B3VDU software resource specification

Revision History

Name	Date	Reason For Changes	Version
Chen Yong	Jan 14, 2022	Initial draft	1.0.1
Chen Yong	Jul 14, 2022	NUC mode	1.0.2
Chen Yong	Aug 14, 2023	Append Version control List	1.0.3

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2 Referenced documents

3 Requirements

3.1 Required states and modes

3.1.1 verbose information mode

Run application with option '-v', then it will enter into the print verbose information mode. It will print out the verbose information of the VDU and exit.

The verbose information includes: the device info, the configuration data, the error recording data and the working information data.

- The device info:(refer 3.5.2)

Main Version:x.x.x (the whole system version)

App Version:x.x.x (the firmware version)

SN:B3VDU-xxx (the VDU serial Number)

date:xx-xx-xxxx (manufacturing date)

- The Configuration data: (refer 3.5.1)

Configuration: tick=xxxxx night dim=xx mode=x

birghtness=xx contrast=xx color=xx

video source mode=x

- the error recording data:(refer 3.5.1)

Recording:

timestamp=xxxxx info=0xhhhhhhhh desc=xxxxxxxxxxx

....

-------Over-----------

- the working information data:(refer 3.4.6)

Power Current: raw=xxx.xxx scale=x.xxx current=x.xxxx

PS temp:raw=xxx.xxx scale=x.xxx offset=xxx.xxx temp=xx.xxx

3.1.2 Normal working mode

Defaut system booting up, the application will run in this normal working mode. The system script file is in /*etc*/init.d/loaduserapp.sh.

It has a configuration file. The default configuration file is /*etc*/b3vdu.conf. It can be assign a special configuration file by option(-f filename). The configuration file data format refer to 3.5.2

3.2   CSCI capability requirements

3.2.1 Booting up

The maxium system booting up time is less than 20 seconds.

3.2.2 Watchdog enable

Enable watchdog and the application refresh the watchdog timer. The watchdog can restart the system if the application cannot refresh the watchdog.

3.2.3 Video latency

The video latency from the SDI input to the LCD display is less than 50 ms.

3.2.4 Video Error monitor

Keep monitoring the video input. Disable the LCD display output if any error in the video input is found.

3.3   CSCI external interface requirements

3.3.1 USB3.0

3.3.2 LCD

.lvds

.(LCD DIM) PWM output

.(LED DIM) PWM output

output control reference 3.4.2

3.3.3 UART

Format: RS422

Device name: /dev/ttyS1

working mode:Duplex

data: 115200n8

flow control: no

3.3.4 Ethernet

10/100/1000 BASE-T

3.3.5 KeyPad

Interface: axi_gpio_0 (0xa0130000)

Key No	Gpio port	Key name	Linux code	
KEY_DIN_1	<axi_gpio_0 0>	key1	KEY_1(2)	FRONT
KEY_DIN_2	<axi_gpio_0 1>	key2	KEY_2(3)	REAR
KEY_DIN_3	<axi_gpio_0 2>	key3	KEY_3(4)	IR
KEY_DIN_4	<axi_gpio_0 3>	key4	KEY_4(5)	NUC
KEY_DIN_5	<axi_gpio_0 4>	key5	KEY_5(6)	NIGHT
KEY_DIN_6	<axi_gpio_0 5>	key6	KEY_6(7)	MINUS
KEY_DIN_7	<axi_gpio_0 6>	key7	KEY_7(8)	PLUS
KEY_DIN_8	<axi_gpio_0 7>	key8	KEY_8(9)	MENU

3.3.6 SDI Input

control reference 3.4.2

3.3.7 CAN

3.4   CSCI internal interface requirements

3.4.1 I2C

device name: /*dev*/i2c-0

slave chip: mb85rc256vfp **slave address**: 0x50

description: log data storage

3.4.2 Video Registers

Registers Physical address: 0xa0000000

Registers Physical size: 0x2000

Registers data: 32bits

registers	W/R	items	value

0x0000	W/R	brightness	0 - 100
0x0004	W/R	NVG brightness	0 - 100 default 10
0x0008	W/R	NVG mode	0 – normal mode 1 – NVG mode
0x000C	W/R	auto_manu	0 – auto select video 1 – manual select video
0x0010	W/R	osdCtrl	0 – no OSD 1 – overlay OSD
0x0014	W/R	video source	0 – video source 0 1 - video source 1
0x0018	W/R	contrast value	0 – 100 convert to -255 ~ 255 (x- 50) x 255 /50
0x001C	W/R	color value	0 – 100 convert to -255 ~ 255 (x- 50) x 255 /50
0x0100	read only	status	bit 3-0 -- sdi 4 inputs: 0 normal, 1 no signal bit 4 -- ddr read: 0 normal, 1 no read operation bit 5 -- ddr write: 0 normal, 1 no write operation bit 7-6 – display: 00 normal, 01 no signal, 10 error

3.4.3 OSD

Osd physcial address: 0x70000000

Osd Resolution: 1920x1080

Osd format: RGBA32

3.4.4 iio sensor

CPU:/sys/bus/iio/devices/iio\:device0

Power Current Sensor:/sys/bus/iio/devices/iio\:device1

3.4.5 Watchdog

Device: /dev/watchdog0, /dev/watchdog1

watchdog0 is controlled by OS.

Watchdog1 can be controooled by the user.

3.5   CSCI internal data requirements

3.5.1 Log data

Log data is stored in the Log FRAM chip. It includes two configuration data structrue and the error recording data array. The error recording data array can fill the space of the log chip except the configuration data area.

conf[2] (logdata_conf_data_t)	header (guint32)	0x5555aaaa	Configuration data header ID
	timestamp (guint32)		Linux epoch time(unit:s)
	totaltick (guint32)		Totoal power on time(unit:s)
	dim (guint8)	0-100	Dim value when in night mode
	mode (guint8)	0/1	0: normal mode 1: night mode
	brightness (guint8)	0-100	
	contrast (guint8)	0-100	
	color (guint8)	0-100	
	video_srcmode (guint8)	0-2	0: video source auto 1: video source 0 2: video source 1
	chk (guint16)		CRC16 checksum(modbus)
rec[] (logdata_rec_data_t)	header (guint32)	0x66669999	Recording data header ID
	timestamp (guint32)		Linux epoch time(unit:s)
	infocode (guint32)		0x80000001: memory error 0x80000002:temperature error 0x80000003:power error 0x80010001:log chip error 0x80010002:sensor error 0x80010003:pwm error 0x80010004:key error 0x80010005:sdi device error 0x80010006:lcd device error 0x80010007:serial device error
	desc[34] (guint8)		Error info description
	chk (guin16)		CRC16 checksum(modbus)

3.5.2 Configuration file data

Default Configuration file: */etc/b3vdu.conf*

file data format based on "libconfig"

Item	Type	Value	descritpion
device.version	String	"x.x.x"	Whole system version
device.SN	String	"B3VCU-xxx"	Device Serial Number
device.date	String	"xx-xx-xxxx"	Manufacturing Date
DISABEL_WATCHDOG	Boolean	true: disable watchdog false: enable watchdog	Firmware watchdog enable/disable
DISABEL_NUCDEV MODE	Boolean	True: auto mode false: development mode	NUC mode
VIDEO_SOURCE	Integer	0: auto(video0/video1) 1: video0 2: video1	Video source selection mode.

3.5.3 global parameters

PGParam (glb_priv_data_t)	Sysbits (guint32)	Bit0: memory bit1: logdata bit2: snsor bit3: current bit4: temperature bit5: pwm0 bit6: pwm1 bit7: keypad bit8: video out bit9: video in0 bit10: video in1 bit11: osd bit12: serial bit13: host	System BIT information: 0: pass 1: fail

4 Requirements traceability

5 Note

6 Appendixes

6.1 Version Log

Vesrion	Date	content
1.0.1	30 Jun 2022	initial version

1.0.2	14 Jul 2022	add "NUC mode" in menu
		    add "NUC mode" bit in sending key package
		    based on STK document "VDU View Switching 13072022.pptx"

1.0.3	11 Aug 2022	Modify OSD based on STK document "VDU View Switching 25072022.pptx"
1.0.4	17 Aug 2022	Modify OSD based on STK document "VDU Software V0.5_16082022.pptx"

1.0.5	20 Sep 2022	insert "VDU software Version", "Reset to Default" item into menu.
		    the lowest contrast value is 10.
		    based on STK doucunent "VDU Software V0.6_20092022.pptx"

1.0.6	1 Nov 2022	change RS422 protocol (move "elapsetime" from "DEV" package to "KEY" package) based on STK document "VCU_IDS_V0.4.xlsx"

2.0.1	15 Nov 2022	rebuild system by Petalinux 2022.2
		    Add Font into system.
		    Add brightness value under brightness bar base on "VDU Software V0.7_31102022.pptx"

2.0.2	8 Feb 2023	Change NUC protocol base on "VDU Software V0.8_0602023.pptx"