

Power

9V battery
 5 V buck boost 2 A>
 3V3 1 A
 1V8 1 A
 1V2 1 A
 Power up sequence
 5 V Current limiter
 5V on/off
 Current measurement on overall current
 Voltage check on Batteries
 5V BURN OUT

See page 6

Ram Flash uSD

mDDR 1,8V 64 Mbyte 16 bit Wide
 uSD CARD HC version up to 32 Gbyte
 I2C boot ROM for secure boot
 SPI flash 3V3 16Mbyte

See page 2 and 3

TIAM1808

MCU

USB Host Client

USB Client 1,5 , 12 and 480 MBit
 USB Host 1,5, 12 Mbit
 5 Volt +500 mA (1,2A MAX)
 Current limiter
 Apple Autentic IC + Decoding MCU

See page 2 and 3

Display Button GUI

Display, B&W, 178X128 Reflective
 6 Buttons UP, DOWN, L, R, ACK/ON, BACK
 R and G Diodes
 Sound out

See page 2 and 3

Input

4 Input
 Pin 1: ADC 5 V PU
 Pin 2: I/O, PU,PD
 Pin 3: Ground
 Pin 4: 5 Volt +20 mA
 Pin 5: I/O, PU,
 SCK(I2C), UART(TX)
 Pin 6: I/O, ADC 5 V, PD,
 SDA(I2C), UART(RX)
 Auto detect Sensor and Motor

See page 4


Output

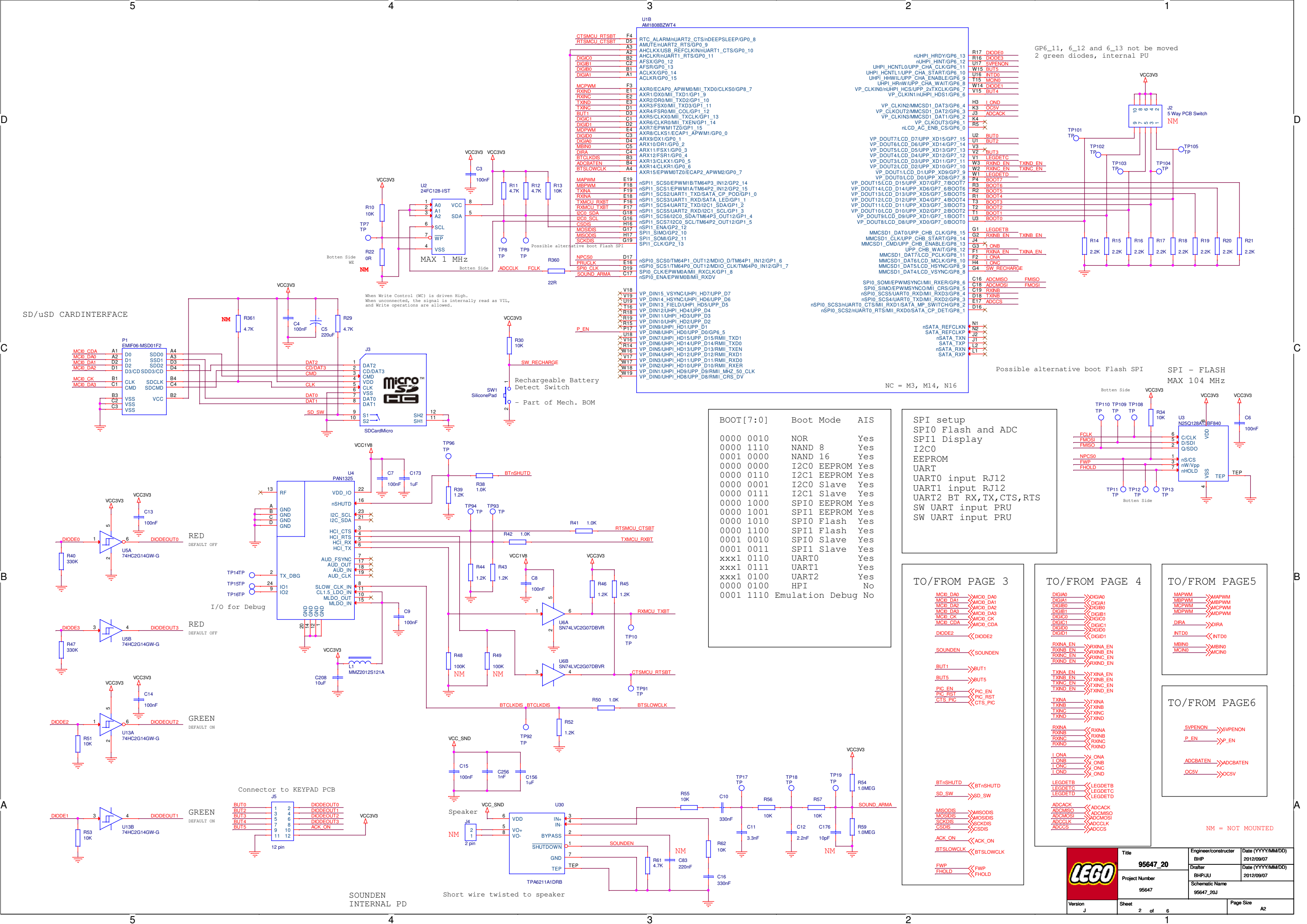
4 Output
 Pin 1: Motor Out PWM
 Pin 2: Motor Out PWM PU to pin 6
 Pin 3: Ground
 Pin 4: 5 Volt +20 mA
 Pin 5: I/O (OC), Tacho, PD,PU, ADC
 Pin 6: I Tacho, PU from Mx1
 Auto Detect Motor and Sensor

See page 5

Buttons
 Diodes
 are on the KEYPAD PCB

Note:
 PU = Pull Up
 PD = Pull Down
 SDA = Serial DATA
 SCK = Serial Clock
 ADC = Analog Digital Converter
 USB = Universal Serial Bus
 UART = Universal Asynchronous Receiver/Transmitter
 PWM = Pulse Wide Modulation
 GUI = Graphical User Interface
 B&W = Black and White
 mDDR = Mobile Double Data Rate synchronous DRAM
 R = Red
 G = Green
 uSD = micro Secure Digital
 I2C = Inter-Integrated Circuit
 SPI = Serial Peripheral Interface Bus
 PCB = Printed Circuit Board

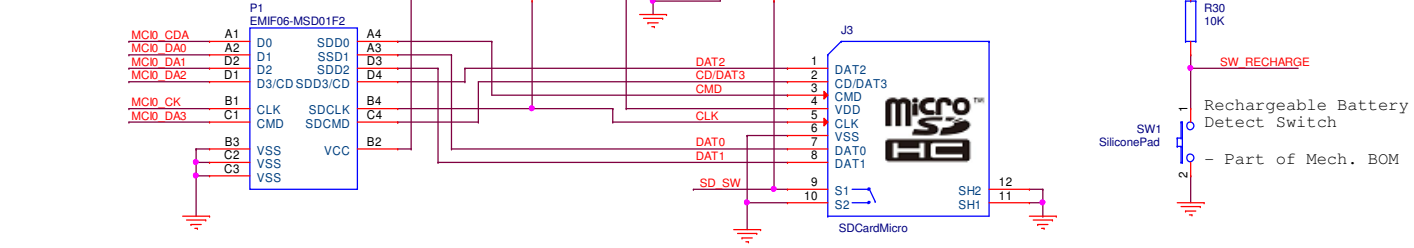
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	Project Number	95647	Drafter	BHPJU	Date (YYYY/MM/DD)	2012/09/07
	Version	J	Schematic Name	95647_20J	Page Size	A2
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Pin	Signal	Notes
F4	CTSMCU RTSBT	
D5	RTSMCU CTSBT	
A3	AMUTE/UART2_RTS/GP0_9	
A2	AHCLKX/USB_REFCLKIN/UART1_CTS/GP0_10	
C2	AHCLKR/UART1_RTS/GP0_11	
B2	DIGIC0	
B1	DIGIB1	
B1	DIGIB0	
A1	DIGIA1	
F3	MCPWM	
E1	AXR0/ECAP0_APWM0/MII_TXD0/CLKS0/GP6_7	
E2	AXR1/DX0/MII_TXD1/GP1_9	
E3	AXR2/DR0/MII_TXD2/GP1_10	
D1	AXR3/FSX0/MII_TXD3/GP1_11	
D3	AXR4/FSR0/MII_C0L/GP1_12	
C1	AXR5/CLKX0/MII_TXCLK/GP1_13	
D2	AXR6/CLKR0/MII_TXEN/GP1_14	
E4	AXR7/EPWM1720/GP1_15	
D4	AXR8/CLKS1/ECAP1_APWM1/GP0_0	
C3	AXR9/DX1/GP0_1	
C5	AXR10/DR1/GP0_2	
C4	AXR11/FSX1/GP0_3	
B3	AXR12/FSR1/GP0_4	
B4	AXR13/CLKR1/GP0_5	
A4	AXR14/CLKR1/GP0_6	
A4	AXR15/EPWM0T20/ECAP2_APWM2/GP0_7	
E19	MAPWM	
F18	MBPWM	
F18	TXNA	
E18	TXNA	
F16	TXMCU RXBT	
F17	TXMCU TXBT	
G18	IC0 SDA	
G16	IC0 SCL	
H16	CSJ5	
G17	MOSDIS	
H17	MISODIS	
G19	SCKDIS	
D17	NPCSO	
E16	PRUCLK	
D19	SPI0_CLK	
C17	SOUND_ARMA	
V18	VP_DIN15_VSYNC/UHPI_HD7/UPP_D7	
V19	VP_DIN14_HSVM/UHPI_HD5/UPP_D6	
V16	VP_DIN13_FIELD/UHPI_HD5/UPP_D5	
V18	VP_DIN12/UHPI_HD4/UPP_D4	
V19	VP_DIN11/UHPI_HD3/UPP_D3	
V15	VP_DIN10/UHPI_HD2/UPP_D2	
V17	VP_DIN9/UHPI_HD1/UPP_D1	
V18	VP_DIN8/UHPI_HD0/UPP_D0/GP6_5	
V16	VP_DIN7/UHPI_HD15/UPP_D15/RMI_TXD1	
V14	VP_DIN6/UHPI_HD14/UPP_D14/RMI_TXD0	
V16	VP_DIN5/UHPI_HD13/UPP_D13/RMI_TXEN	
V17	VP_DIN4/UHPI_HD12/UPP_D12/RMI_RXD0	
V17	VP_DIN3/UHPI_HD11/UPP_D11/RMI_RXD1	
V18	VP_DIN2/UHPI_HD10/UPP_D10/RMI_RXER	
V19	VP_DIN1/UHPI_HD9/UPP_D9/RMI_MWZ_50_CLK	
V19	VP_DIN0/UHPI_HD8/UPP_D8/RMI_CR5_DV	
R17	DIODE0	
R16	DIODE3	
U17	SUPENON	
W15	BUT5	
U16	INTD0	
T15	MCINO	
W14	DIODE1	
V15	BUT4	
H3	IOND	
K3	OC5V	
J3	ADCACK	
R5	X	
U2	BUT0	
U1	BUT2	
V3	X	
V2	BUT3	
V1	LEGDETC	
W3	RXIND EN	
W2	RXNC EN	
W1	LEGDETD	
P4	BOOT7	
R3	BOOT6	
R2	BOOT5	
R1	BOOT4	
T3	BOOT3	
T2	BOOT2	
T1	BOOT1	
U3	BOOT0	
G1	LEGDETB	
G2	RXNB EN	
J4	X	
K4	ONB	
F1	RXNA EN	
F2	IONA	
H4	IONC	
G4	SW RECHARGE	
C16	ADCMISO	
C18	ADCMOSI	
C19	RXNB	
D18	TXNB	
D16	ADCCS	
D16	X	
N1	X	
N2	X	
J2	X	
J1	X	
L2	X	
L1	X	

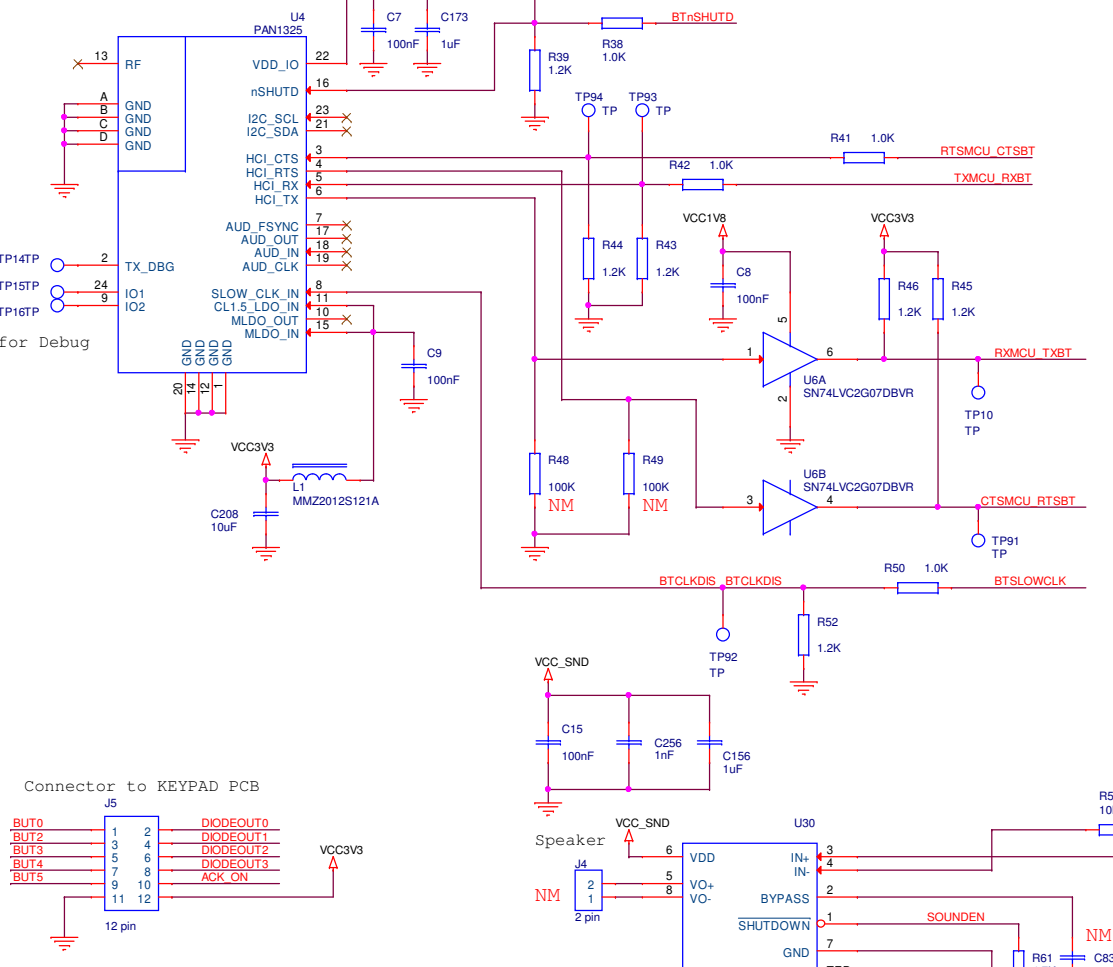
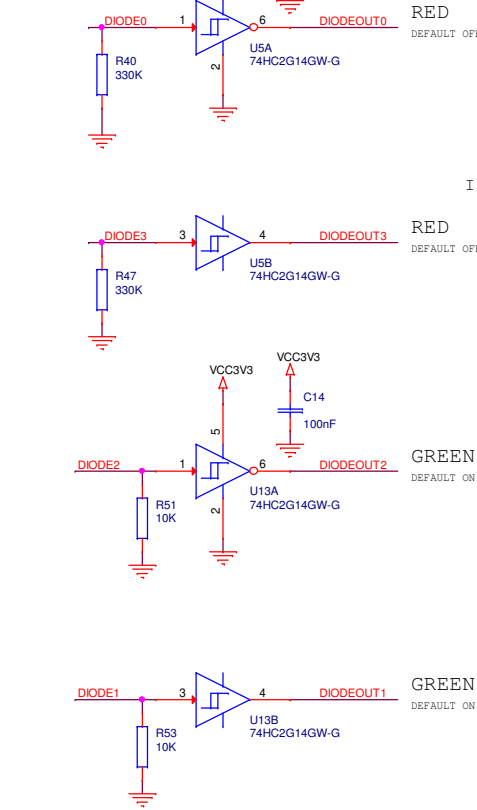
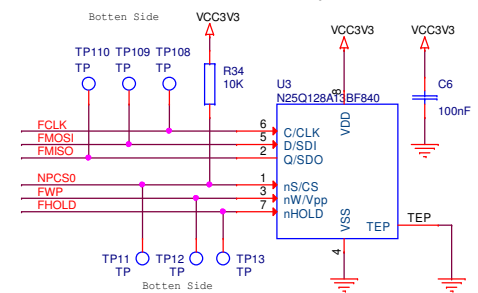
GP6_11, 6_12 and 6_13 not be moved
2 green diodes, internal PU

SD/USD CARDINTERFACE



BOOT[7:0]	Boot Mode	AIS
0000 0010	NOR	Yes
0000 1110	NAND 8	Yes
0001 0000	NAND 16	Yes
0000 0000	I2C0 EEPROM	Yes
0000 0110	I2C1 EEPROM	Yes
0000 0001	I2C0 Slave	Yes
0000 0111	I2C1 Slave	Yes
0000 1000	SPI0 EEPROM	Yes
0000 1001	SPI1 EEPROM	Yes
0000 1010	SPI0 Flash	Yes
0000 1100	SPI1 Flash	Yes
0001 0010	SPI0 Slave	Yes
0001 0011	SPI1 Slave	Yes
xxxx 0110	UART0	Yes
xxxx 0111	UART1	Yes
0000 0100	HPI	No
0001 1110	Emulation Debug	No

SPI setup
 SPI0 Flash and ADC
 SPI1 Display
 I2C0
 EEPROM
 UART
 UART0 input RJ12
 UART1 input RJ12
 UART2 BT RX, TX, CTS, RTS
 SW UART input PRU
 SW UART input PRU



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MCIO_DA0	MCIO_DA0
MCIO_DA1	MCIO_DA1
MCIO_DA2	MCIO_DA2
MCIO_DA3	MCIO_DA3
MCIO_DA4	MCIO_DA4
MCIO_DA5	MCIO_DA5
MCIO_DA6	MCIO_DA6
MCIO_DA7	MCIO_DA7
MCIO_DA8	MCIO_DA8
MCIO_DA9	MCIO_DA9
MCIO_CDA	MCIO_CDA
DIODE2	DIODE2
SOUNDEN	SOUNDEN
BUT1	BUT1
BUT5	BUT5
PIC_EN	PIC_EN
PIC_RST	PIC_RST
CTS_PIC	CTS_PIC

TO/FROM PAGE 4

DIGIA0	DIGIA0
DIGIA1	DIGIA1
DIGIB0	DIGIB0
DIGIB1	DIGIB1
DIGIC0	DIGIC0
DIGIC1	DIGIC1
DIGID0	DIGID0
DIGID1	DIGID1
RXNA_EN	RXNA_EN
RXNB_EN	RXNB_EN
RXNC_EN	RXNC_EN
RXND_EN	RXND_EN
TXNA_EN	TXNA_EN
TXNB_EN	TXNB_EN
TXNC_EN	TXNC_EN
TXND_EN	TXND_EN
RXNA	RXNA
RXNB	RXNB
RXNC	RXNC
RXND	RXND
IONA	IONA
IONB	IONB
IONC	IONC
IOND	IOND
LEGDETB	LEGDETB
LEGDETC	LEGDETC
LEGDETD	LEGDETD
ADCACK	ADCACK
ADCMISO	ADCMISO
ADCMOSI	ADCMOSI
ADCCS	ADCCS
ADCCS	ADCCS

TO/FROM PAGE 5

MAPWM	MAPWM
MBPWM	MBPWM
MCPWM	MCPWM
MDPWM	MDPWM
DIRA	DIRA
INTD0	INTD0
MBNO	MBNO
MCINO	MCINO

TO/FROM PAGE 6

5VPENON	5VPENON
P_EN	P_EN
ADCBATEN	ADCBATEN
OC5V	OC5V

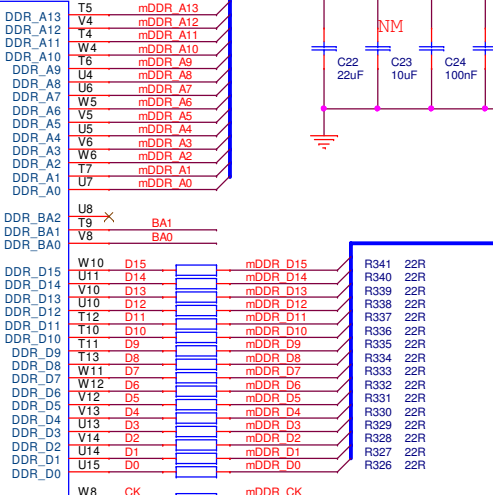
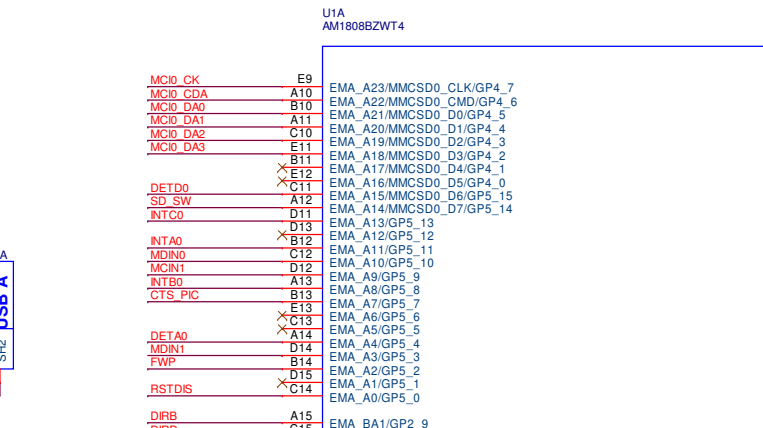
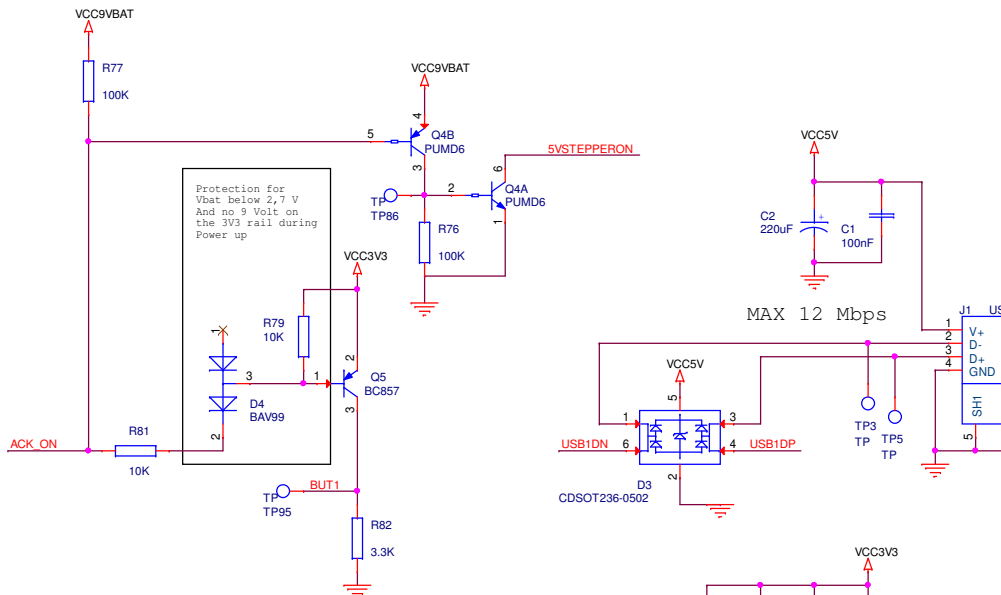
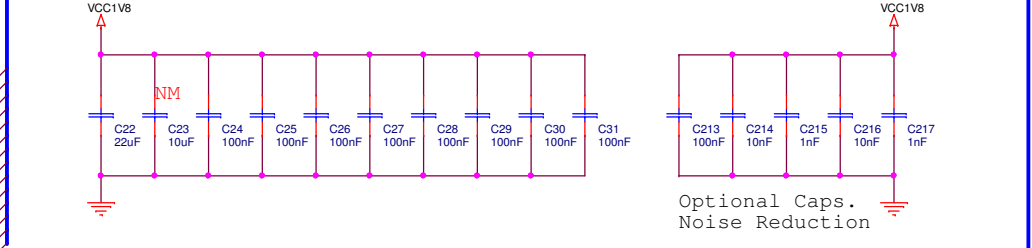
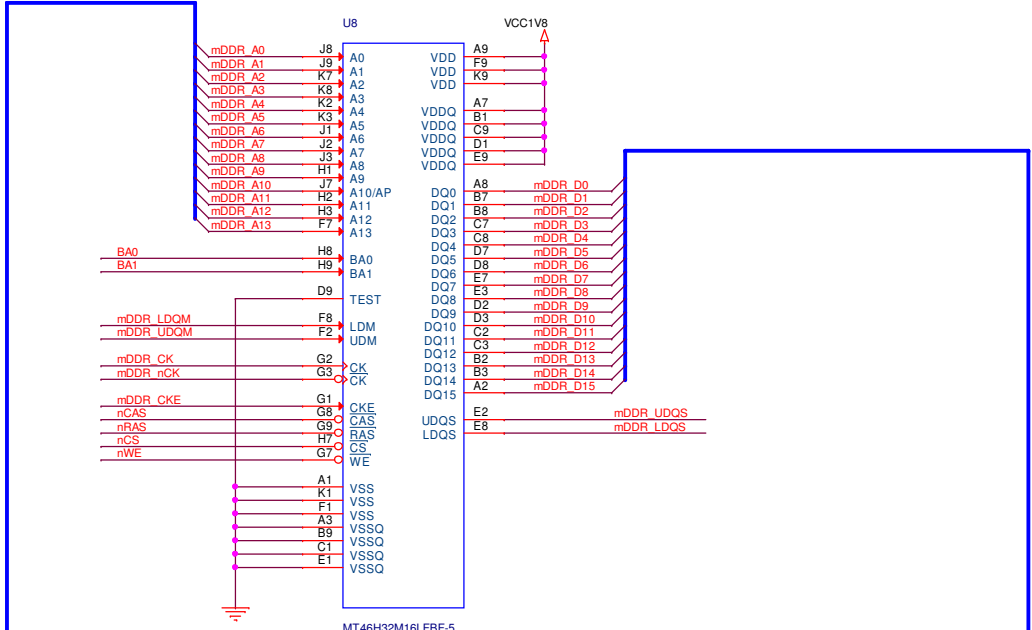
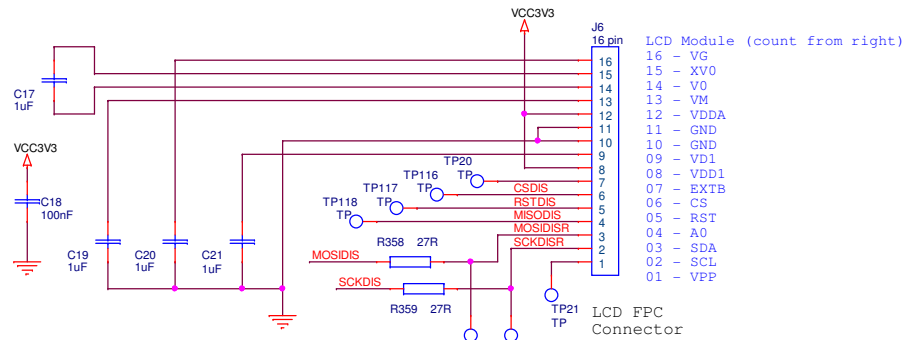
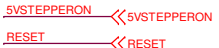
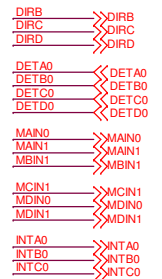
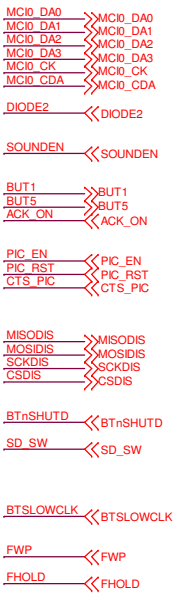
Version J Sheet 2 of 6 Page Size A2

LEGO
 Title: 95647_20
 Project Number: 95647
 Engineer/constructor: BHP
 Drafter: BHP/JU
 Date (YYYY/MM/DD): 2012/09/07
 Date (YYYY/MM/DD): 2012/09/07
 Schematic Name: 95647_20J

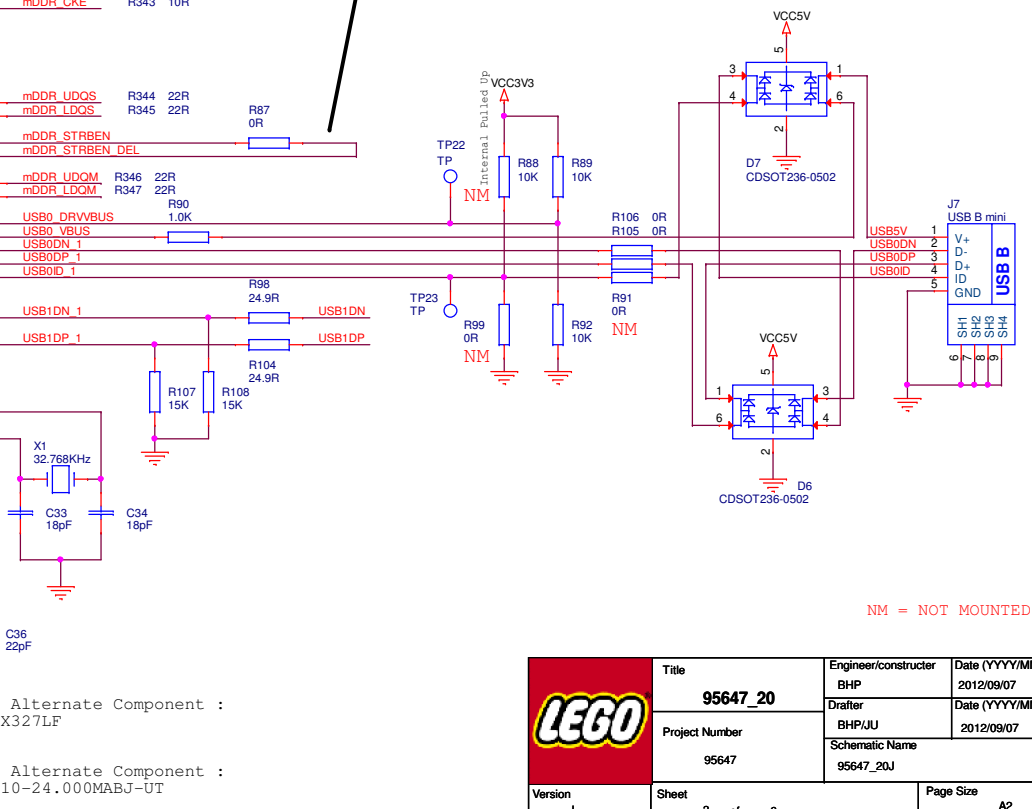
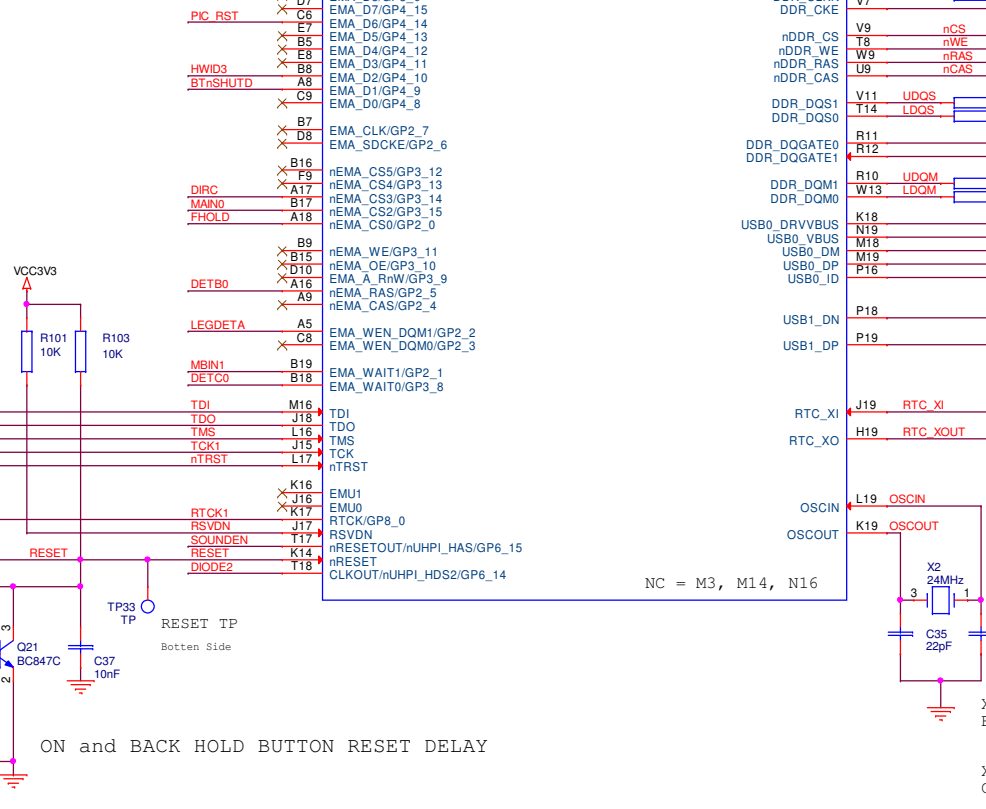
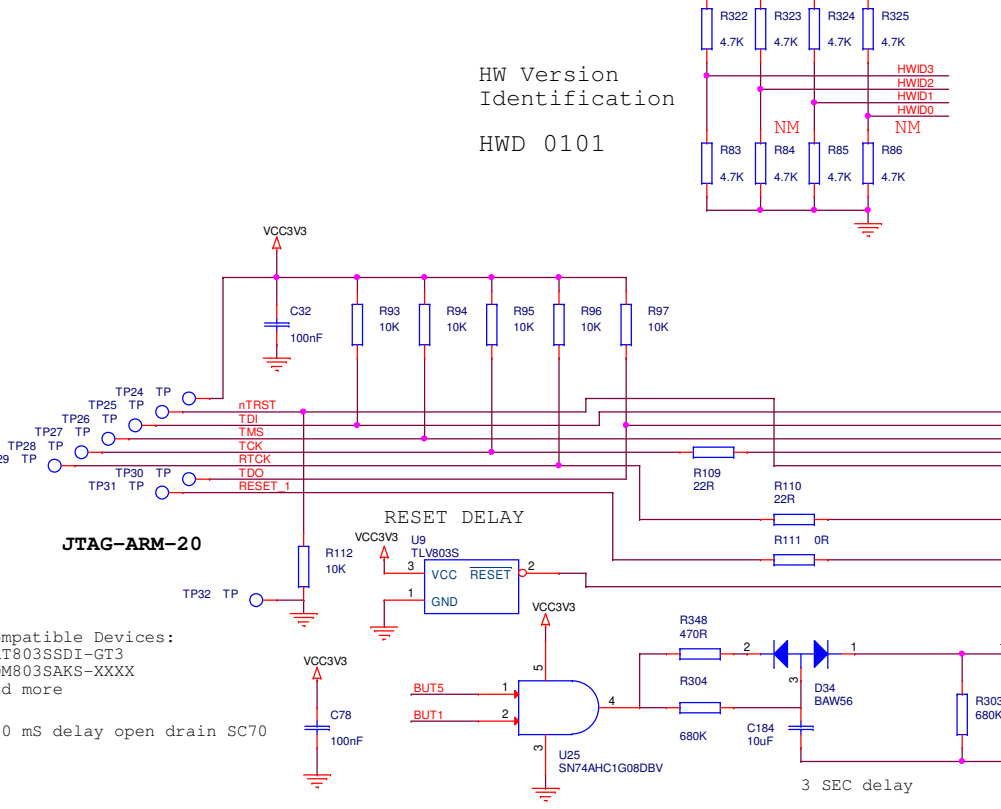
SOUNDEN
INTERNAL PD

Short wire twisted to speaker

NM = NOT MOUNTED



DQS1/DQS0 , DQM1/DQM0 : Target 50 ohms to GND for each signal Keep away from other signals.
 CLKP/CLKN : Route Clock Signal as 100ohm Differential Pair,match Trace length
 NOTE THIS PAIR OF SIGNALS PHYSICALLY CLOSE TO THE DATA BUS. TOTAL TRACE LENGTH OF STRBEN + STRBEN_DEL SHOULD BE SUM OF DDR CLOCK LENGTH +AVG(DQS0 + DQS1) LENGTH. KEEP BOTH SIGNALS CLOSE TO EACH OTHER. THERE IS NO IMPEDANCE REQUIREMENT FOR THESE SIGNALS



NM = NOT MOUNTED

Compatible Devices:
 CAT803SSDI-GT3
 ADM803SAKS-XXXX
 and more

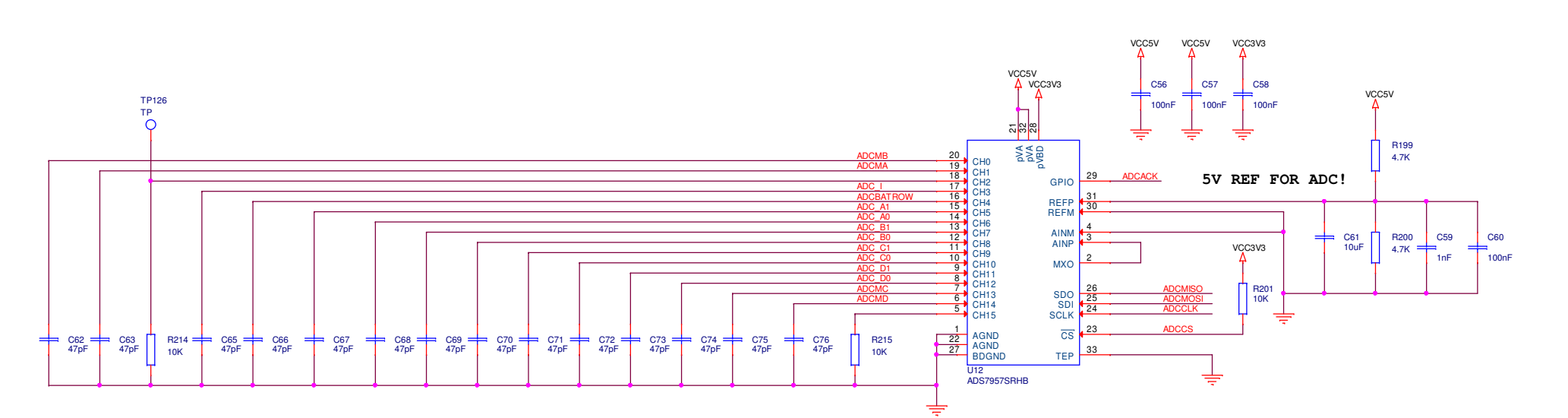
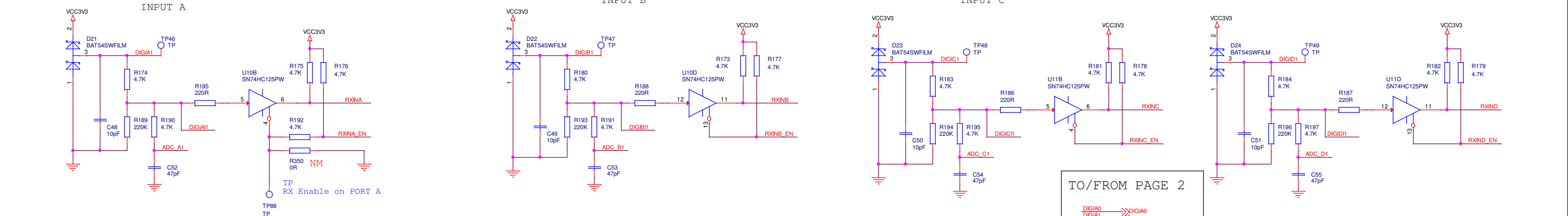
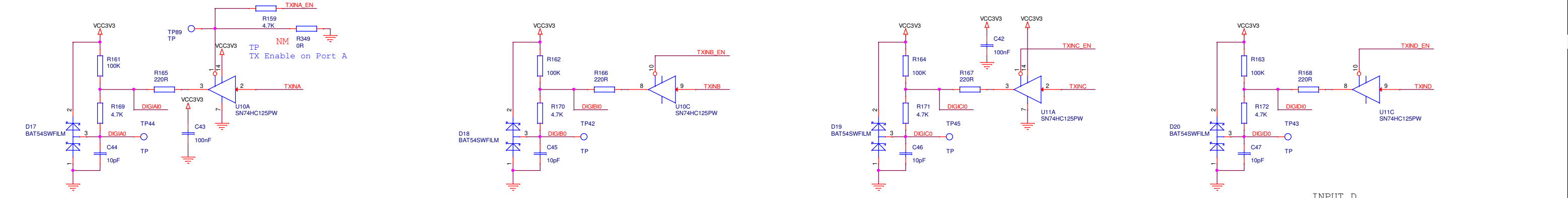
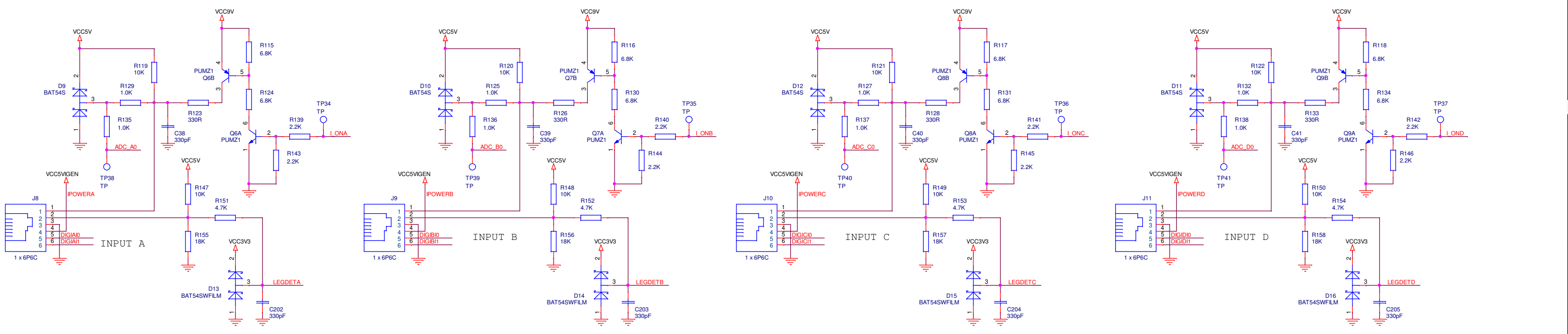
240 mS delay open drain SC70

X1 Alternate Component :
 FSX327LF

X2 Alternate Component :
 CS10-24.000MABJ-UT

LEGO	Title	95647_20	Engineer/constructor	BHP	Date (YYYY/MM/DD)	2012/09/07
	Project Number	95647	Drafter	BHP/JU	Date (YYYY/MM/DD)	2012/09/07
Version	Sheet	Schematic Name		Page Size		
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TO BE REDRAWN



TO/FROM PAGE 2

DIGIA0	DIGIA0
DIGIA1	DIGIA1
DIGIB0	DIGIB0
DIGIB1	DIGIB1
DIGIC0	DIGIC0
DIGIC1	DIGIC1
DIGID0	DIGID0
DIGID1	DIGID1
RXINA_EN	RXINA_EN
RXINB_EN	RXINB_EN
RXINC_EN	RXINC_EN
RXIND_EN	RXIND_EN
TXENA_EN	TXENA_EN
TXINB_EN	TXINB_EN
TXINC_EN	TXINC_EN
TXIND_EN	TXIND_EN
RXINA	RXINA
RXINB	RXINB
RXINC	RXINC
RXIND	RXIND
L_ONA	L_ONA
L_ONB	L_ONB
L_ONC	L_ONC
L_OND	L_OND
LEGDETB	LEGDETB
LEGDETC	LEGDETC
LEGDETD	LEGDETD
ADCCMA	ADCCMA
ADCCMB	ADCCMB
ADCCMC	ADCCMC
ADCCMD	ADCCMD
ADCCACK	ADCCACK
ADCMISO	ADCMISO
ADCMOSI	ADCMOSI
ADCCCLK	ADCCCLK
ADCCS	ADCCS

TO/FROM PAGE 3

LEGDETA	LEGDETA
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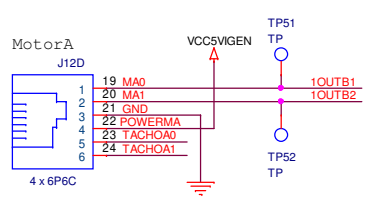
ADC_I	ADC_I
ADCBATROW	ADCBATROW

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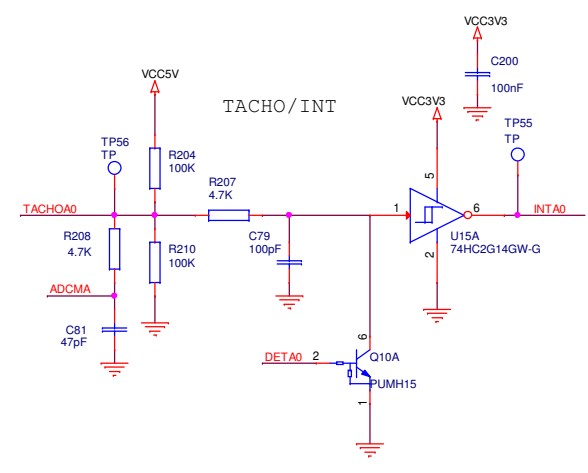
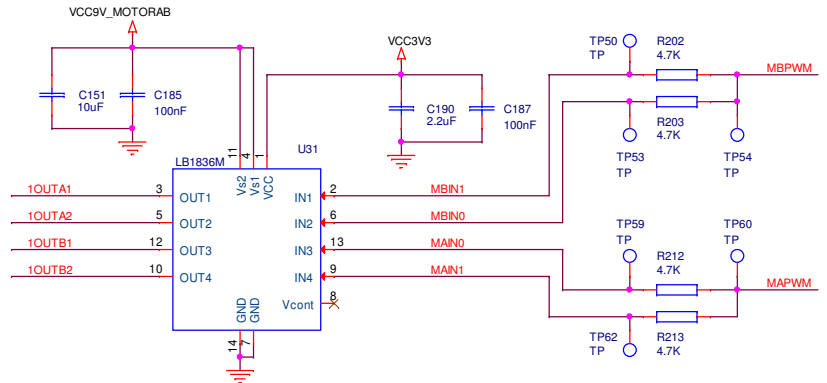
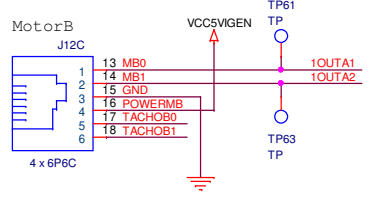
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ADCCMB	ADCCMB
ADCCMC	ADCCMC
ADCCMD	ADCCMD

NM = NOT MOUNTED

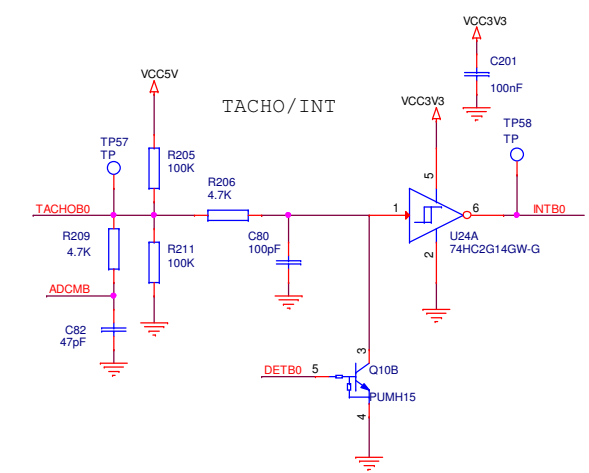
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	Project Number	95647	Drafter	BHP/JU	Date (YYYY/MM/DD)	2012/09/07	
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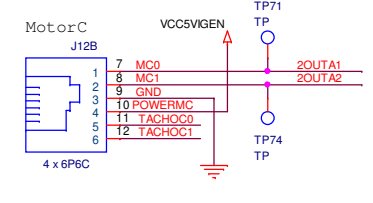
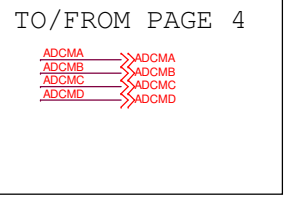
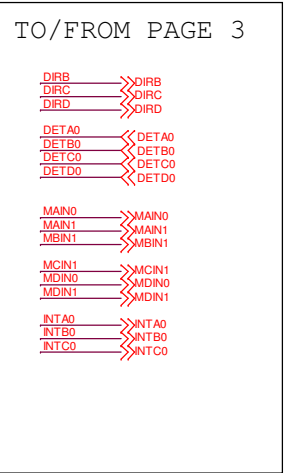
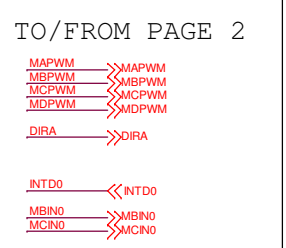
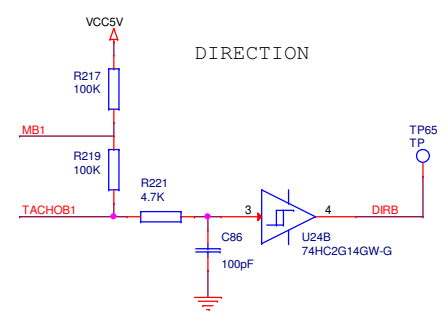
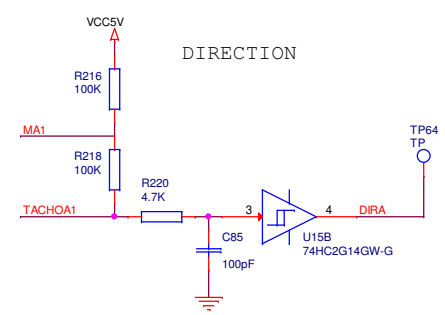
Possible alternative Motor detection



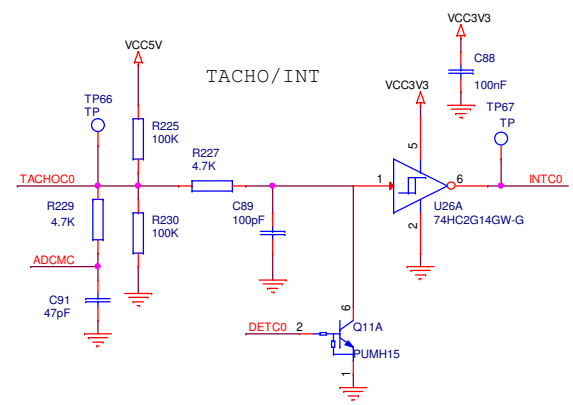
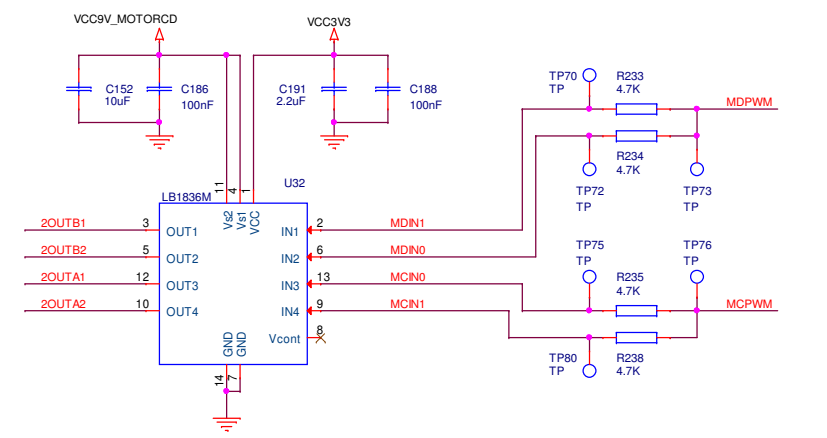
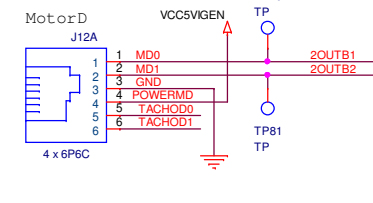
MotorA



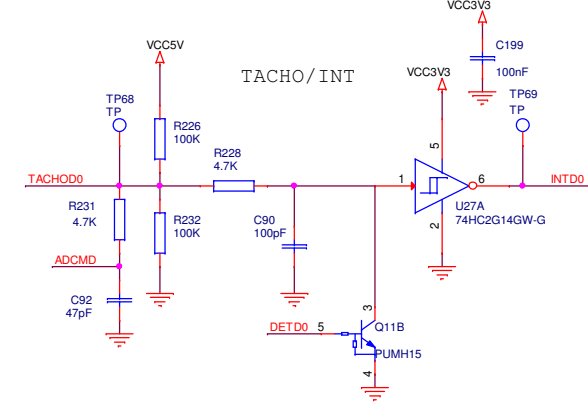
MotorB



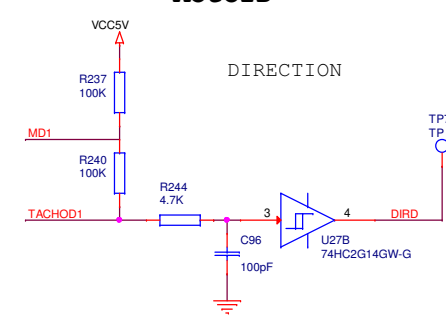
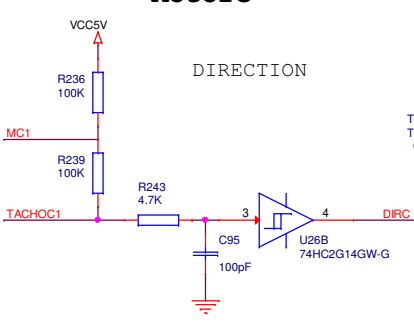
Possible alternative Motor detection



MotorC

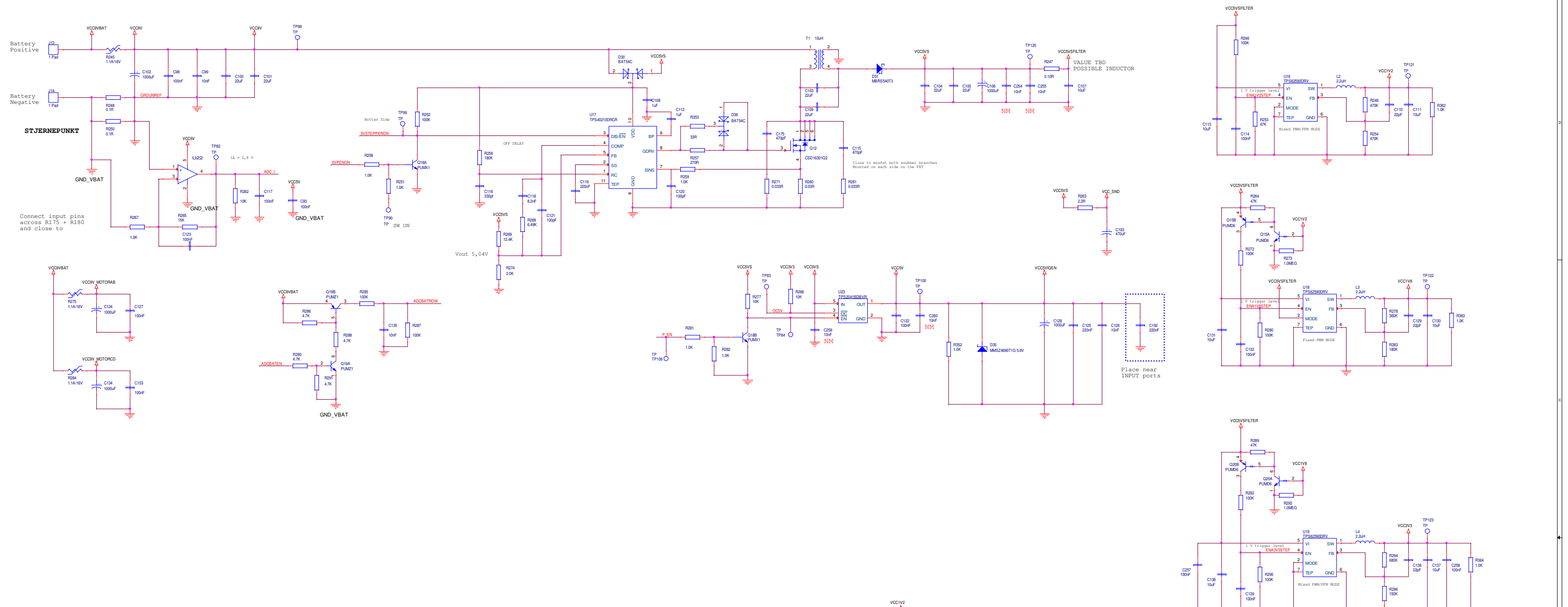


MotorD

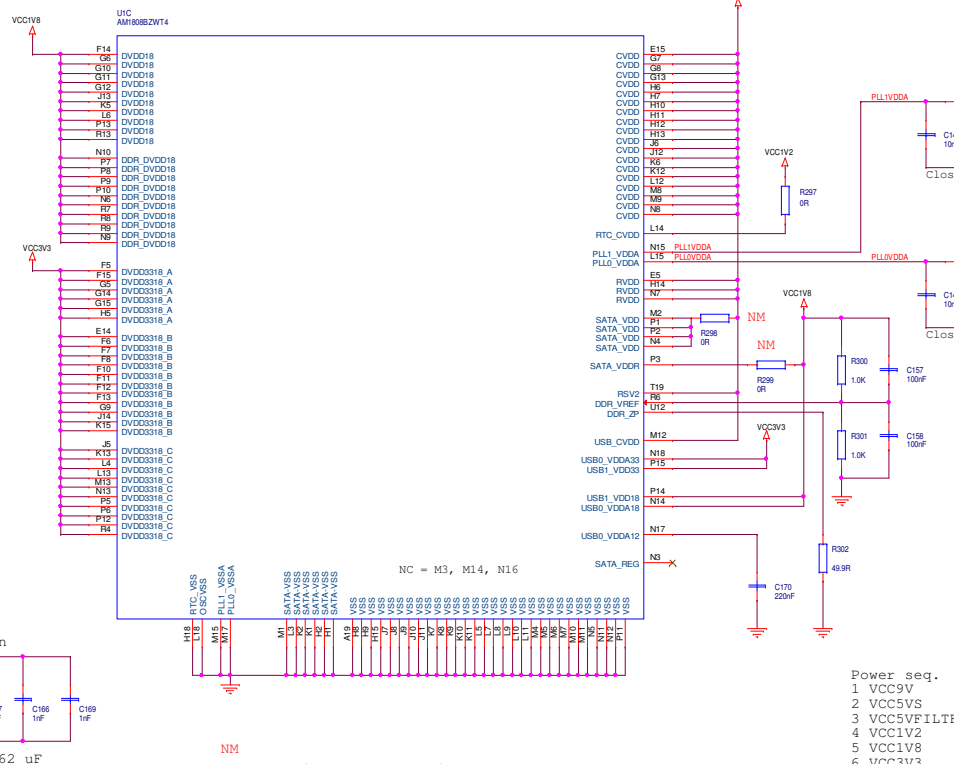
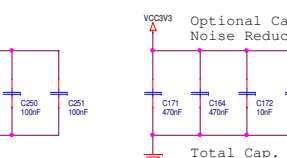
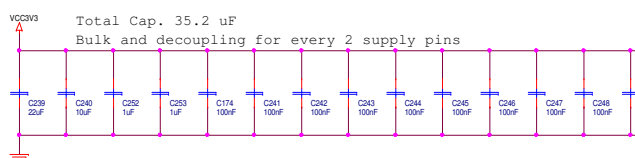
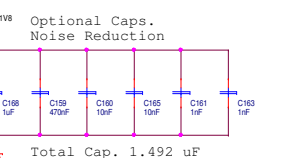
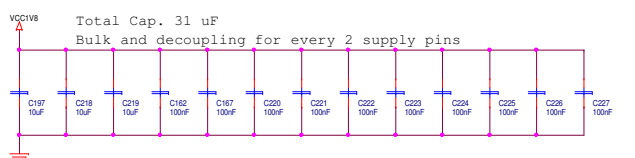
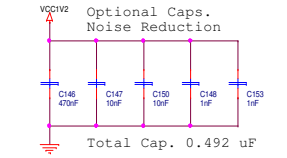
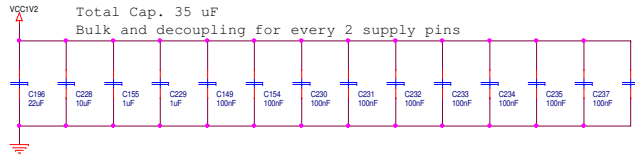


NM = NOT MOUNTED

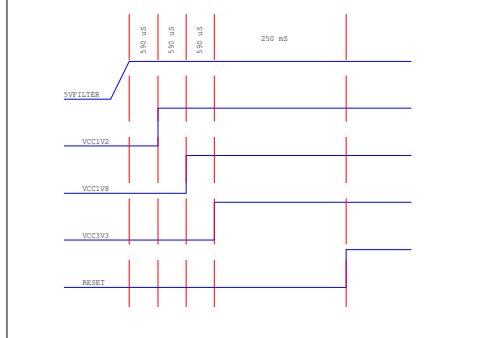
	Title	95647_20	Engineer/constructor	BHP	Date (YYYYMMDD)	2012/09/07
	Project Number	95647	Drafter	BHP/JU	Date (YYYYMMDD)	2012/09/07
	Version	J	Sheet	5 of 6	Page Size	A2
	Schematic Name					



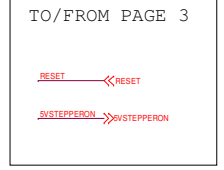
Decoupling for MCU



POWER SEQ. AM1808



- Power seq.
- 1 VCCV5
 - 2 VCCV3
 - 3 VCCV5FILTER
 - 4 VCCV2
 - 5 VCCV18
 - 6 VCCV3V
 - 7 VCCV5
 - 8 VCC_SND



NM - NOT MOUNTED