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| **Software Resource Specification of****B3VDU****STELS PART NO: 2200298216**  |

**Change Index.**

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| Index | Date | Amendment contents | Version | Person |
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**Table of Contents**

[1 Scope 5](#_Toc109852851)

[1.1 Document overview 5](#_Toc109852852)

[2 Requirements 5](#_Toc109852853)

[2.1 Required states and modes 5](#_Toc109852854)

[2.1.1 Verbose Information Mode 5](#_Toc109852855)

[2.1.2 Normal working mode 6](#_Toc109852856)

[2.2 CSCI capability requirements 6](#_Toc109852857)

[2.2.1 Booting Up 6](#_Toc109852858)

[2.2.2 Watchdog Enable 6](#_Toc109852859)

[2.2.3 Video Latency 6](#_Toc109852860)

[2.2.4 Video Error monitor 6](#_Toc109852861)

[2.3 CSCI external interface requirements 7](#_Toc109852862)

[2.3.1 USB3.0 7](#_Toc109852863)

[2.3.2 LCD 7](#_Toc109852864)

[2.3.3 VDU UART 7](#_Toc109852865)

[2.3.4 Ethernet 7](#_Toc109852866)

[2.3.5 Keypad 7](#_Toc109852867)

[2.3.6 SDI Input 8](#_Toc109852868)

[2.3.7 CAN 8](#_Toc109852869)

[2.4 CSCI internal interface requirements 8](#_Toc109852870)

[2.4.1 I2C 8](#_Toc109852871)

[2.4.2 Video Resisters 8](#_Toc109852872)

[2.4.3 OSD 9](#_Toc109852873)

[2.4.4 Iio Sensor 9](#_Toc109852874)

[2.4.5 Watchdog 9](#_Toc109852875)

[2.5 CSCI internal data requirements 10](#_Toc109852876)

[2.5.1 Log data 10](#_Toc109852877)

[2.5.2 Configuration file data 11](#_Toc109852878)

[2.5.3 Global Parameters 11](#_Toc109852879)

[3 Requirements traceability 12](#_Toc109852880)

[4 Notes 12](#_Toc109852881)

[5 Appendixes 12](#_Toc109852882)

# Scope

## Document overview

 This document stipulates software resource specification procedures for Video Display Unit (abbreviated as VDU B3 here after). This document will be used as a guideline to software resources and programming of VDU B3 in according to the technical specification requirements.

# Requirements

## Required states and modes

### 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 (the total power on time. unit(s))

* 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

###  Normal working mode

Default 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*/b3vcu.conf. It can be assigning a special configuration file by option (-f filename). The configuration file data format refers to 3.5.2

## CSCI capability requirements

### Booting Up

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

### Watchdog Enable

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

### Video Latency

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

### Video Error monitor

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

## CSCI external interface requirements

### USB3.0

### LCD

.lvds

.(LCD DIM) PWM output

.(LED DIM) PWM output

output control reference 3.4.2

### VDU UART

***Format****: RS422*

***Device name****: /dev/ttySC1*

***working mode****:Duplex*

***data****: 115200n8*

***flow control****: no*

### Ethernet

1**0/100/1000 BASE-T**

### 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 |

### SDI Input

*control reference 3.4.2*

### CAN

###

## CSCI internal interface requirements

### I2C

**device name**: /*dev*/i2c-0

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

**description**: log data storage

### Video Resisters

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 - 100default 10 |
| 0x0008 | W/R | NVG mode | 0 – normal mode 1 – NVG mode |
| 0x000C | W/R | auto\_manu | 0 – auto select video1 – manual select video |
| 0x0010 | W/R | osdCtrl | 0 – no OSD1 – overlay OSD |
| 0x0014 | W/R | video source | 0 – video source 01 -  video source 1 |
| 0x0018 | W/R | contrast value | 0 – 100 convert to -255 ~ 255(x- 50) x 255 /50 |
| 0x001C | W/R | colour 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 signalbit 4 -- ddr read: 0 normal, 1 no read operationbit 5 -- ddr write: 0 normal, 1 no write operationbit 7-6 – display: 00 normal, 01 no signal, 10 error |

### OSD

OSD physical address: 0x70000000

OSD Resolution: 1920x1080

OSD format: RGBA32

### Iio Sensor

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

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

### Watchdog

**Device**: /dev/watchdog0, /dev/watchdog1

watchdog0 is controlled by OS.

Watchdog1 can be controlled by the user.

## CSCI internal data requirements

### Log data

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **Type** | **Value** | **Description** |
| conf[2](logdata\_conf\_data\_t) | header(guint32) | 0x5555aaaa | Configuration data header ID |
| timestamp(guint32) |  | Linux epoch time(unit:s) |
| totaltick(guint32) |  | Total power on time(unit:s) |
| dim(guint8) | 0-100 | Dim value when in night mode |
| mode(guint8) | 0/1 | 0: normal mode1: night mode |
| brightness(guint8) | 0-100 |  |
| contrast(guint8) | 0-100 |  |
| color(guint8) | 0-100 |  |
| video\_srcmode(guint8) | 0-2 | 0: video source auto1: video source 02: 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 error0x80000002:temperature error0x80000003:power error0x80010001:log chip error0x80010002:sensor error0x80010003:pwm error0x80010004:key error0x80010005:sdi device error0x80010006:lcd device error0x80010007:serial device error |
| desc[34](guint8) |  | Error info description |
| chk(guin16) |  | CRC16 checksum(modbus) |

### Configuration file data

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

*file data format based on “libconfig”*

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **Type** | **Value** | **Description** |
| 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 watchdogfalse: enable watchdog | Firmware watchdog enable/disable |
| DISABEL\_NUCDEVMODE | Boolean | True: auto modefalse: development mode | NUC mode |
| VIDEO\_SOURCE | Integer | 0: auto(video0/video1)1: video02: video1 | Video source selection mode. |

### Global Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **Type** | **Value** | **Description** |
| PGParam (glb\_priv\_data\_t) | Sysbits (guint32) | Bit0: memorybit1: logdatabit2: snsorbit3: currentbit4: temperaturebit5: pwm0bit6: pwm1bit7: keypadbit8: video outbit9: video in0bit10: video in1bit11: osdbit12: serialbit13: host | System BIT information:0: pass1: fail |
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# Requirements traceability

# Notes

# Appendixes