Digital Library

Hardware

Ver 1.0

Draft

Note: This document is intended to be read in conjunction with Digital Library Ver 1.0 firmware.

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1. Introduction

The Digital Library software is intended to run on simple, robust, low cost hardware that is readily available to users worldwide.

The system is built on OpenWRT, with Ver 1.0 based on OpenWRT 19.07 as the latest stable release.

In choosing hardware, preference has been given to devices which operate natively on OpenWRT as this ensures a simple conversion / upgrade process.

It is fairly straightforward to build the firmware for other hardware devices as long as they are supported under a current version of OpenWRT.

'Tiny' Devices

Firmware for a number of TP-Link devices has been built because there are many of these devices operating in the field with legacy software such as Library Box, and Digital Library can extend their useful life.

These devices include MR3020, MR3040, and WR703.

However, these devices have only 4MB of Flash memory, and it is difficult to fit even the operating system into this space. A special 'tiny' version of OpenWRT 19.07 has been used for these devices, and some DL functionality has been ommitted, specifically SFTP support.

This does not affect the basic operation of the device for use as a Digital Library, and they perform the basic functions quite well.

OpenWRT 19.07 is the last version that will support 'tiny' devices, so long term support will obviously be limited.

These devices are therefore not generally recommended for new purchases, and there are better alternatives available.

2. GL-iNET Devices

GL-iNET devices operate natively on OpenWRT and the company actively supports end user development of their products.

Digital Library firmware has been built for a number of their products as follows:

- MT300N-V2
- AR300M
- AR750
- AR150

2.1 MT300N-V2 - ‘Mango’

This device is based on the MediaTek MT7628NN @580Mhz chipset.

It is sold as a ‘N300 Mini Router’ for around $20.

The WiFi protocol is 802.11 b/g/n with 2x2 MIMO operation.

Antennas are internal on the PCB.

It provides 128MB RAM, 16MB Flash ROM, dual Ethernet ports and a single USB port.

Power connection is via Micro USB connector and is < 2.75 Watts.

Installation of the Digital Library may be done using the Firmware Upgrade page in the native firmware, or by using the U-Boot Web Failsafe screen.

2.2 AR300M, AR300M-Ext - ‘Shadow’

This device is based on the Atheros QCA9531, @650MHz chipset.

It is sold as a ‘Mini Smart Router’ for around $35 / $40.

The WiFi protocol is 802.11 b/g/n with 2x2 MIMO operation.

Antennas are internal on the PCB in the base model and external 2dB in the ‘-Ext’ model.

It provides 128MB RAM, 16MB Flash ROM, two 10/100M Ethernet ports and a single USB port.

Power connection is via Micro USB connector and is < 2Watts.

Installation of the Digital Library may be done using the Firmware Upgrade page in the native firmware, or by using the U-Boot Web Failsafe screen.

2.3 AR150, AR150-Ext, AR150-PoE - ‘White’

This device is based on the Atheros AR9331, @400MHz chipset.

It is sold as a ‘Mini Smart Router’ for around $25 - $30 depending on options.

The WiFi protocol is 802.11 b/g/n.

Antennas are internal on the PCB in the base model and external 2dB in the ‘-Ext’ models.

It provides 64MB RAM, 16MB Flash ROM, two 10/100M Ethernet ports and a single USB port.

Power connection is via Micro USB connector and is < 1.5Watts.

A PoE option is available on the ‘-PoE’ models.

Installation of the Digital Library may be done using the Firmware Upgrade page in the native firmware, or by using the U-Boot Web Failsafe screen.

2.4 AR750 - ‘Creta’

This device is based on the Atheros QCA9531, @650MHz chipset.

It is sold as a ‘Dual Band Wireless Router’ for around $45.

Both 2.4GHz and 5GHz WiFi bands are provided.

The WiFi protocol is 802.11 802.11 a/b/g/n/ac with 2x2 MIMO operation on 2.4GHz band.

Antennas are internal on the PCB for 2.4GHz and internal via connector for the 5GHz band.

It provides 128MB RAM, 16MB Flash ROM, three 10/100M Ethernet ports and a single USB port.

An SD card port is also provided.

Power connection is via Micro USB connector and is < 4Watts.

Note: A mains plug pack is provided as the power consumption is too high for a normal USB port.

Installation of the Digital Library may be done using the Firmware Upgrade page in the native firmware, or by using the U-Boot Web Failsafe screen.

3. Dragino Devices

3.1 MS14N-P

This device is based on the Atheros AR9331, @400MHz chipset.

It is sold as a ‘Linux Appliance’ for around $45.

The WiFi protocol is 802.11 b/g/n .

Antennas are internal on the PCB in the base model and external 2dB in the ‘-Ext’ model.

It provides 64MB RAM, 16MB Flash ROM, dual Ethernet ports and a single USB port.

Power connection is via 12Volt Barrel connector , < 2Watts, and a mains plug pack is supplied.

Installation of the Digital Library may be done using the Firmware Upgrade page in the native firmware, or by using the U-Boot Web Failsafe screen.

3.2 PAN

This device is based on the Atheros AR9331, @400MHz chipset.

It is sold as a ‘Outdoor OpenWRT Appliance’ for around $45.

The WiFi protocol is 802.11 b/g/n .

Antennas are internal on the PCB.

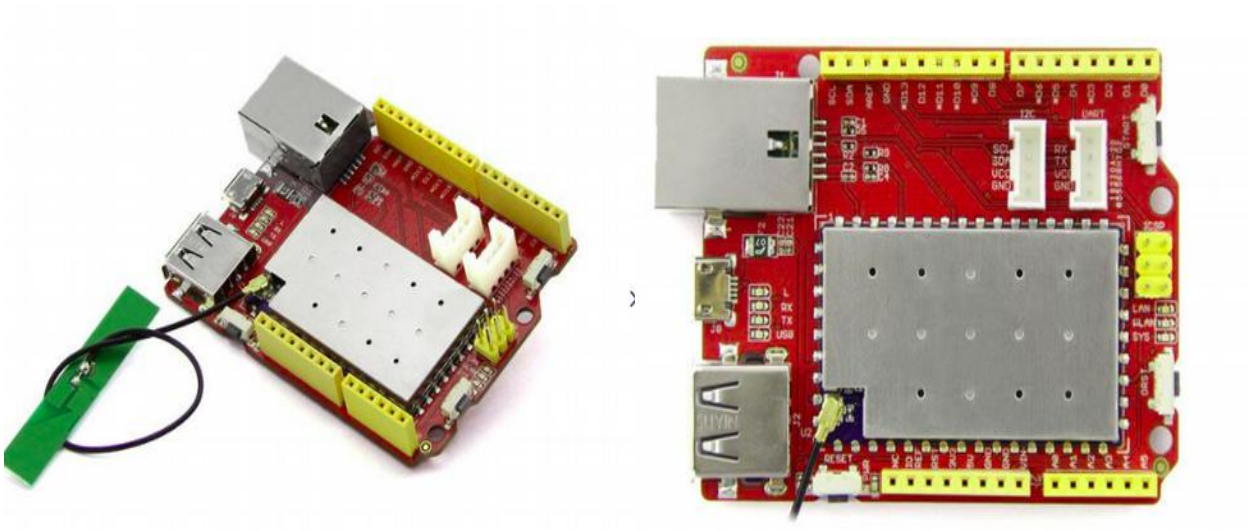
It provides 64MB RAM, 16MB Flash ROM, dual Ethernet ports and a single USB port.

Power connection is via 12Volt Barrel connector, < 2Watts, and a mains plug pack is supplied.

Installation of the Digital Library may be done using the Firmware Upgrade page in the native firmware, or by using the U-Boot Web Failsafe screen.

4. SEEED Devices

4.1 SEEEDuino Cloud Yun Board



This device is based on the Atheros AR9331, @400MHz chipset.

It is sold as an ‘Arduino Yun Controller for around $16.

The WiFi protocol is 802.11 b/g/n.

Antennas is external via connector.

It provides 64MB RAM, 16MB Flash ROM, one 10/100M Ethernet ports and a single USB port.

Power connection is via Micro USB connector and is < 1.5Watts.

Installation of the Digital Library requies a somewhat complex two step process to replace the default pre-installed YUN firmware.

This device includes a complete Arduino subsystem based on Atmega32u4 which may be programmed separately, and provides a wealth of I/O options including Analogue, Digital, I2C and UART.

5. TP-Link Devices

5.1 TL-MR3020, TL-MR3040

NOTE: These are regarded as legacy devices due to the limited memory provided.

These devices are based on the Atheros AR9331, @400MHz chipset.

The WiFi protocol is 802.11 b/g/n with 2x2 MIMO

Antennas are internal on the PCB.

It provides 32MB RAM, 4MB Flash ROM, one 10/100M Ethernet port and a single USB port.

Power connection is via Mini / Micro USB connector and is < 1.5Watts.

The MR3040 has an internal Li-Ion battery so can operate stand-alone.

Installation of the Digital Library may be done using the Firmware Upgrade page in the native firmware, initially using the special ‘factory’ firmware version, and subsequently upgraded using the normal ‘sysupgrade’ version.

5.2 TL-WR842N(D) V1, V2, V3

These devices are based on a variety of chipsets and memory depending on the version.

Ver 1: Atheros AR7241 + AR9287 (8MB Flash / 32MB RAM)

Ver 2: Atheros AR9341 (16MB Flash / 64MB RAM)

Ver 3: Qualcomm Atheros QCA9531 (16MB Flash / 64MB RAM)

The WiFi protocol is 802.11 b/g/n with 2x2 MIMO.

Antennas are external and removable on some models (D).

It provides five 10/100M Ethernet ports and a single USB port.

Power connection is via 12V Barrel connector and a mains plug pack is supplied.

Installation of the Digital Library may be done using the Firmware Upgrade page in the native firmware, initially using the special ‘factory’ firmware version, and subsequently upgraded using the normal ‘sysupgrade’ version.