MYD-YT507H Development Board

➢ *MYC-YT507H CPU Module as Controller Board*

➢ *1.5GHz ALLWINNER T507-H Quad-core ARM Cortex-A53 Automotive Grade Processor*

➢ *1GB/2GB LPDDR4, 8GB eMMC Flash, 32Kbit EEPROM*

➢ *Serial ports, 1 x Gigabit Ethernet, 1 x 10/100M bps Ethernet, 2 x USB 2.0 Host, 1 x USB 2.0 OTG, TF Card Slot*

➢ *Supports Dual LVDS, HDMI and CVBS Display Output Interfaces to Achieve Different Display in Dual Screens*

➢ *Supports MIPI-CSI and DVP Camera Input*

➢ *Supports Running Linux OS*

➢ *Optional LCD Modules, Camera Modules, WiFi/BT Module and RPI Module (RS232/RS485)*
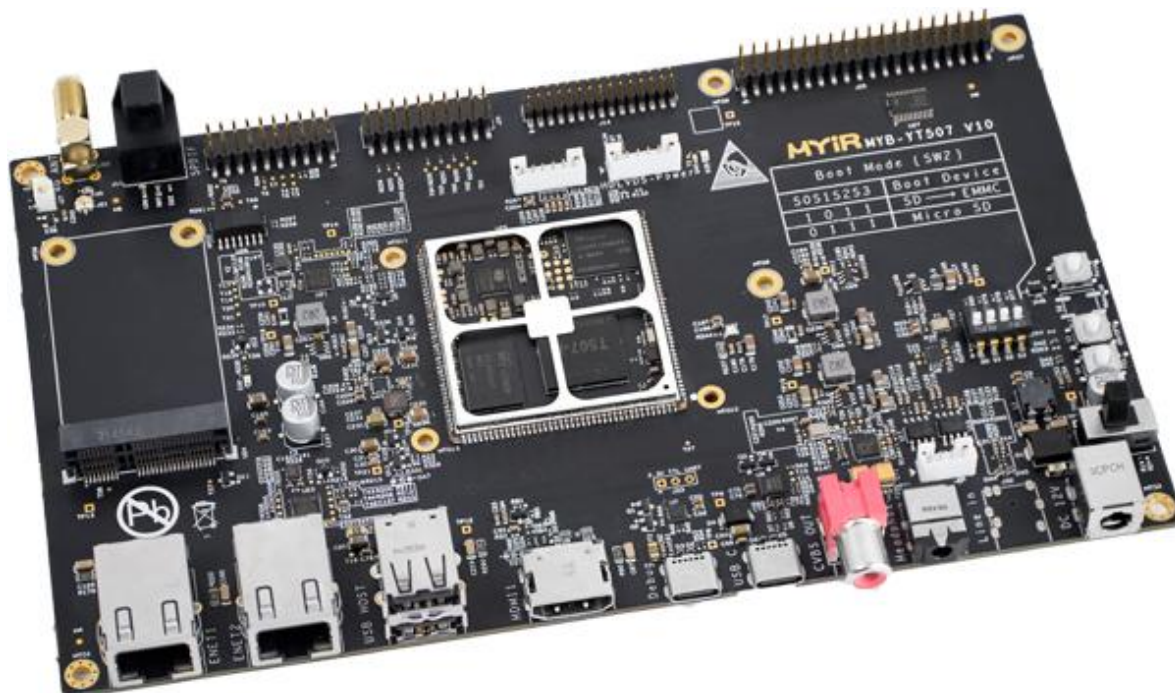

Figure 1-1 MYD-YT507H Development Board (CPU Module is delivered with shielding cover by default)

The **MYD-YT507H Development Board** consists of a compact CPU Module **MYC-YT507H** and a base board to provide a complete evaluation platform for **ALLWINNER T507-H Processor** which among **Allwinner T5** series with a 1.5GHz quad-core Cortex-A53 CPU and a Mali-G31 MP2 GPU. The processor is AEC-Q100 certified and targets the new generation of automotive markets. Typical applications are power IoT, automotive electronics, commercial display, industrial control, medical devices, intelligent terminals and more others.

The **MYD-YT507H** has a base board which installed **MYC-YT507H CPU Module** through 1.0mm pitch 222-pin stamp-hole (Castellated-Hole) interface. The MYC-YT507H CPU Module is a highly-integrated SoM which combines the **ALLWINNER T507-H processor**, 1GB/2GB DDR4, 8GB eMMC, 32Kbit EEPROM and PMIC. The base board is explored with Serial ports, one Gigabit Ethernet and one 10/100M bps Ethernet, two USB 2.0 HOST and one USB 2.0 OTG, one TF card slot as well as a USB based 4G Mini PCIE interface. It has a DVP camera interface and a MIPI-CSI interface to allow connecting with camera modules. It also supports multi video output interfaces such as dual LVDS, HDMI and CVBS OUT, to achieve different display in dual screens.

The **MYD-YT507H Development Board** is delivered with one Quick Start Guide, one USB cable, one 12V/2A power adapter and one DC power jack adapter to provide user a complete platform for evaluating and prototyping based

on T507H processor. MYIR also offers MY-CAM002U USB Camera Module, MY-CAM011B DVP Camera Module, MY-CAM003M MIPI Camera Module, MY-WIREDCOM RPI Module (RS232/RS485), MY-WF005S WiFi/BT Module and MY-LVDS070C LCD Module as options for the board which have greatly enhanced the functionality of the board.

The **MYD-YT507H** is running Linux OS. MYIR provides abundant software resources for Linux 4.9 based MYIR MEasy HMI V2.0 system with QT5.12.5, Ubuntu 18.04.5 system, including kernel, driver source codes and compilation tools to enable users to start their development rapidly and easily.
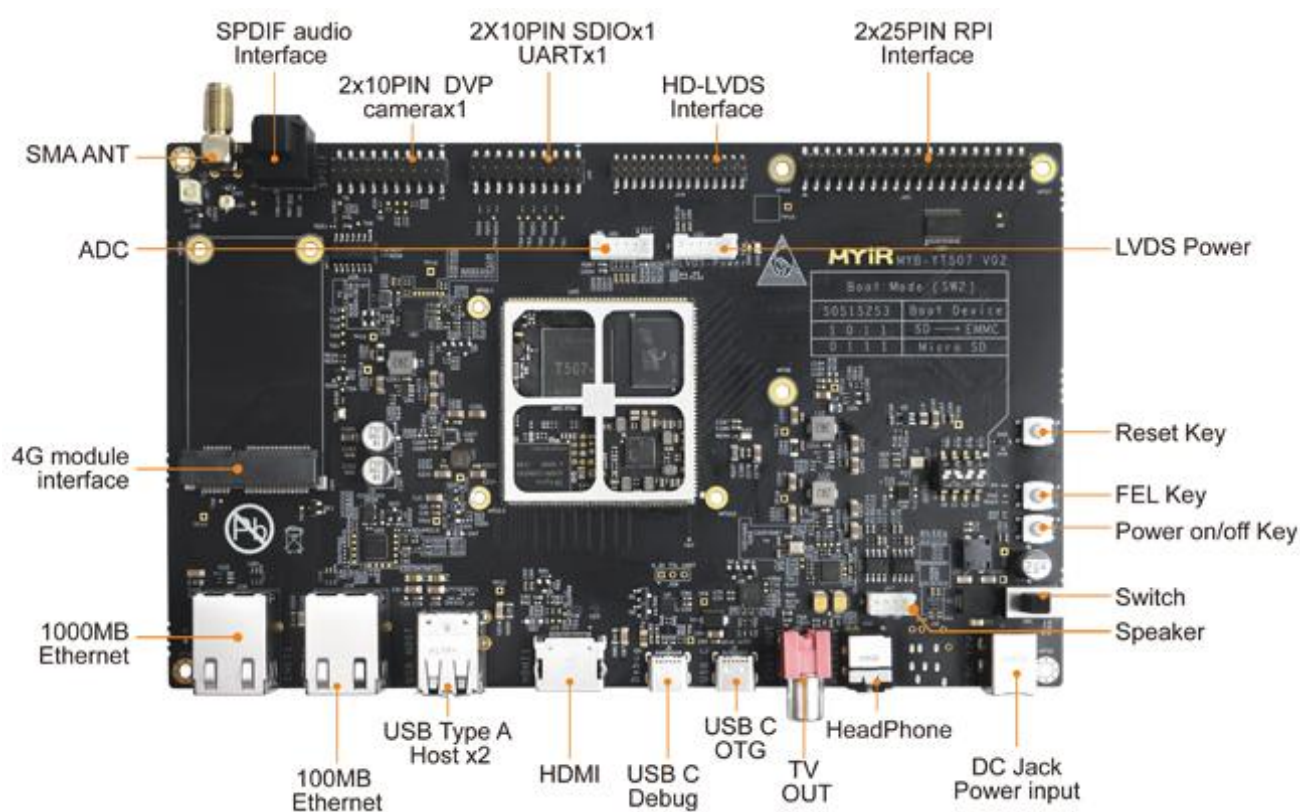

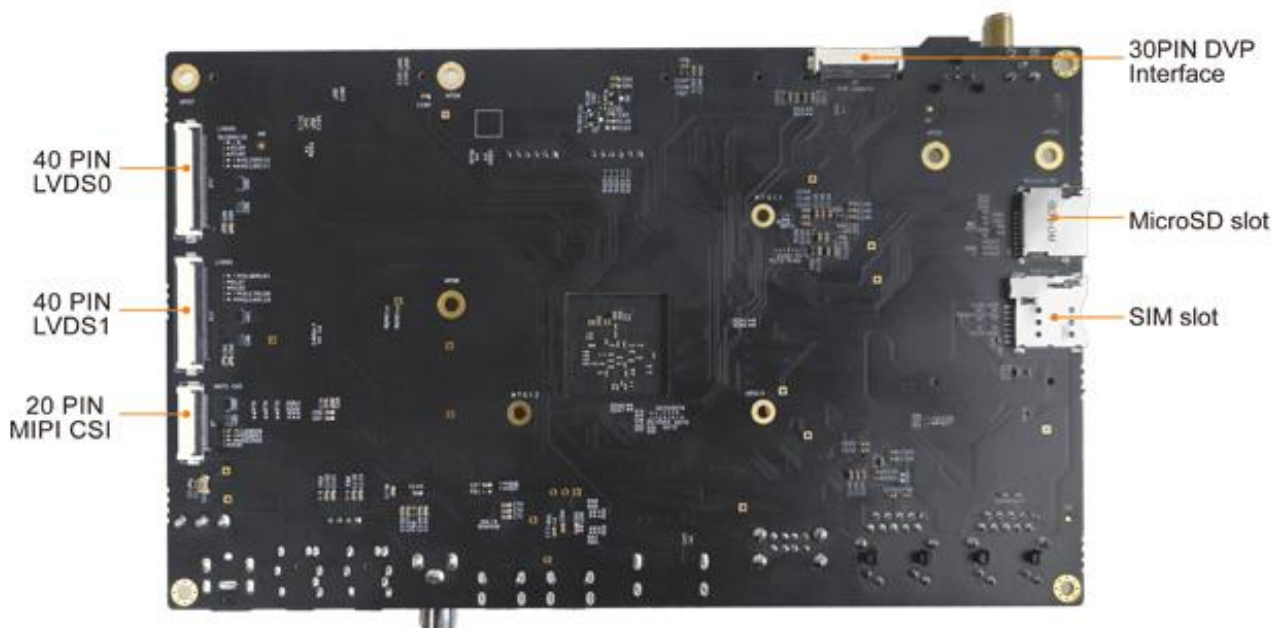*Figure 1-2 MYD-YT507H Development Board Top-view*

Figure 1-3 MYD-YT507H Development Board Bottom-view

Hardware Specification

The MYC-YT507H CPU Module populated on the MYD-YT507H Development Board is using Allwinner T507-H Microprocessor with 15 mm x 15 mm size,0.65 mm ball pitch,0.35 mm ball size, TFBGA 421balls. The chip family integrates Cortex-A53 quad-core CPU, G31 MP2 GPU, 32-bit DDR3/LPDDR3/DDR4/LPDDR4 DRAM, multi video output interfaces (RGB/2*LVDS/ HDMI/CVBS OUT), and multi video input interfaces(MIPI CSI/BT656/BT1120). The chip family supports 4K@60fps H.265 decoder, 4K@25fps H.264 encoder, DI, 3D noise reduction, SmartColor system, and keystone correction module, which provides smooth user experience and professional visual effect. Supports 4 x USB, 2 x Ethernet MAC, 6 x UART, 6 x TWI, 4 x GPADC, greatly facilitating product expansion.

Resources	Parametric Description
CPU	• Quad-core ARM Cortex™-A53@1.5Ghz
GPU	• G31 MP2 • Supports OpenGL ES 3.2/2.0/1.0, Vulkan 1.1, OpenCL 2.0
External Storage	• 32-bit DDR4/DDR3/DDR3L/LPDDR3/LPDDR4 interface, supporting maximum capacity of 4GB • SD3.0/eMMC5.0 interface • 8-bit Nand flash interface with maximum 80-bit/1KB ECC
Video Engine	**Video decoder** • H.265 MP decoder up to 4K@60fps • H.264 BL/MP/HP decoder up to 4K@30fps • VP9 decoder up to 4K@60fps • AVS2 decoder up to 4K@60fps • Multi-format 1080p@60fps video playback, including VP8, MPEG1/2 SP/MP, MPEG4 SP/ASP, • AVS+/AVS JIZHUN, VC1 SP/MP **Video encoder** • H.264 encoder up to 4K@25fps • MJPEG encoder up to 4K@15fps • JPEG encoder up to 8K x 8K resolution
Video Input	• Supports one 8-/10-/12-/16-bit digital camera(DC) interface

	• Maximum pixel clock of 148.5MHz for each DC interface • BT656, BT1120 video input for multichannel YUV • Four-lane MIPI CSI, up to lGbps per lane in HS transmission, compliant with MIPI-CSI2 V1.00 • and MIPI DPHY V1.00 • Maximum video capture resolution of 8M@30fps or 4x 1080p@25fps for MIPI CSI • Supports formats:YUV422,YUV420,RAW-8,RAW-10,RAW-12
Audio	• Two DAC channels • Supports 1 audio output interface (differential LINEOUTP/N or single-end LINEOUTL/LINEOUTR) • One Audio HUB, supporting internal mixing function • Embedded 3 I2S/PCM for connecting the external devices (I2S0 for extended audio codec, I2S2 for BT, I2S3 for digital power amplifier) • Supports Left-justified, Right-justified, Standard I2S mode, PCM mode, and TDM mode • I2S mode supports 8 channels, and 32-bit/192kbit sample rate • I2S and TDM-modes support maximum 16 channels, and 32-bit/96kbit sample rate • One OWA OUT interface, supporting 16-/20-/24-bit outputs • Integrated digital microphone, supporting maximum 8 digital PDM microphones
Display Output	• HDMI 2.0a up to 4K@60fps • TV CVBS output, supporting PAL/NTSC • LVDS interface with dual link, up to 1080p@60fps • RGB interface with DE/SYNC mode, up to 1080p@60fps
Security Engine	• Supports Full Disk Encryption • AES, DES, 3DES, and XTS encryption and decryption algorithms • MD5, SHA, and HMAC tamper proofing • RSA, ECC signature and verification algorithms • Supports 160-bit hardware pseudo random number generator(PRNG) with 175-bit seed • Supports 256-bit hardware true random number generator(TRNG) • Integrated 2K-bit EFUSE for chip ID and security application
Interfaces	• 3 x USB2.0 Host, l x USB2.0 OTG • 2 x Ethernet MAC (one 10/100 Mbps Ethernet port, one 10/100/1000 Mbps Ethernet port) • SDIO 3.0, TSC, SCR, CIR Receiver • 6 x TWI, 2 x SPI, 6 x UART • 6-ch PWM, 4-ch GPADC. 1-ch LRADC
PMIC	• Companion Allwinner Power Management IC
Packaging	• TFBGA 421balls • 15 mm x 15 mm size,0.65 mm ball pitch,0.35 mm ball size
Process Technology	• 28nm HPC

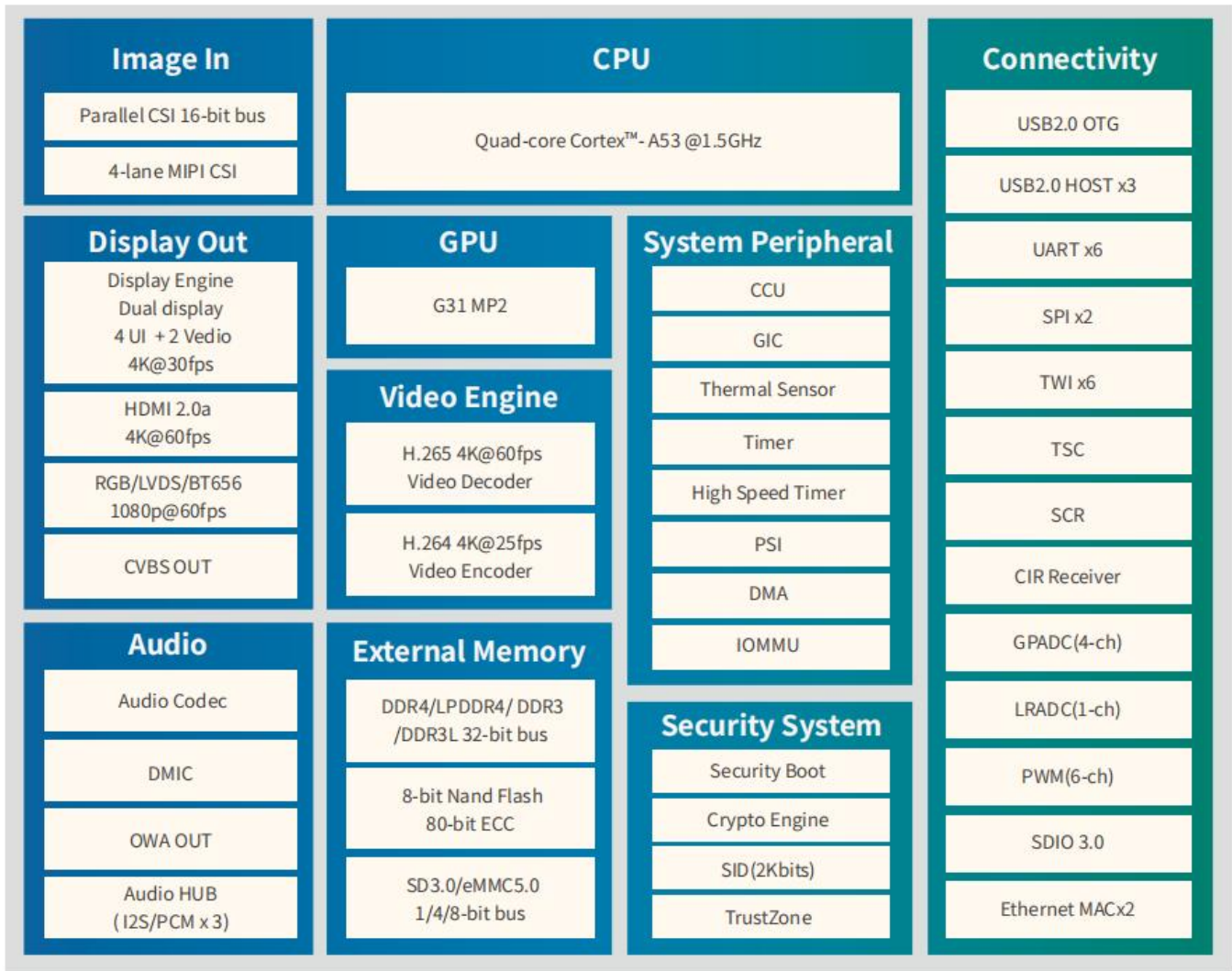*Table 1-1 Features of T507-H Processor*

Figure 1-4 ALLWINNER T507-H Processor Block Diagram

The MYD-YT507H Development Board is using MYC-YT507H CPU Module as core controller board. It takes full features of T507-H processor and the main features are characterized as below:

Mechanical Parameters

- Dimensions: 200mm x 120mm (base board), 43mm x 45mm (CPU Module)
- PCB Layers: 6-layer design (base board), 10-layer design (CPU Module)
- Power supply: +12V/2A (base board), 5V/2A (CPU Module)
- Working temperature: -40~85 Celsius (industrial grade)

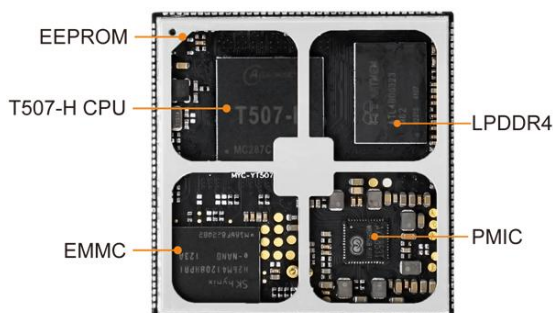**The MYD-YT507H Controller Board (MYC-YT507H CPU Module)**

Figure 1-5 MYC-YT507H CPU Module Top-view (delivered with shielding cover by default)

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Processor

- Allwinner T507H processor
- - Up to 1.5GHz Quad-core ARM Cortex-A53
- - ARM Mali-G31 MP2 GPU with support for OpenGL ES 3.2/2.0/1.0, Vulkan 1.1, OpenCL 2.0

Memory

- 1G/2G LPDDR4 (supports optional 3GB / 4GB LPDDR4)
- 8GB eMMC (supports optional 4GB, 16GB / 64GB eMMC)
- 32Kbit EEPROM

Peripherals and Signals Routed to Pins

- Power Management IC (Allwinner AXP853T)
- 1.0mm pitch 222-pin Stamp Hole Expansion Interface
- - up to 138 x GPIO
- - 1 x RGMII and 1 x RMII
- - 4 x I2C and 2 x SPI
- - 3 x USB 2.0 Host and 1 x USB 2.0 OTG
- - 1 x DVP digital camera and 1 x MIPI CSI camera
- - 2 x SDIO
- - 6 x UART
- - 4 x GPADC and 1x LRADC
- - 1 x HDMI 2.0a (supports 4K@60fps)
- - 2 x Single-channel LVDS or 1 x Dual-channel LVDS or 24-bit RGB (supports up to 1080p@60fps)
- - 1x TV CVBS output (supports PAL/NTSC)
- - 1 x JTAG
- - 3x I2S/PCM
- - 1x Audio out
- *Note: the peripheral signals brought out to the expansion interface are listed in maximum number. Some signals are reused. Please refer to the processor datasheet and the CPU Module pinout description file.*

The MYD-YT507H Development Board Base Board

- 1 x Power Jack
- 1 x Power Switch
- Serial ports
  - 1 x Debug UART (TTL, USB Type-C connector)
  - 2 x TTL serial ports (UART2, UART5)
- USB
  - 2 x USB2.0 Host port
  - 1 x USB 2.0 OTG port (Type-C)
  - 1 x Mini-PCIe interface (for 4G LTE Module)
- 1 x SIM card slot
- Ethernet
  - 1 x 10/100/1000 Mbps Ethernet interface (RJ45, ENET1)
  - 1 x 10/100 Mpbs Ethernet interface (RJ45, ENET2)
- 1 x Micro SD card slot
- Video Input
  - 1 x MIPI-CSI Interface (0.5mm pitch 24-pin FPC connector)
  - *Supports MYIR's MY-CAM003M Camera Module through J2*

- 1 x DPV Camera Interface (0.5mm pitch 30-pin FPC connector)

  Supports MYIR's MY-CAM011B Camera Module through J3

- Video Output

  - 1 x HDMI Output Interface

  - 2 x Single-channel LVDS Display interface (LVDS0 & LVDS1, 40-pin 0.5mm pitch FPC connector)

  - 1 x Dual-channel LVDS Display interface (J14, 30-pin 2.0mm pitch header connector)

  Supports MYIR's MY-LVDS070C LCD Module with Capacitive Touch Screen through the LCD interface

  - 1 x TV CVBS Display interface

- Audio

  - 1 x 3.5mm Headphone/Mic Jack

  - 1 x SPDIF Audio Output

  - 1 x Speaker

- 1 x 2.54mm 2 x 20-pin male expansion header (J25, GPIO/TWI/UART, compatible with Raspberry PI standard 40-pin extension interface)

  Supports MYIR's MY-WIREDCOM RPI Module through J25 to extend RS485 and RS232 functions

- 1 x 2.54mm 2*10-pin male expansion header (J26)

  - 1 x SDIO

  - 1 x UART

  Supports MYIR's MY-WF005S WiFi/BT Module through the J26

- 3 x Buttons (one for Reset, one for Power On/Off and one for FLASH)
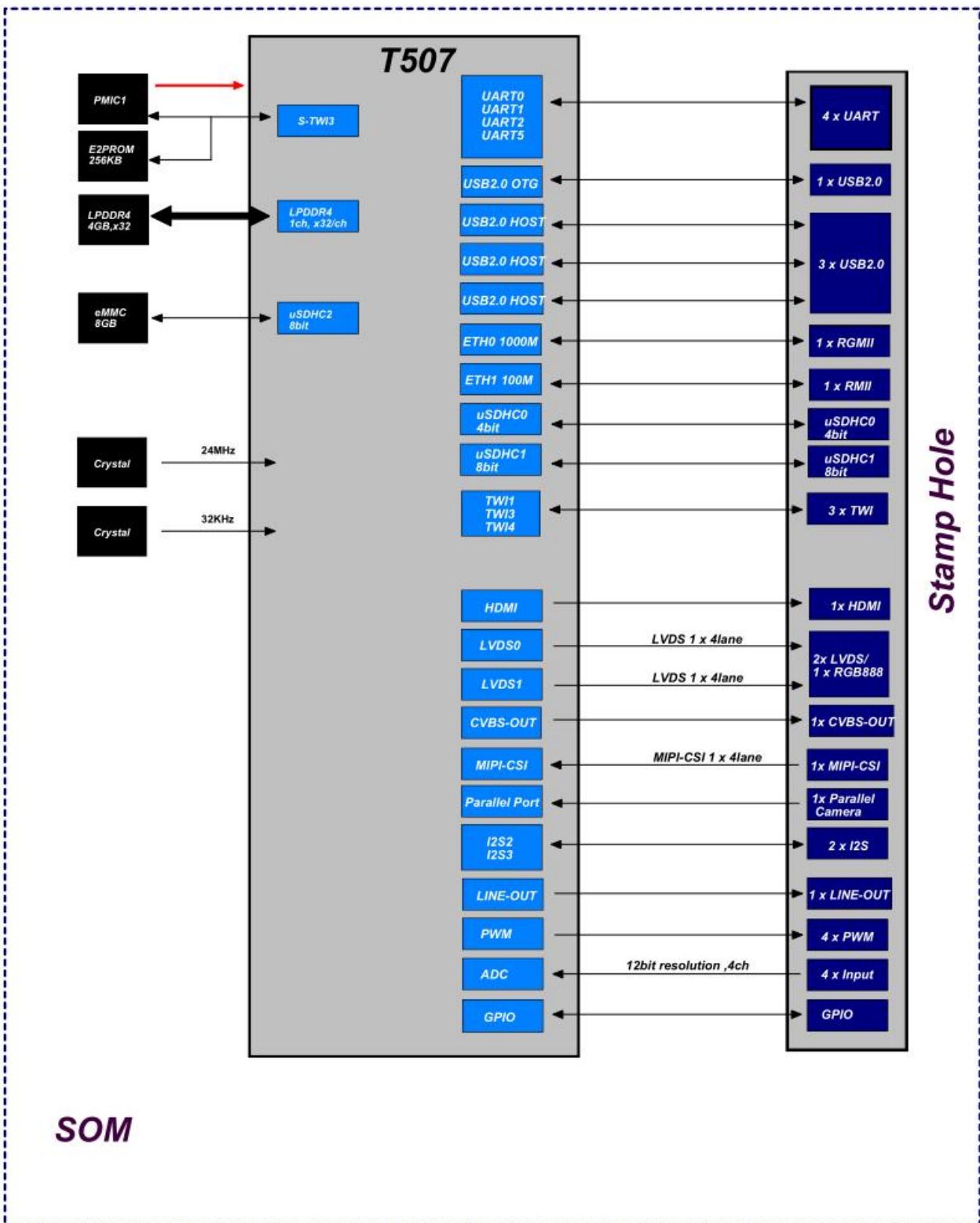
- 1 x RTC Battery Interface

Figure 1-6 MYC-YT507H CPU Module Function Block Diagram

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T507

PMIC1
E2PROM 256KB
LPDDR4 4GB,x32
eMMC 8GB
Crystal — 24MHz
Crystal — 32KHz

S-TWI3
LPDDR4 1ch, x32/ch
uSDHC2 8bit

UART0 UART1 UART2 UART5
USB2.0 OTG
USB2.0 HOST
USB2.0 HOST
USB2.0 HOST
ETH0 1000M
ETH1 100M
uSDHC0 4bit
uSDHC1 8bit
TWI1 TWI3 TWI4
HDMI
LVDS0
LVDS1
CVBS-OUT
MIPI-CSI
Parallel Port
I2S2 I2S3
LINE-OUT
PWM
ADC
GPIO

LVDS 1 x 4lane
LVDS 1 x 4lane
MIPI-CSI 1 x 4lane
12bit resolution ,4ch

Stamp Hole

4 x UART
1 x USB2.0
3 x USB2.0
1 x RGMII
1 x RMII
uSDHC0 4bit
uSDHC1 8bit
3 x TWI
1x HDMI
2x LVDS/ 1 x RGB888
1x CVBS-OUT
1x MIPI-CSI
1x Parallel Camera
2 x I2S
1 x LINE-OUT
4 x PWM
4 x Input
GPIO

SOM
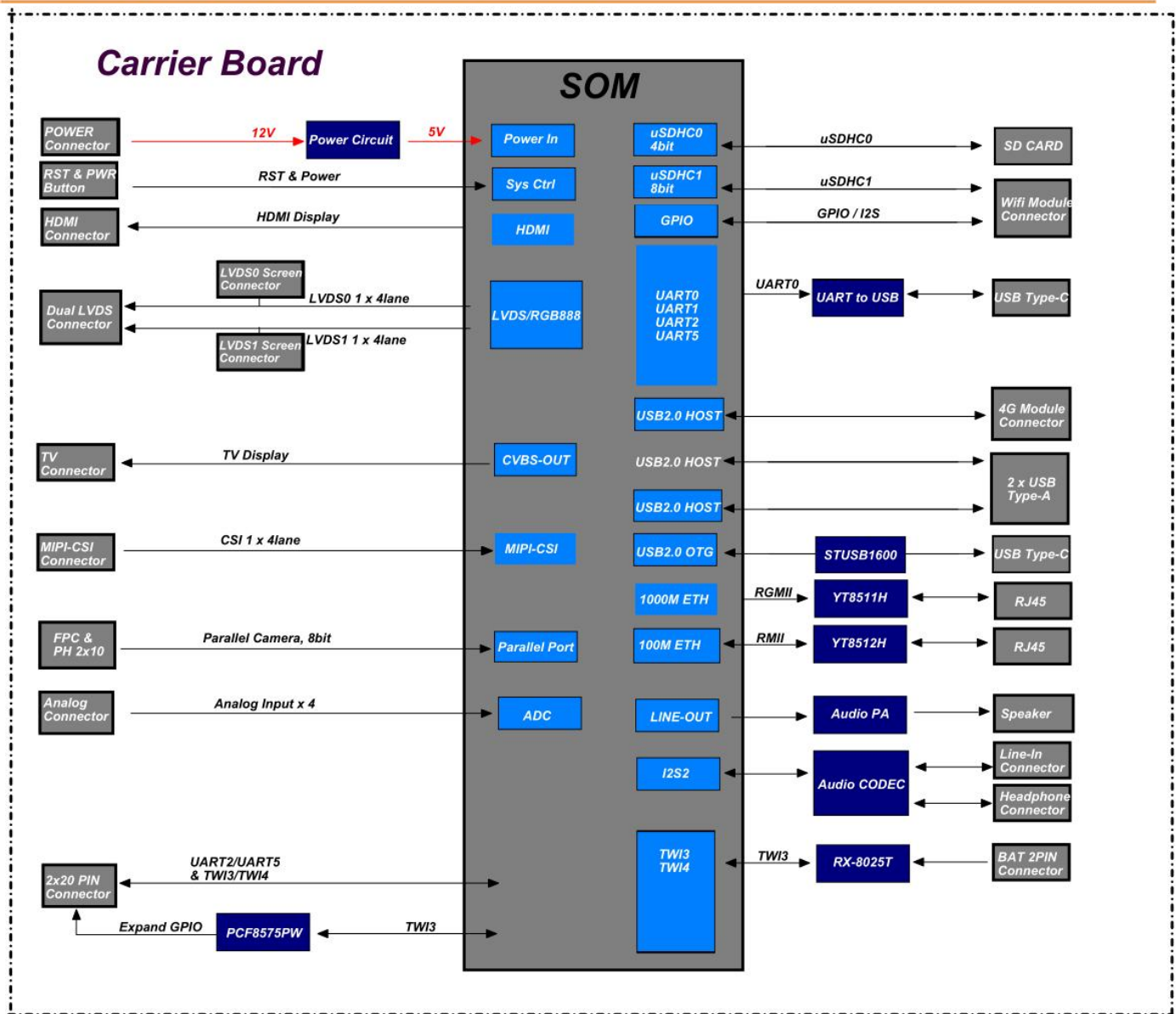
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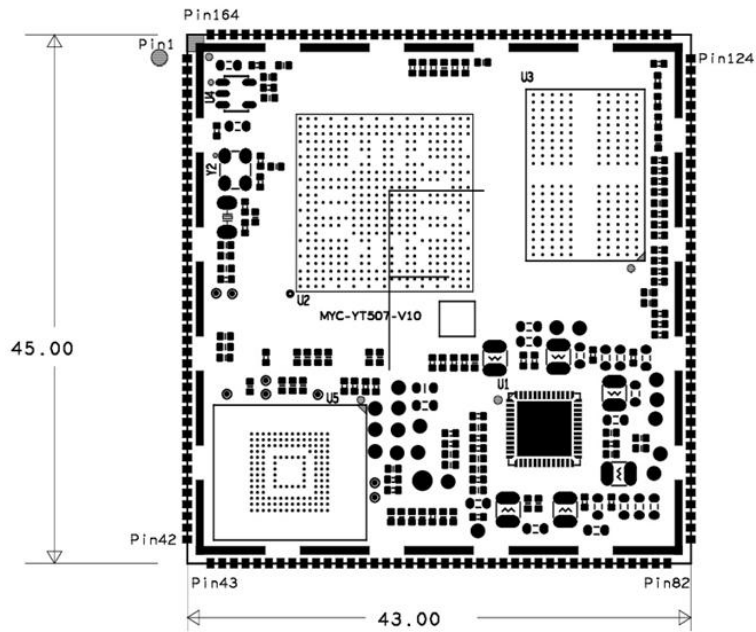*Figure 1-7 MYD-YT507H Development Board Function Block Diagram*

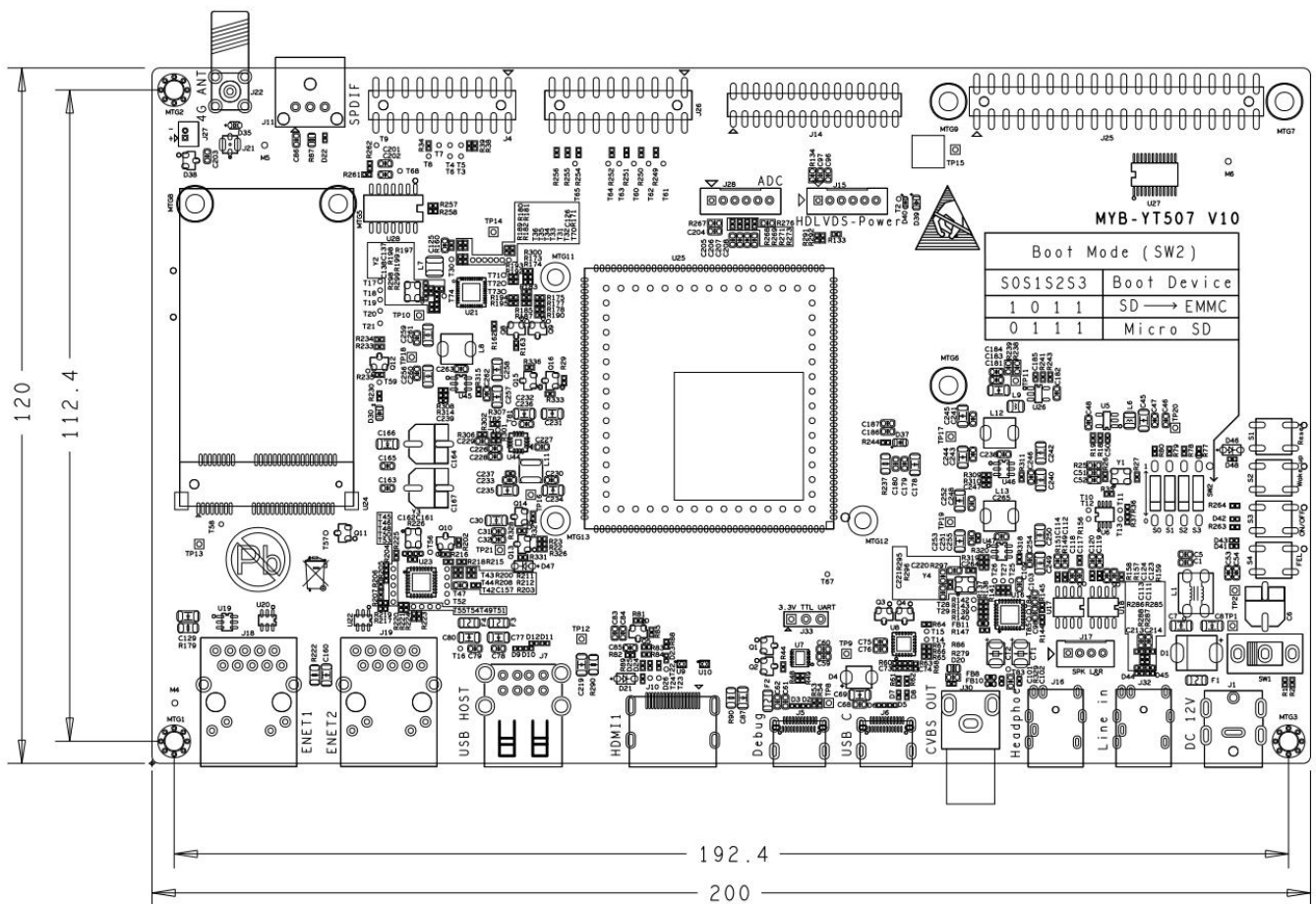*Figure 1-10 MYC-YT507H Dimensions Chart (Unit: MM)*

Figure 1-11 MYD-YT507H Base Board Dimensions Chart (Unit: MM)

Software Features

The MYC-YT507H CPU module supports Linux and comes with software packages. The kernel and many peripheral drivers are available in source code to assist clients expedite their ideas. The following are a summary of the software features:

Item	Feature	Description	Source Code
Bootloader	U-boot	Boot boot program uboot_2018	YES
Linux kernel	Linux kernel	Customized base on official kernel_4.9.170 version	YES
Device driver	PMIC	AXP858 driver	YES
	USB Host	USB Host driver	YES
	USB OTG	USB OTG driver	YES
	TWI	TWI bus driver	YES
	SPI	SPI bus driver	YES
	Ethernet	10M/100M/1000M driver	YES
	SDC	eMMC/TF card storage driver	YES
	HDMI	HDMI display driver	YES
	Singer LVDS	7-inch single-channel LVDS driver	YES
	Double LVDS	21.5 inch dual LVDS driver	YES
	CVBS OUT	CVBS display driver	YES
	Linout	audio output driver	YES
	SPDIF	SPDIF audio output driver	YES
	audio	Sgtl5000 audio driver	YES
	4G	4G driver	YES
	PWM	PWM control	YES
	GPADC	GPADC driver	YES
	LRADC	LRADC driver	YES
	RTC	real time clock driver	YES
	IO driver	Generic GPIO driver	YES
	tty	RS232/RS485/TTL driver	YES
	Touch	capacitive touch	YES
	Camera (DVP)	500W camera driver	YES
	Camera (MIPI)	500W camera driver	YES
	WiFi & BT	AP6212 driver	YES
	Watchdog	Watchdog driver	YES
File system	Ubuntu18.04	Base on ubuntu-base-18.04.5-base-arm64	YES
	myir-image-full	Base on buildroot construction zone Qt 5.12.5 file system	YES

Application Program	GPIO LED	Indicator routine	YES
	GPIO KEY	keystroke routine	YES
	NET	TCP/IP Sokect C/S routine	YES
	eeprom	Read/write eeprom routine	YES
	RTC	Real Time Clock routine	YES
	RS232	RS232 routine	YES
	RS485	RS485 routine	YES
	LCD	LCD routine	YES
	Camera	Camera display routine	YES
Compiler Tool Chain	Cross compiler	gcc-linaro-7.4.1-2019.02-x86_64_aarch64-linux-gnu	BINARY

Table 1-2 MYD-YT507H Software Features

Order Information

Product Item	Part No.	Packing List
MYD-YT507H Development Board	MYD-YT507H-8E1D-150-I	➢ One MYD-YT507H Development Board ➢ (including MYC-YT507H CPU Module) ➢ One USB TYPE-A to TYPE-C cable ➢ One 12V/2A Power adapter ➢ One DC Power jack adapter ➢ One Quick Start Guide
	MYD-YT507H-8E2D-150-I	
MYC-YT507H CPU Module	MYC-YT507H-8E1D-150-I	**Add-on Options** ➢ MYC-YT507H CPU Module ➢ MY-CAM002U USB Digital Camera Module ➢ MY-CAM011B BUS Camera Module ➢ MY-CAM003M MIPI Camera Module ➢ MY-LVDS070C 7-inch LCD Module ➢ MY-WIREDCOM RPI Module ➢ MY-WF005S WiFi/BT Module
	MYC-YT507H-8E2D-150-I	
MY-CAM002U USB Digital Camera Module	MY-CAM002U	
MY-CAM011B BUS Camera Module	MY-CAM011B	
MY-CAM003M MIPI Camera Module	MY-CAM003M	
MY-LVDS070C 7 inch LCD Module	MY-LVDS070C	
MY-WIREDCOM RPI Module (RS485/RS232)	MY-WIREDCOM	
MY-WF005S WiFi/BT Module	MY-WF005S	

MYïR™

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