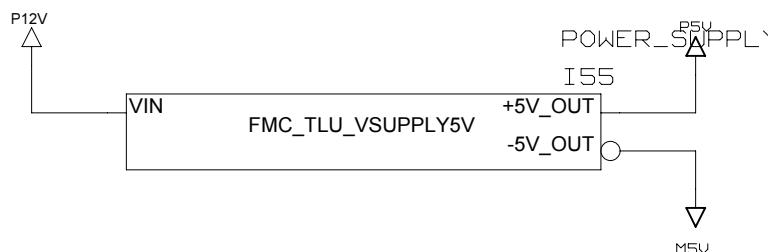
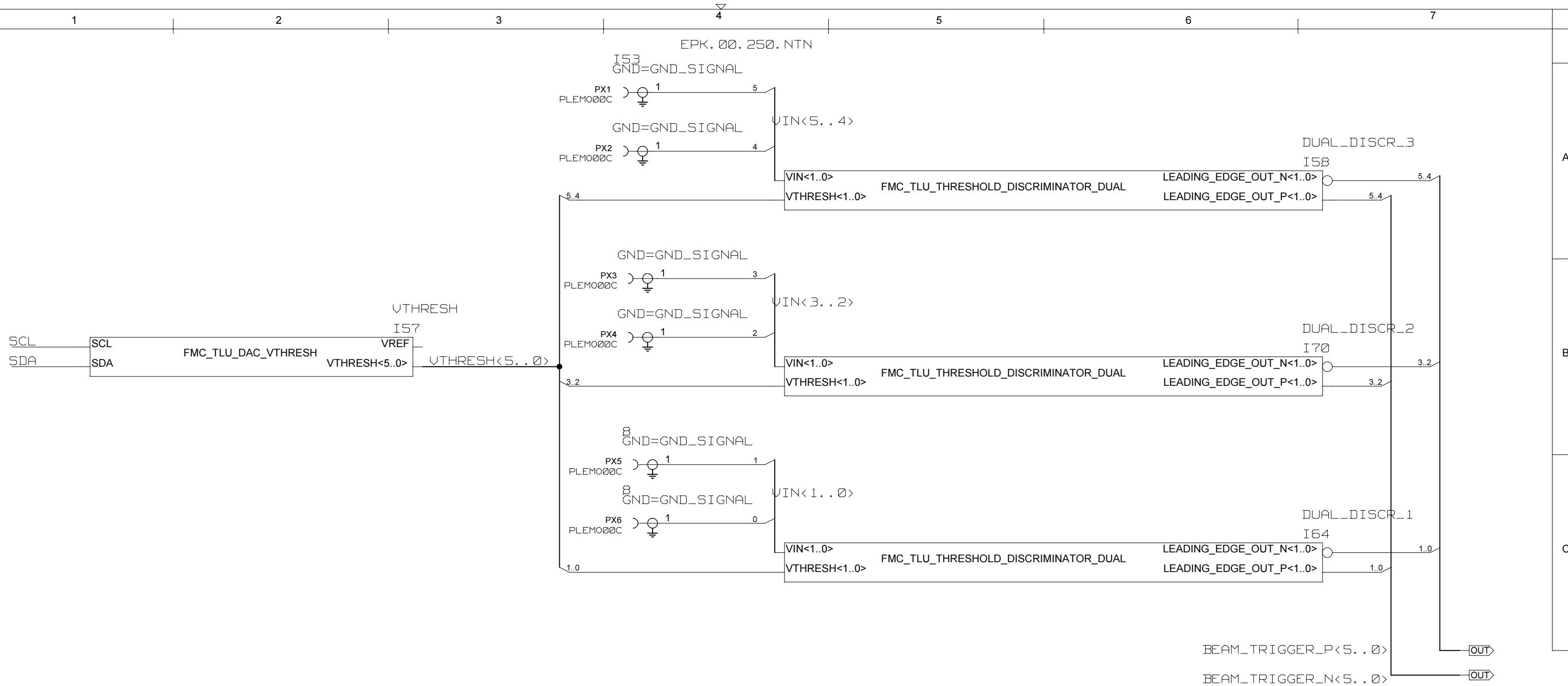


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USED ON						
UOB-HEP UNIVERSITY OF BRISTOL HIGH ENERGY PHYSICS GROUP						
H.H.WILLS PHYSICS LAB, TYNDALL AVE, BRISTOL, BS8 1TL.						
TITLE	fmc_tlu_v1.lib					FMC CONNECTOR
MODULE:	fmc_tlu_top_level.e					AND I2C EEPROM
LICENSED UNDER THE TAPR OPEN HARDWARE LICENSE (WWW.TAPR.ORG/OHL)						
MODULE PAGE: 1 OF 7						
OVERALL PAGE: 1 OF 29						
TOTAL NO. OF SHEETS						

A2



	Thu May 04 13:37:48 2017											
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H.H.WILLS PHYSICS LAB, TYNDALL AVE, BRISTOL, BS8 1TL.												
TITLE	fmc_tlu_v1.lib			FRONT PANEL DUT CONNECTORS								
MODULE:	fmc_tlu_top_level			3 X HDMI < DUT ONLY >								
				1 X HDMI < DUT OR UPLINK >								
LICENSED UNDER THE TAPR OPEN HARDWARE LICENSE (WWW.TAPR.ORG/OHL)												
A2												
MODULE PAGE: 2 OF 7												
OVERALL PAGE: 2 OF 29												
TOTAL NO. OF SHEETS												



	Mon Mar 27 17:58:51 2017					
ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
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TITLE fmrc tlu u1 lib

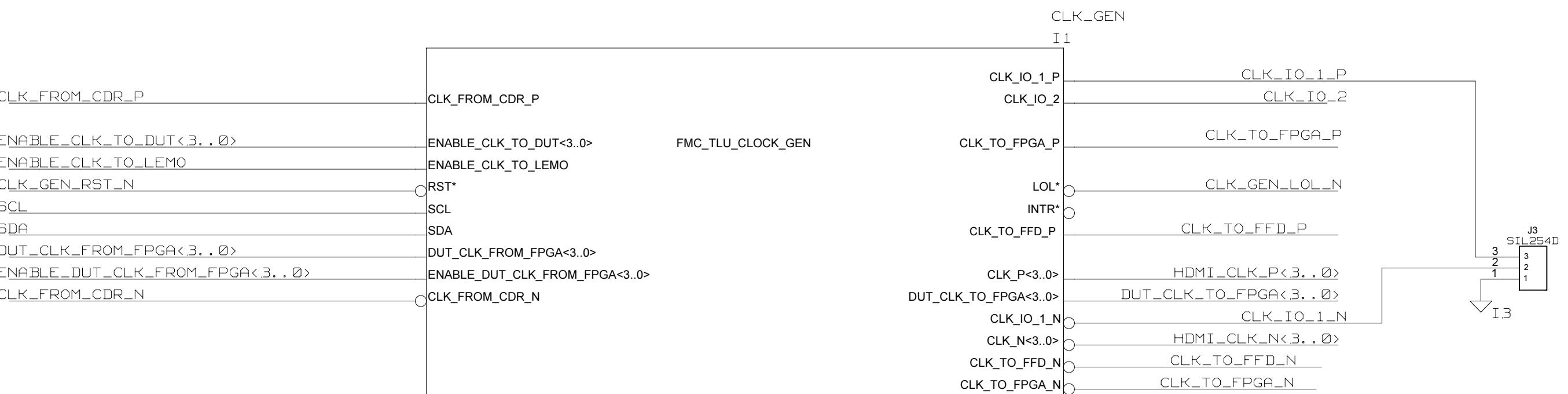
MODULE: fmc_tlu_top_level_e

DISCRIMINATORS

MODULE PAGE: 3 OF 7
OVERALL PAGE: 3 OF 29

1 | 2 | 3 | 4 | 5 | 6 | 7

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C

	Thu Mar 30 17:10:57 2017					
ISSUE	DATE	MOD NO.	DRN BY.	CHKD.	APPD.	STATUS
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TITLE fmc_tlu_v1.lib CLOCK GENERATION
MODULE: fmc_tlu_top_level

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A2

MODULE PAGE: 4 OF 7
OVERALL PAGE: 4 OF 29

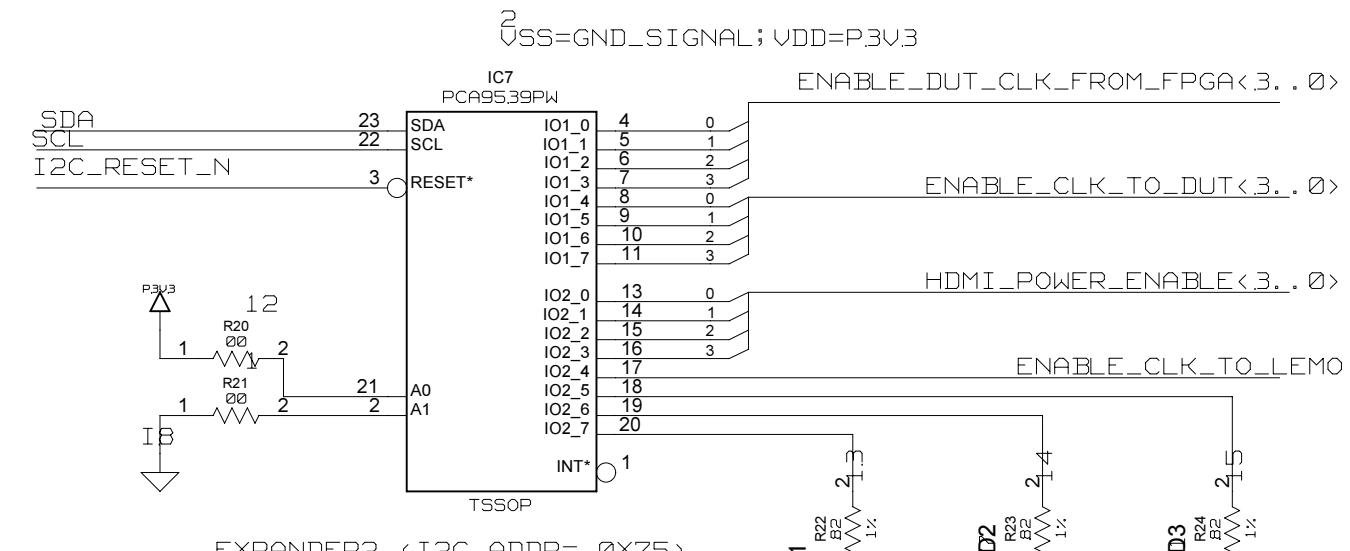
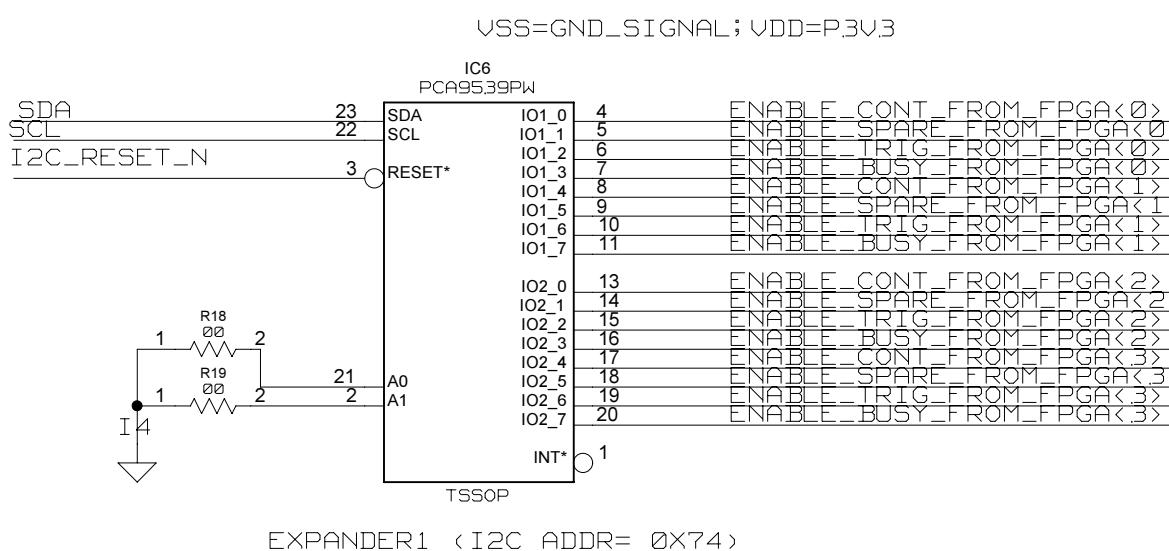
TOTAL NO. OF SHEETS

A2

1 | 2 | 3 | 4 | 5 | 6 | 7

A

A



	Mon Mar 27 17:58:54 2017					
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TITLE fmc_tlu_v1_l1b I2C I/O EXTENDERS
MODULE: fmc_tlu_top_level_e

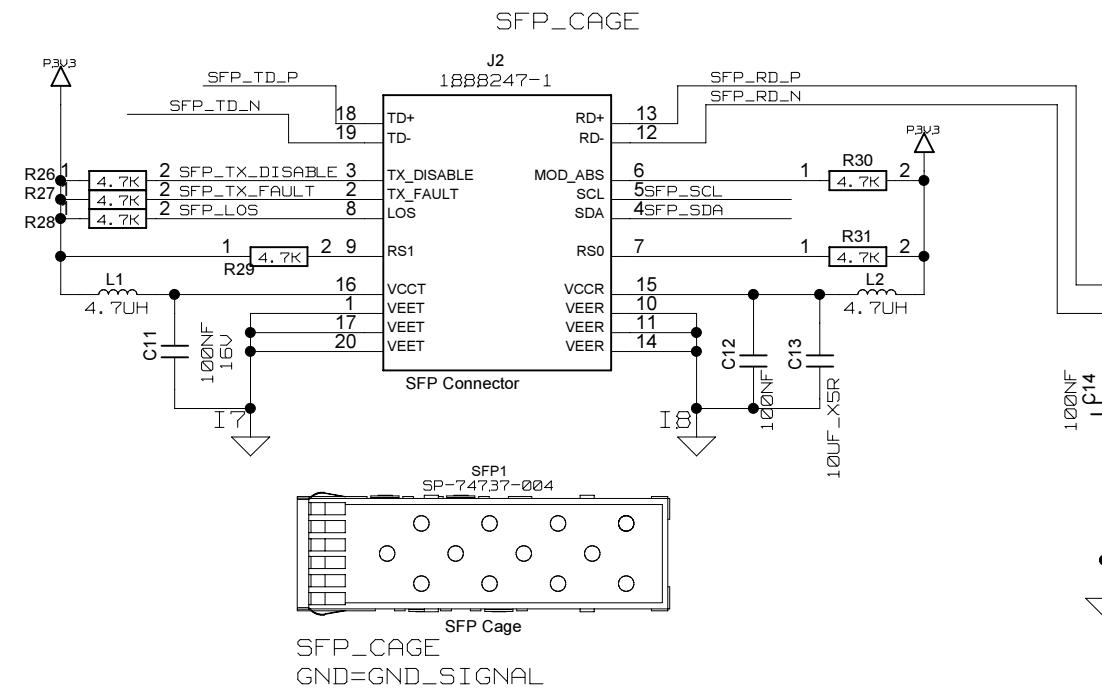
LICENSED UNDER THE TAPR OPEN HARDWARE LICENSE (WWW.TAPR.ORG/OHL)

A2

MODULE PAGE: 5 OF 7
OVERALL PAGE: 5 OF 29

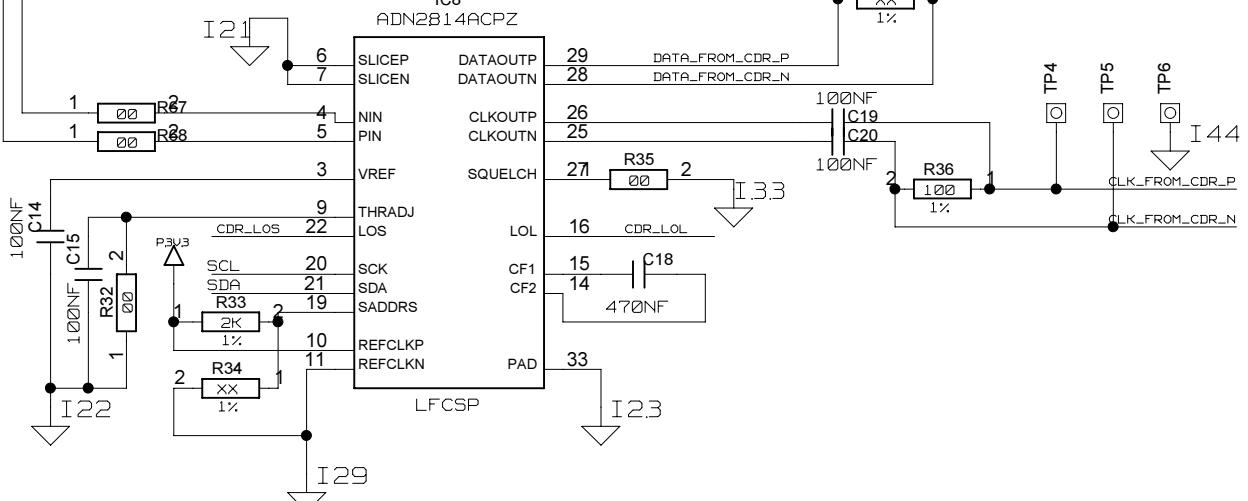
TOTAL NO. OF SHEETS

A2



CDR (I2C ADDR= 0X60)
VEE=GND_SIGNAL; VCC=P3V3
IC8

SN65LVDS2 OR SN65LVDT2
SN65LVDT2 HAS TERMINATION.
SN65LVDS2 REQUIRES EXTERNAL TERMINATION.



E TERMINATION IN FPGA IF POSSIBLE

This diagram illustrates a digital logic section. It begins with a clock distribution network on the left, featuring resistors R25, R38, and R39, along with diodes and capacitors for signal processing. The CLK_TO_FFD_P signal is distributed through R25 and R38 to two parallel paths. The top path includes a resistor R43 and an inverter P3U3. The bottom path includes resistors R39 and R66, followed by a resistor R40 and an inverter P3U3. These paths converge at a junction before entering a D flip-flop. The D flip-flop, labeled QFN, has its inputs connected via resistors R44 and R42. Its outputs, Q and Q*, are buffered by inverters P3U3. The output Q is connected to an output buffer consisting of resistors R45 and R46, followed by a capacitor C21 and a transmission line labeled SFP_TD_P. The output Q* is connected to another output buffer with resistors R45 and R46, followed by a capacitor C22 and a transmission line labeled SFP_TD_N.

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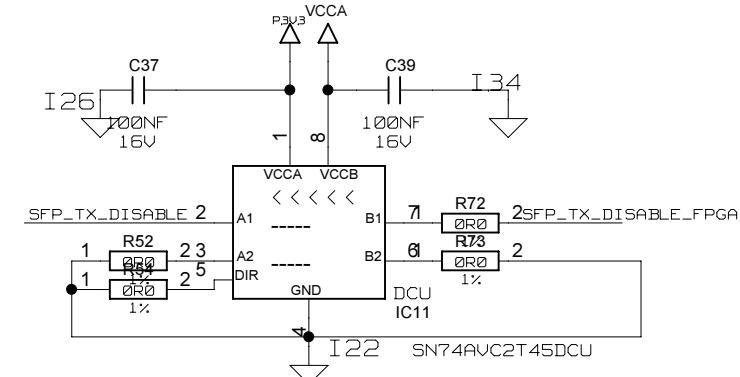
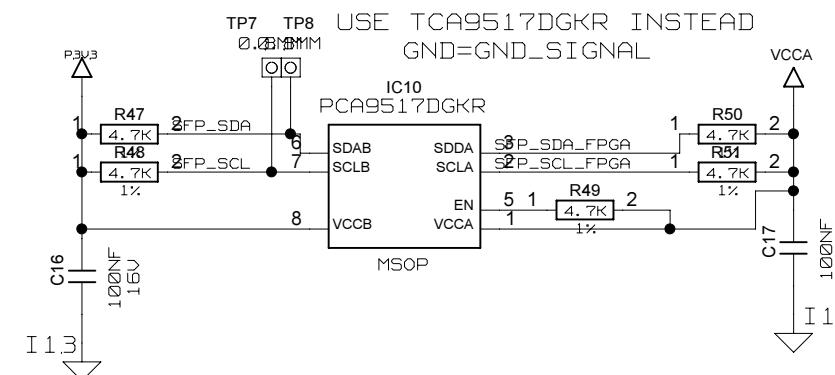
TITLE fmc_tlu_v1.lib
MODULE: fmc_tlu_top_level

SFP INTERFACE

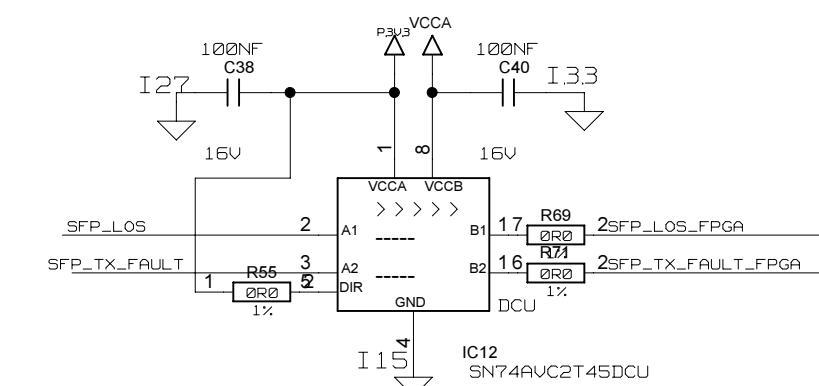
A2

MODULE PAGE: 6 OF 7
OVERALL PAGE: 6 OF 29

TOTAL NO. OF SHEETS

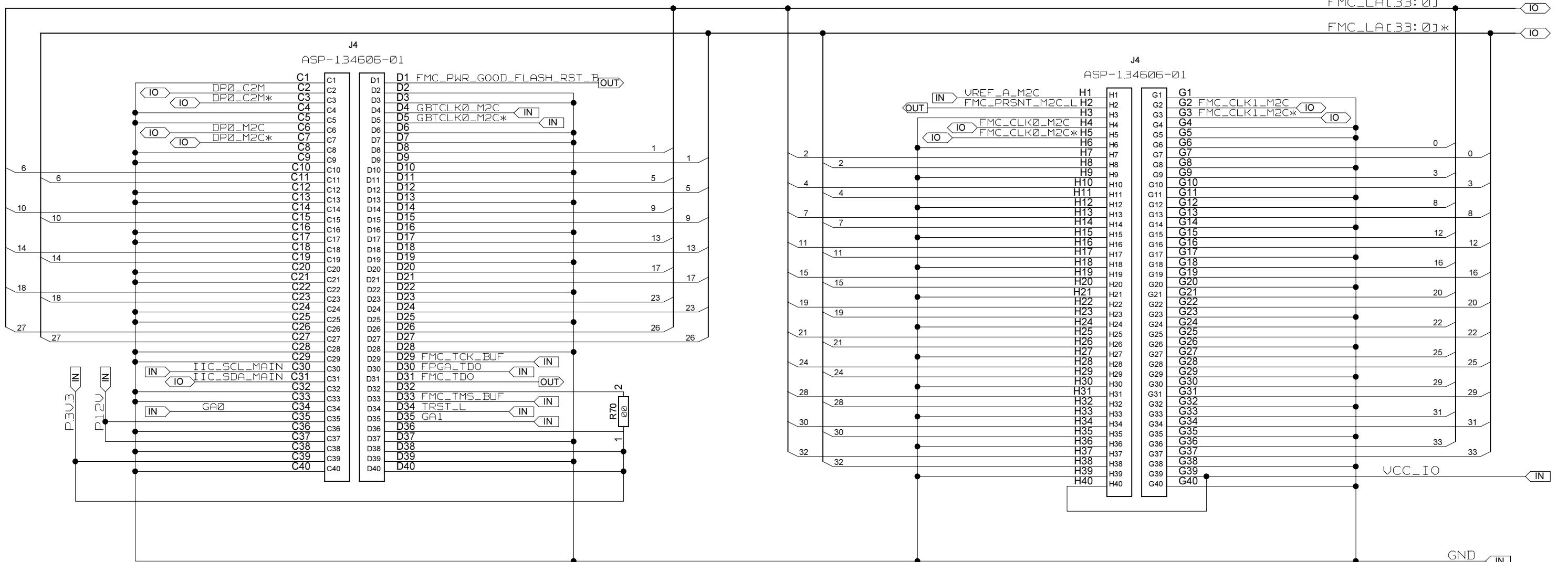


DIR LOW : B → A
DIR HIGH: A → B



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H.H.WILLS PHYSICS LAB, TYNDALL AVE, BRISTOL, BS8 1TL.						
TITLE	fmc_tlu_v1_l1b					
MODULE:	fmc_tlu_top_level_e					
LEVEL TRANSLATORS						
A2	MODULE PAGE: 7 OF 7 OVERALL PAGE: 7 OF 29					
	TOTAL NO. OF SHEETS					

1 | 2 | 3 | 4 | 5 | 6 | 7



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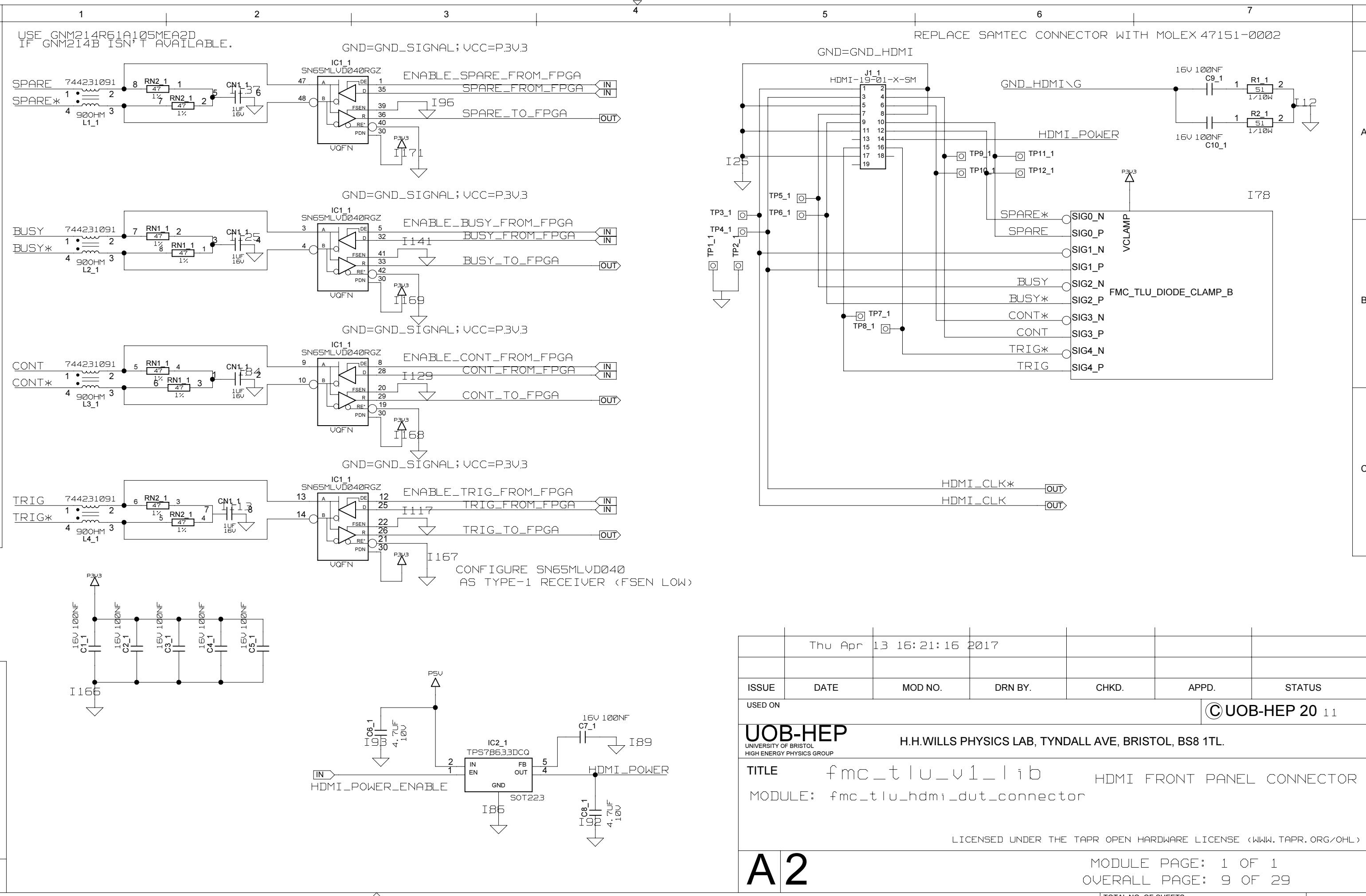
TITLE: fmc_tlu_v1.lib
MODULE: pc036a_fmc_lpc_connector

FMC LPC

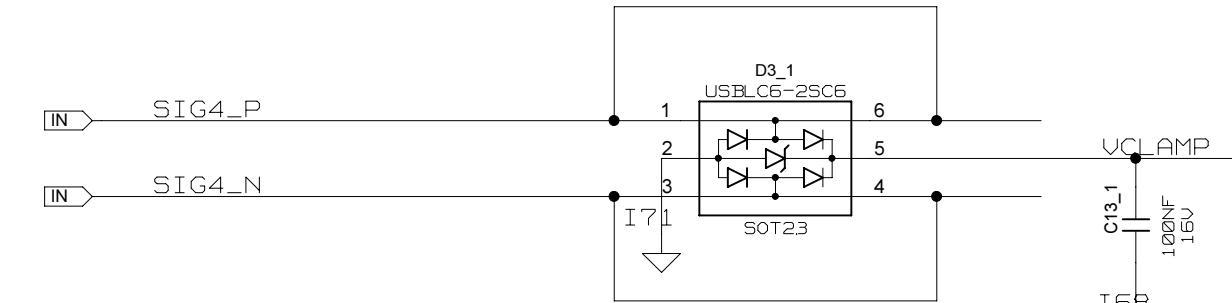
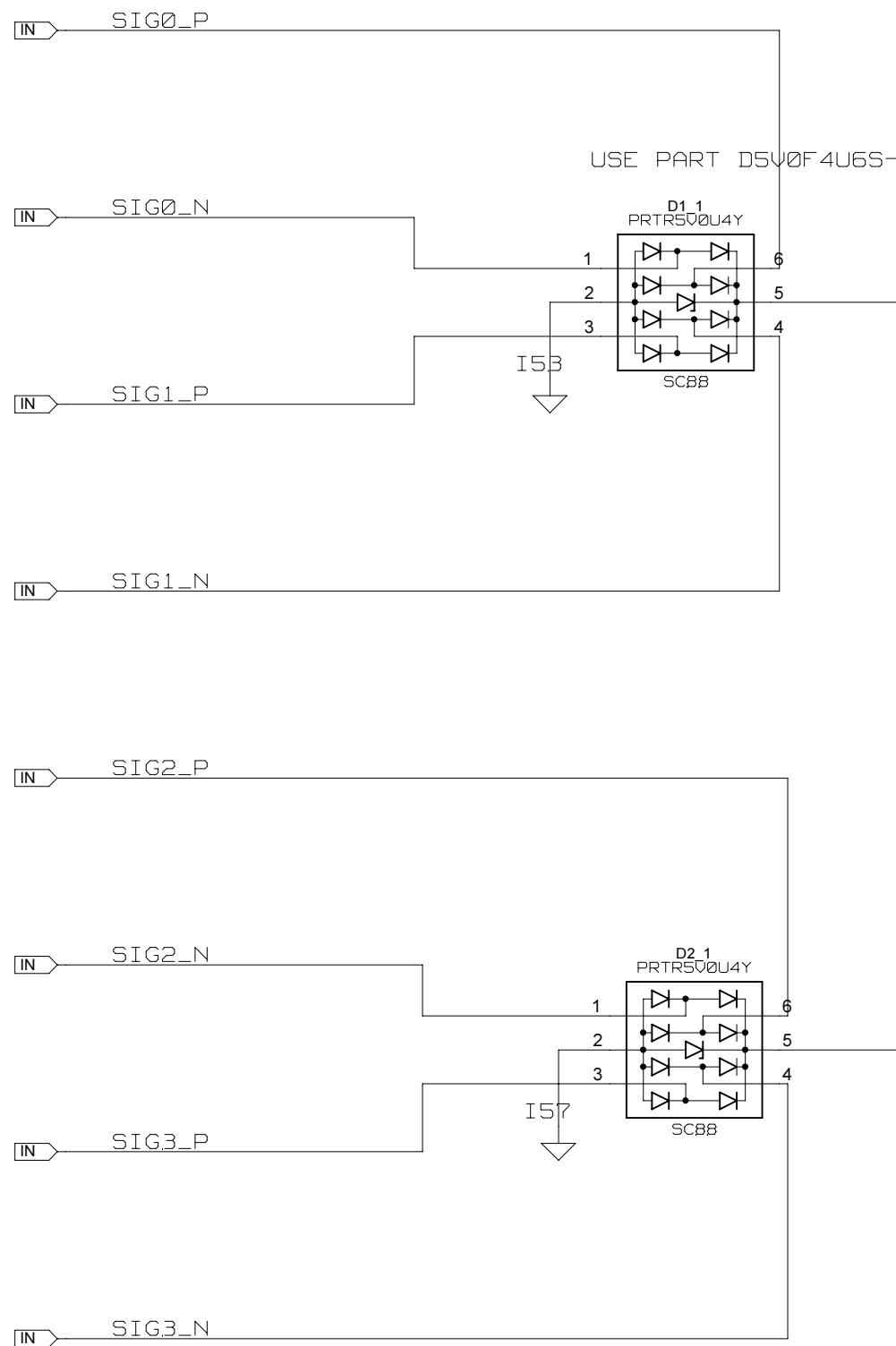
A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 8 OF 29

TOTAL NO. OF SHEETS



1 | 2 | 3 | 4 | 5 | 6 | 7



	Thu Jun 22 10:11:39 2017				
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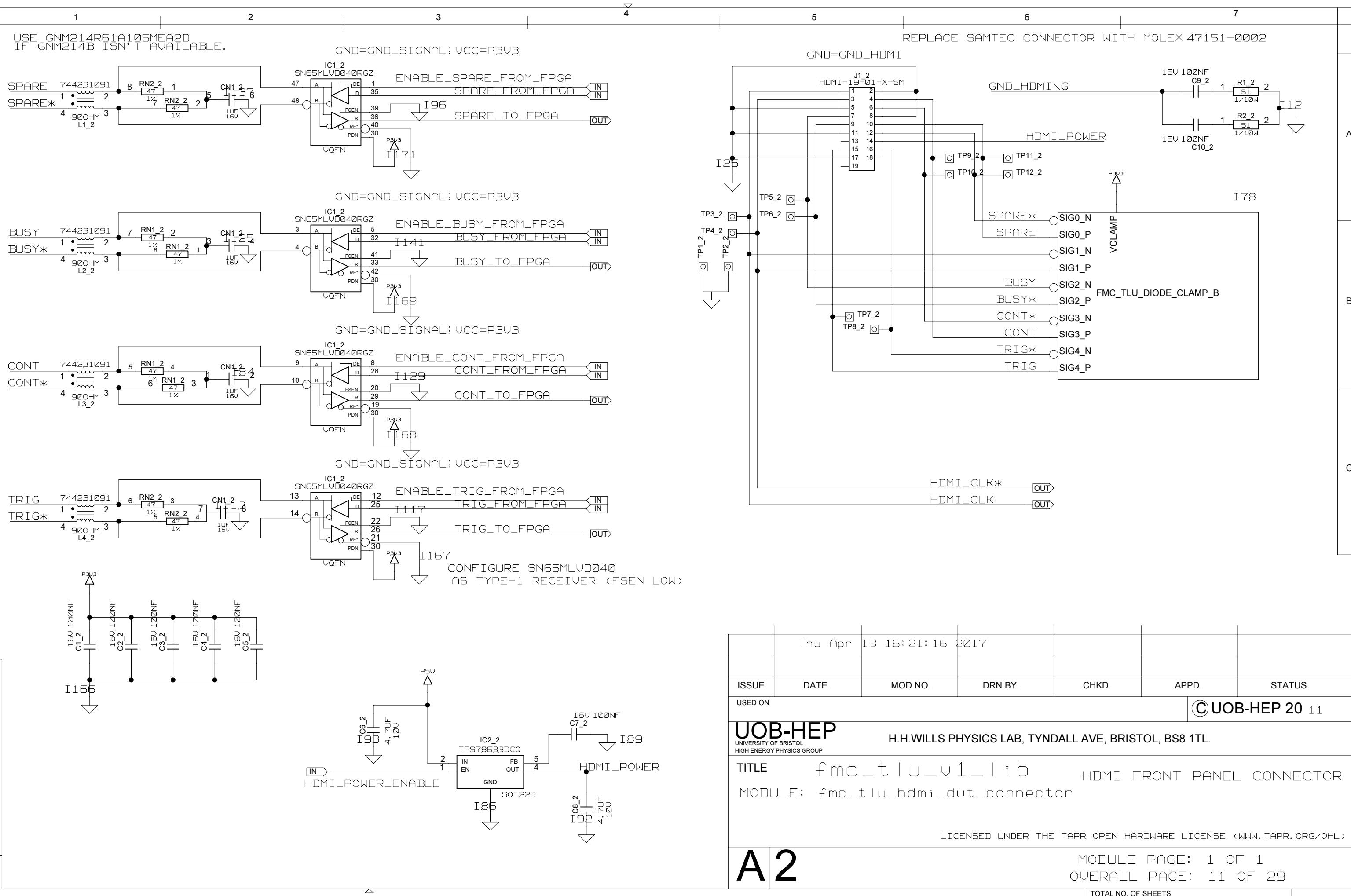
TITLE: fmc_tlu_v1_l1b
MODULE: fmc_tlu_diode_clamp_b

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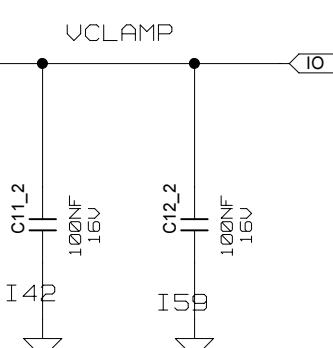
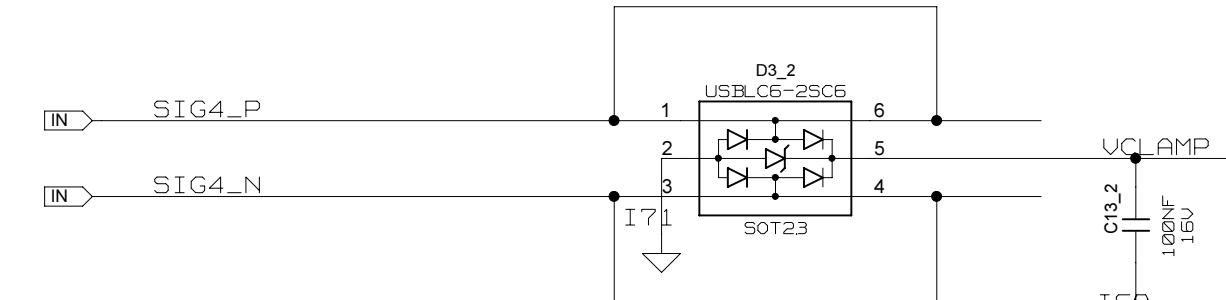
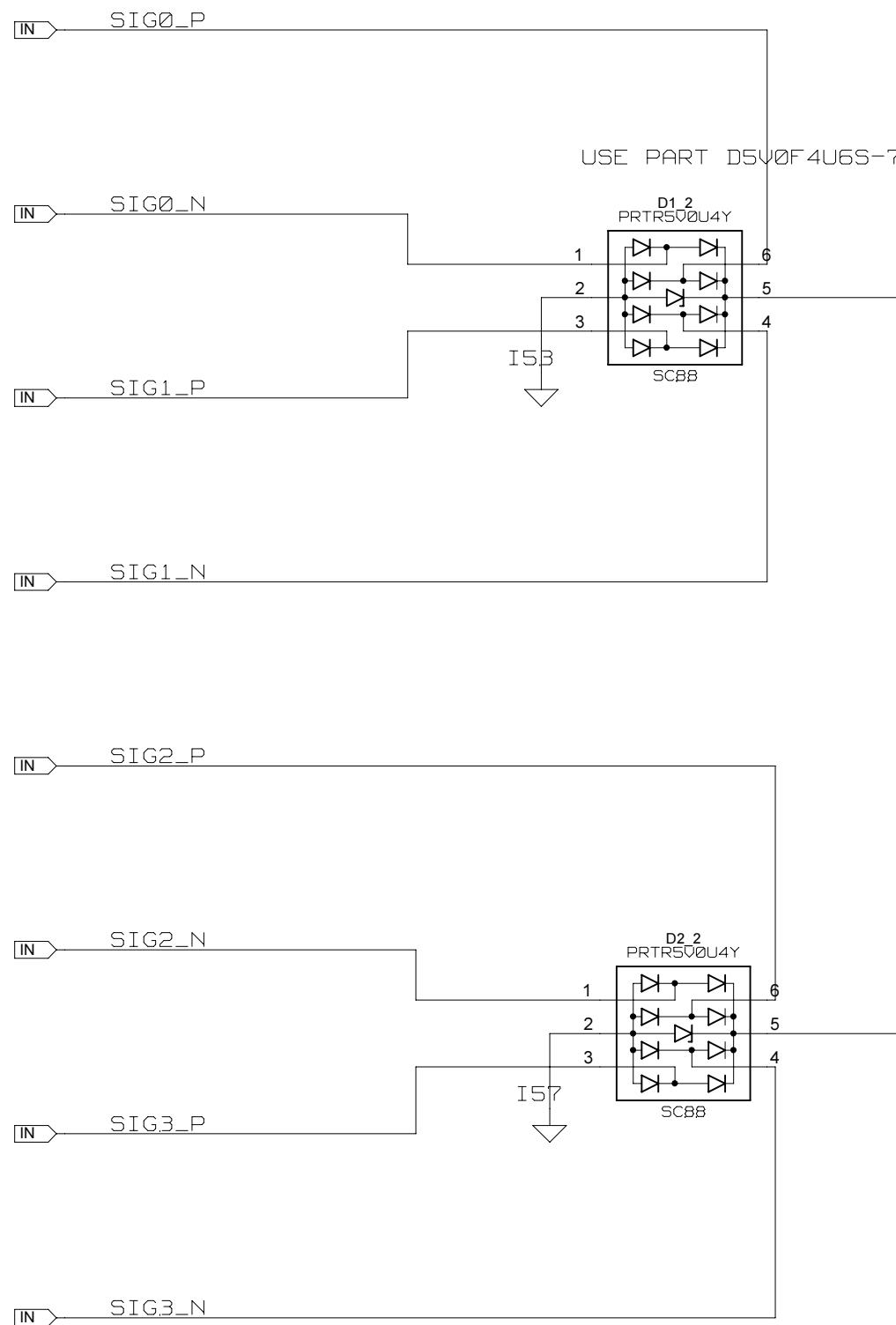
A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 10 OF 29

TOTAL NO. OF SHEETS



1 | 2 | 3 | 4 | 5 | 6 | 7



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TITLE: fmc_tlu_v1_l1b
MODULE: fmc_tlu_diode_clamp_b

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A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 12 OF 29

TOTAL NO. OF SHEETS

A

A

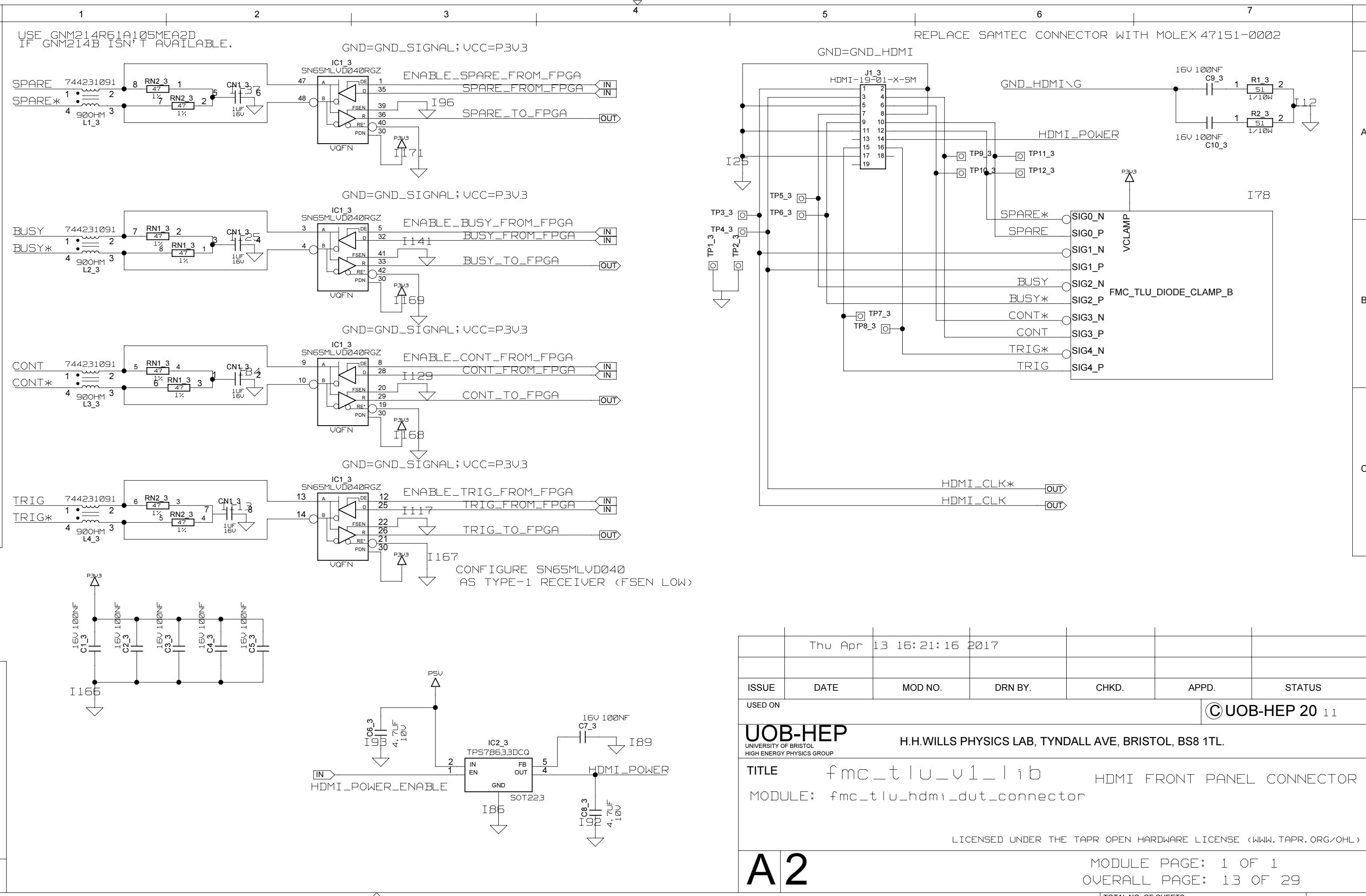
B

B

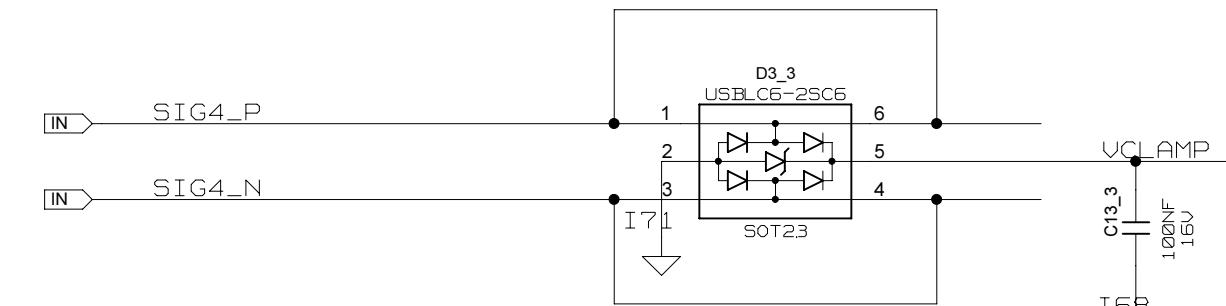
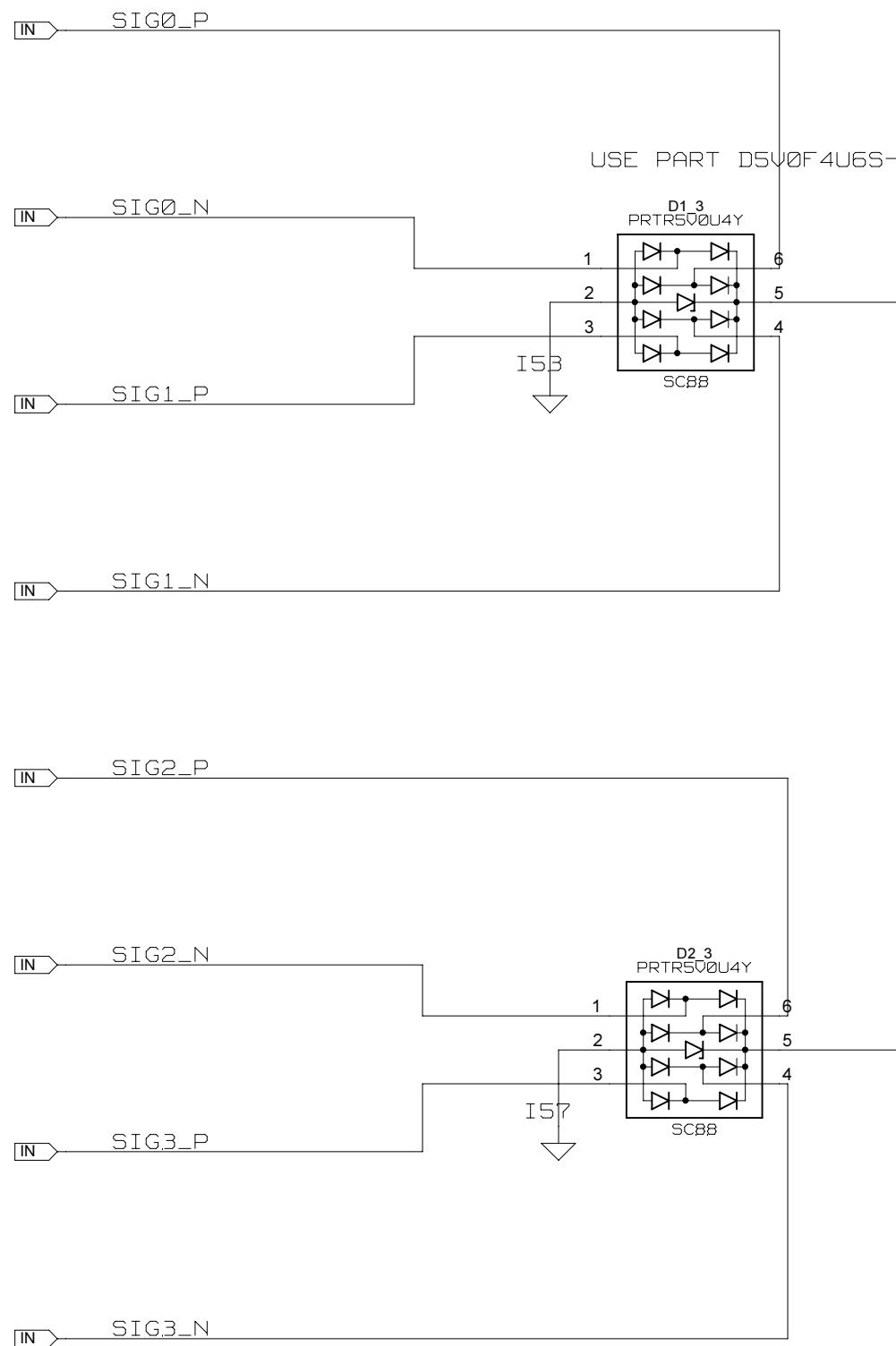
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C

A2



1 | 2 | 3 | 4 | 5 | 6 | 7



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TITLE: fmc_tlu_v1_l1b
MODULE: fmc_tlu_diode_clamp_b

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A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 14 OF 29

TOTAL NO. OF SHEETS

A

A

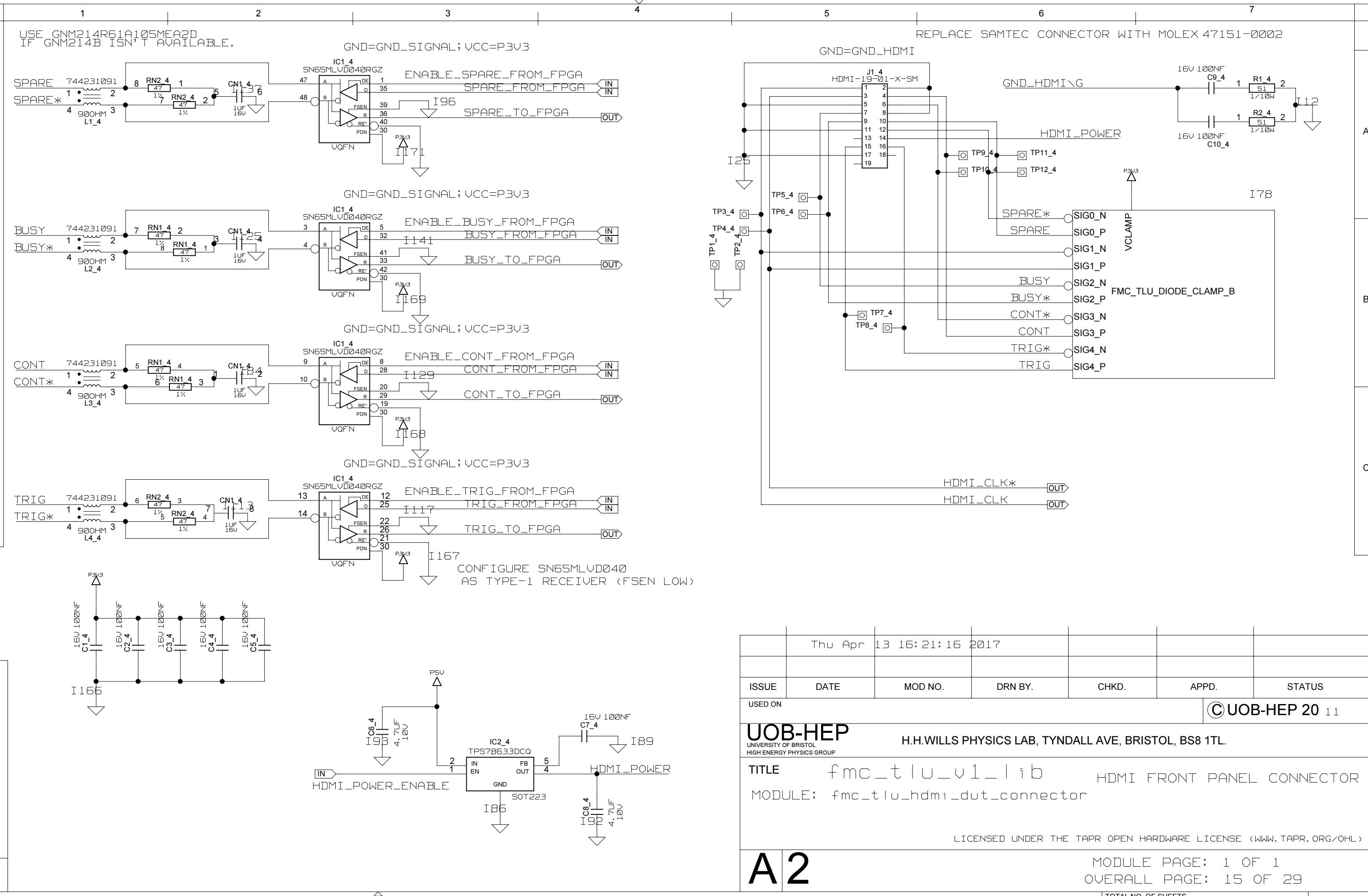
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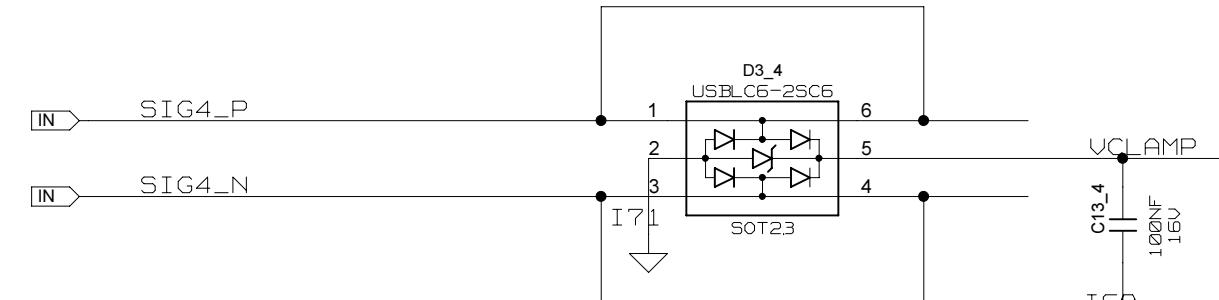
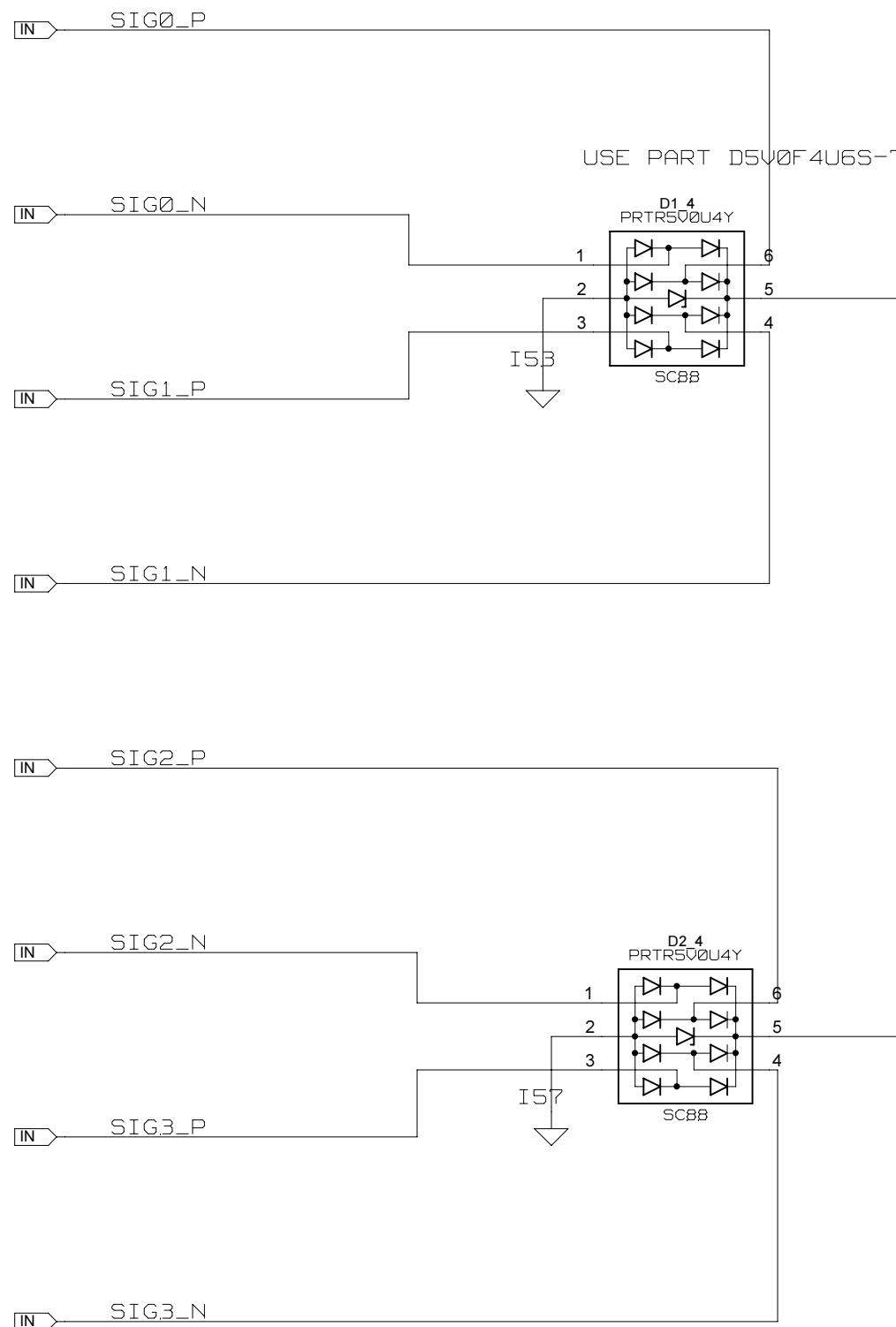
C

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A2



1 | 2 | 3 | 4 | 5 | 6 | 7



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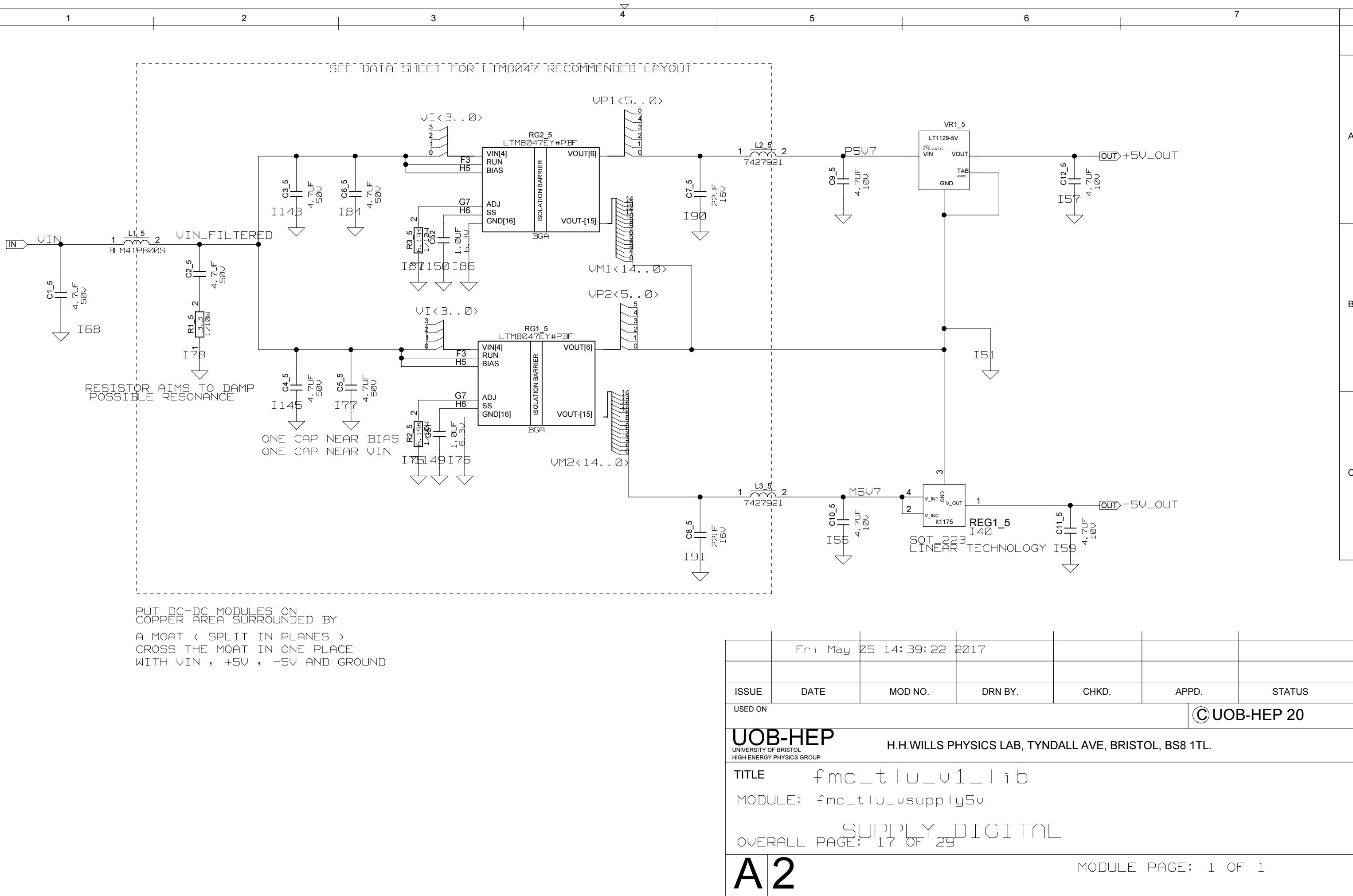
TITLE fmc_tlu_v1_l1b
MODULE: fmc_tlu_diode_clamp_b

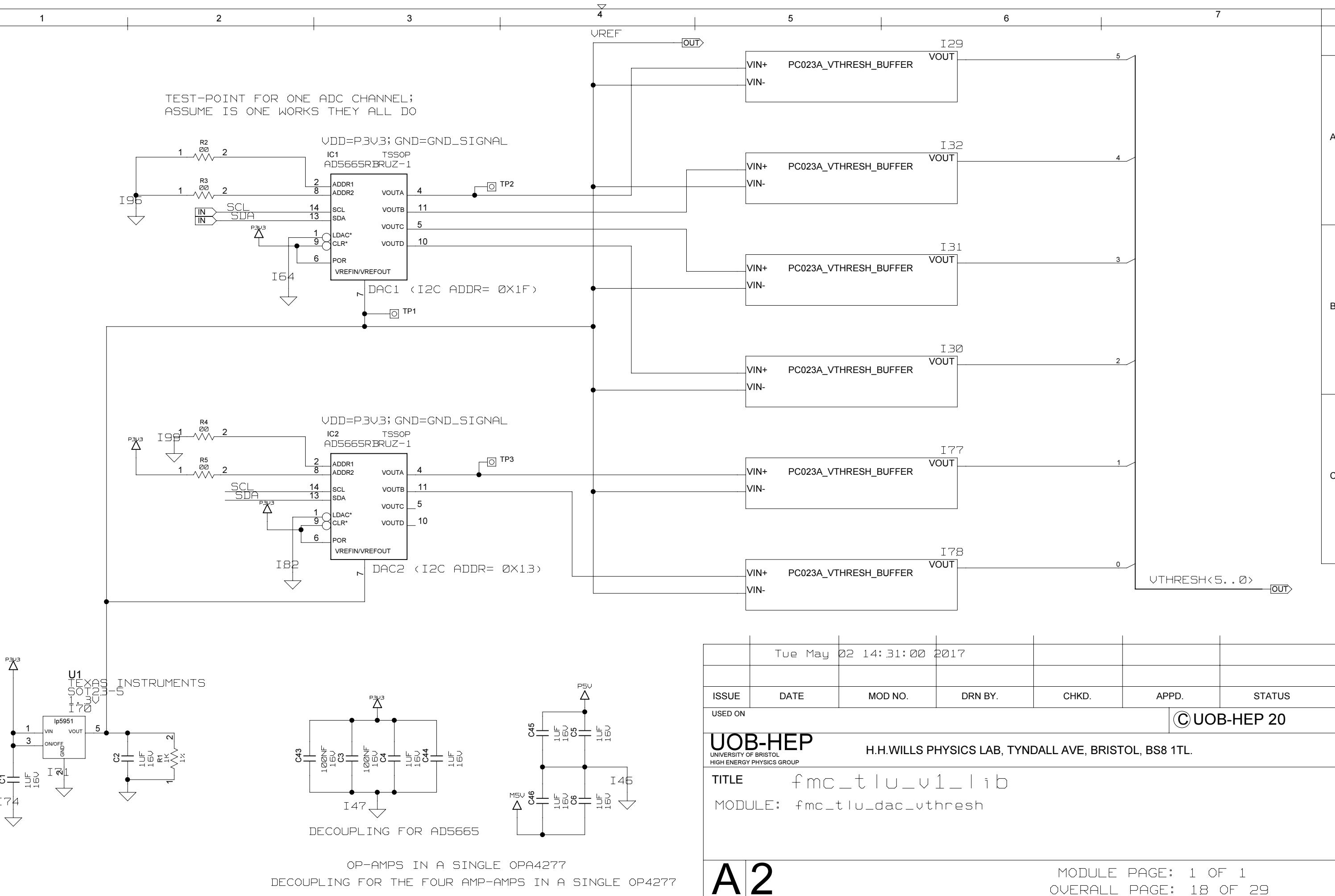
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A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 16 OF 29

TOTAL NO. OF SHEETS





A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 18 OF 29

TOTAL NO. OF SHEETS

1 | 2 | 3 | 4 | 5 | 6 | 7

A

INVERTING BUFFER WITH X-1 GAIN

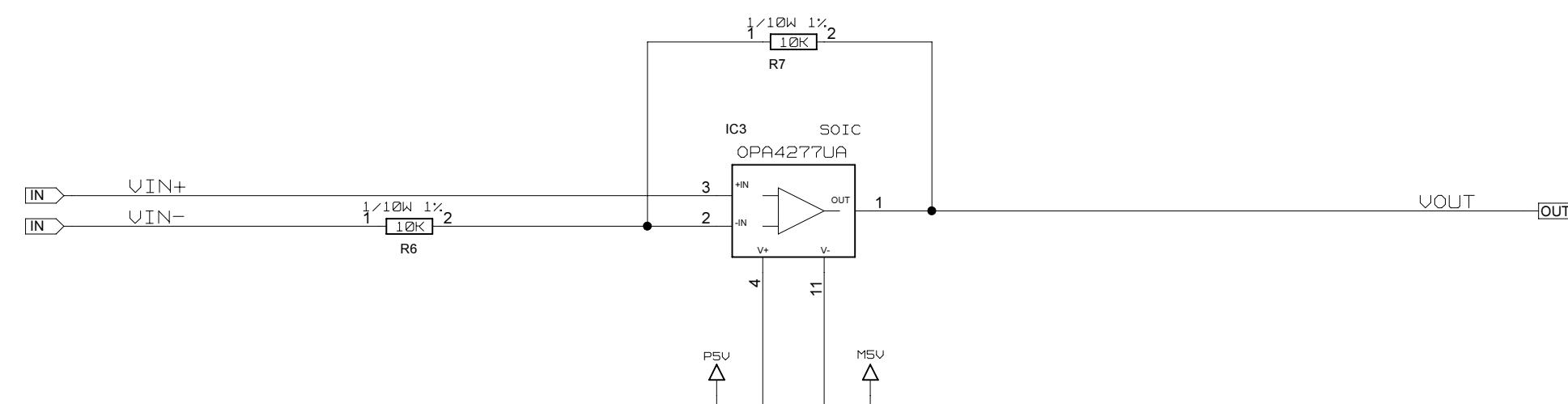
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TITLE: fmc_tlu_v1_l1b
MODULE: pc023a_vthresh_buffer

H.H.WILLS PHYSICS LAB, TYNDALL AVE, BRISTOL, BS8 1TL.

A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 19 OF 29

TOTAL NO. OF SHEETS

A2

1 | 2 | 3 | 4 | 5 | 6 | 7

A

INVERTING BUFFER WITH X-1 GAIN

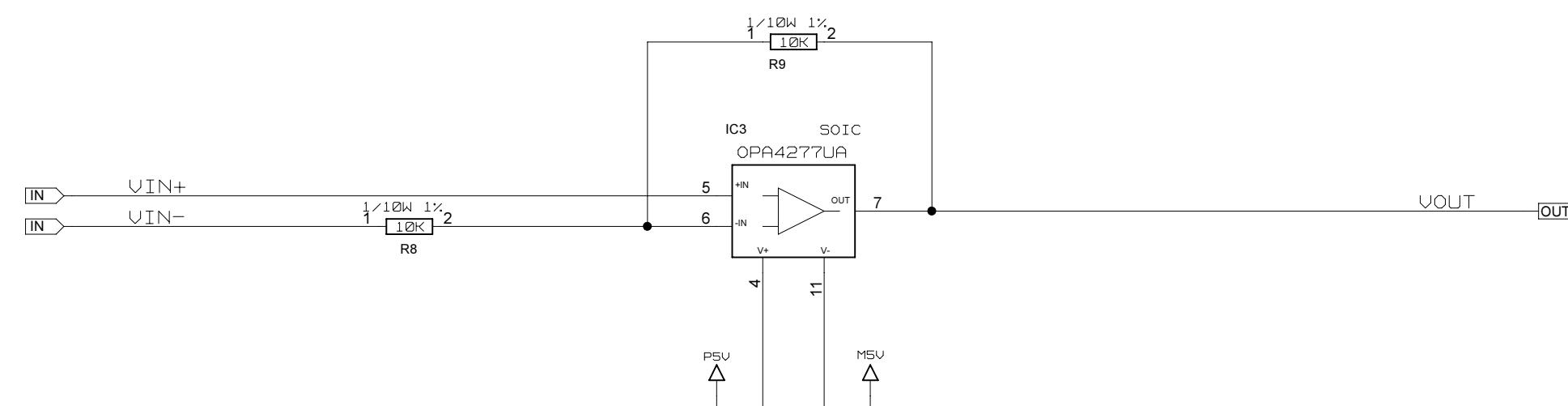
A

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TITLE: fmc_tlu_v1_l1b
MODULE: pc023a_vthresh_buffer

H.H.WILLS PHYSICS LAB, TYNDALL AVE, BRISTOL, BS8 1TL.

A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 20 OF 29

TOTAL NO. OF SHEETS

A2

1 | 2 | 3 | 4 | 5 | 6 | 7

A

INVERTING BUFFER WITH X-1 GAIN

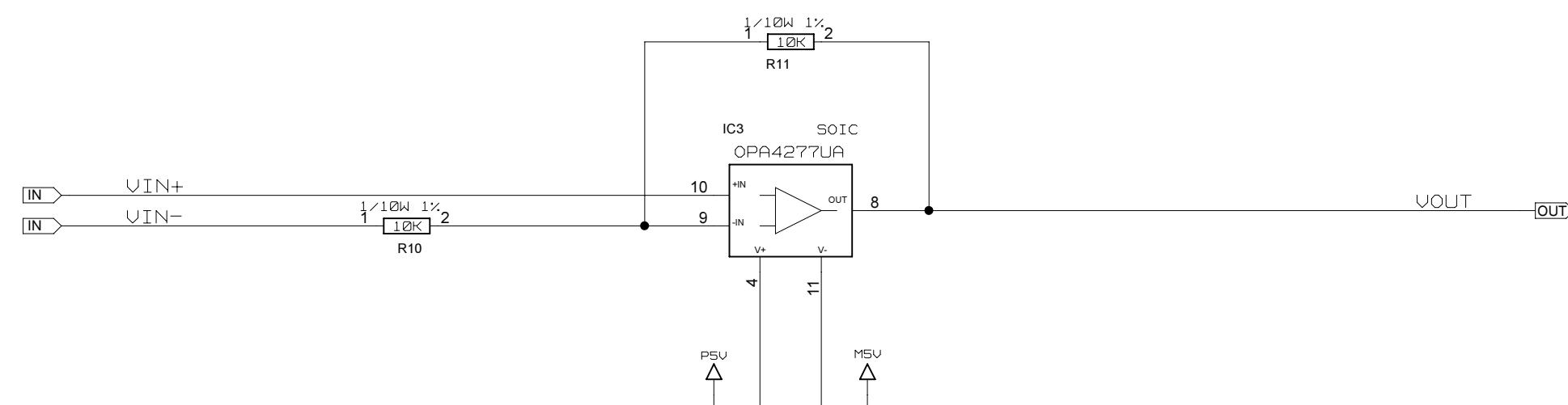
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USED ON						(C) UOB-HEP 20

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HIGH ENERGY PHYSICS GROUP

TITLE: fmc_tlu_v1_l1b
MODULE: pc023a_vthresh_buffer

H.H.WILLS PHYSICS LAB, TYNDALL AVE, BRISTOL, BS8 1TL.

A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 21 OF 29

TOTAL NO. OF SHEETS

A2

1 | 2 | 3 | 4 | 5 | 6 | 7

A

INVERTING BUFFER WITH X-1 GAIN

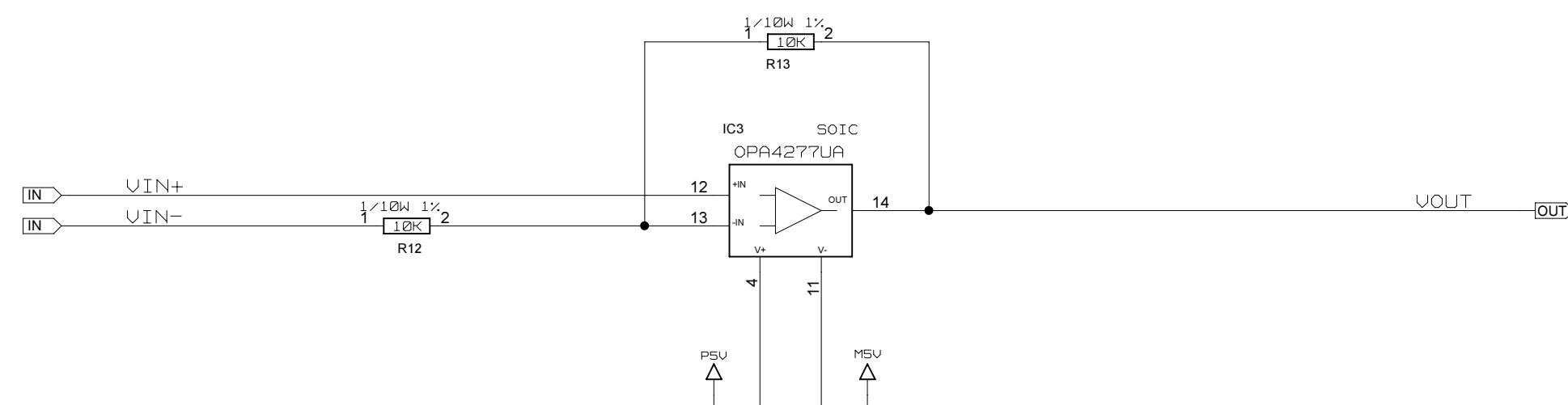
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TITLE: fmc_tlu_v1_l1b
MODULE: pc023a_vthresh_buffer

H.H.WILLS PHYSICS LAB, TYNDALL AVE, BRISTOL, BS8 1TL.

A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 22 OF 29

TOTAL NO. OF SHEETS

1 | 2 | 3 | 4 | 5 | 6 | 7

A

INVERTING BUFFER WITH X-1 GAIN

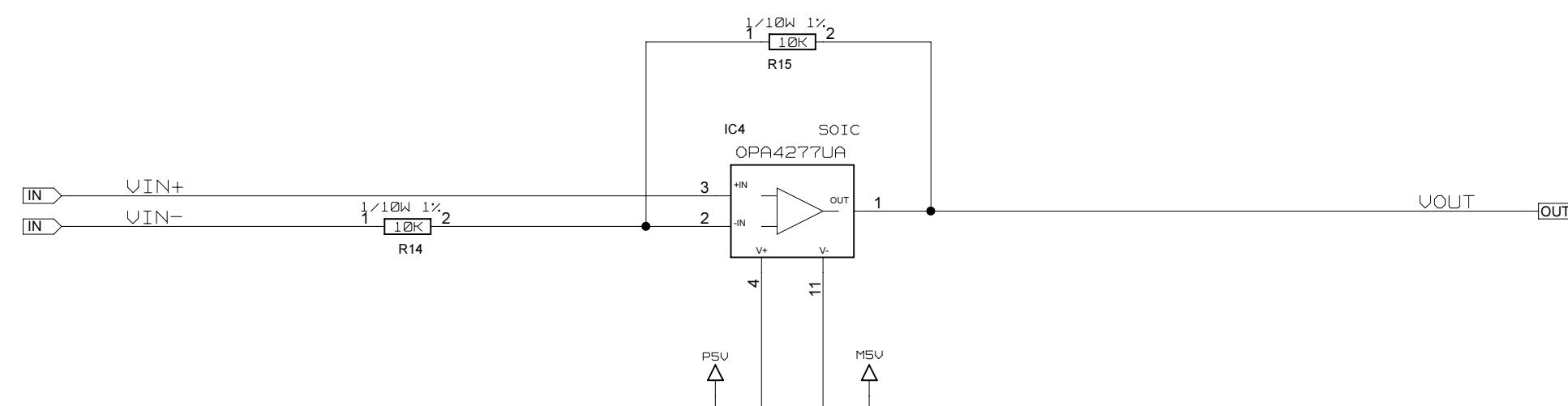
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TITLE: fmc_tlu_v1_l1b
MODULE: pc023a_vthresh_buffer

H.H.WILLS PHYSICS LAB, TYNDALL AVE, BRISTOL, BS8 1TL.

A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 23 OF 29

TOTAL NO. OF SHEETS

A2

1 | 2 | 3 | 4 | 5 | 6 | 7

A

INVERTING BUFFER WITH X-1 GAIN

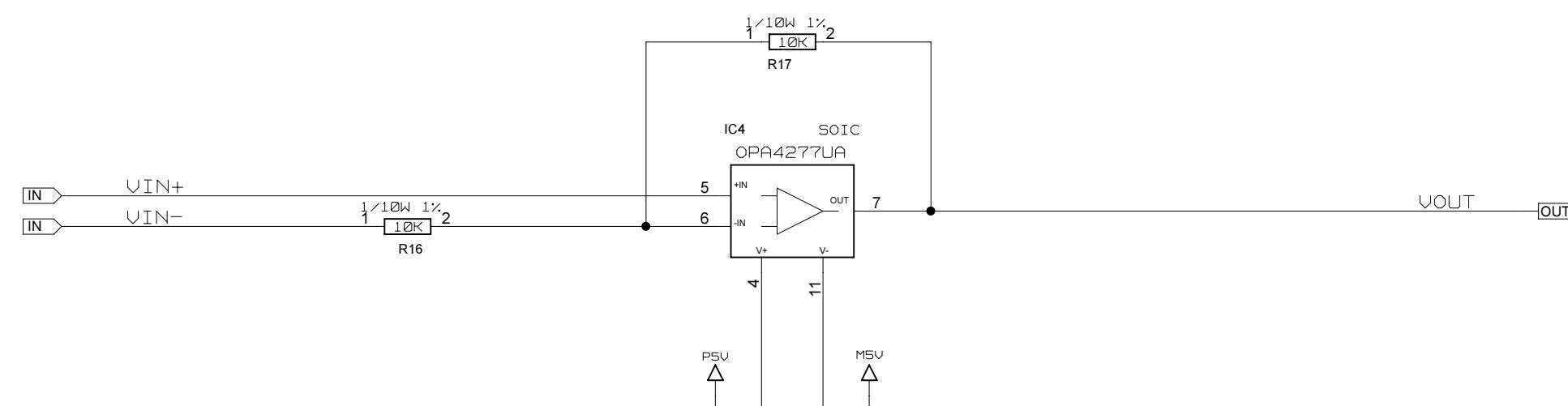
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USED ON						(C) UOB-HEP 20

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TITLE: fmc_tlu_v1_l1b
MODULE: pc023a_vthresh_buffer

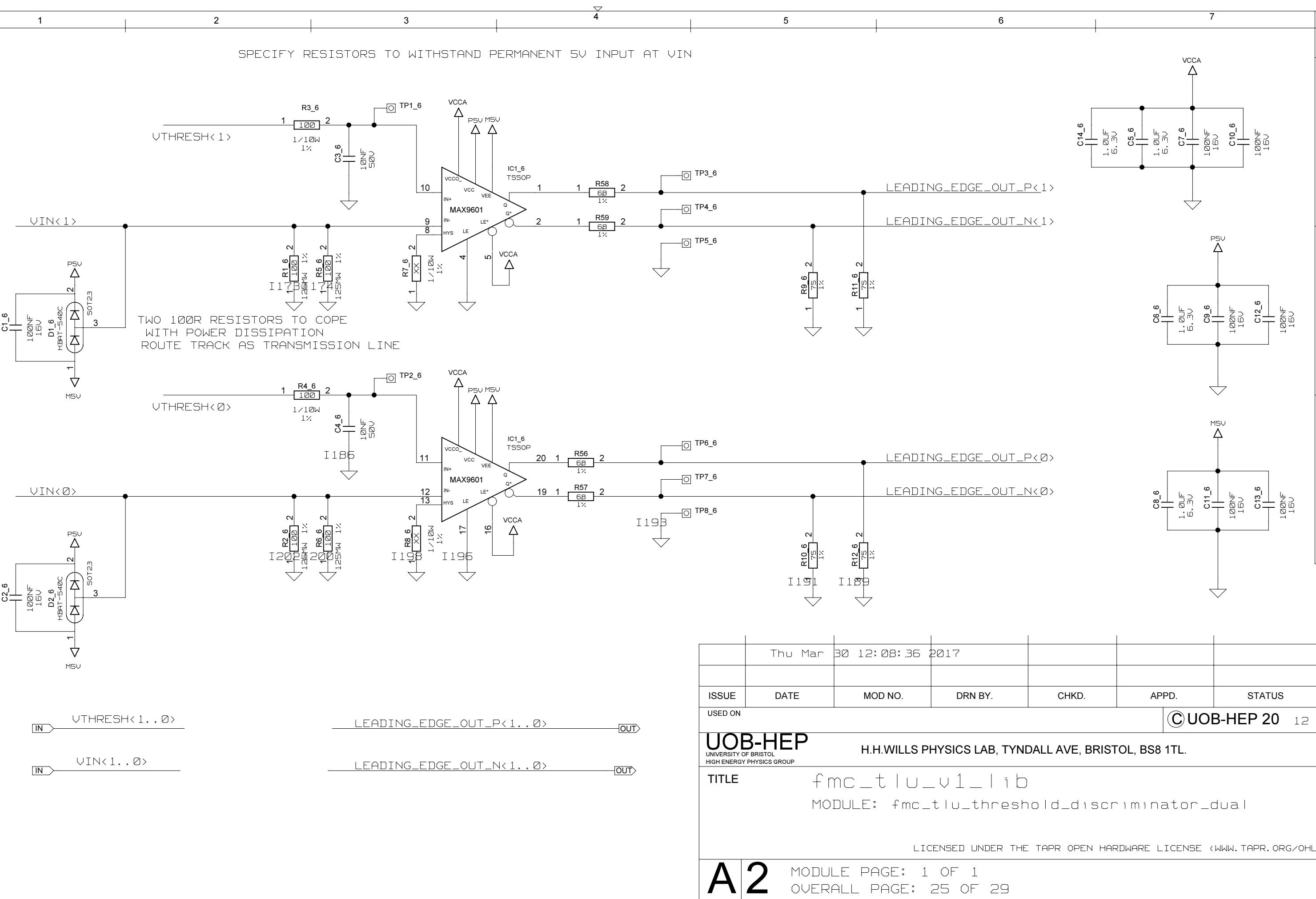
H.H.WILLS PHYSICS LAB, TYNDALL AVE, BRISTOL, BS8 1TL.

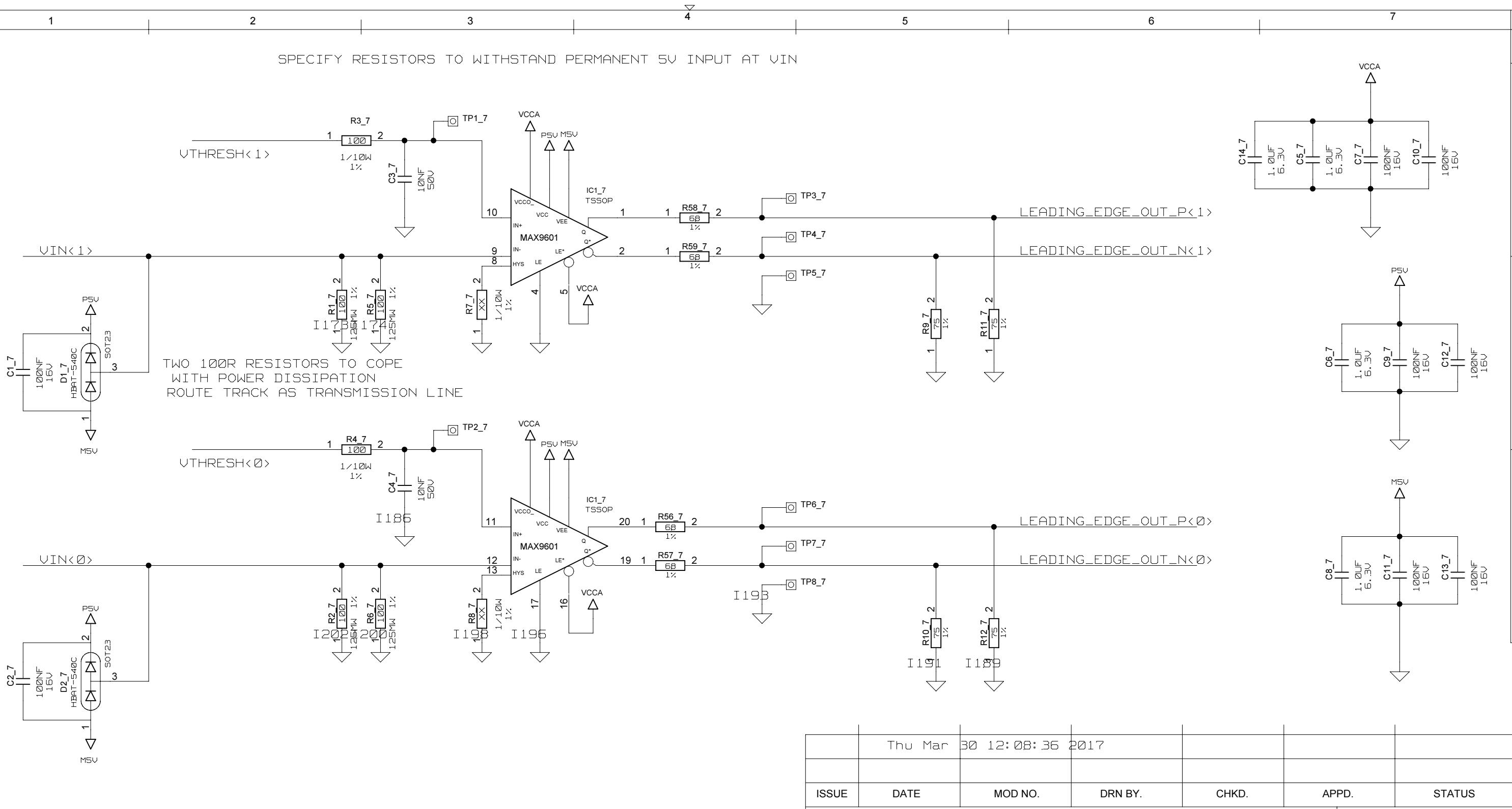
A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 24 OF 29

TOTAL NO. OF SHEETS

A2





Thu Mar 30 12:08:36 2017

DATE	MOD NO	DRN BY	CHKD	APPD	STATUS
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1

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fmc_tlu_v1.lib

MODULE: fmc_tlu_threshold_discriminator_dual

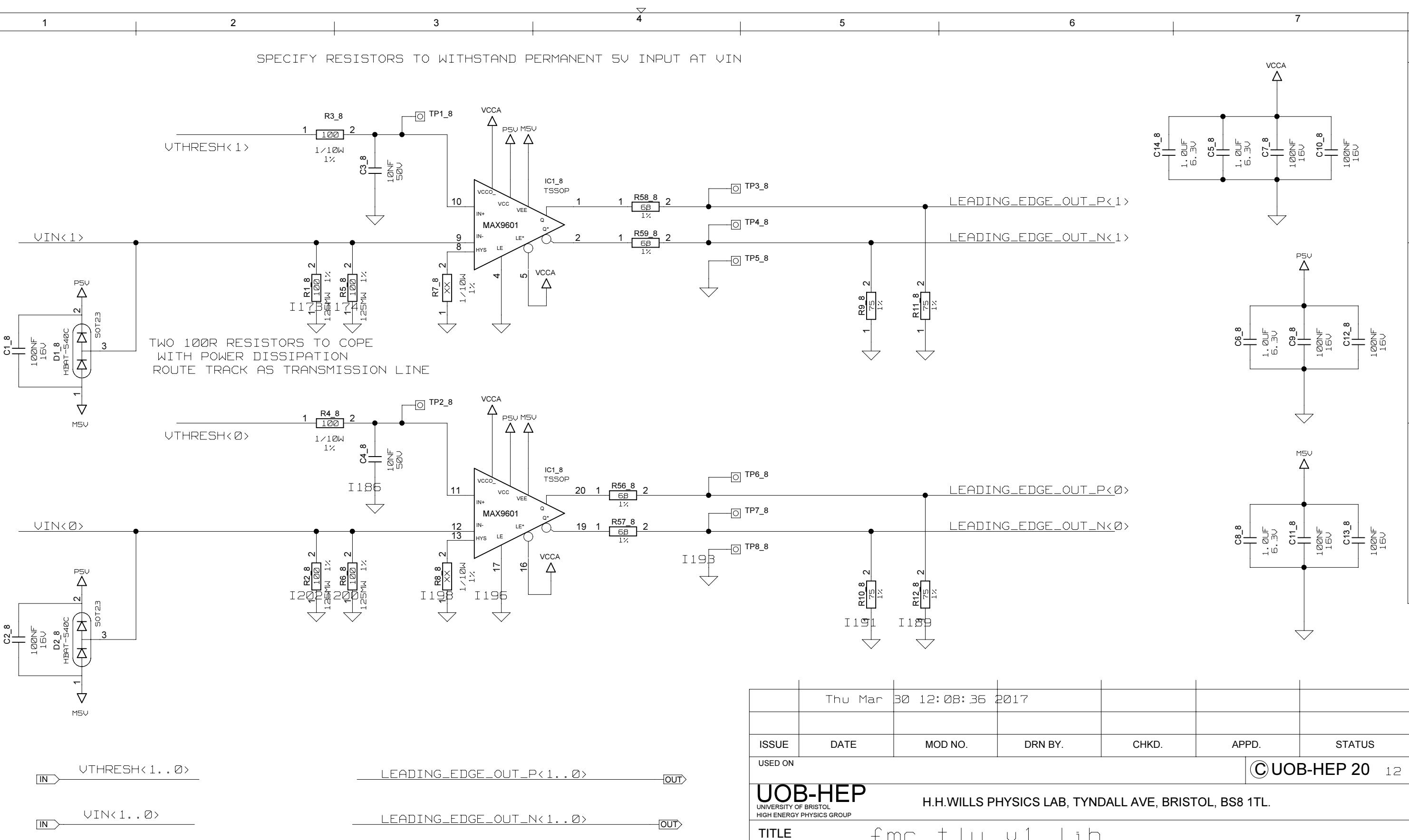
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A2

MODULE PAGE: 1 OF 1

OVERALL PAGE: 26 OF 29

TOTAL NO. OF SHEETS



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TITLE

fmc_tlu_v1plib

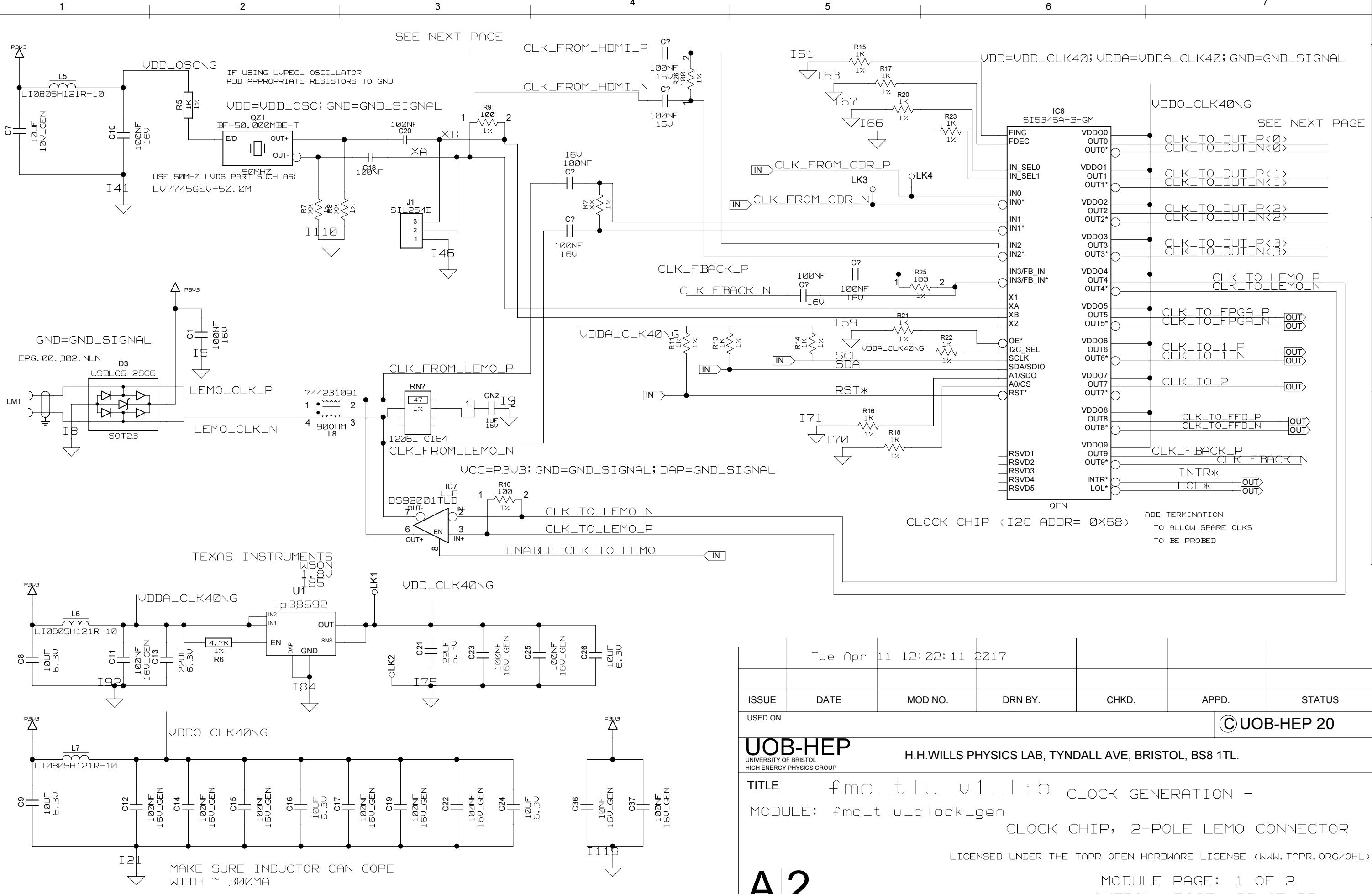
MODULE: fmc_tlu_threshold_discriminator_dual

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A2

MODULE PAGE: 1 OF 1
OVERALL PAGE: 27 OF 29

TOTAL NO. OF SHEETS



A2

ERALL PAGE: 28 OF 29

