StarFive 赛昉科技

VisionFive 2 Software Release Notes

Version: P

Date: 2024-09-29

Shanghai StarFive Technology Co., Ltd.

Address:	Room 502, Building 2, No. 61 Shengxia Rd., China (Shanghai) Pilot Free Trade Zone, Shanghai, 201203, China
Website:	www.starfivetech.com
Email:	sales@starfivetech.com (sales) support@starfivetech.com (support)

1 About This Manual

Introduction
This document provides release information of VisionFive2 SBC Software.

Revision History

Version	Released	Change Description
A	2022-09-05	VisionFive2 Software v1.0.0 Pre-release
B	2022-10-27	VisionFive2 Software v2.2.0 Pre-release
C	2022-11-15	VisionFive2 Software v2.4.1 Pre-release
D	2022-12-23	VisionFive2 Software v2.5.0 Pre-release
E	2023-01-18	VisionFive2 Software v2.8.0 Pre-release
F	2023-02-27	VisionFive2 Software v2.10.4 Pre-release
G	2023-03-25	VisionFive2 Software v2.11.5 Pre-release
H	2023-05-31	VisionFive2 Software v3.0.4 Pre-release
I	2023-08-08	VisionFive2 Software v3.4.5 Pre-release
J	2023-09-27	VisionFive2 Software v3.7.5 Pre-release
K	2023-10-31	VisionFive2 Software v3.8.2 Pre-release
L	2023-11-30	VisionFive2 Software v3.9.3 Pre-release
M	2023-12-28	VisionFive2 Software v5.10.3 Pre-release
N	2024-03-15	VisionFive2 Software v5.11.3 Pre-release
O	2024-05-13	VisionFive2 Software v5.12.0 Pre-release
P	2024-09-29	VisionFive2 Software v5.13.1 Pre-release

Table of Contents

2 Overview

This document contains important information about the VisionFive2 Software, supported features, known issues and limitations in this release.

Supported Single Board Computer:
- VisionFive2 Board v1.2A and v1.3B

2.1 Release contents

This release consists of the following:
- Pre-build images
- u-boot Binaries
- Source code

Table 2-1 Pre-build Image & Binaries

File	Description
Image.fit	FIT image (kernel/dtb/initramfs)
Image.gz	Kernel compressed image file
initramfs.cpio.gz	Root filesystem based on ram
Visioinfive2_fw_payload.img	OpenSBI binaries with u-boot as payload
u-boot-spl.bin.normal.out	SPL binary
sdcard.img	TF card/eMMC/nvme image including SPL/u-boot/Kernel/FS
dts and dtbo files	Device tree binary and device tree binary overlay

Table 2-2 Table 1-2 Source Code with tags

Deliverable	Version	Source	Tags
VisionFive	v5.13.1	gitlab github	VF2_515_v5.13.1 VF2_6.6_v5.13.1
Linux Kernel	5.15.0 6.6		
OpenSBI	v1.2		
u-boot	2021.10		
Buildroot	2021.11		

3 What's New

This section describes the changes in this release, including new features and updates.

3.1 New Features

A summary of the main new features are as follows.

- Support JH7110 SDK v5.13.1;
- Support VisionFive2 v1.2A & 1.3B SBC;
- Support Linux Kernel 5.15.0 and 6.6.20;
- Add amp ipi interrupt and rpmsg driver support;
- Add RT-Thread AMP (running on one U74 core) support;
- Add MCU core driver and sample code support;
- Significantly reduces system startup time;
- Modify buildroot config to download linux header from local repo;

3.2 Fixed Issues

- JPU: fix array index out of range in irq handler;
- ENC: add retry counter to avoid query status failure in RTlinux;
- Package/sf-gst-omx: Fix omxmjpegdec decoder cannot set the frame rate;
- ALSA: Drop 2s sleep before print ALSA device list;
- i2c: designware_i2c: Revert a part of commit "i2c:desigware-snps: add i2c clock config";
- Clk: starfive: jh7110: Drop i2c core clock;
- Pinctrl: starfive: fix gpio level-triggered interrupt exception;
- phy: starfive: jh7110-usb: Fix link configuration to controller;

3.3 GStreamer plugins

GStreamer version: 1.18.5

Table 4-1 GStreamer plugins

Module	Plugin
source	**v4l2src**: V4L2-based camera source plugin **alsasrc**: ALSA-based audio source plugin
sink	**kmssink**: kmssink is a simple video sink that renders video frames directly in a plane of a DRM device **alsasink**: ALSA-based audio sink plugin
decoder	**omxh264dec, omxh265dec**: VPU-based video decoder plugin **omxmjpegdec**: JPU-based JPEG/MJPEG decoder plugin
encoder	**omxh265enc**: VPU-based video encoder plugin

3.4 FFMPEG plugins

FFMPEG version: 4.4.1

Table 4-2 FFMPEG plugins

Module	Plugin
avcodec	**h264_omx**: VPU-based h264 codec plugin **hevc_omx**: VPU-based h265 codec plugin **mjpeg_omx**: JPU-based JPEG/MJPEG decoder plugin
avdevice	**v4l2**: V4L2-based input video device **alsa**: ALSA-based audio input/output device

3.5 Multimedia feature matrix

This section provides feature matrix for multimedia

Table 4-3 Supported VPU encode & decode YUV format

	NV12	NV21	I420
Driver	Y	Y	Y
OMX	Y	Y	Y
GStreamer	Y	Y	Y
FFMPEG	Y	Y	Y

Supported audio/video container format:

- MP4
- AVI (only h264 decoder)
- MKV
- MOV

Table 4-6 Supported JPU decode format

	NV12	NV21	I420	I422	I444	YUV422	YUV444
Driver	Y	Y	Y	Y	Y	Y	Y
OMX	Y	Y	Y	Y	Y	Y	Y
GStreamer	Y	Y	Y	Y	Y	Y	Y
FFMPEG	Y	Y	Y	Y	Y	Y	Y

Supported image codec format:

- jpg
- mjpeg

4 BSP Supported Features

The following table describes the features that are supported in this release. In this table, if no board is explicitly stated, the feature is shared across all boards listed in Section Overview. Otherwise, the feature is only supported on the boards listed.

Table 5-1. Supported features

Feature	Comment

Kernel	
Kernel	Kernel version: 5.15.0 / 6.6
File System	Buildroot version: 2021.11 EXT4 is used as the file system in SD card/eMMC.
Boot binary	
U-Boot SPL	Secondary Program Loader, do some initial hardware configuration (e.g. DDR initialization and UART) and load the fully featured U-Boot.
U-Boot Proper	U-Boot delivery is based on U-Boot version 2021.10
Machine-specific layer	
RISC-V core	JH7110 consists of Quad U74 64-bit RISC-V cores
Memory	JH7110 supports 32-bit LPDDR4/DDR4 channels @2133MHz, 4GB/8GB
GPIO/IOMUX	Supports pinctrl sub-system in kernel
Clock	Controls the system frequency and clock tree distribution
DMA	Supports up to 4(DMA Multi-blk) + 4(DMA Single-blk) channels
Power Management drivers	
CPUIdle	Supports WFI mode
CPUFreq	Supports DVFS
Input device drivers	
USB devices	Supports USB mouse and keypad through USB ports
Networking drivers	
ETHERNET	Supports Gigabit PHY (YT8531) & 10/100M PHY (YT8512) for 1.2A version Supports 2x Gigabit PHY (YT8531) for 1.3B version
PCIe	Supports 2x PCIe2.0 1 lane; One is for PCIe to USB; another is for PCIe to NVMe cards(M.2 M Key) Only supports RC mode;
Security drivers	
SHA/HMAC	Support SHA-1/SHA-2/SM3
Encryption	Support AES-ECB/CBC/CFB/OFB/CTR operation modes
AEAD	Support AES-CCM / AES-GCM operation modes
PKA	Support RSA/ECDSA
TRNG	256-bit random number generation
Storage drivers	
QSPI NOR	GD25LQ128
USB drivers	
USB Host	Support USB 3.0/2.0 host USB Host mode: HID, hub, UVC, MSC(Mass Storage Class)
USB Device	Support USB 2.0 device mode (mass storage, adb shell)
Sound drivers	

PWMDAC	Play audio through 3.5mm mini-jack Only S16LE audio files are supported. Support 8KHz/11.025KHz/16KHz/22.05KHz/32KHz/44.1KHz/48KHz sample rate audio files;
I2S	WM8960 ReSpeaker-2-Mics-Pi-HAT, supports record and playback; AC108 record board; Support 16bit / 32bit, 8KHz/11.025KHz/16KHz/22.05KHz/32KHz/44.1KHz/48KHz sample rate stereo audio files;
HDMI audio	Support audio playback through HDMI; Support 16bit / 32bit, 32KHz/48KHz sample rate stereo audio files;
Graphics and Video display drivers	
GPU	PowerVR Rogue BXE-4-32 Support GPU DDK 1.19 Support OpenGL ES 3.2 for Wayland Support EGL 1.4 for Wayland Support OpenCL 3.0 Support Vulkan 1.3
Direct Rendering Manager Display	Display framework for JH7110 as default
HDMI Display	Support on-chip HDMI hardware, display resolution upto 4K@30fps
MIPI DSI Display	Supports 4.3/5/7inch 800*480 MIPI 2-Lane TouchScreen LCD (WaveShare) Supports 8 inch 800*1280 MIPI 4-Lane TouchScreen LCD (Radxa) Supports new 10 inch 1200*1920 MIPI 4-Lane LCD (Radxa)
Video codec drivers	
VPU Dec	Upto 1 channel 4K@30fps, HEVC Main/Main10, L5.1. H.264 High/High10/Main/Baseline Profile, L5.2
VPU Enc	Upto 1channel 1080p@30fps, HEVC
JPU Codec	JPEG / MJPEG encoder and decoder
Video Capture drivers	
V4L2 Capture	Supports 3 camera sensors (IMX219 / IMX708 / OV4689)
MIPI Camera CSI	2-lane CSI MIPI camera IMX219/OV4689 with 1080p30
ISP	Support ISP DDK v2.0.3, AE/AWB/LSC, etc; Support ISP tuning tool v2.0.3;
General drivers	
SDIO/eMMC	2 sets of host controller for SDIO devices: SDIO controller 1 for SD/TF card; SDIO controller 0 for eMMC board;
UART	6 sets of UART controller with auto flow control: UART0 for debug serial port
Watchdog	Supports Watchdog reset, 32bit down counter
Timer	4 sets of timers

I2C	7 sets of I2C master: I2C2 for MIPI-DSI interface; I2C5 for PMIC; I2C6 for MIPI-CSI(imx219);
SPI	7 sets of SPI master mode and slave mode
PWM	8 channels PWM
Temp Sensor	Internal temp sensor, 12-bit resolution
GPIO	Support 64 GPIOs: sysfs(/sys/class/gpio/*) and chardev(/dev/gpiochip*) interface
RTC	Realtime clock

5 Known Issues/Limitations

The following tables list some key know issues

Table 6-1. Known issues and workarounds

Module	Source	Description	Workaround
PWMDAC	Software	Only 22.05K/44.1K audio through PWMDAC are obviously out of sync when playing video/audio file	
SDIO	Software	Some TF cards have compatibility issue	Restart system
GPU	Software	Segmentation fault when running unit tests in DDK 1.19	
GPU	Software	OpenCL CTS segmentation fault in DDK 1.19	
Vulkan CTS test	Software	Failure on 8 test cases of dEQP-VK.memory and dEQp-VK.pipeline.monolithic for the GPU Vulkan CTS test; (Pass: 391847 cases, Not supported: 1164574 cases)	
Crypto	Software	Crypto module hangs intermittently when 6.6 kernel boot-up(workaround: disable RSA module);	