

vsm GPIO Box

User Manual

Version: 4.0/2

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Revision History

Version	Edition	Changes	Firmware Version
1	2014-05-19	Initial draft	2.33
2	2014-06-13	Initial Release	2.33
3	2014-10-29	Ember+ added	2.35
4.0/1	2017-03-31	New Overview graphics & template	2.40
4.0/2	2020-05-18	Updates to Power Specification GPIO 64 Analog Device Removed	2.40

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1. Welcome

About this Manual

This document describes how to install and setup the **vsm GPIO Box** within a VSM system.

Note that a system may comprise several software and hardware components.

Other useful documents include the:

- **vsm Software User Manual** - more about **vsmStudio**, the main configuration and administration tool, plus other software components: **vsmPanel**, **vsmWebPanel**, **vsmTimeSync**, etc.
- **vsm Gear User Manuals** - more about other hardware panel and interface options.

All Lawo manuals are available from the **Downloads** area at www.lawo.com (after **Login**).

Look out for the following which indicate:

Notes - points of clarification.

Tips - useful tips and short cuts.

Attention - alert you when an action should *always* be observed.

Lawo User Registration

For access to the **Download-Center** and to receive regular product updates, please register at:

www.lawo.com/user-registration.

2. Important Safety Instructions

Please observe all of the instructions provided in the "General Safety Information for Lawo Equipment" booklet delivered with your devices. Double-click [here](#) to open the same information (as a pdf).

3. Introduction

A **vsm GPIO Box** is the interface between Ethernet and a specific number of digital general purpose ports. The number of inputs and/or outputs and their type depends on the box in use. This guide provides you with all the information that is required in order to integrate a GPIO Box into a vsmStudio.

4. Product Overview

GPI 64

Number of ports	64 galvanically isolated TTL-compatible inputs
Communication port	1xEthernet
Dimensions	483mm x 43,7mm x 127,3mm (WxHxD): 1RU
Weight	approx. 1,9KG
Power Consumption	<25W
Working Environment	0°C-60°C non condensing humidity



GPO 64

Number of serial ports	64 dry relay-outputs, up to 60VDC/35VAC/7A
Communication port	1xEthernet
Dimensions	483mm x 43,7mm x 127,3mm (WxHxD): 1RU
Weight	approx. 2,3KG
Power Consumption	<25W
Working Environment	0°C-60°C non condensing humidity



GPIO 32

Number of serial ports	32 galvanically isolated TTL-compatible inputs 32 dry relay-outputs
Communication port	1xEthernet
Dimensions	483mm x 43,7mm x 127,3mm (WxHxD): 1RU
Weight	approx. 2,1KG
Power Consumption	<25W
Working Environment	0°C-60°C non condensing humidity



5. Operating Conditions

This device is built to be used in a non-condensing environment within a temperature range of 0-60°C. Under or overshooting this working temperature range may cause fast aging of components or even malfunction of the whole device.

Spillage of any liquids e.g. coffee, coke, water... onto/into the device may cause damage.

The storage temperature of the device must be within -20°C to 60°C with a maximum of 75% non-condensing relative humidity at 60°C @ 0VDC supply-voltage.

DO NOT throw, drop or bend the unit and make sure that there is no strong permanent mechanical pressure on any side of the housing at any time.

Before installing or using this device, always read and observe the [Important Safety Instructions](#).

6. Preparing for Operation

If all GPI-connectors are connected, the total depth of the General Purpose Interface will increase up to 140mm.

Each General Purpose Interface comes enclosed with a cable-lacing bar which can be mounted to the front cover for cable management of in- and output cables. If the bracket is mounted, the complete depth of the GPI-unit will be increased by another 61mm.

All Lawo devices will be shipped with DHCP enabled network configuration. If you don't have a DHCP network ask your administrator for static network settings and edit the "Network" section if required.

Do the following settings in VSM Discover: 

Network	
Dhcp Address	False
Gateway	192.168.16.5
IP Address	192.168.17.109
IP Mask	255.255.248.0
Mac Address	00-13-16-01-26-38
Mode	100MBit-Full Duplex
Network Name	GP-I/O-Box

Press the "Apply" button if you are sure you have entered the settings correctly. The device will automatically perform a reboot to apply the network configuration.

To connect a device to vsmStudio enter the IP Address of Server 1 – 4 (depending on how many vsmStudio servers are configured) in the "Application" section. This connection will also be used for any future firmware updates.

Application	
GP-I/O Mode	32In/32Out
Server 1	192.168.17.38
Server 2	192.168.17.39
Server 3	192.168.17.40
Server 4	192.168.17.41

The Location and Comment fields in the "Misc" section are to set to easily locate the device in your environment.

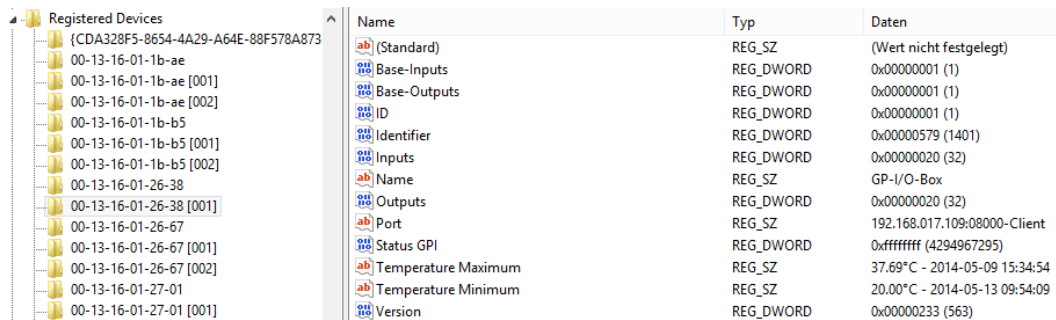
Misc	
Comment	Red Tally
Location	Studio 1

Additional read-only status and device information from vsmDiscover:

Status	
Current Primary	192.168.17.41
Current Secondary	0.0.0.0
Detection State	Online

Device	
Controls	256
Hardware ID	1
Hardware Revision	3
ID	0
Moniker	GP-I/O-Box
Options	FFFF
Software ID	4
Software Version	234
Software Version CPLD	4

Execute “regedit.exe” as Administrator on your vsmStudio server to configure the device and find the vsmStudio registry key: “HKEY_...\VirtualStudioManager\vsmStudio\Registered Devices”. Allocate the MAC Address of the device in the “Registered Devices” list and use the Application Key (MAC Address with [001]) to enter your inputs-/outputs-offset of the GPIO’s in the “Base-Inputs/-Outputs” key and reboot the device.



Name	Typ	Daten
(Standard)	REG_SZ	(Wert nicht festgelegt)
Base-Inputs	REG_DWORD	0x00000001 (1)
Base-Outputs	REG_DWORD	0x00000001 (1)
ID	REG_DWORD	0x00000001 (1)
Identifier	REG_DWORD	0x00000579 (1401)
Inputs	REG_DWORD	0x00000020 (32)
Name	REG_SZ	GP-I/O-Box
Outputs	REG_DWORD	0x00000020 (32)
Port	REG_SZ	192.168.017.109:08000-Client
Status GPI	REG_DWORD	0xffffffff (4294967295)
Temperature Maximum	REG_SZ	37.69°C - 2014-05-09 15:34:54
Temperature Minimum	REG_SZ	20.00°C - 2014-05-13 09:54:09
Version	REG_DWORD	0x00000233 (563)

6.1 Ember+ Interface

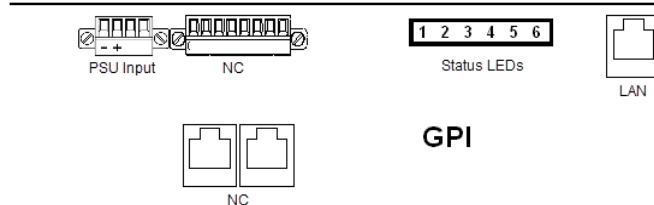


Firmware version 2.35 or higher is required to use the provided Ember+ Interface for digital GPIO's. As long as the device has a valid connection to a vsmStudio, the Ember+ Interface is read only. The ports are represented as a One-To-N Matrix, where the matrix outputs are used as the device GPIO/O ports and the matrix input is the connect/disconnect signal. Use TCP Port 9000 for the Ember+ connection.

7. Technical Specifications

7.1 Status LEDs

Rear-view

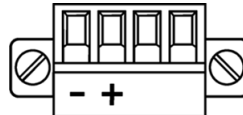


- 1 (R/G/B): Lights blue: internal serial I/O controller OK
- 2 (R/G/B): Pulses red: no connection to the network
Blinks fast red: device in bootloader-mode
Pulses yellow: network connection established
Pulses blue: connected to vsmStudio
- 3 Green: Light, processor core-voltage OK
- 4 Green: Light, internal I/O-voltage OK
- 5 Orange: Blinks, physical LAN connection/TCP/IP-data-transfer

7.2 Connectors

7.2.1 Power

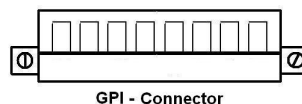
Connector for DC-supply: 4-Pin connector (MC 1,5/ 4-STF-3,81) locked with two screws.
(Mounted on power-supply delivered with each GPIO-Box)



Important: It is understood that only the external Power-Supply-Unit (PSU) provided by Lawo, and shipped with the specific vsm device, is used for operating the product.

The provided Power-Supply-Unit is equipped with an LPS certified 12V-DC-output that is mandatory for all vsmGear products.

7.2.2 GPI-Interface



Connectors for frontally GPI-interface:

8-Pin connector locked with two screws (MC 1,5/ 8-STF-3,81)

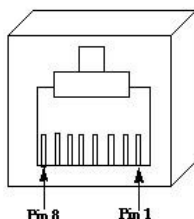
Delivered connectors: 16 pieces for one complete device. See [Connector Pin-outs](#) for wiring details.

7.2.3 Ethernet

Ethernet communication port to vsmStudio

It is understood that for proper operation each GPIO Interface is connected to an Ethernet-switch where the individual port of the switch is set to "Auto-Negotiation".

RJ45 Ethernet



Pin	Signal	Color of a standard TIA-568A-shielded twisted pair patch cable (CAT5 or higher)
1	TX+	white/green
2	TX-	green
3	RX+	white/orange
4	NC	blue
5	NC	white/blue
6	RX-	orange
7	NC	white/brown
8	NC	brown

Notice for wiring:

NC: No connection; does not connect to any signal or supply.

Only use shielded CAT5 (or higher standard) -specified networkable. Refer to TIA-568A or TIA-568B for wiring.

Do not use cable-traces longer than 100m (328ft) between the device and network-switch for 100BASE-T communication.

Make sure to do standard wiring and use shielded RJ45-plugs for shielded cable on both ends of the line.

7.3 Signals

GPI

Grounding the input pin will 'set' the device. Supplying a DC voltage, it needs to be lower than 2.6 V DC to 'set' the device. Make sure not to supply any same ground external DC-voltage exceeding 12V.

The open-circuit-voltage of the inputs is approximately 3,8V. The external current for short-circuiting the input is limited down to max 8mA.

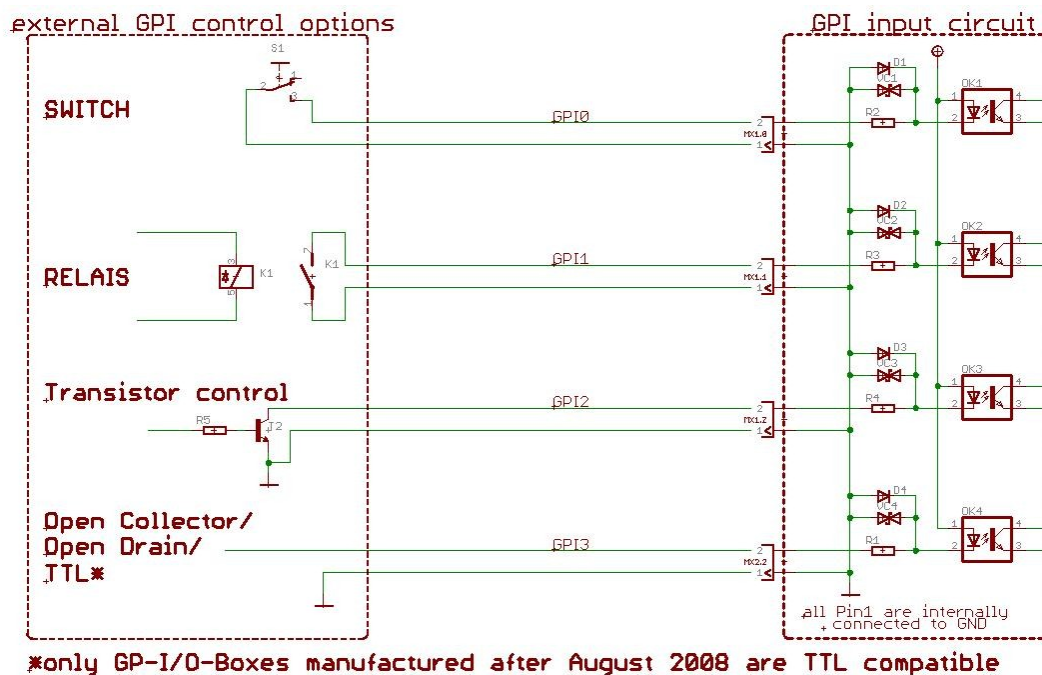
All inputs are galvanically isolated but share the same signal ground potential. Make sure not to supply any positive voltage to the ground potential.

The built-in GPI-inputs follow PS1 (electrical power source class1).

The GPI-input will not allow power to exceed 1W by the device itself.

- Open circuit voltage GPI-input: approx. 3,8V DC, max. 5V DC
- Loaded circuit voltage GPI-input: 0..3,8V DC
- Short circuit current GPI-input: approx. 8mA [$3,8V \times 0,008A = 0,03W$]
- Loaded circuit current with externally 12V (PS1) supplied: approx. 30mA [$12V \times 0,03 = 0,4W$]

Important: It is understood that if supplying any external voltage (DC only) to the GPI-input, it is never to exceed 5V DC rms and must also follow the PS1-rules [b-IEC 62368-1] to never source more than 15W. Check polarity if external DC-voltage is supplied. Always connect GPI-input-ground to external supply-ground! Never apply any AC-voltage to the GPI-inputs!



GPO

The relay outputs are primarily designed for low level voltage (up to 30V DC rms / 30V AC rms) that meet the following LPS requirements for the external circuit (LPS: Limited Power Source, specified in IEC 60950 and IEC 62368 safety standard):

- DC-Voltage: lower or at a maximum of 30V DC rms
- AC-Voltage: lower or at a maximum of 30V AC rms
- Maximum short circuit current of 7A
- Maximum nominal rating of 100 VA
- Maximum nominal current of 5A
- Maximal nominal power of 5A multiplied by supplied voltage needs to be < 100 VA

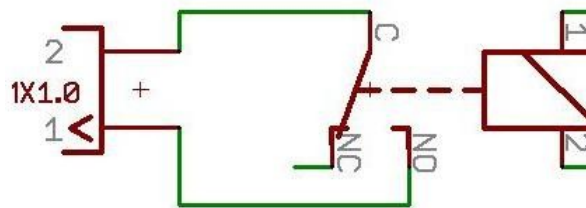
For safety reasons while using "higher current" make sure the current does not exceed the maximum current permitted for each relay (maximum 7 A per relay).

High level signals and low level signals should not be run together on the same GPIO.

Professional broadcast equipment mostly uses 5 V up to 24 V DC with a maximum current of 500 mA.

Important: Due to physical properties the usage of higher voltage and higher current causes more abrasion within the relays. This may result higher transient resistance between the switching contacts.

Once used with up to 30V and up to 7A per relay, the GPO output should not be used (in another application) with voltage below 5V and current below 100mA, to avoid the incorrect interpretation of some switching conditions.



8. Connector Pin-outs

