Table of Contents

Revisions

Rev	Description	Date	Approved
X1	Draft	19 May 11	
A	Release	17 June 11	

A1	1.Update the block diagram to K20D72M
	2.Add 1.8V LDO U13 for MCU power selection
	3.Add Micro USB connector J19
	4.Change OSC circuit,remove 0ohm resistor R54,
	  R56,R58,R60,R61,R64,R65,R66,R67 for
	  disconnect the external 32kHz crystal to main OSC.
	5.Remove R63 for disconnect net CLKIN0 to main OSC
	6.Change ADC channel from PTC9 to PTE0 for measure divided VREGIN
	7.Connection UART0 signals to TWRPI J8
	8.Add test point TP12,TP13 for TSI pads
	9.Change touch pad D7, D8 to LED
	10. Add microphone and buzzer
		22 Aug 11	

B	Elevator connector symbol got updated. Pins A47 & A48 connections VREFH/VREFL deleted	27 Sep 11	
BX1	1. 3.3V selection Jumper , J18 deleted 2. P3V3_ELEV net name changed to P3V3_REG 3. P3V3 Net name changed to V_BRD for the following Interfaces Microphone,POT,Flex Bus & IRDA 4. P3V3_MCU Net change to MCU_PWR 5. Change resistor R129 to a jumper J18 6. Change resistor R143,R144 from no populate to populate 7. Change Net for microphone from PTB0/ADC0_SE8/TSI0_CH0 to ADC1_DP0 8.Buffer (U7) SN74HCT125D replaced with Voltage translators SN74LVC1T45.	15 Nov 11	
C	Release for Pilot production	13 Dec 11	

1. Unless Otherwise Specified:
   All resistors are in ohms
   All capacitors are in uF
   All voltages are DC
   All polarized capacitors are aluminum electrolytic

2. Interrupted lines coded with the same letter or letter
   combinations are electrically connected.

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

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

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

Power & Ground Nets

NET	VOLTAGE	DESCRIPTION
P5V_USB	5V	Primary input power. Filtered from USB connector. Input to USB power switch.
P5V_SW	5V	Output of USB power switch controlled by the 5V_EN signal from the JM60 MCU. Used by OSBDM voltage translation circuits.
P5V_TRG_USB	5V	Output of USB power switch controlled by the VTRG_EN signal from the JM60 MCU. Provides input to regulator.
P3V3_REG	3.3V	Output of regulator using USB power input (P5V_TRG_USB).
P1V8	1.8V	Output of regulator U13
V_BRD	3.3V or 1.8V	MCU & Interface circuit input power
VDDA	3.3V	VDDA power for MCU and analog circuits. Filtered from P3V3_MCU.
VREFH	3.3V	Upper reference voltage for ADC on the MCU. Filtered from VDDA.
VREFL	0V	Lower reference voltage for ADC on the MCU. Filtered from VSSA.
VSSA	0V	VSSA power for MCU and analog circuits. Filtered from GND.
GND	0V	Digital Ground.

ELEVATOR CONNECTORS   Sheet 8

Sheet 3
K20D72M MCU
   (100LQFP)
32.768 KHz XTAL
8 MHz XTAL
VSSA/VDDA filter
VREFH/VREFL filter
VREF_OUT
VREGIN, VOUT33
VBAT

Sheet 4
K20D72M MCU
(100LQFP+scoket)
32.768 KHz XTAL
8 MHz XTAL
VSSA/VDDA filter
VREFH/VREFL filter
VREF_OUT
VREGIN, VOUT33
VBAT

Sheet 5
OSJTAG/USB Bridge Circuit
USB Mini B Connector
MC9S08JM60
Voltage Translation
OSJTAG/JTAG Header
Power Supply Circuits

Sheet 6
INFRARED PORT
PUSH BUTTONS
ADDRESS LATCH
USB Host and Device

Sheet 7
TOWER PLUG-IN (TWRPI)
SENSOR HEADERS
TOUCH ELECTRODES
   WITH LEDS
TOUCH HEADER
POTENTIOMETER
ACCELEROMETER
MICROPHONE
BUZZER
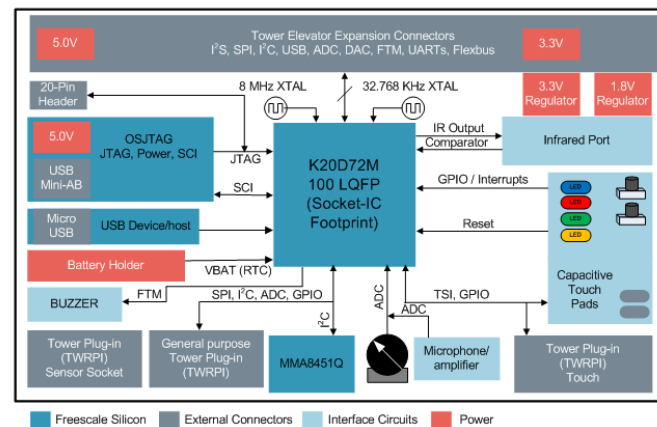
Drawing Title:
TWR-K20D72M

Page Title:
Notes & Block Diagram

Size C	Document Number	Rev C
	SCH-27182 PDF: SPF-27182	

Date: Tuesday, December 13, 2011   Sheet   2   of   8

Note:
1. R49 and R50 0 ohms resistors needs be soldered
if using Socket.
By default these resistors should be
populate at prototype.
By default these resistors should not
be populate at production.
2, Placement R49,R50 as close as U3.

2016/25/32
Coin Cell

U3
PK20DX256VLL7

Default: 1-2 (use VBRD)
J6 HDR 1X2 TH
V_BRD   MCU_PWR
P3V3R

Default: 1-2 (use MCU_PWR)
J13 HDR TH 1X3
VBAT
VBATD

D11 BAT54C

BT1 BK-883
VCC1

L3 100 OHM@100MHZ
L5 100 OHM@100MHZ
L4 100 OHM@100MHZ
L6 100 OHM@100MHZ
L7 100 OHM@100MHZ

C37 0.1uF   C29 0.1uF   C24 0.1uF   C25 0.1uF   C23 0.1uF   C36 0.1uF
C39 0.1uF
C31 0.1uF   C32 0.01uF   C33 0.1uF   C30 0.01uF
C35 0.1uF
C26 2.2UF   C27 0.1uF
C28 0.1uF
C14 18pF   C11 18pF

TP3 DNP
TP5 DNP
TP1 DNP
TP4 DNP

Default: no shunt
(Disconnect Target Power)
J18 HDR 1X2 TH

R130 10.0K   R131 10.0K

VDDA
VBAT
VREFH
VREFL
VSSA
VSS
VDD1 8
VDD2 40
VDD3 48
VDD4 61
VDD5 75
VDD6 89
VBAT 30
VDDA 22
VREFH 23
VREFL 24
VSSA 25
VREF_OUT 26
VOUT33 12
VREGIN 13
ADC0_DP1 14
ADC0_DM1 15
ADC1_DP1 16
ADC1_DM1 17
ADC0_DP0 18
ADC0_DM0 19
ADC1_DP0 20
ADC1_DM0 21
USB0_DP 10
USB0_DM 11
DAC0_OUT 27
XTAL32 28
EXTAL32 29
RESET 52
VSS1 9
VSS2 41
VSS3 49
VSS4 60
VSS5 74
VSS6 88

R49 0 DNP   USB0_DP
R50 0 DNP   USB0_DN

Y1 32.768KHz   R75 1.0M DNP

X1 8.00MHZ   R59 1.0M
R54 0 DNP
R58 0

8MHz_XTL
8MHz_EXTL
PTA19 XTAL
PTA18 EXTAL

PTA0/SCI0_CTS/FTM0_CH5/JTAG_CLK/SWD_CLK/EZP_CLK/TSI0_CH1   PTA0 34   TCK/EZP_CLK
PTA1/SCI0_RX/FTM0_CH6/JTAG_DI/EZP_DI/TSI0_CH2   PTA1 35   TDI/EZP_DI/FTM0_CH6
PTA2/SCI0_TX/FTM0_CH7/JTAG_DO/TRACE_SWO/EZP_DO/TSI0_CH3   PTA2 36   TDO/EZP_DO
PTA3/SCI0_RTS/FTM0_CH0/JTAG_MS/SWD_DIO/TSI0_CH4   PTA3 37   TMS
PTA4/FTM0_CH1/MS/NMI/EZP_CS/TSI0_CH5   PTA4 38   EZP_CS_B/TSI0_CH5
PTA5/FTM0_CH2/RMII0_RXER/MII0_RXER/CMP2_OUT/SSI0_RX_BCLK/JTAG_RESET   PTA5 39   PTA5

PTA12/CAN0_TX/FTM1_CH0/RMII0_RXD1/MII0_RXD1/FBB_CS5/FBB_TSIZ1/FBB_BE23_16_BLS15_8/SSI0_TXD/FTM1_QD_PHA/CMP2_IN   PTA12 42   CAN0_TX/FTM1_CH0
PTA13/CAN0_RX/FTM1_CH1/RMII0_RXD0/MII0_RXD0/FBB_CS4/FBB_BE31_24_BLS7_0/SSI0_TX_FS/FTM1_QD_PHB/CMP2_IN   PTA13 43   CAN0_RX/FTM1_CH1
PTA14/DSPI0_PCS0/SCI0_TX/RMII0_CRS_DV/MII0_RXDV/FBB_AD31/SSI0_TX_BCLK   PTA14 44   PTA14
PTA15/DSPI0_SCK/SCI0_RX/RMII0_TXEN/MII0_TXEN/FBB_AD30/SSI0_RXD   PTA15 45   PTA15
PTA16/DSPI0_SOUT/SCI0_CTS/RMII0_TXD0/MII0_TXD0/FBB_AD29/SSI0_RX_FS   PTA16 46   PTA16
PTA17/DSPI0_SIN/SCI0_RTS/RMII0_TXD1/MII0_TXD1/FBB_AD28/SSI0_MCLK/SSI0_CLKIN/ADC1_SE17   PTA17 47   PTA17
PTA18/FTM0_FLT2/FTM_CLKIN0/EXTAL   PTA18 50   EXTAL
PTA19/FTM1_FLT0/FTM_CLKIN1/LPT_ALT1/XTAL   PTA19 51   XTAL

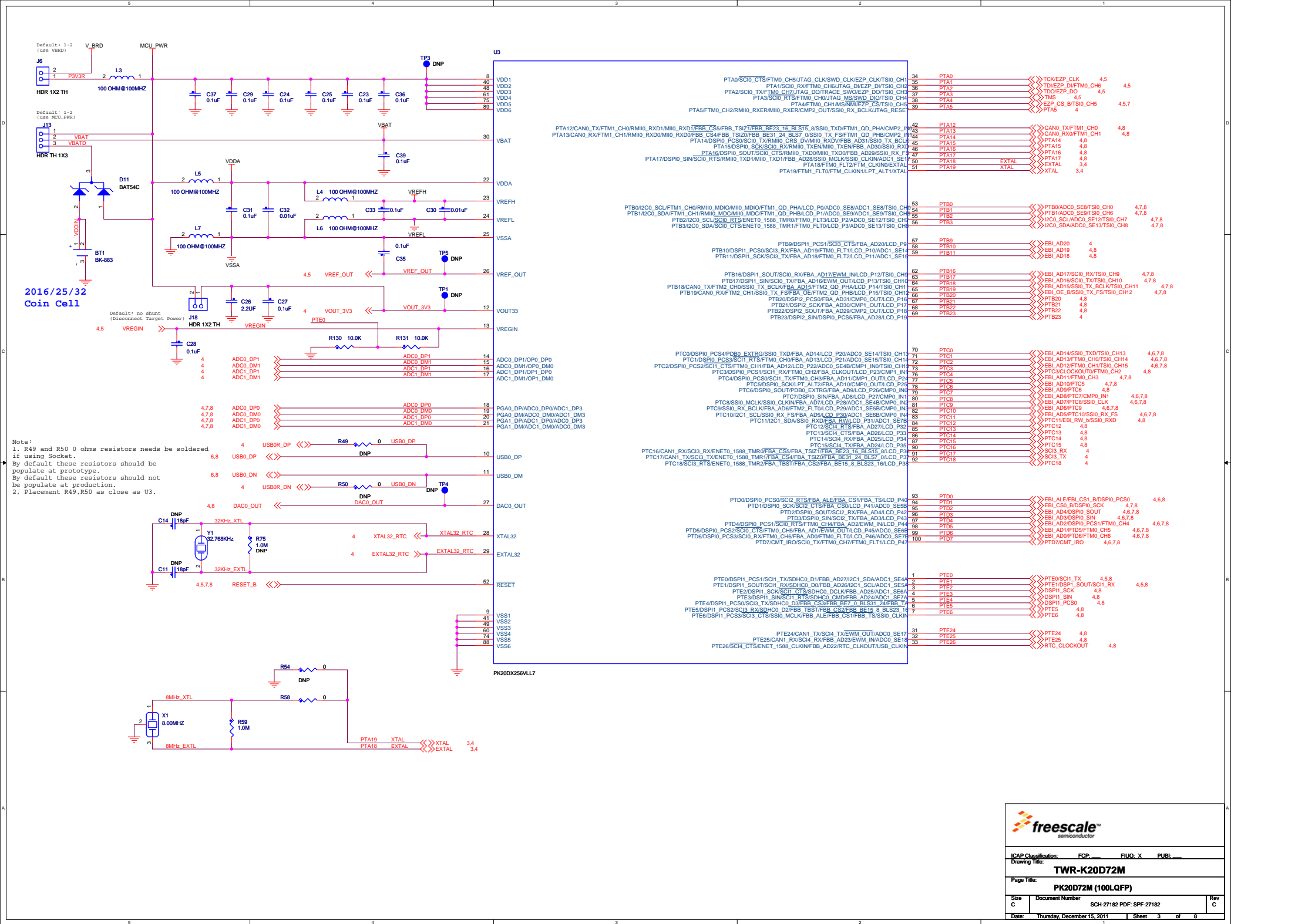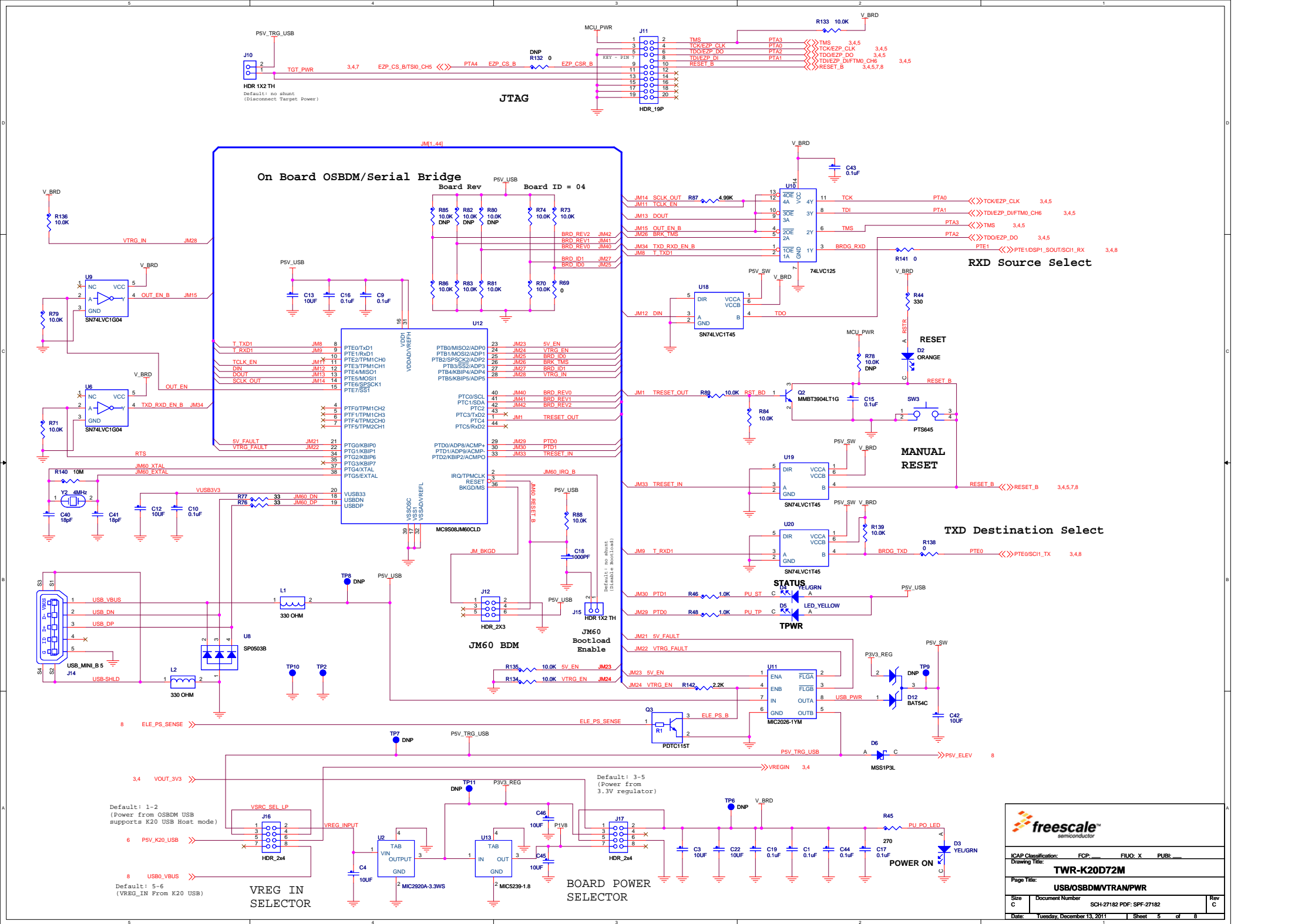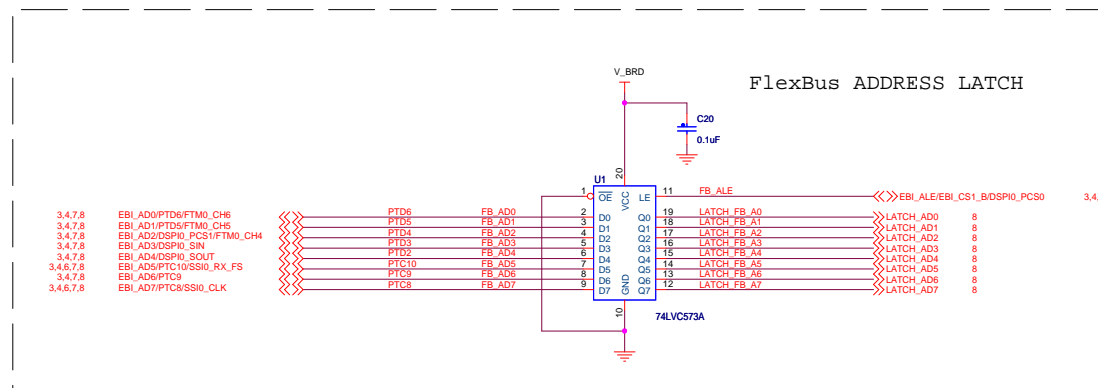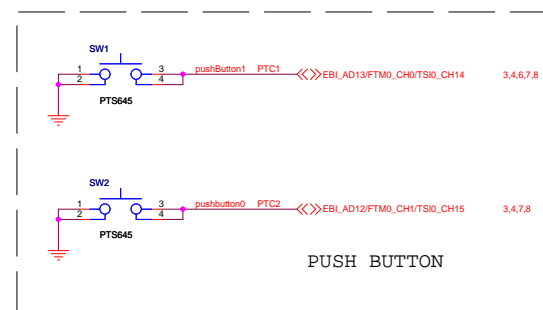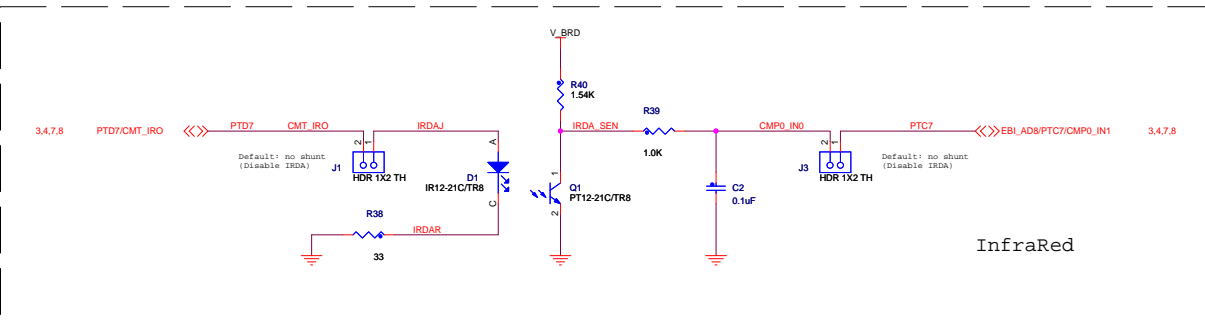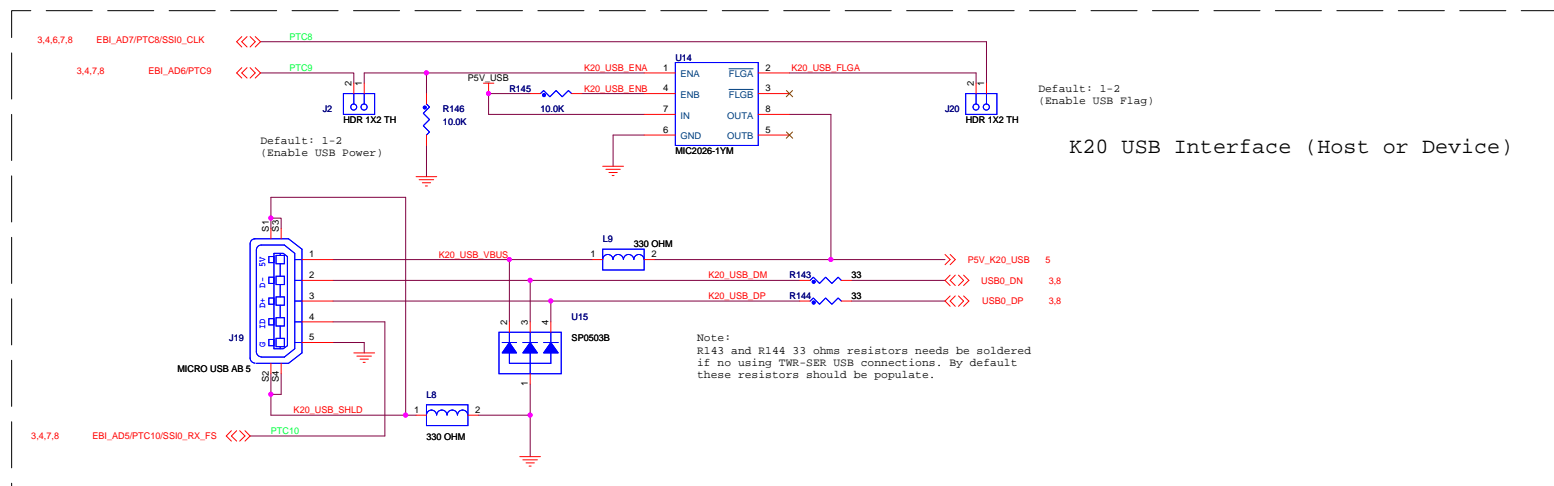PTB0/I2C0_SCL/FTM1_CH0/RMII0_MDIO/MII0_MDIO/FTM1_QD_PHA/LCD_P0/ADC0_SE8/ADC1_SE8/TSI0_CH0   PTB0 53   PTB0/ADC0_SE8/TSI0_CH0
PTB1/I2C0_SDA/FTM1_CH1/RMII0_MDC/MII0_MDC/FTM1_QD_PHB/LCD_P1/ADC0_SE9/ADC1_SE9/TSI0_CH6   PTB1 54   PTB1/ADC0_SE9/TSI0_CH6
PTB2/I2C0_SCL/SCI0_RTS/ENET0_1588_TMR0/FTM0_FLT3/LCD_P2/ADC0_SE12/TSI0_CH7   PTB2 55   I2C0_SCL/ADC0_SE12/TSI0_CH7
PTB3/I2C0_SDA/SCI0_CTS/ENET0_1588_TMR1/FTM0_FLT0/LCD_P3/ADC0_SE13/TSI0_CH8   PTB3 56   I2C0_SDA/ADC0_SE13/TSI0_CH8

PTB9/DSPI1_PCS1/SCI3_CTS/FBA_AD20/LCD_P9   PTB9 57   EBI_AD20
PTB10/DSPI1_PCS0/SCI3_RX/FBA_AD19/FTM0_FLT1/LCD_P10/ADC1_SE14   PTB10 58   EBI_AD19
PTB11/DSPI1_SCK/SCI3_TX/FBA_AD18/FTM0_FLT2/LCD_P11/ADC1_SE15   PTB11 59   EBI_AD18

PTB16/DSPI1_SOUT/SCI0_RX/FBA_AD17/EWM_IN/LCD_P12/TSI0_CH9   PTB16 62   EBI_AD17/SCI0_RX/TSI0_CH9
PTB17/DSPI1_SIN/SCI0_TX/FBA_AD16/EWM_OUT/LCD_P13/TSI0_CH10   PTB17 63   EBI_AD16/SCI0_TX/TSI0_CH10
PTB18/CAN0_TX/FTM2_CH0/SSI0_TX_BCLK/FBA_AD15/FTM2_QD_PHA/LCD_P14/TSI0_CH11   PTB18 64   EBI_AD15/SSI0_TX_BCLK/TSI0_CH11
PTB19/CAN0_RX/FTM2_CH1/SSI0_TX_FS/FBA_OE/FTM2_QD_PHB/LCD_P15/TSI0_CH12   PTB19 65   EBI_OE_B/SSI0_TX_FS/TSI0_CH12
PTB20/DSPI2_PCS0/FBA_AD31/CMP0_OUT/LCD_P16   PTB20 66   PTB20
PTB21/DSPI2_SCK/FBA_AD30/CMP1_OUT/LCD_P17   PTB21 67   PTB21
PTB22/DSPI2_SOUT/FBA_AD29/CMP2_OUT/LCD_P18   PTB22 68   PTB22
PTB23/DSPI2_SIN/DSPI0_PCS5/FBA_AD28/LCD_P19   PTB23 69   PTB23

PTC0/DSPI0_PCS4/PDB0_EXTRG/SSI0_TXD/FBA_AD14/LCD_P20/ADC0_SE14/TSI0_CH13   PTC0 70   EBI_AD14/SSI0_TXD/TSI0_CH13
PTC1/DSPI0_PCS3/SCI1_RTS/FTM0_CH0/FBA_AD13/LCD_P21/ADC0_SE15/TSI0_CH14   PTC1 71   EBI_AD13/FTM0_CH0/TSI0_CH14
PTC2/DSPI0_PCS2/SCI1_CTS/FTM0_CH1/FBA_AD12/LCD_P22/ADC0_SE4B/CMP1_IN0/TSI0_CH15   PTC2 72   EBI_AD12/FTM0_CH1/TSI0_CH15
PTC3/DSPI0_PCS1/SCI1_RX/FTM0_CH2/FBA_CLKOUT/LCD_P23/CMP1_IN1   PTC3 73   PTC3/CLKOUT0/FTM0_CH2
PTC4/DSPI0_PCS0/SCI1_TX/FTM0_CH3/FBA_AD11/CMP1_OUT/LCD_P24   PTC4 76   EBI_AD11/FTM0_CH3
PTC5/DSPI0_SCK/LPT_ALT2/FBA_AD10/CMP0_OUT/LCD_P25   PTC5 77   EBI_AD10/PTC5
PTC6/DSPI0_SOUT/PDB0_EXTRG/FBA_AD9/LCD_P26/CMP0_IN0   PTC6 78   EBI_AD9/PTC6
PTC7/DSPI0_SIN/FBA_AD8/LCD_P27/CMP0_IN1   PTC7 79   EBI_AD8/PTC7/CMP0_IN1
PTC8/SSI0_MCLK/SSI0_CLKIN/FBA_AD7/LCD_P28/ADC1_SE4B/CMP0_IN2   PTC8 80   EBI_AD7/PTC8/SSI0_CLK
PTC9/SSI0_RX_BCLK/FBA_AD6/FTM2_FLT0/LCD_P29/ADC1_SE5B/CMP0_IN3   PTC9 81   EBI_AD6/PTC9
PTC10/I2C1_SCL/SSI0_RX_FS/FBA_AD5/LCD_P30/ADC1_SE6B/CMP0_IN4   PTC10 82   EBI_AD5/PTC10/SSI0_RX_FS
PTC11/I2C1_SDA/SSI0_RXD/FBA_RW/LCD_P31/ADC1_SE7B   PTC11 83   PTC11/EBI_RW_b/SSI0_RXD
PTC12/SCI4_RTS/FBA_AD27/LCD_P32   PTC12 84   PTC12
PTC13/SCI4_CTS/FBA_AD26/LCD_P33   PTC13 85   PTC13
PTC14/SCI4_RX/FBA_AD25/LCD_P34   PTC14 86   PTC14
PTC15/SCI4_TX/FBA_AD24/LCD_P35   PTC15 87   PTC15
PTC16/CAN1_RX/SCI3_RX/ENET0_1588_TMR0/FBA_CS5/FBA_TSIZ1/FBA_BE23_16_BLS15_8/LCD_P36   PTC16 90   SCI3_RX
PTC17/CAN1_TX/SCI3_TX/ENET0_1588_TMR1/FBA_CS4/FBA_TSIZ0/FBA_BE31_24_BLS7_0/LCD_P37   PTC17 91   SCI3_TX
PTC18/SCI3_RTS/ENET0_1588_TMR2/FBA_TBST/FBA_CS2/FBA_BE15_8_BLS23_16/LCD_P38   PTC18 92   PTC18

PTD0/DSPI0_PCS0/SCI2_RTS/FBA_ALE/FBA_CS1/FBA_TS/LCD_P40   PTD0 93   EBI_ALE/EBI_CS1_B/DSPI0_PCS0
PTD1/DSPI0_SCK/SCI2_CTS/FBA_CS0/LCD_P41/ADC0_SE5B   PTD1 94   EBI_CS0_B/DSPI0_SCK
PTD2/DSPI0_SOUT/SCI2_RX/FBA_AD4/LCD_P42   PTD2 95   EBI_AD4/DSPI0_SOUT
PTD3/DSPI0_SIN/SCI2_TX/FBA_AD3/LCD_P43   PTD3 96   EBI_AD3/DSPI0_SIN
PTD4/DSPI0_PCS1/SCI0_RTS/FTM0_CH4/FBA_AD2/EWM_IN/LCD_P44   PTD4 97   EBI_AD2/DSPI0_PCS1/FTM0_CH4
PTD5/DSPI0_PCS2/SCI0_CTS/FTM0_CH5/FBA_AD1/EWM_OUT/LCD_P45/ADC0_SE6B   PTD5 98   EBI_AD1/PTD5/FTM0_CH5
PTD6/DSPI0_PCS3/SCI0_RX/FTM0_CH6/FBA_AD0/FTM0_FLT0/LCD_P46/ADC0_SE7B   PTD6 99   EBI_AD0/PTD6/FTM0_CH6
PTD7/CMT_IRO/SCI0_TX/FTM0_CH7/FTM0_FLT1/LCD_P47   PTD7 100   PTD7/CMT_IRO

PTE0/DSPI1_PCS1/SCI1_TX/SDHC0_D1/FBB_AD27/I2C1_SDA/ADC1_SE4A   PTE0 1   PTE0/SCI1_TX
PTE1/DSPI1_SOUT/SCI1_RX/SDHC0_D0/FBB_AD26/I2C1_SCL/ADC1_SE5A   PTE1 2   PTE1/DSPI1_SOUT/SCI1_RX
PTE2/DSPI1_SCK/SCI1_CTS/SDHC0_DCLK/FBB_AD25/ADC1_SE6A   PTE2 3   DSPI1_SCK
PTE3/DSPI1_SIN/SCI1_RTS/SDHC0_CMD/FBB_AD24/ADC1_SE7A   PTE3 4   DSPI1_SIN
PTE4/DSPI1_PCS0/SCI3_TX/SDHC0_D3/FBB_CS3/FBB_BE7_0_BLS31_24/FBB_TA   PTE4 5   DSPI1_PCS0
PTE5/DSPI1_PCS2/SCI3_RX/SDHC0_D2/FBB_TBST/FBB_CS2/FBB_BE15_8_BLS23_16   PTE5 6   PTE5
PTE6/DSPI1_PCS3/SCI3_CTS/SSI0_MCLK/FBB_ALE/FBB_CS1/FBB_TS/SSI0_CLKIN   PTE6 7   PTE6

PTE24/CAN1_TX/SCI4_TX/EWM_OUT/ADC0_SE17   PTE24 31   PTE24
PTE25/CAN1_RX/SCI4_RX/FBB_AD23/EWM_IN/ADC0_SE18   PTE25 32   PTE25
PTE26/SCI4_CTS/ENET_1588_CLKIN/FBB_AD22/RTC_CLKOUT/USB_CLKIN   PTE26 33   RTC_CLOCKOUT

VREF BYPASS

DNP C34
0.1uF

VREFH
VREFL

MCU_PWR

U17

Pin	Net
8	VDD1
40	VDD2
48	VDD3
61	VDD4
75	VDD5
89	VDD6
30	VBAT
22	VDDA
23	VREFH
24	VREFL
25	VSSA
26	VREF_OUT
12	VOUT33
13	VREGIN
14	ADC0_DP1/OP0_DP0
15	ADC0_DM1/OP0_DM0
16	ADC1_DP1/OP1_DP0
17	ADC1_DM1/OP1_DM0
18	PGA0_DP/ADC0_DP0/ADC1_DP3
19	PGA0_DM/ADC0_DM0/ADC1_DM3
20	PGA1_DP/ADC1_DP0/ADC0_DP3
21	PGA1_DM/ADC1_DM0/ADC0_DM3
10	USB0_DP
11	USB0_DM
27	DAC0_OUT
28	XTAL32
29	EXTAL32
52	RESET
9	VSS1
41	VSS2
49	VSS3
60	VSS4
74	VSS5
88	VSS6

3 VREF_OUT
3 VOUT_3V3
3,5 VREGIN
3 ADC0_DP1
3 ADC0_DM1
3 ADC1_DP1
3 ADC1_DM1
3,7,8 ADC0_DP0
3,7,8 ADC0_DM0
3,7,8 ADC1_DP0
3,7,8 ADC1_DM0
3 USB0R_DP
3 USB0R_DN
3,8 DAC0_OUT
3 XTAL32_RTC
3 EXTAL32_RTC
3,5,7,8 RESET_B

PK20DX256VLL7 + IC500-1004-004P
DNP

Port signal list (PTA/PTB/PTC/PTD/PTE):

Pin	Signal
34	PTA0
35	PTA1
36	PTA2
37	PTA3
38	PTA4
39	PTA5
42	PTA12
43	PTA13
44	PTA14
45	PTA15
46	PTA16
47	PTA17
50	PTA18 EXTAL
51	PTA19 XTAL
53	PTB0
54	PTB1
55	PTB2
56	PTB3
57	PTB9
58	PTB10
59	PTB11
62	PTB16
63	PTB17
64	PTB18
65	PTB19
66	PTB20
67	PTB21
68	PTB22
69	PTB23
70	PTC0
71	PTC1
72	PTC2
73	PTC3
76	PTC4
77	PTC5
78	PTC6
79	PTC7
80	PTC8
81	PTC9
82	PTC10
83	PTC11
84	PTC12
85	PTC13
86	PTC14
87	PTC15
90	PTC16
91	PTC17
92	PTC18
93	PTD0
94	PTD1
95	PTD2
96	PTD3
97	PTD4
98	PTD5
99	PTD6
100	PTD7
1	PTE0
2	PTE1
3	PTE2
4	PTE3
5	PTE4
6	PTE5
7	PTE6
31	PTE24
32	PTE25
33	PTE26

TCK/EZP_CLK 3,5
TDI/EZP_DI/FTM0_CH6 3,5
TDO/EZP_DO 3,5
TMS 3,5
EZP_CS_B/TSI0_CH5 3,5,7
PTA5 3
CAN0_TX/FTM1_CH0 3,8
CAN0_RX0/FTM1_CH1 3,8
PTA14 3,8
PTA15 3,8
PTA16 3,8
PTA17 3,8
EXTAL 3
XTAL 3
PTB0/ADC0_SE8/TSI0_CH0 3,7,8
PTB1/ADC0_SE9/TSI0_CH6 3,7,8
I2C0_SCL/ADC0_SE12/TSI0_CH7 3,7,8
I2C0_SDA/ADC0_SE13/TSI0_CH8 3,7,8
EBI_AD20 3
EBI_AD19 3,8
EBI_AD18 3,8
EBI_AD17/SCI0_RX/TSI0_CH9 3,7,8
EBI_AD16/SCI0_TX/TSI0_CH10 3,7,8
EBI_AD15/SSI0_TX_BCLK/TSI0_CH11 3,7,8
EBI_OE_B/SSI0_TX_FS/TSI0_CH12 3,7,8
PTB20 3,8
PTB21 3,8
PTB22 3,8
PTB23 3
EBI_AD14/SSI0_TXD/TSI0_CH13 3,6,7,8
EBI_AD13/FTM0_CH0/TSI0_CH14 3,6,7,8
EBI_AD12/FTM0_CH1/TSI0_CH15 3,6,7,8
PTC3/CLOCKOUT0/FTM0_CH2 3
EBI_AD10/FTM0_CH3 3,7,8
EBI_AD9/PTC5 3,8
EBI_AD8/PTC7/CMP0_IN1 3
EBI_AD7/PTC8/SSI0_CLK 3,6,7,8
EBI_AD6/PTC9 3,6,7,8
EBI_AD5/PTC10/SSI0_RX_FS 3,6,7,8
PTC11/EBI_RW_b/SSI0_RXD 3,8
PTC12 3,8
PTC13 3,8
PTC14 3,8
PTC15 3,8
SCI3_RX 3
SCI3_TX 3
PTC18 3
EBI_ALE/EBI_CS1_B/DSPI0_PCS0 3,6,8
EBI_CS0_B/DSPI0_SCK 3,7,8
EBI_AD4/DSPI0_SOUT 3,6,7,8
EBI_AD3/DSPI0_SIN 3,6,7,8
EBI_AD2/DSPI0_PCS1/FTM0_CH4 3,6,7,8
EBI_AD1/PTD5/FTM0_CH5 3,6,7,8
EBI_AD0/PTD6/FTM0_CH6 3,6,7,8
PTD7/CMT_IRO 3,6,7,8
PTE0/SCI1_TX 3,5,8
PTE1/DSP1_SOUT/SCI1_RX 3,5,8
DSPI1_SCK 3,8
DSPI1_SIN 3,8
DSPI1_PCS0 3,8
PTE5 3,8
PTE6 3,8
PTE24 3,8
PTE25 3,8
RTC_CLOCKOUT 3,8

freescale semiconductor

ICAP Classification: FCP: ___   FIUO: X   PUBI: ___
Drawing Title:
TWR-K20D72M
Page Title:
PK20D72M (100LQFP+Scoket)

Size	Document Number		Rev
C	SCH-27182 PDF: SPF-27182		C

Date: Tuesday, December 13, 2011   Sheet 4 of 8

JTAG

On Board OSBDM/Serial Bridge

Board Rev   Board ID = 04

RXD Source Select

TXD Destination Select

MANUAL RESET

RESET

STATUS

TPWR

JM60 BDM

JM60 Bootload Enable

VREG IN SELECTOR

BOARD POWER SELECTOR

POWER ON

Default: no shunt
(Disconnect Target Power)

Default: no shunt
(Disable Bootload)

Default: 1-2
(Power from OSBDM USB
supports K20 USB Host mode)

Default: 5-6
(VREG_IN From K20 USB)

Default: 3-5
(Power from
3.3V regulator)

K20 USB Interface (Host or Device)

3,4,6,7,8   EBI_AD7/PTC8/SSI0_CLK   PTC8
3,4,7,8   EBI_AD6/PTC9   PTC9

Default: 1-2
(Enable USB Power)

J2   HDR 1X2 TH
R146   10.0K

P5V_USB
R145   10.0K

K20_USB_ENA   1   ENA   FLGA   2   K20_USB_FLGA
K20_USB_ENB   4   ENB   FLGB   3
  7   IN   OUTA   8
  6   GND   OUTB   5
U14   MIC2026-1YM

Default: 1-2
(Enable USB Flag)

J20   HDR 1X2 TH

K20_USB_VBUS

L9   330 OHM
1   2

K20_USB_DM   R143   33
K20_USB_DP   R144   33

P5V_K20_USB   5
USB0_DN   3,8
USB0_DP   3,8

J19   MICRO USB AB 5

U15   SP0503B

Note:
R143 and R144 33 ohms resistors needs be soldered
if no using TWR-SER USB connections. By default
these resistors should be populate.

K20_USB_SHLD

L8   330 OHM
1   2

3,4,7,8   EBI_AD5/PTC10/SSI0_RX_FS   PTC10

InfraRed

3,4,7,8   PTD7/CMT_IRO   PTD7   CMT_IRO   IRDAJ

Default: no shunt
(Disable IRDA)
J1   HDR 1X2 TH

D1   IR12-21C/TR8

R38   33   IRDAR

V_BRD
R40   1.54K
IRDA_SEN
R39   1.0K

Q1   PT12-21C/TR8

CMP0_IN0

J3   HDR 1X2 TH
Default: no shunt
(Disable IRDA)

PTC7   EBI_AD8/PTC7/CMP0_IN1   3,4,7,8

C2   0.1uF

PUSH BUTTON

SW1   PTS645
pushButton1   PTC1   EBI_AD13/FTM0_CH0/TSI0_CH14   3,4,6,7,8

SW2   PTS645
pushbutton0   PTC2   EBI_AD12/FTM0_CH1/TSI0_CH15   3,4,7,8

FlexBus ADDRESS LATCH

V_BRD
C20   0.1uF

U1   74LVC573A

3,4,7,8	EBI_AD0/PTD6/FTM0_CH6	PTD6
3,4,7,8	EBI_AD1/PTD5/FTM0_CH5	PTD5
3,4,7,8	EBI_AD2/DSPI0_PCS1/FTM0_CH4	PTD4
3,4,7,8	EBI_AD3/DSPI0_SIN	PTD3
3,4,7,8	EBI_AD4/DSPI0_SOUT	PTD2
3,4,6,7,8	EBI_AD5/PTC10/SSI0_RX_FS	PTC10
3,4,7,8	EBI_AD6/PTC9	PTC9
3,4,6,7,8	EBI_AD7/PTC8/SSI0_CLK	PTC8

OE   1
LE   11   FB_ALE   EBI_ALE/EBI_CS1_B/DSPI0_PCS0   3,4,8

FB_AD0   D0 2   Q0 19   LATCH_FB_A0   LATCH_AD0   8
FB_AD1   D1 3   Q1 18   LATCH_FB_A1   LATCH_AD1   8
FB_AD2   D2 4   Q2 17   LATCH_FB_A2   LATCH_AD2   8
FB_AD3   D3 5   Q3 16   LATCH_FB_A3   LATCH_AD3   8
FB_AD4   D4 6   Q4 15   LATCH_FB_A4   LATCH_AD4   8
FB_AD5   D5 7   Q5 14   LATCH_FB_A5   LATCH_AD5   8
FB_AD6   D6 8   Q6 13   LATCH_FB_A6   LATCH_AD6   8
FB_AD7   D7 9   Q7 12   LATCH_FB_A7   LATCH_AD7   8

GENERAL PURPOSE TWRPI

3,4,8 ADC1_DP0
3,4,7,8 PTB0/ADC0_SE8/TSI0_CH0 PTB0
3,4,7,8 PTB1/ADC0_SE9/TSI0_CH6 PTB1 TWRPI-ADC1

P5V_TRG_USB
V_BRD VDDA
V_BRD
R128 10.0K
R127 10.0K

TWRPI-ADC0
TWRPI-ADC2

3,4,7,8 ADC0_DP0 TWRPI-ID0 TWRPI-ID1
RESET_B

J7 CON_2X10
VSSA VSSA

3,4,7,8 ADC0_DM0
3,4,5,7,8 RESET_B

V_BRD
R126 4.7K
V_BRD
R125 4.7K

J8 CON_2X10

3,4,7,8 I2C0_SCL/ADC0_SE12/TSI0_CH7 PTB2 I2C0_SCL I2C0_SDA PTB3 I2C0_SDA/ADC0_SE13/TSI0_CH8 3,4,7,8
3,4,6,8 EBI_AD3/DSPI0_SIN PTD3 SPI0_MISO SPI0_MOSI PTD2 EBI_AD4/DSPI0_SOUT 3,4,6,8
3,4,6,8 EBI_AD2/DSPI0_PCS1/FTM0_CH4 PTD4 SPI0_CS1_B SPI0_CLK PTD1 EBI_CS0_B/DSPI0_SCK 3,4,8
3,4,8 EBI_AD10/PTC5 PTC5 TWRPI_GPIO0/IRQ TWRPI_GPIO1 PTC6 EBI_AD9/PTC6 3,4,6,8
3,4,6,8 EBI_AD0/PTD6/FTM0_CH6 UART0_RX TWRPI_GPIO2 TWRPI_GPIO3 UART0_TX PTD7/CMT_IRO 3,4,6,8
3,4,6,8 EBI_AD1/PTD5/FTM0_CH5 UART0_CTS TWRPI_GPIO4 UART0_RTS EBI_AD2/DSPI0_PCS1/FTM0_CH4 3,4,6,8

TOUCH PAD TWRPI

V_BRD
R124 10.0K
P5V_TRG_USB
V_BRD VDDA
R123 10.0K

J5 CON_2X10
VSSA

3,4,7,8 PTB0/ADC0_SE8/TSI0_CH0 PTB0 TSI0_CH0
3,4,7,8 PTB1/ADC0_SE9/TSI0_CH6 PTB1 TSI0_CH6
3,4,7,8 I2C0_SCL/ADC0_SE12/TSI0_CH7 PTB2 TSI0_CH7 TSI0_CH8 PTB3 I2C0_SDA/ADC0_SE13/TSI0_CH8 3,4,7,8
3,4,6,8 EBI_AD14/SSI0_TXD/TSI0_CH13 PTC0 TSI0_CH13 TSI0_CH14 PTC1 EBI_AD13/FTM0_CH0/TSI0_CH14 3,4,6,7,8
3,4,6,7,8 EBI_AD12/FTM0_CH1/TSI0_CH15 PTC2 TSI0_CH15 TSI0_CH5 PTA4 EZP_CS_B/TSI0_CH5 3,4,5
3,4,8 EBI_AD17/SCI0_RX/TSI0_CH9 PTB16 TSI0_CH9 TSI0_CH10 PTB17 EBI_AD16/SCI0_TX/TSI0_CH10 3,4,8
3,4,6,8 EBI_AD15/SSI0_TX_BCLK/TSI0_CH11 PTB18 TSI0_CH11 TSI0_CH12 PTB19 EBI_OE_B/SSI0_TX_FS/TSI0_CH12 3,4,6,8
3,4,7,8 ADC0_DP0 TOUCH TWRPI-ID0 TOUCH TWRPI-ID1 ADC0_DM0 3,4,7,8
RESET_B RESET_B 3,4,5,7,8

TOUCH ELECTRODES WITH LEDS

3,4,7,8 PTB0/ADC0_SE8/TSI0_CH0 PTB1 PTB0
3,4,7,8 PTB1/ADC0_SE9/TSI0_CH6

P3V3_REG P3V3_REG

3,4,6,8 EBI_AD8/PTC7/CMP0_IN1 PTC7 LEDGR
D7 GREEN LED R43 1.0K
TP12 DNP
R55 0 R62 1.0K
D9 LED_GRN + ELECTRODE
TP13 DNP
R68 0 R72 1.0K
D10 LED2_ELECTRODE

3,4,6,8 EBI_AD7/PTC8/SSI0_CLK PTC8 LEDBE
D8 BLUE LED R51 1.0K

3,4,6,8 EBI_AD6/PTC9 PTC9
3,4,6,8 EBI_AD5/PTC10/SSI0_RX_FS PTC10

ACCELEROMETER

MCU_PWR P3V3_REG
C6 0.1uF C7 0.1uF C8 4.7uF

Default: 1-2 (Enable CLK)
J25 HDR 1X2 TH

3,4,7,8 I2C0_SCL/ADC0_SE12/TSI0_CH7 PTB2 SCL
3,4,7,8 I2C0_SDA/ADC0_SE13/TSI0_CH8 PTB3 SDA

J26 HDR 1X2 TH
MCU_PWR R52 10.0K SA0

U5 MMA8451Q
SCL SDA VDDIO VDD
BYP INT1 INT2
NC3 NC13 NC15 NC16
GND1 GND2 GND3

R53 10.0K DNP
C5 0.1uF

HDR 1X2 TH J24
Default: 1-2 (Enable ACCELEROMETER)

IRQ1 IRQ2 PTB0 PTB0/ADC0_SE8/TSI0_CH0 3,4,7,8
PTB1 PTB1/ADC0_SE9/TSI0_CH6 3,4,7,8

J23 HDR 1X2 TH
Default: 1-2 (Enable ACCELEROMETER)

POTENTIOMETER

V_BRD
R42 5K
C21 0.1uF
ADC1_DM0 3,4,8
J27 HDR 1X2 TH
Default: 1-2 (Enable LED)

MICROPHONE

V_BRD
C49 0.1uF
U16 MIC
PWR OUT GND GAIN
SPM0408HE5H-SB
R149 100 MICR MICJ
C50 0.47UF
J4 HDR 1X2 TH
Default: 1-2 (Enable Microphone)
ADC1_DP0 3,4,7,8
C51 0.47UF

BUZZER

J21 HDR 1X2 TH
EBI_AD11/FTM0_CH3 3,4,8
LS1 PKLCS1212E4001
C52 47PF DNP
Default: 1-2 (Enable BUZZER)
VSSA

PCI EXPRESS TOWER SYSTEM   PRIMARY

PCI EXPRESS TOWER SYSTEM   SECONDARY

J9A

J9B