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BM4Y-PIX
OpiBerry Embedded ARM Cortex-A72
Hardware Guide

[image1]

BM4Y-PIX OpiBerry Embedded ARM
  Compact. Low Power. Affordable
  High-performance expandable
  Embedded Linux, Linux/OpenWRT, FreeRTOS, RT-Thread

 | Version: 0.1 2020 Nov.

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Operation is subject to the following two conditions:
1. This device may not cause interference and
2. This device must accept any interference. Including interference that may cause undesired operation of the device.

Safety information

ATTENTION: Before Connecting the device to DC power input, make sure the DC power source voltage is stable.

ATTENTION: This product is intended to be mounted to a well-grounded mounting surface, such as a metal panel.

This Metal surface can be very hot when operating in high temperature. To avoid injure, please do not touch the metal surface.

Document Amendment History

Revision	Date	Remark
V 0.1	2020 Nov.	Initial Doc

BM4Y-PIX Hardware Guide

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1. Introduction

BM4Y-PIX based on ARM Cortex-A72, is a computer board with highly integrated and low power consumption. BM4Y-PIX provides an ideal building block that easily integrates with a wide range of target markets, such as industrial control, automation, IoT mobile gateway, kiosk, digital signage and many other dedicated applications.

1.1 Features

* Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
* 2GB, 4GB or 8GB LPDDR4-3200 SDRAM (depending on model)
* 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless, Bluetooth 5.0, BLE
* 1x Gigabit Ethernet
* 2x USB 3.0 ports; 2x USB 2.0 ports.
* Raspberry Pi standard 40 pin GPIO header (fully backwards compatible with previous boards)
* 2× Micro-HDMI ports (up to 4kp60 supported)
* 2-lane MIPI DSI display port

* 2-lane MIPI CSI camera port
* 4-pole stereo audio and composite video port
* H.265 (4kp60 decode), H264 (1080p60 decode, 1080p30 encode)
* OpenGL ES 3.0 graphics
* Micro-SD card slot for loading operating system and data storage
* 5V DC via USB-C connector (minimum 3A*)
* 5V DC via GPIO header (minimum 3A*)
* Power over Ethernet (PoE) enabled (requires separate PoE HAT)
* Operating temperature: 0 – 50 degrees C ambient
* OS Supported: Windows IoT / Linux / OpenWRT / FreeRTOS / RT-Thread

1.2 Specifications (Hardware)

CPU / Memory
• CPU: Broadcom BCM2711 ARM SoC @ 1.5GHz
• SDRAM: 2GB, 4GB or 8GB LPDDR4-3200
• Flash: 32GB / 16GB SSD
• DataFlash: Micro-SD for data storage & backup

Network Interface
• Type: 1x Gigabit Ethernet
• Connector Type: RJ45
• Wireless, Bluetooth BLE

USB 3.0 / USB 2.0 Host Interface
• 2× USB 2.0 supports 480Mb/s max
• 2× USB 3.0 supports 5 Gbit/s max;
• 1 port being used

SD Slot
• 1x Micro-SD socket, support up 128G
• SD 2.0 compliant, supports SDHC

Optional TTY Serial Ports
• RS-232 or RS-485, software select
• RS-232 Signals: TX, RX, RTC, CTS
• RS-485 Signals: Data+, Data-
• RS-485 Automatic Flow Control: Yes

Optional TTY Serial Port Parameters
• Baud Rate: up to 921.6Kbps
• Parity: None, Even, Odd, Mark, Space
• Data Bits: 5, 6, 7, 8
• Stop Bits: 1, 1.5, 2
• Flow Control: RTS/CTS, XON/XOFF, None

Optional Console / Debug Ports
?• Support USB console port
?• Serial console port

Power Requirement
• Input Voltage: 110~240VAC to 5VDC adapter
• Typical Consumption: 2.5 Amp @ 5VDC

?General
- Real-time clock(RTC): Yes
- Buzzer: Yes
- Watchdog: Yes
- Dimensions (W x H x D): 78 x 108 x 24mm (3.0x4.25x0.94in)
- Weight: 324g (0.71lb)
- Operating Temperature: 0~70°C (32~158°F)
- Regulation: CE Class A, FCC Class A
- Installation: Optional Wall mounting, DIN-rail mounting

1.3 Specifications (Linux Software)

Operation Systems
- Linux OS
- Supports bootup from SSD or SD card
- Support Backup/Restore from SD card/USB
- Boot Loader : Pi Bootloader
- File System : ETX4

Software Development
- Toolchain: gcc + glibc/uclibc/musl
- Supports remote C/C++ compilation

Package Management
- Package repository: Opiware self-
maintained repository
- Command: Standard apt, apt-get

Popular Packages
- Web server: Apache/Lighttpd
- Database: MySQL/SQLite3
- Scripting: PHP/Node.JS/Node-RED
- Text editor: vim/nano/sed
- Administration: OpiWebUI

Software Documentation and Utility
Please refer to “BM4Y-PIX” repository for software documentation and utility at following: http://www.github.com/Opiware/

1.4 Packing List
- BM4Y-PIX: OpiBerry Embedded ARM Cortex-A72 with 2GB, 4GB or 8GB LPDDR4-3200 SDRAM, and 32GB / 16GB SSD Flash

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1.5 Optional Accessory
 PART-NUM3: DIN RAIL Mounting Kit
 PART-NUM4: 110~240VAC to 12VDC 1A Power Adaptor

2. Layout

2.1 Connector & LED Indicator
System Ready LED
Giga LAN LED
LAN LED
Serial Port LED
9-48 VDC Power
USB Console
10/100Mbps Ethernet
Port
USB2.0
Gigabit Ethernet Port
RS-485 / RS-232
Ports

2.2 Dimension
Unit: mm

3. Pin Assignment and Definitions

3.1 LED Indicators
The LED provides the BM4Y-PIX operation information. The LED status is described as follow:
 “Ready” (Ready LED indicator): Ready LED will turn on in green color while power is properly supplied. After system is ready for operation, Ready LED will keep in solid orange color and a beep will be heard
 “GLAN” & “LAN” (Network LED indicator): Link and Activity LED will turn ON when the Ethernet cable is connected. When there is network data traffic, this LED will flash.
 “P1 ~ P4” (Serial Port LED indicator): These eight dual color LEDs indicate the data traffic at the serial ports. When RXD line is high then Green light is ON and when TXD line is high, Yellow light is ON.
System Ready LED
Giga LAN LED
LAN LED
P1 ~ P4
(Serial Port LED)

3.2 Serial Port
The BM4Y-PIX provide total four RS-485 / RS-232 ports that each port can be configured by software.
RS-485 supports automatic direction control (by hardware).
The pin assignment is shown as following table.
Pin No. RS-232 RS-485
1 DSR -
2 RTS DATA+
3 GND GND
4 TXD DATA-
5 RXD --

6 DCD -
7 CTS -
8 DTR -
Enable/Disable Termination resistor for RS-485
The BM4Y-PIX equips on-board 120Ohm termination resistor for each RS-485 port. Default setting is disable termination resistor. In order to enable termination resistor,
please remove the top cover of the BM4Y-PIX, and the adjust the associated jumper to short position1 - 2, shown below:
RS-485 Port P1 P2 P3 P4
Jumper No. J2 J3 J4 J5
Termination Resistor Disabled (default)
Termination Resistor Enabled
1 2 3
1 2 3
RS-485 / RS-232
Ports

3.3 Power Connector
Connecting +9 ~ +48VDC power line to the Power in terminal block. In the meantime, Ready LED will turn on in green color while power is properly supplied.
After system is ready for operation, Ready LED will keep in solid orange color and a
beep will be heard

3.4 Ethernet LAN Port
The Ethernet Port use RJ45 connector for both 10/100LAN port and GigaLAN port.
Pin definition of 10/100LAN connector.
PIN Signal
1 ETx +
2 ETx -
3 ERx +
6 ERx -
Pin definition of GigaLAN port
PIN Signal
1 TP0 +
2 TP0 -
3 TP1 +
6 TP1 -
4 TP2 +
5 TP2 -
7 TP3 +
8 TP3 -

3.5 Console Port
There are two serial console ports for use:
• Micro-USB connector which is USB client acts as serial console port.
• Debug Console: There is a 4-pin wafer box header (JP3) inside the box.
Pin assignment is: RX, TX, +3.3V, GND.
Therefore, you need to open the upper metal case and prepare or purchase a

serial console cable to use the serial console port.
Or, it can be purchased “Console Cable” from Opiware, P/N is CB-PHDF9-050.

3.6 USB Port
Two type-A USB 2.0 ports are built for operation.
1 2 3 4
RX
TX
+3.3V
GND

3.7 SD card socket
There is a SD card socket inside as data storage. It can be accessed by opening top cover.
SD Card
Socket