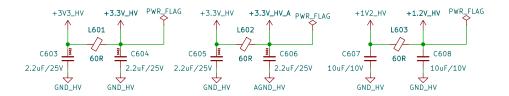


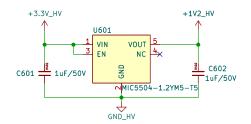
BOTTOM LEFT CONNECTOR BOTTOM RIGHT CONNECTOR 78 ESC_TX0_CLK|GPI085 '8 GND_HV ESC_TX1_DATA3|GPI072| 77 +3V3_Connector_HV +3V3_Connector_HV GND_HV GND_HV GND_HV> GND_HV 79 EPWM1B GPI0146 +3V3_Connector_HV +3V3_Connector_HV ENET_MII_RX_ERR | GPI0113 ENET_MII_TX_Data1 | GPI0122 EPWM1A | GPI0145 6 EPWM2B GPI0148 82 ESC_PHY1_LINKSTATUS | GP1068 +3V3_Connector_HV ENET MII TX EN GPI0118 ENET_MII_TX_ERR | GPI0119 ESC RX0 DVIGPI078 +3V3 Connector HV EPWM2AIGPI0147 GND_HV 83 84 ESC_PHY_RESETn | GPI076 +3V3_Connector_HV +3V3_Connector_HV GND_HV GND_HV GND_HV ESC_LED_STATE_RUN|GPI062 86 GND_HV 10 EPWM3B | GPI0150 +3V3_Connector_HV ENET_MII_TX_Data2 | GPI0123 ENET_MII_TX_CLK|GPI0120 EPWM3A|PGI0149 +3V3_Connector_HV GND HV 88 ESC_RXO_ERR | GPIO79 B8 ENET_MII_RX_Data3 | GPI0117 12 EPWM4B|GPI0152 GND HV ENET MII RX Data1 | GPI0115 EPWM4AIGPI0151 ESC RX1 DATA0 | GPI063 90 ESC_LED_RUN GPI061 92 GND_HV ENET_MII_TX_Data3 | GPI0124 | 89 14 GND_HV GND_HV FreePin2 ENET_MII_TX_Data0 | GPI0121 ESC_RX1_DATA3 | GPI066 GND_HV ENET_CLK_25MHz 91 16 EPWM5B GPI09 FreePin1 92 ENET_MII_RX_Data2|GPI0116 EPWM5AI GPI08 GND_HV GND_HV 93 94 ESC_RX1_DATA2 | GPI065 18 EPWM6B | GPI0156 MCAN_RX | GP 1070 1 MCAN_TX | GPIO4 GND_HV EPWM6AIGPI0155 ESC_RX1_DATA1 | GPI064 20 GND_HV 96 ESC_LED_LINK1_ACTIVE | GPI05 GND_HV> GND_HV FreePin3 FreePin4 GND_HV ESC_LED_ERR | GPI060 98 GND_HV 98 FreePin6 22 EPWM7B | GPI0158 12CA SCLIGPIO1 I2CA_SDA|GPI00 FreePin5 EPWM7AIGPI0157 GND_HV 00 ESC_LED_LINKO_ACTIVE | GPI05 SCIC_RX|GPI013 24 EPWM8B GPI0160 SCIC_TX | GPI012 GND_HV GND_HV EPWM8A | GPI0159 ESC_RX1_DV|GPI0136 FreePin7 101 02 ESC_TX1_DATA2 | GPI0134 02 FreePin8 26 GND_HV ESC_TX1_DATA1 | GPI0132 GND_HV GND_HV GND_HV 10 04 GND_HV 04 GND_HV 28 EPWM9B GPI0162 SPIA_MOSI GPI016 27 SPIA_MISO|GPI017 GND_HV 10. EPWM9AIGPI0161 06 ESC_I2C_SCL | GPI030 08 ESC_I2C_SDA | GPI029 06 GND_HV GND_HV 105 30 EPWM10B|GPI0164 ESC_TX1_DATA0 | GPI0131 10 SPIA_STEn | GPI019 SPIA_CLK | GPI018 EPWM10A|GPI0163 32 GND_HV ESC_LATCHO|GPI0125 10 GND HV GND_HV GND HV 10 GND_HV 12 ESC_SYNCO | GPI0127 14 ESC_TX1_ENA | GPI0129 10× 34 EPWM11B | GPI0166 SPIC_MISO|GPI0101 GND_HV 1 EPWM11A|GPI0165 SPIC_MOSI|GPI0100 36 EPWM12B|GPI0168 SPIC_CLK | GPI0102 ESC_LATCH1 | GPI0126 SPIC_STEn | GPI0103 EPWM12A | GPI0167 14 AGND_HV 38 GND_HV AGND_HV 11 ESC_SYNC1 | GPI0128 11 GND_HV GND_HV > GND_HV 16 GND_HV 18 GPI045 ADC_IN1415_N 115 16 ADC_A0A1_N 40 EPWM13B|GPI0138 GND_HV 11 SPIB_MOSI | GPI024 SPIB_MISO | GPI025 EPWM13A|GPI0137 ADC_IN1415_P 11 .18 ADC_A0A1_P 42 EPWM14B|GPI0140 ESC_TX1_CLK | GPI0130 11 EPWM14A|GPI0139 SPIB_STEn | GPI027 SPIB_CLK | GPI026 20 GPI045 22 GND_HV 24 SSIA_CLK | GPI056 AGND_HV 119 20 AGND_HV 44 GND_HV GND_HV GND_HV> GND_HV GP1044 46 EPWM15B|GPI0142 ADC_A4A5_N EPWM15A|GPI0141 SCIB_TX | GPI022 SCIB_RX | GPI023 ADC_A2A3_N GND_HV ADC_A2A3_P 123 48 EPWM16B GPI0144 24 ADC_A4A5_P GPI020_nErr1 GPI015_Err1 SSIA_FSS GPI057 12 EPWM16A | GPI0143 26 SSIA_TX [GPI056] 28 GND_HV 30 GPI053 32 GPI040 34 GND_HV 36 GPI050 38 GPI050 AGND_HV 125 .26 AGND_HV 50 GND_HV SSIA_RX GPI055 12 GPI021_nErr2 GPI095_Err2 GND_HV ADC_B0B1_N 12 28 ADC_B2B3_N 52 UARTA_RX | GPI043 GPI099_Err3 GND_HV 12 GPI0104_nErr3 UARTA_TX | GPI042 30 ADC_B2B3_P 54 ESC_TXO_DATA1|GPI088 GND_HV GND_HV ADC_B0B1_P ESC_TX0_DATA2 | GPI089 GPI052 1 32 AGND_HV GPI014_nErr4 GPI096_Err4 AGND_HV GND_HV GPI051 ADC_B4B5_N 13 34 ADC_C2C3_N 58 ESC_MDIO_CLK|GPI046 SC_TX0_DATA3 GPI090 GP1034 GND_HV 1 ADC_B4B5_P 135 .36 ADC_C2C3_P 60 ESC_TXO_ENA|GPI084 GPI049 13 ESC_RX0_DATA2|GPI082 GND_HV GND_HV 38 CANB_TX | GPI038 AGND_HV 13 .38 AGND_HV 62 GND_HV CANB_RX | GPI039 13 ENET_MDIO_CLK | GPI0105 ENET_RMII_CLK | GPI073 ⟨GND_HV 40 GND_HV 42 CANA_TX GPI037 ADC_DOD1_N 64 ESC_RXO_DATA1|GPI081 ENET_PPS0|GPI047 ADC_C4C5_N GND_HV ENET_MII_INTR | GPI0108 SC_RX0_DATA0 | GPI080 ADC_DOD1_P GND_HV > ADC_C4C5_P ESC_RX0_DATA3 | GPI083 CANA_RX | GPI036 GND_HV 44 CM-I2CA_SCL|GPI032 AGND_HV 143 68 GND_HV ENET_MDIO_DATA | GPI0106 44 AGND_HV ENET_REVMII_MDIO_RST | GPI0107 CM-I2CA_SDA|GPI031 ⟨GND_HV FSC PHYO_LINKSTATUS|GPIO86 46 GND_HV ADC_D2D3_N 145 .46 ADC_D4D5_N 70 ESC_MDIO_DATA|GPI0153 ENET_MII_COL|GPI0110 ENET_MII_RX_DV|GPI0112 GND_HV 14 48 P0_CLK_25MHz ADC_D2D3_P 147 48 ADC_D4D5_P 72 ESC_RXO_CLK | GPI077 GND_HV GND HV ESC_TX0_DATA0 | GPI087 P1_CLK_25MHz 14 50 GND_HV AGND_HV 149 50 AGND_HV 74 GND_HV GND_HV ENET_MII_CRS | GPI0109 ENET_PPS1 | GPI048 GND_HV 76 ESC_RX1_CLK | GPI069 ESC_RX1_ERR|GPI071 [NET_MII_RX_CLK | GPI0111 ENET_MII_RX_Data0 | GPI0114 ERM5-075-05.0-L-DV-K-TR ERM5-075-05.0-L-DV-K-TR ERM5-075-05.0-L-DV-K-TR ERM5-075-05.0-L-DV-K-TR

Ferrit Beads





LDO 1.2V for MCU Core

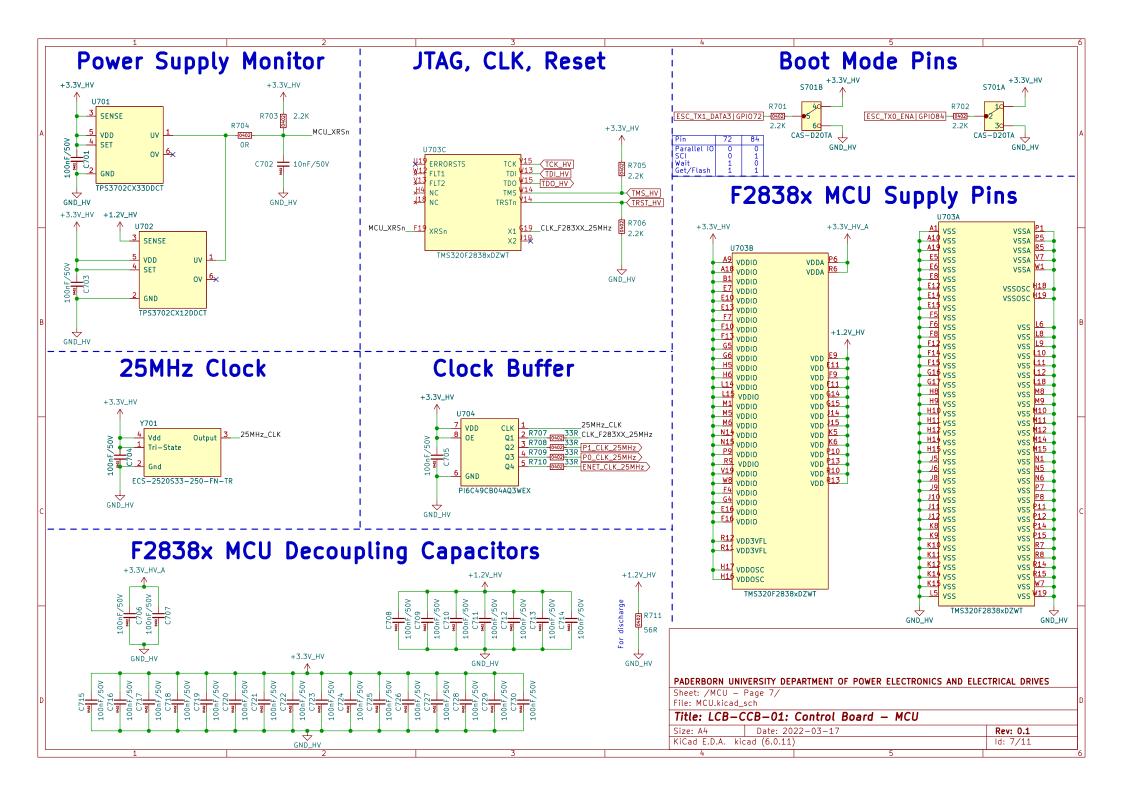


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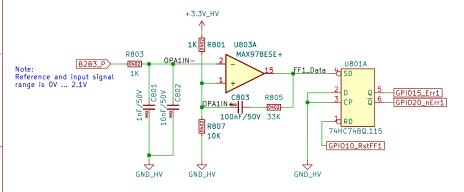
Sheet: /Power — Page 6/ File: Power.kicad_sch

Title: LCB-CCB-01: Control Board - Power

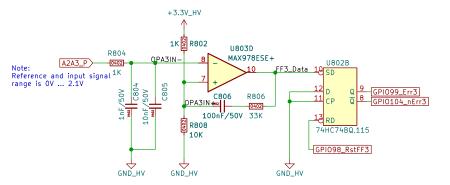
Size: A4	Date: 2022-03-17		Rev: 0.1	
KiCad E.D.A. kid	ad (6.0.11)		ld: 6/11	
	-	-		



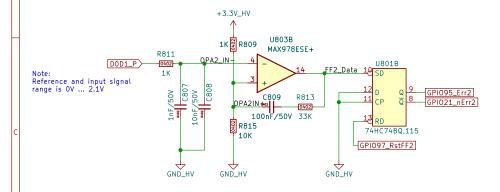
Error1 - B2B3P



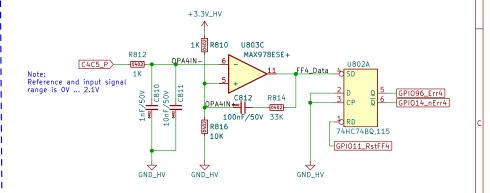
Error3 - A2A3



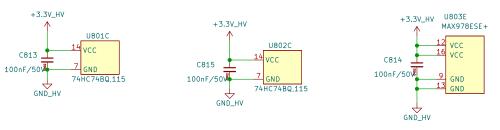
Error2 - D0D1



Error4 - C4C5



Power Supply



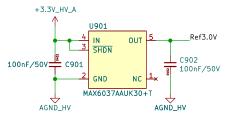
PADERBORN UNIVERSITY DEPARTMENT OF POWER ELECTRONICS AND ELECTRICAL DRIVES

Sheet: /Error Detection - Page 8/ File: ErrorcComparator.kicad sch

Title: ICR-CCR-01: Control Roard - Frror Detection
--

Size: A4	Date: 2022-03-17		Rev: 0.1	
KiCad E.D.A. k	icad (6.0.11)		ld: 8/11	
		C		

3V Referenz Voltage

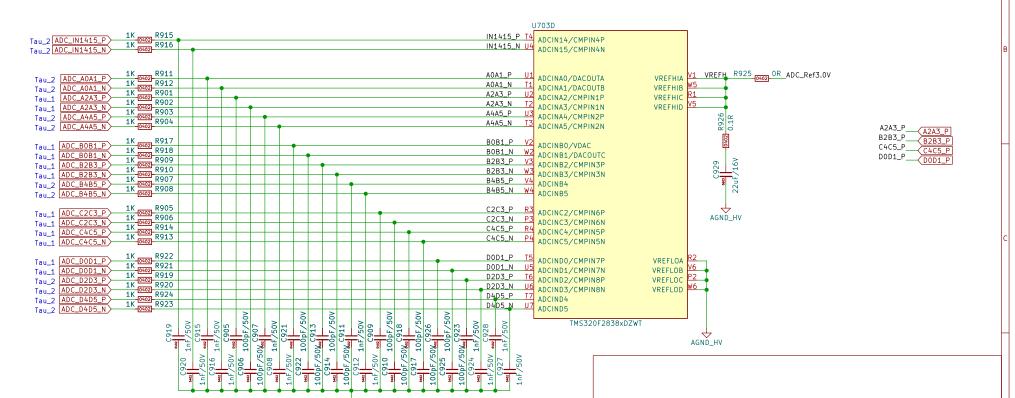


3V Referenz Voltage Buffer



Analog Input Filter MCU F2838X

AGND_HV



Tau_1 = 100ns = 1k0hm * 100pF

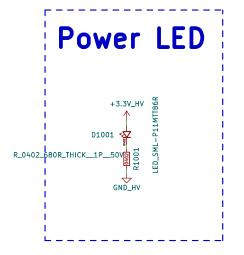
 $Tau_2 = 1\mu s = 1kOhm * 1nF$

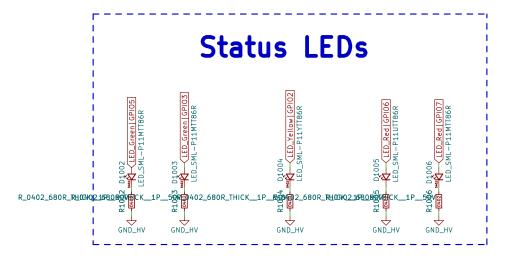
PADERBORN UNIVERSITY DEPARTMENT OF POWER ELECTRONICS AND ELECTRICAL DRIVES

Sheet: /Analog Filter — Page 9/ File: AnalogFilter.kicad_sch

	Title:	LCB-	CCB-01:	Control	Board	-	Analog	Filter
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Size: A4	Date: 2022-03-17		Rev: 0.1
KiCad E.D.A.	kicad (6.0.11)		ld: 9/11





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Sheet: /Status LEDs — Page 10/ File: LEDS.kicad_sch

	Size: A4	Date: 202	22-03-17		Rev: 0.1
	KiCad E.D.A. kid	ad (6.0.11)			ld: 10/11
_	4		5		

F2838x MCU GPIO configuration

```
GPIO_0
                                                                   16 ESC_LED_RUN|GPI061
              12CA_SDA | GP100
                                                                        ESC_LED_STATE_RUN|GPI062
                                     GPIO_1
                                                          GPI0_62
              I2CA_SCL | GPI01
                                                         GPIO 2
            LED Yellow I GPIO2
            LED_Green | GP103 >
                                     GPI0_3
                                     GPIO 4
              MCAN_TX | GPIO4
            LED Green | GPI05
                                     GPIO_5
                                                          GPIO_67 819 X
              LED_Red | GPI06
                                     GPIO_6
                                                        LED_Red | GPI07
                                     GPIO_7
                                     GPIO_8
                                     GPI0_9
                GPI010 RstFF1
                                     GPI0_10
                GPI011_RstFF4
                                     GPI0_11
                                                         GPIO_73 16 ENET_RMII_CLK | GPIO73
                                     GPI0 12
              SCIC_TX|GPI012
                                                          GPIO_74 C17 X
                                     GPI0_13
               SCIC_RX | GPI013
                                                          GPI0_75 016 ×
                 GPI014_nErr4
                                     GPI0_14
                                                         GPIO_75 16 | SC_PHY_RESETn | GPIO76 |
GPIO_76 15 | ESC_RXO_CLK | GPIO77 |
GPIO_78 15 | ESC_RXO_DV | GPIO78 |
GPIO_79 15 | ESC_RXO_DV | GPIO79 |
GPIO_80 14 | ESC_RXO_DATA0 | GPIO80 |
GPIO_81 14 | ESC_RXO_DATA1 | GPIO81 |
GPIO_82 14 | ESC_RXO_DATA2 | GPIO82 |
                                     GPI0_15
            SPIA_MOSIIGPI016
                                     GPI0_16
                                     GPI0_17
            SPIA_MISO | GPI017
             SPIA_CLK | GPI018
                                     GPI0_18
                                     GPI0_19
                                     GPI0_20
                 GPI021_nErr2
                                     GPI0_21
                                                         SCIB_TX | GPI022
                                     GPI0_22
                                     GPI0_23
              SCIB_RX | GPI023
                                     GPI0_24
            SPIB_MOSI | GPI024
                                     GPI0_25
                                     GPI0_26
                                                         GPIO_89

GPIO_89

GPIO_90

A5

ESC_TXO_DATA1 GPIO88

GPIO_90

A5

ESC_TXO_DATA2 GPIO90

A5

ESC_TXO_DATA3 GPIO90
            SPIB_STEn | GPI027
                                     GPI0_27
                                     GPI0_28
                 SCIA_RX_HV
                                     GPI0_29
          ESC_I2C_SDA|GPI029
                                                         GPI0_91 B5
                                                         GPI0_30
         ESC_I2C_SCL | GPI030
         CM-I2CA_SDAIGPI031
                                     GPIO 31
        CM-I2CA_SCL|GPI032
                               T13 GPI0_33
                       GPI033
                                U14 GPI0_34
                                                                        GPI095_Err2
                                                          GPI0_95
                                     GPI0_35
                                                         GPI0_96
             CANA_RX | GPIO_36
                                                         GPI0_97
              CANA_TX | GPI037
                                                          GPI0_98
                                                                        GPI098_RstFF3
                                                         GPI0_99 G1
              CANB_TX | GPI038
                                     GPI0_38
                                                        GPIO_100 H1
                                     GPI0_39
                                                                        SPIC_MOSI|GPI0100
              CANB_RX | GPI039
                                                        GPI0_101 H2
                                     GPI0_40
                                                                         SPIC_MISO | GPI0101
                                                        GPIO_102 H3 SPIC_CLK | GPIO102
                                     GPI0_41
                                                        GPIO_103 J1 SPIC_STEN | GPIO103
            UARTA TXIGPI042
                                     GPIO 42
            UARTA RXIGPI043
                                     GPI0_43
                                                        GPI0_104
                                                                        GPI0104_nErr3
                                     GPI0_44
                       GPI044
                                                        GPI0_105
                                                                        ENET_MDIO_CLK|GPI0105
                                                                        ENET_MDIO_DATA|GPI0106
                                     GPI0_45
                                                         GPI0_106
                                                                        ENET_REVMII_MDIO_RST|GPI0107
       ESC_MDIO_CLK | GPIO46
                                     GPI0_46
                                                        GPI0_107
           ENET_PPS0 | GPI047
                                     GPIO 47
                                                        GPI0_108
                                                                        ENET_MII_INTR | GPI0108
                                                        GPI0_109 N2
           ENET_PPS1 | GPI048
                                                                        ENET_MII_CRS | GPI0109
                                                        GPI0_110 M2
                                     GPI0_49
                       GPI049
                                                                        ENET_MII_COL | GPI0110
                                                        GPI0_111 M4
                                     GPI0_50
                                                                        ENET_MII_RX_CLK|GPI0111
                                                        GPI0_112 M3
                                                                        ENET_MII_RX_DV | GPI0112
                                     GPI0_51
                                                        GPI0_113 N4
                                                        GPIO_113 N4 ENET_MII_RX_ERR | GPIO113 |
GPIO_114 N3 ENET_MII_RX_Data0 | GPIO114
                                     GPI0 52
                                P17
                                     GPI0_53
                                                        GPIO_115 12 ENET_MII_RX_Data1 | GPIO115
                                     GPI0_54
              SSIA_TX | GPI054
                                                        GPI0_116 V10
                                     GPI0 55
                                                        GPIO_116 V10 ENET_MII_RX_Data2 | GPIO116 GPIO_117 ENET_MII_RX_Data3 | GPIO117
                               N16 GPI0_56
                                                        GPIO_117 | 12 | ENET_MIL_TX_EN|GPIO118 | GPIO_119 | 15 | ENET_MIL_TX_ERR|GPIO119
                                N18
             SSIA_FSS | GPI057
                                     GPI0_57
                                N17
ESC LED LINKO ACTIVE | GPI058
                                     GPI0_58
ESC_LED_LINK1_ACTIVE | GPIO_59 | M1 | GPIO_59
                                                        GPIO_120 15 ENET_MII_TX_CLK | GPIO120
                                                        GPI0_121 V16
                                                                       ENET_MII_TX_Data0 | GPI0121
```

TMS320F2838xDZWT

TMS320F2838xDZWT