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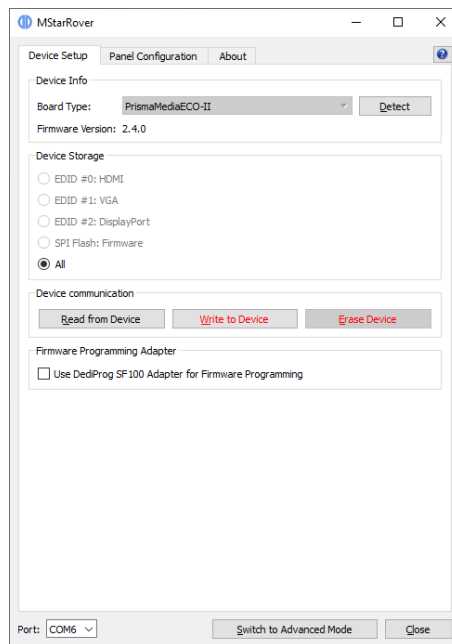


Manual

Distec

MStarRover

Flashing and Configuration Utility for Prisma TFT Controllers



Version 1.0

02.06.2021

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1 Revision History

Date	Rev.No.	Description	Page
26.11.2020	0.2	Initial version	All
02.06.2021	1.0	General update for MStarRover version 1.0	All

2 Overview

MStarRover is Windows software for flashing firmware and EDIDs to MStar based Prisma TFT-LCD controller boards. It also allows the user to configure the parameters of the TFT-LCD.

3 Supported Prisma Boards

The following Prisma boards are supported by MStarRover:

Product Name	Firmware Version	Part #	Board Name	Supply Voltage
PrismaECOeDP-II	>= 1.0.0	PR-02-195	PrismaECOeDP-II-00-12	12V
		PR-02-196	PrismaECOeDP-II-01-24	24V
PrismaMediaECO-II	>= 2.0.0	PR-01-220	PrismaMediaECO-II-00-12RHD_AU	12V
		PR-01-221	PrismaMediaECO-II-01-12RHD_00	12V
		PR-01-222	PrismaMediaECO-II-02-24RHD_AU	24V
		PR-01-224	PrismaMediaECO-II-03-24RHD_00	24V
PrismaMINI-HDMI-DP-II	>= 1.0.0	PR-01-431	PrismaMINI-HDMI-DP-II-00	3.3V, 5V or 12V

4 System Requirements

4.1 Hardware Requirements

PC System:

- Standard PC with Windows operating system
- 1x USB port for USB to RS-232 adapter or 1x COM port (RS-232) for serial programmer
- 1x USB port for DediProg SF100 SPI programmer (optional)

+12 V Power Supply Unit for Prisma Boards with 12V Supply Voltage:

Part #	Part Description	Additional Info
NT-01-062	AC Adapter CWT KPL-060F-VI(C14/12V5A)2,1	

+24 V Power Supply Unit for Prisma Boards with 24V Supply Voltage:

Part #	Part Description	Additional Info
N/A	DC Power Supply Unit (+24 V / 2.0 A)	

USB to Serial Adapter and Cables for PC with USB Port:

Part #	Part Description	Additional Info
ZU-02-430	IF430-00 USB to Serial UART Converter	RS-232 programming adapter
KA-30-101	Cable Service & Remote 80cm	Cable from RS-232 adapter to Prisma board
KA-30-051	USB-Cable, Highspeed, type A/B m/m 1,8m	

Serial Adapter and Cables for PC with COM Port:

Part #	Part Description	Additional Info
ZU-02-370	IF370-00-R10 RS232 to UART Converter	RS-232 programming adapter
KA-30-101	Cable Service & Remote 80cm	Cable from RS-232 adapter to Prisma board
N/A	Standard RS-232 Extension Cable (1:1)	Optional to connect ZU-02-370 to the PC

DediProg SF100 SPI Programmer (optional):

Part #	Part Description	Additional Info
FH-20-001	DediProg SF100 SPI Programmer	
N/A	USB A-A Cable	Comes with the DediProg SF100 SPI programmer
ZU-02-399	IF399-00-SPI Buffer interface for PIIIA	
KA-30-377	Cable SPI-Buffer-Interface 8pol. 150mm	

The DediProg SF100 SPI programmer is used to flash the firmware and the RS-232 connection is used to program the EDID and the panel configuration data to the Prisma board.

4.2 Supported Operating Systems

- 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). MStarRover 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).

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

5.2 Firmware Update

MStarRover can load firmware updates to the controller board and read the firmware back from the board. The file format of the firmware is BIN. The firmware is stored on the board in an SPI flash. Contact your sales representative at Fortec group to get the current firmware for your controller board.

5.3 EDID Programming

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

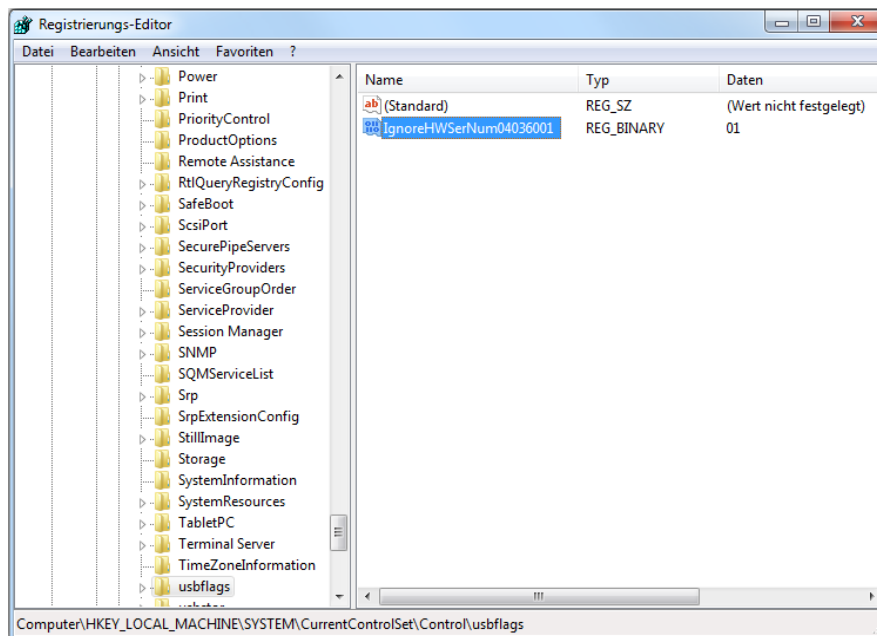
6 Installation

To install MStarRover on a PC, execute the setup **MStarRover_X.X.X_Setup_x86.exe**.

6.1 Registry Setup for PrismaMediaECO-II with USB to Serial Port Adapter

The step described here is just necessary if the USB to serial port converter of PrismaMediaECO-II is used. For every Prisma 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

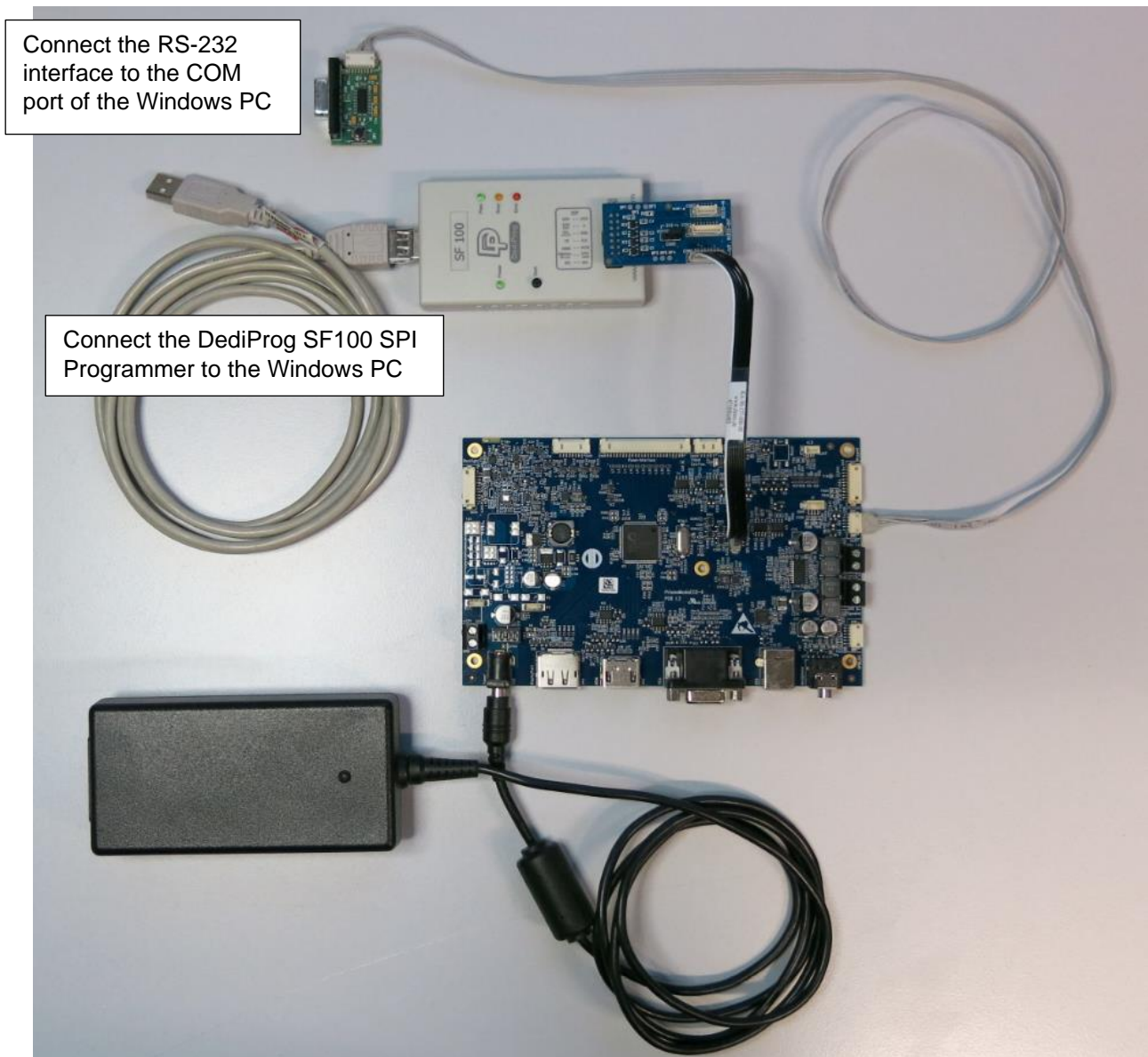
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\UsbFlags\IgnoreHWSerNum04036001



7 Hardware Setup

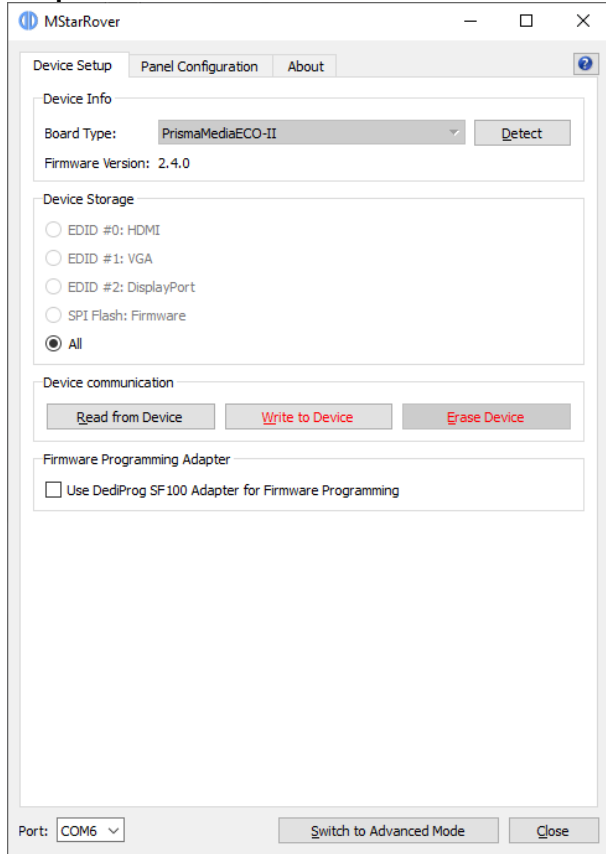
- 1.) Connect the COM port of the PC to the UART connector
 - a. PrismaECOeDP-II: CON8
 - b. PrismaMediaECO-II: CN8
 - c. PrismaMINI-HDMI-DP-II: CON7
- 2.) Optional: Connect the DediProg SF100 adapter to the SPI connector
- 3.) Do not connect the display or the backlight converter to the Prisma board
- 4.) Connect the Prisma board to the power supply (12V or 24V)

The picture below shows the hardware setup to program the firmware via the DediProg SF100 SPI programmer and the EDID and panel configuration data via RS-232:

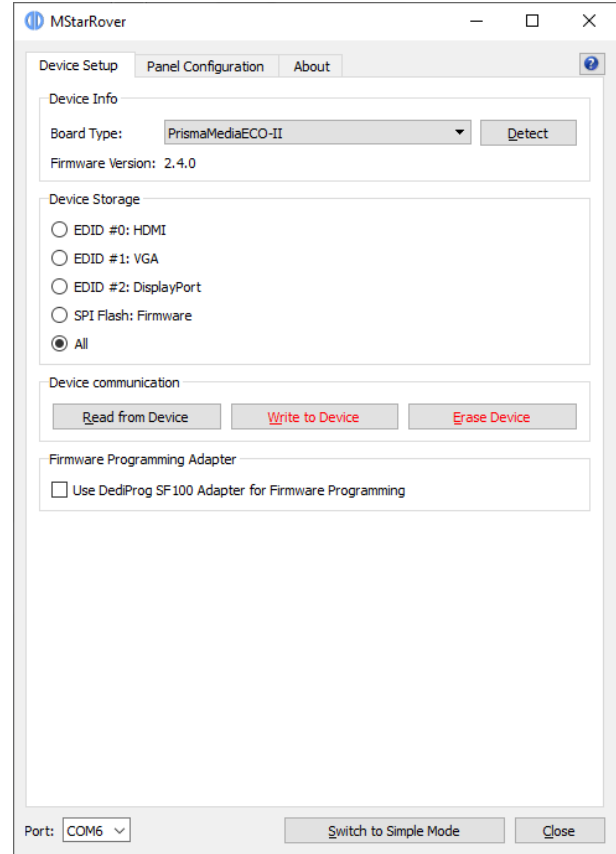


8 Graphical User Interface (GUI)

Simple Mode:



Advanced Mode:



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. MStarRover remembers the last port selection so the selection is only required once. PrismaMediaECO-II boards connected via USB 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 MStarRoverLite version.

8.2.1 Simple Mode

MStarRover 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 MStarRoverLite 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.

The user can select among

- EDID #0: HDMI
- EDID #1: VGA
- EDID #2: DisplayPort
- SPI Flash: Firmware
- 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 of the controller.

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	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 from Device
- Write to Device
- Erase Device

operations.

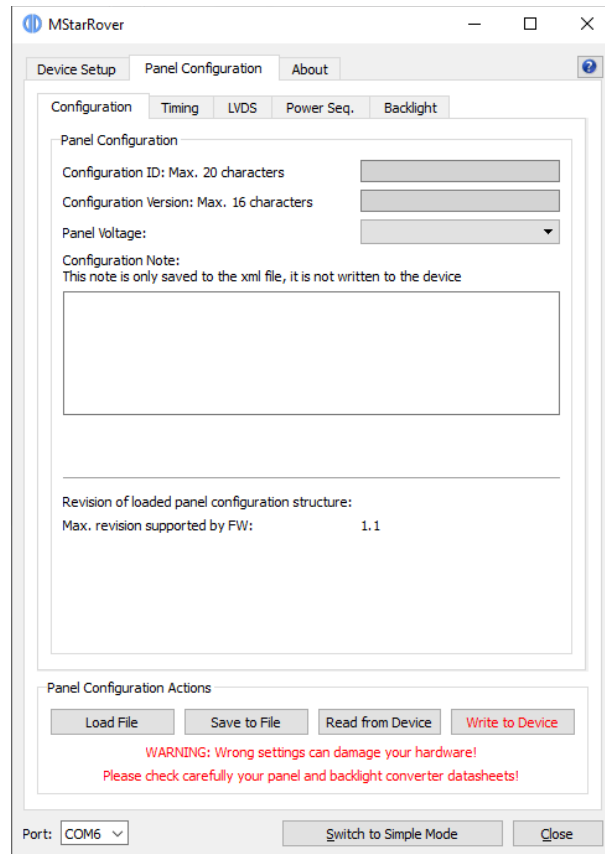
Detect operation identifies the connected board and the firmware present on the board. It also disables EDID radio buttons if it is not supported with the present firmware.

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 MStarRoverLite 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 MStarRover 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 MStarRover 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 MStarRover 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.

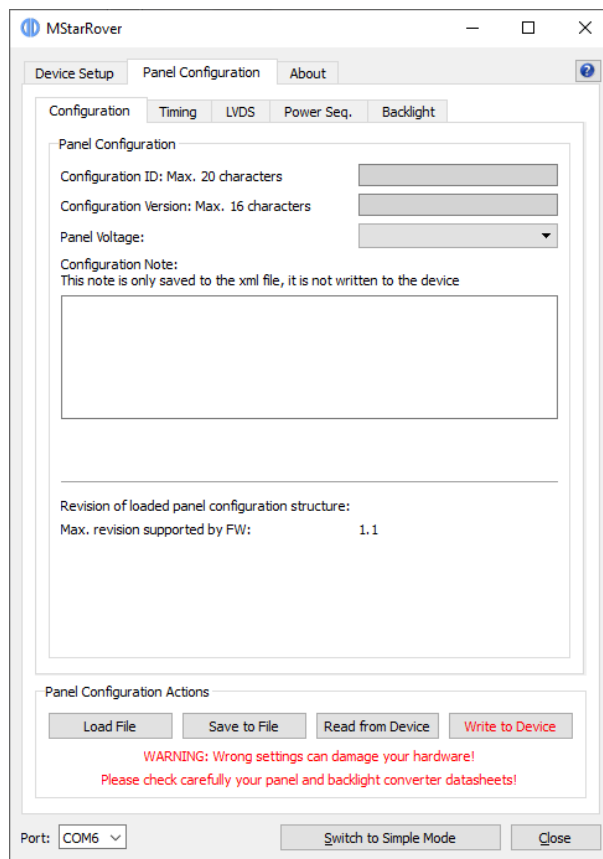
Configuration Version

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.

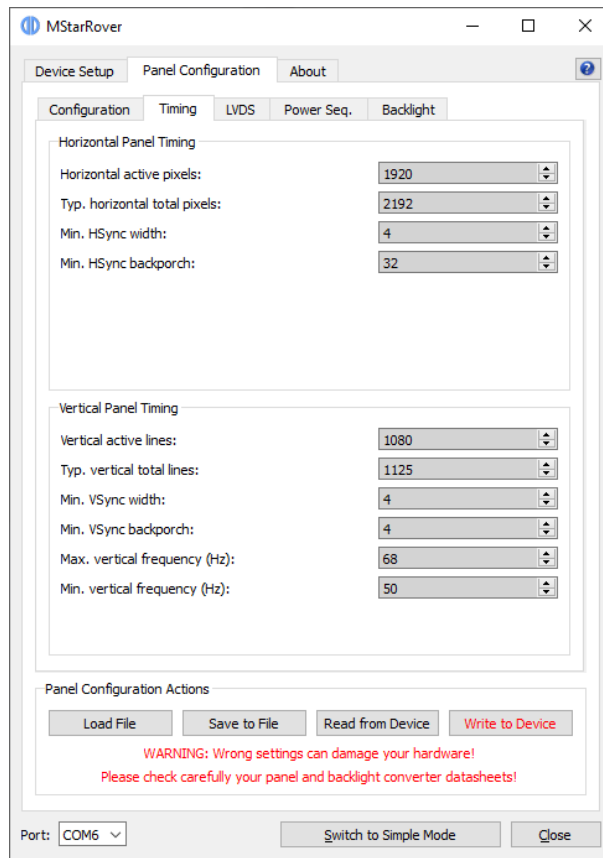
Attention: Selecting the wrong voltage can damage your panel!



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

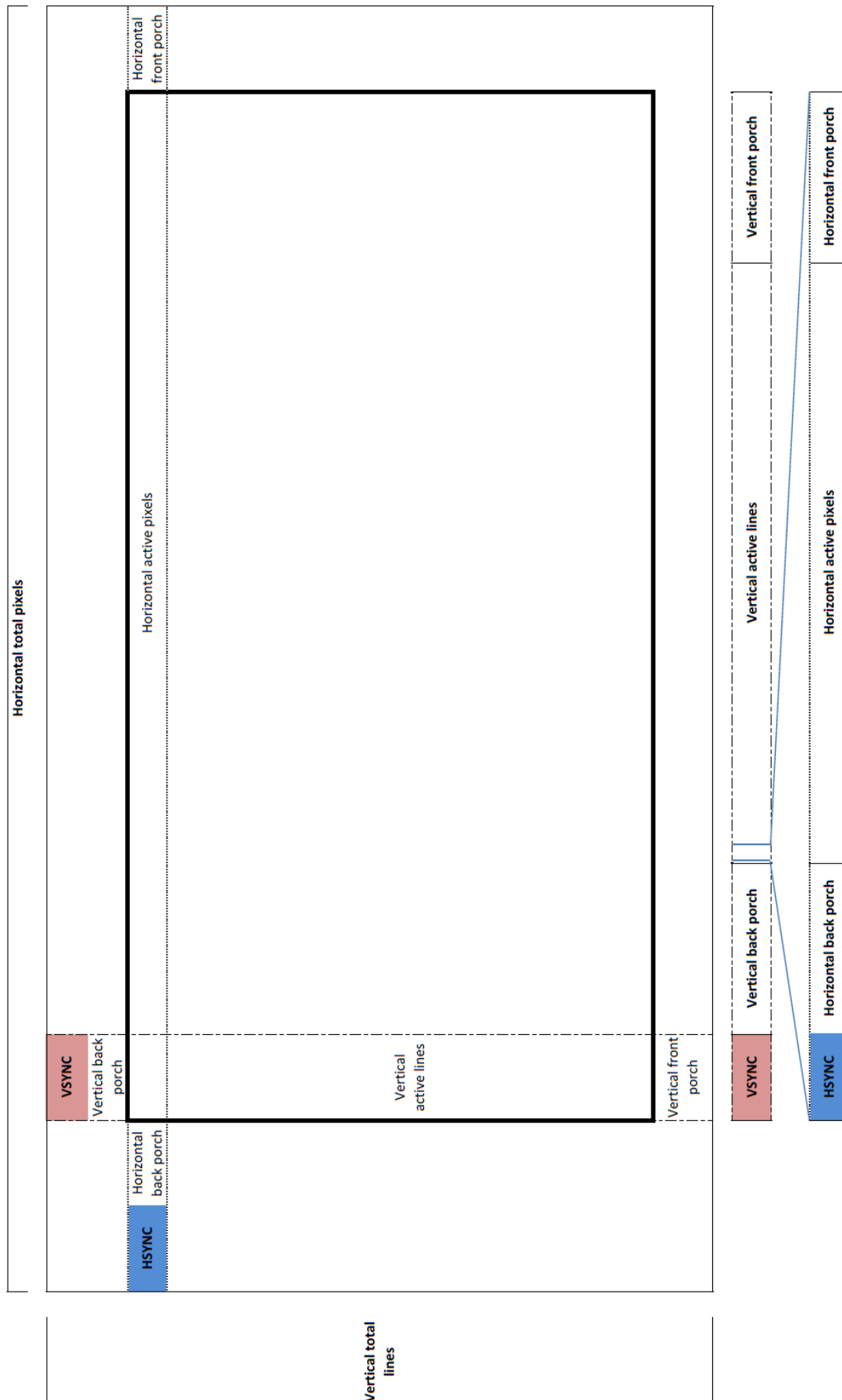


Horizontal Panel Timing

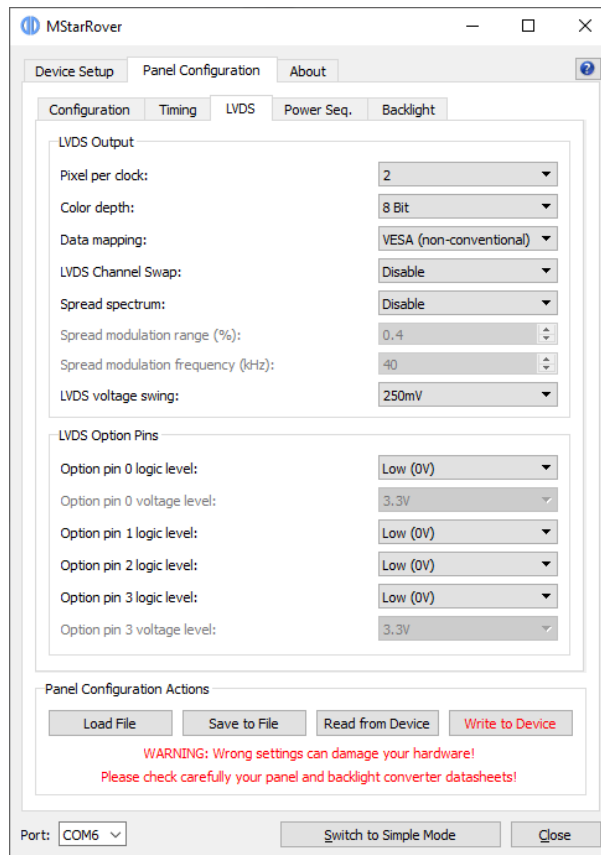
Set the values “**Horizontal active pixels**”, “**Typ. horizontal total pixels**”, “**Min. HSync width**” and “**Min. HSync backporch**” according to the display datasheet. All values must be greater than 0. The definition of these parameters can be seen in the following diagram.

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.



8.4.4 LVDS Tab



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 the LVDS spread spectrum feature

Spread modulation range

Set the spread spectrum modulation range to a value between 0% and 3.0% of the LVDS clock frequency

Spread modulation frequency

Set the spread spectrum modulation frequency to a value between 0 kHz and 40 kHz

LVDS voltage swing

The voltage swing of the LVDS signal can be set to 200mV, 250mV, 300mV or 350mV

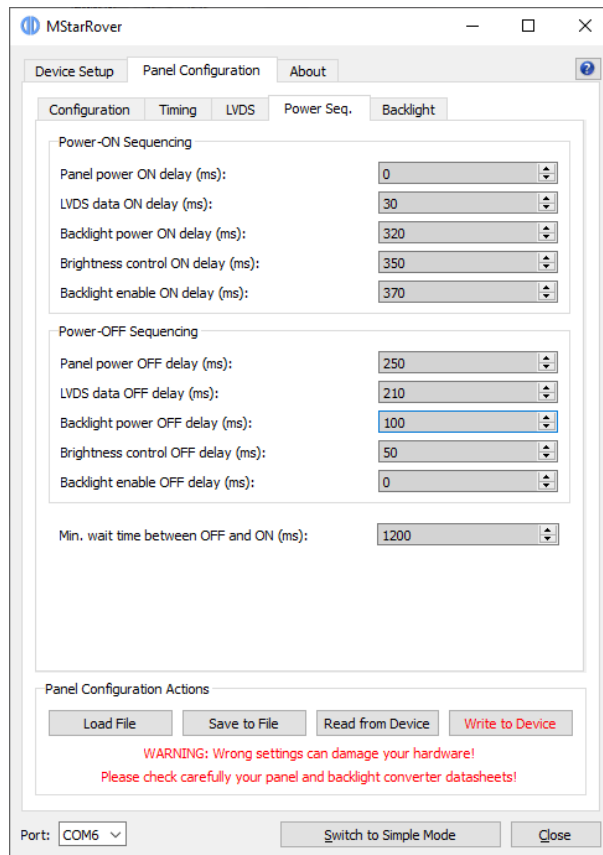
LVDS Option Pins

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 MStarRover. Most pins have a logic high voltage level of 3.3V, for pins 0 and 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 or 5V)
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

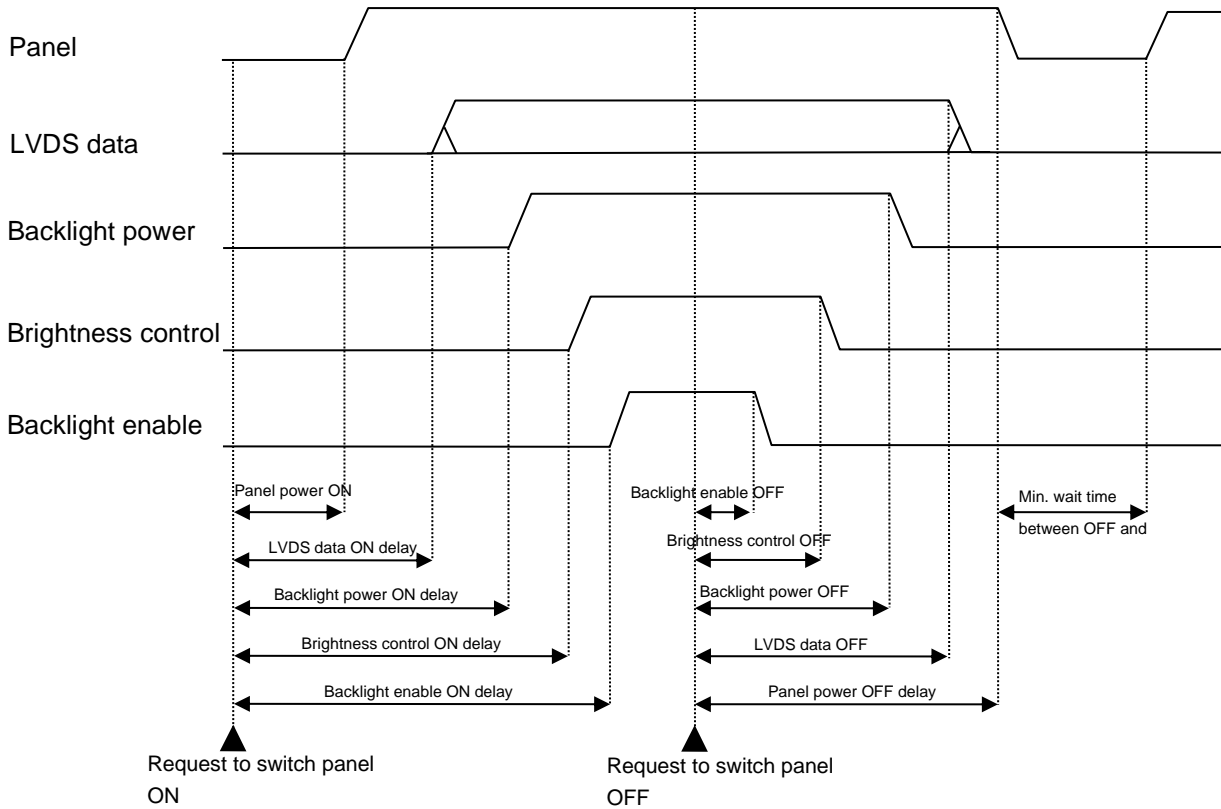
8.4.5 Power Sequencing Tab



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

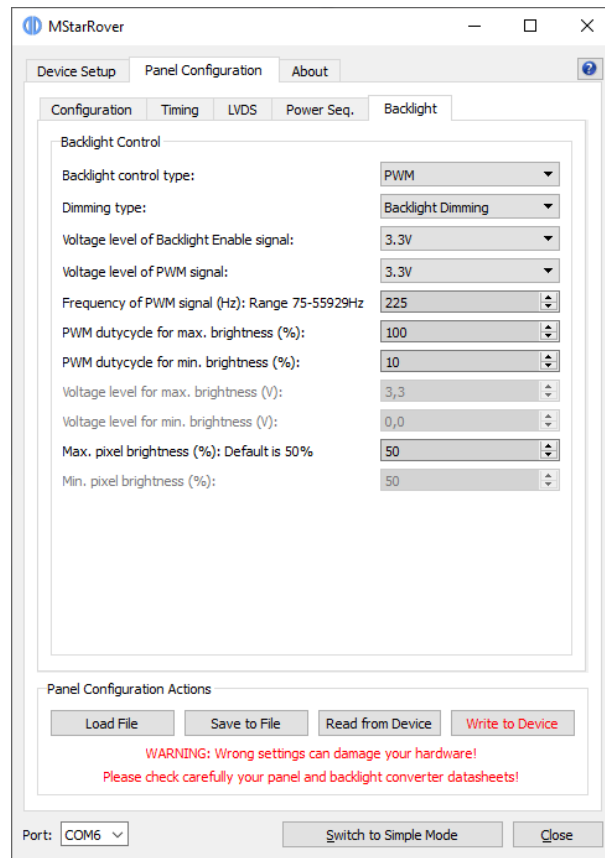
The following diagram shows the definition of the sequencing values:



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 75 Hz to 55929 Hz

PWM duty cycle for max. brightness (%)

Enter the duty cycle of the PWM signal at which the backlight unit has its highest brightness.

PWM duty cycle 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

MStarRover 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:

MStarRover -?

This prints the following help screen:

```

MStarRover v0.3.0.65030
Configuration Tool for TFT Controller Boards
Copyright: 2020-2021 Distec GmbH
http://www.distec.de

USAGE:
"MStarRover.exe" -d portName [-t | -r | -e | -x # ] | [-i # | -I # | -p | -P | -c | -C | -a | -A fileName]

-d : specify name of serial port (e.g. "-d COM1" on Windows, "-d ttyS0" on Linux)
-t : detect board
-r : reset board
-i : read EDID, output is a bin file; # specifies which EDID to read
-I : write EDID, input is a bin file; # specifies which EDID to write
-x : erase EDID; # specifies which EDID to erase
    # = 0: HDMI (default)
    # = 1: VGA
    # = 2: DisplayPort
-p : read FW from Flash device, output is a bin file
-P : write FW to Flash device, input is a bin file
-e : erase Flash device
-c : read Panel Configuration, output is an xml file
-C : write Panel Configuration, input is an xml file
-a : read all, output is a zip file
-A : write all, input is a zip file
The running task can be aborted by pressing keys Ctrl+C

C:\Program Files (x86)\Distec\MStarRover>
  
```

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