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Revisions

Rev	Description	Date	Approved
A	Prototype Release	21 May 12	J.H.
A1	Update from DVT - Change shunt on J6 to pins 2-3 - Change shunt on J24 to pins 2-4 - Change shunts on J17 to wirejumpers from 8-12,9-11,2-6,3-5 - Change R224, R225, R226, R227, R230 and R231 to zero ohms.	02 Jul 12	J.H.
AX1	Update from DVT - Remove R224 thru R227,R230 & R231 and connect pin 2 of C211,C213, C216,C221,C234, and C235 to GND. - Change connection to J18 pin3 to MB_PTC6 and J18 pin 6 to MB_PTC7. - Change connection to J17 pin 2 to be PTB1,pin 5 to be PTB0,pin 8 to be PBB3,and pin 11 to be PTB2. - Update default shunt positions to match. - Update MCU to the new library parts.	07 Nov 12	J.H.
AX2	- Crystal & OSC Circuits, Series resistor options were replaced by Jumpers. (210-30004)	20 Mar 13	Barbara
AX3	- Q1 MFR-PN changed to PDTC115TE. - Y200 Prefered MFR-PN changed to CX3225GA40000D0PTVZ1 - SW3 MFR-PN changed to 1101M2S3CQE2 - R235 changed to two pin jumper JP6.	22 Mar 13 25 Mar 13 27 Mar 13	Marilyn & Barbara
B	A085 Release	05 Apr 13	Marilyn & Barbara
BX1	1. R16 - 249K changed to 24.9K(470-30990) 2. R18 - 80.6K changed to 8.06K(470-30936) 3. R17 - 2.15K changed to 510(470-80725) 4. R19 - 82.5K changed to 18K(470-30974) 5. C15 - 56PF changed to 680PF(150-79131) 6. C16 - 100PF changed to 150PF(150-77532) 7. R20 - 200K changed to 11K(470-30951) 8. Added 1x2 HDR (J25) and 10K pullup resistor(R249) on the SBC_FS1 to V_PRE. 9. Added pull down resistor R250-100K (470-75597) on SBC_IO2. 10. SBC_IO3 net pulled up to SB_VCORE through R251 -10K(470-75416). 11. C14 -22UF changed to 4.7UF(150-30266) 12. C248 -22UF changed to 4.7UF(150-30266) 13. C7 -4.7UF changed to 1.0UF(150-77475) 14. Added pull down resistors 100K (R252, R253 and R254) on the nets SBC_IO1, SBC_IO4 and SBC_IO5 respectively. 15. C17 -10uF changed to 22uF(150-77933) 16. J24 HDR2x3 repalced by R256 & R257 4.99K(470-30913) & also marked as DNP.	17 Sep 14	Fraser Jamaal
BX2	1. D19-(9480-75144), J27-2x2H(211-75268) Q3-(480-78185) added on V_PRE circuitry. 2. SW4(510-75093), R259-4.99K(470-30913) C255 -0.1uf(150-75142),R262-510K (470-76166) added near to J10 Connector. 3. R260-24.9K(470-30990)&R261-8.06K (470-30936)connected to FB_CORE, 4. IO_1 FB_CORE connected to J10-3rd Pin	18 Sep 14	Fraser Jamaal
BX3	1. J26-2x2H(211-75268) added across R252 to SBC_IO1. 2. R260-24.9K(470-30990) are connected to SB_VCORE,instead of FB_VCORE. 3. Pin 3 of Q3(480-78185)connected to GND. 4. Pin 3 of Q3(480-78185)connected to GND 5. Pin 2 of J24 connected to Pin 1 of Q3. A070 Release	26 Sep 14	Fraser Jamaal
BX4	1. Changed default assigned net names to user defined net names(VPRE_D and GATE_LS)	30 Sep 14	Fraser Jamaal
C	1. Removed the pull up resistors on the Power SBC's select pin (U3.31) and replaced two pull down resistors (49.9K || 4.9K) by a single pull down resitor (5.1K ohm). A085 Release	08 Oct 14	Fraser Jamaal
C1	U3, replaced 315-79478 with 315-80391	03 Mar 15	DK
D	Revision-C A085 Release 1.U3 is changed to 315-80572 (FS6522LAE); 2.Y201 is change to 230-75398 (ECS-3953C-080B) 3.L2 is change to 180-78432 (ACT1210-510-2P-TL00) 4.R19 is change to 470-81693	31 Jul 18	Dennis Zeng
D1	add jumper setting table (see page 3)	24 Oct 18	J. Q.

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ICAP Classification: CP: IUO: X PUBI:

Designer: Jay Hartvigsen	Drawing Title: MPC5744P-144DS	
Drawn by: Jay Hartvigsen	Page Title: Title Page	
Approved: Barbara	Size C / Document Number SCH-27513: SPF-27513	Rev D1
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1. Interrupted lines coded with the same letter or letter combinations are electrically connected.

2. Device type number is for reference only. The number varies with the manufacturer.

3. Special signal usage:
   _B Denotes - Active-Low Signal
   <> or [] Denotes - Vectored Signals

4. Interpret diagram in accordance with American National Standards Institute specifications, current revision, with the exception of logic block symbology.

Power & Ground Nets

MOTHER BOARD SUPPLIED POWER

1.25V_MB_SR	1.25V	
3.3V_MB_SR	3.3V	
5V_MB_SR	5V	From the MB switching regulator - only used to provide power back to the MB I/'O circuits
5V_MB_LR	5V	From the MB linear regulator - used for 3.3V on the daughter card

EXTERNALLY SUPPLIED POWER

EXT_PWR	12V	External power supplied through the barrel connector to the System Basis Chip (SBC) - MC33907
EXT_PWR_SW	12V	EXT_PWR out of the power switch - used by the SBC to detect input power
VSUP	12V	EXT_PWR_SW after the reverse voltage protection diode
1.25V_DC_LR	1.25V	External power into pin 1 of the terminal block
3.3V_DC_LR	3.3V	External power into pin 2 of the terminal block
5V_DC_LR	5V	External power into pin 3 of the terminal block

SYSTEM BASIS CHIP (SBC) POWER NETS

VSUP12	12V	Power into the pre-regulator switching regulator in the SBC
V_PRE	6.5V	Power out of the pre-regulator switching regulator in the SBC
SB_VCORE	3.3V	Power out of the core switching regulator in the SBC
SB_VAUX	3.3V	Power out of the VAUX linear regulator in the SBC
SB_VCCA	3.3V	Power out of the VCCA linear regulator in the SBC
VCAN	5V	Power out of the CAN linear regulator in the SBC

POWER TO THE MCU

VDD_LV_CORE	1.25V	Power to the core logic on the MCU
VDD_LV_EXT	1.25V	Power derived from VDD_HV_PMU and regulated by the MCU through an external transistor
VDD_LV_PLL	1.25V	Power to the pll circuit on the MCU
VDD_HV_PMU	3.3V	Power to the pmu circuit on the MCU
VDD_HV_IO	3.3V	Power to the I/O circuits on the MCU
VDD_HV_OSC0	3.3V	Power to the oscillator circuit on the MCU
VDD_HV_FLA0	3.3V	Power to the flash memory circuit on the MCU
VDD_HV_ADV0/1	3.3V	Power to the ADC circuit on the MCU
VDD_HV_ADR0	3.3V	Reference voltage to the ADC0 circuit on the MCU
VDD_HV_ADR1	3.3V	Reference voltage to the ADC1 circuit on the MCU

GROUND NETS

GND	0V	
VSS_PLL	0V	Filtered ground for the on chip PLL circuit
VSS_OSC	0V	Filtered ground for the on chip oscillator circuit
VSSA	0V	Filtered ground for the on chip ADC circuits

REF DES	JUMPER(DEFAULT)	PAGE NAME
J12	1-2	04 MPC5744 MCU in SKT
J6	2-3	04 MPC5744 MCU in SKT
J1,J16,J19,J23,J3,J20,J21,J22	3-4	04 MPC5744 MCU in SKT
J7	1-2, 3-4, 5-6	05 MPC5744 MCU
J27	1-2, 3-4	06 Power, RST, LIN, CAN
J25,J15	1-2	06 Power, RST, LIN, CAN
J9	1-3, 2-4	06 Power, RST, LIN, CAN
J18,J17	2-3, 5-6, 8-9, 11-12	06 Power, RST, LIN, CAN
J10	3-4	06 Power, RST, LIN, CAN
J2,J26	NONE	06 Power, RST, LIN, CAN
J13	2-3	08 MB Connections 1

REF DES	ASSY_OPT	PAGE NAME
R229,R221,JP6,JP1,JP5,JP2, R232,C243	DNP	04 MPC5744 MCU in SKT
U2,TP26	DNP	05 MPC5744 MCU
D12,R15	DNP	06 Power, RST, LIN, CAN

REF DES	SWITCH(DEFAULT)	PAGE NAME
SW4	A	06 Power, RST, LIN, CAN
SW3	OFF	06 Power, RST, LIN, CAN

Sheet 4

MPC5744P MCU in Socket

40 MHz XTAL

8 MHz Crystal Oscillator

SMA for External Clock

Power Selector for VDD_LV_CORE

Power Selector for VDD_LV_PLL

Power Selector for VDD_HV_PMU

Power Selector for VDD_HV_IO

Power Selector for VDD_HV_OSC0

Power Selector for VDD_HV_FLA0

Power Selector for VDD_HV_ADV0/1

Power Selector for VDD_HV_ADR0

Power Selector for VDD_HV_ADR1

VSS_PLL, VSS_OSC, VSSA filters

Sheet 6

External Power Jack

External Power Switch & LED

External Power Terminal Block

Terminal Block Power LEDs

SBC Power Supply

Vcca/Vaux Voltage Sel Header

SBC I/O & MCU FCCU_F0,1 Header

SBC Power LEDs (V_PRE, VCCA, VAUX, VCAN, VCORE)

SBC FS0 and FS1 LEDs

CAN Interface

LIN Interface

RESET & POR Push Buttons & LEDs

SPI, CAN, & LIN Source Headers

Sheet 5

MPC5744P MCU

MC_RGM Boot Selector

Sheet 7

Nexus Connector

JTAG Connector

Sheets 8 and 9

Motherboard Connectors

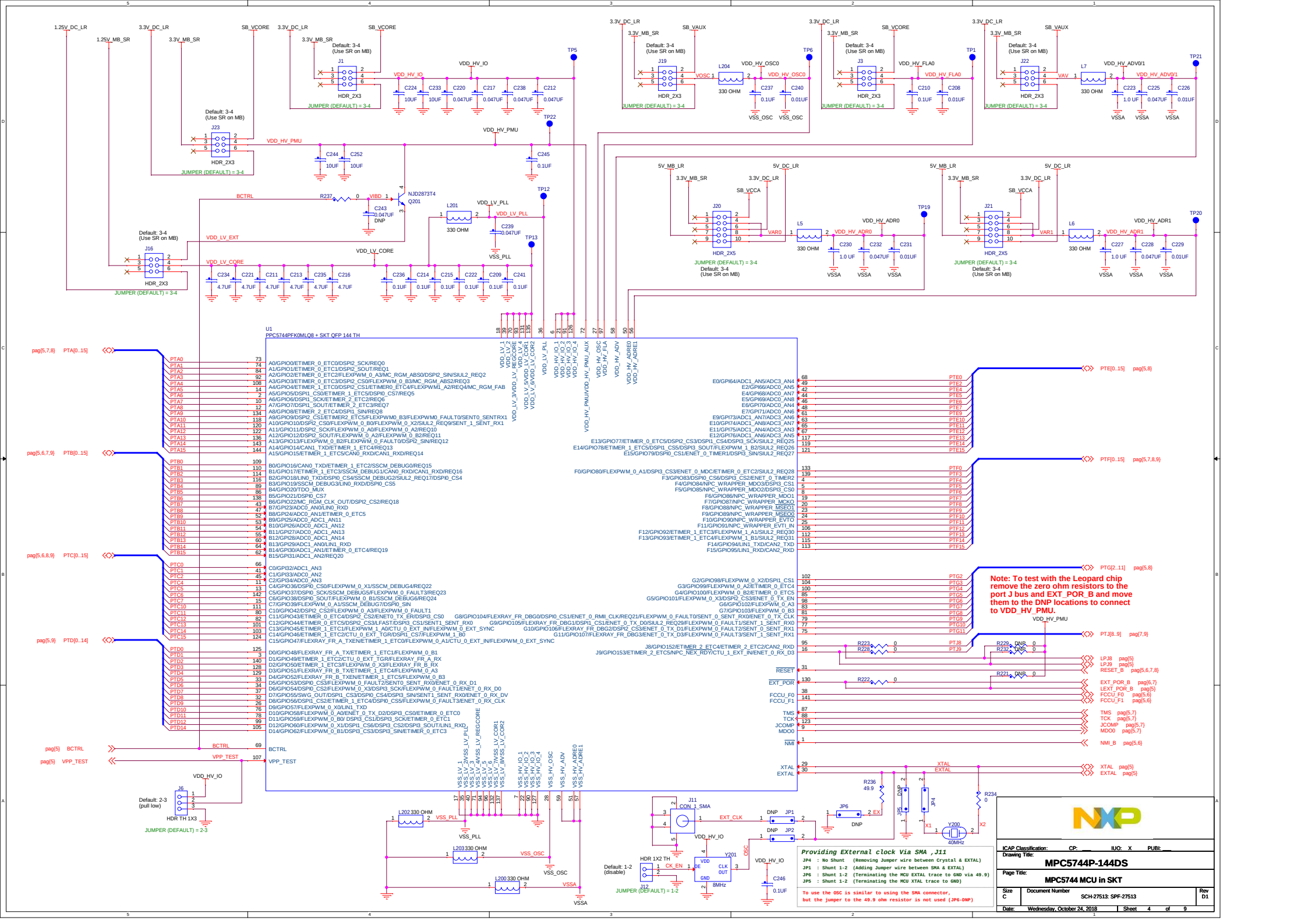
ICAP Classification: CP: ___ IUO: X PUBI: ___

Drawing Title: **MPC5744P-144DS**

Page Title: **Block Diagram**

Size	Document Number	Rev
C	SCH-27513: SPF-27513	D1

Date: Wednesday, October 24, 2018 | Sheet 3 of 9


1.25V_DC_LR
1.25V_MB_SR
3.3V_DC_LR
3.3V_MB_SR
SB_VCORE
SB_VAUX
SB_VCCA
5V_DC_LR
5V_MB_LR
Default: 3-4 (Use SR on MB)
JUMPER (DEFAULT) = 3-4
HDR_2X3
HDR_2X5
J1
J3
J16
J19
J20
J21
J22
J23
VDD_HV_IO
VDD_HV_PMU
VDD_HV_OSC0
VDD_HV_FLA0
VDD_HV_ADV0/1
VDD_HV_ADR0
VDD_HV_ADR1
VDD_LV_EXT
VDD_LV_CORE
VDD_LV_PLL
VSS_OSC
VSS_PLL
VSSA
330 OHM
BCTRL
VIBD
NJD2873T4
Q201
R237
C243 0.047UF DNP
TP5
TP6
TP1
TP21
TP22
TP12
TP13
TP19
TP20
U1
PPC5744PFK0MLQ8 + SKT QFP 144 TH
pag[5,7,8] PTA[0..15]
pag[5,6,7,9] PTB[0..15]
pag[5,6,8,9] PTC[0..15]
pag[5,9] PTD[0..14]
pag[5] BCTRL
pag[5] VPP_TEST
PTE[0..15] pag[5,8]
PTF[0..15] pag[5,7,8,9]
PTG[2..11] pag[5,8]
PTJ[8..9] pag[7,9]
LPJ8 pag[5]
LPJ9 pag[5]
RESET_B pag[5,6,7,8]
EXT_POR_B pag[6,7]
LEXT_POR_B pag[5]
FCCU_F0 pag[5,6]
FCCU_F1 pag[5,6]
TMS pag[5,7]
TCK pag[5,7]
JCOMP pag[5,7]
MDO0 pag[5,7]
NMI_B pag[5,6]
XTAL pag[5]
EXTAL pag[5]
Note: To test with the Leopard chip remove the zero ohm resistors to the port J bus and EXT_POR_B and move them to the DNP locations to connect to VDD_HV_PMU.
J11 CON_1_SMA
EXT_CLK
Y200 40MHz
Y201 8MHz
JP1
JP2
JP4
JP5
JP6
Providing EXternal clock Via SMA , J11
JP4 : No Shunt (Removing Jumper wire between Crystal & EXTAL)
JP1 : Shunt 1-2 (Adding Jumper wire between SMA & EXTAL)
JP6 : Shunt 1-2 (Terminating the MCU EXTAL trace to GND via 49.9)
JP5 : Shunt 1-2 (Terminating the MCU XTAL trace to GND)
To use the OSC is similar to using the SMA connector, but the jumper to the 49.9 ohm resistor is not used (JP6-DNP)
ICAP Classification: CP: ___ IUO: X PUBI: ___
Drawing Title: MPC5744P-144DS
Page Title: MPC5744 MCU in SKT
Size C
Document Number SCH-27513: SPF-27513
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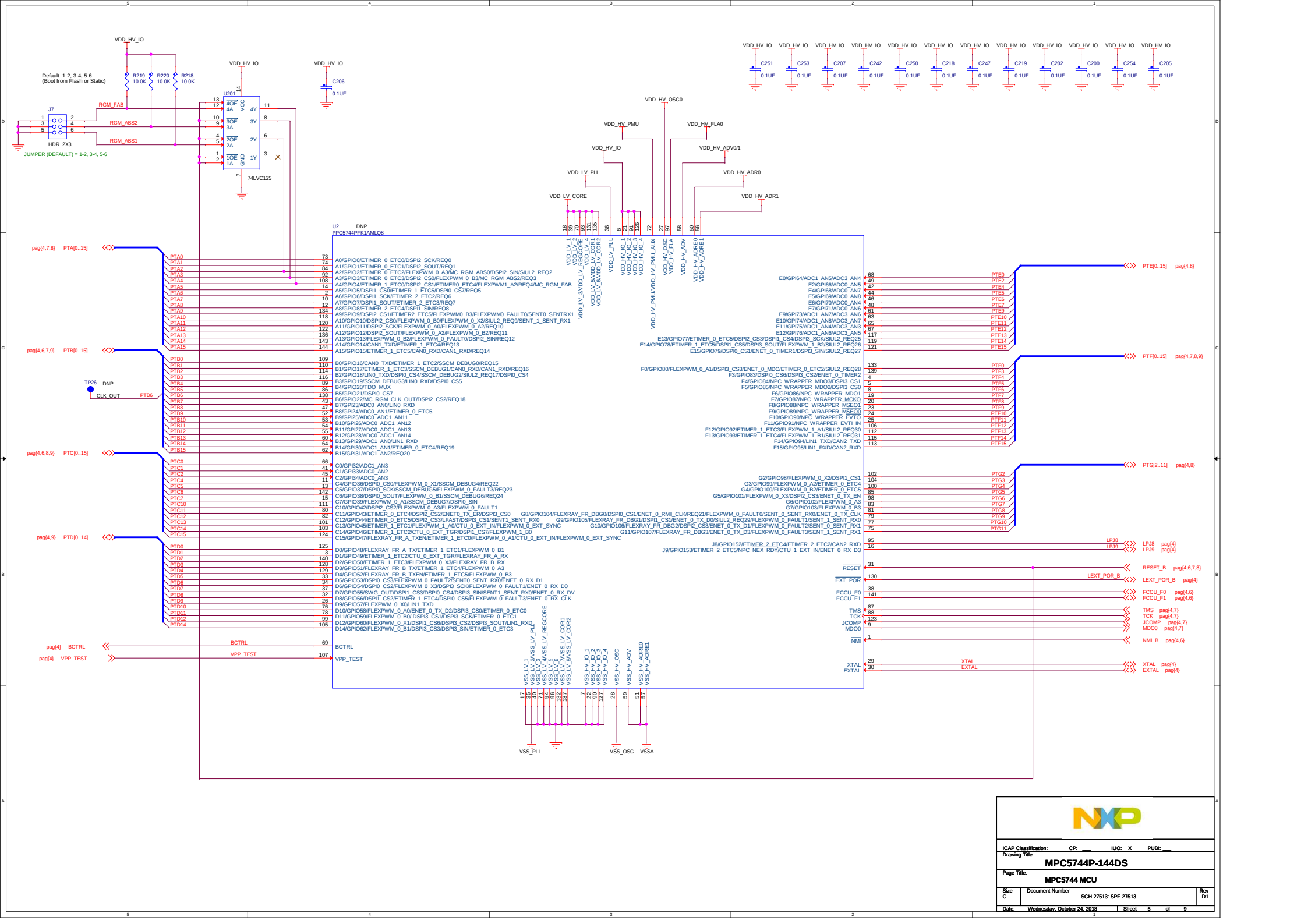

ICAP Classification:	CP: ___ IUO: X PUBI: ___
Drawing Title:	MPC5744P-144DS
Page Title:	MPC5744 MCU
Size: C	Document Number: SCH-27513: SPF-27513 Rev: D1
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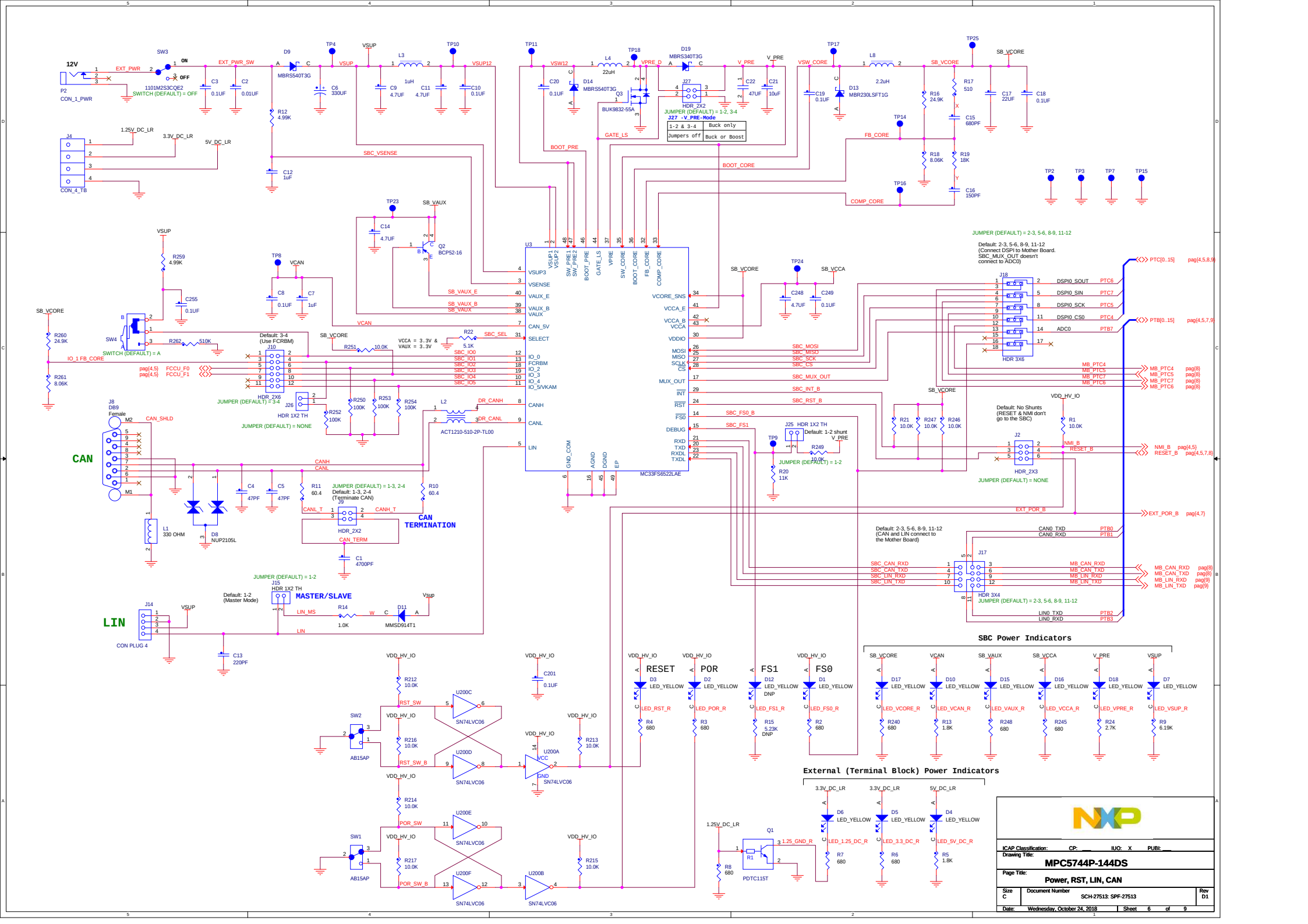
12V
SW3
ON
OFF
1101M2S3CQE2
SWITCH (DEFAULT) = OFF
P2
CON_1_PWR
EXT_PWR
EXT_PWR_SW
D9
MBRS540T3G
TP4
VSUP
L3
1uH
TP10
VSUP12
C3 0.1UF
C2 0.01UF
C6 330UF
C9 4.7UF
C11 4.7UF
C10 0.1UF
R12 4.99K
C12 1uF
J4
CON_4_TB
1.25V_DC_LR
3.3V_DC_LR
5V_DC_LR
SBC_VSENSE
TP11
VSW12
L4 22uH
TP18
VPRE_D
D19
MBRS340T3G
V_PRE
C20 0.1UF
D14 MBRS540T3G
Q3 BUK9832-55A
GATE_LS
BOOT_PRE
J27 -V_PRE-Mode
JUMPER (DEFAULT) = 1-2, 3-4
1-2 & 3-4 Buck only
Jumpers off Buck or Boost
C22 47UF
C21 10uF
TP17
VSW_CORE
L8 2.2uH
SB_VCORE
TP25
C19 0.1UF
D13 MBR230LSFT1G
R16 24.9K
R17 510
C17 22UF
C18 0.1UF
C15 680PF
TP14
FB_CORE
R18 8.06K
R19 18K
C16 150PF
TP16
COMP_CORE
TP2
TP3
TP7
TP15
BOOT_CORE
TP23
SB_VAUX
C14 4.7UF
Q2 BCP52-16
U3
MC33FS6522LAE
VSUP3
VSENSE
VAUX_E
VAUX_B
CAN_5V
SELECT
IO_0
IO_2
IO_3
IO_4
IO_5/VKAM
CANH
CANL
LIN
GND_COM
AGND
DGND
EP
VCORE_SNS
VCCA_E
VCCA_B
VDDIO
MOSI
MISO
SCLK
CS
MUX_OUT
INT
RST
FS0
DEBUG
RXD
TXD
RXDL
TXDL
SB_VAUX_E
SB_VAUX_B
SB_VAUX
VCAN
SB_SEL
SBC_IO0
SBC_IO1
SBC_IO2
SBC_IO3
SBC_IO4
SBC_IO5
SBC_MOSI
SBC_MISO
SBC_SCK
SBC_CS
SBC_MUX_OUT
SBC_INT_B
SBC_RST_B
SBC_FS0_B
SBC_FS1
TP8
VCAN
C8 0.1UF
C7 1uF
C255 0.1UF
R259 4.99K
R260 24.9K
R261 8.06K
SW4
R262 510K
SWITCH (DEFAULT) = A
IO_1 FB_CORE
R22 5.1K
R251 10.0K
VCCA = 3.3V & VAUX = 3.3V
J10
Default: 3-4 (Use FCRBM)
pag{4,5} FCCU_F0
pag{4,5} FCCU_F1
HDR_2X6
J26
HDR 1X2 TH
JUMPER (DEFAULT) = 3-4
JUMPER (DEFAULT) = NONE
R250 100K
R252 100K
R253 100K
R254 100K
L2
ACT1210-510-2P-TL00
DR_CANH
DR_CANL
J8
DB9 Female
M2
M1
CAN_SHLD
CAN
CANH
CANL
C4 47PF
C5 47PF
R11 60.4
R10 60.4
JUMPER (DEFAULT) = 1-3, 2-4
Default: 1-3, 2-4 (Terminate CAN)
CANL_T
CANH_T
J9
HDR_2X2
CAN_TERM
CAN TERMINATION
C1 4700PF
L1 330 OHM
D8 NUP2105L
JUMPER (DEFAULT) = 1-2
J15
HDR 1X2 TH
Default: 1-2 (Master Mode)
MASTER/SLAVE
LIN_MS
R14 1.0K
D11 MMSD914T1
Vsup
LIN
J14
CON PLUG 4
C13 220PF
TP24
SB_VCCA
C248 4.7UF
C249 0.1UF
J18
HDR 3X6
DSPI0_SOUT PTC6
DSPI0_SIN PTC7
DSPI0_SCK PTC5
DSPI0_CS0 PTC4
ADC0 PTB7
PTC[0..15] pag{4,5,8,9}
PTB[0..15] pag{4,5,7,9}
JUMPER (DEFAULT) = 2-3, 5-6, 8-9, 11-12
Default: 2-3, 5-6, 8-9, 11-12 (Connect DSPI to Mother Board. SBC_MUX_OUT doesn't connect to ADC0)
MB_PTC4 MB_PTC5 MB_PTC7 MB_PTC6
MB_PTC4 pag{8}
MB_PTC5 pag{8}
MB_PTC7 pag{8}
MB_PTC6 pag{8}
R21 10.0K
R247 10.0K
R246 10.0K
Default: No Shunts (RESET & NMI don't go to the SBC)
R1 10.0K
J2
HDR_2X3
JUMPER (DEFAULT) = NONE
NMI_B
RESET_B
NMI_B pag{4,5}
RESET_B pag{4,5,7,8}
J25 HDR 1X2 TH
Default: 1-2 shunt
R249 10.0K
JUMPER (DEFAULT) = 1-2
TP9
R20 11K
EXT_POR_B
EXT_POR_B pag{4,7}
Default: 2-3, 5-6, 8-9, 11-12 (CAN and LIN connect to the Mother Board)
CAN0_TXD PTB0
CAN0_RXD PTB1
SBC_CAN_RXD
SBC_CAN_TXD
SBC_LIN_RXD
SBC_LIN_TXD
MB_CAN_RXD
MB_CAN_TXD
MB_LIN_RXD
MB_LIN_TXD
MB_CAN_RXD pag{8}
MB_CAN_TXD pag{8}
MB_LIN_RXD pag{9}
MB_LIN_TXD pag{9}
J17
HDR 3X4
JUMPER (DEFAULT) = 2-3, 5-6, 8-9, 11-12
LIN0_TXD PTB2
LIN0_RXD PTB3
SBC Power Indicators
RESET D3 LED_YELLOW LED_RST_R R4 680
POR D2 LED_YELLOW LED_POR_R R3 680
FS1 D12 LED_YELLOW DNP LED_FS1_R R15 5.23K DNP
FS0 D1 LED_YELLOW LED_FS0_R R2 680
SB_VCORE D17 LED_YELLOW LED_VCORE_R R240 680
VCAN D10 LED_YELLOW LED_VCAN_R R13 1.8K
SB_VAUX D15 LED_YELLOW LED_VAUX_R R248 680
SB_VCCA D16 LED_YELLOW LED_VCCA_R R245 680
V_PRE D18 LED_YELLOW LED_VPRE_R R24 2.7K
VSUP D7 LED_YELLOW LED_VSUP_R R9 6.19K
External (Terminal Block) Power Indicators
3.3V_DC_LR D6 LED_YELLOW LED_1.25_DC_R R7 680
3.3V_DC_LR D5 LED_YELLOW LED_3.3_DC_R R6 680
5V_DC_LR D4 LED_YELLOW LED_5V_DC_R R5 1.8K
1.25V_DC_LR
Q1
PDTC115T
R8 680
1.25_GND_R
SW2
AB15AP
SW1
AB15AP
U200C
U200D
U200A
U200E
U200F
U200B
SN74LVC06
RST_SW
RST_SW_B
POR_SW
POR_SW_B
R212 10.0K
R216 10.0K
R213 10.0K
R214 10.0K
R217 10.0K
R215 10.0K
C201 0.1UF
VDD_HV_IO
NXP
ICAP Classification: CP: ___ IUO: X PUBI: ___
Drawing Title: MPC5744P-144DS
Page Title: Power, RST, LIN, CAN
Size C
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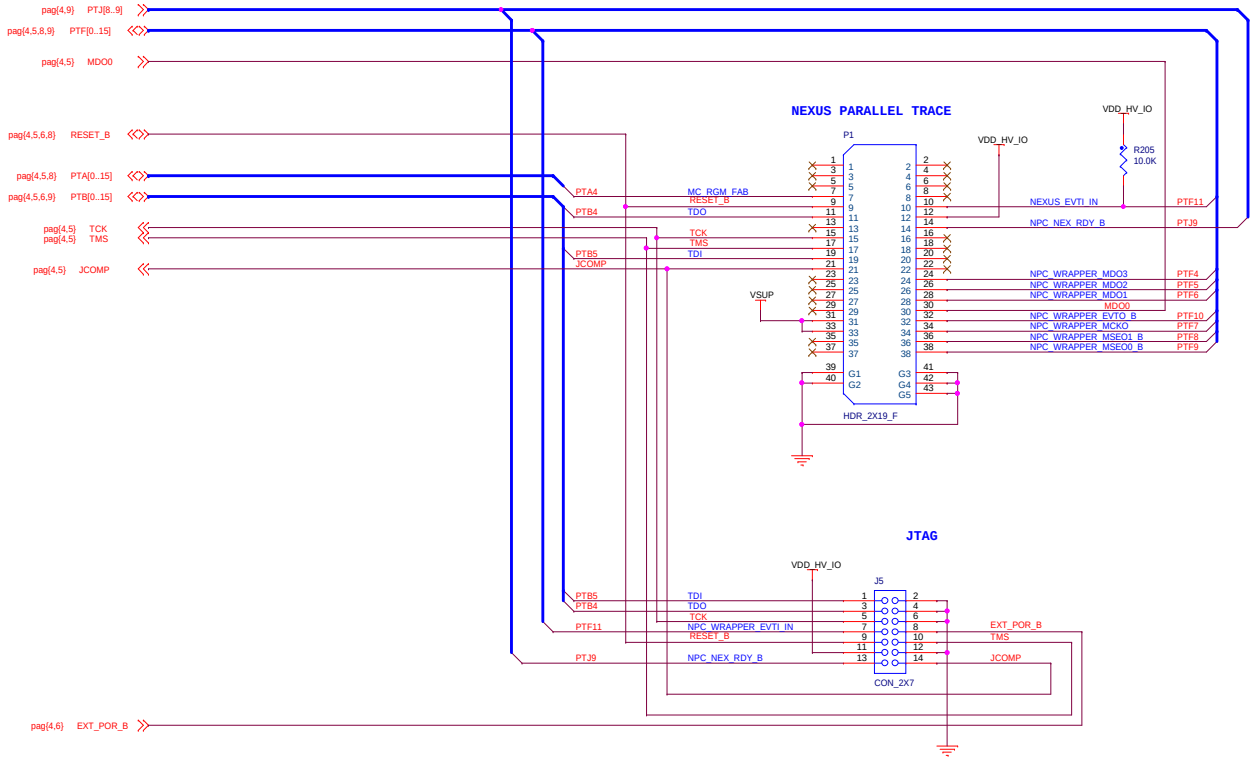
JTAG & NEXUS PARALLEL TRACE



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Drawing Title:	MPC5744P-144DS		
Page Title:	JTAG & NEXUS		
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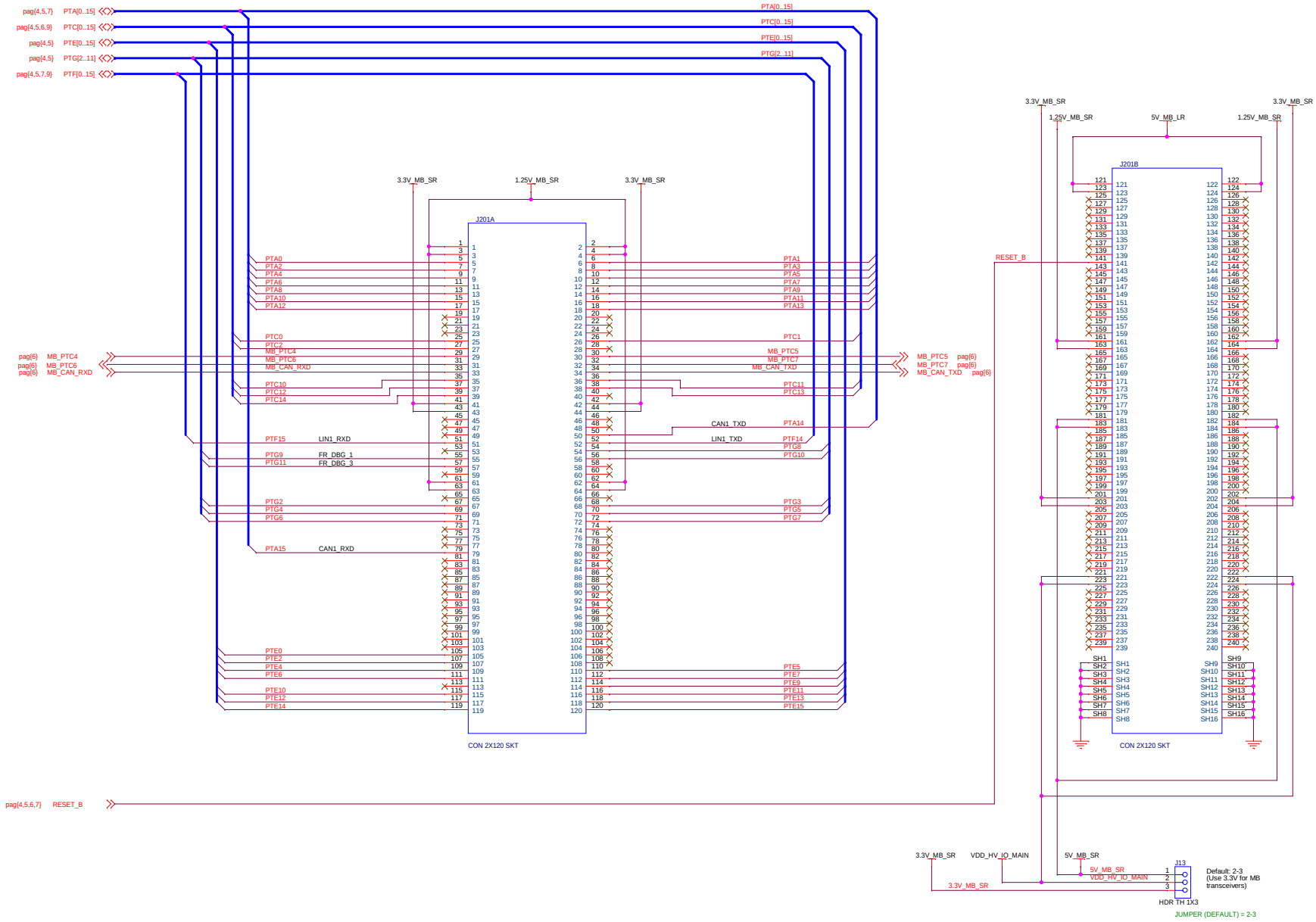
Mother Board connections - 1



ICAP Classification: CP: ___ IUO: X PUBI: ___

Drawing Title: **MPC5744P-144DS**

Page Title: **MB Connections 1**

Size	Document Number	Rev
C	SCH-27513: SPF-27513	D1

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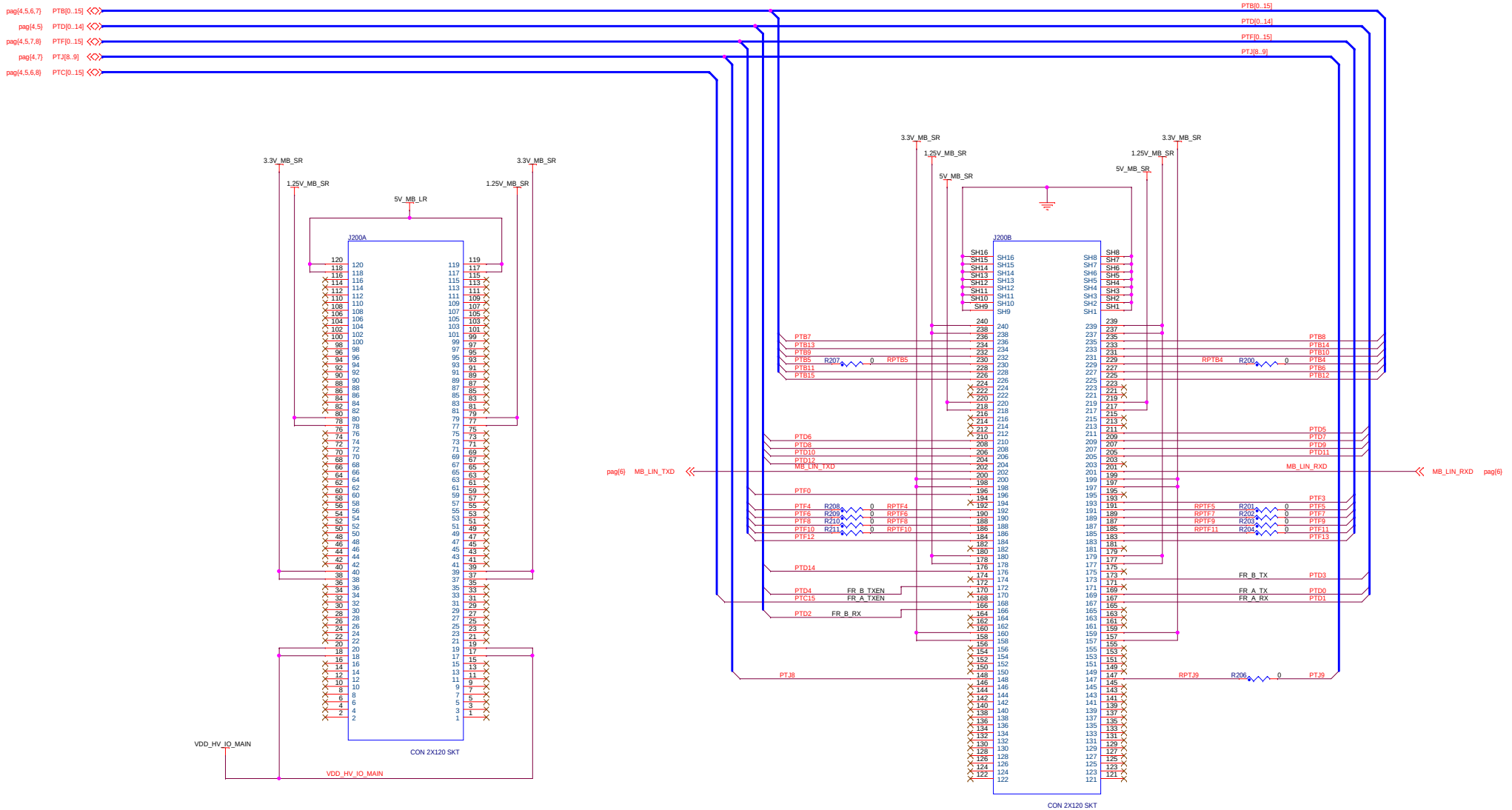
Mother Board connections - 2



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Drawing Title:	MPC5744P-144DS		
Page Title:	MB Connections 2		
Size C	Document Number SCH-27513: SPF-27513		Rev D1
Date: Wednesday, October 24, 2018	Sheet 9 of 9		