Synertronic Designs

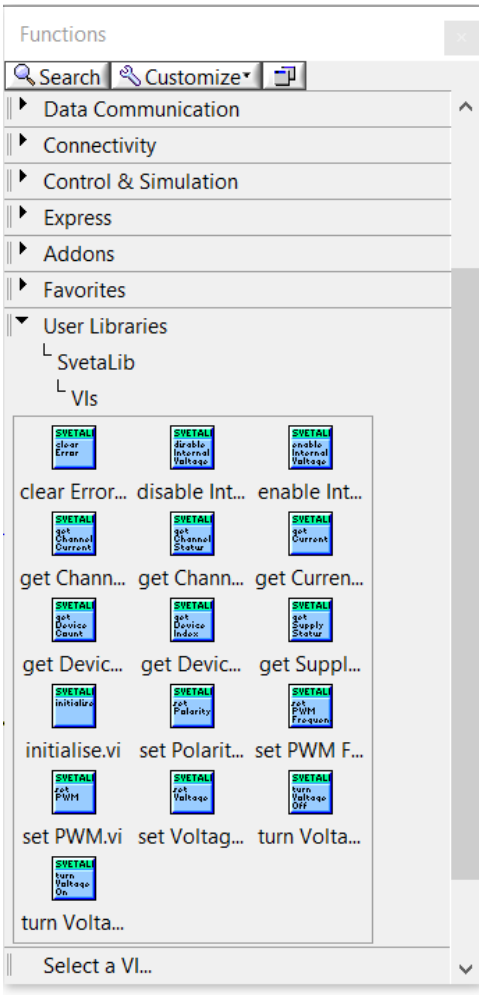
Sveta 7.1 LabView Manual

Installation

Follow these steps to install the LabView driver:

1. Download *SvetaLabView.zip*
2. Unzip *SvetaLabView.zip* in the *user.lib* directory of your LabView installation
3. Run LabView

The VIs for interfacing with Sveta power supplies should now be visible in LabView's *Functions* palette under *User Libraries → SvetaLib → VIs*.



Programming interface

VIs and error handling

The LabView driver and programming interface for Sveta devices consists of a set of VIs. Every VI uses the LabView error handling technique and each VI has an *Error in* and *Error out* parameter. The error parameters are standard LabView error structures, which provide error feedback and flow control.

Error codes are listed in the table below:

Code	Description	Reason
0	ERROR_NONE	No error
1	ERROR_DEVICE_INDEX_OUT_OF_RANGE	Trying to index a device outside the device index range. For example: If two Sveta devices are connected, only device indices 1 and 2 are valid. All other indices are not valid.
2	ERROR_DEVICE_ALREADY_IN_USE	Trying to connect to a device, which is already opened by another application. Close or disconnect the other application.
3	ERROR_DEVICE_OPEN_FAILURE	The device could not be opened. Check the USB cable connection and make sure the correct USB driver is installed.
4	ERROR_INITIALISING	The device cannot be initialised. Check the USB cable connection.
5	ERROR_NOT_INITIALISED	The initialise VI was not called. First call the initialise VI.
6	ERROR_DEVICE_BUSY_OR_NOT_FOUND	The device being referenced via the device ID parameter is either busy or not available.
7	ERROR_RETRIEVING_DEVICE_SIGNATURE	There was a communication error while retrieving the device signature. Check the USB cable connection.
8	ERROR_DEVICE_SIGNATURE	There is an error in the device signature. Check the USB cable connection.
9	ERROR_UNSUPPORTED_FIRMWARE_VERSION	The device uses an older unsupported firmware version. Update the firmware using Uragan Studio. Alternatively, the LabView driver might be outdated. Get the latest LabView driver from the Synertronic Designs web page.
10	ERROR_UNSUPPORTED_FEATURE	The connected device does not support the feature the VI tries to access.
11	ERROR_READING_CALIBRATION	There was a communication error while retrieving the device calibration. Check the USB cable connection.
12	ERROR_READING_POLARITY	There was a communication error while retrieving the device polarity. Check the USB cable connection.
13	ERROR_PWM_CHANNEL_OUT_OF_RANGE	The specified PWM channel index is out of range. Refer to the device-specific information in the next chapter.
14	ERROR_PWM_DUTY_CYCLE_OUT_OF_RANGE	The specified duty cycle is given in percent and must be in the range `[0 .. 100]`.
15	ERROR_SETTING_PWM_DUTY_CYCLE	There was a communication error while setting the PWM duty cycle. Check the USB cable connection.
16	ERROR_PWM_FREQUENCY_OUT_OF_RANGE	The specified PWM frequency is out of range. Refer to the device-specific information in the next chapter.

17	ERROR_SETTING_PWM_FREQUENCY	There was a communication error while setting the PWM frequency. Check the USB cable connection.
18	ERROR_OUTPUT_CHANNEL_OUT_OF_RANGE	The specified supply output channel index is out of range. Refer to the device-specific information in the next chapter.
19	ERROR_VOLTAGE_OUT_OF_RANGE	The specified supply output voltage is out of range. Refer to the device-specific information in the next chapter.
20	ERROR_CURRENT_OUT_OF_RANGE	The specified supply output current is out of range. Refer to the device-specific information in the next chapter.
21	ERROR_SETTING_VOLTAGE	There was a communication error while setting the supply output voltage. Check the USB cable connection.
22	ERROR_INVALID_POLARITY	The specified supply output polarity is out of range. Only `0` (positive polarity) and `1` (negative polarity) is allowed.
23	ERROR_SETTING_POLARITY	There was a communication error while setting the supply output polarity. Check the USB cable connection.
24	ERROR_TURNING_VOLTAGE_ON	There was a communication error while sending the command. Check the USB cable connection.
25	ERROR_TURNING_VOLTAGE_OFF	There was a communication error while sending the command. Check the USB cable connection.
26	ERROR_INVALID_VOLTAGE_RANGE	The specified internal bus voltage range is out of range. Refer to the device-specific information in the next chapter.
27	ERROR_ENABLING_INTERNAL_BUS	There was a communication error while sending the command. Check the USB cable connection.
28	ERROR_DISABLING_INTERNAL_BUS	There was a communication error while sending the command. Check the USB cable connection.
29	ERROR_INTERNAL_BUS_DISABLED	The supply output cannot be turned on, because the internal bus voltage is disabled. Refer to the device-specific information in the next chapter.
30	ERROR_LP_USB_ONLY	For USB-powered devices: there might be limitations when powered only by a low-power USB interface.
31	ERROR_GETTING_STATUS	There was a communication error while retrieving the supply status. Check the USB cable connection
32	ERROR_GETTING_CURRENT	There was a communication error while retrieving the supply output current. Check the USB cable connection
33	ERROR_CLEARING_ERROR	There was a communication error while sending the command. Check the USB cable connection
34	ERROR_PWM_FUNCTION_UNKNOWN	Unknown PWM function was specified.

intialise

Execute this VI before any other commands are sent to the target device. It ensures that the LabView driver is reset and in a consistent state.

get Device Count

Returns the number of connected Sveta power supplies.

Supported devices: **All**

Parameter	Type	Description
`pCount`	Integer (out)	Number of connected devices.

The `pCount` value can be used to determine the range of device indices that can be used. For example: When three devices are connected, the individual devices can be accessed using device indices 1, 2 and 3.

get Device Index

Tries to find the device index of the Sveta power supplies with the given serial number.

Supported devices: **All**

Parameter	Type	Description
`serialNumber`	String (in)	Serial number of the target Sveta power supply.
`deviceIndex`	Integer(out)	The device index of the Sveta power supply with the given serial number

If the device with the given serial number cannot be found, an error code is returned and `deviceIndex` will be equal to -1.

set PWM Function

Specifies the PWM function. The PWM output performs one of the following functions:

- *WaveStart*: Outputs a short pulse at the beginning of a voltage waveform.

Supported devices: **Sveta-100V1-X3**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]
`channel`	Integer (in)	Specifies the PWM channel number. Allowed channel numbers: Sveta-100V1-X3: `1,2`
`pwmFunction`	Integer (in)	The duty cycle in [%]. Allowed ranges: Sveta-100V1-X3: `0` (WaveStart for voltage output 1) `1` (WaveStart for voltage output 2) `2` (WaveStart for voltage output 3)

set PWM

Specifies the PWM duty cycle.

Supported devices: **Sveta-2k2, Sveta-100V1-X3**

Parameter	Type	Description
deviceIndex	Integer (in)	The target device index. Range: [1..pCount]
channel	Integer (in)	Specifies the PWM channel number. Allowed channel numbers: Sveta-2k2: 1 Sveta-100V1-X3: 1,2 Sveta-5k1: not supported
dutyCycle	Integer (in)	The duty cycle in [%]. Allowed ranges: Sveta-100V1-X3: [0..100] Sveta-2k2: [0..100]

set PWM Frequency

Specifies the PWM frequency. This VI is only supported for Sveta-2k2 and Sveta-100V1-X3 devices.

Supported devices: **Sveta-2k2, Sveta-100V1-X3**

Parameter	Type	Description
deviceIndex	Integer (in)	The target device index. Range: [1..pCount]
Hz	Integer (in)	Specifies the PWM frequency in [Hz]. Allowed ranges: Sveta-100V1-X3: [1..200000] Sveta-2k2: [1..200000]

set Voltage

Specifies the supply output voltage and output current limit.

Supported devices: **Sveta-100V1-X3, Sveta-2k2, Sveta-5k1, Sveta-40V1-WG, Sveta-50V1-WG**

Parameter	Type	Description
deviceIndex	Integer (in)	The target device index. Range: [1..pCount]
channel	Integer (in)	Specifies the supply output channel number. Allowed channel numbers: Sveta-100V1-X3: 1 (low-power USB) 1,2,3 (high-power USB) Sveta-2k2: 1 Sveta-5k1: 1 Sveta-40V1-WG: 1 Sveta-50V1-WG: 1
voltage_V	Double (in)	The output voltage in [V]. Allowed ranges: Sveta-100V1-X3: [0..75] (75V internal bus) [0..100] (100V internal bus) Sveta-2k2: [0..2000] Sveta-5k1: [0..5000] Sveta-40V1-WG: [-40..40] Sveta-50V1-WG: [0..50]
current_uA	Double (in)	The output current limit in [µA]. Allowed ranges: Sveta-100V1-X3: ignored Sveta-2k2: [0..1000] Sveta-5k1: [0..200] Sveta-40V1-WG: ignored Sveta-50V1-WG: ignored

set Accurate Voltage

Specifies the supply output voltage for low-noise, high-accuracy devices.

Supported devices: **Sveta-50V1-LN**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]
`channel`	Integer (in)	Specifies the supply output channel number. Allowed channel numbers: Sveta-50V1-LN: `1`
`coarseVoltage_mV`	Double (in)	The coarse output voltage in [mV]. Allowed ranges: Sveta-50V1-LN: `[0..52000]`
`fineVoltage_uV`	Double (in)	The output current limit in [μA]. Allowed ranges: Sveta-50V1-LN: `[-2500..2500]`

set Voltage Waveform

Specifies a voltage waveform.

Supported devices: **Sveta-100V1-X3, Sveta-40V1-WG, Sveta-50V1-WG**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]
`channel`	Integer (in)	Specifies the supply output channel number. Allowed channel numbers: Sveta-100V1-X3: `1` (low-power USB) `1,2,3` (high-power USB) Sveta-40V1-WG: `1` Sveta-50V1-WG: `1`
`waveform`	Integer (in)	Specifies the waveform type. Allowed types: Sveta-100V1-X3: Sveta-40V1-WG: `0` triangle `1` sawtooth `2` sinusoidal Sveta-50V1-WG: `0` triangle `1` sawtooth
`offset_V`	Double (in)	DC offset in [V]. Allowed ranges: Sveta-100V1-X3: `[0..75]` (75V internal bus) `[0..100]` (100V internal bus) Sveta-40V1-WG: `[-40..40]` Sveta-50V1-WG: `[0..50]`
`amplitude_V`	Double (in)	Amplitude in [V]. Allowed ranges: Sveta-100V1-X3: `[0..75]` (75V internal bus) `[0..100]` (100V internal bus) Sveta-40V1-WG: `[0..20]` Sveta-50V1-WG: `[0..25]`
`frequency_Hz`	Double (in)	Frequency in [Hz]. Allowed ranges: Sveta-100V1-X3: `[0.1..50]` Sveta-40V1-WG: `[0.1..50]` Sveta-50V1-WG: `[0.1..50]`

set Polarity

Specifies the supply output polarity.

Supported devices: **Sveta-2k2**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]
`channel`	Integer (in)	Specifies the supply output channel number. Allowed channel numbers: Sveta-2k2: `1`
`polarity`	Integer (in)	Specifies the supply output polarity. Allowed polarities: Sveta-2k2: `0` positive `1` negative

set Voltage On

Turns a supply output channel on. For Sveta-100V1-X3 devices, the internal voltage bus must be enabled, before a supply channel can be turned on.

Supported devices: **Sveta-100V1-X3, Sveta-2k2, Sveta-5k1, Sveta-40V1-WG, Sveta-50V1-WG**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]
`channel`	Integer (in)	Specifies the supply output channel number. Allowed channel numbers: Sveta-100V1-X3: `1` (low-power USB) `1,2,3` (high-power USB) Sveta-2k2: `1` Sveta-5k1: `1` Sveta-40V1-WG: `1` Sveta-50V1-WG: `1`

set Voltage Off

Turns a supply output channel off.

Supported devices: **Sveta-100V1-X3, Sveta-2k2, Sveta-5k1, Sveta-40V1-WG, Sveta-50V1-WG**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]
`channel`	Integer (in)	Specifies the supply output channel number. Allowed channel numbers: Sveta-100V1-X3: `1` (low-power USB) `1,2,3` (high-power USB) Sveta-2k2: `1` Sveta-5k1: `1` Sveta-40V1-WG: `1` Sveta-50V1-WG: `1`

enable Internal Voltage Bus

Enables the internal voltage bus of the power supply.

Supported devices: **Sveta-100V1-X3**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]
`range`	Integer (in)	Specifies the internal voltage bus range/level. Allowed ranges: Sveta-100V1-X3: `0` 75V `1` 100V

disable Internal Voltage Bus

Disables the internal voltage bus of the power supply. This will also turn off all supply outputs.

Supported devices: **Sveta-100V1-X3**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]

get Supply Status

Retrieves the supply status. Use this VI to determine if the supply encountered an error condition. If an error was encountered, all supply output channels will be turned off. The error must be cleared, before any supply output channel can be enabled.

Supported devices: **Sveta-100V1-X3, Sveta-2k2, Sveta-5k1**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]
`hasError`	Bool (out)	Returns `true` if an error was encountered, else returns `false`.
`errorDescription`	String (out)	The error description.

get Channel Status

Retrieves the status of a supply output channel.

Supported devices: **Sveta-100V1-X3, Sveta-2k2, Sveta-5k1**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]
`channel`	Integer (in)	Specifies the supply output channel number. Allowed channel numbers: Sveta-100V1-X3: `1` (low-power USB) `1,2,3` (high-power USB) Sveta-2k2: `1` Sveta-5k1: `1`
`isOn`	Bool (out)	Returns `true` if the supply output channel is on, else returns `false`.
`isCurrentLimit`	Bool (out)	Returns `true` if the supply output channel is limiting the output current, else returns `false`.

get Channel Current

Retrieves the output current of a supply output channel.

Supported devices: **Sveta-2k2, Sveta-5k1**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]
`channel`	Integer (in)	Specifies the supply output channel number. Allowed channel numbers: Sveta-2k2: `1` Sveta-5k1: `1`
`current_uA`	Double (out)	The output current of the given supply output channel in [µA].

clear Error

If an error was encountered, all supply output channels will be turned off. The error must be cleared, before any supply output channel can be enabled.

Supported devices: **All**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]

get ADC Value

Get the value of an ADC converter.

Supported devices: **PD-Mixer**

Parameter	Type	Description
`deviceIndex`	Integer (in)	The target device index. Range: [`1..pCount`]
`voltage_mV`	double (out)	The measured voltage at the ADC input.

Examples

There are examples VIs in the *user.lib/SvetaLib/examples* directory:

- *Example-Sveta-100V1X3.vi*
  This basic example shows how the SvetaLib VIs can be used to set-up the PWM and supply output.
- *Example-Sveta-100V1X3-ControlLoop.vi*
  This is a more advanced example. It shows how event cases can be used in LabView to control the power supply.
- *Example-Sveta-2k2.vi*
  This basic example shows how the SvetaLib VIs can be used to set-up the PWM and supply output.
- *Example-Sveta-2k2-ControlLoop.vi*
  This is a more advanced example. It shows how event cases can be used in LabView to control the power supply.
- *Example-Sveta-5k1.vi*
  This basic example shows how the SvetaLib VIs can be used to set-up the supply output.
- *Example-Sveta-5k1-ControlLoop.vi*
  This is a more advanced example. It shows how event cases can be used in LabView to control the power supply.

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