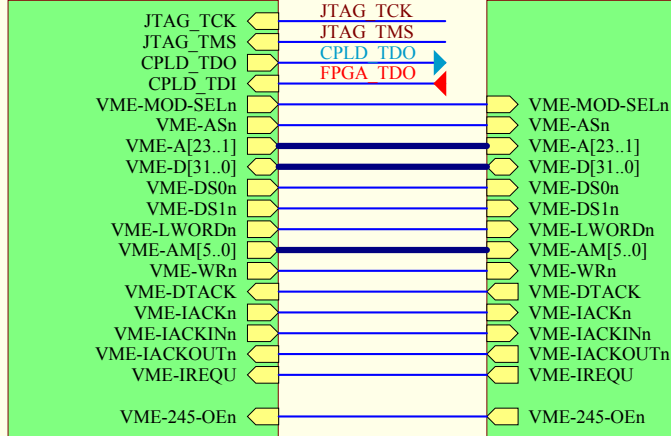


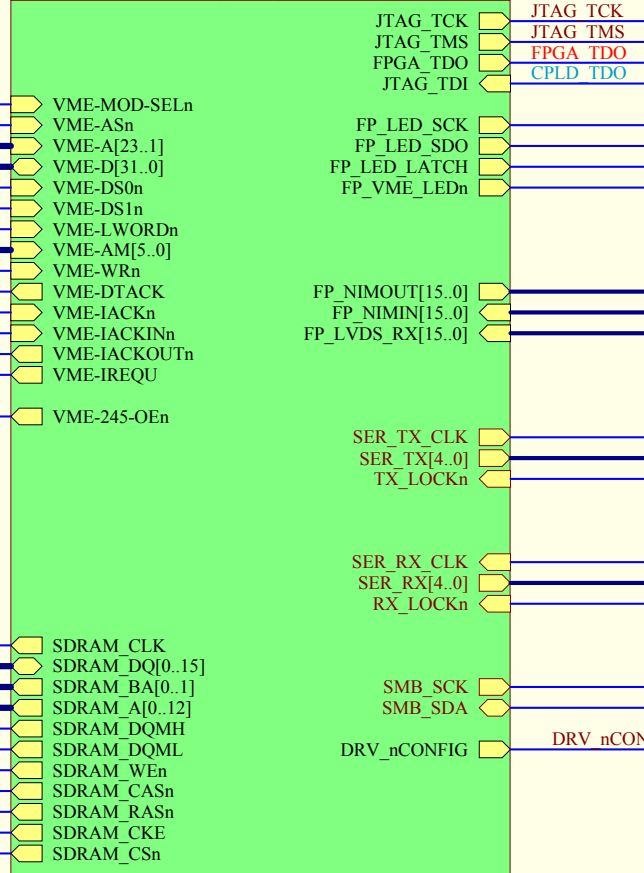
VME

VME-NIMIO32 Rev2 - VME Interface.SchDoc



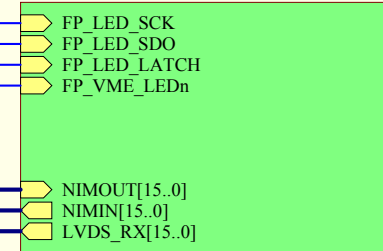
FPGA

VME-NIMIO32 Rev2 - Trigger Logic.SCHDOC



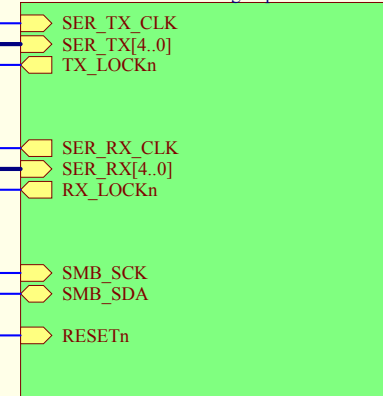
FP

VME-NIMIO32 Rev2 - Front Panel.SCHDOC



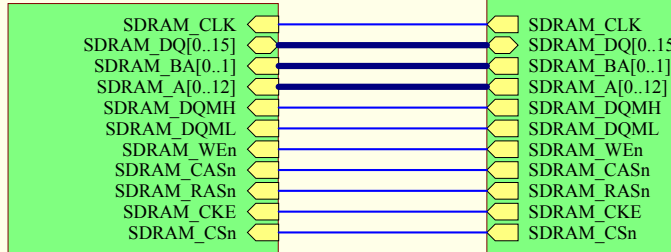
SERIAL

VME - NIMIO32 Rev2 - High Speed Serial.SchDoc



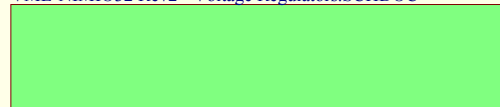
SDRAM

VME-NIMIO32 Rev2 - SDRAM.SCHDOC



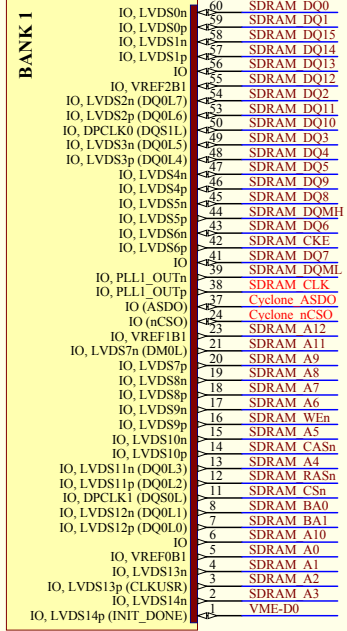
REG

VME-NIMIO32 Rev2 - Voltage Regulators.SCHDOC

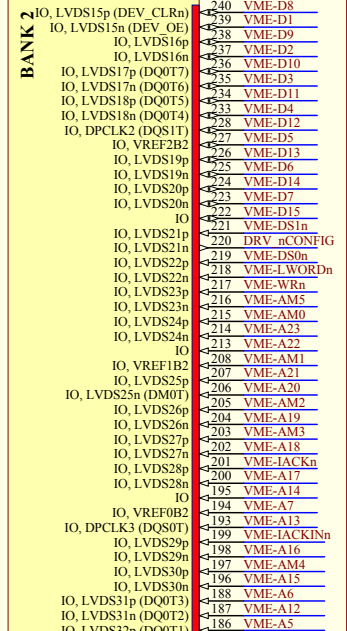


VME - NIMIO32 - Top Level			TRIUMF LOGO
Revision	Drawing #: 1		TRIUMF 4004 Westbrook Mall Vancouver, B.C. Canada V6T 2A3
2	Sheet #: 1 of 14	Size: A	
	Drawn by: D.Bishop	Date: 15/12/2011	
File: C:\Altium\VME-NIMIO32-Rev2\VME-NIMIO32 Rev2 - Top Level.SCHDOC			11:50:27 AM

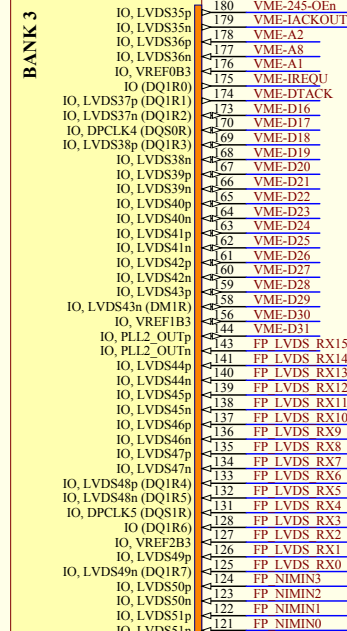
CY1A



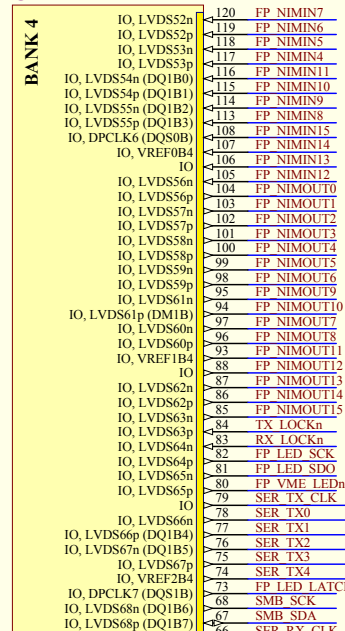
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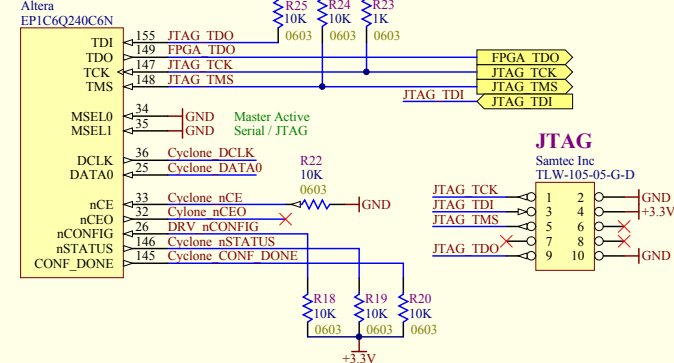
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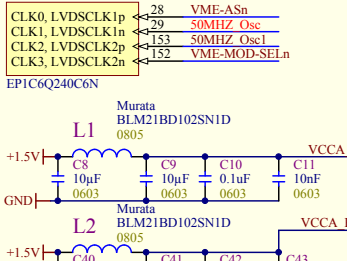
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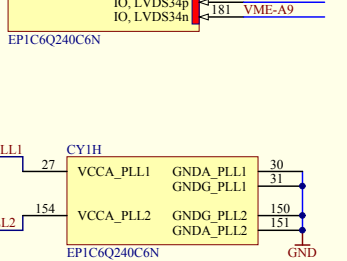
CY1E



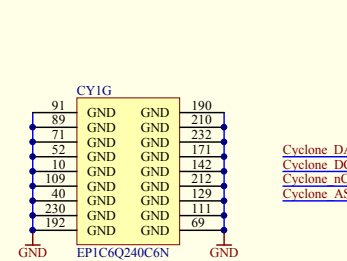
CY1H



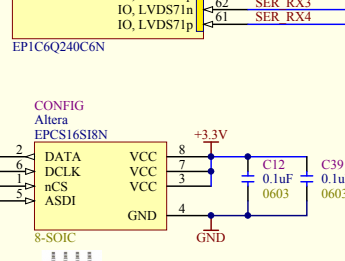
CY1I



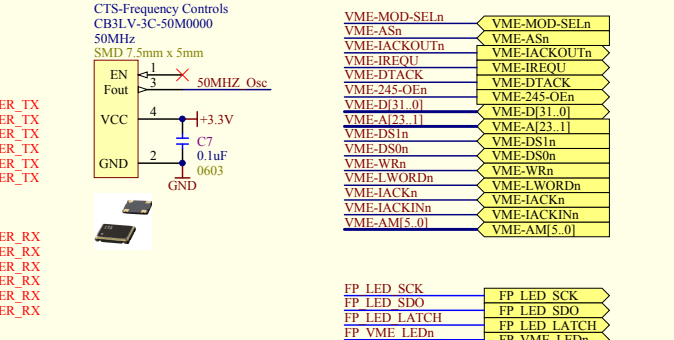
CY1G



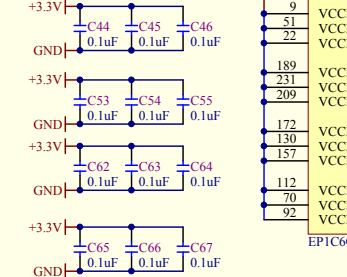
CY1F



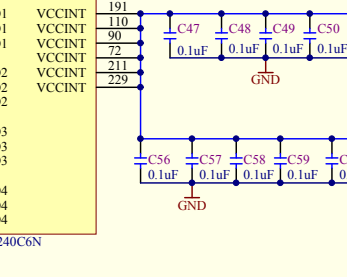
OSC1



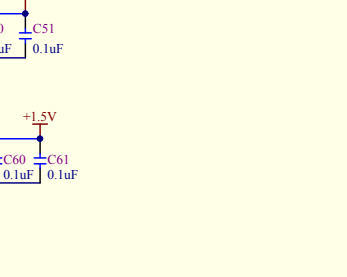
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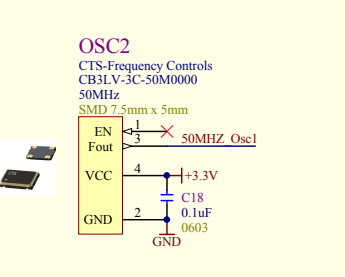
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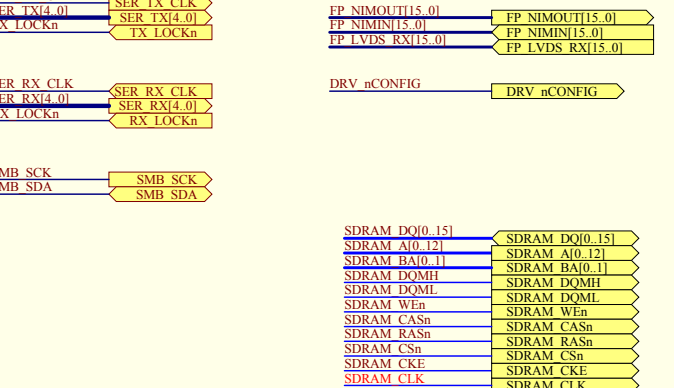
CY1X



OSC2

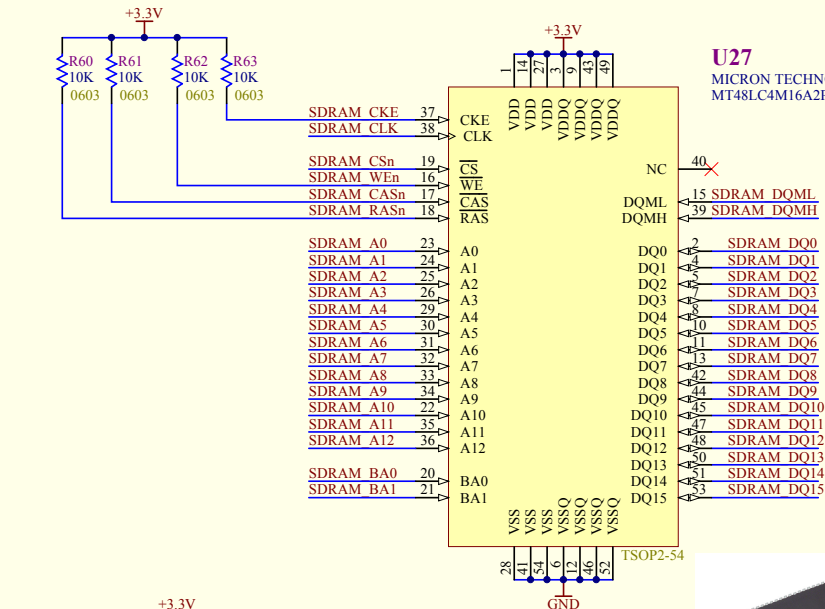


OSC3

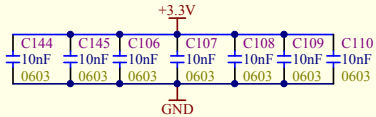
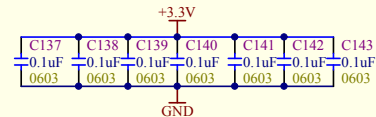
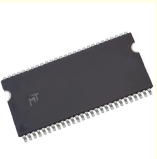


VME - NIMIO32 - Trigger Logic & VME Interface			
Revision	Sheet #:	Size:	TRIUMF
2	2 of 14	B	4004 Wesbrook Mall
	Drawn by: D.Bishop	Date: 15/12/2011	Vancouver, B.C.
			Canada
			v6T 2A3
			Cannot open file G:\ALTIMISCH_L1
			File: C:\Altium\VME-NIMIO32-Rev2\VME-NIMIO32 Rev2 - Trigger Logic.SCHDOC
			11:50:27 AM


SDRAM DQ[0..15]	SDRAM DQ[0..15]
SDRAM A[0..12]	SDRAM A[0..12]
SDRAM BA[0..1]	SDRAM BA[0..1]
SDRAM DQMH	SDRAM DQMH
SDRAM DQML	SDRAM DQML
SDRAM WEn	SDRAM WEn
SDRAM CASn	SDRAM CASn
SDRAM RASn	SDRAM RASn
SDRAM CSn	SDRAM CSn
SDRAM CKE	SDRAM CKE
SDRAM CLK	SDRAM CLK



U27
 MICRON TECHNOLOGY INC
 MT48LC4M16A2P-75:G TR

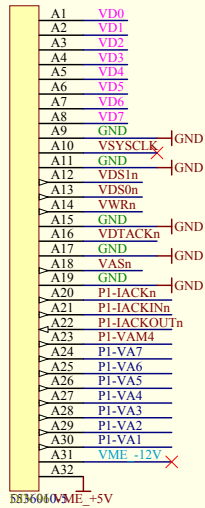


VME - NIMIO32 - SDRAM

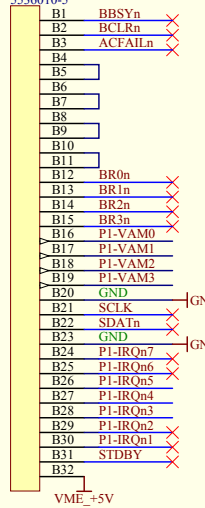
Revision 2	Drawing #: 3	<i>TRIUMF</i> 4004 Westbrook Mall Vancouver, B.C. Canada V6T 2A3	
	Sheet #: 3 of 14		
	Drawn by: D.Bishop	Date: 15/12/2011	
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A32815-ND

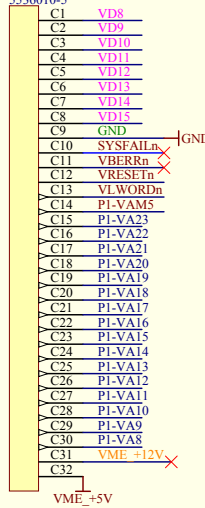
P1A
Tyco Electronics



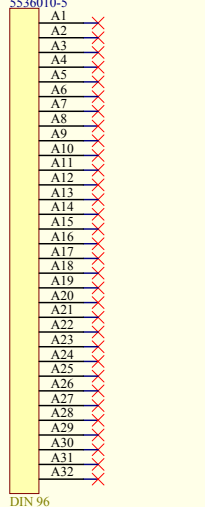
P1B
Tyco Electronics



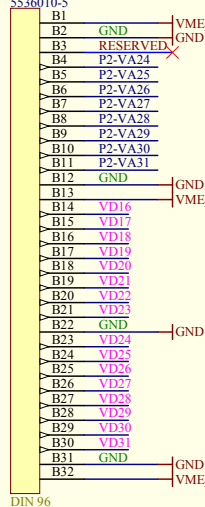
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Tyco Electronics



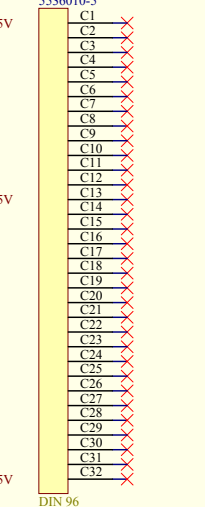
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Tyco Electronics



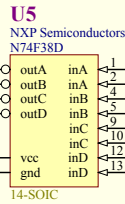
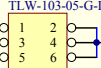
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Tyco Electronics



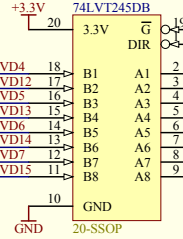
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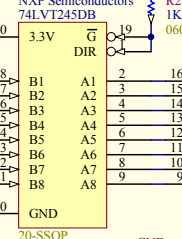
IrqSel
Samtec Inc



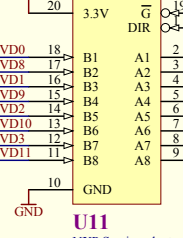
U4
NXP Semiconductors



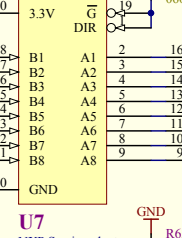
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NXP Semiconductors



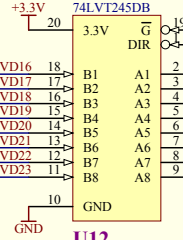
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NXP Semiconductors



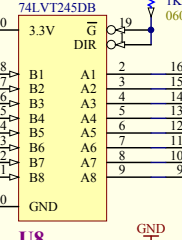
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NXP Semiconductors



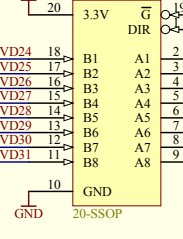
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NXP Semiconductors



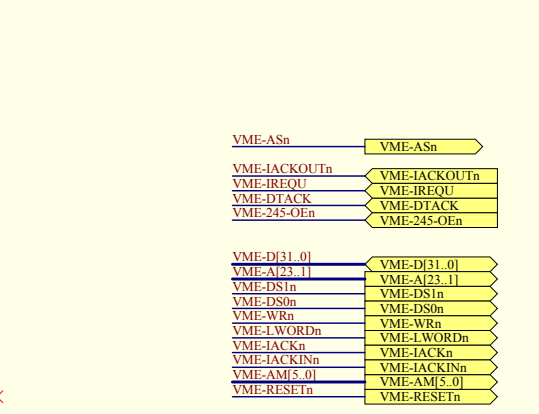
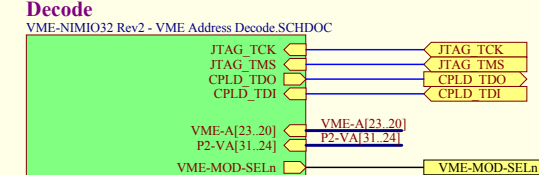
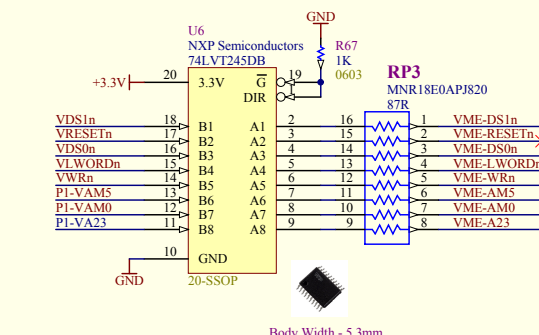
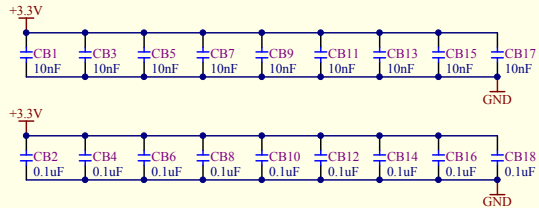
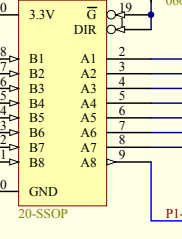
U7
NXP Semiconductors



U12
NXP Semiconductors



U8
NXP Semiconductors



VME - NIMIO32 - VME Interface			
Revision	Drawing #:	TRUMF	
2	Sheet #:	4 of 14	4004 Wesbrook Mall
	Size:	B	Vancouver, B.C.
	Drawn by:	Hubert Hui	Canada
	Date:	15/12/2011	V6T 2A3
File: C:\Altium\VME-NIMIO32-Rev2\VME-NIMIO32 Rev2 - VME Interface.SchDoc			
11:50:27 AM			

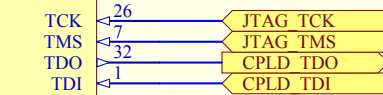
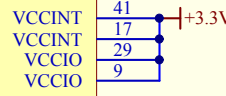
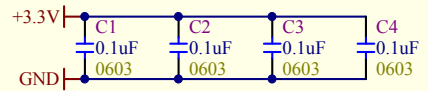
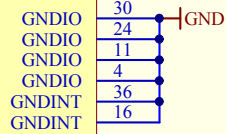
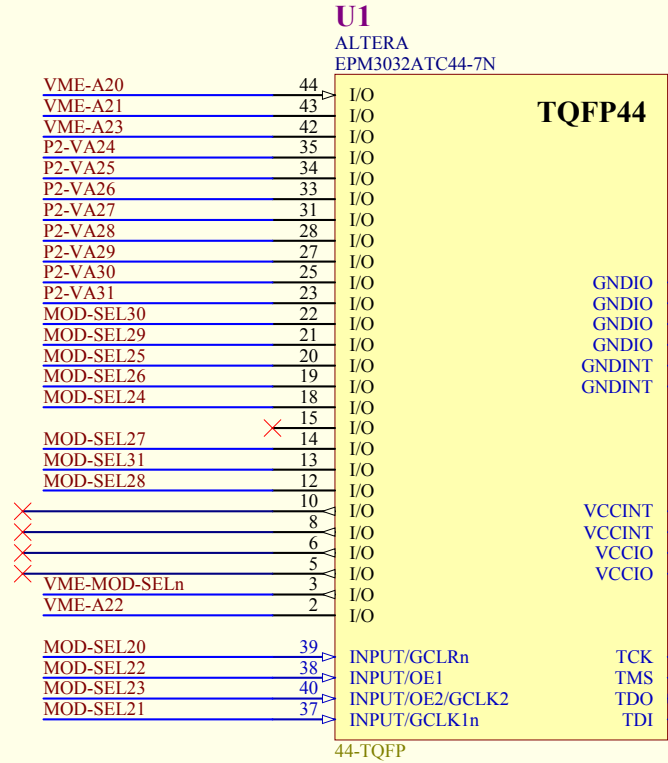
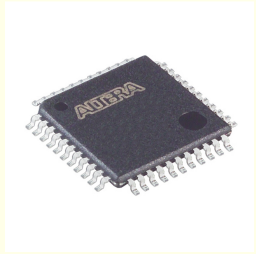
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 VME-A[23..20] → VME-A[23..20]

VME-MOD-SELn → VME-MOD-SELn

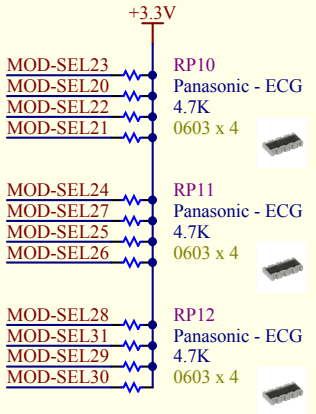
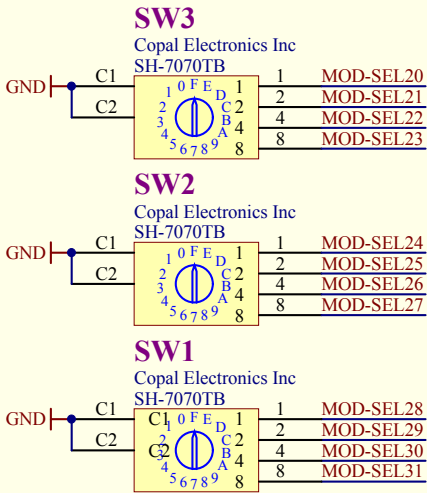
COPAL ELECTRONICS

SH-7000
 ROTARY CODED SWITCHES (SMD)

● SH-7050B (Real code)
 ● SH-7070B (Complementary code)



44-TQFP



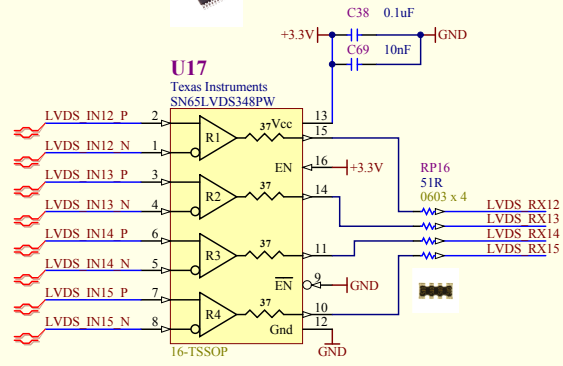
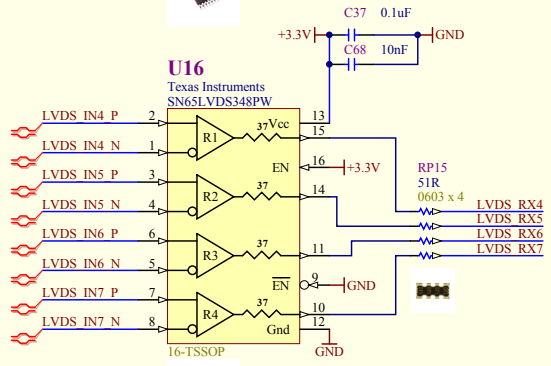
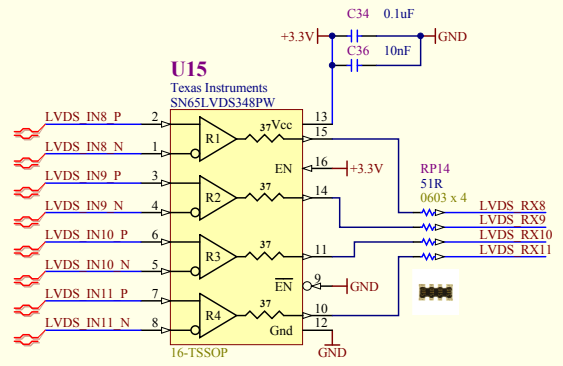
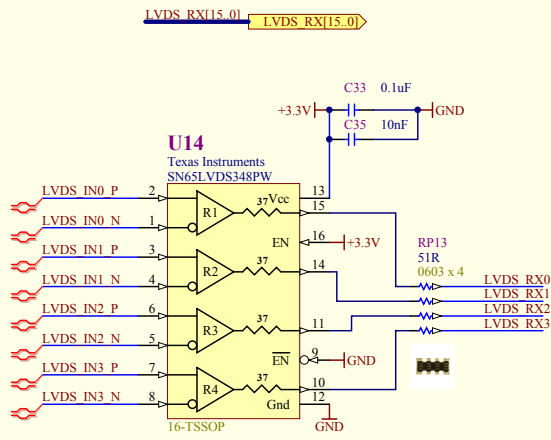
CODE FORMAT

No. of positions	16 positions																
	Position	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Real code	8																
	4																
	2																
	1																
Complementary code	8																
	4																
	2																
	1																
Gray code	8																
	4																
	2																
	1																

●...Contact closed

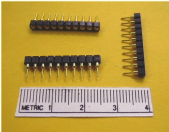
VME - NIMIO32 - VME Address Decode

Revision	Drawing #: 5	TRIUMF 4004 Wesbrook Mall Vancouver, B.C. Canada V6T 2A3	
2	Sheet #: 5 of 14		
	Size: A		
	Drawn by: D.Bishop	Date: 15/12/2011	
File: C:\Altium\VME-NIMIO32-Rev2\VME-NIMIO32 Rev2 - VME Address Decode.SCHDOC			11:50:27 AM

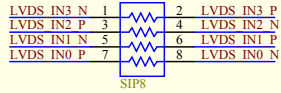


SAMTEC Sockets
SS-108-G-2

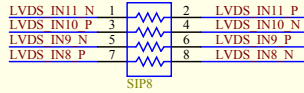
STORES: 1-1/01026



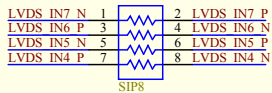
TERM1
CTS Resistor Products
77083101P
100R



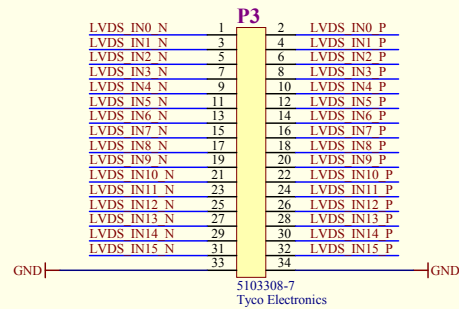
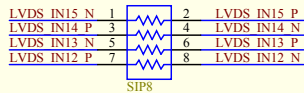
TERM3
CTS Resistor Products
77083101P
100R



TERM2
CTS Resistor Products
77083101P
100R

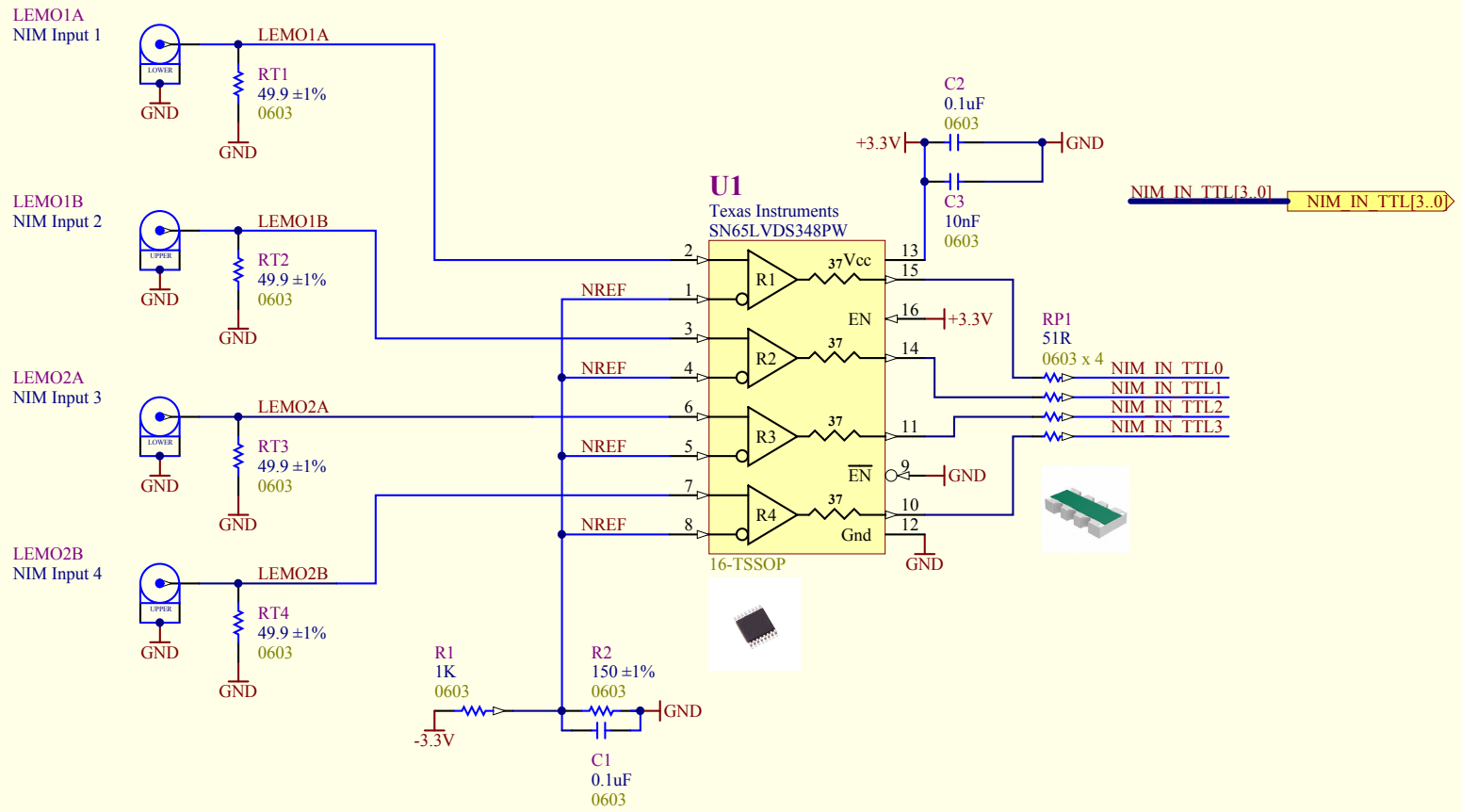


TERM4
CTS Resistor Products
77083101P
100R

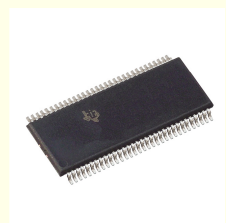
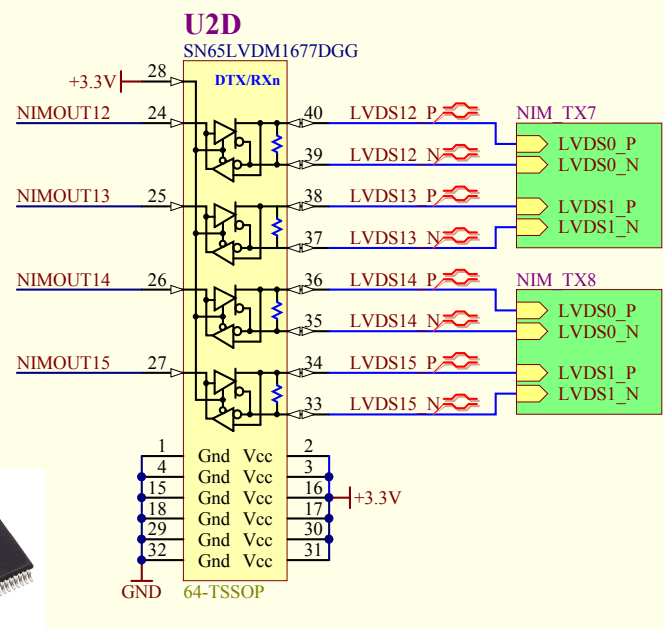
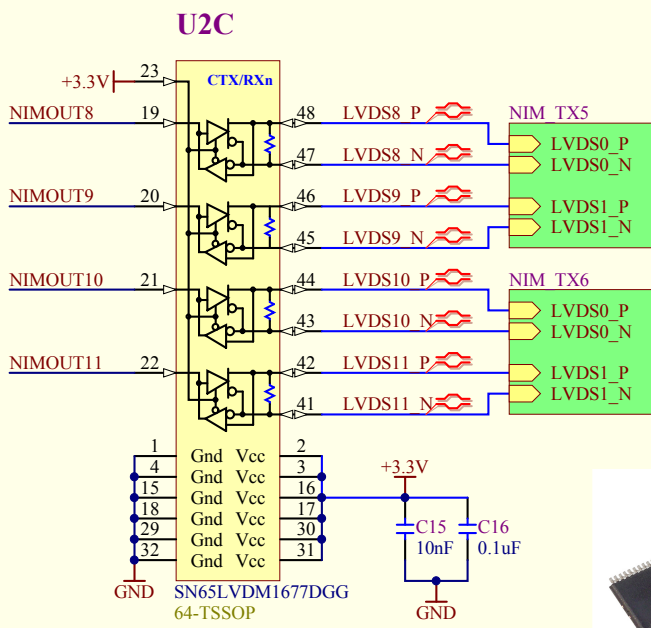
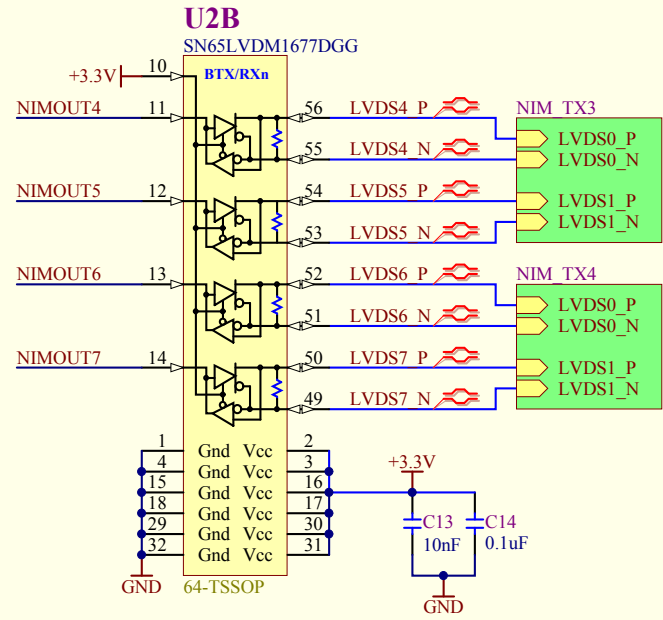
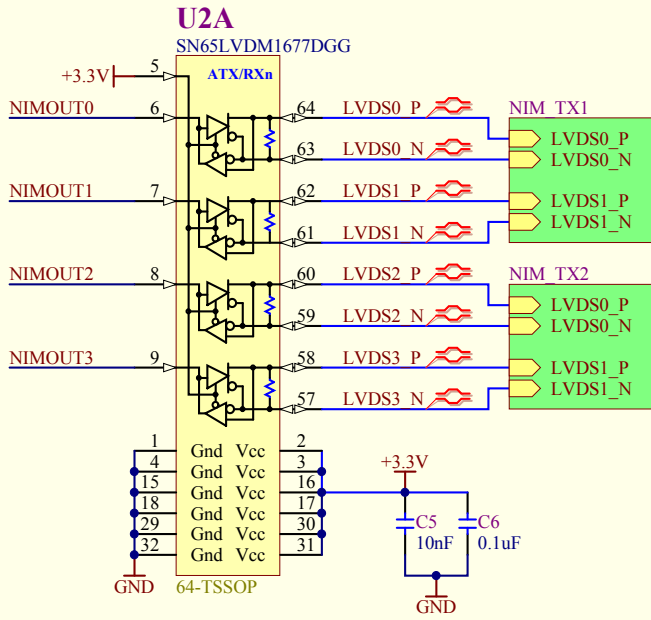


VMEIO - NIMIO32 - LVDS / ECL Input


Revision	Drawing #:	TRIUMF	Cannot open file
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Drawn by: D.Bishop	Size: B	Vancouver, B.C.	ROTEL\SC
Date: 15/12/2011		Canada	Rev: 1 00000001
		V6T 2A3	
File: C:\Altium\VME-NIMIO32-Rev2\VME - NIMIO32 Rev2 - LVDS_IN.SchDoc			11:50:28 AM



VMEIO - NIMIO32 - NIM INPUT				
Revision	Drawing #: 7		TRIUMF 4004 Wesbrook Mall Vancouver, B.C. Canada V6T 2A3	
2	Sheet #: 7	of 14		Size: A
	Drawn by: D.Bishop			Date: 15/12/2011
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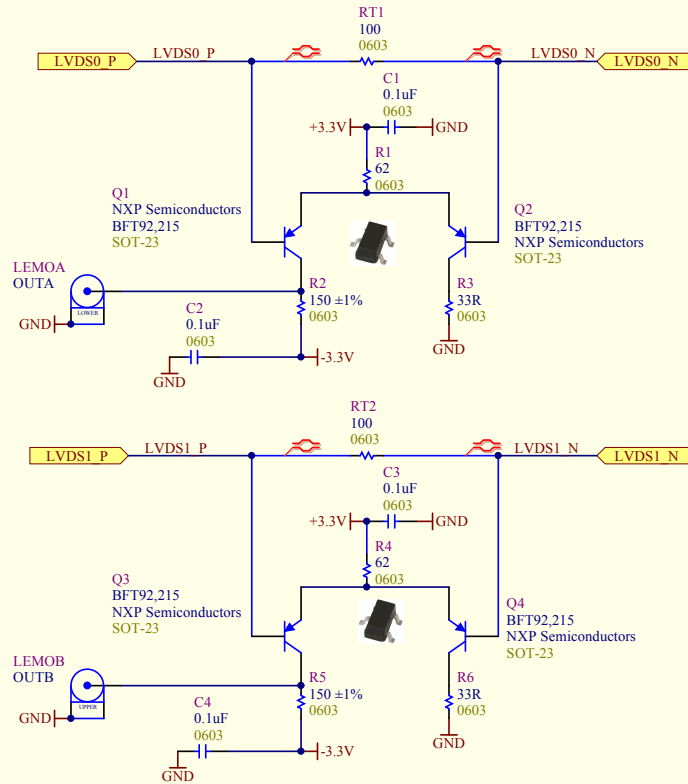
NIMOUT[15..0] → NIMOUT[15..0]

VMEIO - NIMIO32 - LVDS / ECL Input			
Revision	Drawing #: 8		TRIUMF 4004 Wesbrook Mall Vancouver, B.C. Canada V6T 2A3
2	Sheet #: 8 of 14	Size: A	
	Drawn by: D.Bishop	Date: 15/12/2011	
File: C:\Altium\VME-NIMIO32-Rev2\VME - NIMIO32 Rev2 - NIMOUT.SchDoc			
			11:50:28 AM

CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I _{CB0}	collector cut-off current	I _E = 0; V _{CB} = -10 V;	-	-	-50	nA
h _{FE}	DC current gain	I _C = -14 mA; V _{CE} = -10 V	20	50	-	
f _r	transition frequency	I _C = -14 mA; V _{CE} = -10 V; f = 500 MHz	-	5	-	GHz
C _c	collector capacitance	I _E = I _B = 0; V _{CB} = -10 V; f = 1 MHz	-	0.75	-	pF
C _e	emitter capacitance	I _C = I _E = 0; V _{EB} = -0.5 V; f = 1 MHz	-	0.8	-	pF
C _{re}	feedback capacitance	I _C = -2 mA; V _{CE} = -10 V; f = 1 MHz	-	0.7	-	pF
G _{UM}	maximum unilateral power gain (note 1)	I _C = -14 mA; V _{CE} = -10 V; f = 500 MHz; T _{amb} = 25 °C	-	18	-	dB
F	noise figure	I _C = -5 mA; V _{CE} = -10 V; f = 500 MHz; T _{amb} = 25 °C	-	2.5	-	dB
V _o	output voltage	note 2	-	150	-	mV



Cyclone - LVDS


Output Offset Voltage

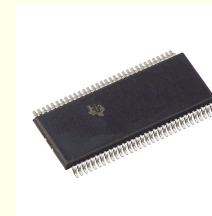
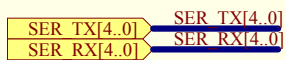
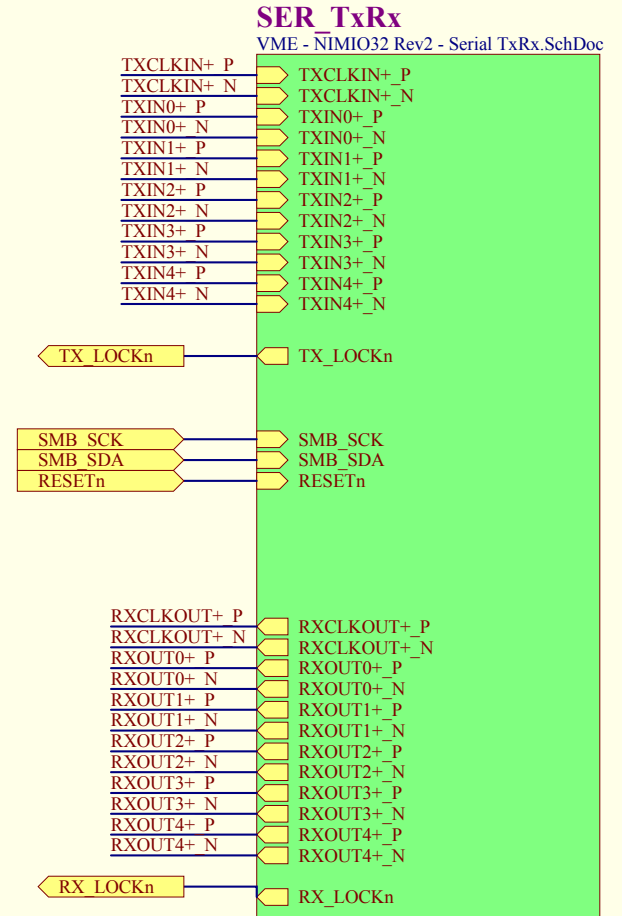
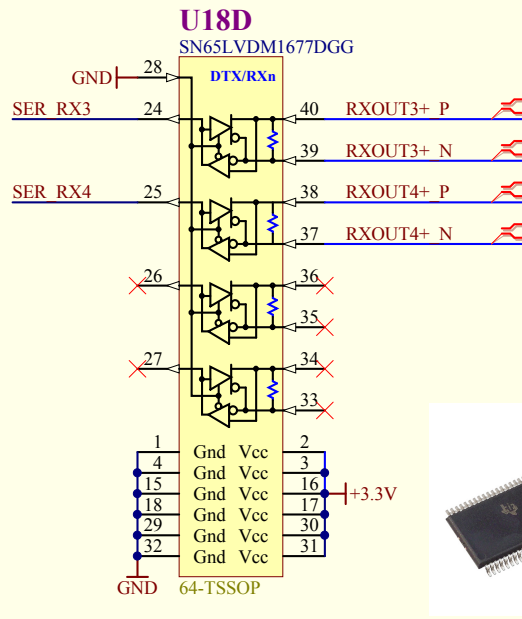
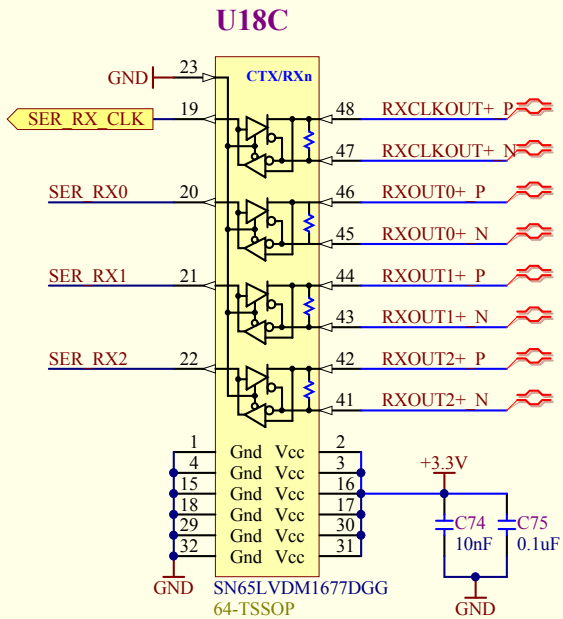
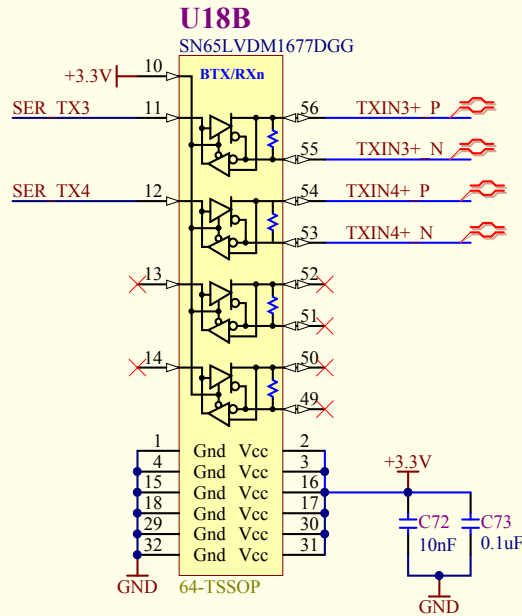
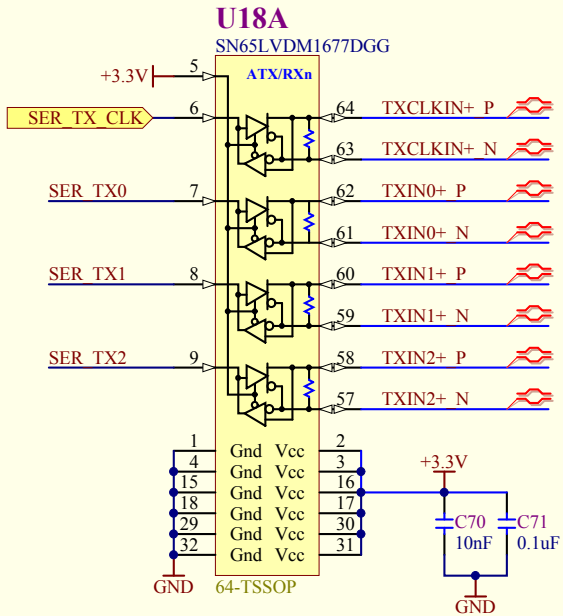
V_{os} Max: 1.375
 V_{os} Typ: 1.25
 V_{os} Min: 1.125

Diff Output Voltage

V_{od} Min: 250mv
 V_{od} Max: 600mv

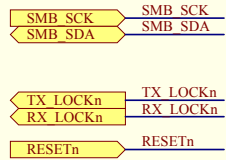
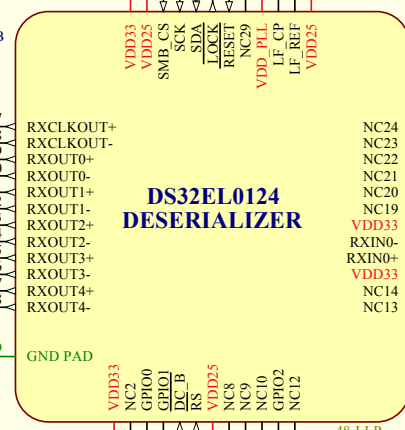
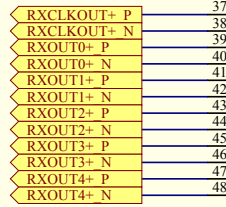
VME - NIMIO32 - LVDS to NIM Converter

Revision	Drawing #: 9	TRUMF	
2	Sheet #: 9 of 14	4004 Wesbrook Mall Vancouver, B.C. Canada	
Drawn by: D.Bishop	Date: 15/12/2011	V6T 2A3	
File: C:\Altium\VME-NIMIO32-Rev2\VME-NIMIO32 Rev2 - LVDS to NIM.SCHDOC		11:50:28 AM	

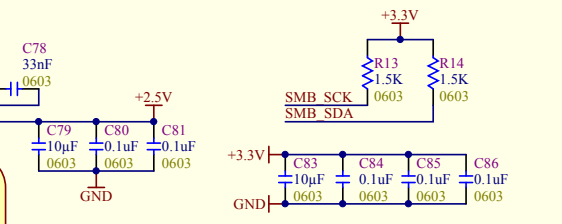
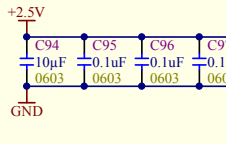
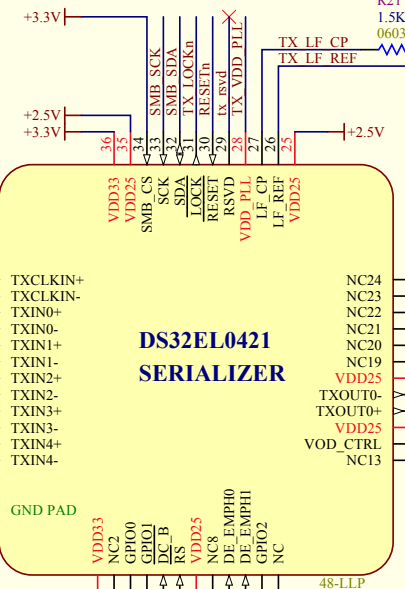
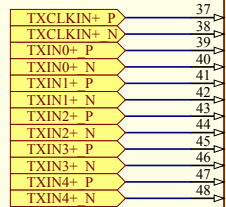


VMEIO - NIMIO32 - High Speed Serial			
Revision	Drawing #: 10		TRIUMF
2	Sheet #: 10 of 14		4004 Wesbrook Mall
	Size: A		Vancouver, B.C.
Drawn by: D.Bishop		Date: 15/12/2011	Canada
			V6T 2A3
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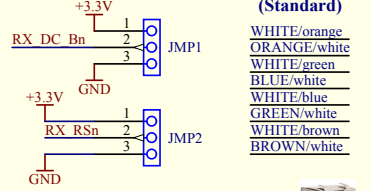
U19
National Semiconductor
DS32EL0124SQE/NOPB



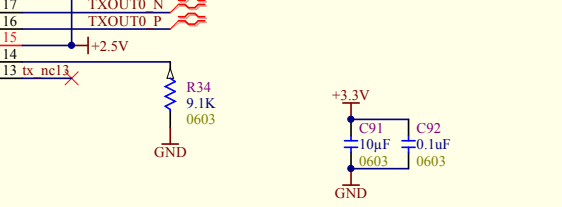
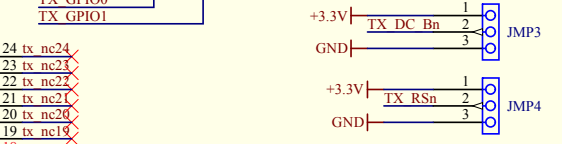
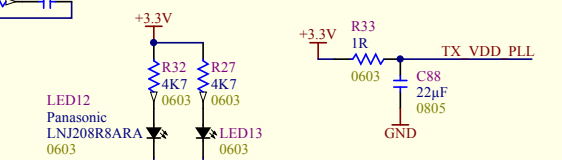
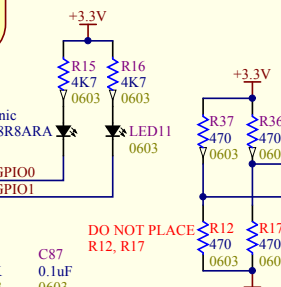
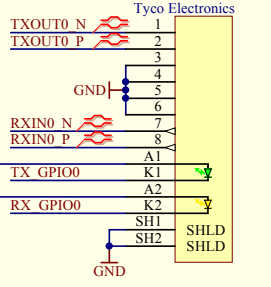
U20
National Semiconductor
DS32EL0421SQE/NOPB



Cable Termination (Standard)



J1
2-406549-1
Tyco Electronics

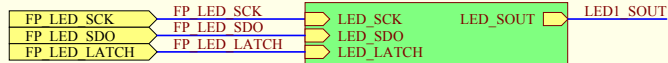


VME - NIMIO32 - TX/RX Serializer

Revision	Drawing #: 11	TRUMF 4004 Wesbrook Mall Vancouver, B.C. Canada V6T 2A3		
2	Sheet #: 11 of 14	Size: A		
	Drawn by: D.Bishop	Date: 15/12/2011		
File: C:\Altium\VME-NIMIO32-Rev2\VME - NIMIO32 Rev2 - Serial TxRx.SchDoc				
11:50:28 AM				

LED1

VME - NIM32IO Rev2 - LED.SchDoc



LED2

VME - NIM32IO Rev2 - LED.SchDoc



NIM_OUT

VME - NIMIO32 Rev2 - NIMOUT.SchDoc



NIM_IN1

VME - NIMIO32 Rev2 - NIMIN.SchDoc



NIM_IN2

VME - NIMIO32 Rev2 - NIMIN.SchDoc



NIM_IN3

VME - NIMIO32 Rev2 - NIMIN.SchDoc



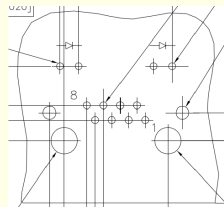
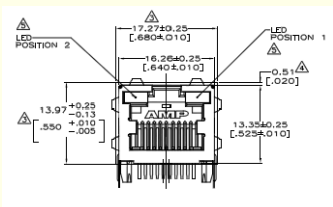
NIM_IN4

VME - NIMIO32 Rev2 - NIMIN.SchDoc

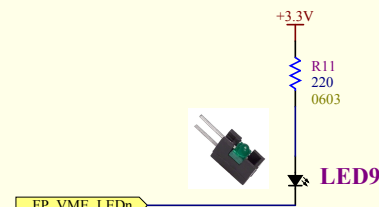


LVDS_IN

VME - NIMIO32 Rev2 - LVDS_IN.SchDoc



MATTE TIN	TRAY	-	GREEN/RED	3-406549-3
MATTE TIN	TRAY	RED	GREEN	3-406549-2
MATTE TIN	TUBE	YELLOW	GREEN	3-406549-1
MATTE TIN	TRAY	ORANGE/GREEN	GREEN	3-406549-0
MATTE TIN	TRAY	ORANGE/GREEN	YELLOW	2-406549-9
MATTE TIN	TRAY	YELLOW/GREEN	YELLOW/GREEN	2-406549-8
MATTE TIN	TRAY	ORANGE/GREEN	ORANGE/GREEN	2-406549-7
MATTE TIN	TRAY	YELLOW	YELLOW	2-406549-6
MATTE TIN	TRAY	GREEN	GREEN	2-406549-5
MATTE TIN	TRAY	GREEN	YELLOW	2-406549-4
MATTE TIN	TRAY	YELLOW	GREEN	2-406549-3
MATTE TIN	TRAY	YELLOW	GREEN	2-406549-2
MATTE TIN	TRAY	YELLOW	GREEN	2-406549-1
TIN-LEAD	TRAY	YELLOW/GREEN	YELLOW/GREEN	406549-8
TIN-LEAD	TRAY	YELLOW	YELLOW	406549-6
TIN-LEAD	TRAY	GREEN	GREEN	406549-5
TIN-LEAD	TRAY	GREEN	YELLOW	406549-4
TIN-LEAD	TRAY	YELLOW	-	406549-3
TIN-LEAD	TRAY	-	GREEN	406549-2
TIN-LEAD	TRAY	YELLOW	GREEN	406549-1
TERMINAL LEAD PLATING	PACKAGING	POSITION 2	POSITION 1	PART NUMBER



CHICAGO MINIATURE LIGHTING, LLC
5350T5LC
Round, 2mm, T-3/4



MB1
Keystone Electronics
621
GND - FP Mounting Bracket

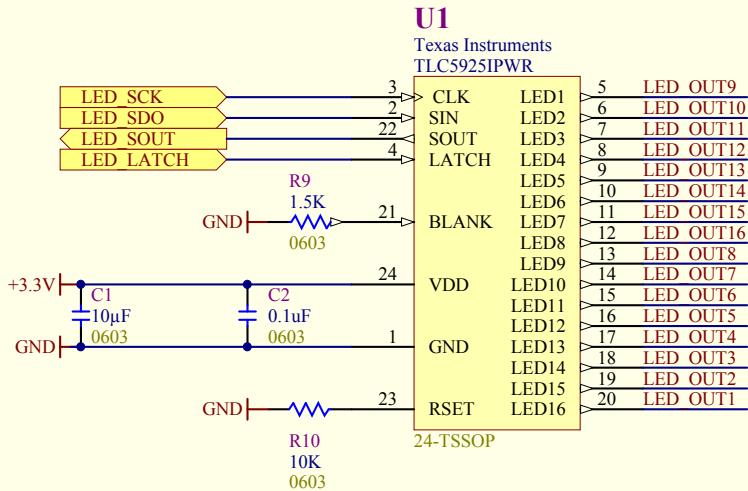
AWING IS A CONTROLLED DOCUMENT.	REV	17-SEP-97	TYCO ELECTRONICS CORPORATION
DESIGNER	CHK	17-SEP-97	HARRISBURG, PA 17105-3608
(REVIEWS)	APR	17-SEP-97	
OTHERWISE SPECIFIED:	NAME	INVERTED MODULAR JACK ASSEMBLY, 1X1, SHIELDED, PANEL GROUND, LED	
Q. PLS	PRODUCT SPEC		
1. PLS	103-1163-4		
2. PLS	APPLICATION SPEC		
3. PLS	114-2154		
4. PLS	REV	ONE CODE	19990100
5. PLS	REGR	A1	00779
NOTE 1	CUSTOMER DRAWING	SCALE	4:1
SEE NOTE 1		SHEET	1 OF 1

VME - NIMIO32 - Front Panel

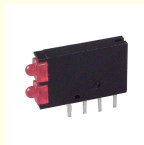
Revision	Drawing #: 12	TRUMF
2	Sheet #: 12 of 14	4004 Wesbrook Mall
	Size: A	Vancouver, B.C.
	Drawn by: D.Bishop	Canada
	Date: 15/12/2011	V6T 2A3



Alternate Part Numbers:
 Texas Instruments - TLC5925IPWR
 ST Microelectronics - STP16CP05TTR
 Catalyst Semiconductor - CAT4016Y-T2
 Allegro - A6282ELP-T



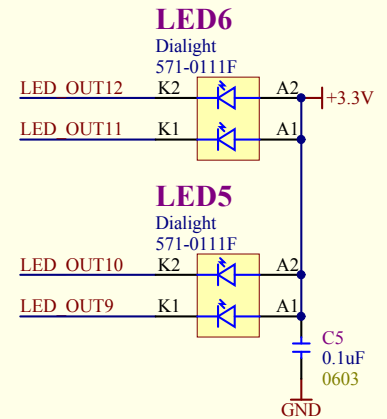
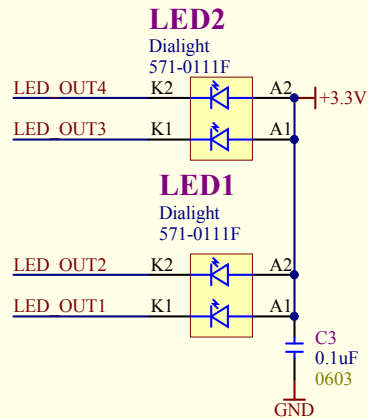
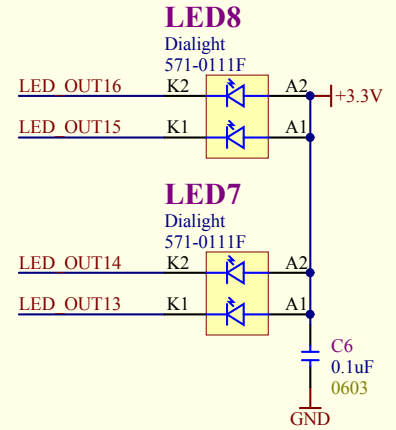
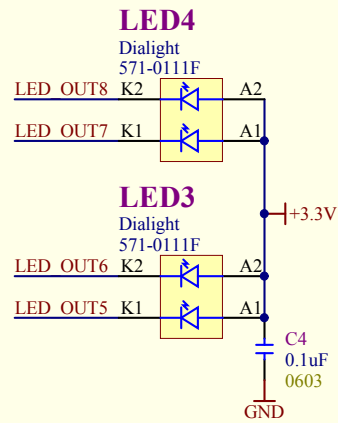
TLC5928DBQR: R10 = 25K (2ma)
 STP16CP05TTR: R10 = 10K (2ma)
 TLC5925IPWR: R10 = 10K (2.2ma)
 CAT4016Y-T2: R10 = 25K (2ma)
 A6282ELP-T: R10 = 10K (2.5ma)



OUTPUTS
 Red LEDs: 571-0111F

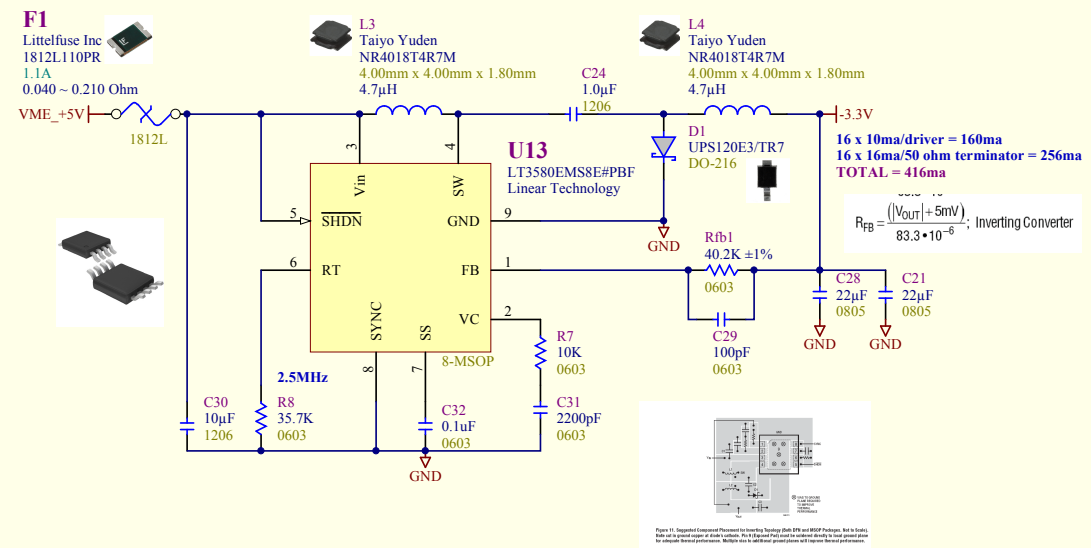
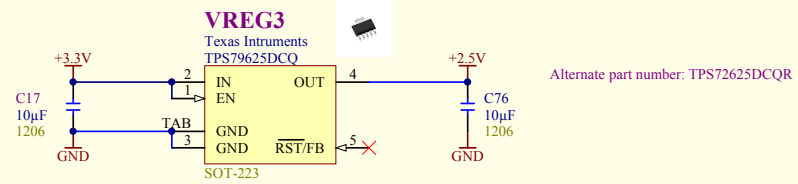
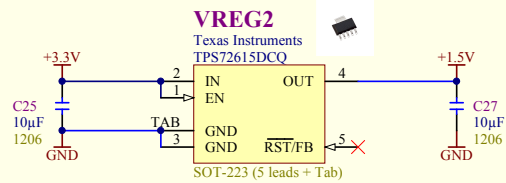
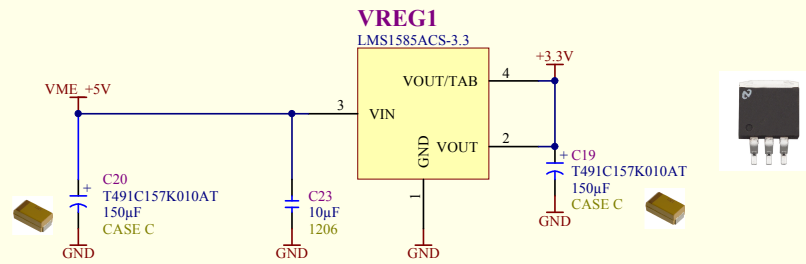


INPUTS
 Green LEDs: 571-0122F



VME - NIMIO32 - Front Panel LEDs and driver

Revision 2	Drawing #: 13		TRIUMF 4004 Wesbrook Mall Vancouver, B.C. Canada V6T 2A3	
	Sheet #: 13 of 14	Size: A		
	Drawn by: D.Bishop	Date: 15/12/2011		
File: C:\Altium\VME-NIMIO32-Rev2\VME - NIM32IO Rev2 - LED.SchDoc				11:50:28 AM



VME - NIMIO32 - Voltage Regulators			
Revision	Drawing #: 14	TRIUMF 4004 Wesbrook Mall Vancouver, B.C. Canada V6T 2A3	
2	Sheet #: 14 of 14	Size: A	
Drawn by: D.Bishop	Date: 15/12/2011		
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