8 HEADER 2 REMOVED

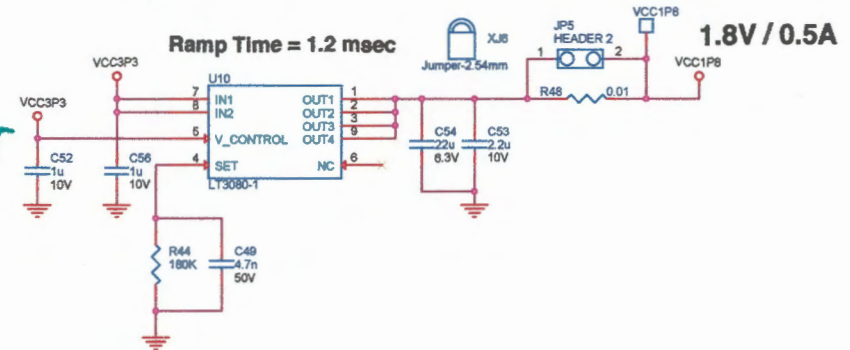


Ramp Time = 1.6 msec

2.5V / 1.1A

VCC5 USED FOR:  
- HDMI TX SV → USE SV FROM TARGET

- ✗ ADC
- ✗ GPIO/AROUND
- ✗ USB-to-UART

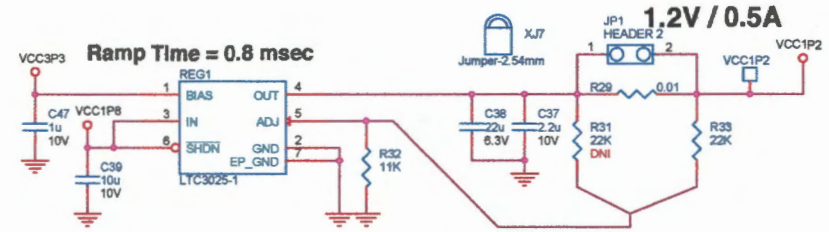


Ramp Time = 1.2 msec

1.8V / 0.5A

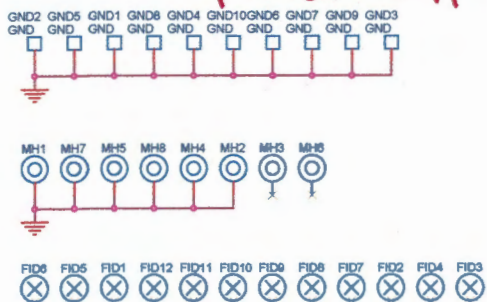
- POWER SUPPLY SEQUENCING

- MODIFY REGULATORS  
TO USE VBAT AS  
INPUT



Ramp Time = 0.8 msec

1.2V / 0.5A



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File: Cyclone V GX Starter Kit		
Size B	Document Number: Power - VCC5 & VCC1P2 & VCC1P8 & VCC2P5	Rev B
Date:	Wednesday, September 04, 2013	Sheet 22 of 23