AKEBI96 Hardware Manual

12-16-2019

Document Title

Version	Date	Author	Reviewer	Remarks
V0.1	12-16-2019			

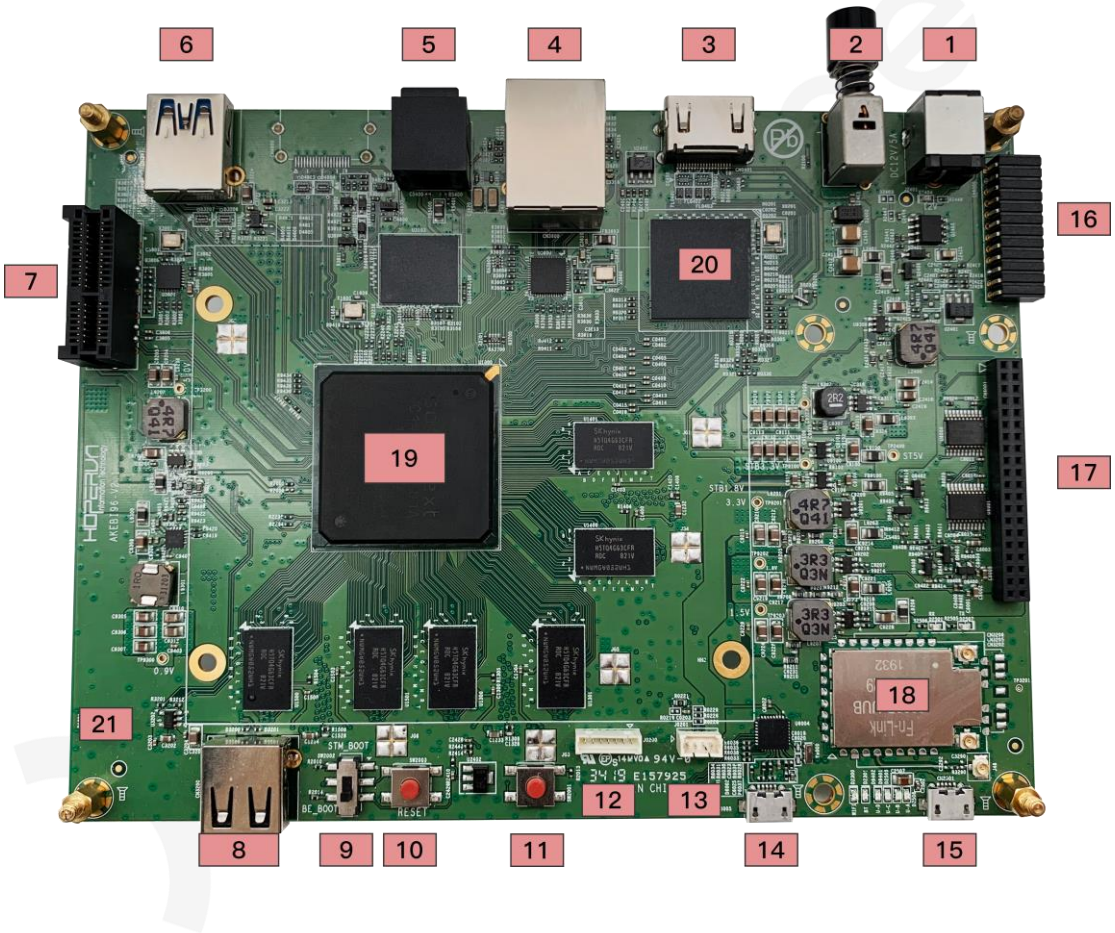
Contents

1 Introduction

The AKEBI96 board is a 96Boards compliant community board based on Socionext LD20 series of SoCs.

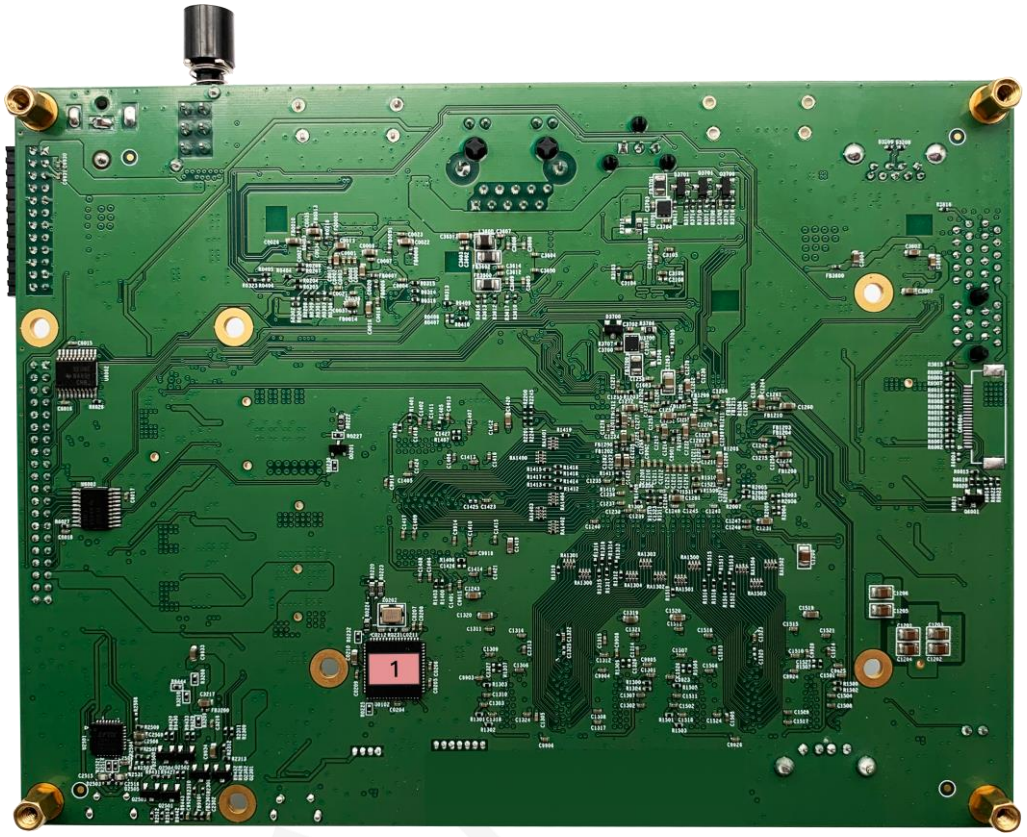
1.1 Overview

Figure 1-1 Top View of the AKEBI96 PCB



Number	Description
1	Power Port (J2401)
2	Power Button (SW2402)
3	HDMI Type A Port (CN0401) / Output
4	RJ45 Port (CN3600)
5	SPDIF Output Port (CN5400)
6	USB 3.0 Type A Port (CN3201)
7	PCIe Port(CN3800)
8	USB 2.0 Type A Port (CN3200)
9	Boot Mode Switch (SW2002)
10	Reset Key (SW2003)
11	USB Boot Key (SW2001)
12	MCU ICSP Port (J0200)
13	MCU UART Port (J0201)
14	USB Micro-B Port (CN6005)/ADB
15	USB Micro-B Port (CN2501)/UART0
16	TS Port (CN6000)
17	LowSpeed Expansion Port (CN6001)
18	BT/WiFi Module (CN3202)
19	MN869120 HV2 Chip
20	LD20 Processor (U1000)
21	Jumper (J1000)

Figure 1-2 Bottom View of the AKEBI96 PCB



Number	Description
1	MCU (U0102)

1.2 Key Features

Processor	Socionext LD20 ARM Cortex-A72 MPCore*2 ARM Cortex-A53 MPCore*2	
Memory	3GB DDR3 1866MHz	
Storage	16GB eMMC	
	Micro SD	
Video	HDMI 2.0	2K/60p
		4K/60p
Terminal	USB	USB3.0 x1, USB2.0 x1, micro USB x 2(for Debugging)
	Ether	10M/100M/1000Mbps PHY : RTL8211E-VB-CG(REALTEK)
	SPDIF	Digital Audio Out
	Tuner Port	TS Serial Signal Input
	Expansion Port	UART, I2C, SPI, I2S, GPIO
Other	Wi-Fi/BT	WiFi : Dual-band 2T2R 802.11a/b/g/n/ac BT : Ver.4.1 Chipset : RTL8822BU(REALTEK) Module : FN-LINK 6222D-UUB
User Interface	8 LED indicators 2 Keys 1 Switch	
OS-support	Android	
Power	12V	
Mechanical	Dimensions: 160mm by 120mm meeting 96Boards™ Consumer Edition standard dimensions specifications.	
Environmental		

2 Getting Start

2.1 Prerequisites

Before you power up your AKEBI96 board for the first time, you need:

- AKEBI96 board
- A 96Boards compatible power supply
- A HDMI LCD display
- HDMI-HDMI cable to connect the board to the Monitor
- A computer keyboard with USB interface
- A computer mouse with USB interface

2.2 Starting the board for the first time

To start the board, follow these simple steps:

Step 1. Connect the HDMI port (marked CN0401) and the LCD Monitor by HDMI cable.

Step 2. Connect the keyboard to the USB port marked CN3201 (or CN3200) and the mouse to the USB port marked CN3200 (or CN3201).

Step 3. Make sure that the Boot Mode Switch (SW2002) is set to BE_BOOT Mode.

Step 4. Connect the power supply to power port J2401.

Step 5. Press down the power button SW2402.

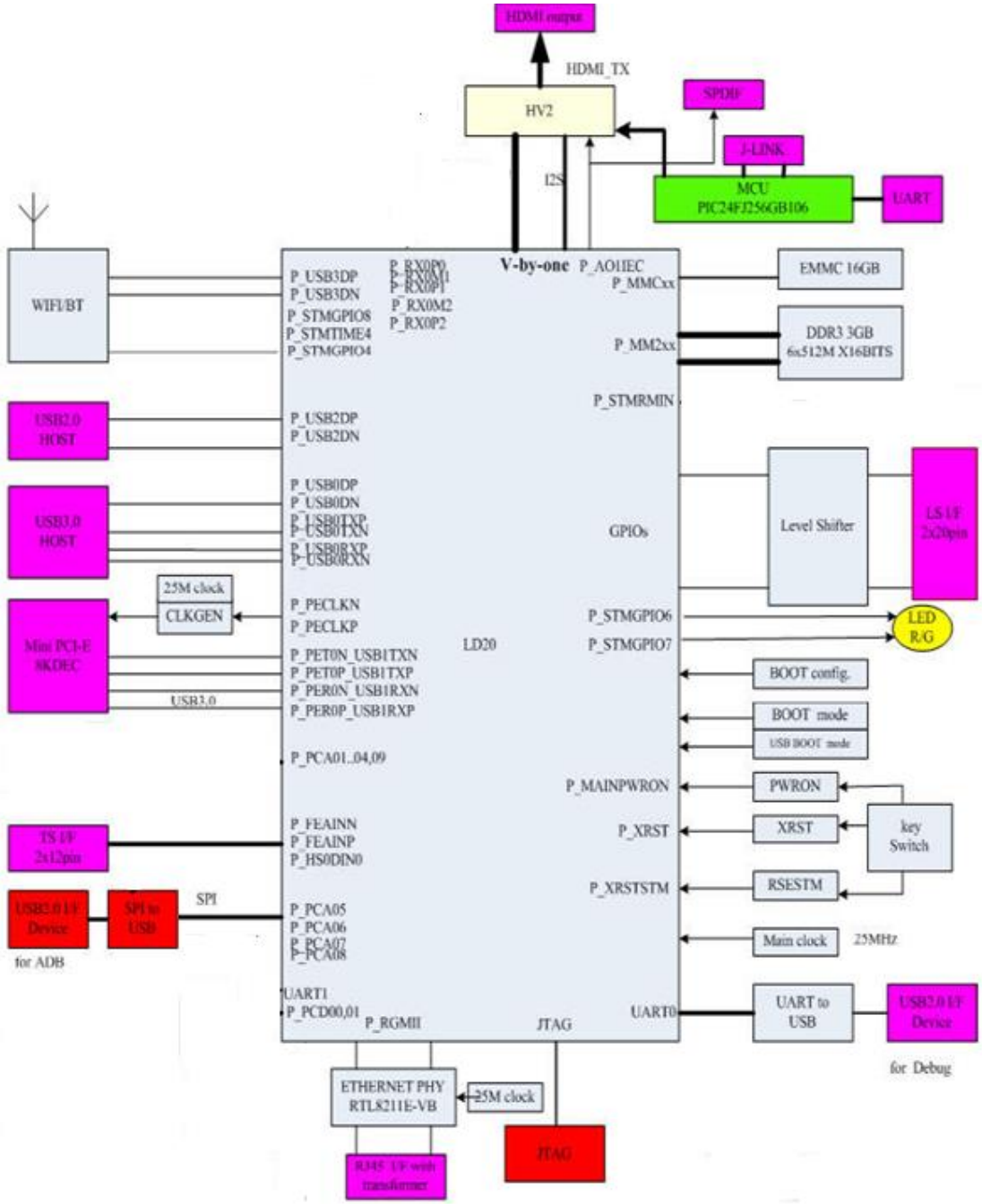
Once you plug the power supply into a power outlet, the board will start the booting process, and you should see Android boot up.

Please note that the first boot takes several minutes due to Androids initialization. It will take less time next time

3 AKEBI96 Overview

3.1 System Block Diagram

Figure 1-3 System Block Diagram



3.2 Switches and Keys

Boot Mode Switch (SW2002): BE Mode:

Reset Key (SW2003): Press down and release, the board will reboot.

3.3 Power Button

The power button SW2402 can be used to power up/ down the system.

3.4 DC in Jack

DC Power is provided via the DC jack at J2401. This is a CUI PJ-063BH connector with a center pin diameter of 1.65mm configured with positive polarity (center +). An 8V up to 18V power supply at a minimum of 2A rating can be used to provide sufficient board power for on system requirements as well as external devices. Additional current rating may be required for mezzanine boards or modules. DC Power can also be supplied via the SYS_DCIN pins on the low speed expansion CN6001.

3.5 Low Speed Expansion Port

The board features one 40 pin low speed expansion connector. The low speed expansion connector carries GPIO and other low speed interfaces. The connector is a low profile 40 pin female 2mm receptacle (20x2) of a specified height of 4.5mm height.

The low speed expansion brings out 1.8V level SoC signals such as UART0 and UART1, I2C0 and I2C1, GPIO signals as well as SPI, PCM, Reset, 1.8V and Ground. The complete list of SoC signals is shown in Table 1 below:

Signal	Pin	Pin	Signal
GND	1	2	GND
UART0_CTS	3	4	PWR_BTN_N
UART0_TxD	5	6	RST_BTN_N
UART0_RxD	7	8	SPI0_SCLK
UART0_RTS	9	10	SPI0_DIN
UART1_TxD	11	12	SPI0_CS
UART1_RxD	13	14	SPI0_DOUT
I2C0_SCL	15	16	PCM_FS

I2C0_SDA	17	18	PCM_CLK
I2C1_SCL	19	20	PCM_DO
I2C1_SDA	21	22	PCM_DI
GPIO-A	23	24	GPIO-B
GPIO-C	25	26	GPIO-D
GPIO-E	27	28	GPIO-F
GPIO-G	29	30	GPIO-H
GPIO-I	31	32	GPIO-J
GPIO-K	33	34	GPIO-L
+1V8	35	36	SYS_DCIN1
+5V	37	38	SYS_DCIN2
GND	39	40	GND

The power for these is available on the low speed Expansion connector and can be supplied through a 2-pin 2mm male header inserted at pins CN6001.37-CN6001 .39 or CN6001.38-CN6001 .40, respectively.

3.6 BT and WiFi

The board is equipped with a Fn-Link 6222D-UUB BT/WiFi Module with Realtek RTL8822BU Chipset which supports IEEE 802.11ac, 802.11b, 802.11g, 802.11n WiFi and Bluetooth 4.2.

3.7 Display Interfaces

There is a Type A HDMI port mounted at CN0401.The LD20 SoC has only V-by-one interface for video output. AKEBI96 use a HV2 (MN869120) chip to convert V-by-one to HDMI.

Current state: Software only supports 1080p at most. 2K/4K features require special license

3.8 SPDIF

This port only supports audio output.

3.9 PCIe

This interface is not officially supported. Compatibility may not be good.

3.10 USB Interfaces

There is a total of 4 USB ports on the board.

CN3201: USB 3.0 Type-A port.

CN3200: USB 2.0 Type-A port.

CN6005: USB Micro-B Port, is used for ADB.

CN2501: USB Micro-B Port, connect with UART0 for Debugging.

3.11 System and User LEDs

There are 8 LEDs on the board.

3.12 TS Port

The tuner module board is optionally supplied.

Signal	Pin	Pin	Signal
+5V	1	2	+12V
+3.3V	3	4	P_PORT04
GND	5	6	P_TU_AGCI
P_HS1DIN3	7	8	P_XIRQ6
GND	9	10	P_HS1DIN5
P_HS1DIN2	11	12	P_FEAINP
GND	13	14	P_FEAINN
P_HS1SYNCIN	15	16	P_HS1DIN4
GND	17	18	P_HS1DIN0
P_HS1BCLKIN	19	20	GND
GND	21	22	P_HS1VALIN
EXCN_DMDSDA0	23	24	EXCN_DMDSCL0

3.13 Debug Interface

The board has 2 USB Micro-B ports (CN2501 and CN6005) for debugging. CN2501 is normally used by the first stage bootloader developers, and is connected to the UART0. CN6005 is used for ADB.

3.14 MCU

The board uses a MCU (PIC24FJ256GB106) to control HV2 (MN869120) chip. HV2 is used to convert V-by-one to HDMI. The board provides 2 interfaces to debug this MCU. An ICSP port mounted at J0200 and an UART port mounted at J0201.

