KNERON-KL630-008

KL630 96board User Manual

96board

1 INTRODUCTION

1.1 Installation

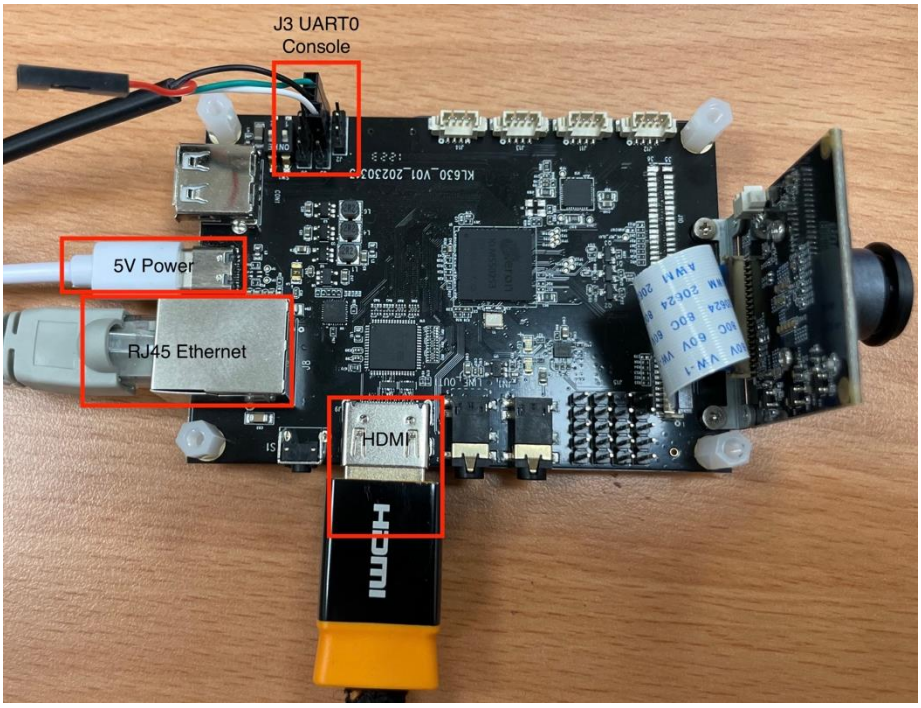

Figure 1-1 96board Connectivity

The following steps describe the hardware installation procedure.

1. Connect the network cable to RJ45 connector.
2. Connect USB-UART Cable to J3
    - Pin 1 : Green, UART0_RXD
    - Pin 2 : Black, GND
    - Pin 3 : White, UART0_TXD

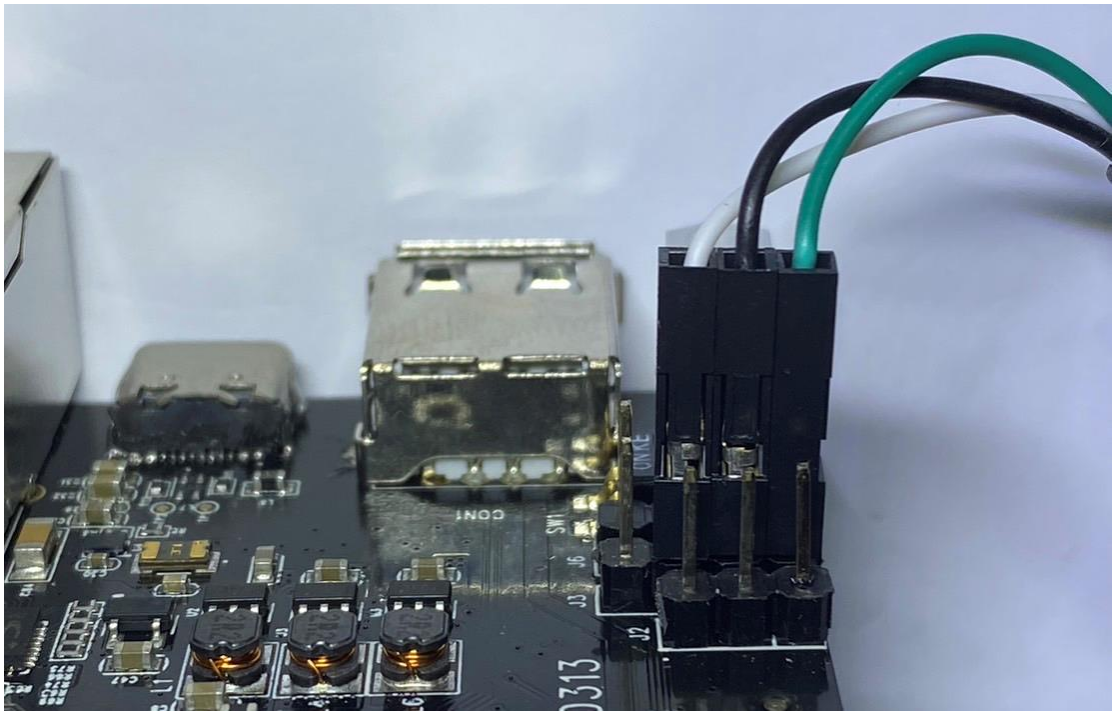

Figure 1-2 UART Connects to J3

3. Connect HDMI cable for video display. (optional)
4. Connect type C cable for 5V DC Power

1.2 Connecting to Serial Terminal

When connecting the 96board via serial terminal programs (e.g. Minicom and gtkterm on Linux OS or HyperTerminal and PuTTY on Windows OS) at the host PC, users must set the following console configurations in the serial terminal programs:

Table 1-1 Console Configuration

Option	Configuration
Bits per second	115200
Data bits	8 bits
Parity	None
Stop bits	1bit
Flow control	none

When the 96board is powered on, the boot message will appear on the console and users can press any key to stop auto booting sequence from entering the U-Boot environment.

1.3 Boot Information

The boot message allows users to find important hardware information (e.g. number of memory slots, memory size, and boot device) during the booting process. Figure 1-3 lists some of the important boot messages and Figure 2-4 shows the output information of various boot messages.

Table 1-2 Boot Message

Boot Message	Description
DRAM	Shows the number of memory slots and memory size
SN	Shows the model of SPI NAND Flash device, page size, and total size.
Loader	Shows version of the loader
Net	Shows the model of ethernet phy device, ethernet phy type configuration, and network status.

```
U-Boot 2015.01-Vienna-SDK-2.5-3 (Jan 18 2023 - 16:04:27)

I2C:   ready
SPI:   ready
DRAM:  256 MiB
WARNING: Caches not enabled
NAND:  SPI NAND: Got idcode ef aa 21 00 00.
SN: Detected W25N01GVSF1G with page size 2048, total 128 MiB
128 MiB
MMC:   MMC Version 2.90a
VPL DWMMC: 0
In:    serial
Out:   serial
Err:   serial
Model: Schubert
Loader: Version 0x23010601 @ 0x81005fe0
Relocation Offset is: 03f2c000
Relocating to 03f2e000, new gd at 03a1def0, sp at 03a1ded0
Net:     GMAC Desc/Buf : 0x03ff3e00 -> 0x04000000
  PHY TYPE     : Generic PHY(rmii)
  Link Detect  : dweqos Waiting for PHY auto negotiation to complete... done
  Link Status  : Link Up
               : Full Duplex
  Link Speed   : 100Mbps
dweqos
Hit any key to stop autoboot:  0
```

Figure 1-3 Boot Message

1.4 U-Boot Environment

When the message "**Hit any key to stop autoboot**" appears, users can hit any key to load U-Boot command prompt. The following table describes the common commands that can be used under U-Boot prompt.

Table 1-3 U-Boot Environment

Common Command	Description
?	Lists all command or information about specified command. Usage: ? [command ...]
help	Lists all command or information about specified command. Usage: help [command ...]
printenv	Print environment variables. Usage: printenv [variable...]
setenv	Sets environment variables. Usage: setenv variable [value]
saveenv	Save environment variables to persistent storage.
tftp	Downloads files from the TFTP server to the DDR. Usage: tftp [address] [file path]
reset	Perform RESET of the CPU. Usage: reset

The syntax “printenv” will list all the environment variables used in U-Boot. Figure shows the U-Boot default environment settings after entering “printenv”. U-Boot will pass the variable “bootargs” to kernel after booting to Linux kernel.

```
baudrate=115200
bootcmd=run setargs;nand read 0xa00000 0x1e0000 0x400000;nand read 0x1400000 0x180000 0x60000;bootz
0xa00000 - 0x1400000
bootdelay=3
ethact=dweqos
ethaddr=02:00:DB:00:11:F2
fdt_high=0xffffffff
gatewayip=192.168.2.1
ipaddr=192.168.2.100
modelname=Schubert
netmask=255.255.255.0
phy_mode=rmii
root=/dev/mtdblock4
serverip=172.17.0.12
setargs=setenv bootargs;setenv bootargs root=${root} mem=16M@0x00000000 mem=45M@0x1100000 console=0,
${baudrate} phy_mode=${phy_mode} ${mtdparts}
stderr=serial
stdin=serial
stdout=serial
```

Figure 1-4 U-Boot Environment Settings

The following table describes the U-Boot environment variables.

Table 1-4 U-Boot Environment

Variable	Description	Example
bootargs	The contents of this variable are passed to the Linux kernel as boot arguments (aka “command line”) including root file system partition, memory size, UART console port number, and UART console baud rate.	root=/dev/mtdblock4 mem=16M@0x00000000 mem=45M@0x1100000 console=0,115200 phy_mode=rmii
bootcmd	This variable defines a command string that is automatically executed when the initial countdown is not interrupted. This command is only executed when the variable bootdelay is also defined.	run setargs;nand read 0xa00000 0x1e0000 0x400000;nand read 0x1400000 0x180000 0x60000;bootz 0xa00000 - 0x1400000
setargs	Sets arguments to pass the Linux kernel with the use of boot command.	setenv bootargs;setenv bootargs root=${root} mem=16M@0x00000000 mem=45M@0x1100000 console=0,${baudrate} phy_mode=${phy_mode} ${mtdparts}
bootdelay	After reset, U-Boot will wait for this number of seconds before it executes the contents of the bootcmd variable. At this moment, a countdown is printed and can be interrupted by pressing any key. Set this variable to 0 to boot without delay or “-1” to disable autoboot.	3
baudrate	A decimal number that selects the console baud rate (in bps). A predefined list of baud rate settings is currently available. When users change the baud rate (using the “setenv baudrate ...” command), U-Boot will switch the baud rate of the console terminal and wait for a newline which must be entered with the new speed setting. This is to make sure users are certain to run with the new speed. If this fails, users will have to reset the board (which will operate at the previous speed since users are not able to use “saveenv” in the new setting). If no “baudrate” variable is defined, the default baud rate used is 115200.	115200

Variable	Description	Example
ethaddr	Ethernet MAC address for the first or sole Ethernet interface (eth0 in Linux).	02:00:DB:00:11:F2
ipaddr	IP address of the EVM; needed for tftp command.	192.168.3.10
serverip	IP address of the TFTP server; needed for tftp command.	172.17.0.6
gatewayip	IP address of the gateway (router); needed for tftp command.	172.23.0.1
netmask	Subnet mask of the EVM; needed for tftp command.	255.255.255.0
Phy_mode	Operation mode of the Ethernet PHY interface; supported values are rmii, rgmii, and mii.	rmii
modelname	SoC model name	Schubert

1.5 Telnet

To establish Telnet connection, please insert the following

telnet 192.168.3.10

login : root

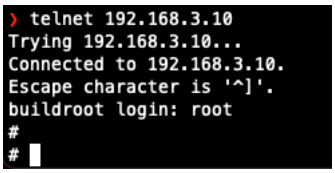

Figure 1-5 Telnet Connection

1.6 RTSP Video Stream

Please make sure rtsps and solution_host_stream are running in process, and open the streaming software (e.g. VLC).

Open Network Stream → URL → rtsp://192.168.3.10/live1.sdp

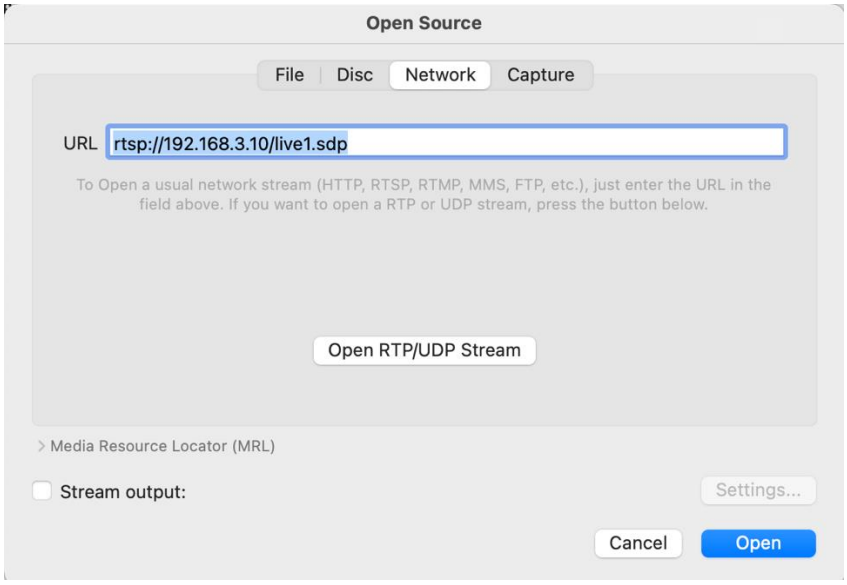

Figure 1-6 Open Network Stream

Figure 1-7 Running Video Streaming

1.7 HDMI Display

Connect HDMI cable for video display. The output resolution should be 1920x1080.

1.8 USB Host – Mass Storage

1. Change SW1 switch to Host

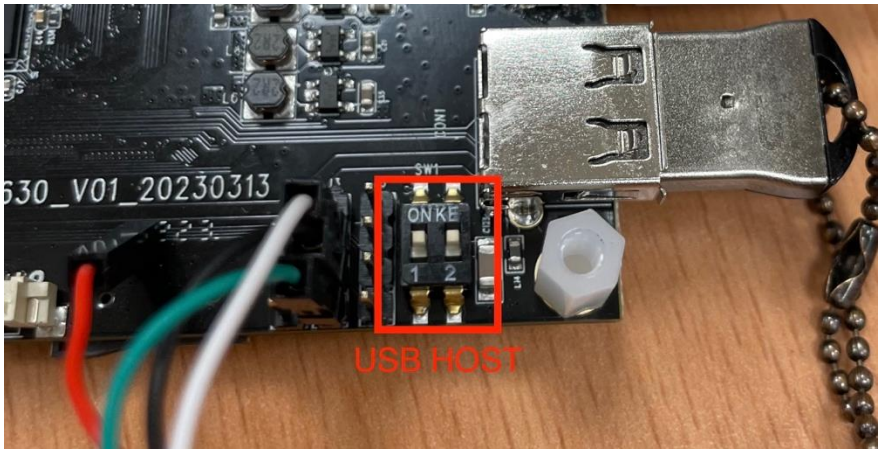

Figure 1-8 Change SW1 switch to Host

2. Connect USB disk.
3. Mount USB disk.

```
# mkdir /mnt/flash/usb
# mount /dev/sda1 /mnt/flash/usb/
# cd /mnt/flash/usb/
# ls
20180108
607????.exe
DMS.pdf
EFI
EM048 5M CMOS Sensor
LOST.DIR
M3C_RDK_Ver1.1(A.a).zip
M5S-V2.4.5.tar.gz
```

Figure 1-9 Mount USB Disk

1.9 USB Device – PC (Kneron Plus)

1. Change SW1 switch to Device.

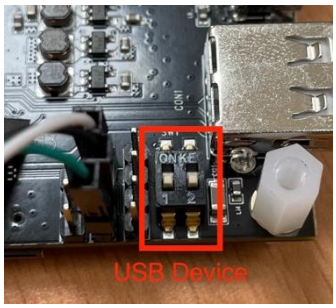

Figure 1-10 Change SW1 Switch to Device

2. Connect USB cable to PC.
3. Run the following command.

```
echo 3 > /proc/sys/kernel/panic
/sbin/watchdog -T 3 -t 2 /dev/watchdog
sh /mnt/flash/etc/plus_usb_companion_init.sh
```

1.10 Audio

Users can plug-in audio cable to line in/out.

Run test program

```
cd /mnt/flash/plus/kp_firmware/kp_firmware_0/kp_firmware/bin
./audio_test/sh
```

1.11 GPIO

For example :

LED1 : GPIOC_1_IO_DATA[25]

```
echo 57 > /sys/class/gpio/export
echo out > /sys/class/gpio/gpio57/direction
```

Turn on LED

```
echo 1 > /sys/class/gpio/gpio57/value
```

Turn off LED

```
echo 0 > /sys/class/gpio/gpio57/value
```

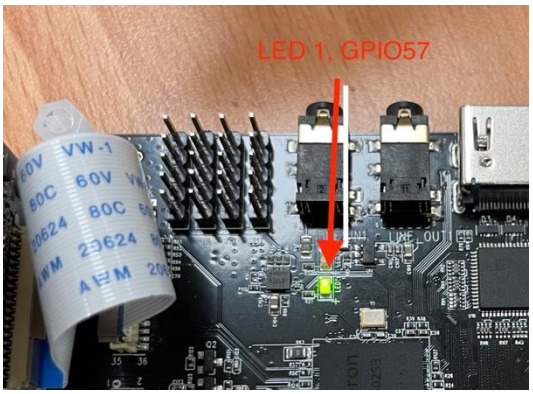

Figure 1-11 LED1 to GPIO57

Table 1-5 GPIO Setting

Board GPIO Number	Kernel GPIO Number
LED1	gpio57
LED2	gpio58
GPIO_1	gpio63
GPIO_2	gpio64
GPIO_3	gpio65
GPIO_4	gpio66

1.12 AGPO

Generate a 1KHz frequency with 80% duty cycple at PWM channel 0 and on fly change to 60% duty cycle

```
echo 0 > /sys/class/pwm/pwmchip0/export
echo 1000000 > /sys/class/pwm/pwmchip0/pwm0/period
echo 800000 >/sys/class/pwm/pwmchip0/pwm0/duty_cycle
echo 1 >/sys/class/pwm/pwmchip0/pwm0/enable
echo 600000 >/sys/class/pwm/pwmchip0/pwm0/duty_cycle
```

Using AGPOC_O_DATA[5]

```
echo 5 > /sys/class/pwm/pwmchip0/export
echo 1000 > /sys/class/pwm/pwmchip0/pwm5/perio
echo 1 >/sys/class/pwm/pwmchip0/pwm5/enable
echo 500 > /sys/class/pwm/pwmchip0/pwm5/duty_cycle
```

Table 1-6 AGPO Setting

AGPO Number	PWM Number
agpo_0	pwm0
agpo_1	pwm1
agpo_2	pwm2
agpo_3	pwm3
agpo_4	pwm4
agpo_5	pwm5
agpo_6	pwm6

AGPO Number	PWM Number
agpo_7	pwm7

1.13 I2C

Users can use i2c tool to control i2c

a. i2cdetect

b. i2cset

c. i2cget

1.14 SPI

Users can use spidev_test to control the SPI device

Build the spidev_test binary from Knernel

```
cd Kernel/tools/spi
make
➢ spidev_test
```

For example,

```
./spidev_test -s 4000000 -d 100 -b 8 -p "\xdc\x43" -v -C
```

1.15 Firmware Update

Please download latest firmware at Kneron's website

1. Format Micro SD card to FAT32
2. Rename SD card to BOOTEXT
3. Copy all the file into SD card

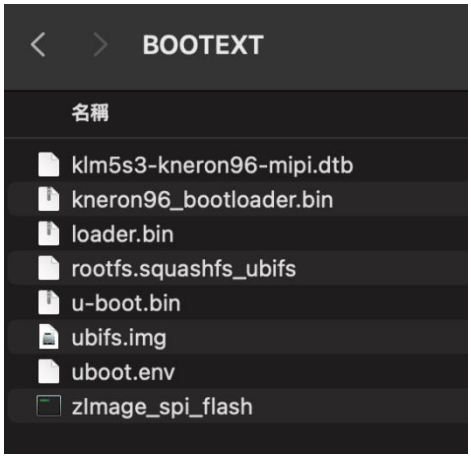

Figure 1-12 Copy Files Into SD Card

4. Insert Micro SD card to 96board.
5. Power-on and it will start update firmware automatically.