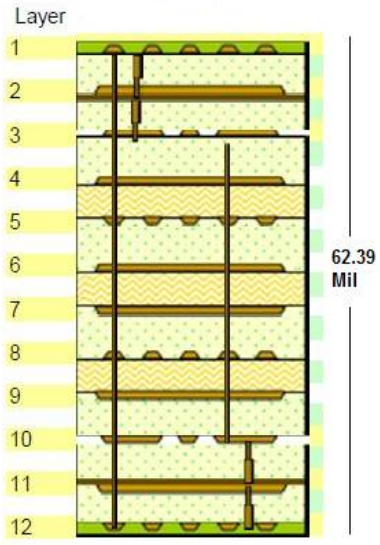
Arrow iMX8M HMI Platform

MAJOR REVISION HISTORY :

PCB REV.	SCH. REV.	DESCRIPTION	DATE
	0.1	Initial schematic draft created	13-Aug-2018
	0.2	Draft version with incorporated review comments	25-Aug-2018
	0.3	Draft version with incorporated review comments	28-Sep-2018
	0.4	Draft version with incorporated review comments	03-Oct-2018
	0.5	Draft version with incorporated review comments	08-Oct-2018
	0.6	Draft version with back annotation	10-Oct-2018
	1.0	Released version	11-Oct-2018

PAGE DESCRIPTION :

PCB LAYER STACK-UP DETAILS :



PCB MECHANICAL DETAILS :

1. PCB SIZE: 85 mm X 100 mm X 1.57 mm
2. PCB MATERIAL: FR4
3. NUMBER OF LAYERS: 12
4. IMPEDANCE CONTROL: YES

NOTES, UNLESS OTHERWISE SPECIFIED :

1. RESISTANCE VALUES ARE IN OHM.
2. PARTS NOT INSTALLED ARE INDICATED WITH 'NU' or 'DNP.

Project: Arrow_iMX8M_HMI_Platform		Designed eInfochips
Title: COVER PAGE		eInfochips The Solutions People
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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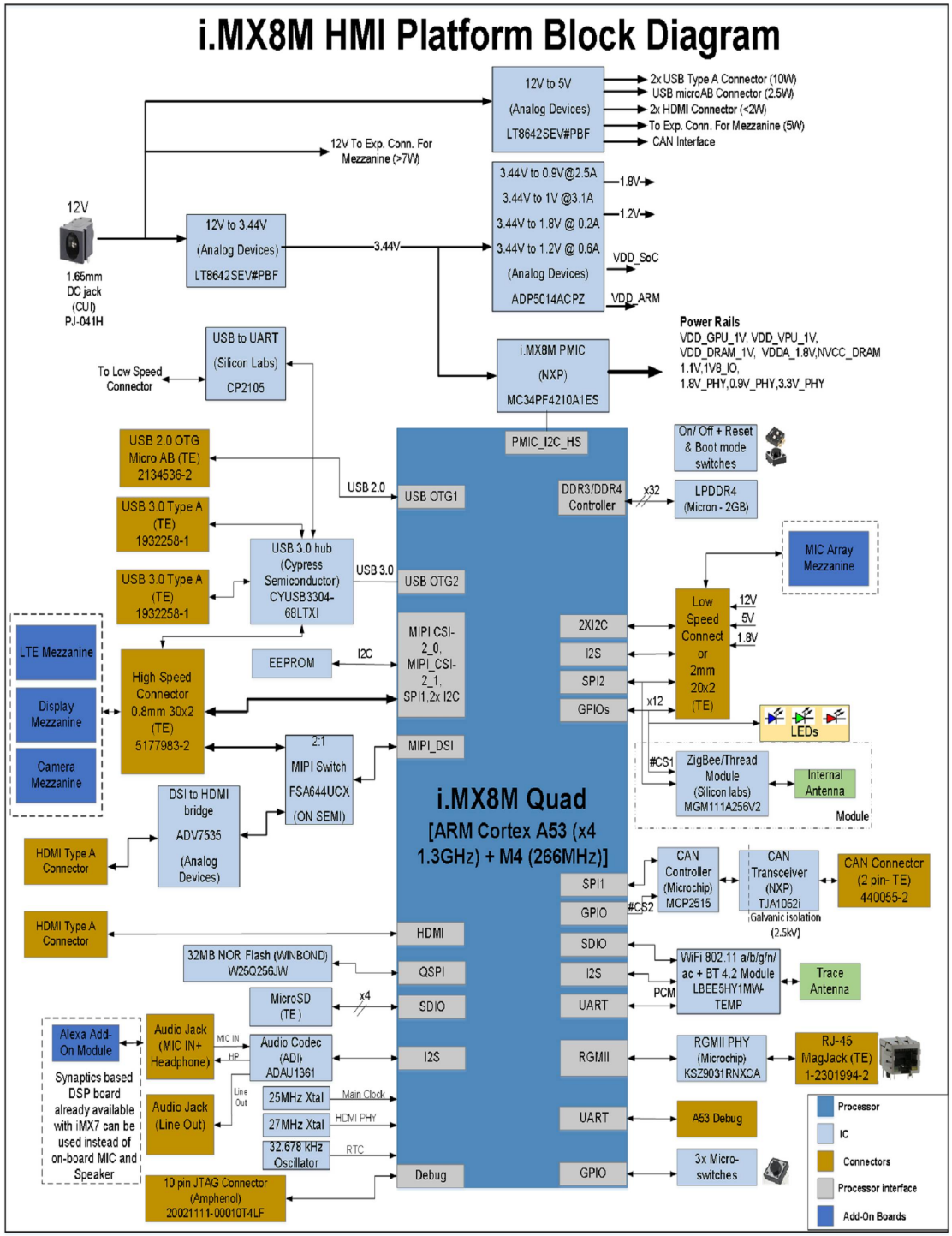
BLOCK DIAGRAM



Project: Arrow_iMX8M_HMI_Platform	Designed: eInfochips	
Title: BLOCK DIAGRAM		
Size: E	eInfochips#: 16_00666_01	Rev: 1.0
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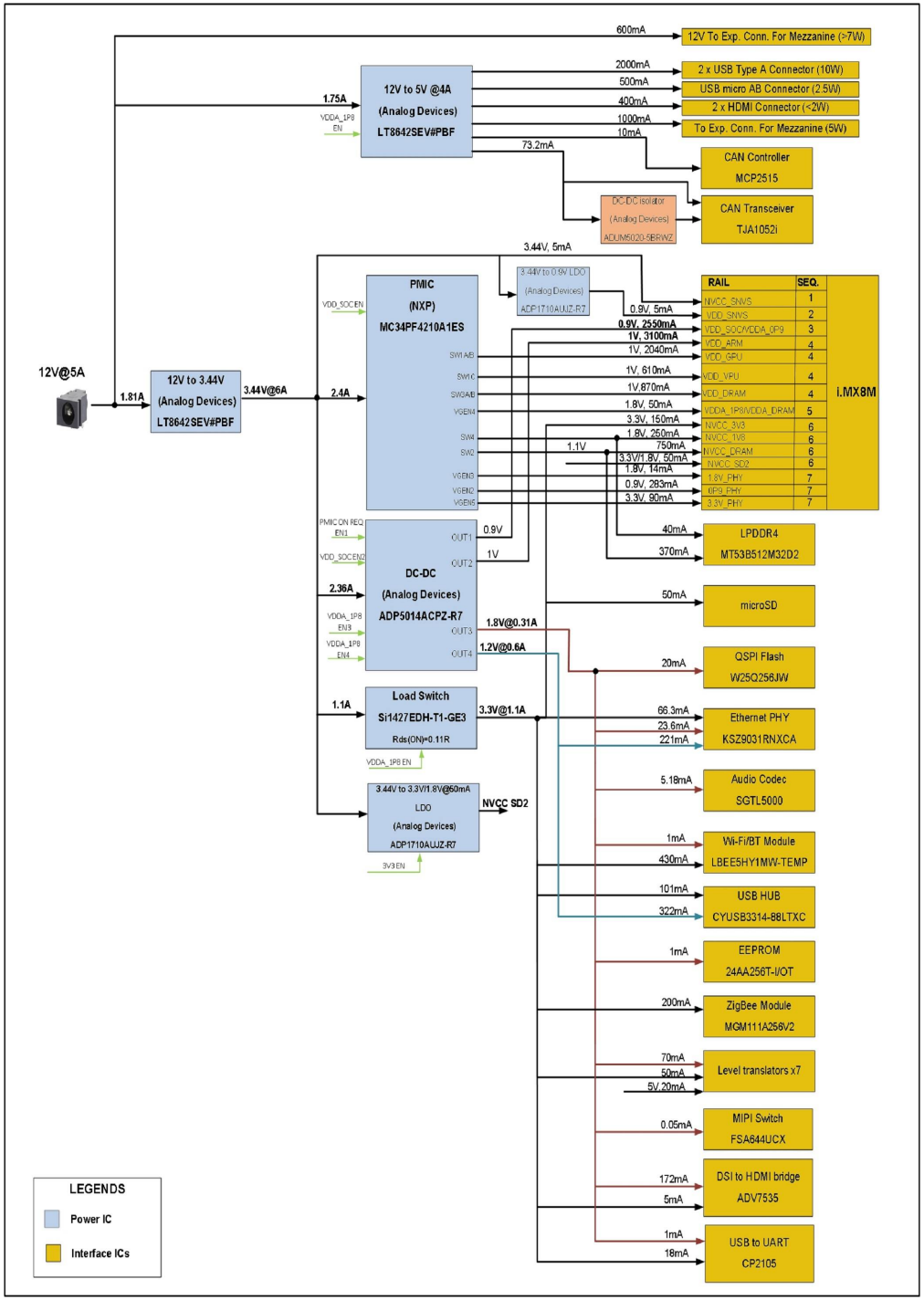
POWER SCHEME



Project: Arrow iMX8M HMI Platform		Designed elnfochips
Title: POWER SCHEME		
Size: E	elnfochips#: 16_00666_01	Rev: 1.0
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I2C ADDRESS TABLE

DEVICE	DEVICE ADDRESS	I2C Interface	IO LEVEL
PMIC PF4210	0x08	I2C 1	1.8V
LOW SPEED EXPANSION	NA	I2C 1	1.8V
LOW SPEED EXPANSION	NA	I2C 2	1.8V
HIGH SPEED EXPANSION	NA	I2C 3	1.8V
HIGH SPEED EXPANSION	NA	I2C 4	1.8V
EEPROM	0x50	I2C 2	1.8V
Audio Codec ADAU1361	0x38	I2C 2	1.8V
DSI to HDMI	0X72	I2C 1	1.8V
USB HUB CYUSB3304	0X60	I2C 4	3.3V
A71CH Security IC	0X49	I2C 3	1.8V

Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: I2C ADDRESS TABLE	eInfochips The Solutions People	
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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PROCESSOR GPIO TABLE1

GPIO BANK1

GPIO0	REF_CLK_32K (CLK FOR BT)	OUTPUT
GPIO1	ECSPI1_SS1	OUTPUT
GPIO2	nWDOG (WATCHDOG TIMER)	OUTPUT
GPIO3	LS_GPIO1_J	BIDIRECTIONAL
GPIO4	SD2_VSELECT (SD2 VOLTAGE SELECT)	OUTPUT
GPIO5	LS_GPIO1_L	BIDIRECTIONAL
GPIO6	GPIO_CAN_nINT (INTERRUPT FROM CAN)	INPUT
GPIO7	PMIC_nINT (INTERRUPT FROM PMIC)	INPUT
GPIO8	ECSPI2_SS1	OUTPUT
GPIO9	ENET_nRST (ETHERNET PHY nRESET)	OUTPUT
GPIO10	USB1_OTG_ID	INPUT
GPIO11	ENET_nINT (INTERRUPT FROM ETHERNET PHY)	INPUT
GPIO12	USB1_OTG_PWR	OUTPUT
GPIO13	USB1_OTG_OC	INPUT
GPIO14	CSI1_CLK (CSI1 CLK TO HS CONNECTOR)	OUTPUT
GPIO15	CSI0_CLK (CSI0 CLK TO HS CONNECTOR)	OUTPUT

GPIO BANK2

GPIO6	GPIO_CAN_TX0RTS	OUTPUT
GPIO7	LS_GPIO2_E	BIDIRECTIONAL
GPIO8	LS_GPIO2_G	BIDIRECTIONAL
GPIO9	GPIO_CAN_RX0BF	INPUT
GPIO10	LS_GPIO2_A	BIDIRECTIONAL
GPIO11	LS_GPIO2_B	BIDIRECTIONAL

GPIO BANK4

GPIO0	BT_LED	OUTPUT
GPIO1	WL_LED	OUTPUT
GPIO21	USER_LED1	OUTPUT
GPIO22	USER_LED2	OUTPUT
GPIO27	FAN ON	OUTPUT
GPIO28	USER_LED3	OUTPUT
GPIO29	USER_LED4	OUTPUT

Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: PROCESSOR GPIO TABLE1	eInfochips The Solutions People	
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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PROCESSOR GPIO TABLE2

GPIO BANK3

GPIO2	BT_DEV_WAKE	OUTPUT
GPIO3	WL_REG_ON	OUTPUT
GPIO4	DSI_SW_SEL	OUTPUT
GPIO5	BT_REG_ON	OUTPUT
GPIO10	nWAKE_ZigBee	OUTPUT
GPIO11	nINT_ZigBee	OUTPUT
GPIO12	LS_GPIO3_I	BIDIRECTIONAL
GPIO13	LS_GPIO3_K	BIDIRECTIONAL
GPIO14	BT_HOST_WAKE	INPUT
GPIO15	DSI_INT_OUT	INPUT
GPIO16	mSW1	INPUT
GPIO17	mSW3	INPUT
GPIO18	mSW2	INPUT
GPIO20	LS_GPIO3_D	BIDIRECTIONAL
GPIO21	LS_GPIO3_F	BIDIRECTIONAL
GPIO22	LS_GPIO3_H	BIDIRECTIONAL
GPIO24	LS_GPIO3_C	BIDIRECTIONAL
GPIO25	CAN_RST#	OUTPUT

GPIO BANK5

GPIO2	HP_DET_B (HEADPHONE DETECT)	INPUT
GPIO4	nRESET_ZigBee	OUTPUT
GPIO5	USB_HUB_RST	OUTPUT

Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: PROCESSOR GPIO TABLE2	eInfochips The Solutions People	
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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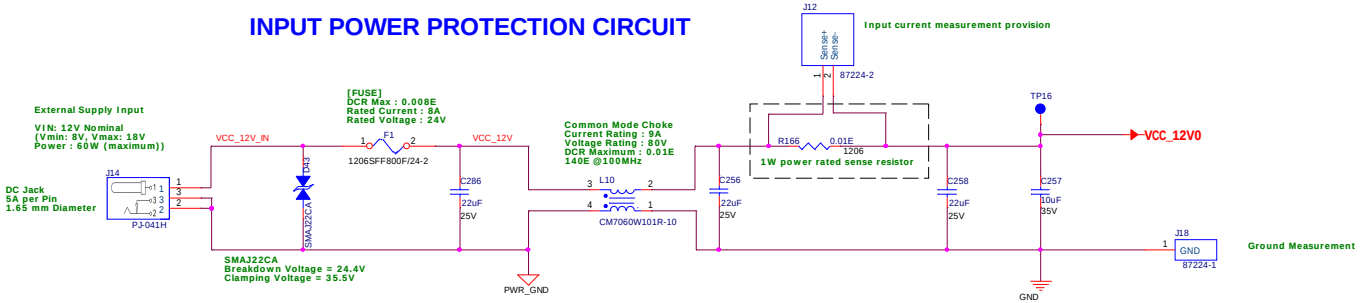
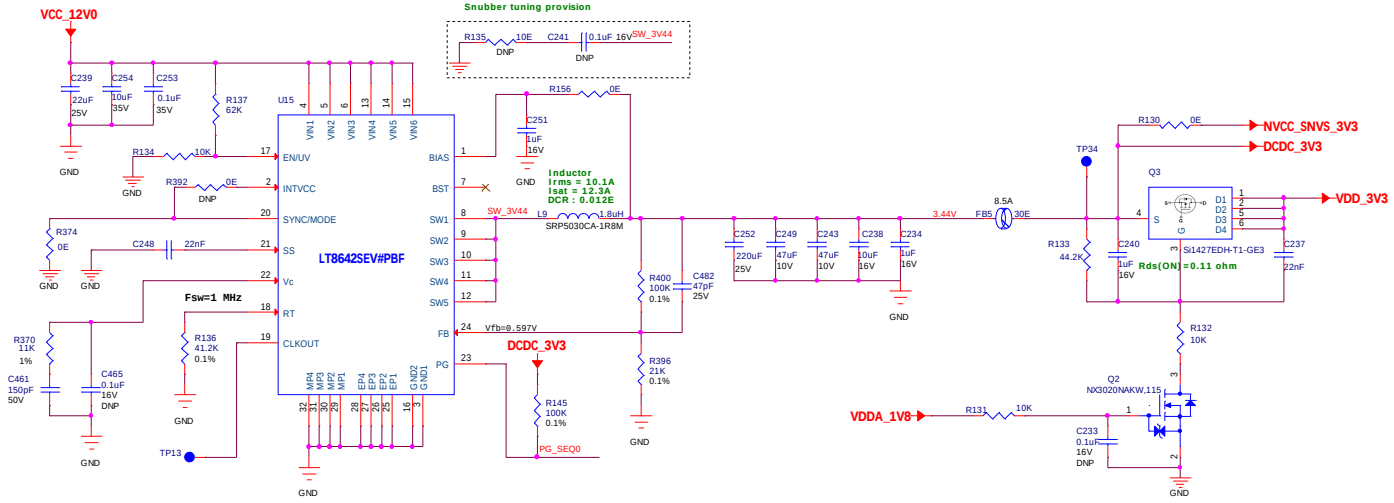
INPUT POWER SUPPLY

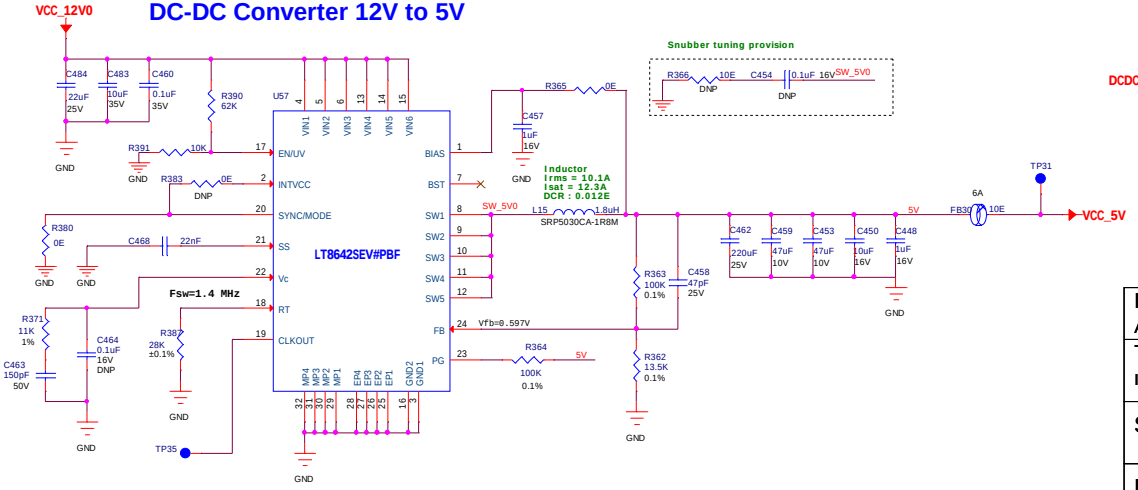
INPUT POWER PROTECTION CIRCUIT



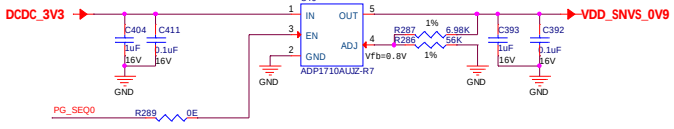
DC-DC Converter 12V to 3.44V



DC-DC Converter 12V to 5V



LDO 3.44V to 0.9V



Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: INPUT POWER SUPPLY		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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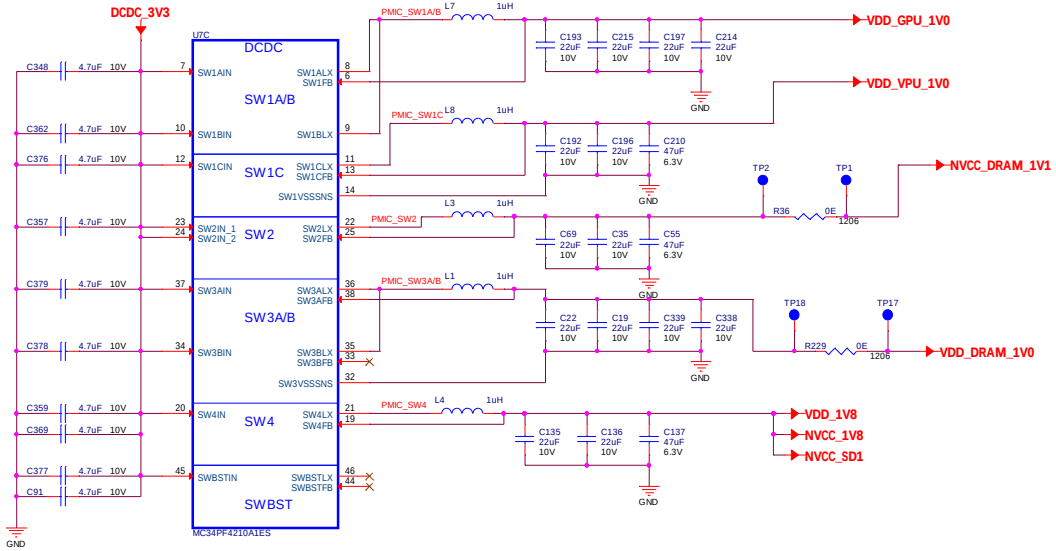
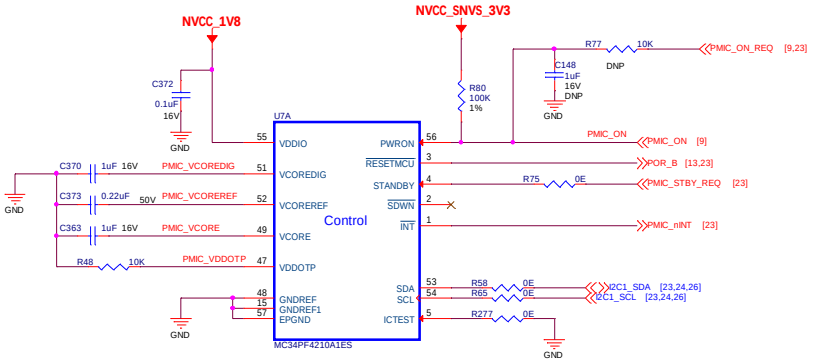
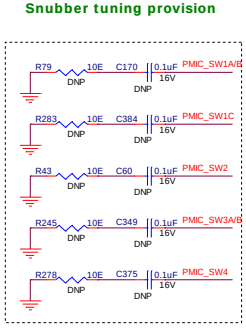
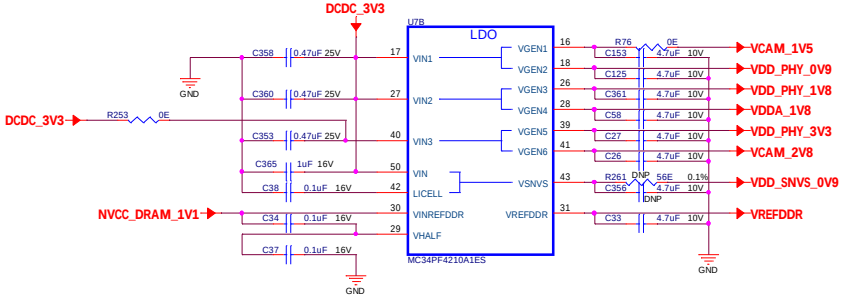
PMIC SECTION









Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: PMIC SECTION		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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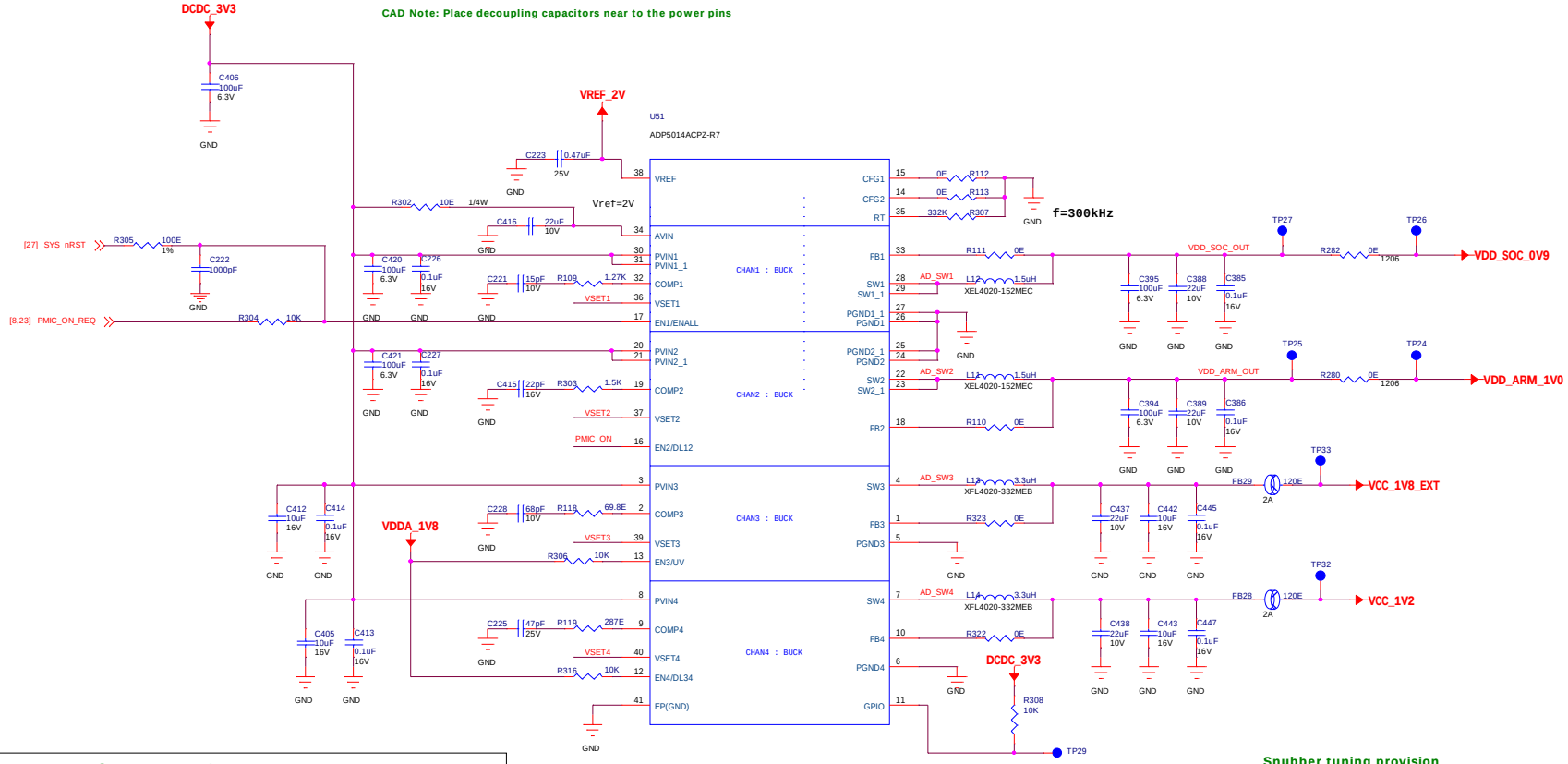
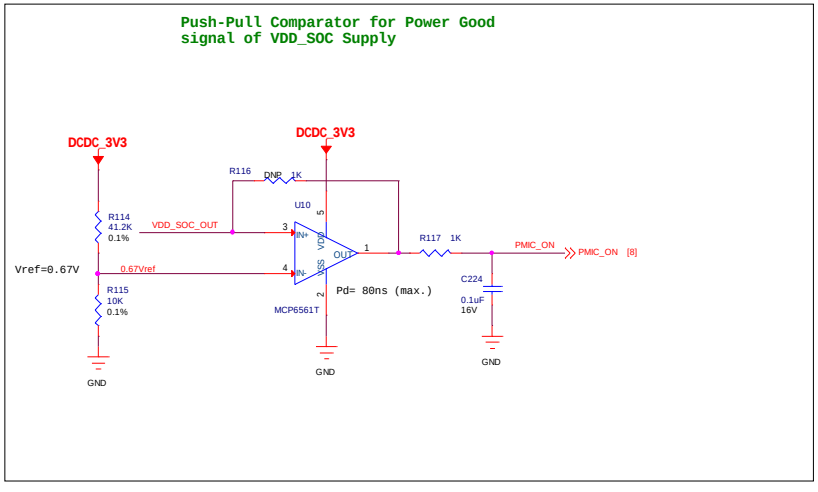
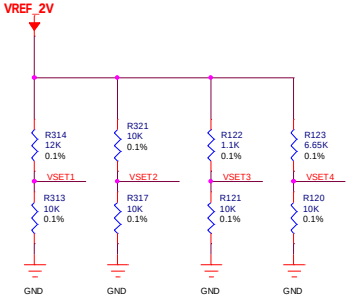
POWER REGULATORS







Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: POWER REGULATORS		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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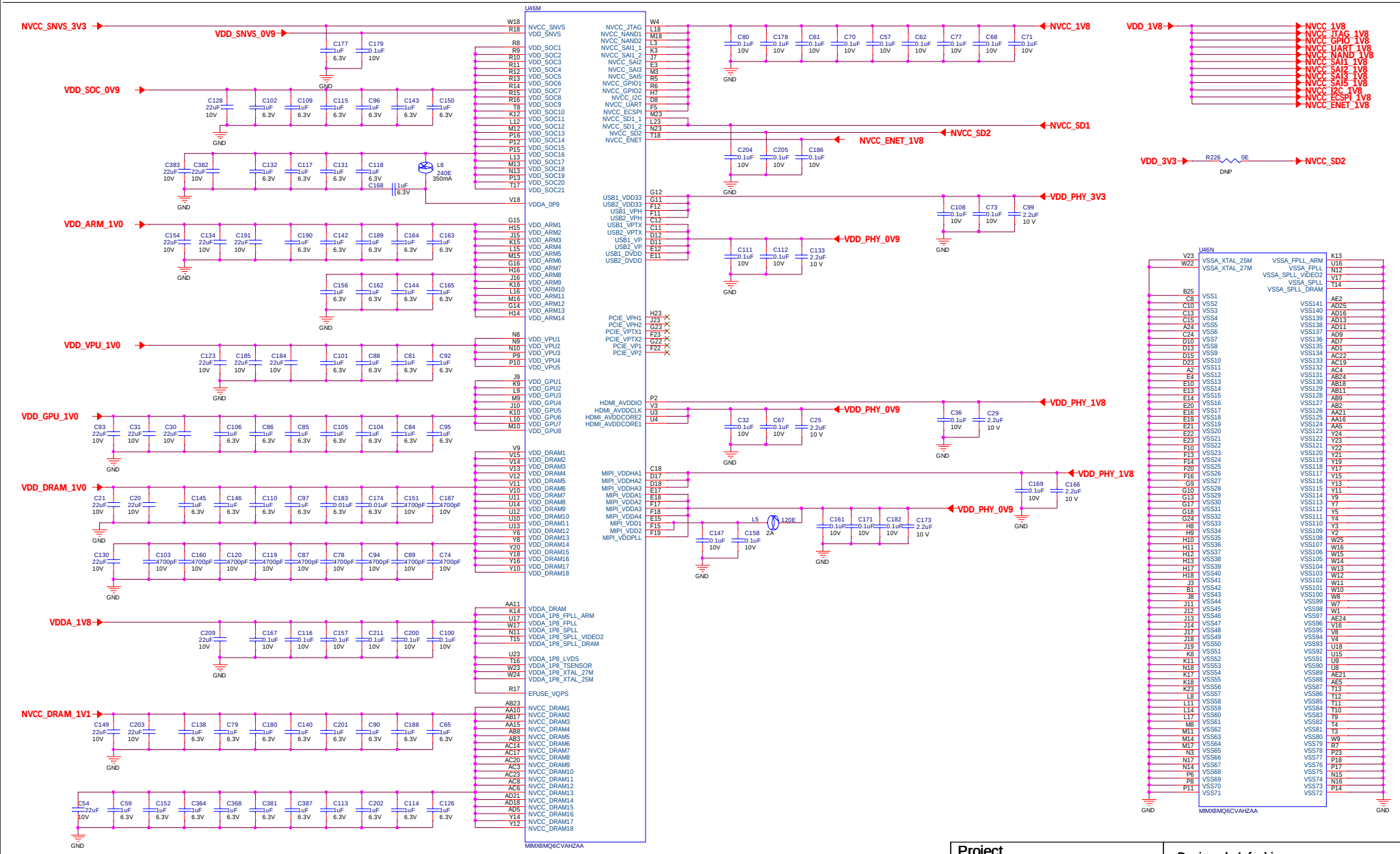
PROCESSOR(iMX 8M) POWER AND GROUND



Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: PROCESSOR POWER AND GROUND		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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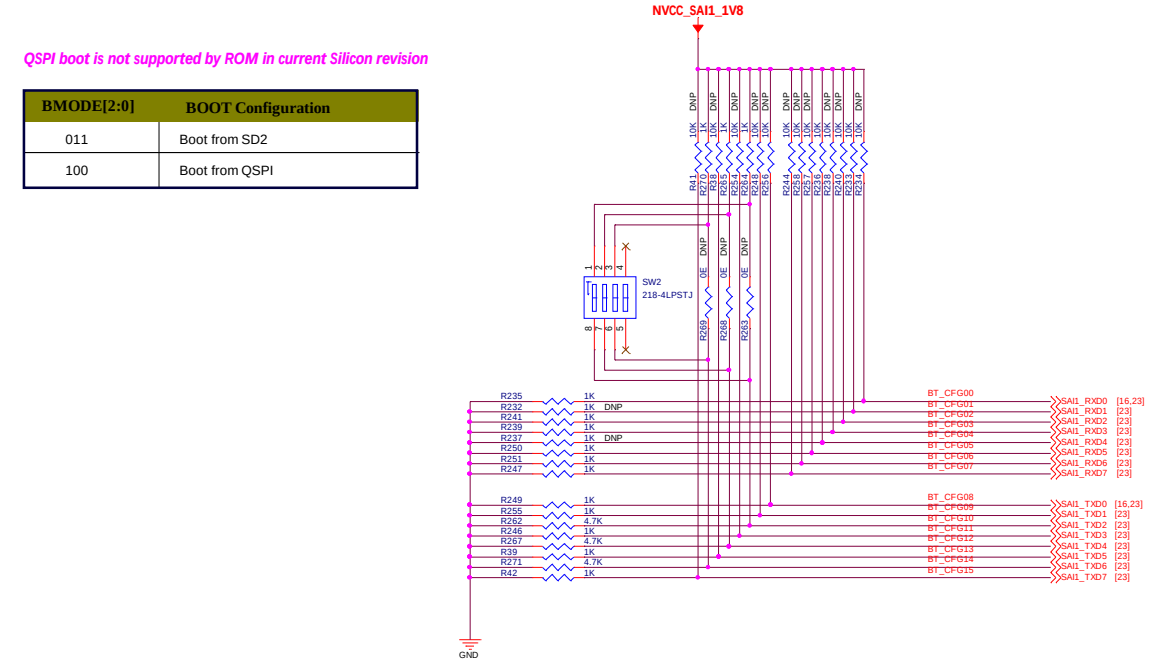
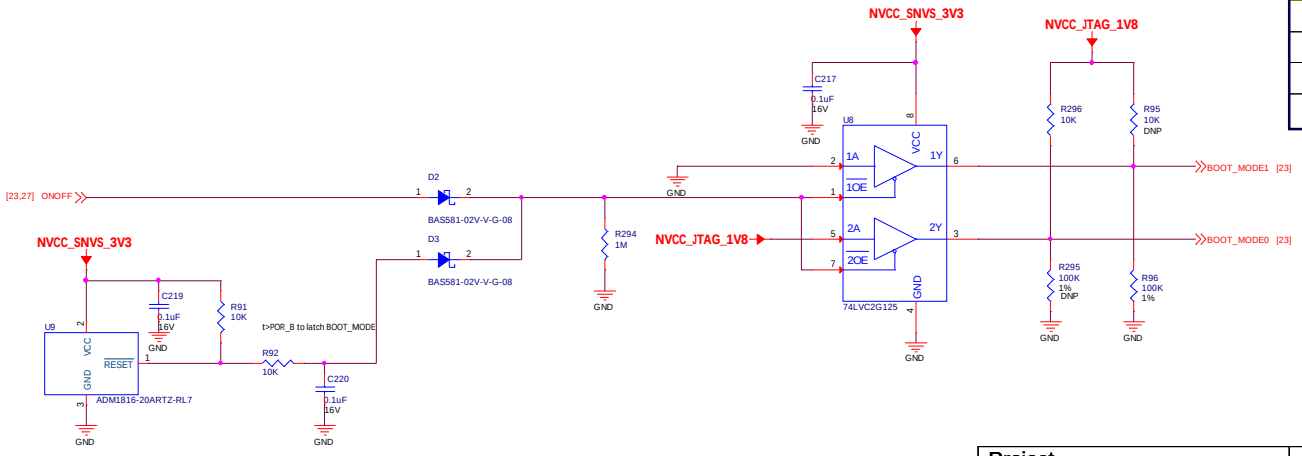
PROCESSOR(iMX 8M QUAD) CONTROL

QSPI boot is not supported by ROM in current Silicon revision

BMODE[2:0]	BOOT Configuration
011	Boot from SD2
100	Boot from QSPI



BMODE[1:0]	BOOT Source
00	Boot from fuses
01	Serial downloader
10	Internal boot
11	Reserved



Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: PROCESSOR CONTROL		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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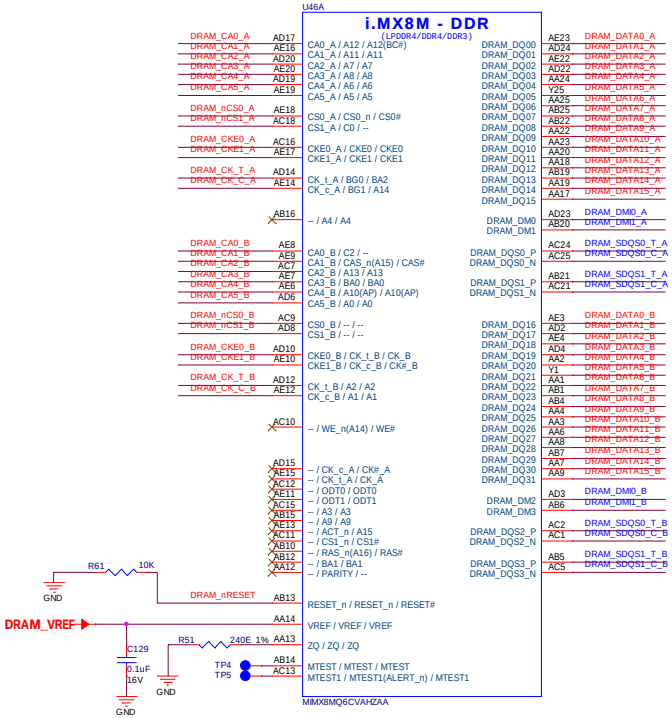
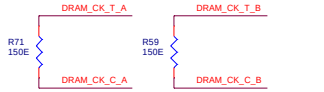
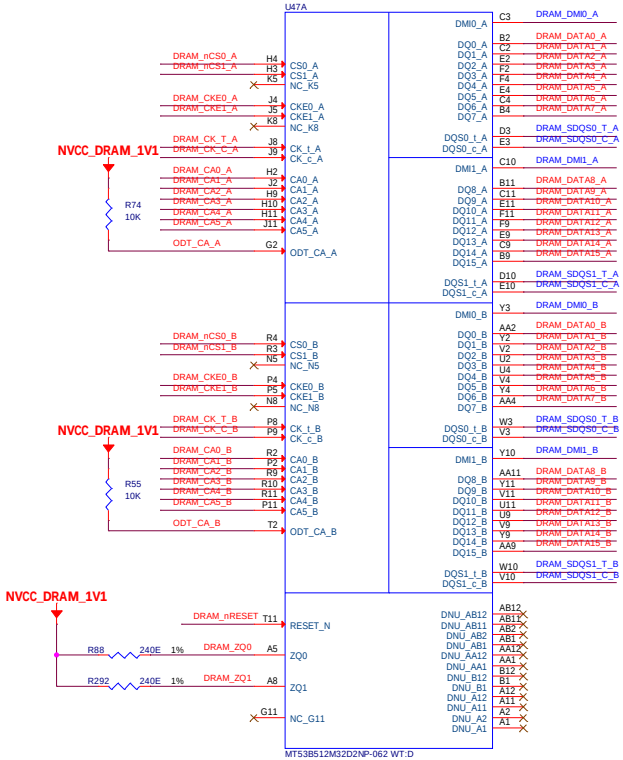
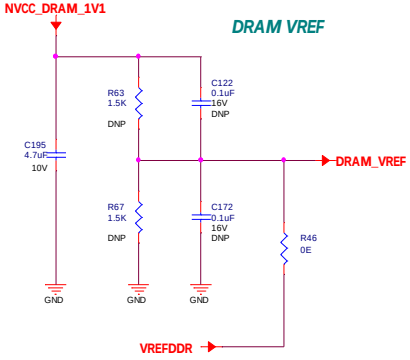
DDR INTERFACE



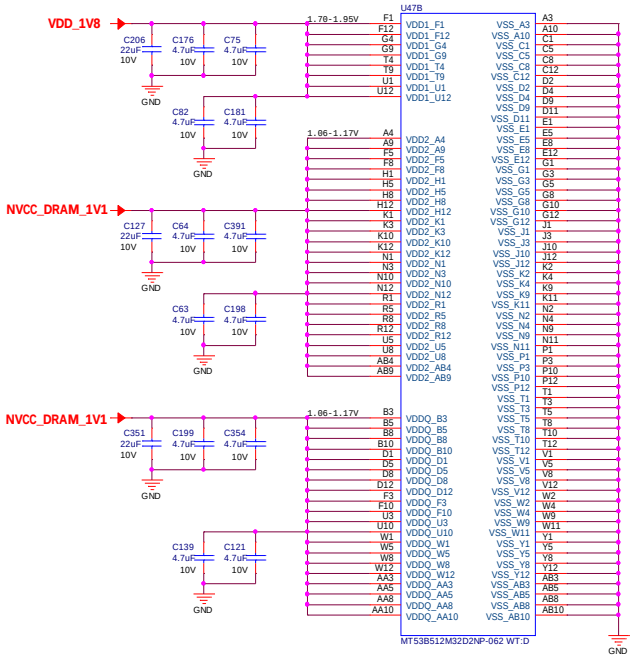






Note : LPDDR4 4GB and 2GB parts are pin to pin compatible

CAD Note:
1. DDR single ended signal impedance should be routed with 42E
2. DDR Differencial signal impedance should be routed with 85E



Project: Arrow_iMX8M_HMI_Platform		Designed eInfochips
Title: DDR INTERFACE		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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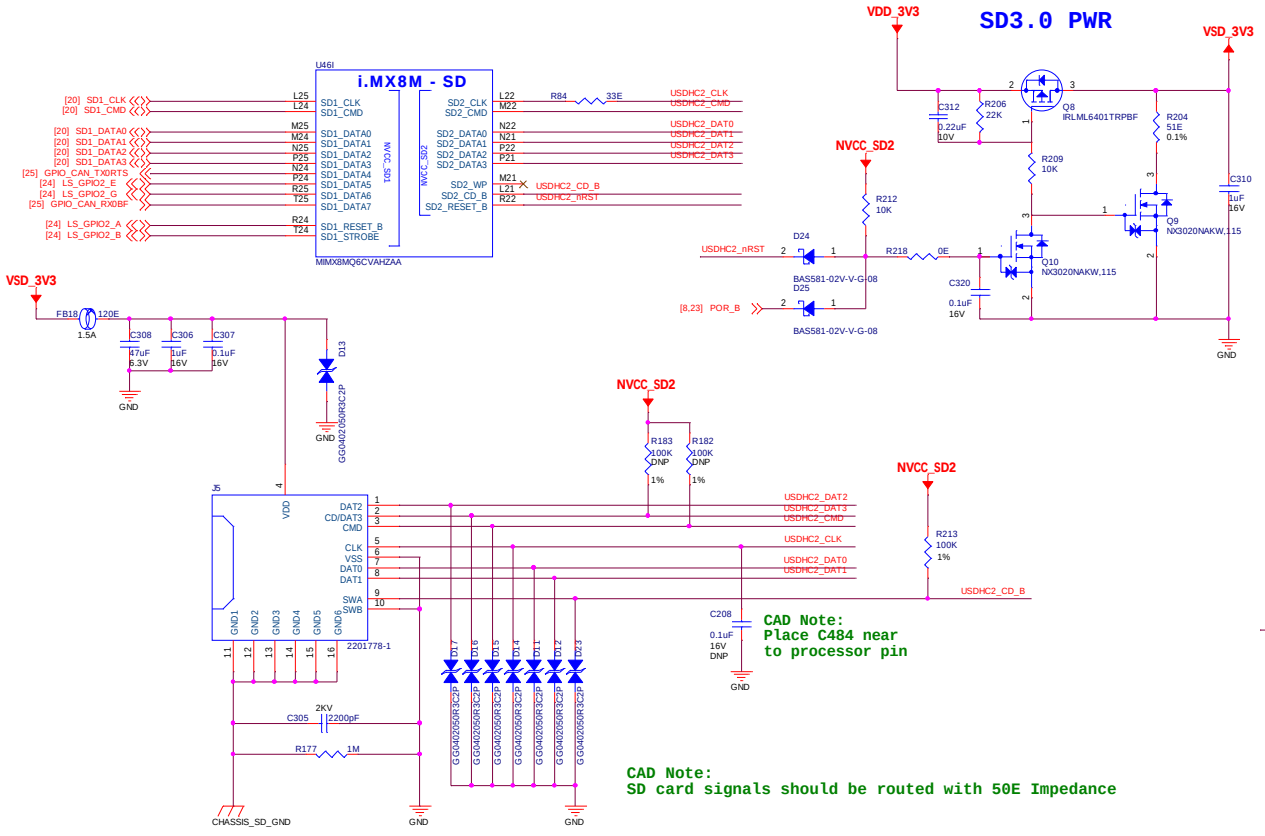
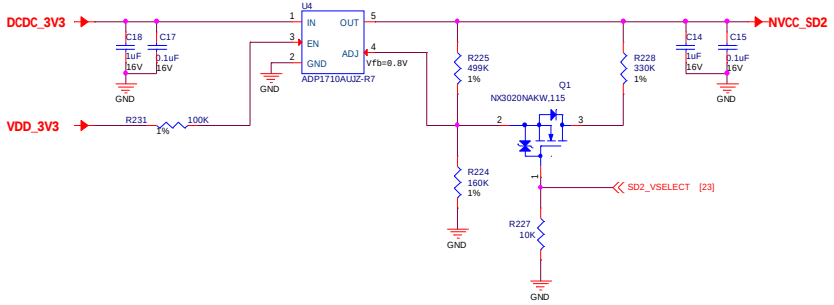
FLASH MEMORY SD CARD, NOR and EEPROM

SDIO INTERFACE



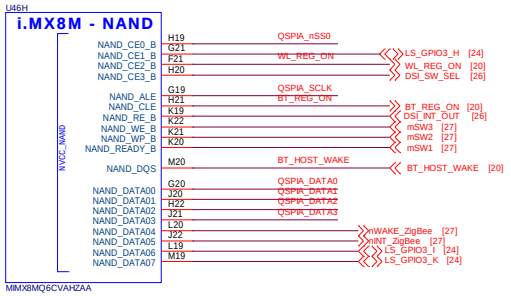
SD3.0 PWR

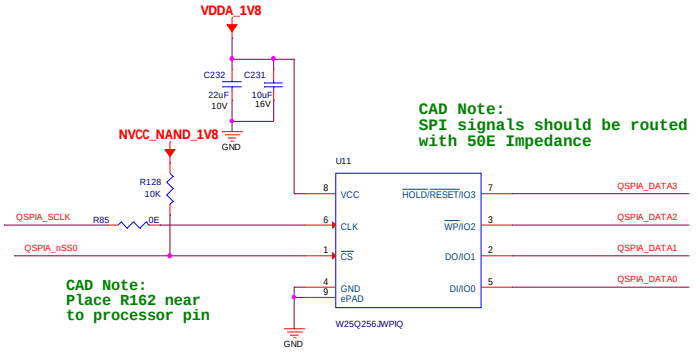
SD3.0 IO PWR



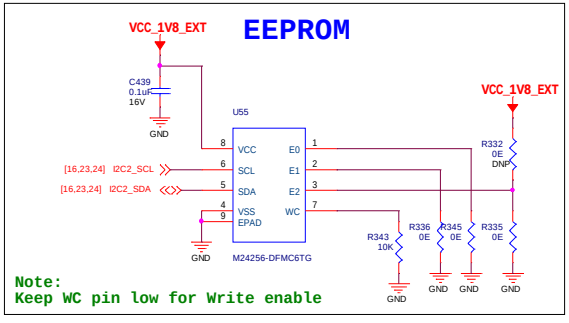
NOR MEMORY (QUAD SPI)

MIMX8MQ6DVAJZAA





EEPROM



Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: FLASH MEMORY SD CARD, NOR, EEPROM		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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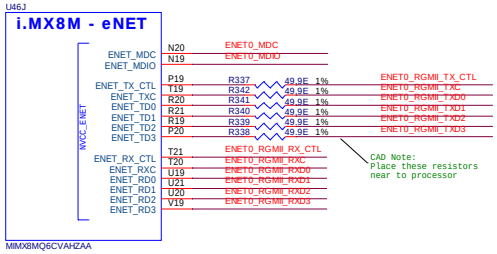
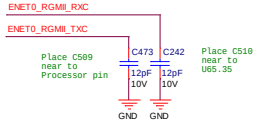
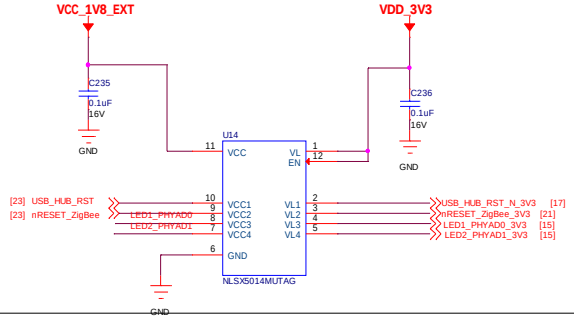
ETHERNET SECTION

Note: 1.8Volt ENET0_RGMII TX and RX





Voltage Level Translator_1V8 to 3V3



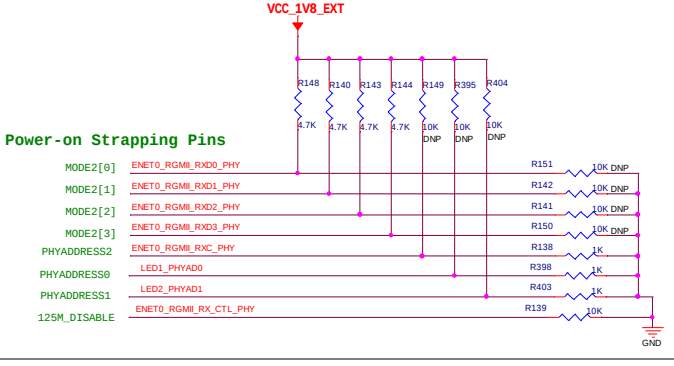
CAD Note:
RGMII signals should be routed with 50E Impedance

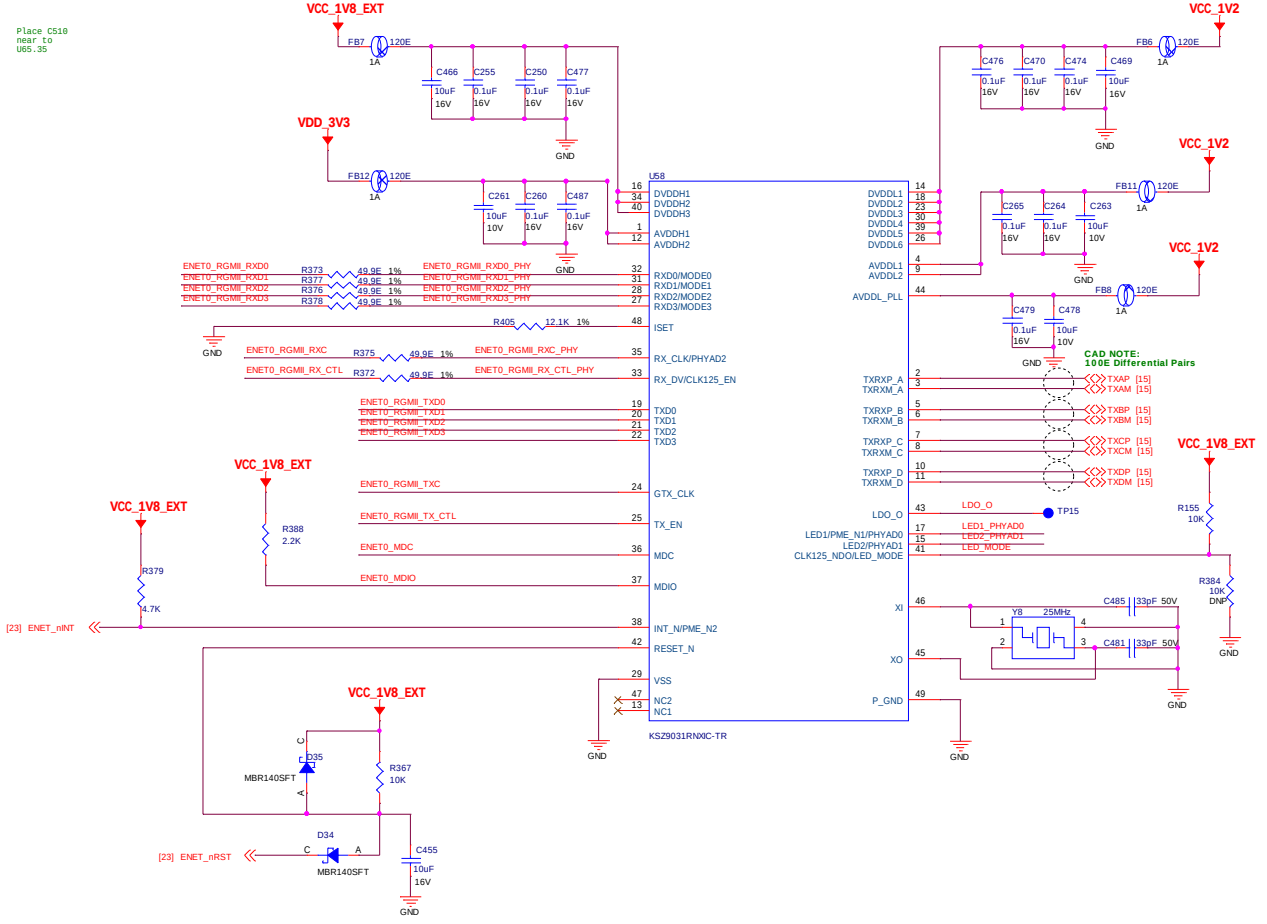
MODE2[3:0]

(Default assemble: 1111)
0100 NAND tree mode
0111 Chip power-down mode
1100 RGMII mode - Advertise 1000BASE-T full-duplex only
1101 RGMII mode - Advertise 1000BASE-T full- and halfduplex only
1110 RGMII mode - Advertise all capabilities (10/100/1000 speed half-/full-duplex), except 1000BASE-T halfduplex
1111 RGMII mode - Advertise all capabilities (10/100/1000 speed half-/full-duplex)

Others Reserved

Power-on Strapping Pins





Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: ETHERNET SECTION1		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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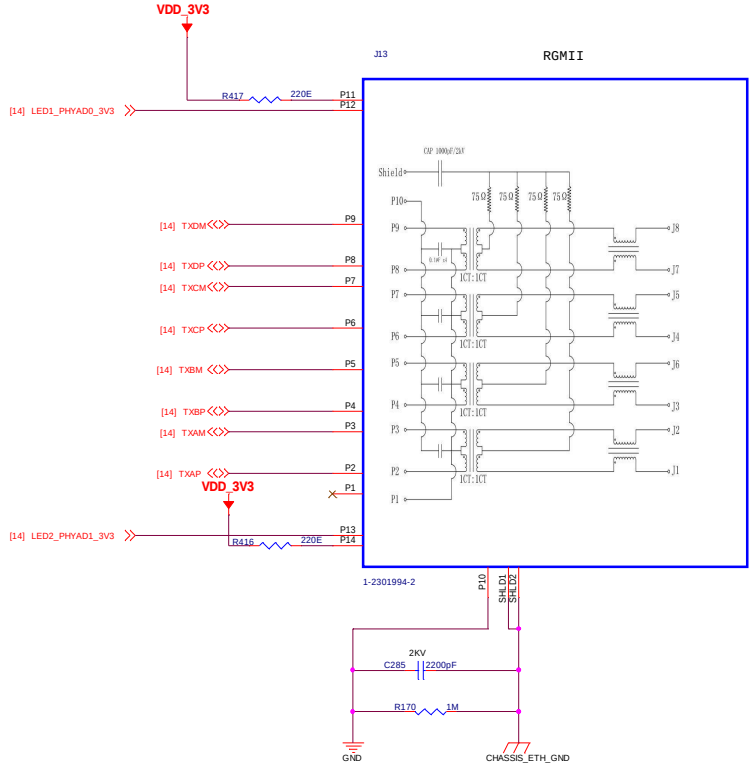
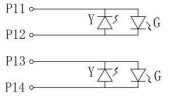
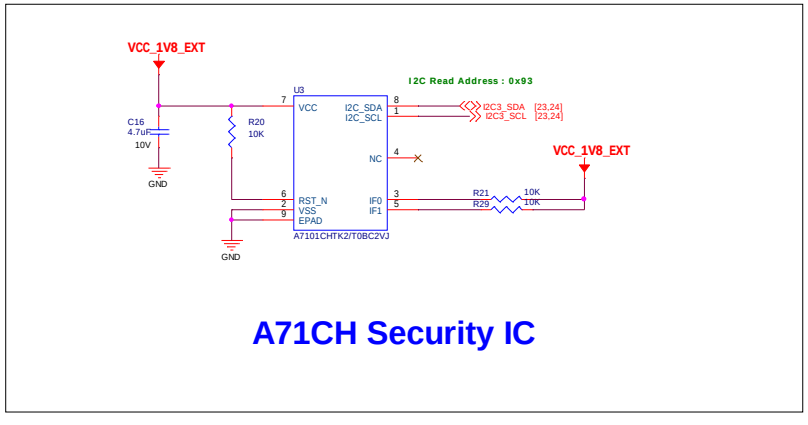
ETHERNET CONNECTOR

ETHERNET CONNECTOR INTERFACE (RGMII MODE)





Pin	Green	Yellow	Pin	Green	Yellow
P11	+	−	P13	+	−
P12	−	+	P14	−	+



A71CH Security IC

Project: Arrow_iMX8M_HMI_Platform		Designed eInfochips
Title: ETHERNET SECTION2		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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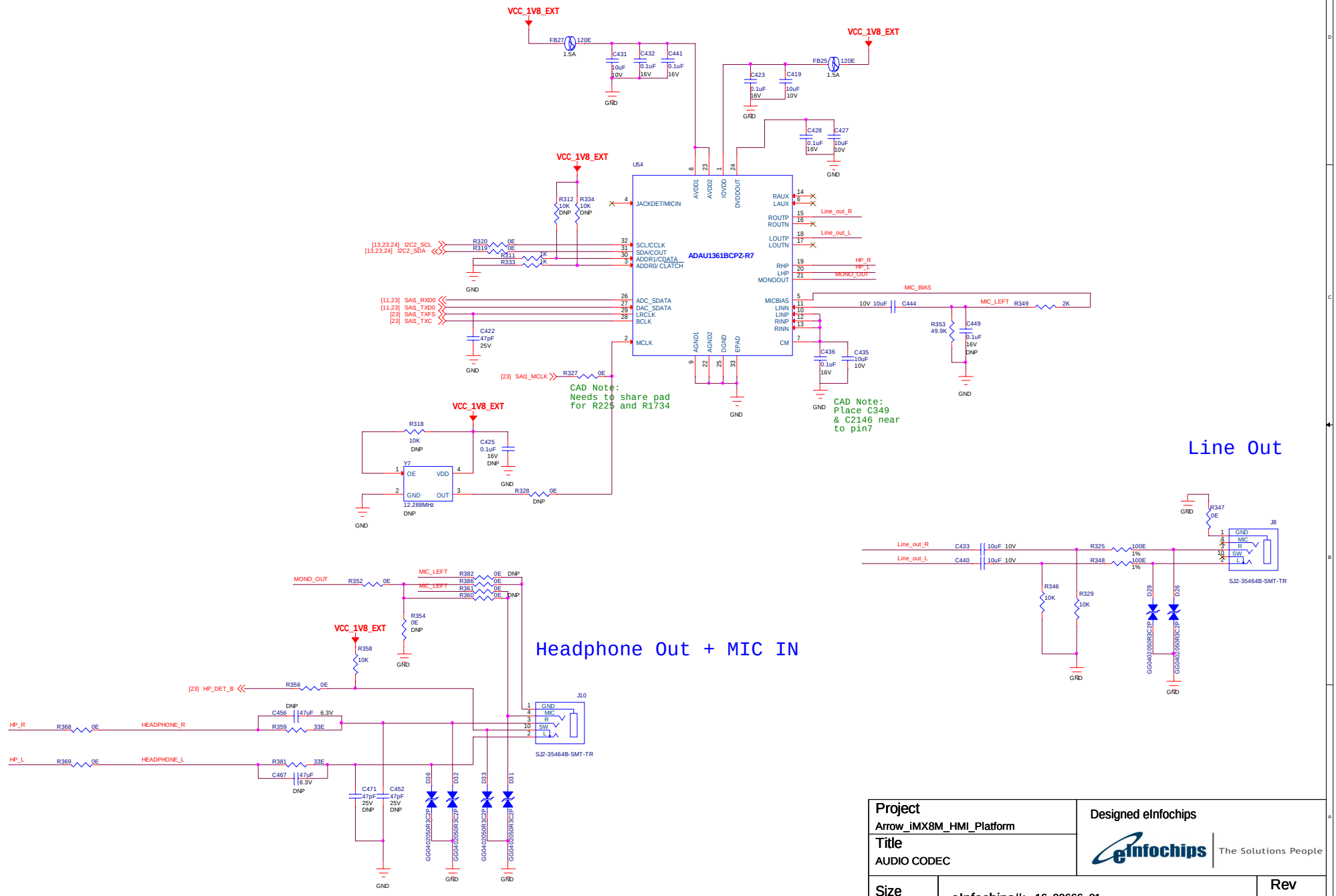
AUDIO CODEC



Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: AUDIO CODEC		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
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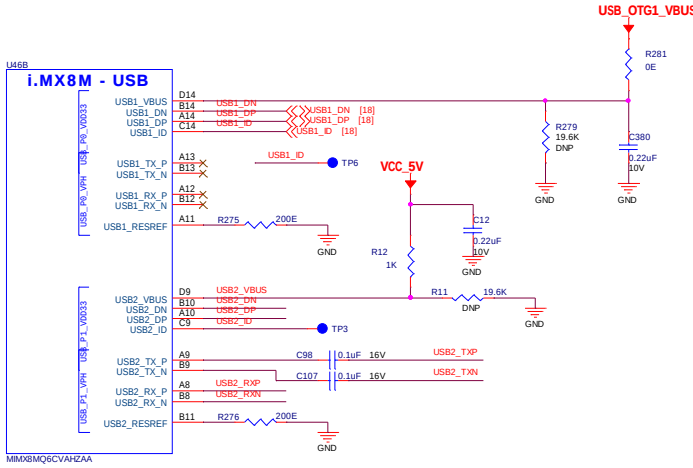
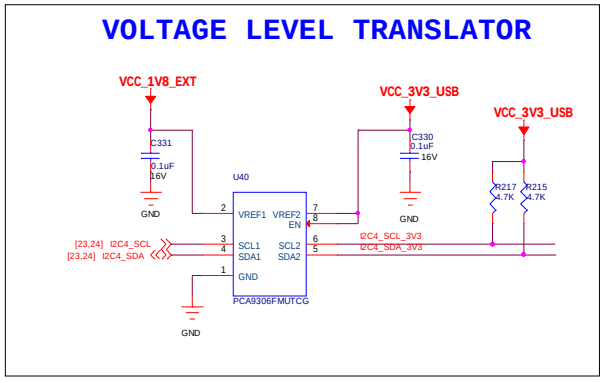
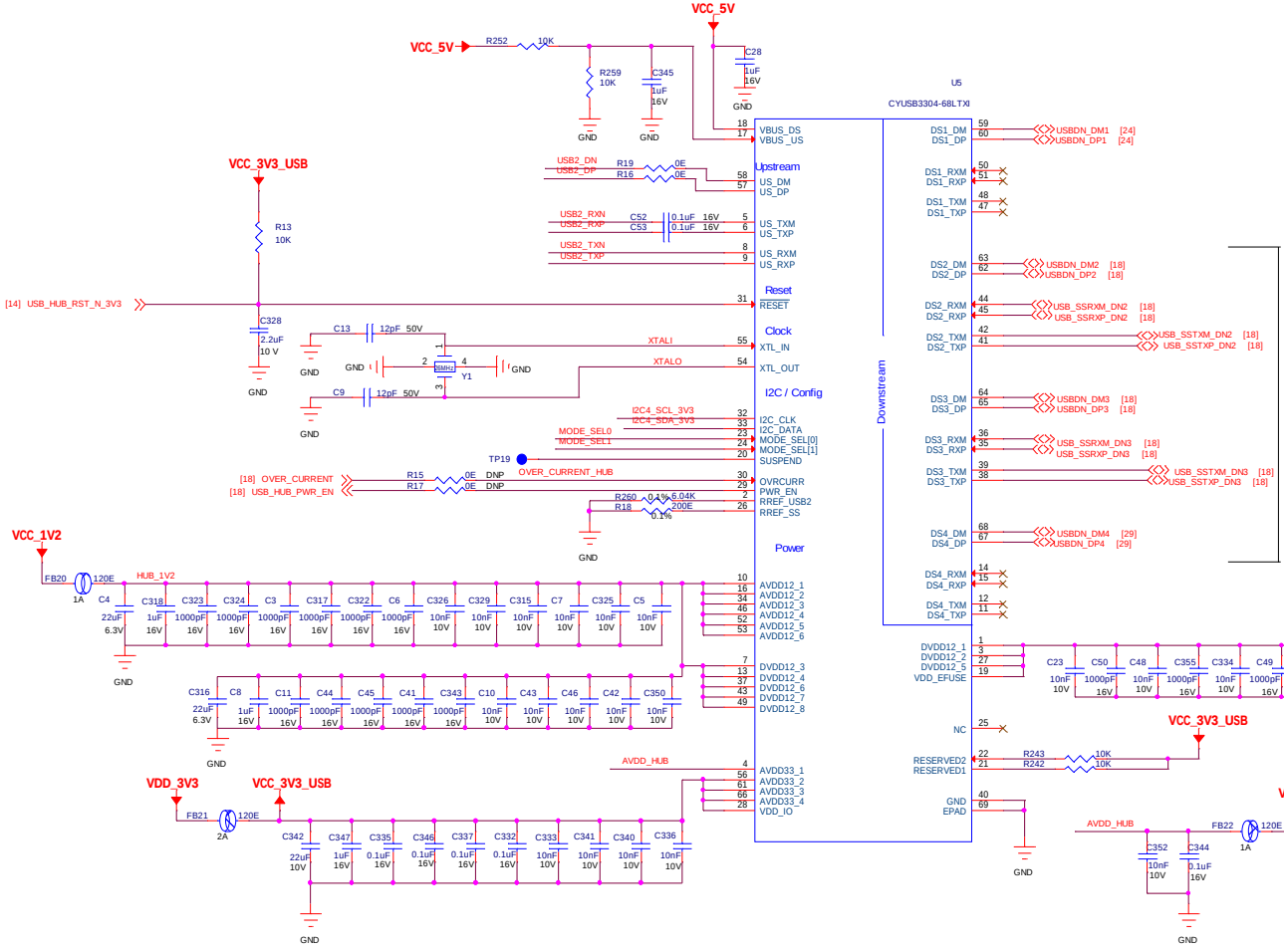
USB HUB CONTROLLER



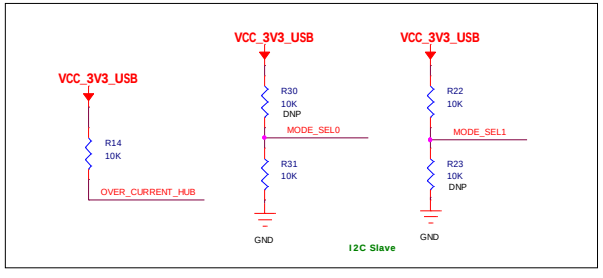
VOLTAGE LEVEL TRANSLATOR



USB 3.0 HUB (4 DOWN STREAM PORTS)



I2C Slave

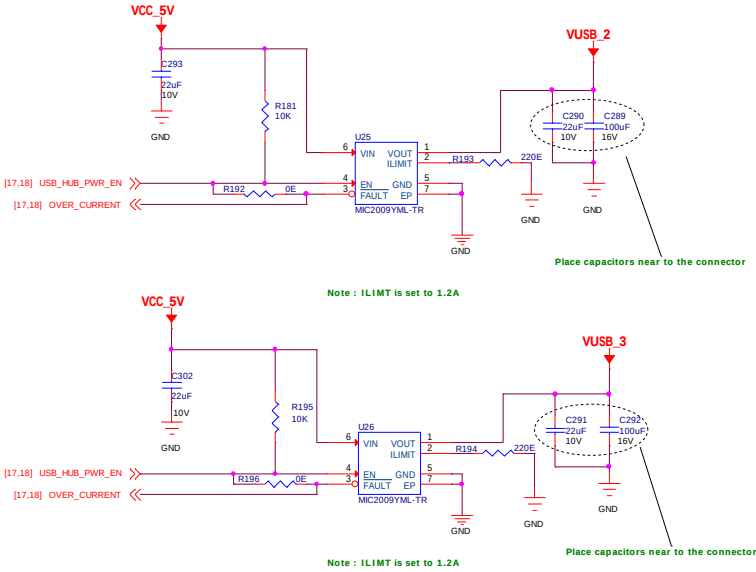


CAD Note:
USB signals should be routed with 90E Impedance

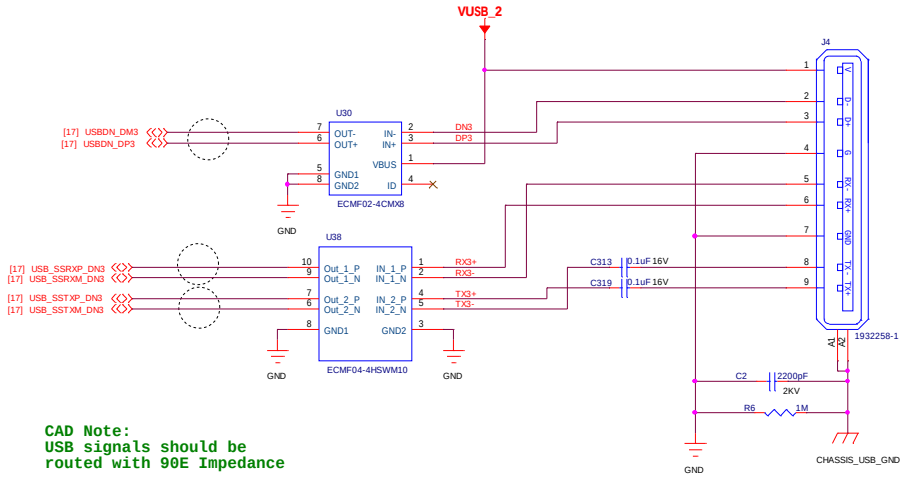
Note: USB 3.0 Downstream port speed will be devided by four due to USB HUB

Project: Arrow_iMX8M_HMI_Platform		Designed eInfochips
Title: USB HUB CONTROLLER		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 17 of 31	

USB CONNECTORS

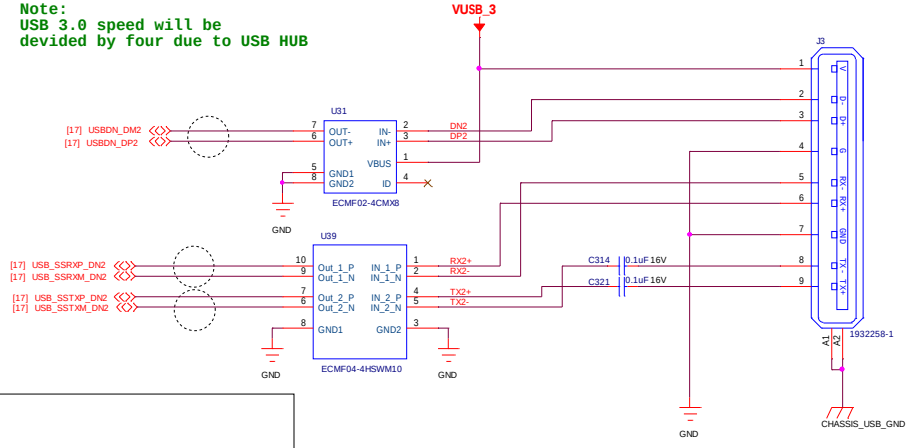


USB 3.0 TYPE A HOST CONNECTORS

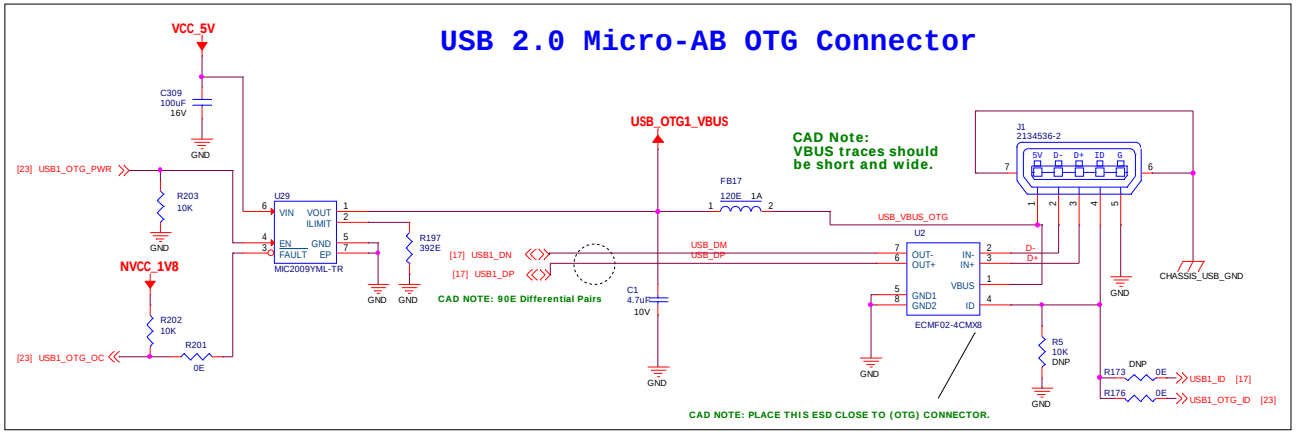


CAD Note:
USB signals should be routed with 90E Impedance

Note:
USB 3.0 speed will be devided by four due to USB HUB

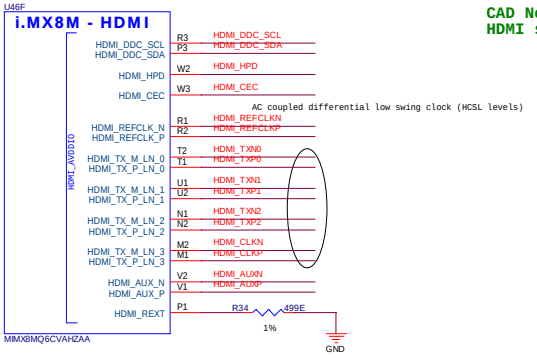


USB 2.0 Micro-AB OTG Connector



Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: USB CONNECTORS		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 18 of 31	

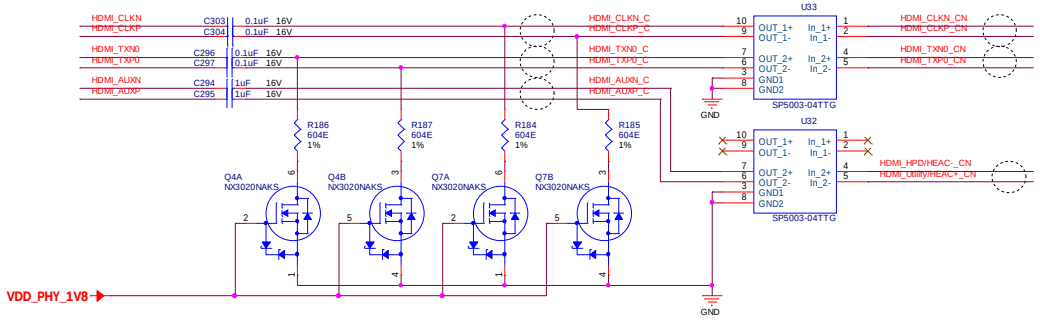
HDMI CONNECTOR

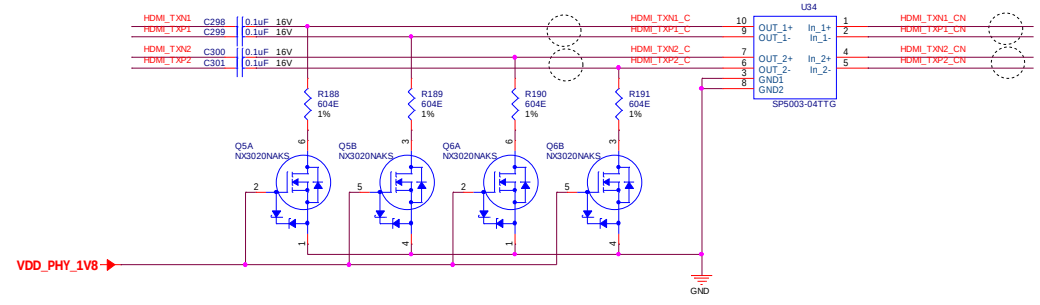


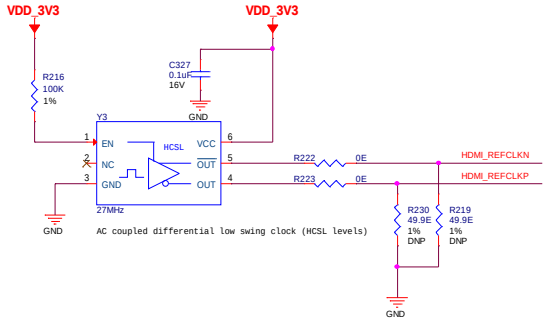
AC coupled differential low swing clock (HCSL levels)

CAD Note:
HDMI signals should be routed with 100E Impedance

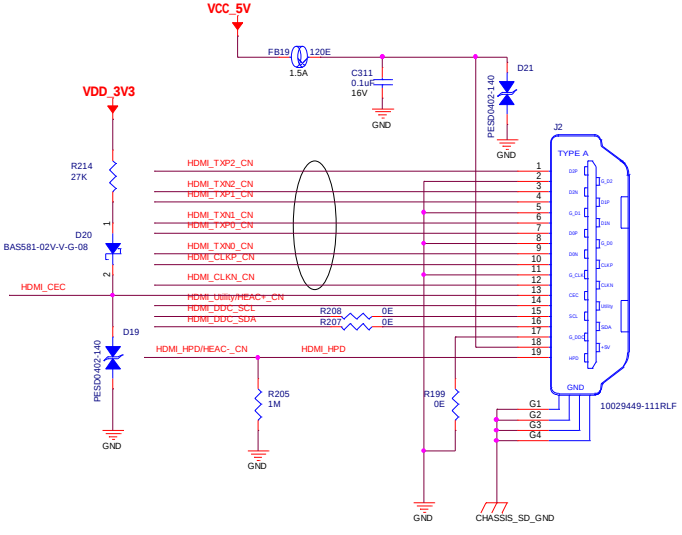
HDMI data EMI/ESD

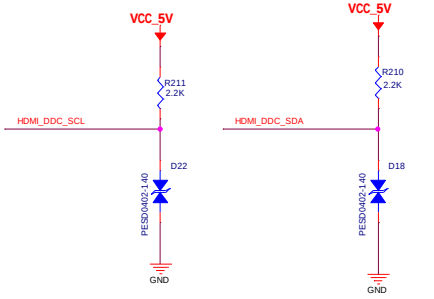






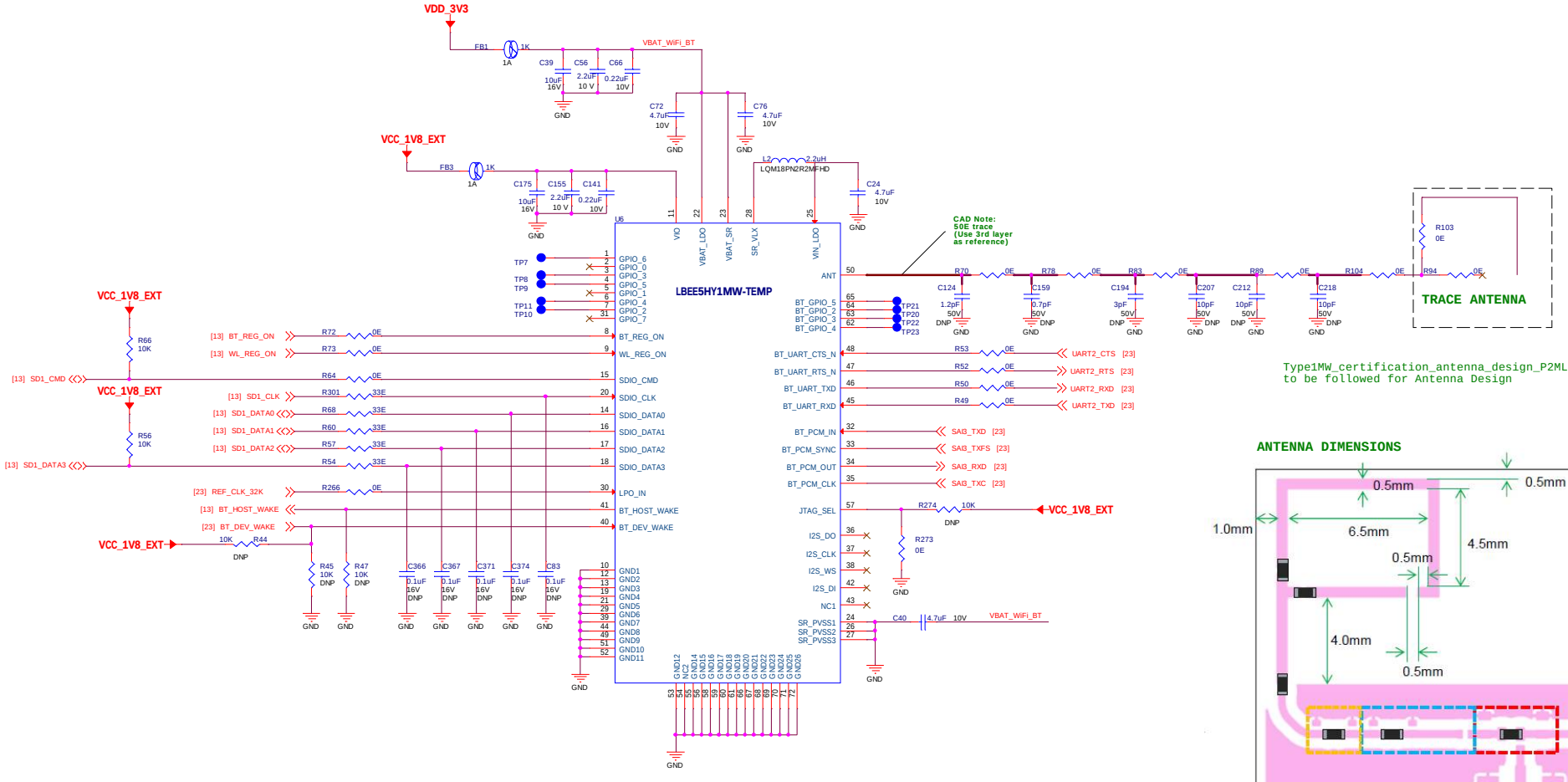
AC coupled differential low swing clock (HCSL levels)





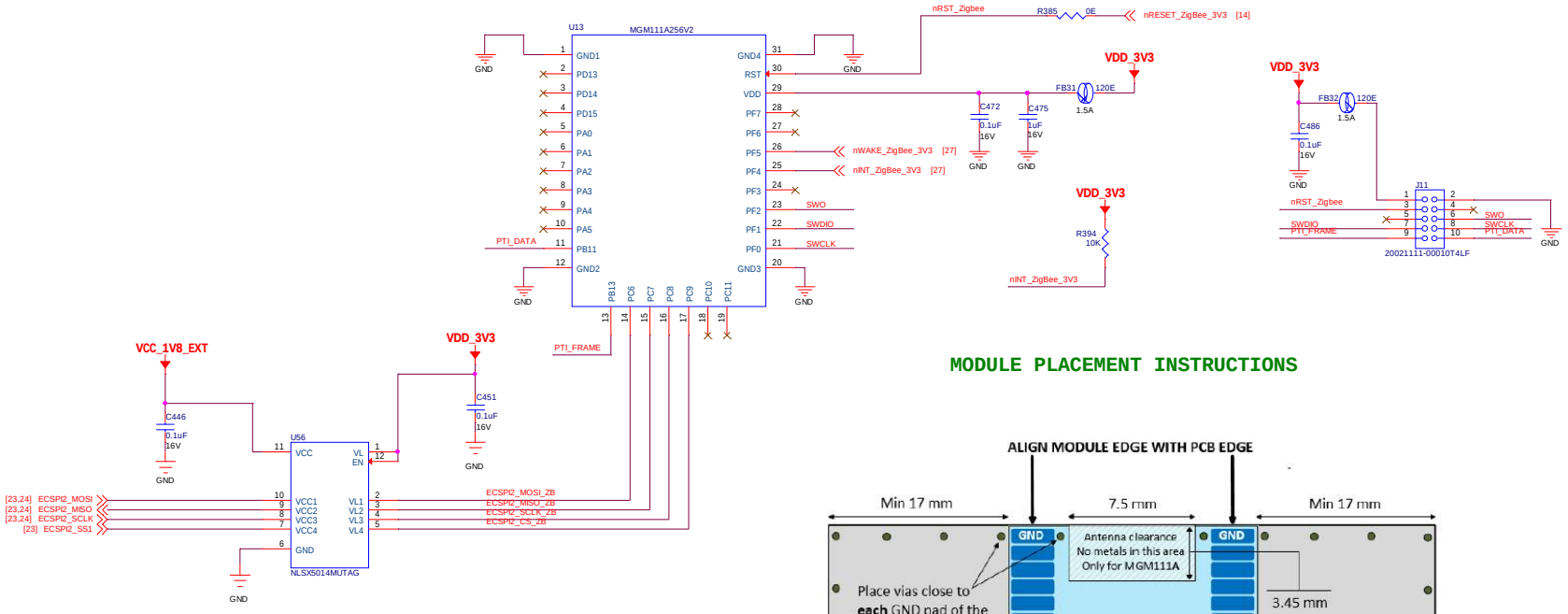
Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: HDMI CONNECTOR		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 19 of 31	

Wi-Fi AND BLUETOOTH SECTION

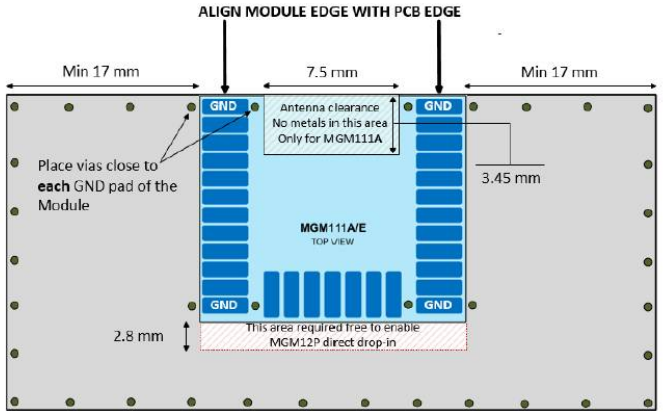


Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: Wi-Fi AND BLUETOOTH SECTION		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 20 of 31	

ZIGBEE SECTION

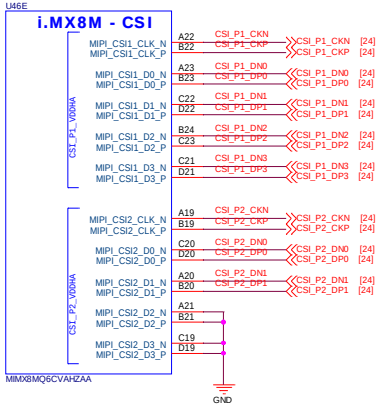


MODULE PLACEMENT INSTRUCTIONS

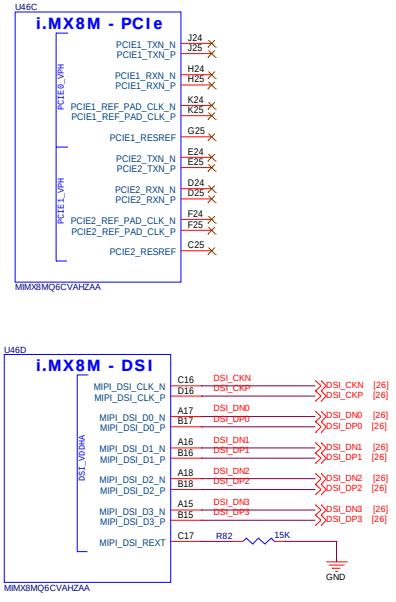


Project: Arrow_iMX8M_HMI_Platform		Designed eInfochips
Title: ZIGBEE SECTION		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 21 of 31	

PROCESSOR OTHER INTERFACES1



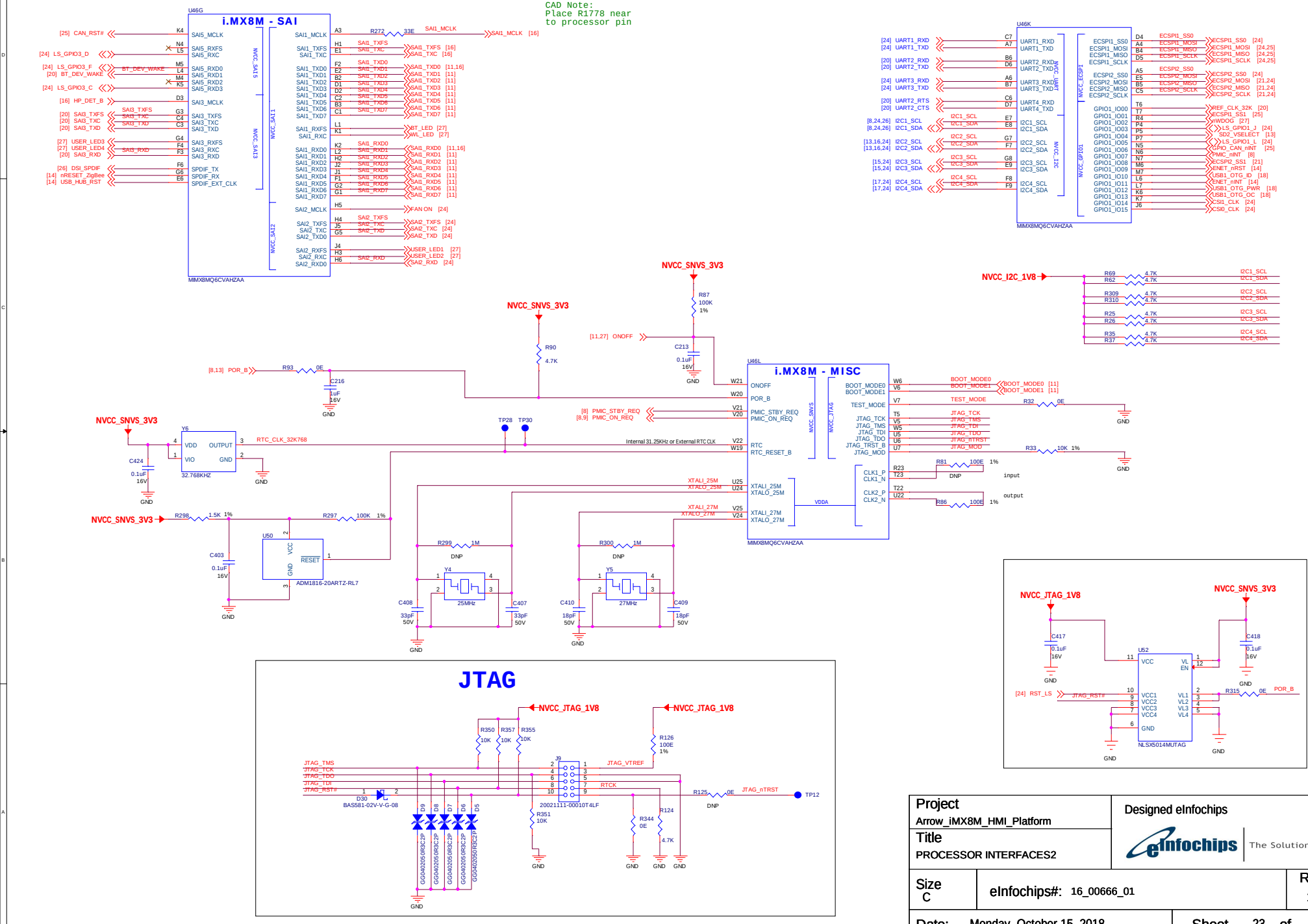
CAD Note:
MIPI CSI signals should be routed with 100E Impedance



CAD Note:
MIPI DSI signals should be routed with 100E Impedance

Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: PROCESSOR INTERFACES1		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 22 of 31	

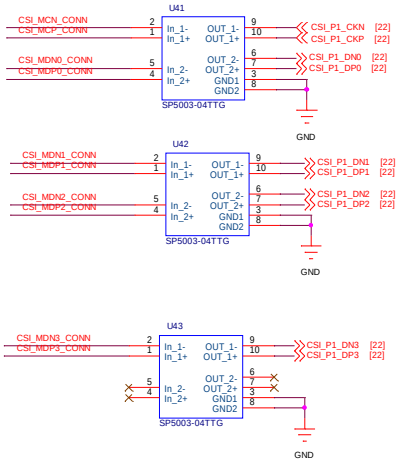
PROCESSOR OTHER INTERFACES2



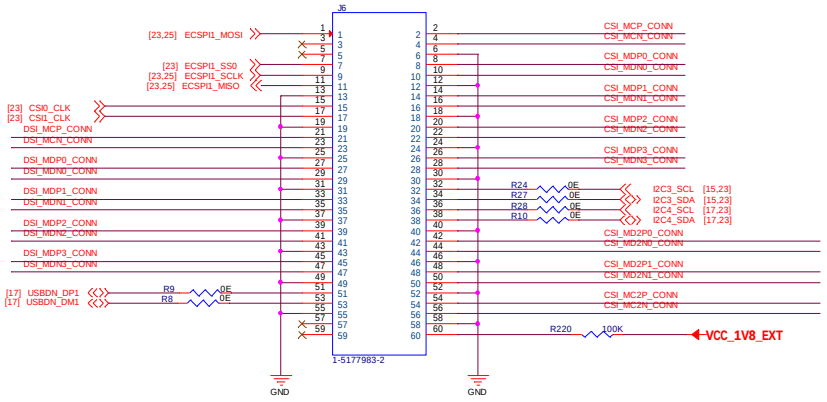
Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: PROCESSOR INTERFACES2		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 23 of 31	

HS / LS EXPANSION CONNECTOR

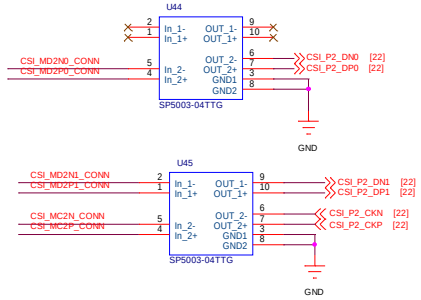
CSI1 EMI FILTERS



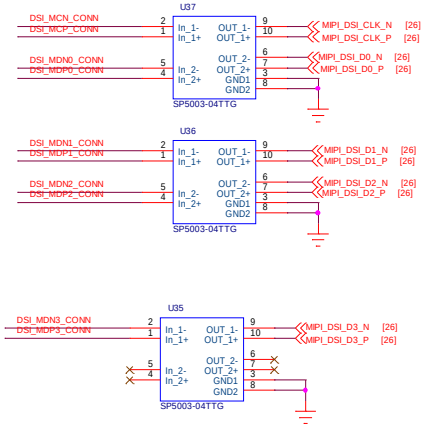
HIGH SPEED EXPANSION CONNECTOR



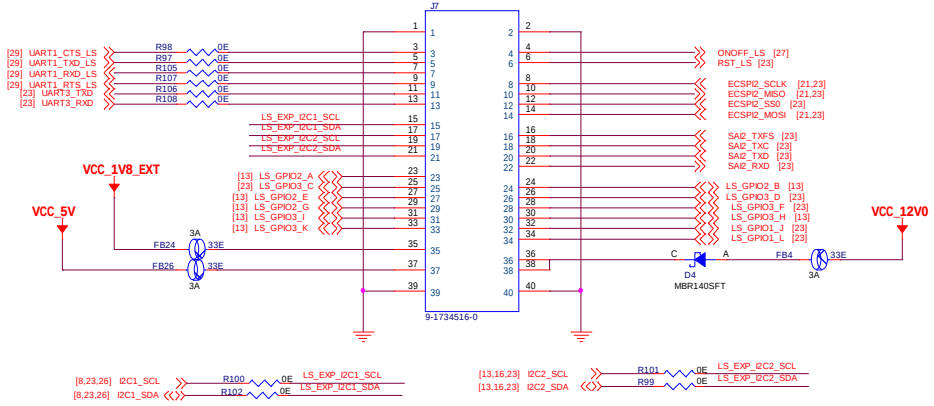
CSI2 EMI FILTERS



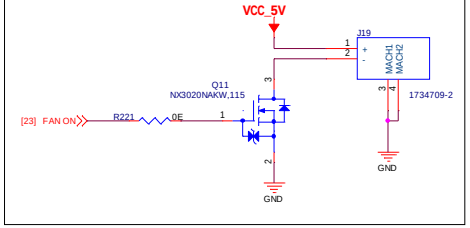
DSI0 EMI FILTERS

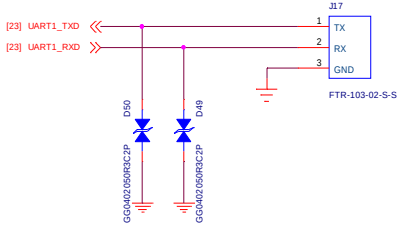


LOW SPEED EXPANSION CONNECTOR



FAN CONNNECTOR

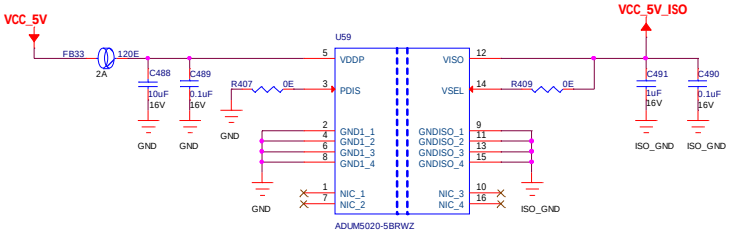




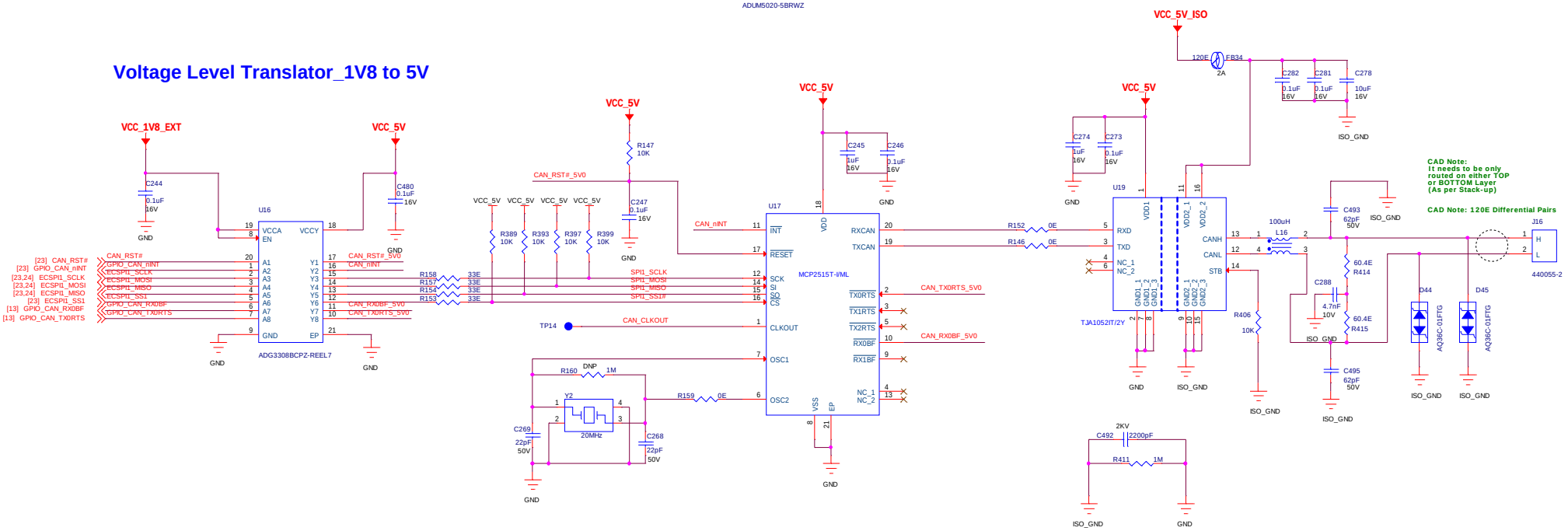
Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: HS / LS EXPANSION CONN		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 24 of 31	

CAN INTERFACE

DC-DC ISOLATOR

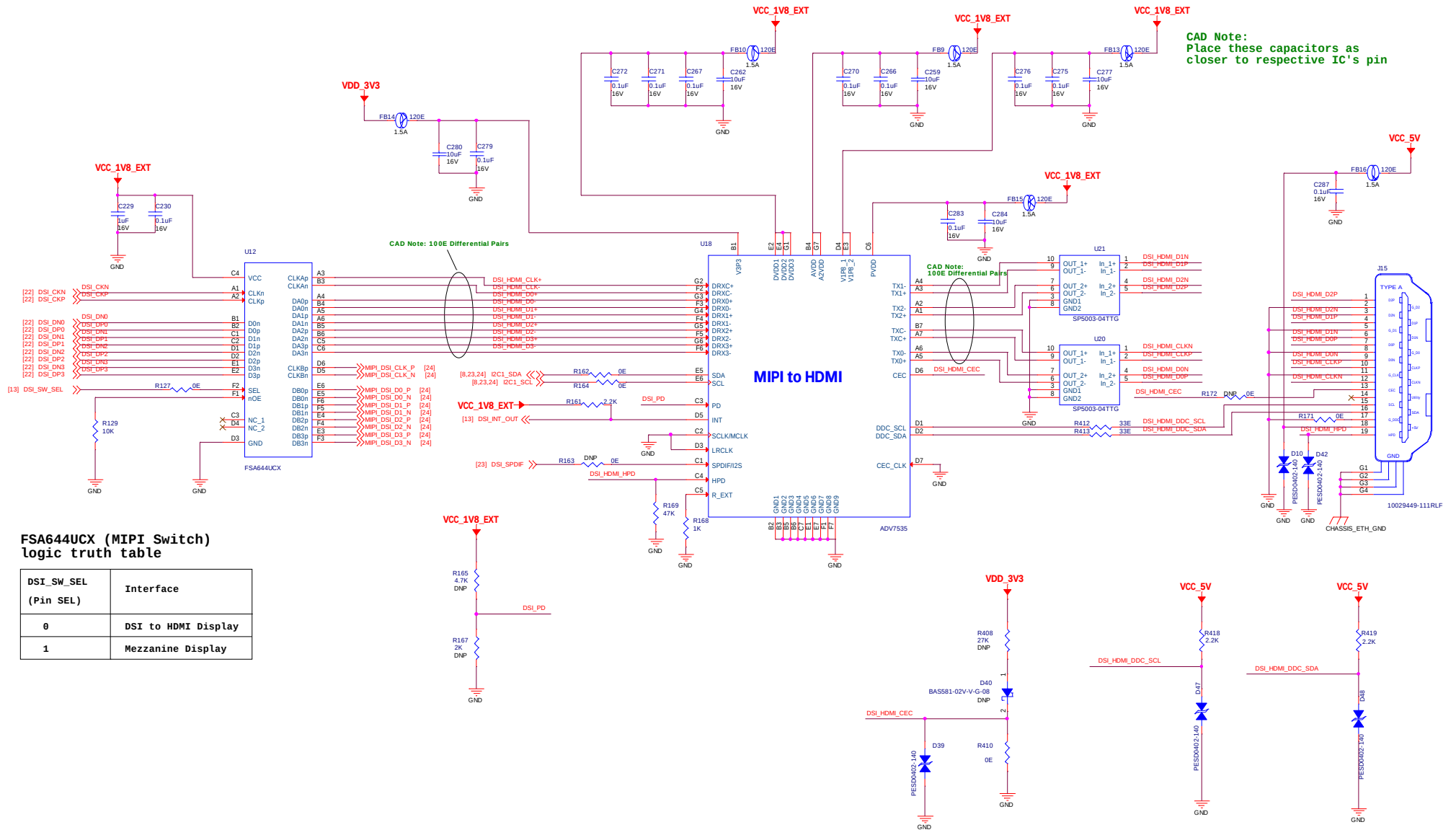


Voltage Level Translator_1V8 to 5V



Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: CAN INTERFACE		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 25 of 31	

DSI TO HDMI INTERFACE



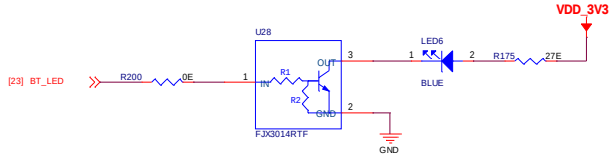
FSA644UCX (MIPI Switch) logic truth table

DSI_SW_SEL (Pin SEL)	Interface
0	DSI to HDMI Display
1	Mezzanine Display

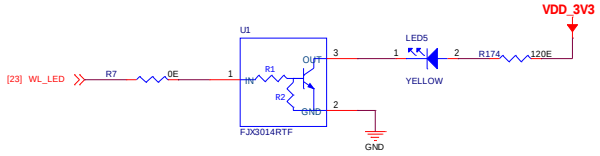
Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: DSI TO HDMI INTERFACE		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 26 of 31	

RESET SCHEME AND LED

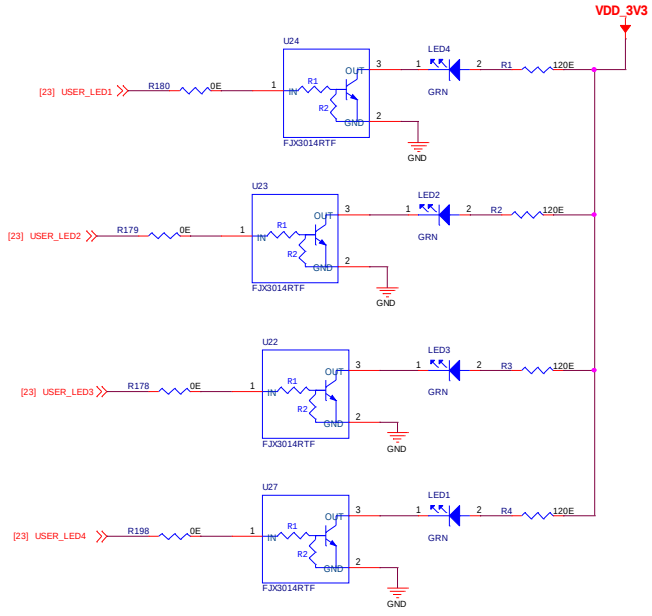
BLUETOOTH BLUE LED



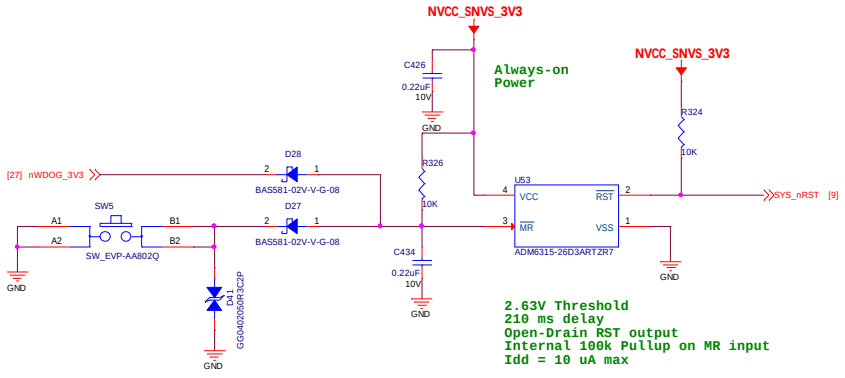
Wi-Fi YELLOW LED



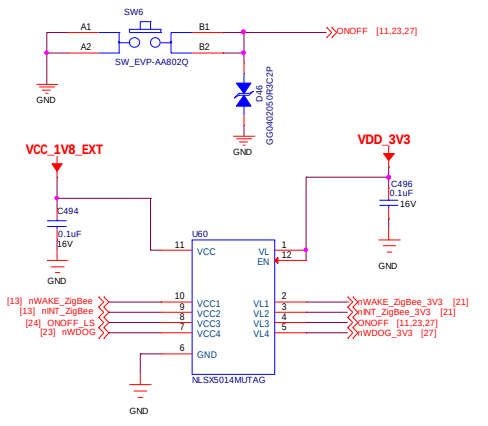
4X USER GREEN LEDs



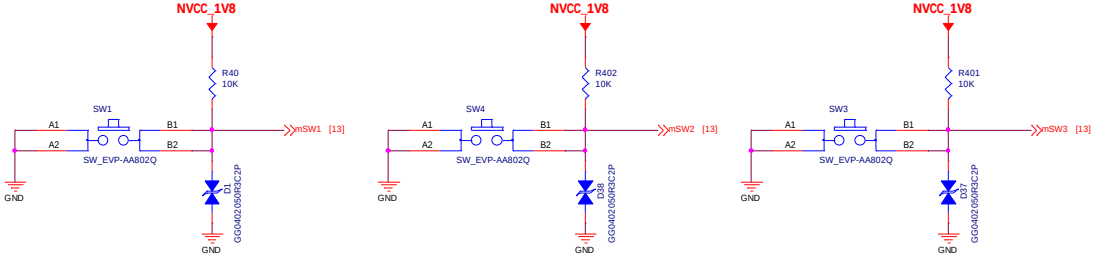
RESET Scheme



POWER ON-OFF SWITCH



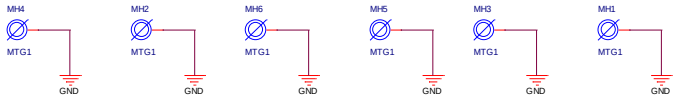
3 Microswitches



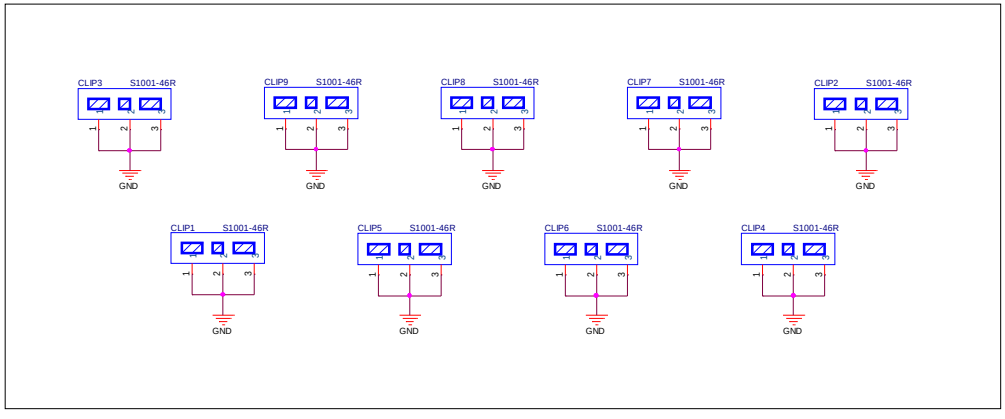
Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: RESET Scheme and LEDs		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 27 of 31	

MISCELLANEOUS

Mounting Holes

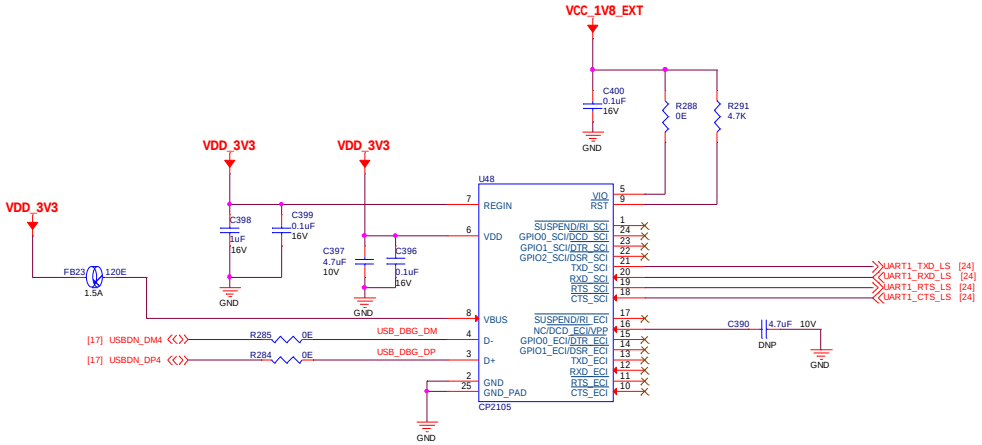


SHIELD CLIPS FOR PROCESSOR AND DDR SECTION



Project: Arrow_iMX8M_HMI_Platform		Designed eInfochips
Title: MISCELLANEOUS		eInfochips The Solutions People
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 28 of 31	

USB TO UART FOR LS CONNECTOR



Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: USB to UART Bridge		
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 29 of 31	

RIVISION HISTORY1

PCB REV	SCH REV	CHANGE DESCRIPTION	DATE	AUTHOR
	0.1	Initial draft version created for internal review	13/08/2018	eInfochips
	0.2	U7 part changed to MCP6561T, related circuitry changed and added N channel MOSFET SW1 and SW2:SW6 part changed for smaller footprints	25/08/2018	eInfochips
	0.3	ESD added on JTAG connector and R329, R330, R331 are mounted Net name updated for CSI signals on page 24 ; L2 part number changed Pull up provision removed for SD card signals ; R1764, R1765 pull down added at HPD pin of HDMI Reverse protection diode D803 for 12V mezzanine supply added Y502 changed to 20MHz ; C456 & C457 values changed to 16pF ; Removed U60 22uF and 220uF caps to be changed to smaller package ; L9,L10 parts changed for less height 1uF/16V changed to 0402 package ; 22uF/10V changed to 0603 package USB HUB Section power capacitors changed to small package Ethernet Section power capacitors changed to small package L3, L9, L10, L11, L12, L19, L20, L21, L104, L702, L703, L704, L705, L707 parts changed C1734, C1735, C1736, C1767 FPs changed to smaller ; Chassis ground changed U4 removed ; Q1603 added ; U603 value changed as per mfg part ; Y501 pin names modified Y3 part changed ; J9 & J20 part number changed ; U244 added ; C2118 added ; R11 removed GPIO table updated ; C2119 added USB to UART IC added ; A71CH Security IC added ; EEPROM part changed ADP2386 changed to LT8642S and respective passive components changed Murata review comments implemented ; Analog Devices review comments implemented J8, J9, J15, J16, J23 parts changed and footprints changed R1815, R1816, R1817 added ; C2138 added ; R510 & R511 changed to 22E ; R1764 & R1765 changed to 1M NXP review comments implemented ; Microchip Technology review comments implemented Changed C12 to 2.2uF ; R510, R511 mounted ; R512,R513 changed to DNP ; Deleted PCIe supplies to processor Removed C521,C526,C524 ; Changed C529, C530 to 33pF ; Added 10K pull-down on net ENET0_RGMII_RX_CTL Changed R455 to DNP ; Moved C562 after divider ; Y11 part changed same as Y401 USB HUB decaps added ; Switch symbol updated ; LED symbol updated ; CAD Notes added NXP review coments implemented ; C396 removed ; C2117 value changed to 100uF Implemented BOM review comments from Internal team U1603, C2141, C2142, R262, R265 removed ; R1824, R1825, R1826, R1827 added	28/09/2018	eInfochips
	0.4	Changed U7 related circuit Implemented SCH review comments from Internal team ESD Part number is changed on HDMI connector USB HUB port 1 and 4 connection swapped R1843, R1844 resistors added, Y2 part changed	03/10/2018	eInfochips

Project: Arrow_iMX8M_HMI_Platform		Designed eInfochips
Title: REVISION HISTORY1		eInfochips The Solutions People
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Monday, October 15, 2018	Sheet 30 of 31	

RIVISION HISTORY1

PCB REV	SCH REV	CHANGE DESCRIPTION	DATE	AUTHOR
	0.5	Removed R149 ; Changed R460 to 10K ; Removed R455 ; Swapped connection of U24 & U27 Removed D812 ; Removed R217, R218 QSPI power net changed ; D820 Added ; R1846 & C2155 added D819 & R1845 added ; C2156 added ; R164 removed CLIP16, CLIP18, CLIP32, CLIP33, CLIP34, CLIP35, CLIP36, CLIP37, CLIP38 removed R391, R392, R393, R394 removed ; R1814, R1813, R172, R168 changed to 0E	08/10/2018	eInfochips
	0.6	Back annotation done R54, R57, R60, R68, R301 changed to 33E after SI simulation of WIFI Section Ethernet RGMII part changed to Industrial (KSZ9031RNXIC-TR)	10/10/2018	eInfochips
	1.0	Released version	11/10/2018	eInfochips

Project: Arrow_iMX8M_HMI_Platform	Designed eInfochips	
Title: REVISION HISTORY2	eInfochips The Solutions People	
Size: C	eInfochips#: 16_00666_01	Rev: 1.0
Date: Tuesday, October 23, 2018	Sheet 31 of 31	