Matrix-702

Linux-Ready Cortex-A5 Industrial IoT Gateway

Hardware Guide

Version: 1.1

2020 Dec.

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FCC AND IC INFORMATION:

This Class A digital apparatus complies with Part 15 of the FCC rules and with Canadian ICES-003

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.

Document Amendment History

Revision	Date	Remark
V 1.0	2020 May.	Initial
V 1.1	2020 Dec.	Kernel version updated

Table of Contents

1. Introduction

Matrix-702 based on ARM Cortex-A5, is a Linux-ready IoT gateway with highly integrated and low power consumption and wide-range Temperature operating. Matrix-702 provides a reliable IoT gateway as a data transmission from wired to wireless network that easily integrates with a wide range of target markets, such as industrial control, automation, mobile gateway and other applications.

1.1 Features

- ATMEL ATSAMA5D35 536MHz Cortex-A5 Processor
- Linux Kernel 5.4.x and File System
- Support Toolchain: gcc 9.3.0 + glibc 2.31
- 512MB LPDDR2 SDRAM
- 16GB eMMC Flash and 8MB DataFlash for system backup
- One Gigabit and one 10/100Mbps Ethernet port
- One miniPCIe slot
- One micro-SIM card socket reserved
- Two SMA-type Antenna holes reserved
- One microSD socket
- +9 to +48VDC Power input
- Ultra-low power consumption, less than 1.5Watts
- Wall-mounting, Optional DIN RAIL mounting adaptor

1.2 Specifications (Hardware)

CPU / Memory

- CPU: ATMEL ATSAMA5D35 536MHz w/MMU
- SDRAM: 512MB, LPDDR2
- Flash: 16GB, eMMC
- DataFlash: 8MB, for system backup

Network Interface

- Type: 1 x Gigabit and 1 x 10/100Mbps Ethernet
- Connector Type: RJ45

Console / Debug Ports

- Serial console port (inside the box)

SD Slot

• SD 2.0 compliant, supports SDHC

• 1 x microSD socket (inside the box)

Expansion

• 1 x miniPCIe Full-size socket

• 1 x micro-SIM card socket reserved (inside the box)

• 2 x SMA-type Antenna holes reserved

Power Requirement

• Input Voltage: +9~+48VDC (terminal block or DC-Jack)

• Typical Power Consumption: 12VDC@120mA

General

• Real-time Clock (RTC): Yes

• Buzzer: Yes

• Watchdog: Yes

• Dimensions (W x L x H): 89 x 109.6 x 30mm (3.5 x 4.7 x 1.18in)

• Weight: 330g (0.72lb)

• Operating Temperature: 0~70°C (32~158°F)

• Regulation: CE Class A, FCC Class A

• Installation: Wall mounting, DIN-rail mounting (with optional kit)

1.3 Specifications (Software)

Operation System

• Linux kernel 5.4.x

• Supports bootup from eMMC or SD card

• Support Backup/Restore from SD card or USB device

• Boot Loader: Barebox

• File System: EXT4

Software Development

• Toolchain: gcc 9.3.0 + glibc 2.31

• Supports in-place C/C++ code compilation

Package Management

• Package repository: Artila self-maintained repository

• Command: Using standard apt-get command

Popular Packages

- Web server: Apache/Nginx/Lighttpd

- Database: MySQL/SQLite3/PostgreSQL

- Script Language: PHP/Python/Perl/NodeJS

- Text editor: vim/nano/sed

- Administration: Webmin

Software Operating & Utility

Please refer to "M-A5D35" system on module information for software operating & utility at following: http://www.artila.com/download/A5D35/Linux/

1.4 Packing List

- **Matrix-702**: Linux-ready Cortex-A5 536MHz Industrial IoT Gateway
  with 512MB SDRAM, 16GB eMMC Flash

1.5 Optional Accessory

- **DK-35A** (36-DK35A-000): DIN RAIL Mounting Kit
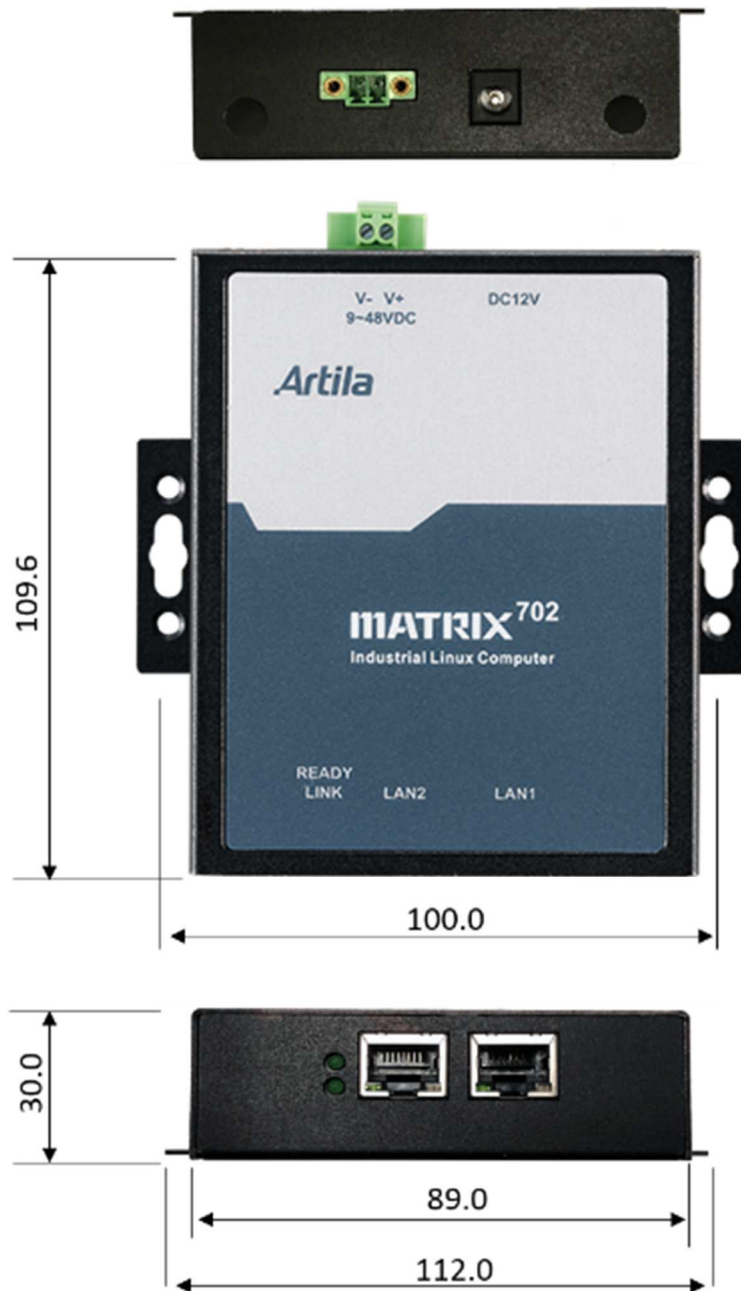- **PWR-12V-1A** (31-62100-000): 110~240VAC to 12VDC 1A Power Adaptor

2. Layout

2.1 Connector & LED Indicator

+9~+48 VDC
Power Input

+12VDC
Power Input

Hole reserved for
Antenna

Hole reserved for
Antenna

System Ready LED

LINK LED

LAN2
10/100Mbps
Ethernet Port

LAN1
Gigabit
Ethernet Port

2.2 Dimension

Unit: mm

3. Pin Assignment and Definitions

3.1 LED Indicators

The LED provides the Matrix-702 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

- **"LINK"** (Network LED indicator): Link and Activity LED will turn ON when the communication mPCIe Module installed. When there is network data traffic, this LED will flash.

   "LINK" LED indicators (controlled by GPIO: PA23) is defined by user.

   Please refer to "Status" LED indicator's programming on software guide.
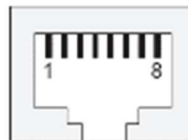
3.2 Ethernet LAN Port

The Ethernet Port use RJ45 connector for both

LAN1: Gigabit Ethernet port and LAN2: 10/100Mbps Ethernet port
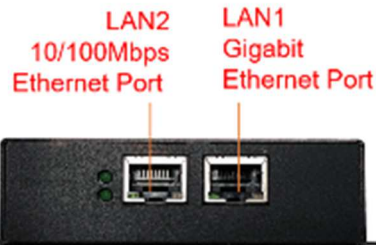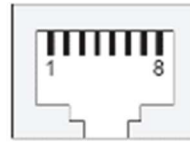

Pin definition of GigaLAN port (LAN1)

PIN	Signal
1	TP0 +
2	TP0 -
3	TP1 +
6	TP1 -
4	TP2 +
5	TP2 -
7	TP3 +
8	TP3 -

Pin definition of 10/100LAN connector (LAN2)

| PIN	Signal
1	ETx +
2	ETx -
3	ERx +
6	ERx -

3.3 Power Connector

Connecting +9 ~ +48VDC power line to either "Terminal Block" or "Power Jack".
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.
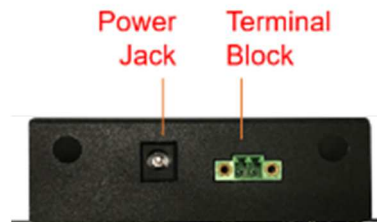
3.4 Console Port

There is a serial console ports (4-pin wafer box header / JP1) inside the Matrix-702.
Pin assignment is: RX, TX, +3.3V, GND.
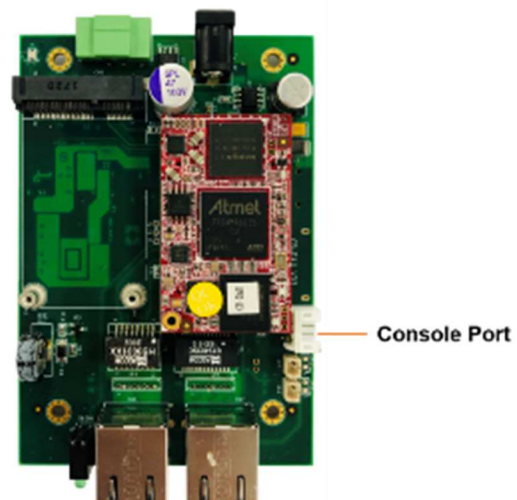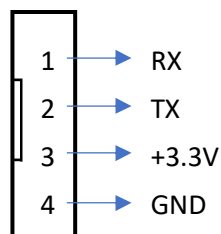
Therefore, you need to open the upper metal case and prepare or purchase a serial console cable to use the serial console port.
Or, it can be purchased "Console Cable" from Artila, P/N is CB-PHDF9-050.
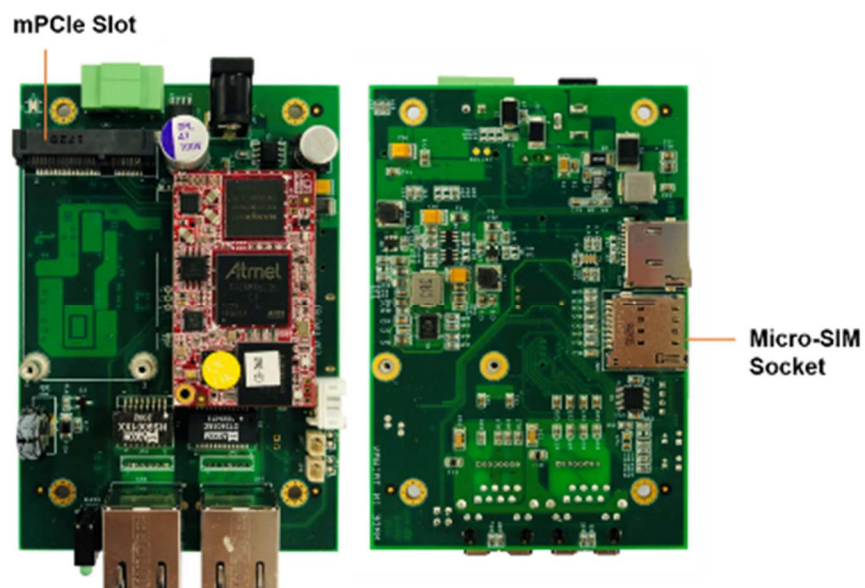
3.5 miniPCIe Slot

The Matrix-702 comes with one miniPCIe (mPCIe) slot and dual holes for antenna reserved for communication/networking functionality.
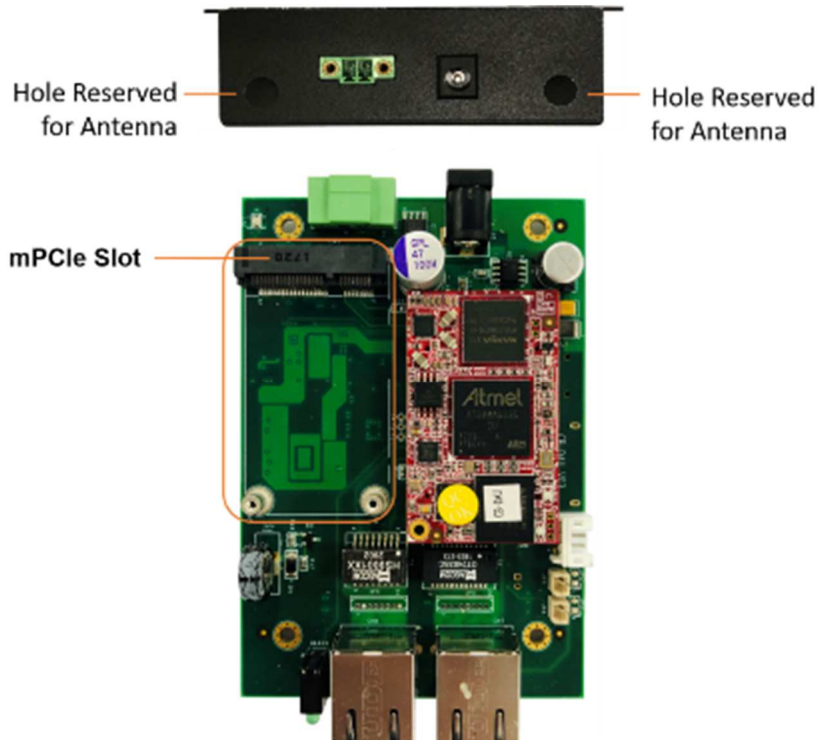
3.6 SIM card Socket

There is a micro-SIM card socket inside.

After removed top cover, it can be inserted a micro-SIM card accompanying LTE/4G module.

3.7 SD card Socket

There is a micro-SD card socket inside as data storage.

After removed top cover, it can be accessed the SD card.

Micro-SD card Socket