MT8516 Power Ref 0.2

Aug, 2017

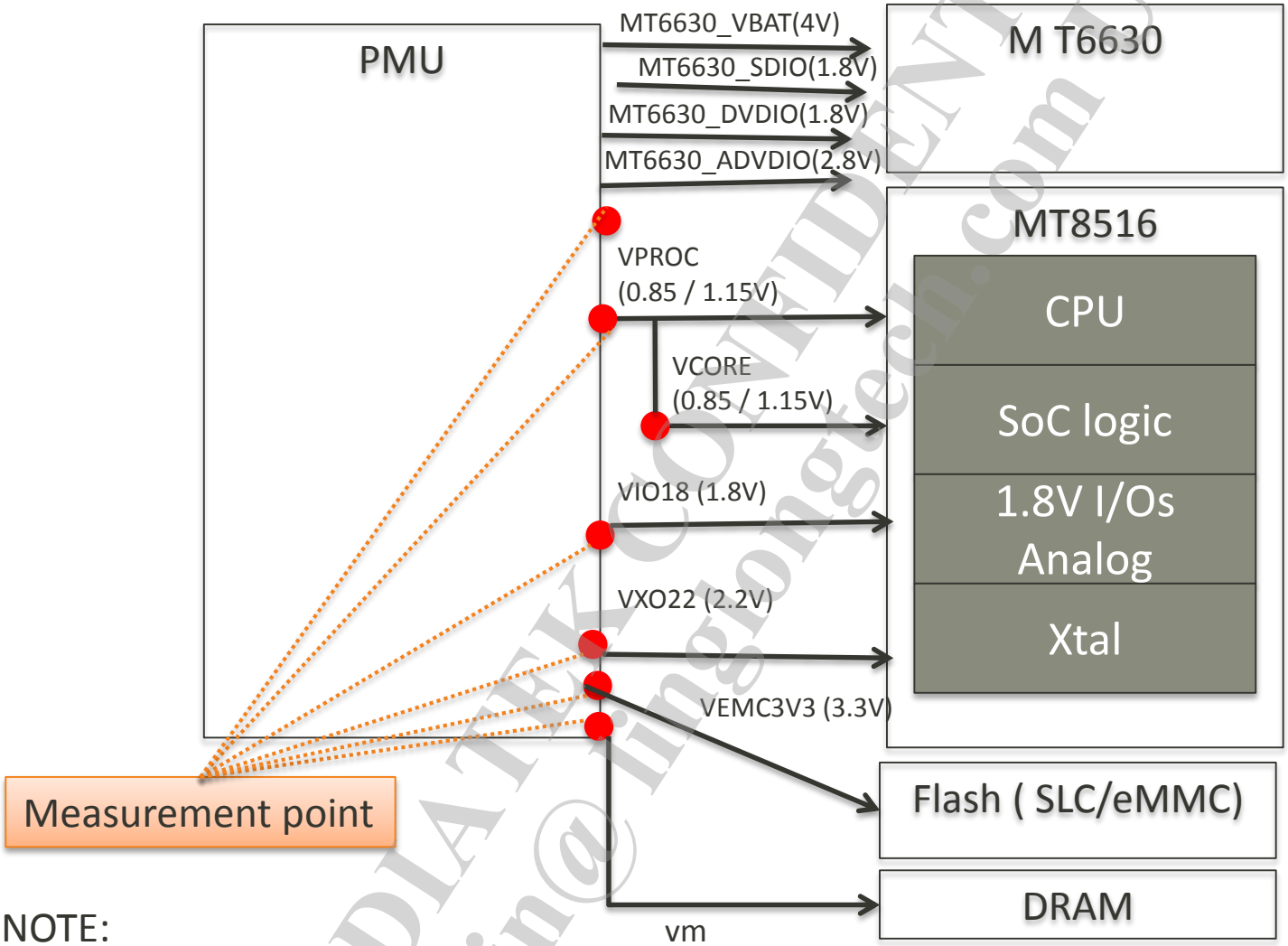
MT8516 POWER INTRO

MT8516 EVB Configuration - for Power Analysis

Item	Description
Memory	DDR3L X 2Gb(16bits) X 1 Part No: Nanya HT5CC256M16DP-DI 2Gb x 1 SLC NAND Part No:MXIC MX30LF4G18AC-TI
Connectivity	MT6630 (wifi 1x1 ac/b/g/n + BT4.2)
Power tree	power input： 5V w/ external buck G2156
MIC	SOC DMIC
AMP	I2S + TAS5751M
Speaker	12w output

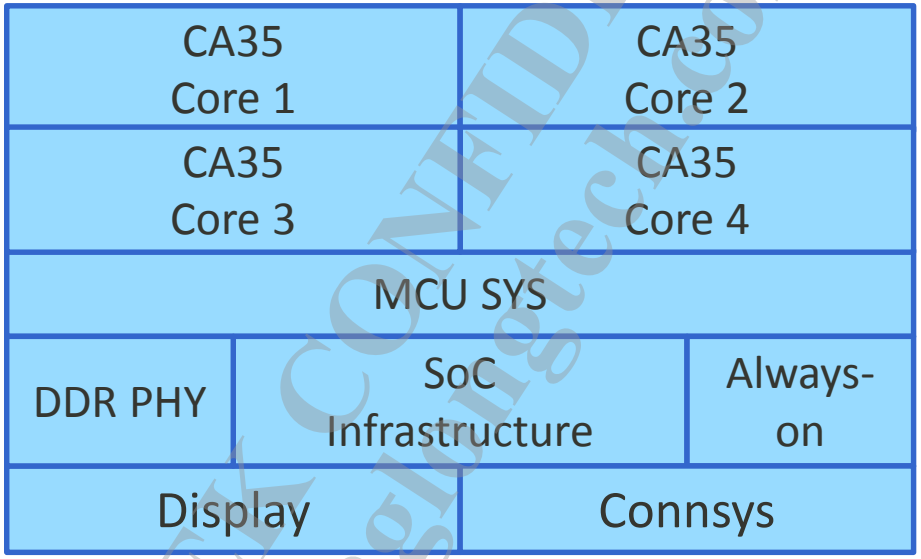
Note: TT sample, room temperature
No Display

MT8516 Power Measurement



NOTE:
VPROC and VCORE share power rail
just example, not all component

MT8516 Power Domain



- Per CPU core and whole CPU cluster can be power down
- Fine grain power domain can be power down depending on scenario
- Only “always-on” power domain will be active in the most low power scenario (Suspend)

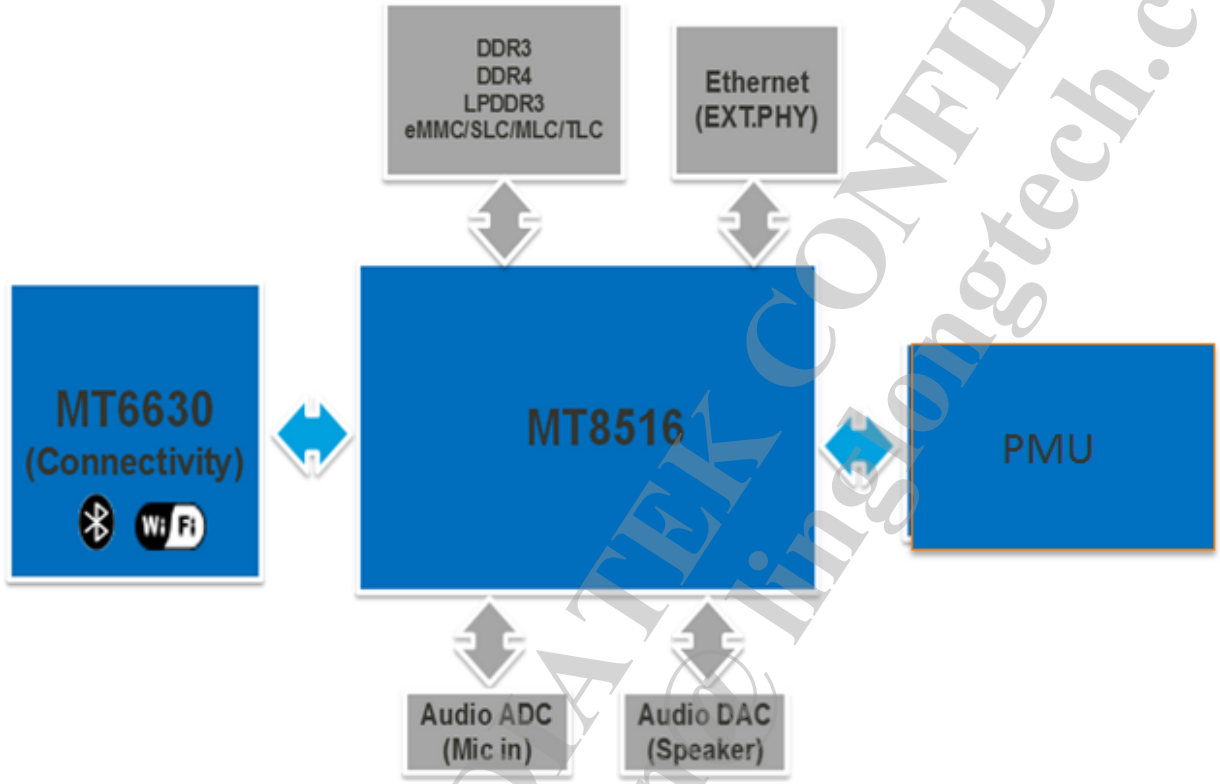
MT8516 Power Mode Scenarios

SOC power state	deep standby	Network standby	normal
ARM CPU state	off	off	running, WFI
Active Core num.	0	0	1~4
Vproc (for CPU)	1.25V	1.25V	1.25V
Vcore (for SoC logic)	1.25V	1.25V	1.25V
DDRPHY	off	off	on
dram operation clk	off	off	1600 Mbps
bus operation clk	off	off	Full speed
OSC (26M/32K)	on/on	on/on	on/on
SoC Infra power domain	off	off	on

Note:
In network standby mode, wifi stay connected with AP, it will need resources sometimes

MT8516 SYSTEM INFORMATION

MT8516 Demo board Configuration



SOC chip:MT8516
connectivity: MT6630
PMU: G2156
DRAM: DDR3L

MT8516 System Power Consumption

Module	Deep Standby	Network Standby	MP3 Playback	GVA (mW)	GVA + C4A (mW)
Scenario	System Suspend and wakeup via GPIO.	System wakeup over Wifi magic packet.	System local mp3 playback, wifi module active but idle.	Ready for Google Voice Assistant. GVA is always on when system in normal mode.	System playback streaming audio and keep Google Voice Assistant ability.
MT8516	18mW	19mW	134mW	378mW	450mW
MT6630	2mW	67mW	147mW	211mW	283mW
DRAM	9mW	9mW	65mW	71mW	79mW
NandSLC	5mW	5mW	5mW	5mW	5mW
MT8516 System Power*	34mW	102mW	351mW	665mW	817mW
Time to Google service resume	12s	3s			

8516 SoC power – GVA Mode (TBD)

GVA mode: working with google voice assitant			
Item	Description	Voltage (V)	Power (mW)
VPROC	CPU running GVA	1.15	111.96
VCORE	Digital core power	1.15	195.98
VIO18	SoC I/O and analog power	1.8	51.51
AVDD28_AUDIO	Power rail for audio DAC	2.8	8.82
VAUD22	Power rail for audio DAC	2.2	1.29
VXO22	Xtal power rail	2.2	8.47
SoC total			378.03

- CPU Loading: Every 10s wake-up with “OK Google”, CPU loading is around 31%

8516 SoC power – GVA + C4A Mode (TBD)

GVA mode: working with GVA+C4A, play music by GVA and choose youtube to play music			
Item	Description	Voltage (V)	Power (mW)
VPROC	CPU running GVA+C4A	1.15	147.59
VCORE	Digital core power	1.15	232.2
VIO18	SoC I/O and analog power	1.8	51.52
AVDD28_AUDIO	Power rail for audio DAC	2.8	8.81
VAUD22	Power rail for audio DAC	2.2	1.25
VXO22	Xtal power rail	2.2	8.65
SoC total			450.02

- CPU Loading: Use “OK Google” to play music, CPU loading is around 58%

MT6630 POWER REFERENCE

MT6630-WLAN Current Consumption

Description	Performance	
	Typ.	Unit
OFF	NA	μA
RX active, BW40, HT40 MCS7	59.2	mA
RX active, BW20, HT20 MCS7	53.6	mA
RX listen	47	mA
RX sleep	0.1	μA
RX power saving, DTIM = 1	0.6	mA
TX HT40, MCS7@19.5dBm	229	mA
TX HT20, MCS7@19.5dBm	230	mA
TX OFDM, 54M@18dBm	247	mA
TX CCK, 11M@21dBm	311	mA

2.4GHz

Description	Performance	
	Typ.	Unit
RX active, BW40, VHT40 MCS9	83	mA
RX active, BW80, VHT80 MCS9	95	mA
RX listen	47	mA
RX power saving, DTIM = 1	0.6	mA
TX HT40, MCS9@16.5dBm	402.3	mA
TX HT80, MCS9@16.5dBm	409.5	mA

5GHz

Voltage: 3.8V PMIC source

MT6630-BT Current Consumption

Description	Performance	
	Typ.	Unit
Sleep	100	μA
Standard 2.56s inquiry scan	250	μA
2.56s inquiry scan & 1.28s page scan	588	μA
2.56s inquiry scan & 1.28s page scan (low-power scan)	395	uA
500ms sniff (master)	370	μA
500ms sniff (slave)	310	uA
HV3 + 500ms Sniff + 2.56s inquiry scan & 1.28s page scan (master)	22	mA
2-EV3 (Tesco = 12) + 500ms sniff + 2.56s inquiry scan & 1.28s page scan (master)	17	mA
DH1 transmit (test mode)	73	mA
DH3 transmit (test mode)	73	mA

Voltage: 3.8V PMIC source

everyday genius