SBC3500

Quick Start Guide

Release Notes

Version	Release Date	Notes
1.0	July 2022	Initial release

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Table of Contents

1.	Prec	autions	4
	1.1	Safety Precautions	4
	1.2	Write Prohibited Regions	4
	1.3	Warrnty	4
	1.4	FCC Warning	5
2.	Over	rview	6
	2.1	Overview	6
	2.2	Features and Specifications	6
3.	Setu	p	7
	3.1	Console / Debug Port	7
	3.2	Start Running	11
4.	Runr	ning Software	11
	4.1	Android	11
	4.1.1	Desktop	11
	4.1.2	APK install	13
	4.1.3	Sound Settings	15
	4.1.4	Apps	16
	4.1.5	Language & Input	16
	4.1.6	Power Button Switch(SW1)	17
	4.1.7	Reset Switch(SW2)	18
	4.1.8	COM (RS232/RS485) Port	18
	4.1.9	The WiFi/BT	21
	4.1.1	CAN bus test	24
	4.2	Ubuntu Linux	25
	4.2.1	Linux Desktop	25
	4.2.2	Screensaver	25
	4.2.3	Power Button Switch(SW1)	26
	4.2.4	The WiFi/BT	28
	4.2.5	Test COM port by command	29
	4.2.6	CAN bus test	32

1. Precautions

1.1 Safety Precautions

- In order to use this product safely, please take special note of the following precautions.
- Read all product manuals and related documentation before using this product. Use this product correctly and safely. Follow all warnings.
- If operating or extending this product in a manner not described in this manual, please do so at your own risk. Be sure to fully read this manual and other technical information on our website and proceed safely and responsibly.
- Do not install this product in a place with a lot of water, moisture, dust or soot. This could cause product failure, fire, or an electric shock.
- Some parts of this product generate heat and can reach high temperatures. This may cause burns if it is improperly handled. Do not touch the electronic components or surrounding area while powered on or immediately after being turned off.
- Carry out any design and development only after you have thoroughly read and understood this manual and any other related technical materials on the website or in the data sheets. Test your product thoroughly for reliability and safety.
- This product is not intended for applications that require extremely high reliability, safety, functionality and accuracy: including but not limited to medical equipment, traffic control systems, combustion control systems, and safety equipment. This company is not liable for death or injury if used in such systems.
- This product uses semiconductor components designed for generic electronics equipment such as office automation, communications, measurement equipment and machine tools. Foreign noise or a power surge may cause this product to malfunction or fail.
- To ensure there is no risk of bodily harm or property damage, be sure to take all electrical safety precautions such as protection circuits, limit switches, fuse breakers, or redundant systems. Only use the device after sufficient reliability and safety measures are in place.

1.2 Write Prohibited Regions

Data stored by the EEPROM/NOR is used by the software contained in this product. Do not write to these regions as this may cause the product stop working correctly. Purposely writing to these regions voids the product warranty.

1.3 Warrnty

As described in the Product Warranty Policy provided with this product, the product is covered by a one-year warranty starting from the time of purchase. Please note that the other included goods and software are not covered

under this warranty. Some knowledge used in this product is provided by third parties, and we make no representation or warranty as to the accuracy of such information.

1.4 FCC Warning

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help. FCC RF exposure statement:

The equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance between 20cm the radiator your body.

2. Overview

2.1 Overview

The SBC3500 is a small size (101mmx146mm) single board computer designed for applications such as digital signage, HMI, POS, Gaming, Set top box, KIOSK and other smart devices. The SBC3500 features a quad-core 64-bit ARM Cortex-A55 processor, 2x 10/100 LAN ports and PoE (Power over Ethernet) for a wide range of commercial and industrial applications.

Each SBC3500 can be installed in advance with Linux or Android for immediate evaluation.

2.2 Features and Specifications

Features

- ➤ High performance Quad-core ARM Cortex-A55 (64-bit ARMv8)
- Hardware decoder up to 4K@60fps and encoder to 1080P@100fps or 4K@10fps
- Hardware 2D/3D graphics accelerator
- Multiple display interfaces (HDMI, eDP, LVDS or MIPI-DSI TX)
- Multiple camera interfaces (MIPI-CSI RX, USB)
- > Rich set of peripherals (USB3.0, 2.0, LAN, CAN-FD, GPIO, I²C, SPI, etc.)
- Preinstalled Linux or Android OS

	SBC3500
CPU	Rockchip RK3568 (wide temperature version) (Quad-core 64-bit ARM Cortex-A35)
NPU	0.8 TOPs
OS	Android / Ubuntu
DDR RAM	2GB / 4GB / 8GB LPDDR4X
Flash ROM	32GB (or higher)
	1x HDMI (4K @ 60fps)
Display Interface	1x LVDS (1280x800 @60fps) or 1x MIPI-DSI (FHD @ 60fps)
	1x eDP (2K @ 60fps)
Camera Interface	1x MIPI-CSI RX (4 lanes)
Touch Interface	1x Capacitive Touch Screen Interface (I ² C)
Audio Interface	1x Mic/Earphone connector + 1x Speaker output connector
USB 3.0	2x type-A host + 1x OTG
USB 2.0	5x host (pin header)

Specifications

SD 3.0	1x microSD slot
PCle	1x PCIe 2.1 M.2 socket (for SSD)
Ethernet	LAN1: 1x GbE (RJ-45) + (<u>optional</u>) LAN2: 1x GbE (RJ45)
WiFi/BT	WiFi 802.11 b/g/n/ac + Bluetooth 5.2 (optional)
COM port	2x RS232 (or RS485) port + 2x RS232
GPIO	8-bit digital input/output (3.3V)
CAN	2x CAN-FD (optional)
Console port	1× UART (console / debug)
I ² C port	1x I ² C master port
SPI	1x SPI port
ΡοΕ	PoE connector on LAN1 for external PoE module (optional)
Power Input	DC 12V-24V (optional 9V-36V with over-voltage/current protection)
МСИ	(optional) MCU for software power on/off
Operating Temperature	0°C to 70°C -20°C to 70°C
Dimension	146mm x 101mm x H
Weight	<tbd></tbd>

3. Setup

3.1 Console / Debug Port

To use the Debug port, please follow the following steps. You can refer to the Quick Start Guide for more detail.



Console port schematic:+/



① First, connect to debug port and run your hyper terminal program of choice.



Make sure you have a USB UART cable. Please note the cable is not included with this product.

The USB cable comes with four colored terminals. Connect them as shown below.



WARNING: Do NOT connect the red cable (VCC) to the board.

USB UART terminal	CN12 pin number
White (TXD)	pin 2 (RXD)
Green (RXD)	pin 4 (TXD)
Black (GND)	Pin 1 (GND) or pin 5 (GND)

② Connect to PC

The SBC3300 is based on a Silicon Lab CP210X chip. You may need to download and install the driver if your PC does not support it. Please download the file from here: <u>https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers</u>.

Run your terminal emulation program of choice (e.g. TeraTerm) and open the Serial/COM port.

○ TCP/IP	Host:	myhost.exa	mple.com		\sim
	Service:	✓ History ○ Telnet	TCP por	t#; 22	
		SSH	SSH version:	SSH2	
		O Other	Protocol:	UNSPEC	
Serial	Port:	COM9: Silic	con Labs CP210x	USB to U	J ~
	ОК	Cance	l Help]	

Port:	COM9	\sim	ОК
Baud rate:	115200	~	
Data:	8 bit	\sim	Cancel
Parity:	none	\sim	
Stop:	1 bit	\sim	Help
Flow control:	none	\sim	

If the connection is successful, the console will display "\$" to indicate it is waiting for a command.

🜉 COM3:115200baud - Tera Term VT	
File Edit Setup Control Window Resize Help	
<pre>="gnss@1.0-servic" name="idVendor" dev="sysfs" ino=17625 scontext=u:r:hal_ tcontext=u:object_r:sysfs:s0 tclass=file permissive=1 [59.668725] type=1400 audit(1588227222.166:101): avc: denied { open } f ="gnss@1.0-servic" path="/sys/devices/platform/ff340000.usb/usb2/2-1/idVer " ino=17625 scontext=u:r:hal_gnss_default:s0 tcontext=u:object_r:sysfs:s0 missive=1 [59.669730] type=1400 audit(1588227222.166:101): avc: denied { open } f ="gnss@1.0-servic" path="/sys/devices/platform/ff340000.usb/usb2/2-1/idVer " ino=17625 scontext=u:r:hal_gnss_default:s0 tcontext=u:object_r:sysfs:s0</pre>	gnss_default:s0 [^] for pid=248 comm ndor" dev="sysfs tclass=file per for pid=248 comm ndor" dev="sysfs tclass=file per
<pre>missive=1 [59.669830] type=1400 audit(1588227222.166:102): avc: denied { getattr omm="gnss@1.0-servic" path="/sys/devices/platform/ff340000.usb/usb2/2-1/id sfs" ino=17625 scontext=u:r:hal_gnss_default:s0 tcontext=u:object_r:sysfs: permissive=1</pre>	} for pid=248 c Vendor" dev="sy s0 tclass=file
<pre>console:/ \$ console:/ \$ console:/ \$ [324.075644] type=1400 audit(1588227222.166:102): avc: denied or pid=248 comm="gnss@1.0-servic" path="/sys/devices/platform/ff340000.usb dor" dev="sysfs" ino=17625 scontext=u:r:hal_gnss_default:s0 tcontext=u:obj tclass=file permissive=1 [324.075934] type=1400 audit(1588227486.576:103): avc: denied { write } m="gnss@1.0-servic" name="rild-gps" dev="tmpfs" ino=14471 scontext=u:r:hal 0 tcontext=u:object_r:socket_device:s0 tclass=sock_file permissive=1</pre>	ed { getattr } f o/usb2/2-1/idVen ject_r:sysfs:s0 for pid=248 com _gnss_default:s
<pre>console:/ \$ console:/ \$ console:/ \$ console:/ \$</pre>	
At this point, the device has entered debug mode. Type "su" into the	console

to enter root mode.

<pre>console:/</pre>	\$	
<pre>console:/</pre>	\$	
<pre>console:/</pre>	\$	
<pre>console:/</pre>	\$	รม
<pre>console:/</pre>	#	

A "#" indicates the system is now in root mode.

3.2 Start Running

12V-24V DC input (3-pin terminal block) (optional 9V-36V) Note: Tie pin1 and pin3 together if you do not connect pin3 to "ignition" input. Schematic:



4. Running Software

4.1 Android

4.1.1 Desktop



Ø

9:50 AN							
	Q Search apps						
	<u>-</u> + =		۵				
	Calculator	Calendar	Camera	Clock			
	8	6					
	Contacts	Explorer	Files	Gallery			
	\bigcirc	۲		\$			
	Lightning	Music	Search	Settings			

4.1.2 APK install

Following are the steps how to install apps from external devices.

	• •				«=\/pi	
1)	Goto	USB	devices	\rightarrow And	"EXPL	_ORE

9:51 AM Tue, Mar 22					1 50%
\Diamond	*	$\overline{\bigcirc}$		•	Z
បា Settings					^
Kingston US For transferr	B drive ing photos and r	nedia			
EXPLORE	EJECT				
G)			Į.	
			Search	Settings	

2) You can now using USB devices to install apps you want.

9:52 AM 🛈 🛈 🜵

≡	KINGSTON (Q	0 0 0
I	MX Player_v1.24.6.apk Dec 23, 2020	34.83 MB	Android application	
ı Î	MX_Player-1.10.44.apk Mar 12, 2019	28.31 MB	Android application	
Ĩ	RFTestTool.apk Apr 8	124 kB	Android application	
I	Root Checker_v6.5.0_ap	kpure.com.apk 11.39 MB	Android application	
	test.wav	•••		

Ð

3) Click APK File and CONTINUE to install



9:57 AM	() () ()			6	9
≡	KINGST	ON (Q		
T	MX Player_ Dec 23, 20	v1.24.6.apk	application		
ı.	MX_Play Mar 12, 20	Installing	application		
T	RFTestT Apr 8	CANCEL	application		
	Root Check Jul 1, 2021	ker_v6.5.0_apkpure.com.apk 11.39 MB Androi	d application		
		◀• ◀ ● ■ ◀)			

4.1.3 Sound Settings

Go to $\textbf{Apps} \rightarrow \textbf{Settings} \rightarrow \textbf{Sound}$ to set up sound volume.



4.1.4 Apps

Go to Settings \rightarrow Apps to manage all apps. You can force-stop or uninstall an app that you have installed.



4.1.5 Language & Input

You can change the UI display language and the default input methods.

10:02 AN	И 🛈 🛈 🖞	9
÷	System	Q
	Languages & input Android Keyboard (AOSP)	
	Gestures	
0	Date & time GMT+00:00	
٨	Backup Off	
	Advanced 🔶 ┥ 🖝 🖿 🕩 Reset options, Multiple users	

4.1.6 Power Button Switch(SW1)

When DC power is applied to DC input connector, SBC will be turned on automatically.

SBC can be **Power off/Restart/Emergency** if SW1 pin1 and pin2 are short for more than 2 seconds.

* Emergency		ل Power off		Č Restart
	• <	•	■))	

4.1.7 Reset Switch(SW2)

Short SW2 pin1 and pin2 to do SBC hardware reset.

4.1.8 COM (RS232/RS485) Port

To test serial communication on Android OS, you can use our demo APP "**uart_demo.apk**" application. Please contact with us if you want this APP.

1. Click upper right menu

6:26 AM 🕑 🜵		۵
uartdemo		1
		*
2. Click "Config" t ====== RS23 UART CN35 RS232 CN32 RS232 CN28 RS232 CN36 RS485 Poud rate: 115200	o set <u>Device name</u> & <u>Baud rate</u> 2/RS485(CN35 CN36 CN28 CN32) x4 test ====== Device name tyS3 ttyS5 ttyS7 ttyS4 8 bit ten bit 1 non perity, pen flow centrel	:=
Dauu rate. 115200,	o bit, top bit, i , non parity, non now control	

6:22 AM 🗘 🕴	0
uartdemo	Config
	console
	Іоор
	send10101010
	about

	u()	•	•)		
6:25 AM 🛈 🜵					Ø
Device /dev/ttyS5					
Baud rate 1152000					



3. And click "Console" to test receiving & transmission function



The red box is the test receiving function(RX)

Type any number or sentence in terminal window (COMXX)on your PC desktop and you should see the same output appears in the demo uart (Pic red box).

The blue box is the test transmission function(TX)

Type any number or sentence in the demo uart (Pic blue box), remember using the USB keyboard connected to SBC3500 USB poet to enter into the blue box and "Enter " in USB keyboard, so you should see the same output appears in terminal window (CONxxx)

6:26 AM 🕐 🖞	Ø
Reception	
	Ι
Emission	

We take a test video for reference:

https://drive.google.com/file/d/1xcQJclhnWp0p16vf72mxY2jougr-5U5U/view?usp=sharing

4.1.9 The WiFi/BT

Go t	to "Settings" → "Network & internet" → "Wi-Fi"	
5:29 AN	AM 🛈 🛈 🖞	Ø
÷	Network & internet	م
((•	Wi-Fi Off	
	Mobile network	
	Airplane mode	
<···>	Ethernet	
	Mobile plan	
~	Advanced Hotspot & tethering, Data Saver, VPN, Private DNS	
:nat :29 AM		Į.
÷	Wi-Fi	Q
	Use Wi-Fi	
(j)		k
	Wi-Fi preferences Wi-Fi doesn't turn back on automatically	
	Wi-Fi data usage 0 B used May 9 – Jun 6	

Choose your WiFI AP SSID name and input password



Connected success

9:40 AM	() () ψ		☞ 🛙
÷	Wi-Fi		۹
	Use Wi-Fi		
$\widehat{\mathbf{v}}$	icnexus Connected		۹
$\widehat{\mathbf{v}}$	icnexus_5G		€
\bigtriangledown	Galaxy A53 5G631A_Finland		Ð
\bigtriangledown	icnexus-1		Ð
+	Add network	•	818 8+
	Wi-Fi preferences Wi-Fi doesn't turn back on automatically		
	Saved networks:		

The Bluetooth, go to "Settings " \rightarrow "Connected devices " 9:50 AM O O P

9:50 AN		☞ 3
٩	Search settings	
ę		×
Custo Try dif	tomize your phone ifferent styles, wallpapers, and more	
6		×
Secu Set so	u re your phone creen lock to protect tablet	
Ŷ	Network & internet Wi-Fi, mobile, data usage, and hotspot	
60	Connected devices Bluetooth	
	Apps & notifications 🔶 🔹 🔹 🔹	

Choose " + Pair new devices "

9:51 AM	① ① 单	♥ 🖟
÷	Connected devices	Q
	OTHER DEVICES	
धीः	USB Charging this device	
+	Pair new device Bluetooth will turn on to pair	
	PREVIOUSLY CONNECTED DEVICES	
>	See all Bluetooth will turn on	
	Connection preferences Bluetooth	
(j)	Turn on Bluetooth to connect to other devices.	

Search your Bluetooth devices and pair it.

9:52 AM	0 0 ⁴	♥ 🖗
÷	Pair new device	Q
	Device name rk356X	
	Available devices	υ
e.	iPhoneJC	
*	Mi Smart Band 5	
í	Tablet's Bluetooth address: 22:22:4F:C2:09:00	
	•• • • • •	

4.1.1 CAN bus test

=====CAN bus test====== ip link set can0 type can bitrate 125000 dbitrate 2000000 fd on ip link set can0 up

ip link set can1 type can bitrate 125000 dbitrate 2000000 fd on ip link set can1 up

CAN-FD candump can0 & cansend can1 012##1.00112233445566778899AABBCCDDEEFF

4.2 Ubuntu Linux

4.2.1 Linux Desktop

Find your Home folder, File System and external storage here.



4.2.2 Screensaver

Like Android, Ubuntu also has the sleep mode. To disable the sleep mode, you can go to **Settings** \rightarrow **Screensaver Preference** \rightarrow **Display Modes**. Seclet the mode <u>**Disable Screen Saver**</u>.

le Help	nsaver Preferences (XScreenSaver 5.34, 24-Oct-2015)	- +
Display Modes Advanced	Screen Saver Disabled	
StarWars		
StonerView		
Strange		
Substrate		
Superquadrics		
Surfaces		
Tangram		
V		
Blank After 10 🗘	minutes	
Cycle After 10	minutes Preview	
Lock Screen After 0	minutes	

4.2.3 Power Button Switch(SW1) When DC power is applied to DC input connector, SBC will be turned on automatically.

SBC can be **Shutdown** if SW2 pin1 and pin2 are short for more than 2 seconds.

Suspend Mode, if wake up processor from Suspend Mode,

		23:59
	lubuntu®	1
	Logout Lubuntu 18.04 session ?	·
	C Reboot	OC
Onboard	Switch User	
	Logout ⊗Cancel	

Default user (icnexus), password: i1234

	 en en en en
icnexus I I Unlock	

4.2.4 The WiFi/BT





4.2.5 Test COM port by command

=====RS232/RS485(CN35 CN36 CN28 CN32) test======

CN32 RS232 ttyS5

CN35 RS232 ttyS3

CN28 RS232 ttyS7

CN36 RS485 ttyS4

• RS232

cat /dev/ttyS3 &

echo abcde > /dev/ttyS5



root@cnx:~# cat /dev/ttyS3 & [1] 822 root@cnx:~# echo abcde > /dev/ttyS5 abcde

cat /dev/ttyS3 &

echo qwert > /dev/ttyS7



root@cnx:~# echo qwert > /dev/ttyS7
qwert
root@cnx:~# echo qwert > /dev/ttyS7
awert

- RS485
- # stty -F /dev/ttyS4

speed 9600 baud; line = 0;

-brkint -imaxbel

// Baud rate is 9600



Default is to receive:

cat /dev/ttyS4

RE Pol(No.9) Descusional Autorials 2022-06-0 SEC5500	👢 COM8:115200baud - Tera Term VT – 🗆 🗙
-Richiann Machanico Eligibilizi (Wingd	File Edit Setup Control Window Resize Help
E tentuar ou begen 1990-392 E tentuar ou begen 1990-392 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	root@enx:== ^ ^ root@enx:== root@enx:== root@enx:== root@enx:== root@enx:== root@enx:== cat /dev/ttyS3 & [2] 826 root@enx:== cho gwert > /dev/ttyS7
32 Witpercell Biology Still Start tentennikeg tentennigg Biology Start Uppercell 1.50	[370.992703] of_dma_request_slave_channel: dma-names property of node '/serial@fe6b0000' missing or empt
DER 2019 Samer Lat 10/12 (2019) DDR taj Samer	y qwert qwert ====================================
SCOM4:9600baud - Tera Term VT - 🗆 X	root@cnx:~# [413.078675] [dhd-wlan0] wl run escan : LEGACY SCAN sync ID: 9. bssidx: 0
File Edit Setup Control Window Resize Help	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
	root@cnx:-# root@cnx:-# root@cnx:-# root@cnx:-# [917.030903] [dhd-wlan0] wl_run_escan : LEGACY_SCAN sync ID: 17, bssidx: 0
	root@cnx:=# root@cnx: # root@cnx: # cat /dev/ttyS4 _ 919.60
	test rs485

test transmission function(TX)

echo 1 > /sys/class/leds/rs485_d2/brightness

echo abcde > /dev/ttyS4



4.2.6 CAN bus test

======CAN bus test======

apt-get update

apt-get -y install can-utils

ip link set can0 type can bitrate 125000 dbitrate 2000000 fd on ip link set can0 up

ip link set can1 type can bitrate 125000 dbitrate 2000000 fd on ip link set can1 up

CAN-FD

candump can0 &

cansend can1 012##1.00112233445566778899AABBCCDDEEFF

For any further informatin that we do not mention in the manual, please contact us directly.