

# 介绍

LuckFox Pico 与 LuckFox Pico Plus 是一款基于瑞芯微 RV1103 芯片的低成本微型 linux 开发板,旨在为开发者提供一个简单且高效的开发平台。RV1103 是一款专门用于人工智能相关应用的高度集成 IPC 视觉处理器 SoC。它基于单核 ARM Cortex-A7 32 位内核,集成了 NEON 和 FPU,并内置 NPU 支持 INT4 / INT8 / INT16 混合运算,计算能力高达 0.5TOPs。

此外,它采用了全新的基于硬件的 ISP,支持多种算法加速器,如 HDR、3A、LSC、3DNR、2DNR、锐化、去雾、伽马校正等。同时,它还具有内置的16位DRAM DDR2,可维持要求苛刻的内存带宽,以及内置的 POR,音频编解码器和 MAC PHY。总之,RV1103 是一款功能强大的处理器,适用于各种人工智能应用场景。

这款开发板适用于各种场景的应用,包括但不限于:

- 智能家居设备
- 工业自动化设备
- 机器人及无人机
- 智能监控设备
- 智能交通设备
- 智能医疗设备

开发板支持多个接口,包括 GPIO、UART、SPI、I2C、USB 等,方便开发者进行快速开发和调试。

# 产品参数

Luckfox Pico	规格
处理器	Cortex A7 1.2GHz + RISC-V
神经网络处理器 (NPU)	0.5TOPS,支持int4、in8、int16
图像处理器 (ISP)	最大输入4M @30fps
内存	64MB DDR2

Luckfox Pico	规格
USB	USB 2.0 Host/Device
摄像头接口	MIPI CSI 2-lane
GPIO	24 个 GPIO 引脚
図口	10/100M Ethernet controller and embedded PHY
默认存储介质	Mirco SD 卡座

Luckfox Pico Plus	规格
处理器	Cortex A7 1.2GHz + RISC-V
神经网络处理器 (NPU)	0.5TOPS,支持int4、in8、int16
图像处理器(ISP)	最大输入4M @30fps
内存	64MB DDR2
USB	USB 2.0 Host/Device
摄像头接口	MIPI CSI 2-lane
GPIO	25 个 GPIO 引脚
	10/100M Ethernet controller and embedded PHY
默认存储介质	SPI NAND FLASH(128MB)

# 器材准备

- Luckfox Pico Plus 或 Luckfox Pico 开发板
- USB Type-A to Type-C 数据线
- 100M/1000M 以太网线缆,及路由器
- 串口转 USB 模块
- USB 读卡器以及 SD 卡

# 安装驱动

- 1. 下载RK驱动助手 DriverAssitant(戳我下载)。
- 2. 打开RK驱动助手 DriverAssitant 安装 USB 驱动程序,此过程无需连接,安装完成后重启电脑。



# 镜像下载

为用户提供了适配 LuckFox Pico 的 SD 卡固件和 LuckFox Pico Plus 的SPI FLASH固件。

版本	描述	下载
BusyBOX	LuckFox Pico固件和LuckFox Pico Plus SPI FLASH固件	镜像百度网盘链接

# 镜像烧录

LuckFox Pico 由于默认存储介质是 SD 卡出厂未烧录镜像,LuckFox Pico Plus 由于默认存储介质 SPI NAND FLASH 出厂默认已经烧录镜像。

## 烧录 SPI NAND Flash (适用于LuckFox Pico Plus)

#### 1. 下载和解压烧录工具(戳我下载)。

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ovnload Firmware SDTool	ol Help					
USB   COM   Name   Address   Path     Chip Selection   Chip Support List   RV1103   OK   Cancel     Download   Advanced Feature     @ reset   Download     Firmware   Upgrade	ownload	Firmware S	DTool			
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				Firmware Upgrade		

2. Luckfox Pico Plus 在 Windows下载固件库方法:

① 按住 BOOT 键后连接电脑后,松开 BOOT 键,瑞芯微刷机工具就会显示 MaskRom 设备。

- ② 加载固件的存放目录, 重载 env 文件, 勾选所有项。
- ③点击下载。

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0	COM		~	Baudrate: V		Download idblock		
		Name	Address	Path		Write LBA from file (100%)		
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2	$\checkmark$	env	0x00000000	D:\Luckfox\pub\pub\luckfox_pico_plus_image\env.img		Write LBA from file (100%)		
3		idblock	0x00040000	idblock.img		Download ubootOK		
4		uboot	0x00080000	uboot.img	-	Write LBA from file (100%)		
5		boot	0x00100000	boot.img		Download rootfs		
6	$\checkmark$	rootfs	0x00500000	rootfs.img		start to erase0x2800,0x10000 erase done		
7		oem	0x02500000	oem.img		Write LBA from file (100%)		
8		userdata	0x05500000	userdata.img				
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						Reset done.		
						Download done.		

## 擦除SPI NAND Flash (适用于LuckFox Pico Plus)

LuckFox Pico Plus 如果想要使用 SD 卡启动,需要先擦除 SPI FLASH,烧录 SD 卡方法与 LuckFox Pico 方法一致。擦除方法如下:

- ① 加载固件,选择高级功能。
- ② 下载 DownloadBin。

#### ③点击全部擦除。

🛷 Rockchip S	Soc ToolKit v1.8	35(RV1103)			- o ×
Tool Help					
Download	Firmware	SDTool			
O USB	Maskrom r	rockchip 22 🛛 🗸			Start to erase
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3 🗌 id	block	0x00040000	idblock.img		
4 🗌 ul	poot	0x00080000	uboot.img		
5 🗌 bo	oot	0x00100000	boot.img		
6 🗌 rc	ootfs	0x00500000	rootfs.img		
7 🗌 0	em	0x02500000	oem.img		
8 🗌 u	serdata	0x05500000	userdata.img		
Download Offset: Erase Reset	Advanced Read Go Maskr	Feature 1 Count: Erase All rom DownloadBir	F3       FlashInfo       ReadCapability         12       ce Partition Table       ReadComLog         Loader       Upgrade       To IDB         Parameter       Upgrade       To G	ilock PT	

## SD 卡烧录

Luckfox Pico 在 Windows 下载固件库方法:

- ① 将 SD 卡装在读卡器并连接到电脑,选择 SD 卡工具。
- ② 在 USB 磁盘下会显示 SD 卡大小,如果未显示重新插拔读卡器。
- ③ 选择 SD卡启动。
- ④导入启动文件。

### ⑤点击创建 SD 卡。

Tool       Help         Download       Firmware       SDtool         Usb Disk: 2 Generic 14.8G	Rockchip Soc ToolKit v1.85(RV1103)	- D X
Download       Firmware       SDIcol         Usb Didk:       2 Generic 14.83       2         SD Upgrade       SD Exect       Start to create sclard for booting         Write disk from file (100%)       Write envOK         Write idblocking       Write idblockGK         D:Luckfox/image/booting       Write idblockGK         D:Luckfox/image/userdata.img       Write idblockGK         Upgrade Files       Write idblockGK         Upgrade Files       Write obstGK         Creete SD       Read SD       read sector offset         read sector count       write disk from file (100%)	Tool Help	
Usb Disk: 2 Generic 14.86       Image: SD Boot       Start to create sdcard for booting         O SD Upgrade       SD Boot       SD Boot       Write env         Disk: 2 Generic 14.86       Image: SD Boot       Write env       Write env         Disk: 2 Generic 14.86       Image: SD Boot       Write env       Write env         Disk: 2 Generic 14.86       Image: SD Boot       Write env       Write env         Disk: 2 Generic 14.86       Image: SD Boot       Write env       Write env         Disk: 2 Generic 14.86       Image: SD Boot       Write env       Write env         Disk: 2 Generic 14.86       Image: SD Boot       Image: SD Boot       Write env       Write env         Disk: 2 Generic 14.86       Image: SD Boot       Image: So D Boot       Image: So D Boot       Write env       Write env.	Download Firmware SDTool	
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	Create SD Store SD Read SD read sector offset read sector count	







- 2. 打开电脑设置,搜索设备管理器,查看设备管理器对应的 COM 口并记录下来。
- 3. 下载 MobaXterm 远程登录软件 (戳我下载),解压即可使用。

4. 打开 MobaXterm 远程登录软件,选择 Session->Serial,设置串口的波特率波特率为115200。

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#### 5. 点击OK,按下回车,输入登录名和登录密码就可以登陆了。



## 网络ADB调试

#### 安装 ADB

1. 下载 ADB 安装包, 解压即可使用(戳我下载)。

2. 右键我的电脑属性-->高级系统设置-->环境变量。



### 3. 系统变量—>编辑—>将adb解压路径新建进去。

Variable	Value				
OneDrive	C·\Users\ciw\One	Drive			
Path	C:\Users\ciw\Appl	Data\Local\Micros	oft\WindowsApp	s::C:\Users\	
TEMP C:\Users\cjw\AppData\Local\Temp					
TMP	C:\Users\cjw\Appl	C:\Users\cjw\AppData\Local\Temp			
		New	Edit	Delete	
		New	Edit	Delete	
		New	Edit	Delete	
rstem variables	nd	New	Edit	Delete	
rstem variables Variable	Value	New	Edit	Delete	
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rstem variables Variable ComSpec DriverData	Value C:\Windows\syste C:\Windows\Syste	New em32\cmd.exe em32\Drivers\Drive	Edit erData	Delete	
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4. 点击确定保存环境变量。

lit environment variable		
%SystemRoot%\system32	1	New
%SystemRoot%		
%SystemRoot%\System32\Wbem		Edit
%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\		
%SYSTEMROOT%\System32\OpenSSH\ D:\Luckfox\adb_fastboot		Browse
		Delete
	2	Move Up
	Ð	Move Down
		Edit text
	ОК	Cancel
		curreer

### 配置 RNDIS 虚拟网口

LuckFox Pico 和 LuckFox Pico Plus 的 USB 虚拟网卡具有静态 IP 地址为172.32.0.93。在使用之前,需要设置RNDIS虚拟网口。对于 LuckFox Pico Plus 开发板,使用网口则无需进行配置。

1. Windows 安全中心—>防火墙和网络保护—>关闭防火墙。

```
□ 公用网络 (使用中)
防火墙已关闭。
```

2. 配置 RNDIS 网卡的静态IP, 打开设置—>高级网络设置—>更改适配器选项。

3. 网卡一般是类似这样的名字Remote NDIS based nternet Sharing Device,右键属性。



4. 双击 internet 协议版本 (TCP/IPv4), IPV4地址设置为 172.32.0.100, 避免和设备地址冲突。

📱 以太网 4 属性		×
网络共享		
连接时使用:		
Remote NDIS	based Internet Sharing	g Device
		配置(C)
此连接使用下列项目(O	):	
🗹 🖳 Microsoft 网络	路户端	^
🗹 🐙 VMware Bridg	ge Protocol	
🗹 🖳 Microsoft 网络	的文件和打印机共享	
🗹 🐙 VirtualBox ND	IS6 Bridged Network	ing Driver
🗹 🐙 Npcap Packet	t Driver (NPCAP)	10 11
☑ 🥮 ೧ 数据有计	別程库	
☑ _ Internet 协议版	反本 4 (TCP/IPv4)	
🔲 🔹 Microsoft 网络	矿配器多路传送器协议	<b>-</b>
<		>
安装(N)	卸载(U)	属性(R)
描述		
传输控制协议/Inter	net 协议,该协议是默认	的广域网络协议,用
于在不同的相互连接	的网络上通信。	
	74	<b>定</b> 即当
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Internet 协议版本 4 (TCP/IPv4) 属性		×		
常规				
如果网络支持此功能,则可以获取自动指派的 IP 设置。否则,你需要从网络系统管理员处获得适当的 IP 设置。				
○ 自动获得 IP 地址(O)				
●使用下面的 IP 地址(S):				
IP 地址(I):	172.32.0.100			
子网掩码(U):	255.255.0.0			
默认网关(D):				
○ 自动获得 DNS 服务器地址(B)				
●使用下面的 DNS 服务器地址(E):		-		
首选 DNS 服务器(P):				
备用 DNS 服务器(A):				
□ 退出时验证设置(L)	高级(V)			
	确定取消	j		

### ADB 登录

1. 按下 Win + R 快捷键输入 CMD 打开 Windows 终端,在终端输入 ADB 命令即可查看 ADB 相关信息。

```
🖭 C:\Windows\system32\cmd.e: × + 🗸
Microsoft Windows [Version 10.0.22621.1992]
(c) Microsoft Corporation. All rights reserved.
C:\Users\cjw>adb
Android Debug Bridge version 1.0.41
Version 31.0.2-eng.lsh.20220519.123535
RockChip modified
Installed as D:\Luckfox\adb_fastboot\adb.exe
global options:
            listen on all network interfaces, not just localhost
 -a
 -d
            use USB device (error if multiple devices connected)
            use TCP/IP device (error if multiple TCP/IP devices available)
 -e
 -s SERIAL use device with given serial (overrides $ANDROID_SERIAL)
            or devices devpath like:
            adb -s "\\?\usb#vid_2207&pid_0006#6&3795fe82&1&1#{f72fe0d4-cbcb-407d-8814-9ed673d0dd6b}" shell
            adb -s usb:3-1.2 shell
 -t ID
            use device with given transport id
 -H
            name of adb server host [default=localhost]
            port of adb server [default=5037]
 -P
 -L SOCKET listen on given socket for adb server [default=tcp:localhost:5037]
general commands:
 devices [-l]
                          list connected devices (-l for long output)
 help
                          show this help message
 version
                          show version num
networking:
 connect HOST[:PORT]
                          connect to a device via TCP/IP [default port=5555]
```

#### 2. 使用 ADB 连接 Luckfox Pico。

C:\Users\cjw>adb connect 172.32.0.93 ## already connected to 172.32.0.93:5555

#### 3. 查看 ADB 设备。

```
C:\Users\cjw>adb devices
## List of devices attached
## 172.32.0.93:5555 device
```

#### 4. 登录到开发板。

```
C:\Users\cjw>adb -s 172.32.0.93:5555 shell #
```

# 文件传输

## TFTP传输文件

1. 开发板需要确保可以正常联网。

- 2. 开发板的 IP 地址可以通过登录路由器查看、局域网IP扫描工具扫描或者串口调试等方式获取。
- 3. 下文中开发板的 IP 地址为 172.32.0.93, 服务器的IP地址为 192.168.10.127。
- 4. 下载以下免安装包, 解压即可使用。

🏘 Tftpd64 by Ph	. Jounin	_		
Current Directory	D:\Luckfox\image	-	Browse	
Server interfaces	127.0.0.1	Software L 🔻	Show Dir	
Tftp Server Tftp Client DHCP server Syslog server Log viewer				
peer	file	start time	progress	
			$n \geq 1/2$	
About	Settin	gs	Help	

5. 通过网终 TFTP 传输文件。

# 从PC端tftp服务器下载文件到开发板 tftp 192.168.10.127 -g -r tftp\_get.txt tftp 192.168.10.127 -g -r sysfs\_gpio

# 从开发板上传文件到PC端tftp服务器 tftp 192.168.10.127 -p -l tftp\_push.txt

## ADB 传输文件

1. 从 PC 端上传 test\_file.tx t到开发板的 /userdata 目录。

```
adb -s 172.32.0.93:5555 push test_file.txt /userdata
```

2. 下载开发板 /userdata 目录下的 test\_file.txt 到 PC 端。

adb -s 172.32.0.93:5555 pull /userdata/test\_file.txt test\_file.txt

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