FORTEC ELEKTRONIK AG

DATA DISPLAY GROUP

Manual

ChandlerRover

Flashing and Configuration Utility for Prisma TFT Controllers

ZV-90-025 and ZV-90-026

Version 2.6

15.11.2016

Table of Contents

1 Revision History

Date	Rev.No.	Description	Page
22.04.2013	1.0	Initial version	All
13.09.2013	2.0	Update regarding V2.0.0 / Panel Config	
18.09.2013	2.1	Lite version, Switch to Advanced Mode, GUI Section	
19.11.2013	2.2	Added FW download link	5
04.06.2014	2.3	Added PrismaMINI Panel Config availability	4
03.03.2016	2.4	Added PrismaECO-eDP Panel Config availability Added PrismaECO-IV Panel Config availability Updated last page	4 4 22
15.07.2016	2.5	Updated document template Some small updates	All
15.11.2016	2.6	Added support for PrismaMINI-HDMI-DP	4, 8

2 Overview

ChandlerRover is Windows software for flashing firmware and EDIDs into Chandler (STDP6038) based Prisma TFT-LCD controller boards. It also allows the user to configure the parameters of the TFT-LCD.

3 Supported Prisma Boards

Board	PCB Version	Firmware Version	Programmable EDIDs			Panel Config
			DisplayPort	HDMI	VGA	
PrismaCOMPACT-Media	*	*	Y	Y	Y	
PrismaCOMPACT-Media	*	>= 2.0.0	Y	Y	Y	Y
PrismaECO-eDP	*	>=1.0.0	Y	Y		Y
PrismaECO-IV	*	>=1.2.1		Y	Y	Y
PrismaMEDIA-Eco	1.1	>= 1.1.4	Y			
PrismaMEDIA-Eco	1.1	>= 1.2.1	Y	Y		
PrismaMEDIA-Eco	1.2	>= 2.0.0	Y	Y	Y	
PrismaMEDIA-Eco	1.2	>= 3.0.0	Y	Y	Y	Y
PrismaMINI-HDMI	*	<2.0.0		Y		
PrismaMINI-HDMI	*	>=2.0.0		Y		Y
PrismaMINI-HDMI-DP	*	>=1.0.0	Y	Y		Y

4 Requirements

4.1 Hardware Requirements

PC System:

- Standard PC with Windows operating system
- 1x COM port (RS-232) for serial programmer

Serial adapter and cables to program the firmware and configuration:

Part #	Part Description	Additional Info
ZU-02-370	IF370-00-R10programingadap.Pris./Art.NET	RS-232 programming adapter
KA-30-101	Cable Service/Debug ArtistaNET/Pris 80cm	Cable from RS-232 adapter to Prisma board

+12 V power supply unit for Prisma board:

Part #	Part Description	Additional Info
NT-01-060	AC Adapter CWT KPL-060F-VI (C14/12V/5A)	Standard +12V power supply unit

Additional power supply and video input cables for PrismaCOMPACT-Media:
PrismaCOMPACT-Media does not have standard connectors like VGA, DVI, HDMI and +12V power supply input. Thus there are adapter cables available, which must be ordered separately.

Part #	Part Description	Additional Info
KA-30-749	Cable DC Power Jack 2,5mm/PHR-4 800mm	Power supply input cable
KA-03-027	VGA Cable LTM150XI/170EI female 80cm	VGA input cable
KA-30-382	Cable DVI-D Female / PCompactMedia 80cm	DVI input cable
KA-30-577	Cable HDMI-A Male / PCompactMedia 80cm	HDMI input cable

Instead of using the single cables mentioned above, it is also possible to use a connector interface board (IF396) with appropriate cables to connect to the Prisma board. This interface board also has an USB to UART converter onboard for serial programming.

Part #	Part Description	Additional Info
KI-90-008	Kit CP-Input Board IF396 inc. cables	Kit which includes the interface board IF396 and all required cables

4.2 Supported Operating Systems

- Windows 7 SP1 (32-bit, 64-bit)
- Windows 8 (32-bit, 64-bit)
- Windows 8.1 (32-bit, 64-bit)
- Windows 10 (32-bit, 64-bit)

5 Supported Features

5.1 Panel Configuration

Many different panels can be connected to the controller boards but every panel needs a specific configuration (LVDS-, timing-, power- and backlight configuration). ChandlerRover provides a GUI to generate a complete configuration for the desired panel and backlight unit. This configuration can be loaded to the controller board or read back from the controller board. The panel configuration is stored on the controller board in a dedicated area of the main memory (SPI Flash).

ChandlerRover also allows saving of the configuration as an XML file and loading of a configuration from an XML file.

5.2 OSD User Settings

After the controller board is configured for a specific panel, the user can adjust detailed image settings like brightness, colour temperature or RGB-gain with the help of an OSD menu. This OSD menu can be controlled by I/R remote control or a multi button keypad. ChandlerRover provides functionality to read back these OSD settings from the board together with the firmware, store them and load them to other boards - thus allowing the production of multiple boards with exactly the same settings. OSD user settings are stored on the controller board on a dedicated part of the main memory (SPI Flash) together with the panel configuration.
The user should keep in mind that these settings include the Panel Config too and this operation is equivalent to NVRAM read and write operation in MarsRover.

5.3 Firmware Update

ChandlerRover can load firmware updates to the controller board and read the firmware back from the board. The file format of the firmware is Intel-Hex. The firmware is stored on the board in an SPI flash.
Take the actual firmware from Data Display Group customer download area
Request Password at sales@datadisplay.de

5.4 EDID Programming

EDIDs are EEPROMs which store the Extended Display Identification Data as defined by VESA. ChandlerRover can read and write all EDIDs on the controller board.

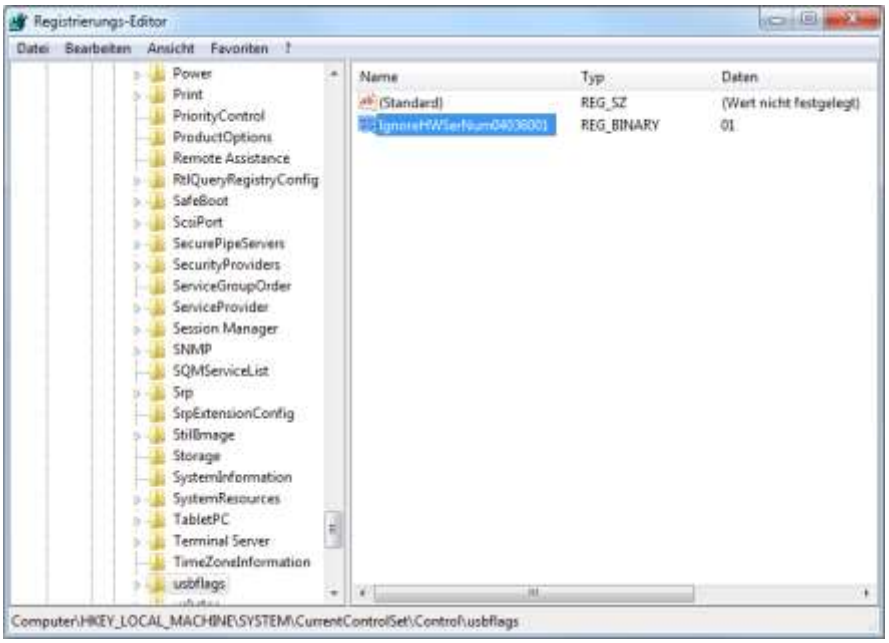
6 Installation

To install ChandlerRover on a PC, execute the setup **ChandlerRover_X.X.X_Setup_x86.exe**.

6.1 Registry Setup for IF396

The step described here is just necessary, if IF396 is used with PrismaCOMPACT-Media.
IF396 has an USB to RS232 converter chip on it. For every IF396 board that is connected to the USB port of the PC, a new COM port is created. To avoid this behavior, a binary key in Registry can be created and set to the value 01

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\UsbFlags\IgnoreHWSerNum04036001
```

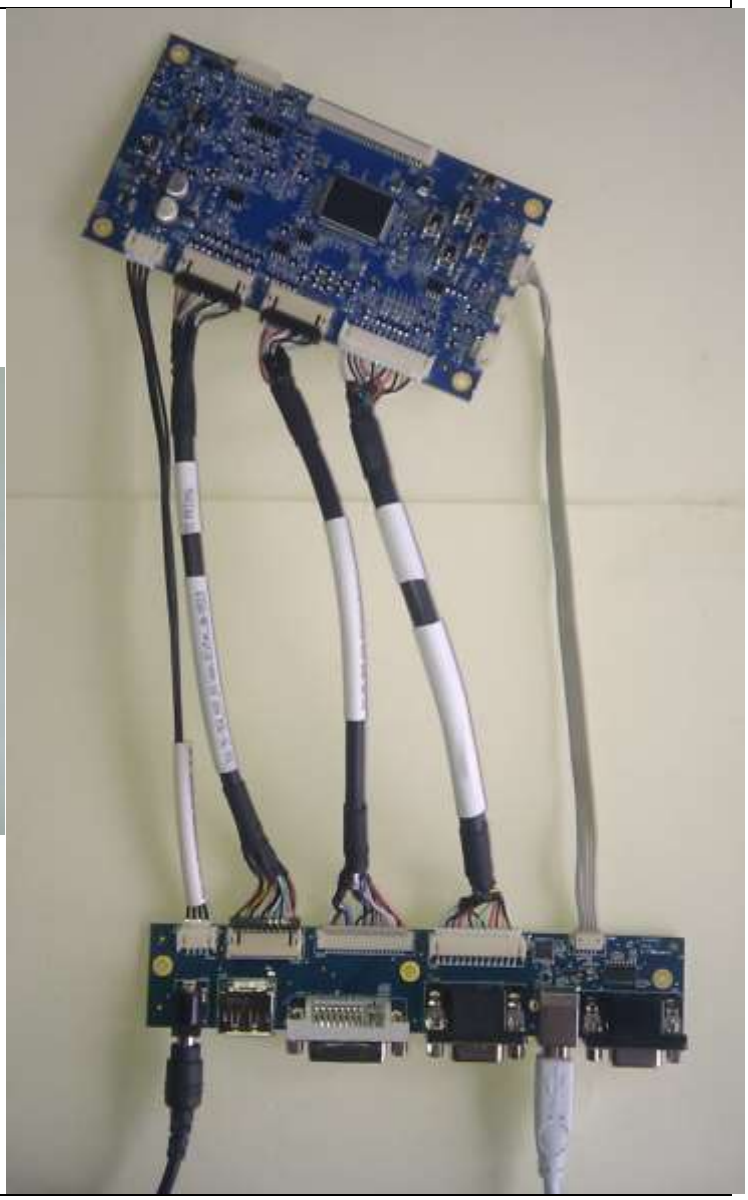


7 Hardware Setup

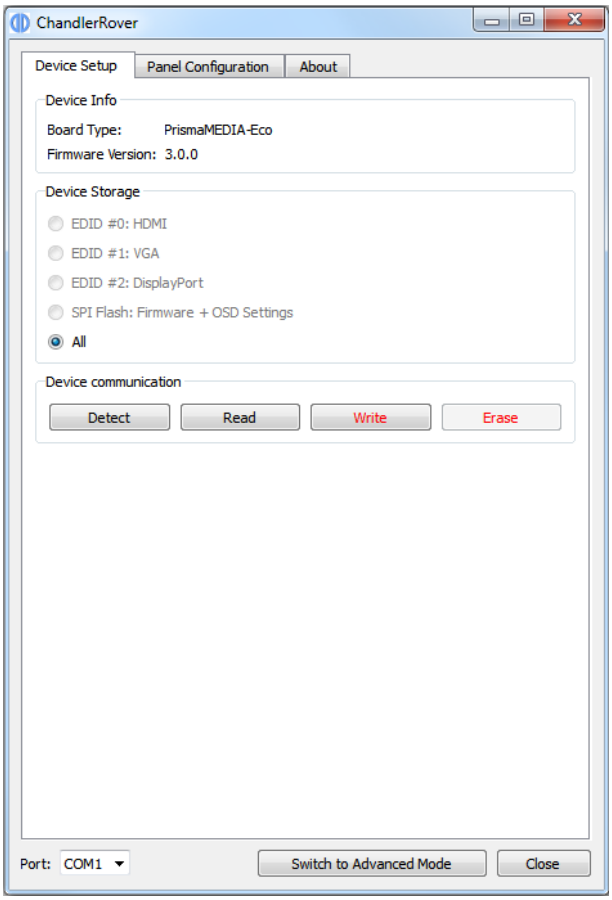
1.) Connect the COM port of the PC to the UART connector
- CON8 of PrismaCOMPACT-Media
- CON8 of PrismaECO-eDP
- CN5 of PrismaECO-IV
- CN8 of PrismaMEDIA-Eco
- CN3 of PrismaMINI
- CON7 of PrismaMINI-HDMI-DP

2.) Do not connect the display or the backlight converter to the Prisma board

3.) Connect the Prisma board to 12V power supply

PrismaMedia-Eco	PrismaCOMPACT-Media with IF396
	

8 Graphical User Interface (GUI)



8.1 COM Port Selection

COM port selection drop down menu allows the user to select which serial port of the PC is to be used. ChandlerRover remembers the last port selection so the selection is only required once. PrismaCompact-Media boards connected via USB (through IF396) are listed as a COM port too.

8.2 Switch between Advanced and Simple Mode

There are two different modes of operation, explained in the next sections. The "Switch to Advanced/Simple mode" button allows user to switch among those modes. This button does not exist in the ChandlerRoverLite version.

8.2.1 Simple Mode

ChandlerRover starts with the **Simple Mode** which only has the most basic functions to not to confuse the user and simplify the workflow. The user can perform **Write All** or **Read All** operations with the Simple Mode.

8.2.2 Advanced Mode

The user can switch to **Advanced Mode** to enable sub operations of the programming process. Advanced Mode can be switched on and off using the pushbutton on the right bottom of the software. Please note, that this button and functionality is not available in the ChandlerRoverLite version.

8.3 Device Setup

Device Setup is the first tab of the software which shows the board information, storage devices and basic operations.

8.3.1 Device Info

Device info section can be seen on the top of the Device Setup tab. It informs the user about the connected board and the version of the firmware found on the board. This section is updated after a click on the **Detect** button. If the board is never flashed before, it will show "Not Detected"

8.3.2 Device Storage

Device Storage section allows the user to select specifically which part of the board to be programmed. Only **All** selection is enabled in the Simple Mode and in Advanced Mode some of the EDIDs can be disabled according to hardware and firmware version. Please refer to section 3 "Supported Prisma Boards" for learning which EDIDs are supported with which firmware.

The user can select among

- EDID #0: HDMI
- EDID #1: VGA
- EDID #2: DisplayPort
- SPI Flash: Firmware + OSD Settings
- All

EDIDs, as the name implies, are EEPROMs which store the Extended Display Identification Data as defined by VESA.

SPI Flash is the nonvolatile memory for storing the firmware, OSD settings (i.e. user preferences) and the panel configuration.

The **All** operation allows the user to read or write all the components at once as a compressed zip file. The Zip file contains files with specific prefix scheme.

File Type	**Prefix**
Firmware	FW_
EDID – HDMI or DVI	EDID0_
EDID – VGA	EDID1_
EDID – DisplayPort	EDID2_
Panel config	CONFIG_

8.3.3 Device Communication

Device communication section contains the buttons to start the required operation.

User can perform
- Detect
- Read
- Write
- Erase

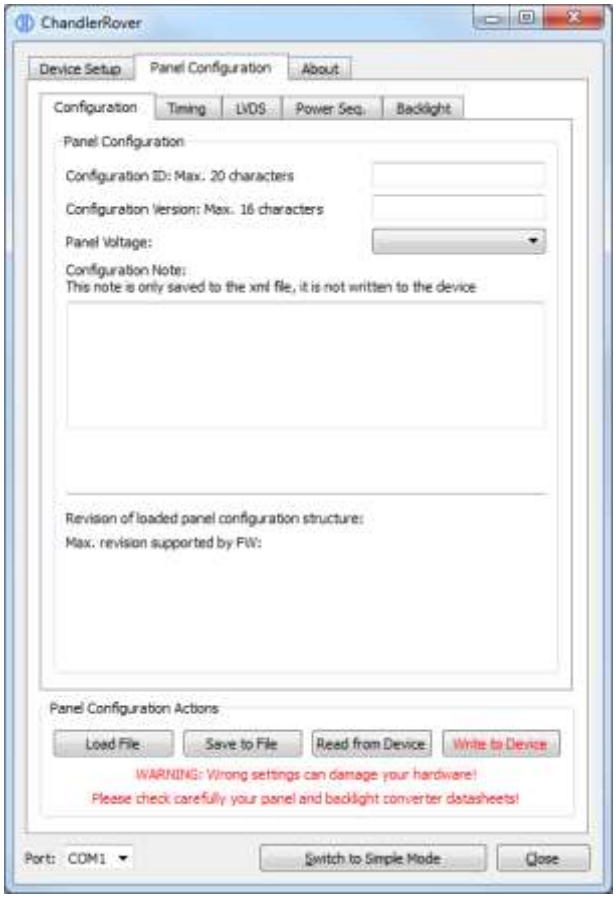
operations.

Detect operation identifies the connected board and the firmware present on the board. It also disables EDID radio buttons if it is not supported with the present firmware.

As the names imply Read, Write and Erase buttons perform the read, write and erase operations on the selected device by the Device storage.
The Erase button is not enabled in the ChandlerRoverLite version.

8.4 Panel Configuration

Every TFT-LCD panel and backlight converter combination has different timing parameters and voltages. Panel configuration, the middle tab in the ChandlerRover interface, allows the user to set those panel timing parameters and voltages, backlight unit control parameters and voltages and power up and down sequences.



8.4.1 Buttons

Four buttons at the bottom of the window provide the following functions:

Load File
Read panel configuration parameters from an XML file and display them in the ChandlerRover GUI.

Save to File
Save the configuration parameters currently shown in the GUI to an XML file.

Read from Device
Read panel configuration parameters via serial port from the connected controller board and show them in the ChandlerRover GUI. For this a powered board with running FW must be connected to the PC.

Write to Device
Load the configuration parameters currently shown in the GUI to the connected controller board. For this a powered board with running firmware must be connected to the PC.

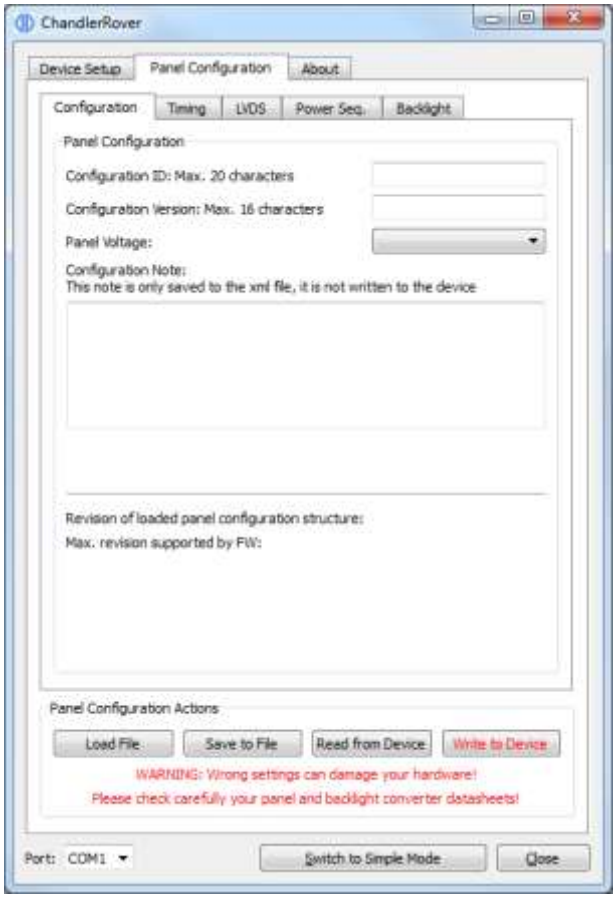
8.4.2 Configuration Tab

Configuration ID
This string identifies the panel configuration (e.g. panel type, product number etc.). It is 20 characters long. The ID can be chosen freely.

Configuration Version
This string identifies the version of the panel configuration. It is 16 characters long. There might be different configurations for the same panel, they can be differentiated by the version number. The version can be chosen freely.

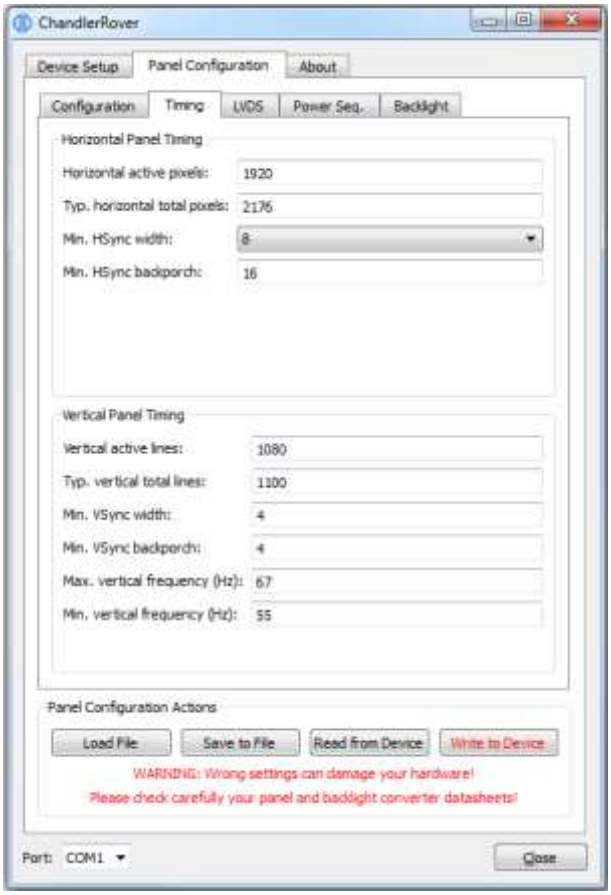
Panel Voltage
Our controller boards support panels with 3.3V, 5V and 12V supply voltage.

Attention: Selecting the wrong voltage can damage your panel!



Configuration Note
This field can be used, to save some description, comment or note to the XML file. This info is not transferred to the Prisma board. It is intended to give the user a possibility to save important information together with the configuration file.

8.4.3 Timing Tab

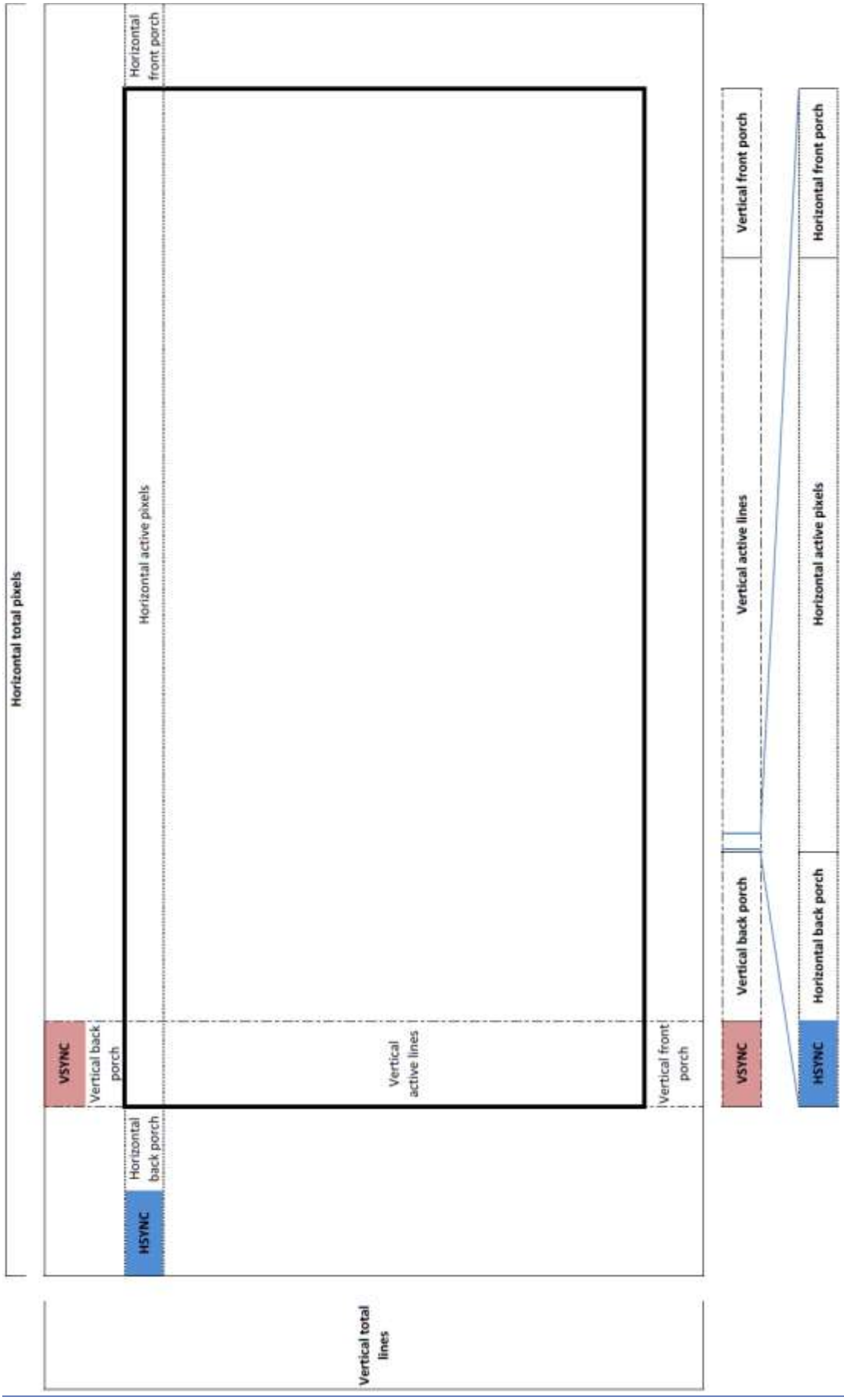


Horizontal Panel Timing

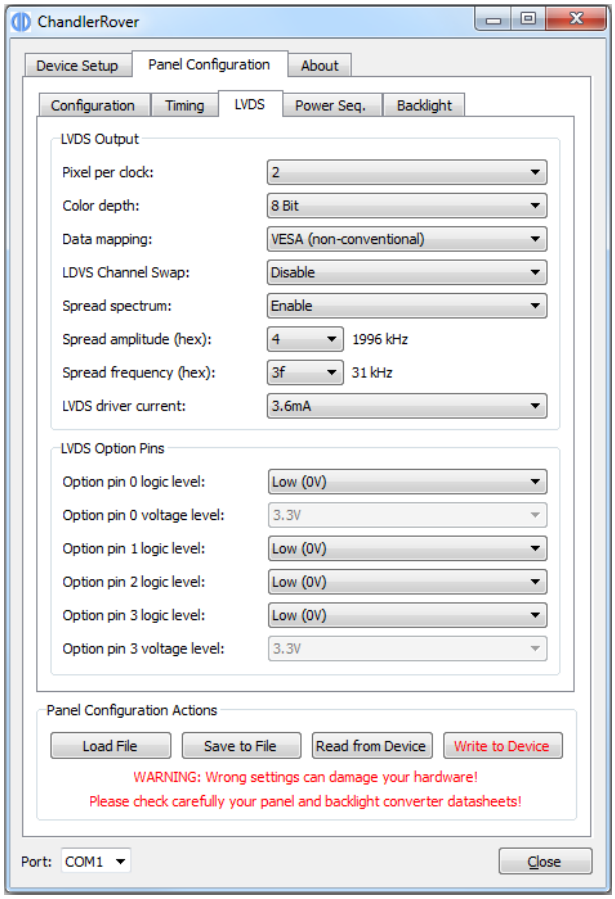
Set the values "**Horizontal active pixels**", "**Typ. horizontal total pixels**", "**Min. HSync width**" and "**Min. HSync backporch**" according to the display datasheet. All values must be greater than 0. The definition of these parameters can be seen in the following diagram.

Vertical Panel Timing

Set values "**Vertical active lines**", "**Typ. vertical total lines**", "**Min. VSync width**", "**Min. VSync backporch**", "**Max. vertical frequency (Hz)**" and "**Min. vertical frequency (Hz)**" according to the display datasheet. All values must be greater than 0. The definition of these parameters can be seen in the following diagram.


Horizontal total pixels
Horizontal front porch
Horizontal active pixels
VSYNC
Vertical back porch
Vertical active lines
Vertical front porch
HSYNC
Horizontal back porch
Vertical total lines
Vertical front porch
Vertical active lines
Vertical back porch
VSYNC
Horizontal front porch
Horizontal active pixels
Horizontal back porch
HSYNC

8.4.4 LVDS Tab



8.4.4.1 LVDS Output

Pixel per clock: 1 or 2 pixel transmitted per LVDS clock cycle
Color depth: 6 or 8 bit per R, G and B color component
Data mapping: JEIDA (conventional LVDS data mapping) or VESA (non-conventional LVDS data mapping);
LVDS Channel Swap: On dual channel LVDS, this option allows swapping odd and even channel.

Spread spectrum: Enable or Disable LVDS spread spectrum
Spread amplitude (hex): Choose from hex values 0x0 to 0x7, the resulting spread amplitude according to the controller datasheet is shown on the right of the drop-down box;
Spread frequency (hex): Choose from hex values 0x0 to 0x3F, the resulting spread frequency according to the controller datasheet is shown on the right of the drop-down box;
Enabling LVDS spread spectrum will result in better EMI behaviour but not all panels work with spread LVDS signals. A good starting point is 0x4 for spread amplitude and 0x3F for spread frequency. If you see some image interference with these values, reduce the amplitude until the picture is stable.

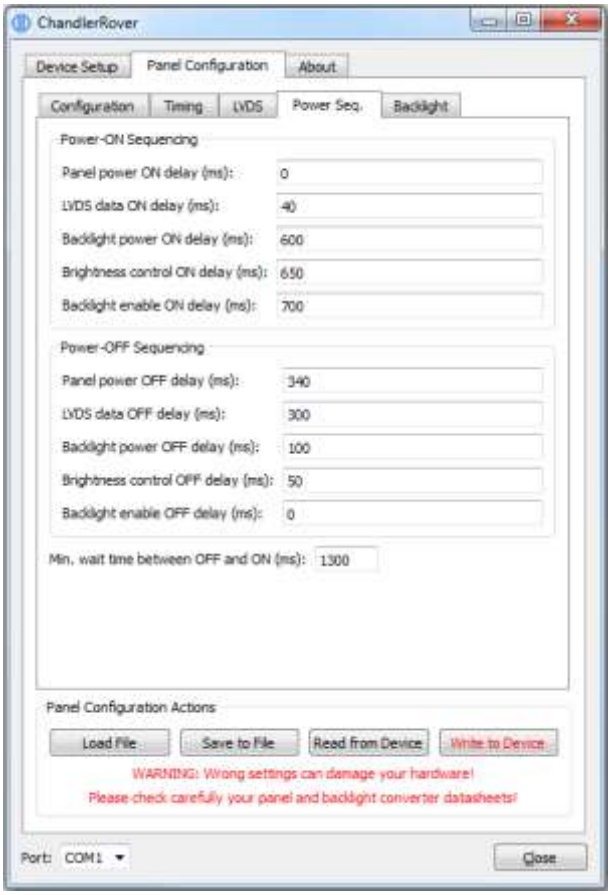
LVDS driver current: 3.6mA, 4.6mA, 5.6mA or 7.1mA;
Lower driver current will result in better EMI behaviour but also means lower LVDS differential output voltage. The resulting differential output voltage depends on the connected panel. Setting the driver current to the minimum can result in a differential output voltage that is too low for the attached panel. In case you see image interference with your driver settings increase the driver current.

8.4.4.2 LVDS Option Pins

Our TFT controller boards provide output pins which can be used to control special panel options. For example many panels offer the possibility to select the color depth or data mapping via a dedicated input pin. Such options can be selected by connecting the panel pins to the board's option pins.
There are three option pins on our controller boards and their logic level is configurable by ChandlerRover. Most pins have a logic high voltage level of 3.3V, for pin 3 the voltage level can be set to 3.3V or 5V. Note that the option pins are included in the power sequencing process: In case an option pin is set to high it is switched on and off together with the Panel Power.

Option pin 0 logic level: Low (0V) or High (3.3V)
Option pin 0 voltage level: 3.3V or 5V
Option pin 1 logic level: Low (0V) or High (3.3V)
Option pin 2 logic level: Low (0V) or High (3.3V)
Option pin 3 logic level: Low (0V) or High (3.3V or 5V)
Option pin 3 voltage level: 3.3V or 5V

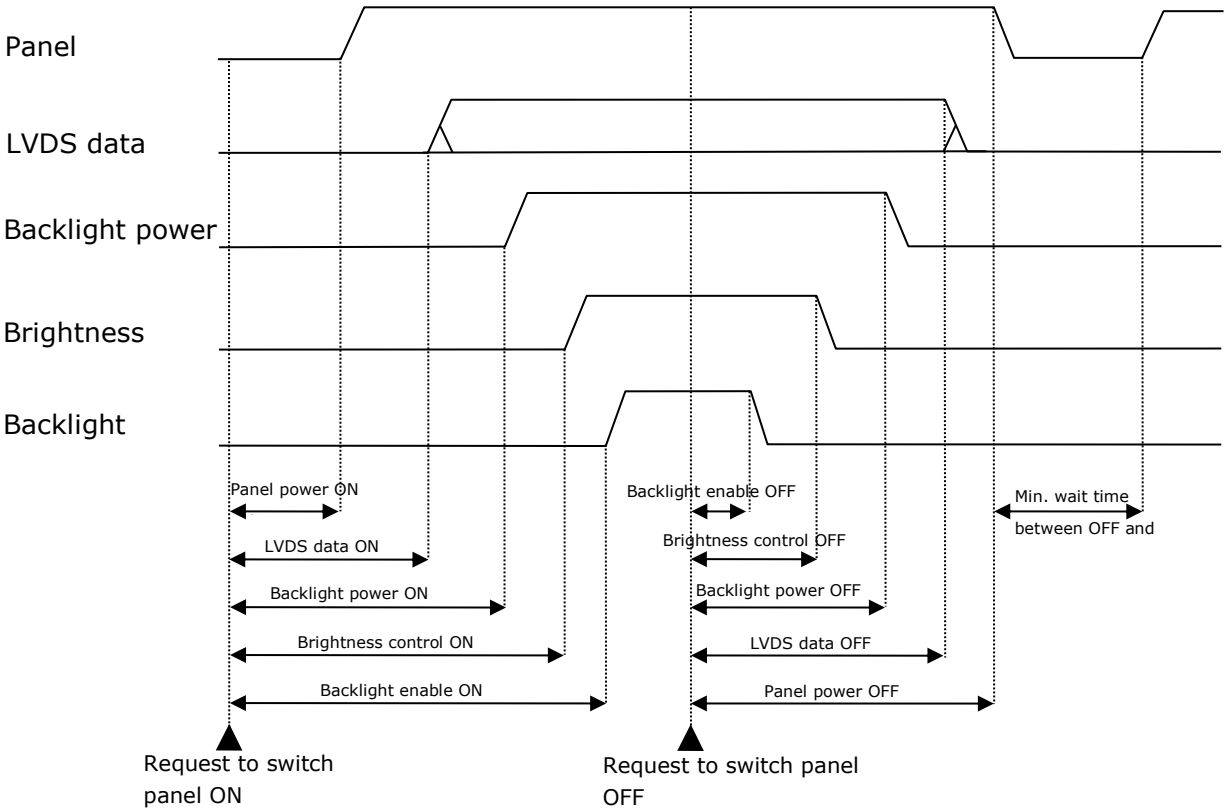
8.4.5 Power Sequencing Tab



Five signals are part of the power sequencing process:

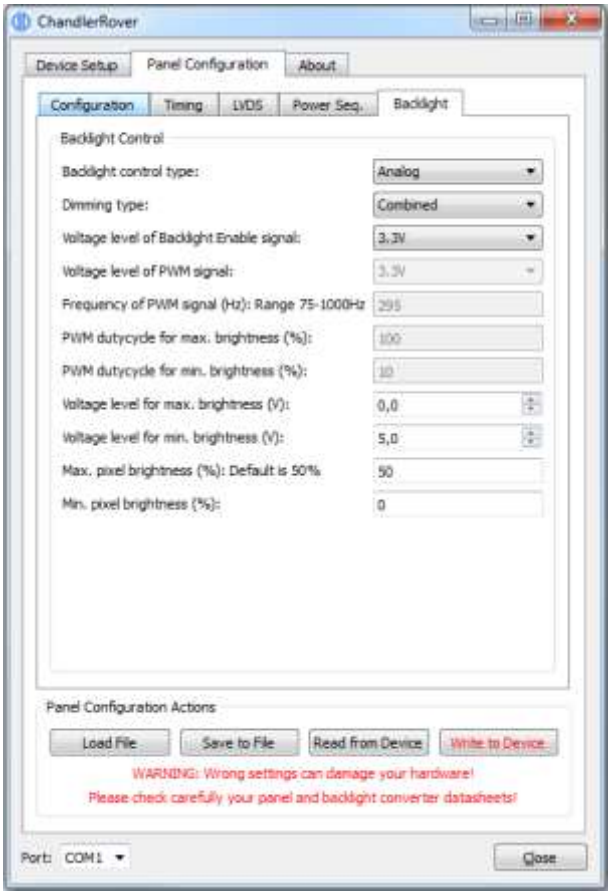
- Panel power (3.3V, 5V or 12V)
- LVDS data
- Backlight power
- Brightness control (PWM signal or analog DC voltage)
- Backlight enable signal

The following diagram shows the definition of the sequencing values:



The time unit of all sequencing values is milliseconds. The request to switch the panel on or off can come from the power button of the OSD keypad, IR remote control or by the controller itself when a valid input signal is found (switch on) or the signal is lost (switch off).
In most cases the panel power will be switched on first and the "Panel power ON delay" value can be set to 0. Similar, in most cases the backlight enable signal will be switched off first and the "Backlight enable OFF delay" value can be set to 0.

8.4.6 Backlight Tab



Backlight control type: Analog (variable DC voltage is used to control the brightness) or PWM (brightness is controlled by the duty cycle of a PWM signal).

Dimming type: Backlight Dimming (brightness is controlled by electrically changing the backlight), Pixel Dimming (brightness is controlled by changing the pixel color) or a combination of both; If combined is selected the lower 50% of the brightness range is controlled by pixel dimming and the upper 50% is controlled by backlight dimming.

Voltage level of Backlight Enable signal: 3.3V or 5V

Voltage level of PWM signal: 3.3V or 5V

Frequency of PWM signal (Hz): The range for the PWM frequency is 75Hz to 1000Hz

PWM dutycycle for max. brightness (%): Enter the duty cycle of the PWM signal at which the backlight unit has its highest brightness.

PWM dutycycle for min. brightness (%): Enter the duty cycle of the PWM signal at which the backlight unit has its lowest brightness.

Voltage level for max. brightness (V): Enter the voltage level of the brightness control signal at which the backlight unit has its highest brightness.

Voltage level for min. brightness (V): Enter the voltage level of the brightness control signal at which the backlight unit has its lowest brightness.

Max. pixel brightness (%): Relative value with range 0% to 100%; This value is usually set to 50% for best picture quality. Higher values than 50% will have the result that black is becoming grey. If "Backlight Dimming" is selected as dimming type, the pixel brightness is always set to "Max. pixel brightness".

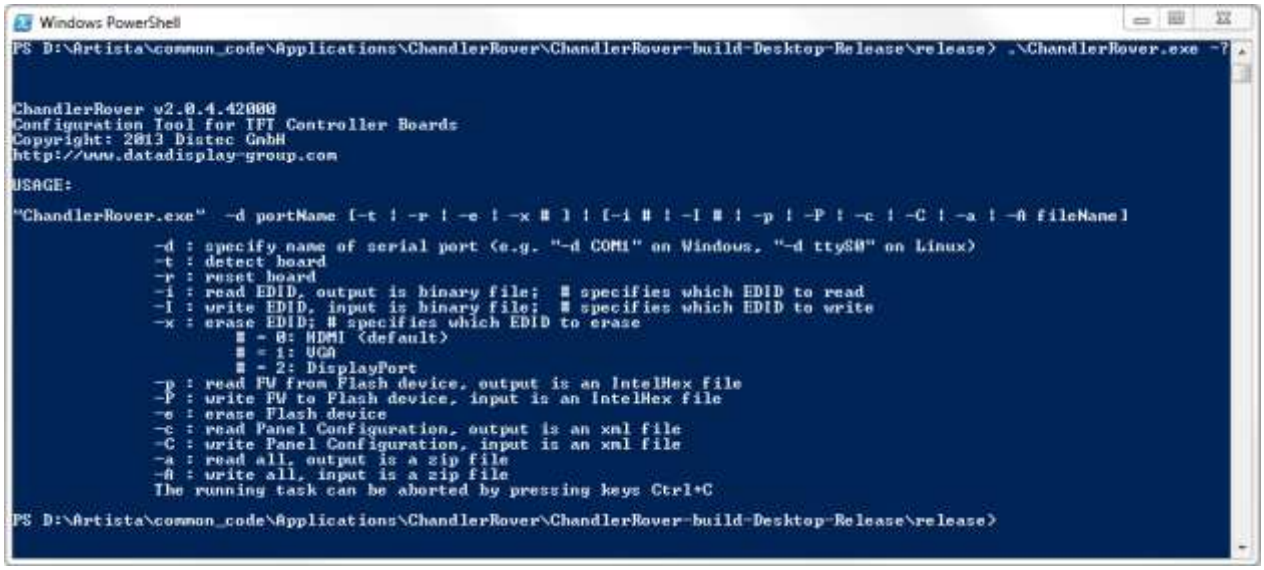
Min. pixel brightness (%): Relative value with range 0% to 100%; This value should be set to 8% or lower for best picture quality;

9 Command Line

ChandlerRover can also be started from a command line in command line mode. All options provided by the GUI (without creating a panel configuration) are available in command line mode. Open a DOS box or shell, go to your installation directory and type the following command for help:

```
ChandlerRover -?
```

This prints the following help screen:



10 News and Updates

The latest version of documents, drivers and software packages can be found at:

German Site http://www.datadisplay-group.de/service/downloads/

English Site http://www.datadisplay-group.com/service/downloads/

Our company network supports you worldwide with offices in Germany, Great Britain, Turkey and the USA. For more information please contact:

DATA DISPLAY GROUP

A FORTEC GROUP MEMBER

Distec GmbH
Augsburger Str. 2b
82110 Germering
Germany

Phone: +49 (0)89 / 89 43 63-0
Fax: +49 (0)89 / 89 43 63-131
E-Mail: info@datadisplay-group.de
Internet: www.datadisplay-group.de

FORTEC Elektronik AG
Lechwiesenstr. 9
86899 Landsberg am Lech
Germany

Phone: +49 (0)8191 / 911 72-0
Fax: +49 (0)8191 / 217 70
E-Mail: sales@fortecag.de
Internet: www.fortecag.de

Display Technology Ltd.
5 The Oaks Business Village
Revenge Road, Lordswood
Chatham, Kent, ME5 8LF
United Kingdom
Phone: +44 (0)1634 / 67 27 55
Fax: +44 (0)1634 / 67 27 54
E-Mail: info@displaytechnology.co.uk
Internet: www.datadisplay-group.com

Apollo Display Technologies, Corp.
87 Raynor Avenue,
Unit 1Ronkonkoma,
NY 11779
United States of America
Phone: +1 631 / 580-43 60
Fax: +1 631 / 580-43 70
E-Mail: info@apollodisplays.com
Internet: www.apollodisplays.com

Sales Partner:

DATA DISPLAY BİLİŞİM TEKNOLOJİLERİ
İÇ VE DIŞ TİCARET LİMİTED ŞİRKETİ
Barbaros Mh. Ak Zambak Sk. A Blok D:143
34376 Ataşehir / Istanbul
Turkey
Phone: +90 (0)216 / 688 04 68
Fax: +90 (0)216 / 688 04 69
E-Mail: info@data-display.com.tr
Internet: www.data-display.com.tr