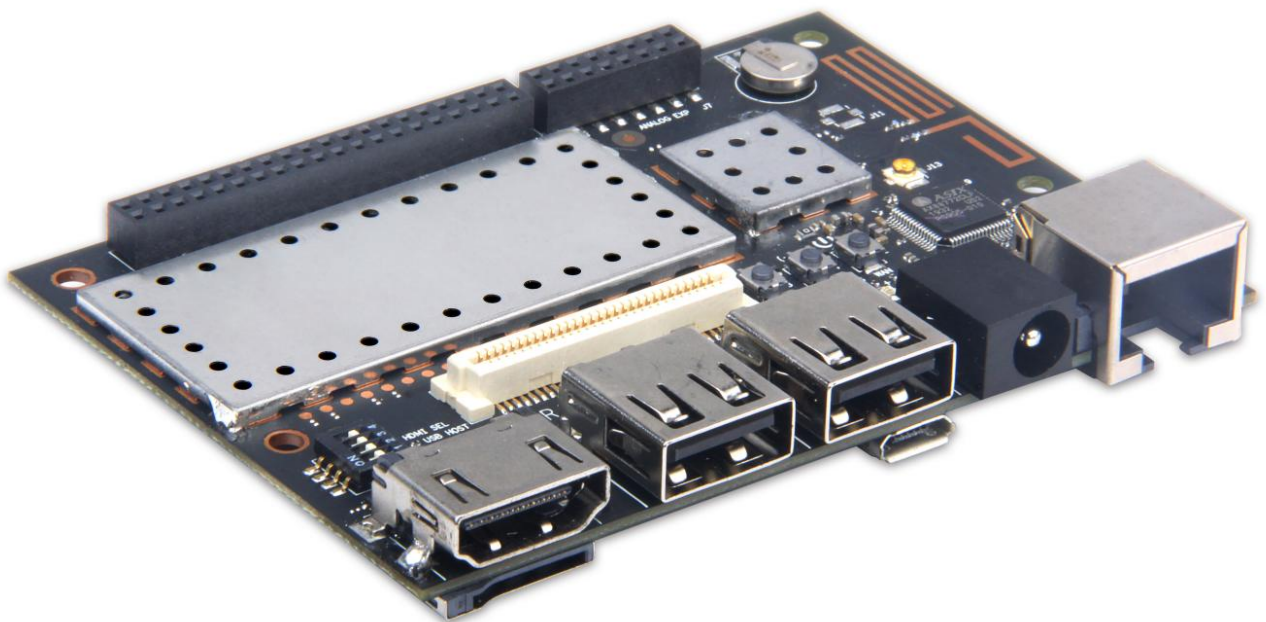


Development Board

SPECIFICATION

MODEL:DB4



Confirmation

REVISION HISTORY					
VERSION	DATE	BOARD ID	PAGE	DESCRIPTION	AUTHOR
V1.0	2020/11/17	RAQ0421_VER1.3	10	specification	
V1.1	2022/4/22	RAQ0421_VER1.31	10	Update HW version	

APPROVED BY GENIATECH		
PREPARED BY 编写	CHECKED BY 审核	APPROVED BY 批准

Please return the original copy after approved by your company with stamp and signature.

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APPROVED BY CUSTOMER		
COMMENTS 确认意见	APPROVED BY 批准签字	COMPANY STAMP 盖章

Website: www.geniatech.com

Address: Room 02-04, 10 / F, Block A, Building 8, Shenzhen International Innovation Valley, Dashi Road,
Nanshan District, Shenzhen, Guangdong, China.

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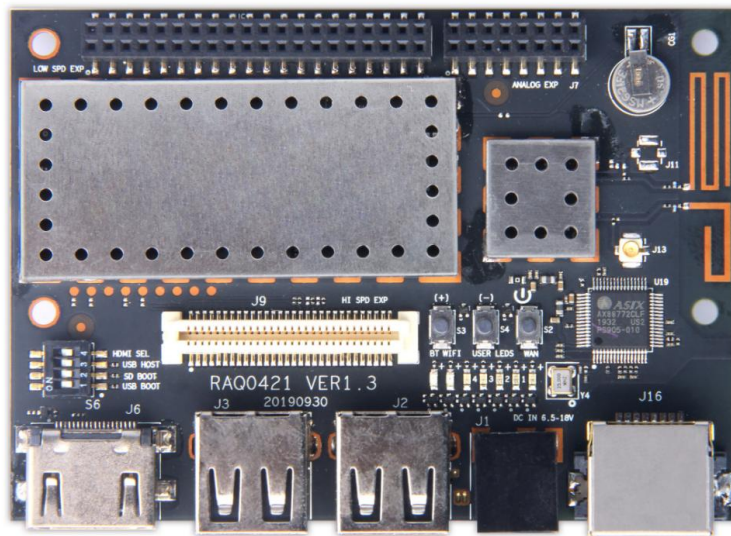
1. General Description

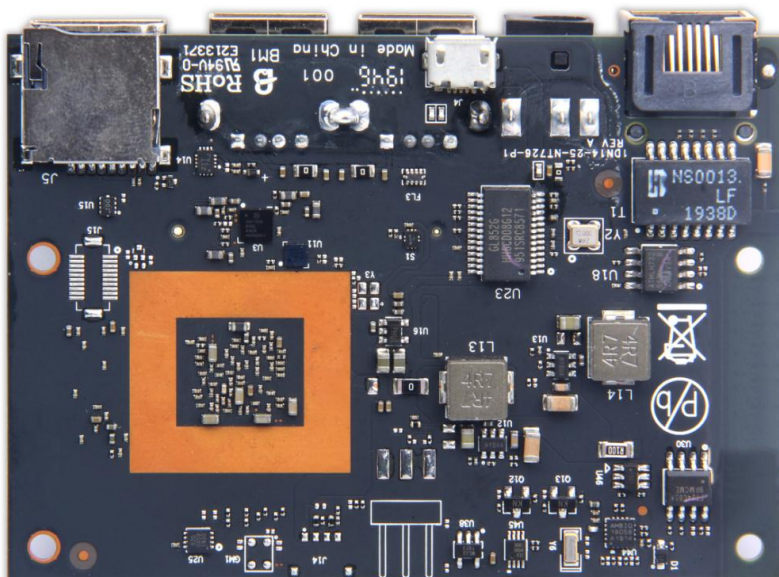
The Snapdragon 410 APQ8016 is a quad 64-bit ARM Cortex-A53 MPcore Harvard Superscalar core, supports both LP-DDR2/ LP-DDR3 SDRAM interface, Hexagon QDSP6, 13.5 MP camera input support, Adreno 306 GPU, 1080p video encode/decode, GPS OneGen 8C with GLONASS, Bluetooth 4.1, OpenGL ES 3.0, DirectX, OpenCL, Render script Compute, Flex Render support. Developer Board 4 IOT(hereinafter referred to as DB4 IOT) is a 96Boards compliant community board based on Qualcomm® Snapdragon 400 series of SoC's:

- Quad-core ARM® Cortex® A53 processor with a maximum frequency of 1.2GHz per core supporting 32 and 64bit computing
- Qualcomm Adreno 306 @ 400MHz for PC-class graphics with support for Advanced APIs, including OpenGL ES 3.0, OpenCL, DirectX, and content security
- RAM:1GB/2GB,Storage:8GB/16GB eMMC
- WLAN 802.11 b / g / n 2.4 GHz, Bluetooth 4.1, GPS. Car GPS, BT and WLAN antennas
- Supports LVDS/MIPI-DSI interface, dual VOP (dual screen display), and multi-format 1080P 60fps video decoding (H.265, H.264, VC-1, MPEG-1/2/4, VP8), 1080P (H.264, VP8 format) video encoding.
- With rich interfaces such as I2C, UART, SPI, SDIO, USB2.0, PWM, RMII, I2S(supports 8-way digital microphone array input), and others
- Support Android 6.0, Linux based on Debian11, Windows 10 IoT core
- With immersion gold process pin, corrosion resistant, 4 studs fixed, stable operation at -25°C-70 °C working temperature for 7X24 hours

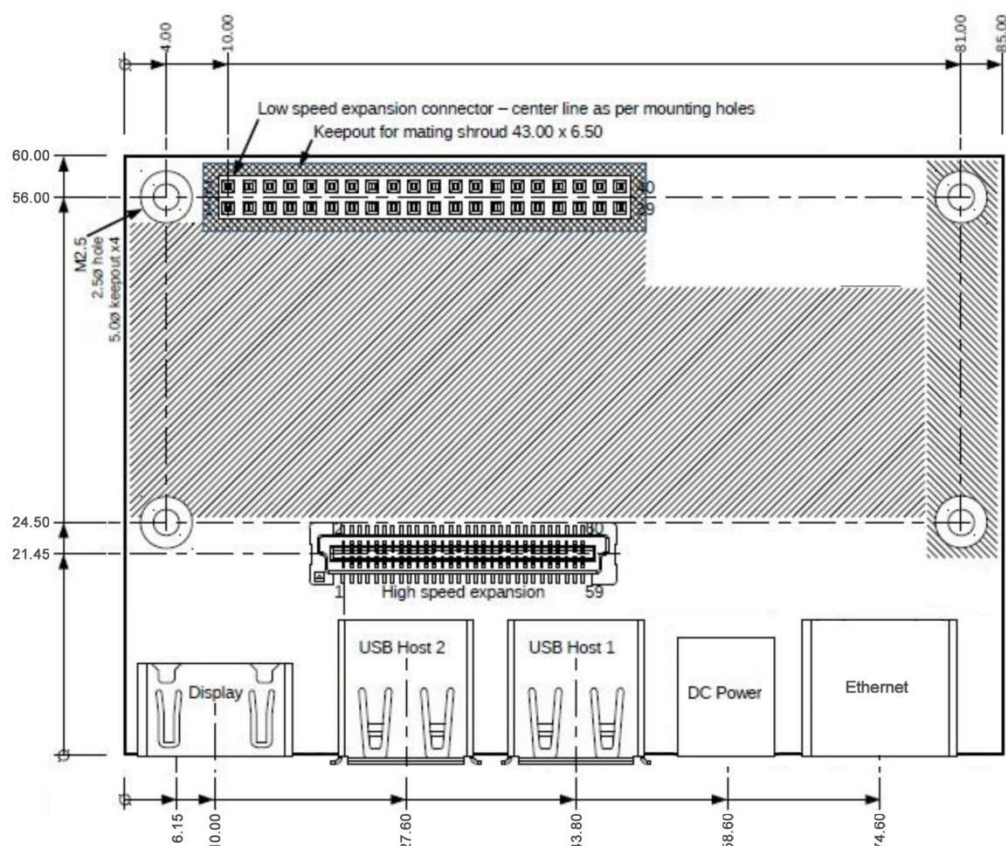
2.Product Pictures

Below pictures are for reference only:





3.Board View



General Top component max height = 6.5mm, except Type A USB connectors <= 7.0mm

PCB/Chip WiFi antenna on top or bottom. Follow antenna specification keepout areas.

Top component max height = 4.0mm except user link headers and thermal management such as fan/heatsink <= 6.5mm

		
TITLE 96Boards Consumer Edition		
VERSION 1.0	SCALE 1:2	DATE 1 FEB 2015
ALL DIMENSIONS IN MM		Geniatech
© 2017		

4.FEATURES

Processor	Qualcomm Snapdragon 410 Quad-core ARM® Cortex® A53 at up to 1.2 GHz per core 64-Bit capable Qualcomm Adreno 306 400MHz GPU for PC-class graphics with support for advanced APIs, including OpenGL ES 3.0, OpenCL, DirectX, and content security
Memory/ Storage	1GB or 2GB LPDDR3 533MHz 8GB or 16GB eMMC 4.5 SD 3.0 (UHS-I)
Video	1080p@30fps HD video playback and capture with H.264 (AVC), and 720p playback with H.265 (HEVC)
Camera Support	Integrated ISP with support for image sensors up to 13MP
Audio	PCM/AAC+/MP3/WMA, ECNS, Audio+ post-processing (optional)
Connectivity	WLAN 802.11 b/g/n 2.4GHz 10/100M Ethernet Bluetooth 4.1 One USB 2.0 micro B (device mode only) Two USB 2.0 (host mode only) GPS On-board GPS antenna On-board BT and WLAN antenna
I/O Interfaces	One 40-pin Low Speed (LS) expansion connector • UART, SPI, I2S, I2C x2, GPIO x12, DC power One 60-pin High Speed (HS) expansion connector • 4L-MIPI DSI, USB, I2C x2, 2L+4L-MIPI CSI Footprint for one optional 16-pin analog expansion connector for stereo headset/line-out, speaker and analog line-in The board can be made compatible with Arduino using an add-on mezzanine board
External Storage	Micro SD card slot
User Interface	Power/Reset Volume Up/down 7 LED indicators: • 4 - user controllable • 3 - for BT、WLAN and Ethernet activity

OS-support	Android 6 Linux based on Debian11 Windows 10 IoT core
Power, Mechanical and Environmental	Power: +6.5V to +18V Dimensions: 60mm by 85mm Operating Temp: -25°C to +70°C RoHS and Reach compliant

5.Support Formats

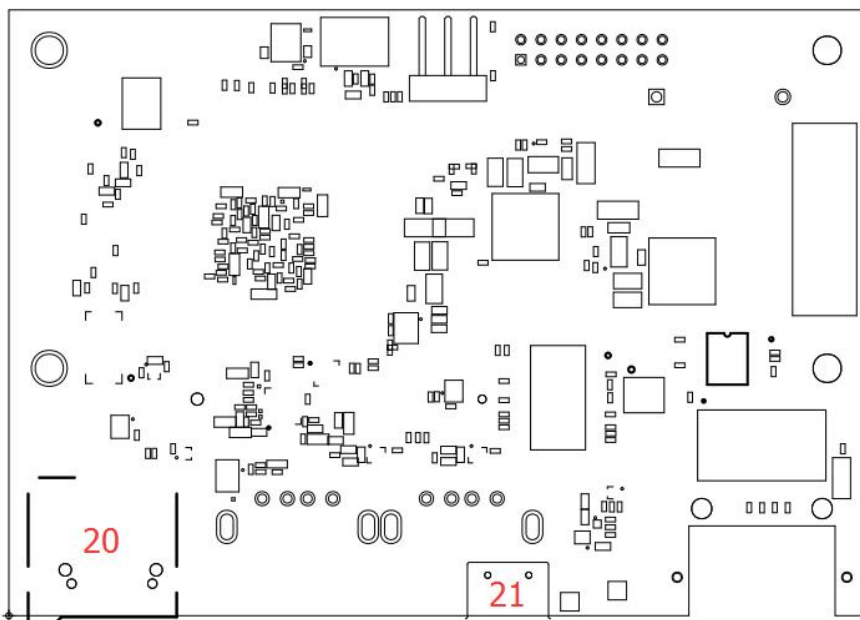
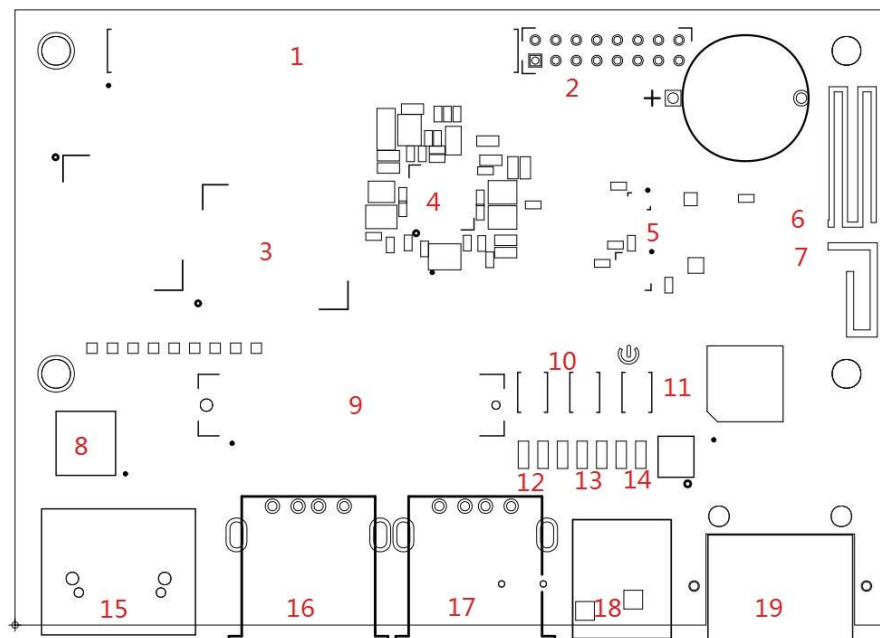
5.1 Video Decoder

- Real-time decoding of MPEG-4, H.264, H.263/DivX/MPEG2/ VP8,/VC1/Soreson
- 30 fps 1080p (MPEG-4, H.264, H.263/DivX/MPEG2/ VP8/VC1/Soreson)
- WFD 1080p 30 fps

5.2 Video Encoder

- Resolution and frame rate are up to 1920x1080@30FPS
- 30 fps 1080p(MPEG-4/H.264/VP8/H.263)
- 720p 30 fps(H.264 Baseline/MPEG-4)
- WFD 720p 30 fps

6. Extension I/O definition



Item No.	Default function	Item No.	Default function
1	(J8) Low Speed Expansion Connector	12	Bluetooth/WLAN LED's
2	(J7) Analog Expansion Connector	13	User LED's 1-4
3	APQ8016 Snapdragon Processor	14	Ethernet LED
4	(U9) Power Management PMIC	15	(J6) HDMI Type A Port
5	WLAN/Bluetooth/GPS	16	(J3) USB Host2 Connector

6	GPS Antenna	17	(J2) USB Host1 Connector
7	Bluetooth/WLAN Antenna	18	(J1) Power Jack
8	(S6) Boot Switches	19	(J16) Ethernet Connector
9	(J9) High Speed Connector	20	(J5) uSD Card Socket
10	(S3-4) Vol+/Vol- Buttons	21	(J4) Micro USB Type B Connector
11	(S2) Power Button		

(J8) Low Speed Expansion Connector

1	GND	2	GND
3	UART0_CTS_N (APQ GPIO_2)	4	PHONE_ON_N
5	UART0_TX (APQ GPIO_0)	6	PM_RESIN_N
7	UART0_RX (APQ GPIO_1)	8	SPI0_CLK (APQ GPIO_19)
9	UART0_RTS_N (APQ GPIO_3)	10	SPI0_MISO (APQ GPIO_17)
11	UART1_TX (APQ GPIO_4)	12	SPI0_CS_N (APQ GPIO_18)
13	UART1_RX (APQ GPIO_5)	14	SPI0_MOSI (APQ GPIO_16)
15	I2C0_SCL (APQ GPIO_7)	16	LS_EXP_MI2S_WS (APQ GPIO_110)
17	I2C0_SDA (APQ GPIO_6)	18	LS_EXP_MI2S_SCK (APQ GPIO_113) (ALPS_INT)
19	I2C1_SCL (APQ GPIO_23)	20	LS_EXP_MI2S_DATA0 (APQ GPIO_114)
21	I2C1_SDA (APQ GPIO_22)	22	N.C. I2S only supports audio out
23	LS_EXP_GPIO_A (APQ GPIO_36) (APQ INT)	24	LS_EXP_GPIO_B (APQ GPIO_12) (TS_RST_N)
25	LS_EXP_GPIO_C (APQ GPIO_13) (TS_INT_N)	26	LS_EXP_GPIO_D (APQ GPIO_69) (MAG_INT)
27	LS_EXP_GPIO_E (APQ GPIO_115) (GYRO_ACCL_INT_N)	28	LS_EXP_GPIO_F (PM_MPP_4) (DSI_BLCtrl) Borrowed GPIO from PMIC
29	LS_EXP_GPIO_G (APQ GPIO_24) (DSI_VSYNC)	30	LS_EXP_GPIO_H (APQ GPIO_25) (DSI_RST)
31	LS_EXP_GPIO_I (APQ GPIO_35) (CSI0_RST)	32	LS_EXP_GPIO_J (APQ GPIO_34) (CSI0_PWDN)
33	LS_EXP_GPIO_K (APQ GPIO_28) (CSI1_RST)	34	LS_EXP_GPIO_L (APQ GPIO_33) (CSI1_PWDN)
35	LS_EXP_1P8	36	SYS_DCIN
37	SYS_5P0	38	SYS_DCIN
39	GND	40	GND

(J9) High speed expansion connector

1	SPI1_MOSI (APQ GPIO_8)	2	MIPI_CSI0_CLK_P
3	N.C. This is SPI implementation.not	4	MIPI_CSI0_CLK_M
5	N.C. an SD interface	6	GND
7	SPI_CS_N(APQ GPIO_10)	8	MIPI_DSIO_DATA0_P
9	SPI1_CLK(APQ GPIO_11)	10	MIPI_DSIO_DATA0_M
11	SPI1_MISO(APQ GPIO_9)	12	GND
13	GND	14	MIPI_DSIO_DATA1_P
15	CSI0_MCLK(APQ GPIO_26)	16	MIPI_DSIO_DATA1_M
17	CSI1_MCLK(APQ GPIO_27)	18	GND

19	GND	20	MIPI_DSI0_DATA2_P
21	MIPI_DSI0_CLK_P_EXP_CONN	22	MIPI_DSI0_DATA2_M
23	MIPI_DSI0_CLK_M_EXP_CONN	24	GND
25	GND	26	MIPI_DSI0_DATA3_P
27	MIPI_DSI0_DATA0_P_EXP_CONN	28	MIPI_DSI0_DATA3_M
29	MIPI_DSI0_DATA0_M_EXP_CONN	30	GND
31	GND	32	I2C2_SCL(APQ GPIO_30)
33	MIPI_DSI0_DATA1_P_EXP_CONN	34	I2C2_SDA(APQ GPIO_29)
35	MIPI_DSI0_DATA1_M_EXP_CONN	36	I2C3_SCL(APQ GPIO_15) R61&R62 need to be installed to enable I2C3
37	GND	38	I2C3_SDA(APQ GPIO_14)
39	MIPI_DSI0_DATA2_P_EXP_CONN	40	GND
41	MIPI_DSI0_DATA2_M_EXP_CONN	42	MIPI_CSI1_DATA0_P
43	GND	44	MIPI_CSI1_DATA0_M
45	MIPI_DSI0_DATA3_P_EXP_CONN	46	GND
47	MIPI_DSI0_DATA3_M_EXP_CONN	48	MIPI_CSI1_DATA1_P
49	GND	50	MIPI_CSI1_DATA1_M
51	USB_HS_D_P_EXP	52	GND
53	USB_HS_D_M_EXP	54	MIPI_CSI1_CLK_P
55	GND	56	MIPI_CSI1_CLK_M
57	N.C.	58	GND
59	N.C. No HSIC implementation	60	N.C.

(J7) Analog Expansion Connector

1	PM8916 Audio signal CDC_SPKDRV_P	2	PM8916 Audio signal CDC_SPKDRV_M
3	A 3.7V from U12 buck switcher	4	GND
5	PM8916 Audio signal CDC_GND_CFILT	6	PM8916 Audio signal CDC_IN2_P
7	PM8916 Audio signal CDC_IN3_P	8	PM8916 Audio signal CDC_HPH_R
9	PM8916 Audio signal CDC_HPH_REF	10	PM8916 Audio signal CDC_HPH_L
11	PM8916 Audio signal CDC_HS_DET	12	PM8916 Audio signal CDC_MIC_BIAS1
13	N.C	14	N.C
15	WCN3620 RF signal FM_HS_RX	16	N.C.

7. Boot configuration

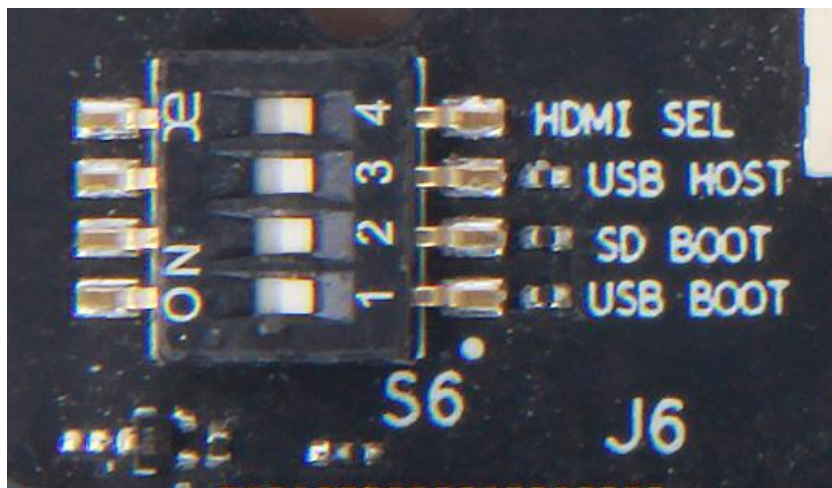
There is a 4 switch Dip Switch marked S6 located at the bottom side of the DB4. For normal operation all four switched need to be set to the 'off' position.

Switch 1, 'USB BOOT', when set to 'on' position, will force boot over USB connection with a PC. This is only required for eMMC boot image upgrade. Please review the proper OS User Guide for more information on this process.

Switch 2, 'SD BOOT', when set to 'on' position, will force the μ SD, J5, to serve as the boot source for the DB4 when set. You can use SD as the main boot source or it can serve as a method for eMMC boot image upgrade. Please review the proper OS User Guide for more information on this process.

Switch 3, 'USB HOST', This switch is not part of the boot configuration.

Switch 4, 'HDMI SEL', This switch is not part of the boot configuration.



8. Precautions for use

1. Relative humidity: 10% ~ 90% .
2. Storage temperature: -10 ~ 125°C
3. Operation temperature: -25°C to +70°C
4. Do not squeeze、 distort or disassemble the board.
5. Keep the board away from static electricity .
6. Keep the board away from water and other liquid.
7. Clean the board with soft and clean dry cloth when it's dirty.
8. Don't use long connect wires which may affect performance and image quality.