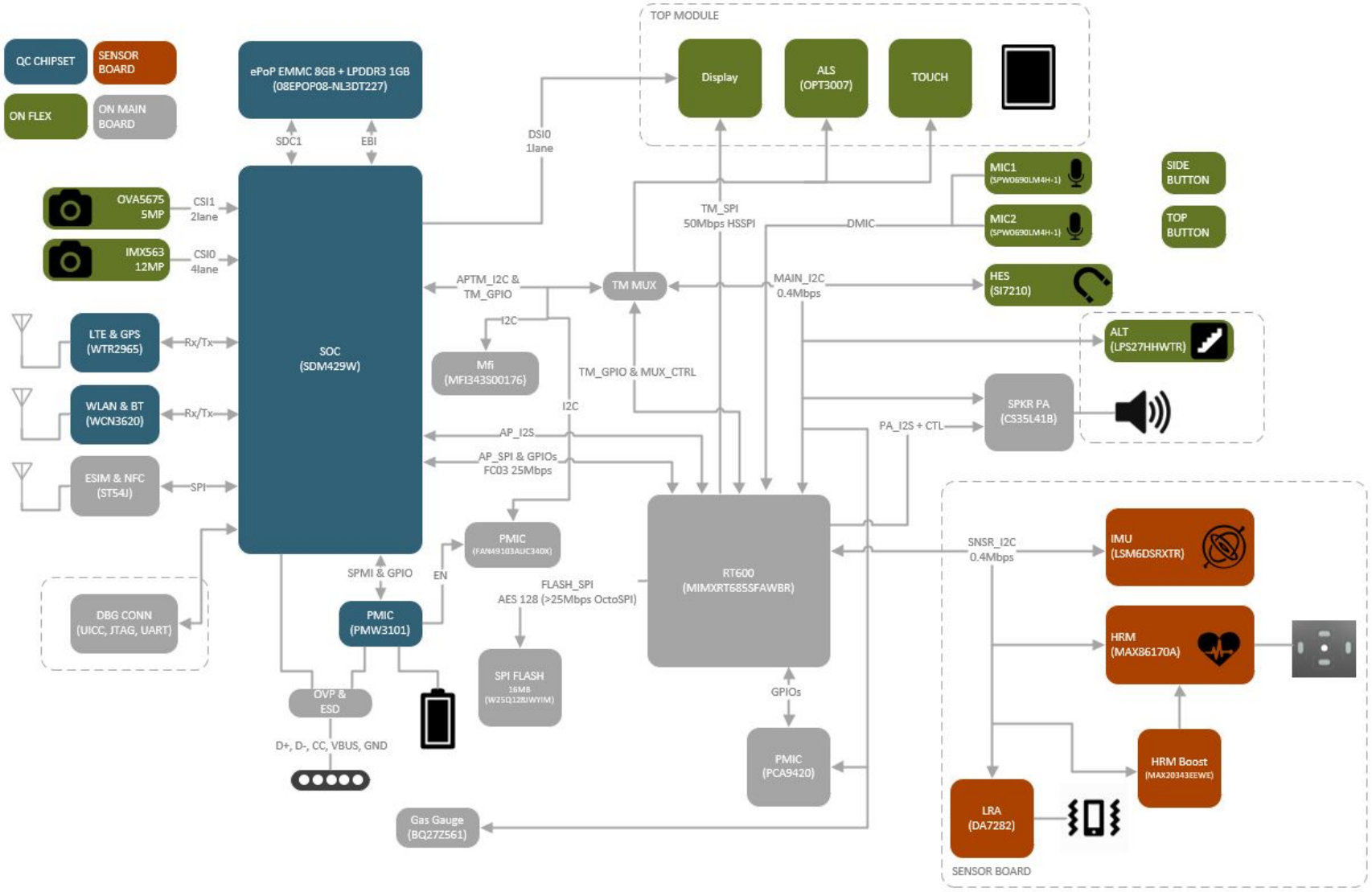
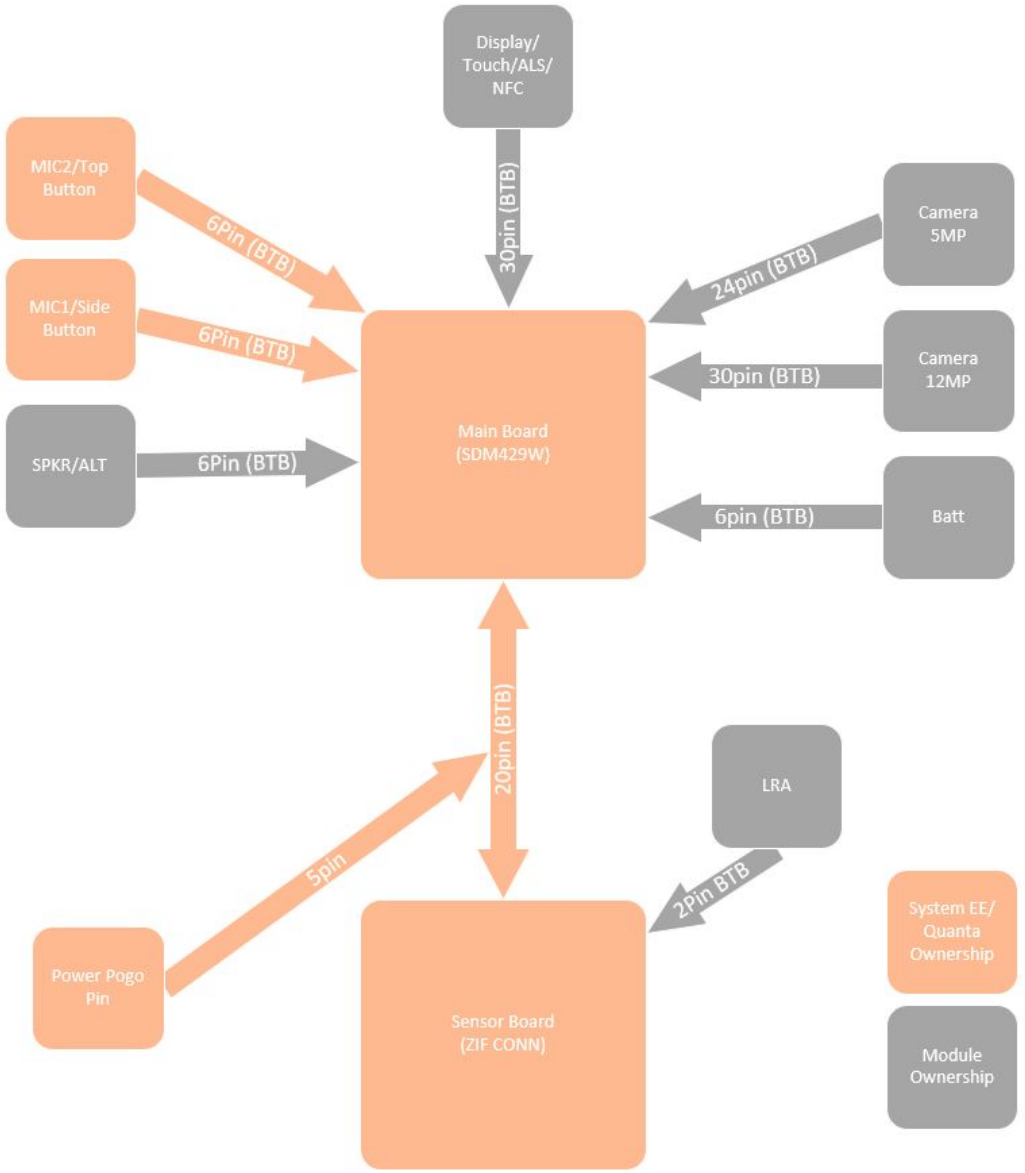
Milan System Architecture



Milan System Interconnect



Milan MCU Architecture

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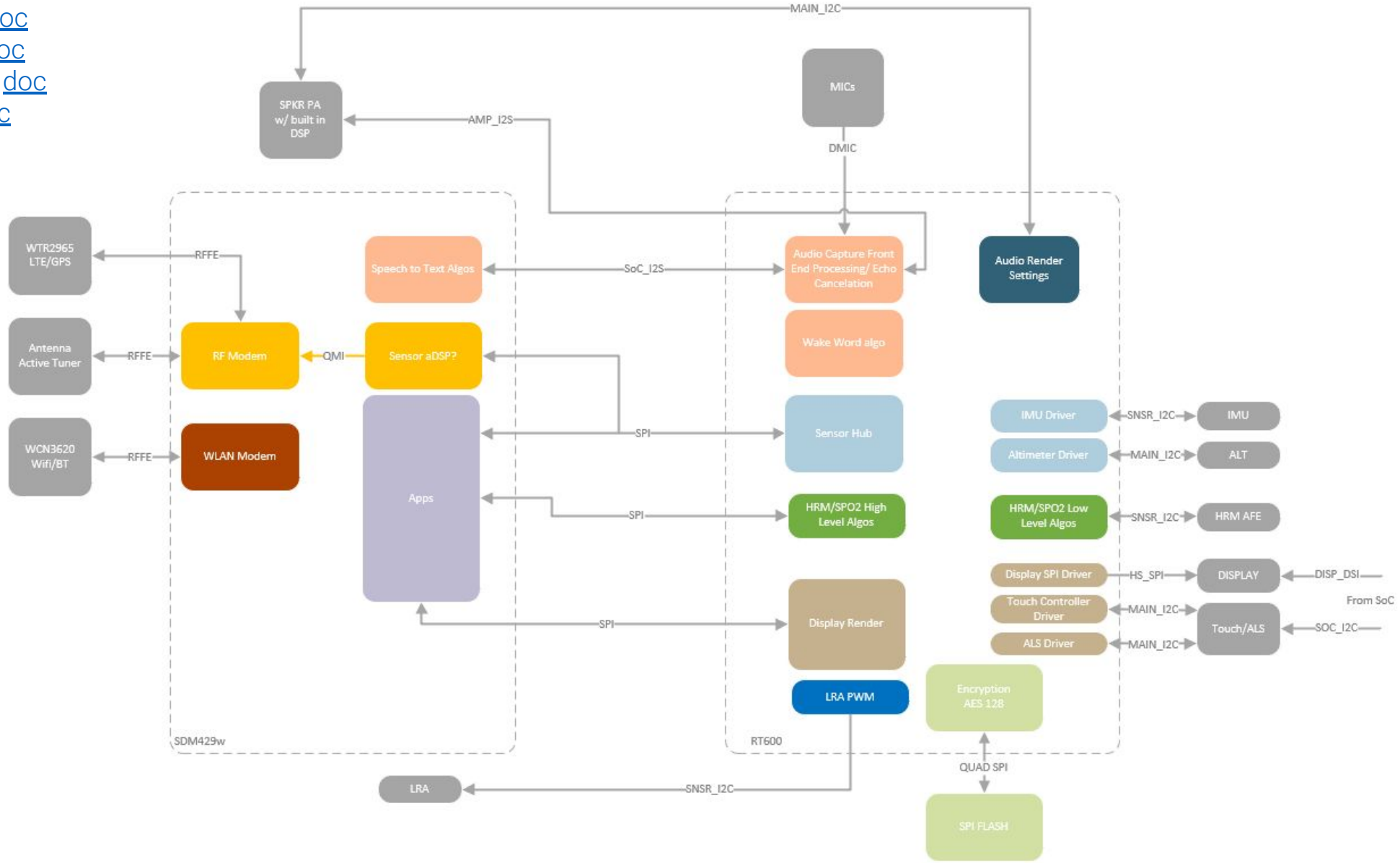
MCU HW architecture doc
MCU SW architecture doc
MCU/SOC Handshakes doc
MCU AOD Handover doc



Milan | Main Components List

MLB - Main Components	
SOC	SDM429W
MEMORY	8GB eMMC + 1GB LPDDR3
PMIC	PMW3101 EXT BUCK/BOOST - FAN49103A QET4101 PCA9420 – MCU's PMIC
WIFI/BT - 802.11n 2.4GHz, BT 4.2	WCN3620
LTE/GPS	WTR2965
NFC + eSIM	ST54J
MCU	RT600
MCU'S EXT MEMORY	FLASH - 16MB
SPEAKER PA	CS35L41B
MFI	AUTH CP 3.0
LTE PA	SKY77638
MUX	FSA634UCX

Milan | Main Component List contd

MLB - Main Components	
RF COMPONENTS	LPF - LFL18628MTC2C221, LFL18829MTCRD627 B13 DUPLEXER - QM23013 QUADPLEXER B5/B12 - SAHRU707MBB0F0A B4/B66 DUPLEXER - SAYRH1G74BA1F0A B2 DUPLEXER - B39202B1244P810 GPS SAW FILTER - SAFFB1G56AC0F0A GPS LNA - NJG1159PHH WIFI FILTER - : SAFQA2G45MA0G0A SP4T SWITCH - QM12154, QAT3518
HALL SENSOR	SI7210-B-10-IM2R
BOARD TO BOARD CONNECTORS	SELFIE CAMERA – OV5675 WORLD VIEW CAMERA – IMX563 DISPLAY + ALS (OPT3007) + NFC ANTENNA BATTERY 1 MIC + TOP BUTTON 1 MIC+ SIDE BUTTON SPEAKER + ALTIMETER SENSOR BOARD DEBUG

Sensor Board - Main Component List

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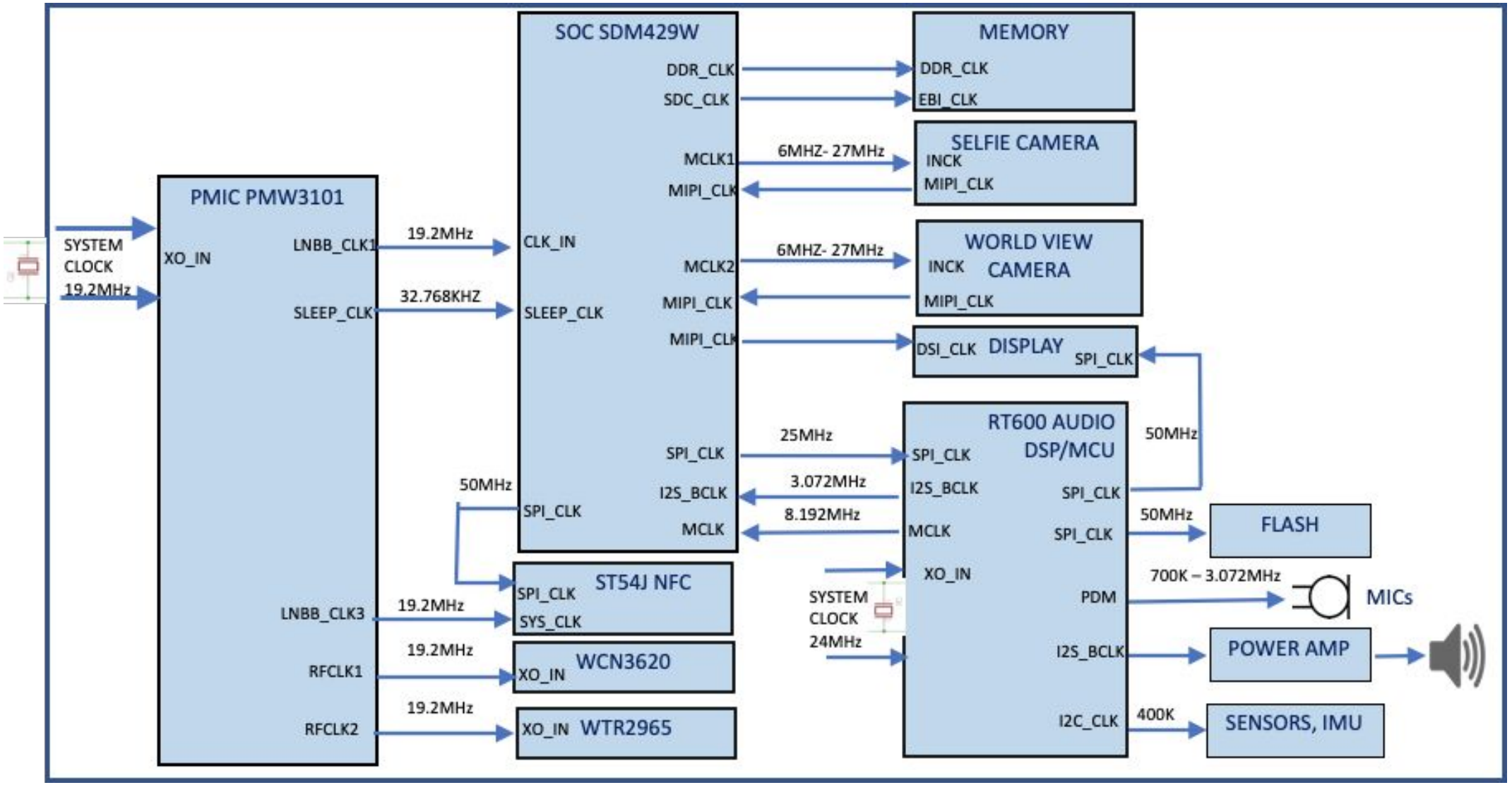
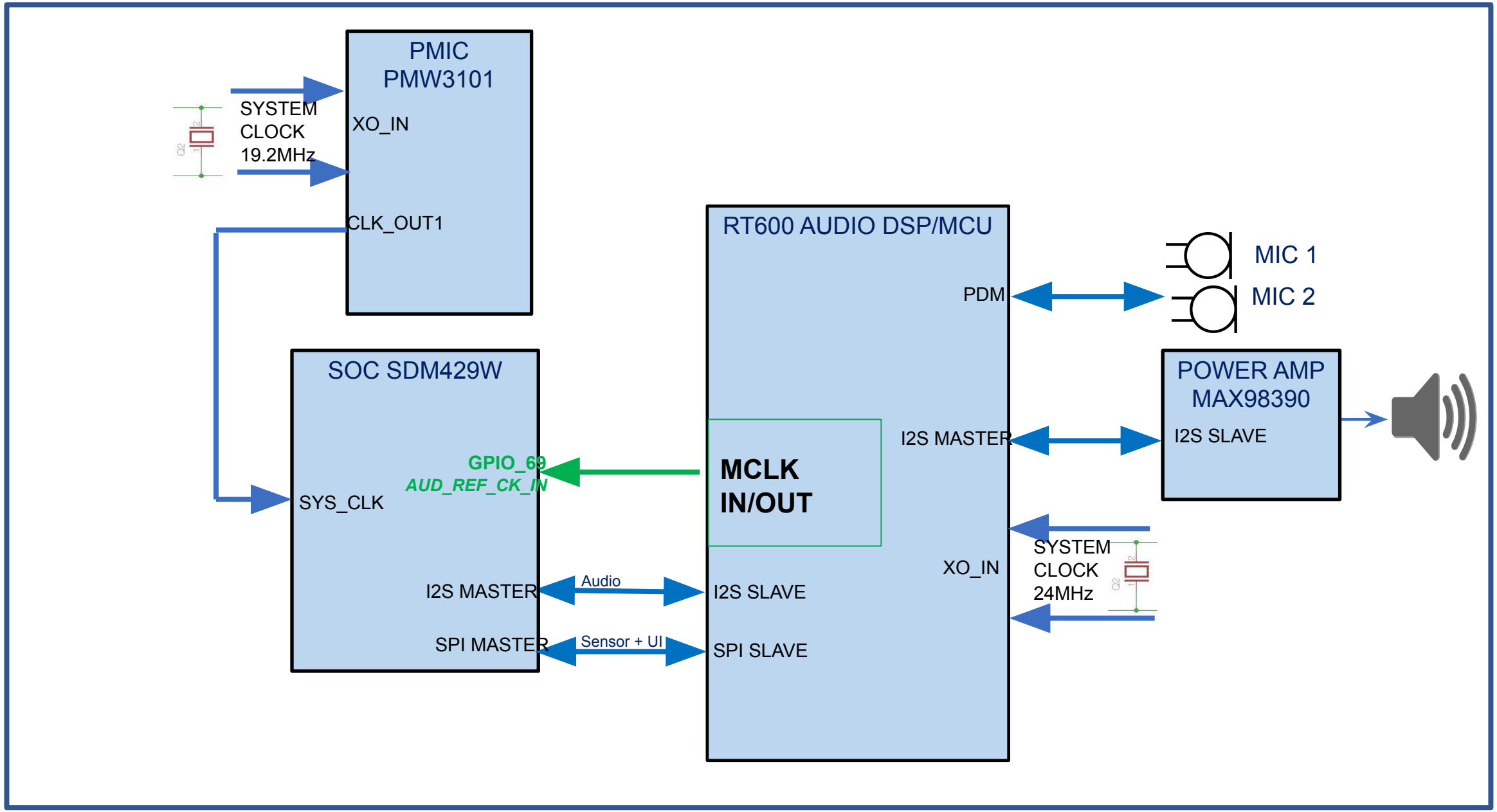
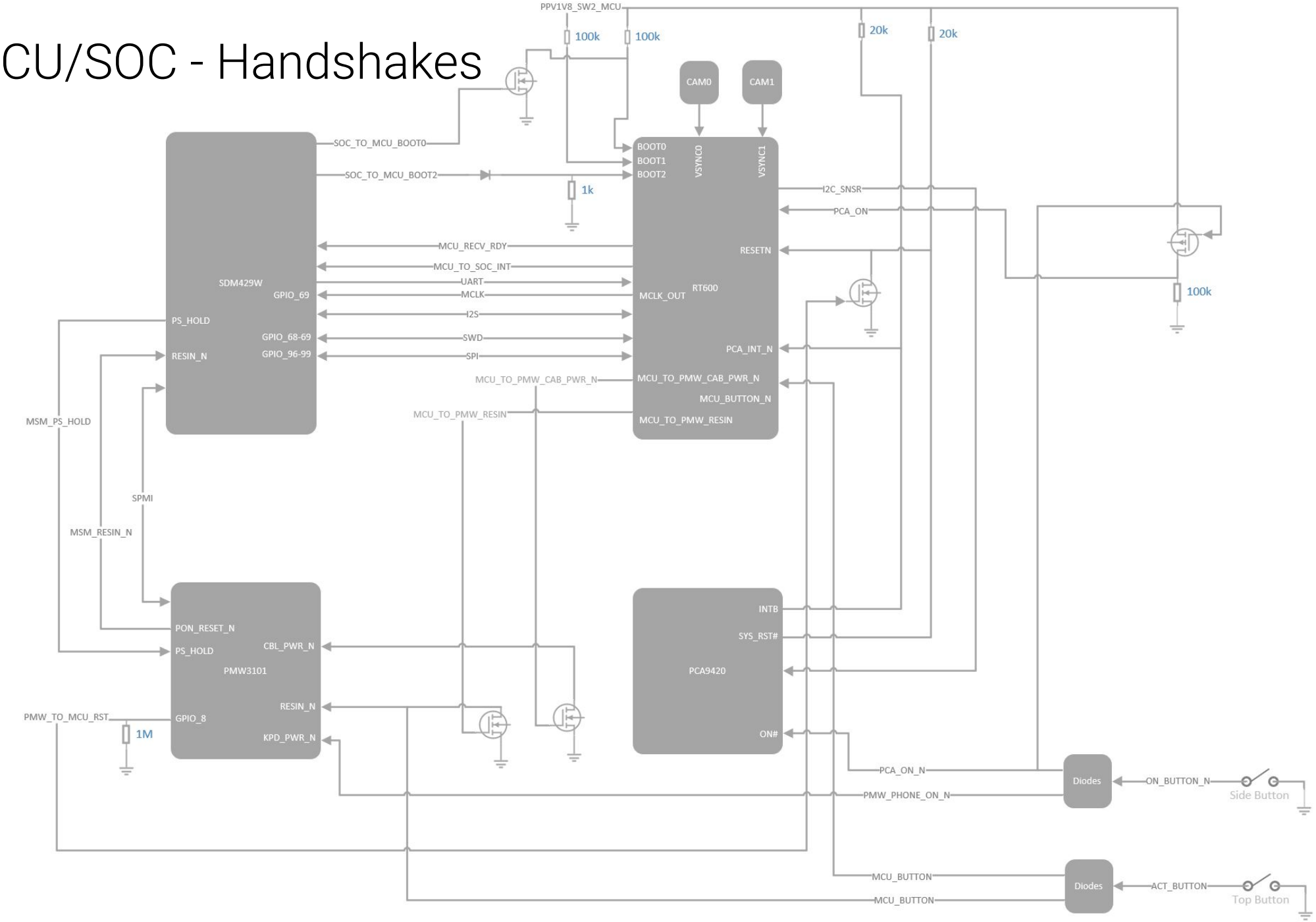
MLB - Main Components	
HRM/ HRM BOOST	· AFE: MAX86170 · BOB: MAX20343EEWE · IND: DFE201208S-2R2M
LRA	· Driver: DA7282 · Module: LRA-0832
IMU	· SENSOR: LSM6DSRXTR · Load switch: TPS22914
LED/PD	· LED: SFH 7017 · PD: VEMD8081 x4
CONN	· ZIF 15s: FH64MA-15S-0.25HW · ZIF 7s: FH64MA-7S-0.25HW

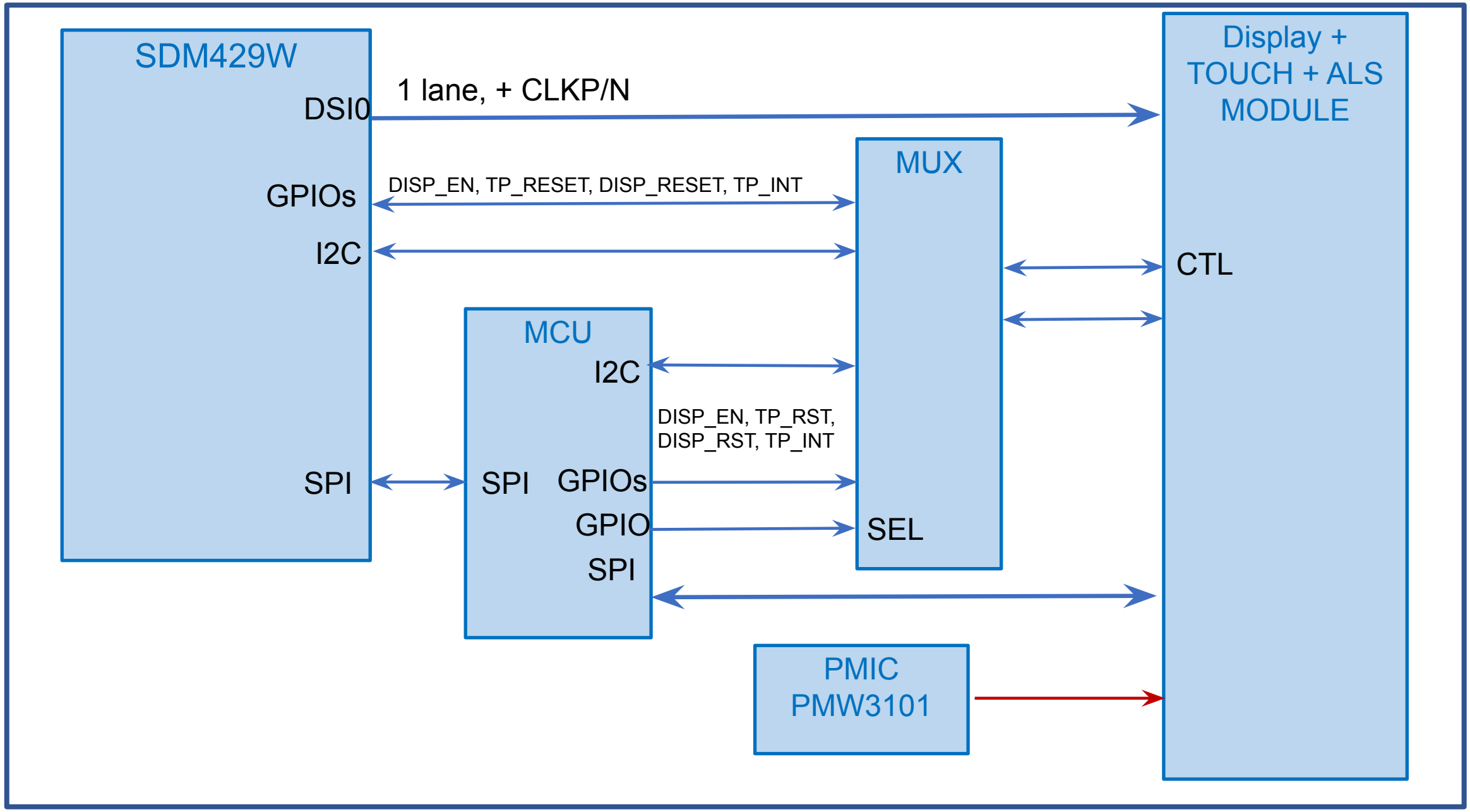
Merlot | Overview Clock Tree

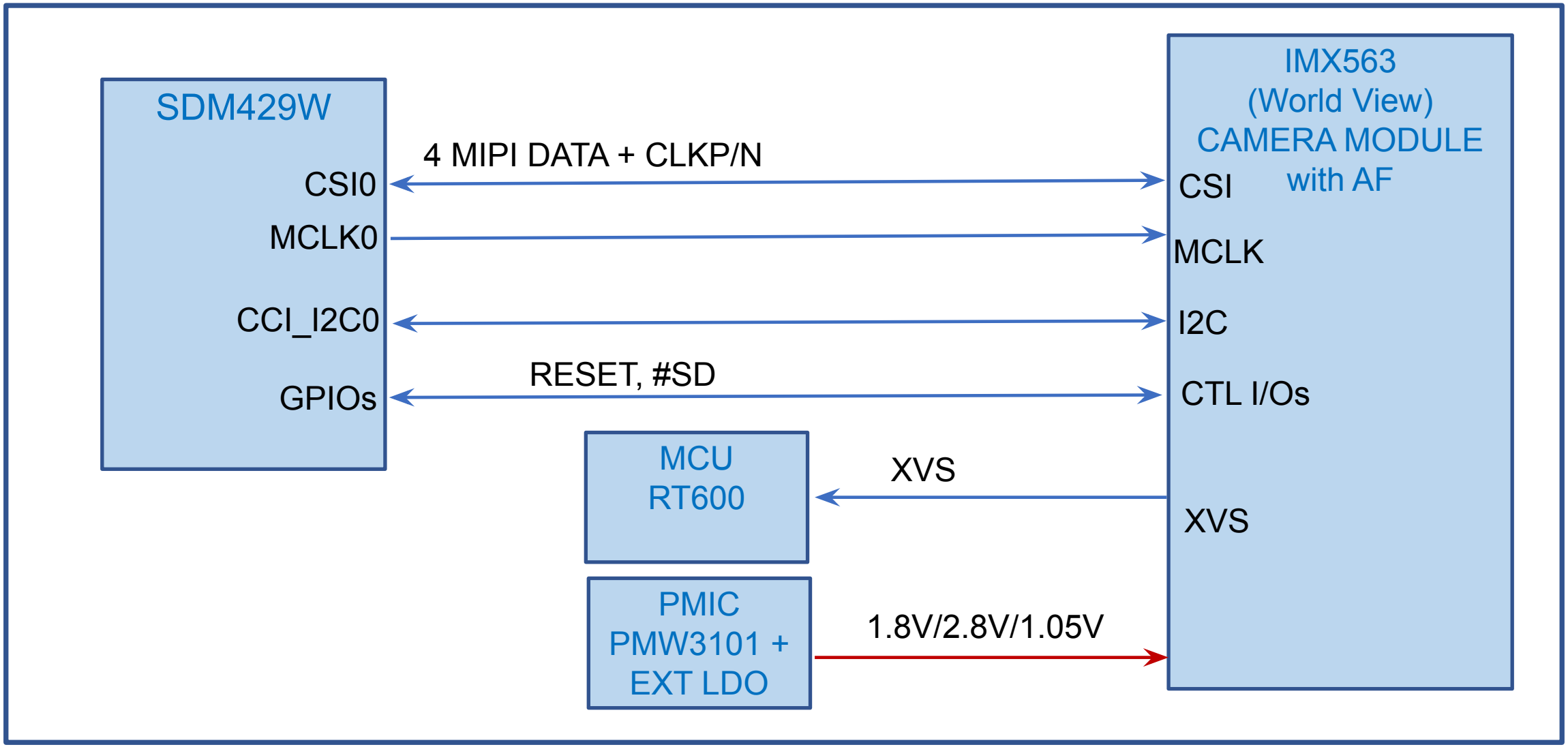


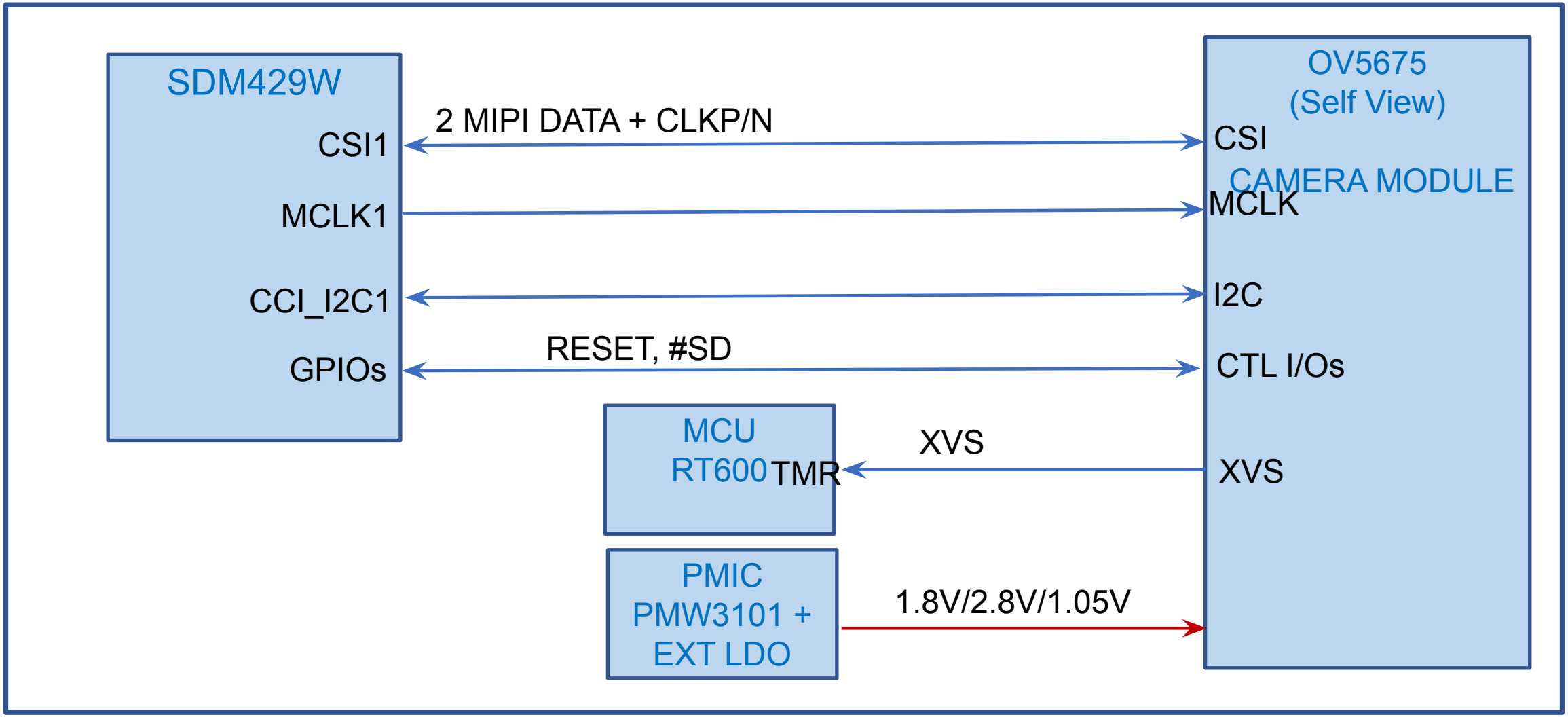

PMIC
PMW3101
SYSTEM
CLOCK
19.2MHz
XO_IN
CLK_OUT1
RT600 AUDIO DSP/MCU
MIC 1
MIC 2
PDM
SOC SDM429W
POWER AMP
MAX98390
I2S SLAVE
I2S MASTER
GPIO_69
AUD_REF_CK_IN
MCLK
IN/OUT
SYS_CLK
SYSTEM
CLOCK
24MHz
XO_IN
I2S MASTER
Audio
I2S SLAVE
SPI MASTER
Sensor + UI
SPI SLAVE

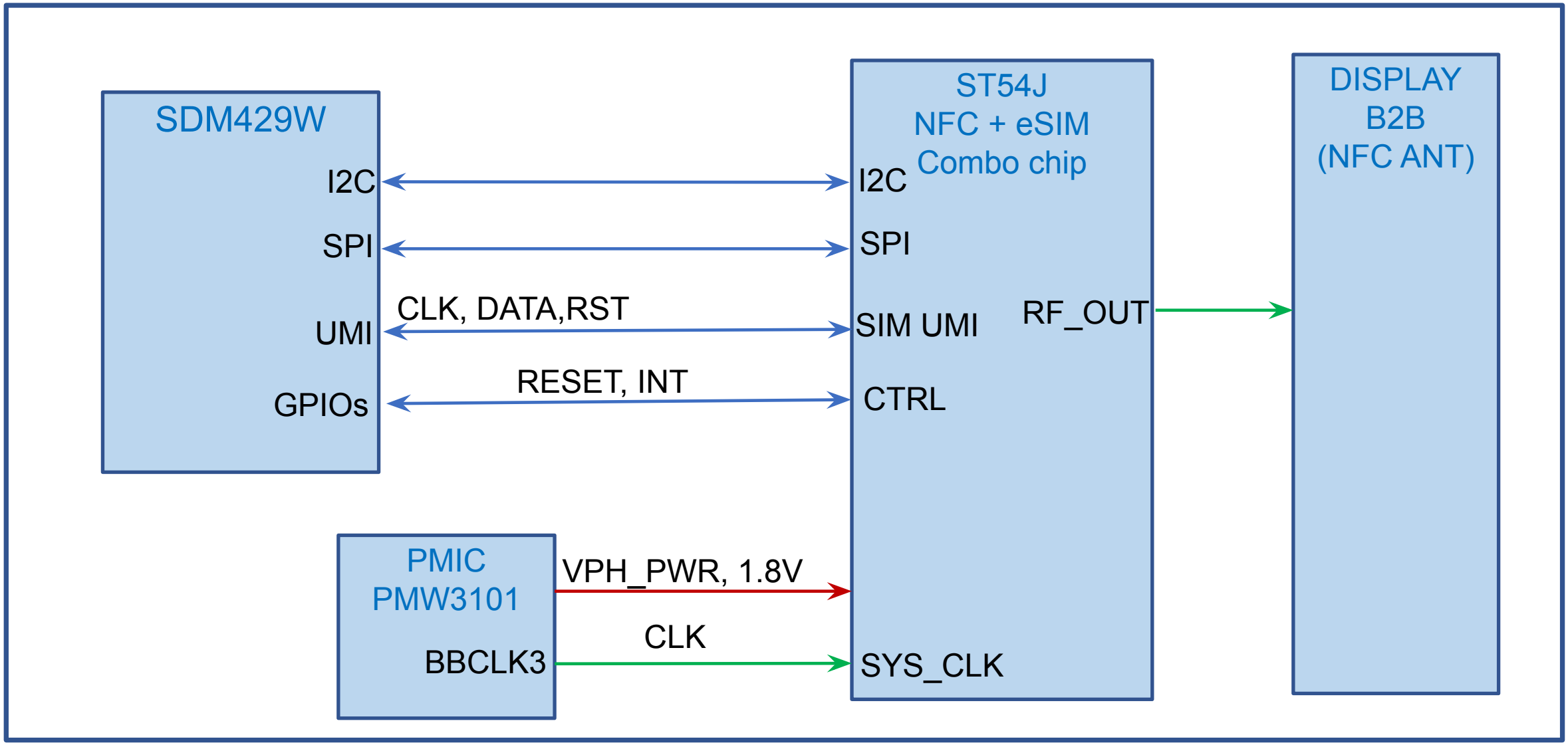
MCU/SOC - Handshakes



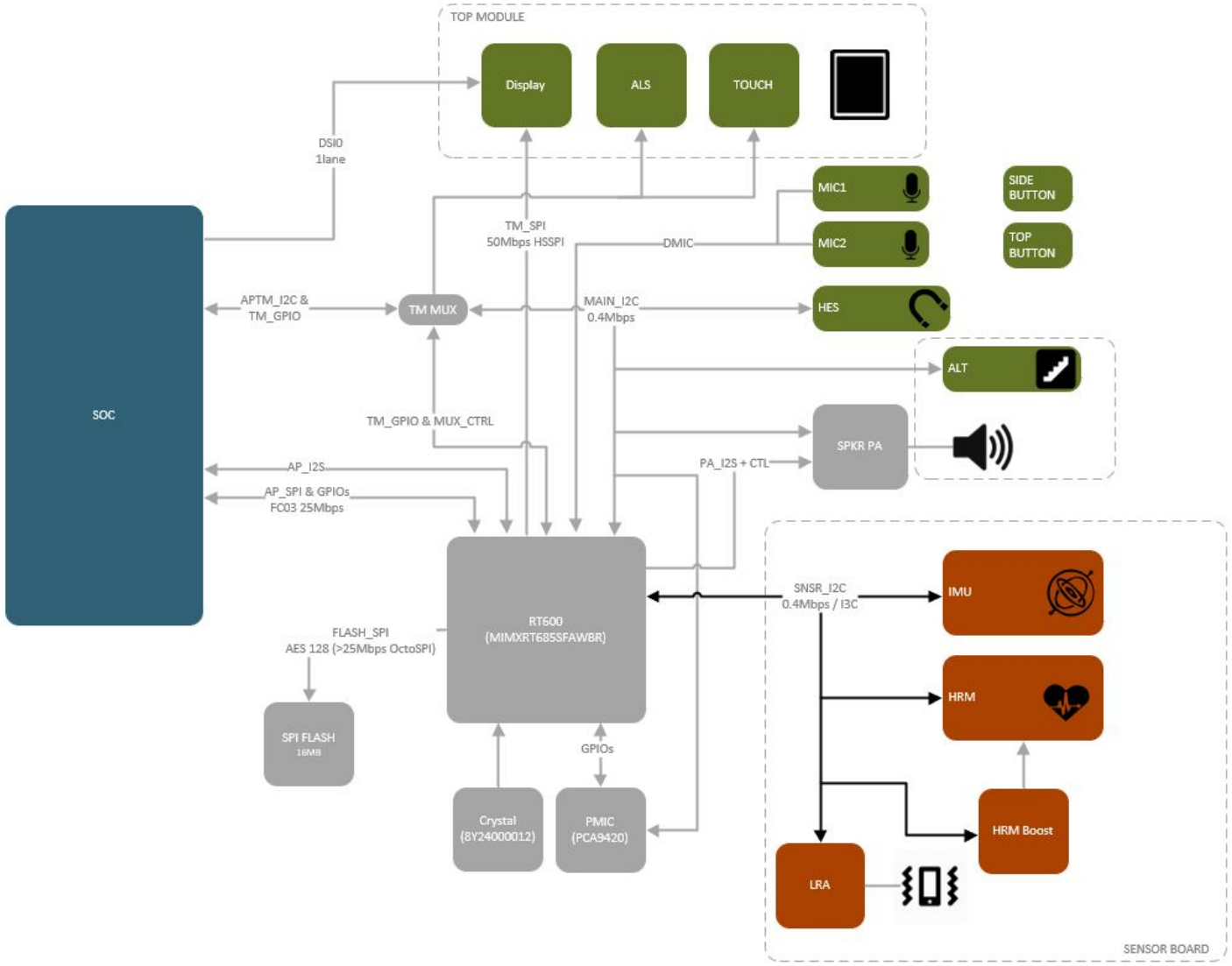

SDM429W
DSI0
1 lane, + CLKP/N
GPIOs
DISP_EN, TP_RESET, DISP_RESET, TP_INT
I2C
SPI
MUX
CTL
SEL
MCU
I2C
DISP_EN, TP_RST,
DISP_RST, TP_INT
SPI
GPIOs
GPIO
SPI
Display +
TOUCH + ALS
MODULE
PMIC
PMW3101


SDM429W
CSI0
MCLK0
CCI_I2C0
GPIOs
4 MIPI DATA + CLKP/N
RESET, #SD
IMX563
(World View)
CAMERA MODULE
with AF
CSI
MCLK
I2C
CTL I/Os
XVS
MCU
RT600
XVS
PMIC
PMW3101 +
EXT LDO
1.8V/2.8V/1.05V


SDM429W
CSI1
MCLK1
CCI_I2C1
GPIOs
2 MIPI DATA + CLKP/N
RESET, #SD
OV5675
(Self View)
CAMERA MODULE
CSI
MCLK
I2C
CTL I/Os
XVS
MCU
RT600
TMR
XVS
PMIC
PMW3101 +
EXT LDO
1.8V/2.8V/1.05V


SDM429W
I2C
SPI
UMI
GPIOs
CLK, DATA,RST
RESET, INT
ST54J
NFC + eSIM
Combo chip
I2C
SPI
SIM UMI
CTRL
RF_OUT
DISPLAY
B2B
(NFC ANT)
PMIC
PMW3101
BBCLK3
VPH_PWR, 1.8V
CLK
SYS_CLK

MCU - Subsystem Block Diagram



Highlights:

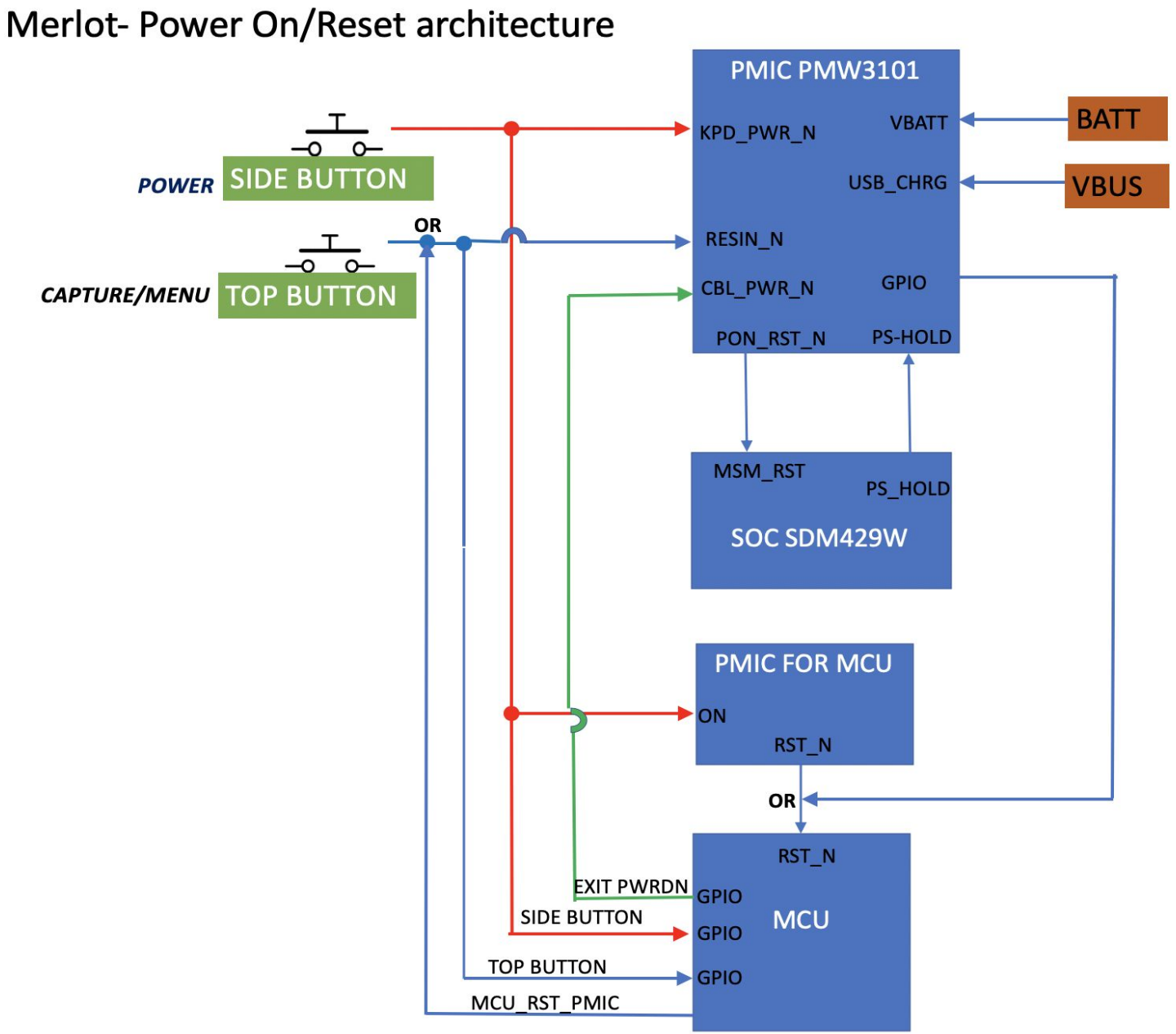
- Cortex-M33 (300MHz)
    - with two coprocessors
- DSP HiFi4 Core (600MHz)
- 4.5MB of internal RAM
- 16MB of external storage

Main Functions:

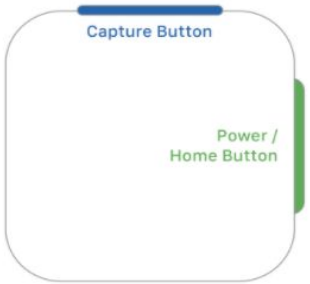
- Sensor Hub
- Audio Front End Processor
- Display Driver for Always on Display

Ports:

Flexcomm	0	UART_DEBUG
Flexcomm	1	I2S_MCU_TO_AMP
Flexcomm	2	I2S_SOC_TO_MCU
Flexcomm	3	SPI_SOC_TO_MCU
Flexcomm	4	I2S_SOC_TO_MCU
Flexcomm	5	I2C_MCU_MAIN (Touch/ALS/ALT/SPKR/PMIC/HES/GG)
Flexcomm	6	I2S_MCU_TO_AMP
FlexSPI HS		SPI_Display
FlexSPI Octo		SPI_Flash
I3C/I2C		I2C_MCU_SNSR (IMU,LRA,HRM, HRM Boost)


Merlot- Power On/Reset architecture
PMIC PMW3101
KPD_PWR_N
VBATT
BATT
USB_CHRG
VBUS
POWER
SIDE BUTTON
OR
RESIN_N
CAPTURE/MENU
TOP BUTTON
CBL_PWR_N
GPIO
PON_RST_N
PS-HOLD
MSM_RST
PS_HOLD
SOC SDM429W
PMIC FOR MCU
ON
RST_N
OR
RST_N
EXIT PWRDN
GPIO
MCU
SIDE BUTTON
GPIO
TOP BUTTON
GPIO
MCU_RST_PMIC

Merlot | Buttons States



	User Intent	Combo Key	On Display
Standard Users	Power Off	1. Hold **Power Button** for Approximately 3 Seconds 2. Use the on screen slider to power off	 Slide to Power Off on screen
	Force Reset	1. Hold **Power Button** for Approximately 3 Seconds to bring up the shutdown screen, then release 2. Hold **Capture Button** until you see the home screen	 
	Factory Reset	1. Powered on, fully booted 2. Use the screen to navigate to the settings menu	 Settings > Reset > Factory Reset
Developer	Fastboot	1. Turn off the phone 2. Hold down **Power Button** + **Capture Button** 3. Release the button **Power Button** when the device starts and continue to hold the **Capture Button** until you enter into the bootloader. ... 4. Scroll up or down with **Capture Button** and select Fastboot with the power key.	  Fastboot starts before android
	Flash recovery mode	1. Turn off the phone 2. Hold down **Power Button** + **Capture Button** 3. Keep holding until device logo shows up and phone restarts again, you should enter recovery mode. 4. Connect cable from watch to the phone & start recovery mode	  

Debug Board

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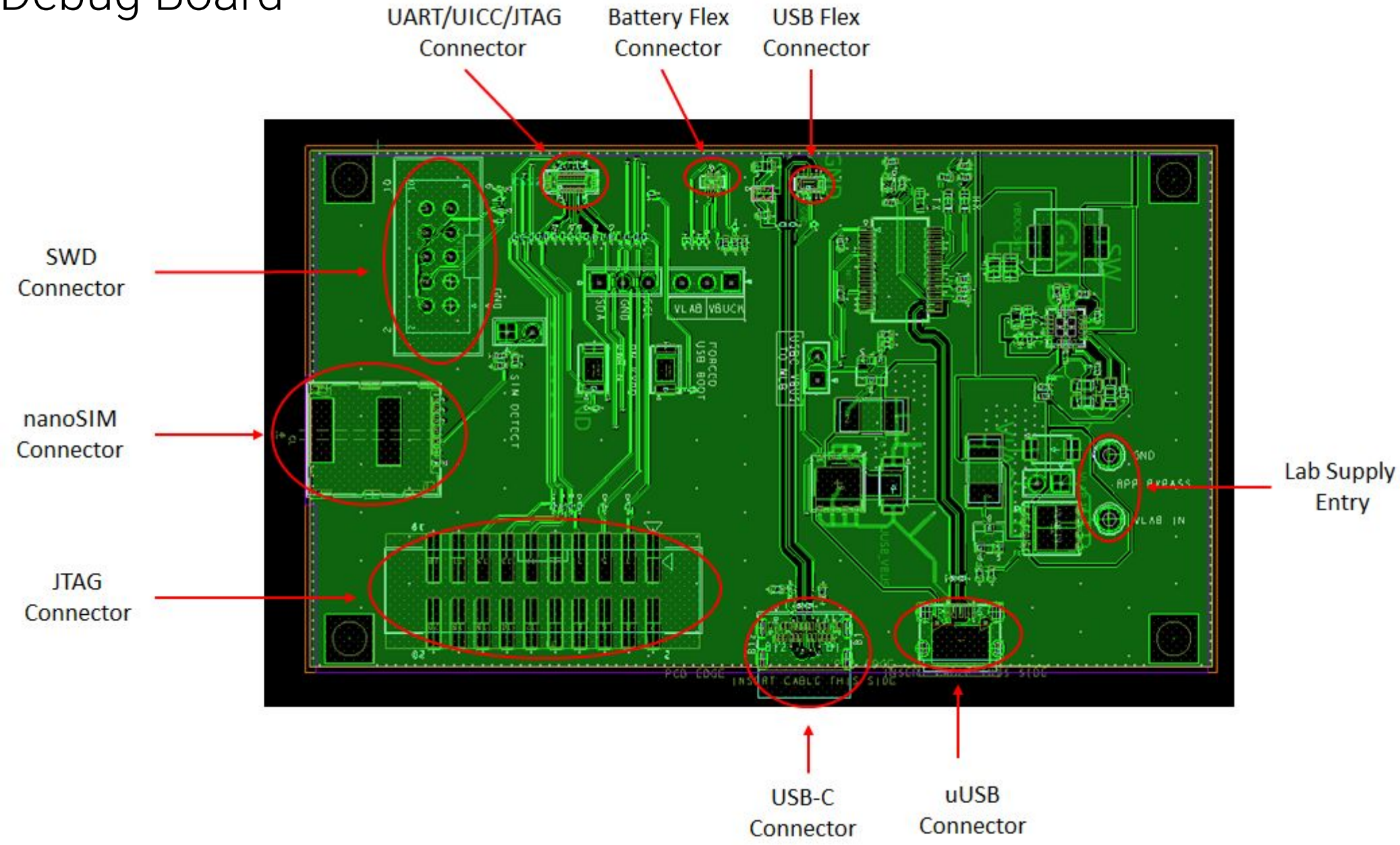

Debug Board + Flexes

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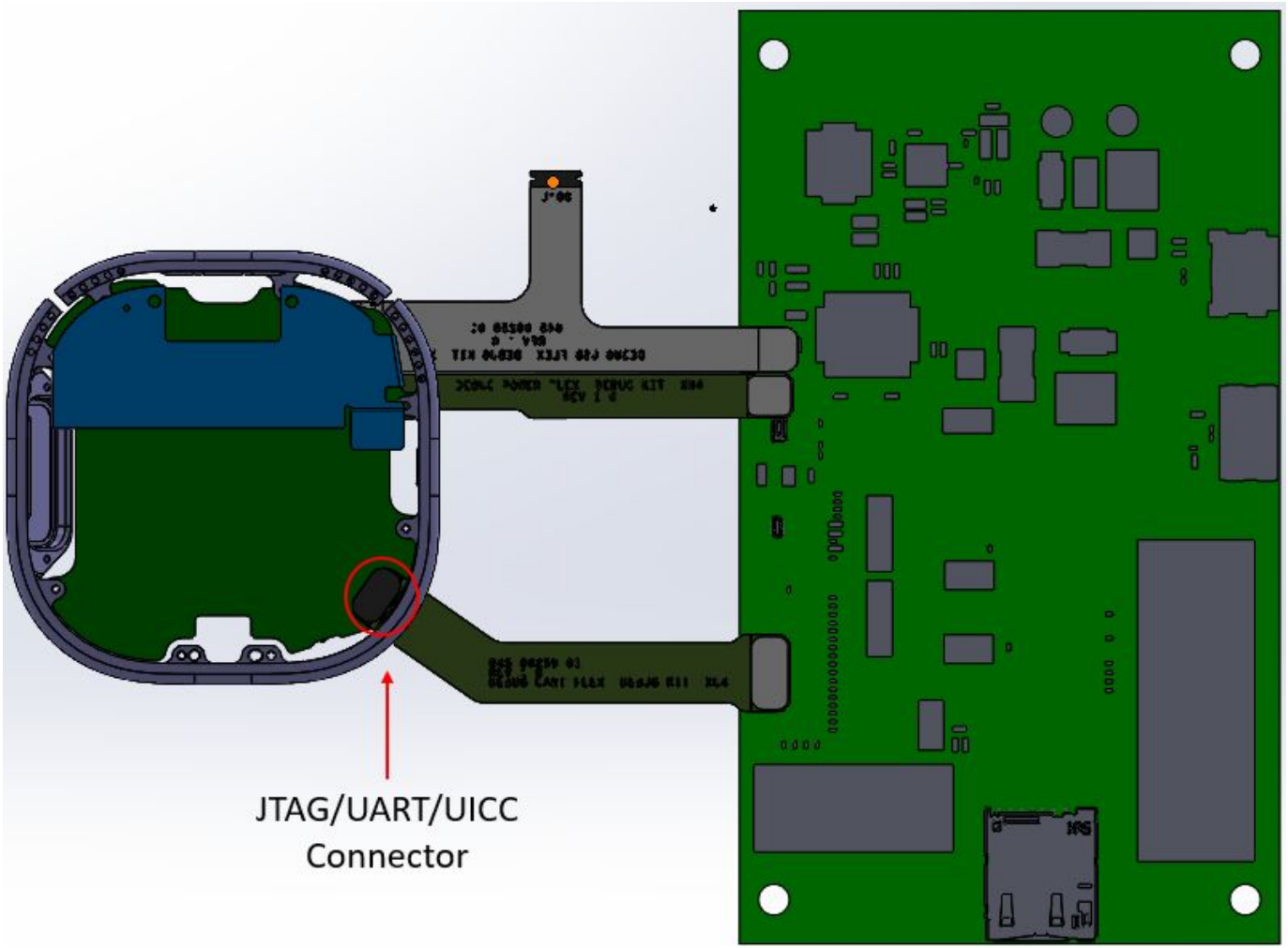

Debug Board + Flexes

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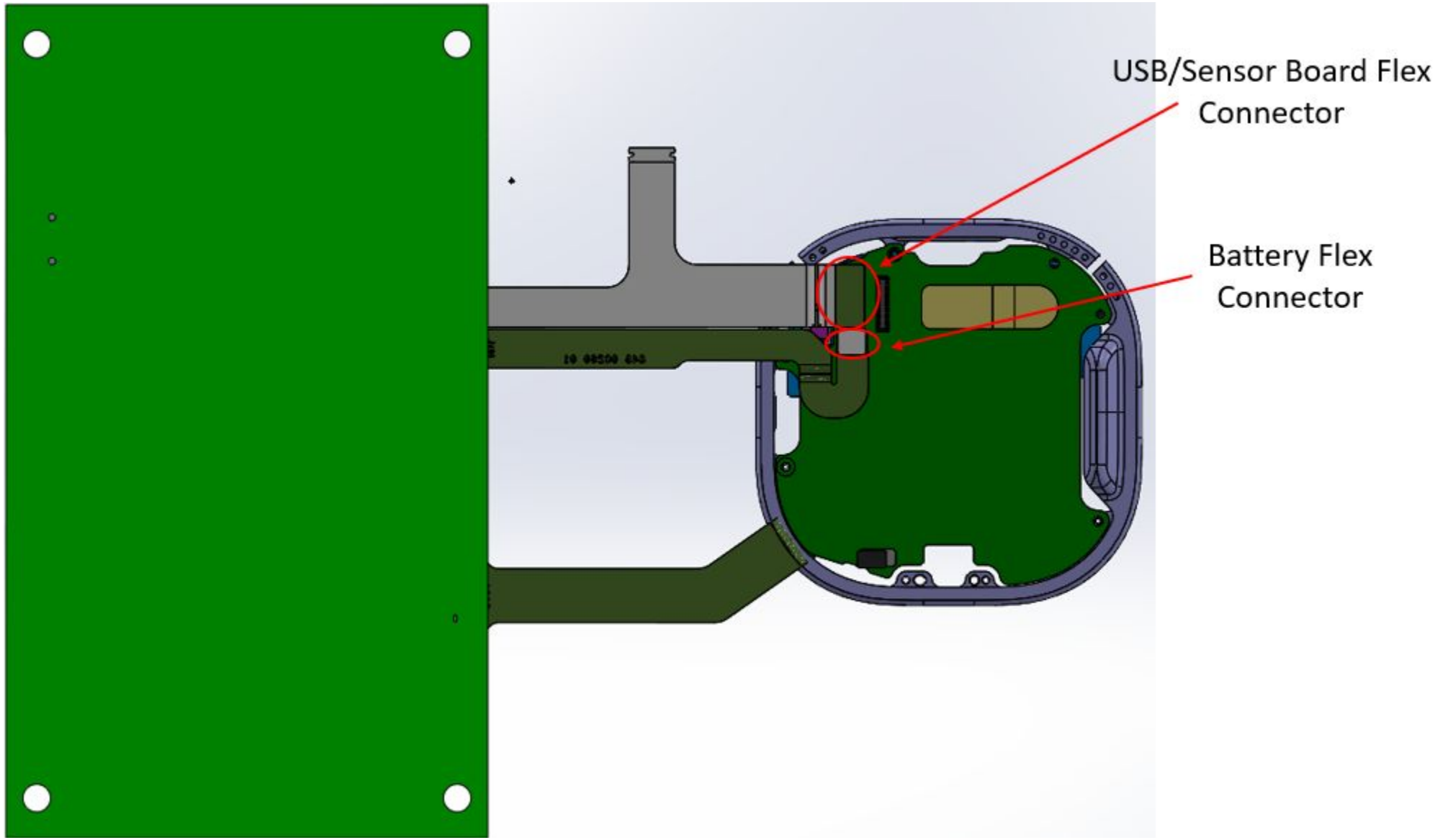

Debug Board + Flexes

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