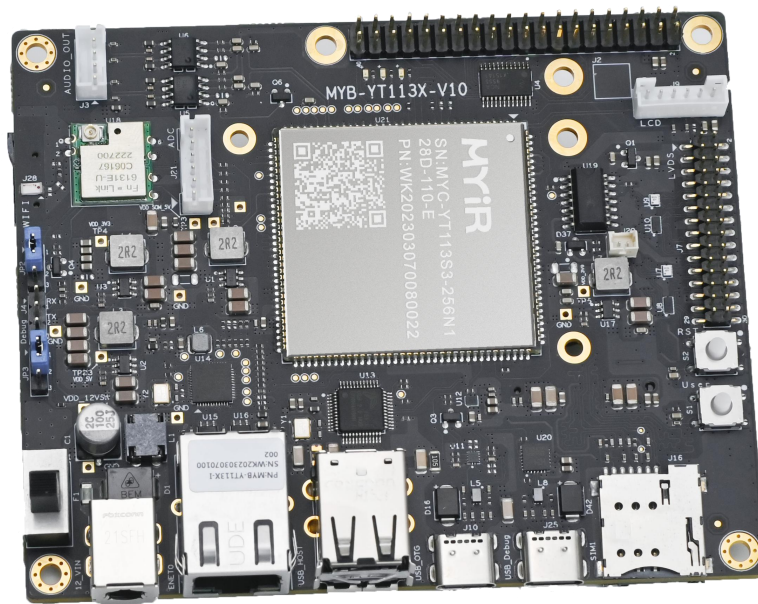MYiR 米尔电子
Make Your Idea Real

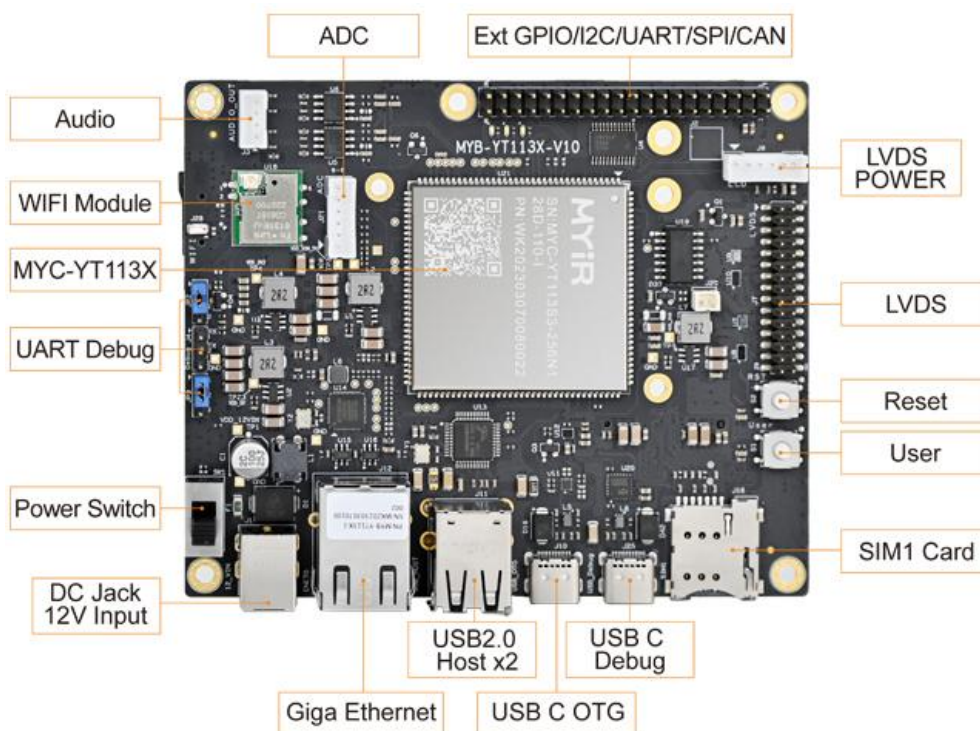# MYD-YT113X Development Board Overview

- ✓ MYC-YT113X CPU Module as Controller Board
- ✓ Up to 1.2GHz Allwinner T113-S3 Dual-core ARM Cortex-A7 MPU with 128MB DDR3 and Single-core HiFi4 DSP
- ✓ 4GB eMMC / 256MB Nand FLASH, 32KB EEPROM
- ✓ UARTs, 2 x USB 2.0 HOST, 1 x USB 2.0 OTG, 1 x CAN, 1 x Gigabit Ethernet, WiFi, 4G/5G Module Interface, Micro SD card Slot
- ✓ 1 x Single-channel LVDS , 1 x Dual-channel LVDS, 1 x Audio Output
- ✓ Supports Running Linux 5.4 OS
- ✓ Optional LCD Module and RPI Module (RS232/CAN)

The MYD-YT113X Development Board consists of a compact CPU Module MYC-YT113X and a base board to provide a complete evaluation platform for **ALLWINNER T113-S3** processors which features **dual-core Arm Cortex-A7** operating at up to 1.2GHz, with built-in 128MB DDR3, single-core HiFi4 DSP and Video CODEC Engine, targeting applications such as HMI, industrial automation, display and control terminals.

The MYC-YT113X CPU Module is populated on the MYD-YT113X base board through 1.0mm pitch 140-pin stamp-hole (Castellated-Hole) interface. It is a highly-integrated SoM which combines the T113-S3 processor, 4GB eMMC FLASH or 256MB Nand FLASH, and 32KB EEPROM. The base board has brought out rich peripherals through connectors and headers such as four UART ports, one Debug port, one Gigabit Ethernet, two USB 2.0 HOST and one USB 2.0 OTG, one Micro SD card slot, one M.2 Socket for 4G/5G LTE Module with two SIM card holders, one WiFi module, one GPIO/I2C/UART/SPI/CAN extension header, one single-channel LVDS and one dual-channel LVDS display interface, as well as audio output interface.
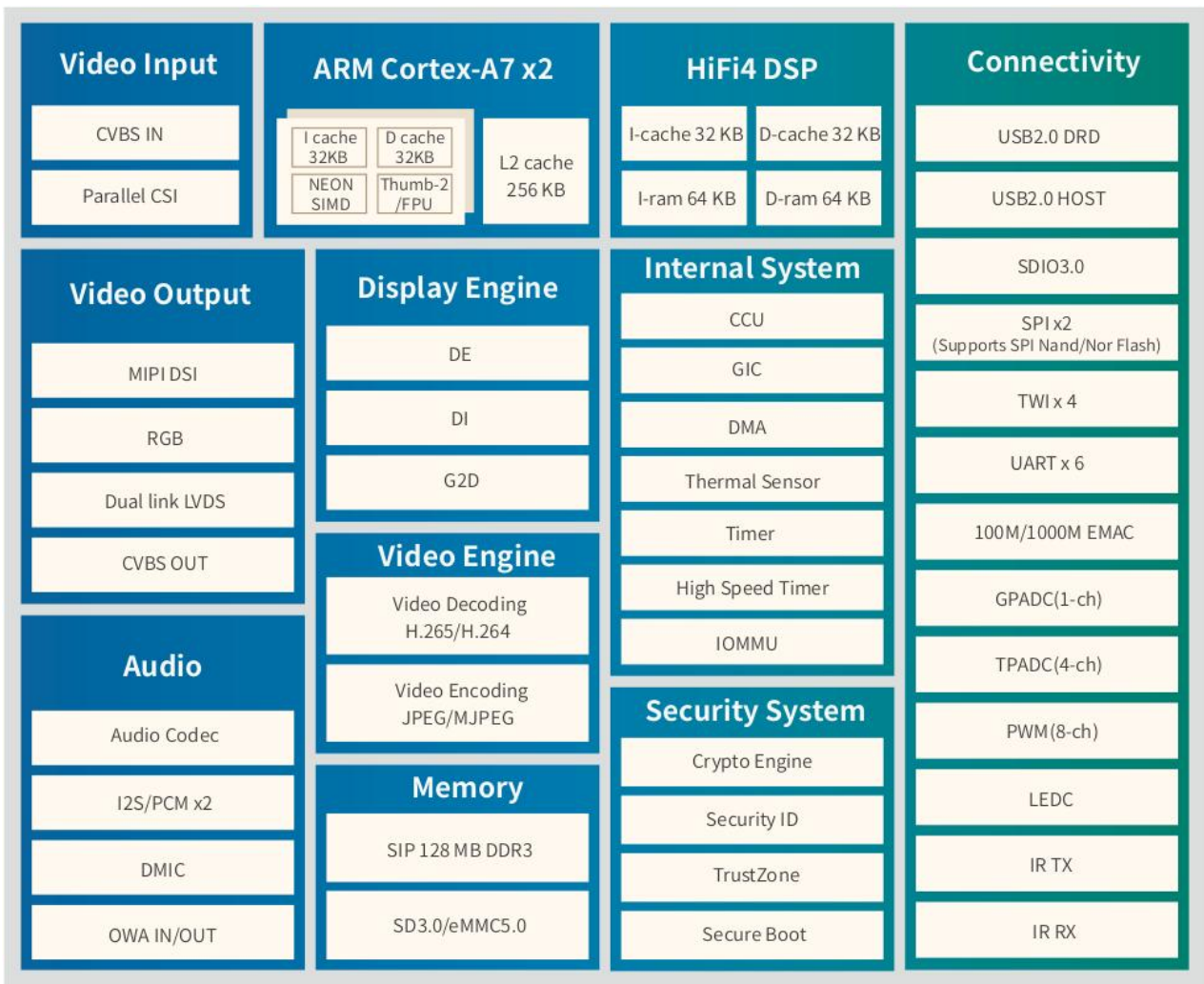
MYD-YT113X Development Board Top-view
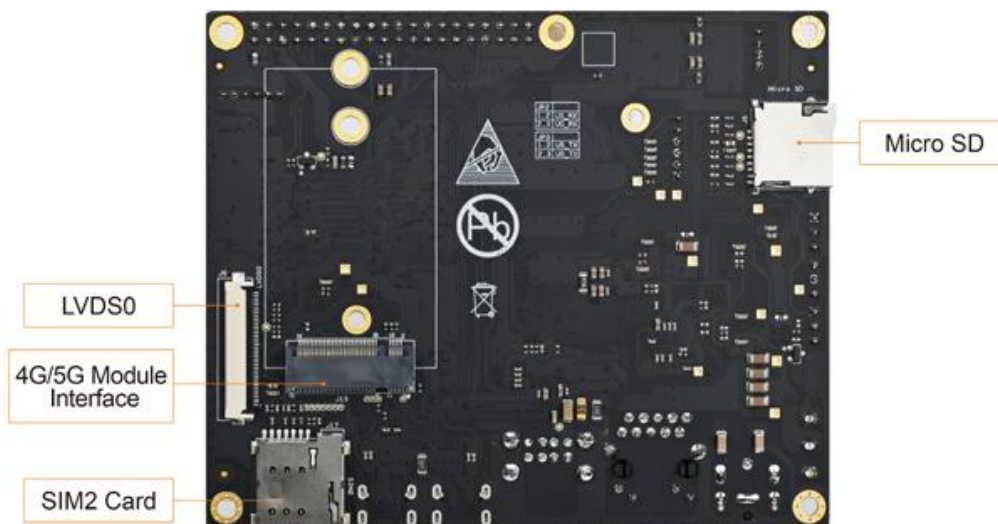
MYD-YT113X Development Board Bottom-view

The MYD-YT113X Development Board is capable of running Linux OS. MYIR provides abundant software resources including image files, kernel and driver source code, application demos and compilation tools to enable users to start their development rapidly and easily. It is delivered with one Quick Start Guide, one USB to TTL serial cable and one 12V/2A power adapter. MYIR also offers MY-WIREDCOM RPI Module (RS232/CAN) and MY-LVDS070C 7 inch LCD Module as add-on options for the board.

Hardware Specification

The MYC-YT113X CPU Module populated on the MYD-YT113X Development Board is using 14 x 14 mm, eLQFP128 package Allwinner T113-S3 processor which is designed for the automotive and industrial control products. It integrates dual-core Cortex-A7 CPU and single-core HiFi4 DSP to provide the high efficient computing power. T113-S3 supports full format decoding such as H.265, H.264, MPEG-1/2/4, JPEG, VC1, and so on. The independent hardware encoder can encode in JPEG or MJPEG. Integrated multi ADCs/DACs and I2S/PCM/DMIC/OWA audio interfaces can provide the perfect voice interaction solution. T113-S3 comes with extensive connectivity to facilitate product expansion, such as CAN, USB, SDIO, EMAC, TWI, UART, SPI, PWM, GPADC, IR TX&RX, and so on.


Allwinner T113-S3 Block Diagram

| Features	Description
CPU	● Dual-core ARM Cortex-A7 ● 32KB L1 I-cache + 32KB L1 D-cache per core, and 256KB L2 cache
DSP	● Single-core HiFi4 ● 32KB I-cache + 32KB D-cache
Memory	● SIP 128MB DDR3 ● SD 3.0/eMMC 5.1, SPI Nor/NAND Flash
Video Engine	**Video decoding** ● H.265 up to 1080p@60fps ● H.264 up to 1080p@60fps ● H.263, MPEG-1/2/4, JPEG, Xvid, Sorenson Spark, up to 1080p@60fps **Video encoding** ● JPEG/MJPEG up to 1080p@60fps ● Supports input picture scaler up/down
Display Engine	● Allwinner SmartColor2.0 post processing for an excellent display experience ● Supports de-interlace (DI) up to 1080p@60fps ● Supports G2D hardware accelerator including rotate, mixer, lbc decompression
Video OUT	● CVBS OUT interface, supporting NTSC and PAL format ● RGB LCD output interface up to 1920 x 1080@60fps ● Dual link LVDS interface up to 1920 x 1080@60fps ● 4-lane MIPI DSI interface up to 1920 x 1080@60fps
Video IN	● 8-bit parallel CSI interface ● CVBS IN interface, supporting NTSC and PAL format
Audio	● 2 DACs and 3 ADCs ● Analog audio interfaces: MICIN3P/N,LINEINL/R, FMINL/R,HPOUTL/R ● Digital audio interfaces: 12S/PCM, DMIC, OWA
Security System	● AES, DES, 3DES encryption and decryption algorithms ● RSA signature verification algorithm ● MD5/SHA and HMAC tamper proofing ● Hardware random number generator ● Integrated 2Kbits OTP storage space
Connectivity	● USB2.0 0TG,USB2.0 Host ● SDIO 3.0,SPI x 2,UART x 6, TWI x 4, CAN x 2 ● PWM (8-ch),GPADC(1-ch),TPADC(4-ch),IR TX&RX ● 10/100/1000M EMAC with RMII and RGMII interfaces
Package	● eOFP128, 14 mm x 14 mm

Features of T113-S3 Processor
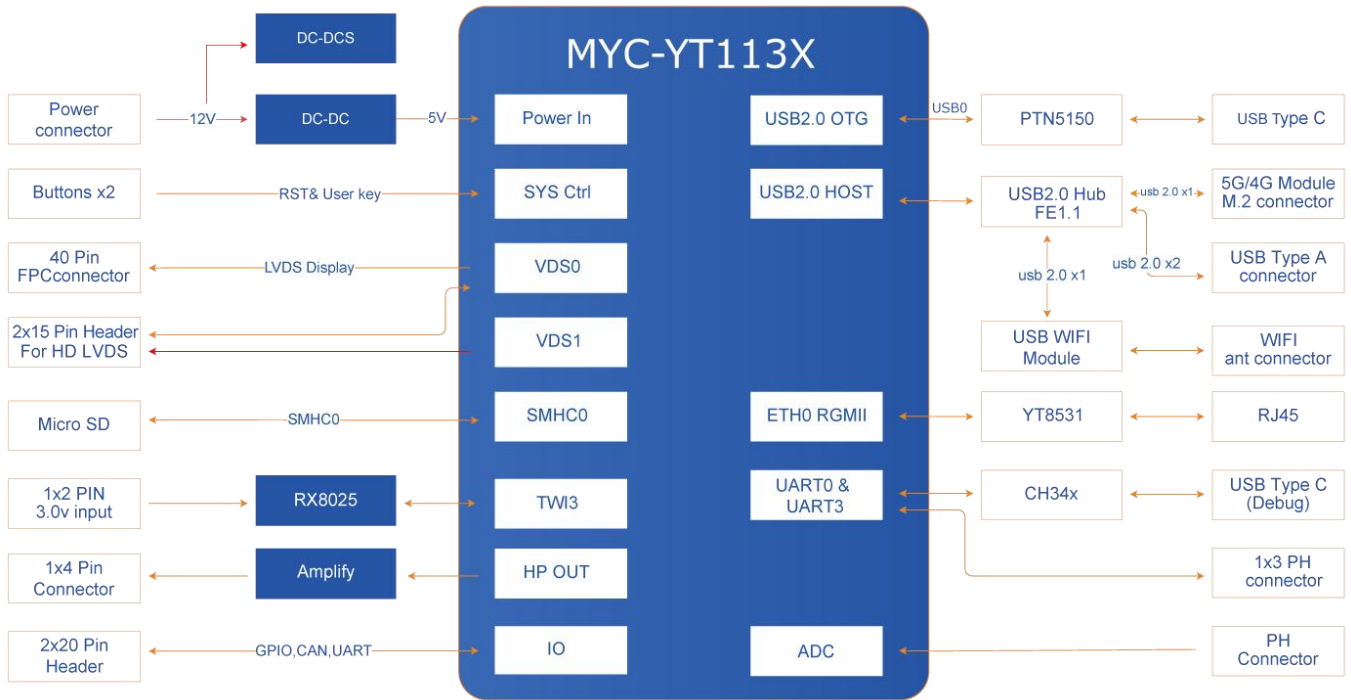
MYD-YT113X Development Board Function Block Diagram
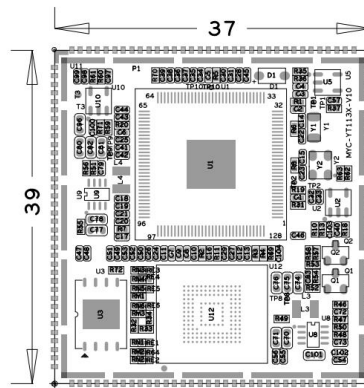
MYC-YT113X Dimensions Chart (Unit: mm)
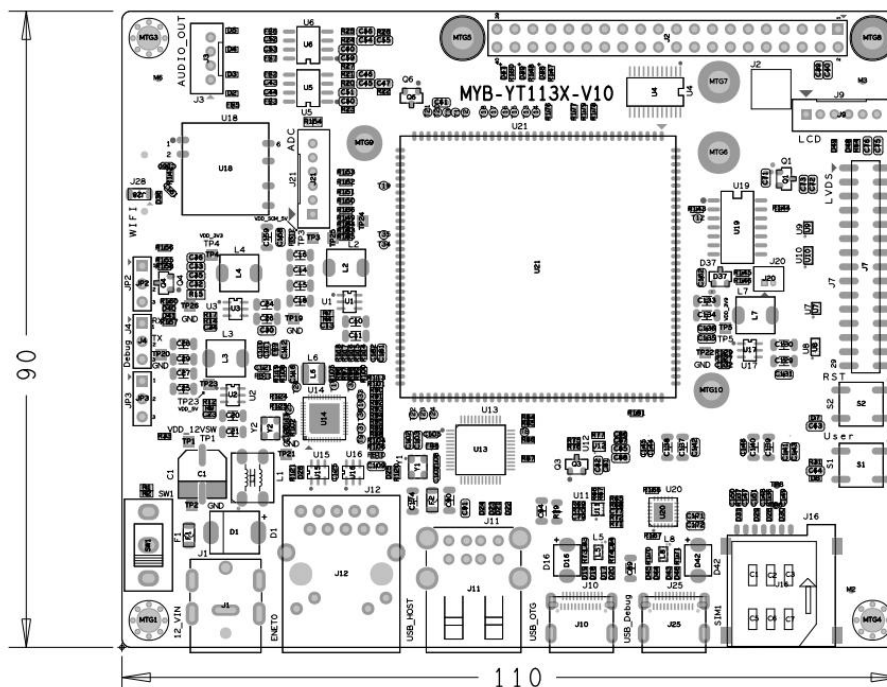
*MYD-YT113X Dimensions Chart (Unit: mm)*

The <u>MYD-YT113X Development Board</u> is using <u>MYC-YT113X CPU Module</u> as core controller board. It takes full features of T113-S3 processor and the main features are characterized as below:

Mechanical Parameters
- Dimensions: 110mm x 90mm (base board), 37mm x 39mm (CPU Module)
- PCB Layers: : 4-layer design (base board), 6-layer design (CPU Module)
- Power supply: +12V/2A (base board), 5V/1A (CPU Module)
- Working temperature: -40~85 Celsius (industrial grade)
  (WiFi Module: -20~70 Celsius)

The MYD-YT113X Controller Board (<u>MYC-YT113X CPU Module</u>)
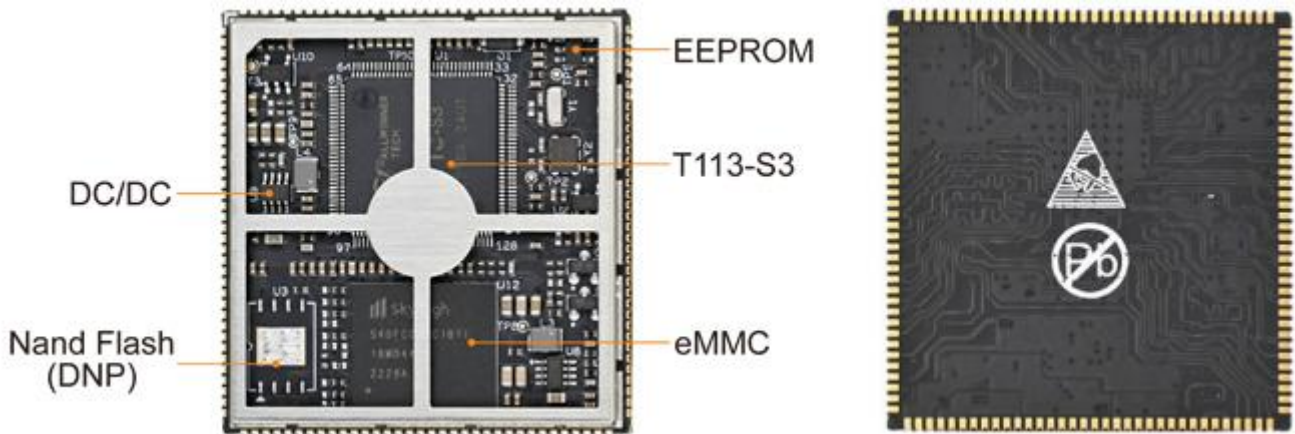
MYC-YT113X CPU Module (Top-view and Bottom-view)

Processor
- ALLWINNER T113-S3 Processor
  - Up to 1.2GHz Dual-core Arm Cortex-A7 with built-in 128MB DDR3
  - Single-core HiFi4 DSP
  - Supports H.265/H.264 video decoding up to 1080p@60fps and JPEG/MJPEG video encoding up to 1080p@60fps

External Memory
- 4GB eMMC / 256MB Nand FLASH
- 32KB EEPROM

Peripherals and Signals Routed to Pins
- 1.0mm pitch 140-pin Stamp Hole Expansion Interface
  - 1 x RGMII/RMII
  - 2 x USB2.0
  - 6 x UART
  - 2 x CAN
  - 4 x TWI
  - 2 x SPI
  - 1 x GPADC and 4 x TRADC
  - 1 x MIPI DSI
  - 1 x Single-channel LVDS and 1 x Dual-channel LVDS or 24-bit RGB (supports up to 1080p@60fps)
  - 1x RGB

- 1 x Parallel CSI

- 2 x I2S

- Up to 59 GPIOs

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-YG2LX Development Board Base Board

- 1 x Power Switch
- Serial ports
  - 1 x Debug UART (TTL)
  - 4 x TTL serial ports
- USB
  - 2 x USB2.0 Host ports (Type-A)
  - 1 x USB 2.0 OTG port (Type-C)
  - 1 x USB based WiFi Module
  - 1 x USB based M.2 socket for 4G/5G LTE Module
- 2 x SIM card slots
- Ethernet
  - 1 x 10/100/1000 Mbps Ethernet interface (RJ45)
- 1 x Micro SD card slot
- Display Interface
  - 1 x Single-channel LVDS interface
  Supports MYIR's MY-LVDS070C LCD Module with Capacitive Touch Screen through the LCD interface
  - 1 x Dual-channel LVDS interface
- 1 x Audio output port
- 1 x 2.54mm 2 x 20-pin male expansion header
  (GPIO/I2C/UART/SPI/CAN, compatible with Raspberry PI standard 40-pin extension interface)
  Supports MYIR's MY-WIREDCOM RPI Module to extend CAN / RS232 functions
- 2 x Buttons (one for Reset and one for User)

Software Features

The [MYD-YT113X Development Board](link) supports Linux OS and comes with complete software package. The kernel and many peripheral drivers are available in source code to assist clients to expedite their development. The following are a summary of the software features:

Item	Feature	Description	Source Code
Bootloader	U-boot	Boot boot program uboot_2018.05	YES
Linux kernel	Linux kernel	Customized base on official kernel_5.4.61 version	YES
Device driver	USB Host	USB Host driver	YES
	USB OTG	USB OTG driver	YES
	I2C	I2C bus driver	YES
	SPI	SPI bus driver	YES
	Ethernet	YT8531SH driver	YES
	SDHI	EMMC/SD card storage driver	YES
	LVDS	LCD driver	YES
	4G/5G	4G/5G driver	YES
	PWM	PWM control driver	YES
	ADC	ADC 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
	RTC	RTC driver	YES
	GPIO	Universal GPIO driver	YES
	UART	RS232/TTL driver	YES
	CAN	CAN driver	YES
	WIFI	FG6188EUFX-05 driver	YES
File system	myir-image-core	Image built with Buildroot, excluding GUI interface	YES
	myir-image-full	A fully functional image built with Buildroot	YES

MYD-YT113X Software Features

Order Information

Product Item	Part No.	Packing List
MYD-YT113X Development Board	MYD-YT113S3-256N128D-110-I	✓ One MYD-YT113X Development Board (including MYC-YT113X CPU Module) ✓ One USB to UART Debug cable ✓ One 12V/2A Power adapter ✓ One DC Power jack adapter ✓ One Quick Start Guide
	MYD-YT113S3-4E128D-110-I	
MYC-YT113X CPU Module	MYC-YT113S3-256N128D-110-I	✓ One MYC-YT113X CPU Module
	MYC-YT113S3-4E128D-110-I	
MY-LVDS070C 7-inch LCD Module	MY-LVDS070C	**Add-on Options** MY-LVDS070C 7-inch LCD Module MY-WIREDCOM Module
MY-WIREDCOM RPI Module	MY-WIREDCOM	

Note:

1. One MYD-YT113X Development Board includes one CPU module MYC-YT113X mounted on the base board. If you need more CPU module, you can order extra ones.

2. Discounts are available for bulk orders.

3. We provide OEM/ODM services to reduce time and save cost for customers.

MYIR Tech Limited

Headquarter Address: Room 04, 6th Floor, Building No.2, Fada Road, Yunli Smart Park, Bantian, Longgang District, Shenzhen, Guangdong, China 518129

Factory Address: Room 201, Block C, Shengjianli Industrial Park, Dafu Industrial Zone, Guanlan, Longhua District, Shenzhen, 518110, China

Website: www.myirtech.com
Email: sales@myirtech.com
Tel: +86-755-22984836

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