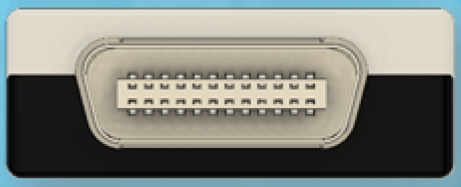
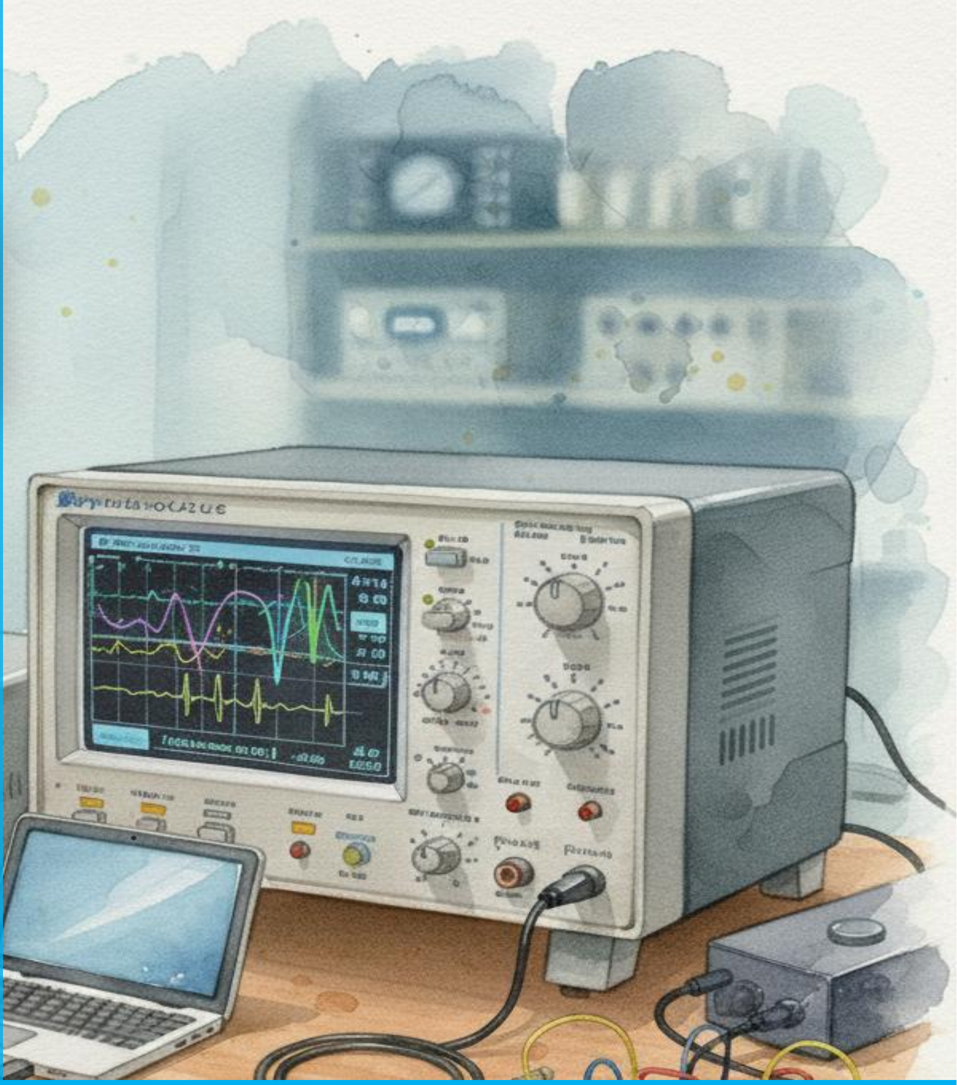




XyphroLabs UsbGpib V2
User Manual

Last update 1st February 2026

Contents

1 Introduction

The UsbGpib V2 is a compact, high-performance USB-to-GPIB adapter engineered from the ground up for seamless integration with modern and legacy test equipment.

Unlike clone devices, UsbGpib V2 delivers robust IEEE-488.1 and IEEE-488.2 compatibility, stable USBTMC operation, and a unique device identifier that ensures consistent VISA resource naming across systems - eliminating the need for manual remapping or COM port assignments.

Designed to match the physical footprint and cable path of traditional GPIB connectors, the adapter fits into all existing lab setups while offering significant advantages in space efficiency, cable management, and cross-platform support. Whether you're automating instrument control on Windows, macOS, Linux, or FreeBSD, UsbGpib V2 provides plug-and-play reliability without proprietary drivers.

With firmware upgradability, protocol-aware communication, and a focus on user-friendly integration, UsbGpib V2 is the ideal choice for engineers, researchers, and developers seeking a dependable GPIB interface that just works.

2 Advantages of UsbGpib V2 adapter

- Modern Connectivity: Bridges USB and IEEE 488 (GPIB) with full USBTMC protocol compliance
- Slim Design: Minimal depth of just 1.5cm allows instruments to be placed closer to walls or rack panels
- Cable Efficiency: Uses thin USB cables instead of bulky ”garden hose” GPIB cables, reducing clutter and improving portability
- Multi Adapter Support: Unique identifier per unit enables multiple adapters to be connected and operated reliably on the same PC
- No COM Ports: Avoids serial port mapping issues; Each adapter is consistently accessible with the same name across multiple PCs
- Transparent Operation: Plug into your instruments GPIB port and it behaves like a modern USB measurement device, including proper USB port deactivation when the instrument is powered off
- Controller Role: Optimized as a dedicated GPIB controller for one instrument per adapter, ensuring robust one to one communication and optimized cable management.
- Standards Compliance: Implements full IEEE-488.1 IEEE 488.2 controller support via USBTMC, including status byte reading, triggering, service requests, and termination settings

- Software Compatibility: Works seamlessly with all standard VISA providers (NI VISA, Rohde & Schwarz VISA, Keysight VISA)
- Tool Integration: Fully compatible with LabVIEW, MATLAB, PyVISA, and PyVISA py for established and modern automation workflows
- Cross Platform Support: Operation across Windows, macOS, FreeBSD, and Linux
- German Engineering: Designed and developed in Germany over six years, extensively tested for robustness and compatibility with instruments from new to decades old
- Reliability: Built to ensure long automated measurement sequences complete without interruption
- Future Proof: Firmware is field upgradable and actively maintained, providing ongoing improvements and compatibility updates

3 Safety Precautions

To ensure reliable operation and long-term durability of the UsbGpib V2 adapter, please observe the following environmental and handling Guidelines

3.1 Operating Conditions

Temperature Range:	0°C to +50°C
Humidity:	10% to 90% RH, non-condensing
Altitude:	Up to 2000m above sea level

3.2 Storage Conditions

Temperature Range:	-20°C to +70°C
Humidity:	5% to 95% RH, non-condensing

3.3 Moisture & Contaminants

- Avoid exposure to liquids, vapors or corrosive substances
- Do not operate in environments with condensation, high dust levels or chemical fumes

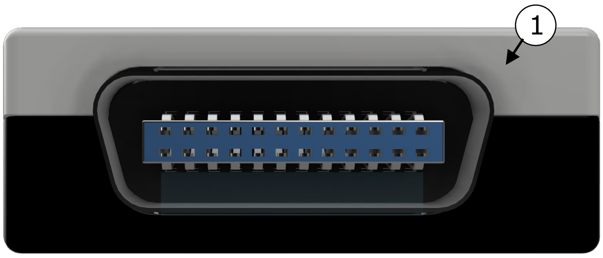
3.4 Electric Safety

- Do not expose to voltage levels above 6V
- Do not short circuit or connect to non IEEE488 / non-USB compliant ports
- Ensure proper grounding of connected instruments

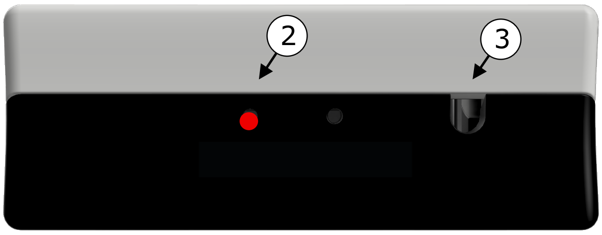
3.5 Handling & Installation

- Do not bend or stress the USB or GPIB connectors during installation
- Avoid excessive force when plugging/unplugging
- Avoid direct sunlight
- Keep away from electrostatic discharge (ESD) sources; use ESD-safe handling procedures

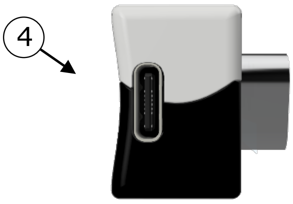
4 Overview



(1) GPIB connector - Plugs directly into your measurement equipments GPIB port.



(2) Status LED
(3) Firmware update button



(4) USB-Type C connector - plug it with either a USB Type C to USB type A or USB type C to type C cable into your PC.

5 LED

The LED has multiple purposes as summarized in the table below.

Led blinking with a frequency of about 2 Hz. ☀ → ● → ☀ → ●	The Adapter is connected to a USB port, but no GPIB device is found. Connect a GPIB measurement device to the GPIB port and ensure that GPIB is enabled in the instrument.
LED is continuously on. ☀	The GPIB device was identified, but no GPIB communication is executed from PC.
LED is flickering (mostly on, but sometimes off for short periods). ☀ → ● long short	Every time GPIB data is transferred from the PC or to the PC, the LED will be turned off for short periods of time. This indicates data exchange = activity.
LED is always off. ●	The USB port is not connected to the PC, the PC powered off or the USB cable defect.

6 Using the adapter

To use the adapter, connect the USB-C connector with a USB cable to a PC.

The GPIB connector can be plugged directly into the measurement instrument, which you want to control. It can also connect via a GPIB cable if required due to setup constraints.

When the measurement equipment is turned on and if the GPIB port is enabled in the instrument, the adapter will enumerate on the PC as USBTMC class device.

Operating system specific instructions & tutorials are available under this link:

https://github.com/xyphro/UsbGpib/blob/master/Tutorials/README.md

Those tutorials explain how to ensure that a USB driver is installed and guide through the first setup up to the point where you can talk with the instrument.

Note: The UsbGpib Adapter does not enumerate on the PC, if it is not connected to a GPIB measurement device, which is powered and GPIB enabled.

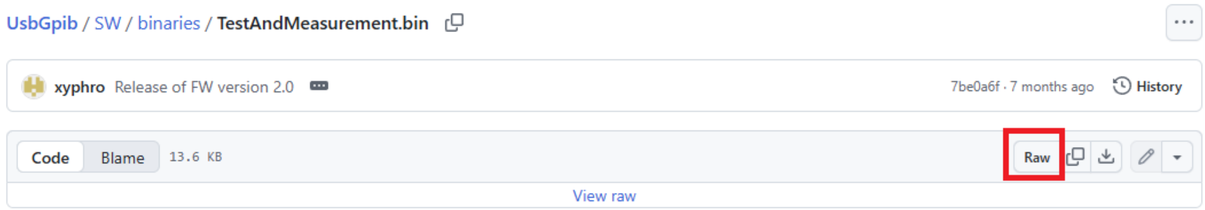
7 Firmware update procedure

The UsbGpib V2 adapter comes preinstalled with a firmware. But as the firmware is actively maintained you might want to update the adapters firmware sooner or later. The UsbGpib V2 adapter allows for firmware updates. It requires the bootloader mode to be entered, followed by programming the firmware and power cycling the adapter.

Firmware images are distributed via GitHub:

https://github.com/xyphro/UsbGpib/tree/master/SW/binaries

to download, left-click on ”TestAndMeasurement.bin” file. After the new page loads, click on the RAW button on the top right side:

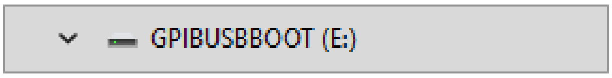

UsbGpib / SW / binaries / TestAndMeasurement.bin
xyphro Release of FW version 2.0
7be0a6f · 7 months ago
History
Code
Blame
13.6 KB
Raw
View raw

After downloading the file, rename it to FLASH.BIN. Ensure to use capital letters for the full filename during rename. Filenames with lowercase letters like ”Flash.bin”, ”flash.bin”, ”FLASH.bin” will result in the firmware update procedure not to work (but it won’t break the adapter).

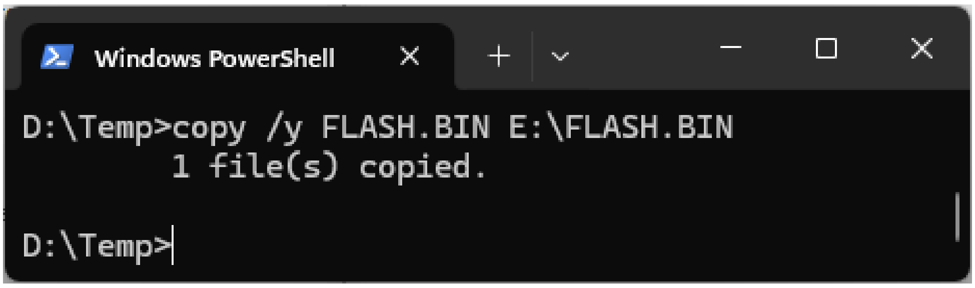
After downloading the file, enter the bootloader:

- Connect the adapter to a PC via USB. The GPIB side can be left unconnected.
- Hold the button (3) down for a few seconds (use e.g. a pencil to push it), until the PC recognizes a memory stick device (USB flash or mass storage device).

A new drive appears on the PC:



Then open a command line and enter a command like the following:



```
D:\Temp>copy /y FLASH.BIN E:\FLASH.BIN
        1 file(s) copied.

D:\Temp>
```

Adjust the file paths and drive letters to your actual system. When no error is shown, you can unplug USB (and GPIB) and reconnect to power cycle the adapter and use the new firmware.

Note: Drag and drop operation e.g. from Windows explorer does will work. Ensure you use the command line method as described.

8 Technical specifications

Item	**Specification**
USB power requirements	• 5V supply voltage nominal • Valid supply voltage range: 4.5V to 5.5V • 100mA current consumption
USB standard	• USB 1.1, USB 2.0, USB 3 and higher are supported with full speed mode
USB connector	• USB Type-C connector • Compatible with USB-A by using a USB Type C to USB Type A cable • Compatible with USB Type C to USB Type C cable.
Supported IEEE-488 features	• IEEE-488.1, IEEE-488.2, HPIB, GPIB compatible • Service request (reported using interrupt transfers) • Device Clearing • Trigger • Status Byte read • GPIB write, read and queries (supports talker only, listener only and talker+listener instruments) • Full timeout support for reliable operation • All GPIB features are exposed using the exact USBTMC equivalents for good compatibility
Supported IEEE-488 device roles	• Controller
Operating Systems	• Windows • Linux, FreeBSD • Mac-OS
Dimensions	• Excluding GPIB connector: 60mm x 23mm x 15mm (Width x Height x Depth) • Including GPIB connector: 60mm x 23mm x 22mm (Width x Height x Depth)
Weight	• 30g

Frequently Asked Questions

Why doesn't the adapter show up on my PC when I plug it in?
This is a feature called ”Ghost Mode.” The adapter only enumerates (becomes visible) on the PC if it is connected to a GPIB instrument that is powered on. This reduces device manager clutter when you have multiple adapters connected to instruments that are currently off.

The reason for this feature is to make an instrument behave like one with native USB interface and avoid seeing adapters on the PC with that you can't communicate anyway as there is no measurement equipment connected.

What is the AutoID feature of UsbGpib V2?
AutoID is a feature where the adapter automatically queries the instrument for its identity (using *IDN?) and uses that information to create a unique VISA resource name. For very old instruments that do not support *IDN?, this feature should be disabled to avoid errors. When Auto ID is off, the Visa ressource name is constructed out of the GPIB address of the instrument and a unique serial number of the GPIB adapter.

What are the AutoID timing options?
When the AutoID feature is enabled there are different delay options. This delay specifies how long the adapter waits after instrument turnon before executing the *IDN? query for the AutoID feature. While 5s works for each instrument, some instruments require a setting to higher number which is exposed by the other AutoID settings. AutoID is a non-volatile setting which is permanently stored in the MCUs eeprom. **UsbGpibGui**:

- **AutoID ON:** The adapter waits 5 seconds after detecting a powered GPIB instrument before performing the identification scan `*IDN?`.
- **AutoID SLOW:** Increases the initial waiting period to 15 seconds before the scan begins.
- **AutoID SLOWEST:** Designed for instruments with very long boot sequences, this setting waits 30 seconds before attempting to communicate on the GPIB side.
- **AutoID OFF:** Disables the automatic identification query entirely. This is essential for older, non-SCPI instruments that do not support the `*IDN?` query and might return errors or lock up if they receive it.

Tip: Turn AutoID OFF for older non SCPI compliant instruments to avoid that they start up with an Error. To change the AutoID settings you can use e.g. the UsbGpibGui in the UsbGpib SW folder for Windows or NiceGui for Linux. Note that UsbGpib GUI requires a Visa installation.

How do I set Read Termination?
It is best to use standard VISA attributes:

- Set `VI_ATTR_TERMCHAR_EN` to 1.
- Set `VI_ATTR_TERMCHAR` to `0x0A` (or any other ASCII character).

With firmware version $\geq$ 2.2 you can set any read termination character you like, from ASCII code 0 to 255. This enables instruments to react on EOT, CR, LF or any other character like e.g. ',' for easier parsing of input data. Independent of the set termination character setting the instrument will always react on the GPIB EOI as termination of a read query.

When read termination is turned off, the read termination is EOI only.

Is the UsbGpib adapter a clone of an existing commercial adapter?
No. This is a common and important misconception. The UsbGpib adapter is a completely original, open-source hardware and software project and does not copy commercial adapters. It works for that reasons without risk of getting blocked or locked out in future.

- **Unique Identity:** Unlike the many inexpensive adapters found on online marketplaces, this is **not** a counterfeit clone of National Instruments (NI), Keysight or other hardware.
- **Safe to Use:** Because it is not a clone, it is safe from "driver sabotage." Vendor software updates (like those from NI-VISA) often detect and disable counterfeit hardware; since this adapter uses its own independent firmware and identity, it remains fully functional and stable regardless of official driver updates.
- **Standard Compliance:** Instead of mimicking a proprietary device, it implements the standard **USBTMC-USB488.2** protocol. This allows it to "nicely integrate" into any VISA environment by following industry standards rather than exploiting a specific manufacturer's driver.

In short: It is an independent, professional-grade tool designed to coexist peacefully within the ecosystem of your choice.

Does it support Service Requests (SRQ)?
Yes, the adapter actively pushes SRQ signaling to the PC via an interrupt pipe, as mandated by the USBTMC 488.2 standard. This means your software does not need to poll for status continuously.

Can I use it with Linux?
Yes, it can be used either as a standard USBTMC device or through Linux-GPIB for

advanced features like controlling multiple instruments with a single adapter. In case you want to use Linux-GPIB, have a look here and search for ”xyphro” for further instructions: https://linux-gpib.sourceforge.io/doc_html/supported-hardware.html

---

Do I really need to use a VISA library?
Technically, no-but it is highly recommended. Because the adapter follows the standard **USBTMC** protocol, it is natively recognized by modern operating systems. Visa, while it seems like an ”old-school concept” is a quite convinient tool to enable access to instruments over multiple different interfaces with a common interface.

I started e.g. by controlling only USBTMC instruments and made a dedicated solution for that without visa, but when I later wanted to control GPIB instruments and Ethernet based instruments in the same setup, that ”island solution” concept breaked and I started looking seriously into Visa and saw the clear benefits. Don’t get shocked by Gigabytes of Visa installation - there are smaller Visas available like e.g. R&S Visa. Lean and mean and available for Mac OS, Windows, Linux and even Raspberry PI with the same application level interface across those operating systems. You also get a very stable tested solution for your instrument access and can focus on the real measurement task.

- **With VISA:** Libraries like *R&S VISA* or *NI-VISA* provide a unified API. This is the most stable path for tools like LabVIEW or standard `PyVISA`.
- **Linux native:** You can interact directly with the kernel driver via `/dev/usbtmcX`. For advanced users, *Linux-GPIB* also supports the adapter via a dedicated firmware variant.
- **python-usbtmc:** A great alternative if you want to avoid a VISA installation entirely. It is a bit more ”hands-on” (manual configuration), but it supports the full command set of the adapter more reliably than PyVISA-py in many cases.
- **PyVISA-py:** A ”VISA-free” Python backend. While popular, it currently has an incomplete USBTMC implementation (e.g., issues with version queries). Basic instrument communication works, but it may require workarounds for advanced features.

Recommendation: Use **R&S VISA** for a lightweight, professional setup, or the **python-usbtmc** package if you strictly require a driverless Python environment.

Can the CMU200 which uses GPIB subaddressing be used with this adapter?
Yes, the CMU200 is supported and used too by me. USbGpib exposes the first subaddresses which gives access to most features.

Also other devices with GPIB subaddressing are supported. UsbGpib will always expose the firstly found subaddress over USBTMC.

---

9 References

Issue reports and support	https://github.com/xyphro/UsbGpib/issues
Technical support and feature requests	xyphro@gmail.com
Firmware download	https://github.com/xyphro/UsbGpib/blob/master/SW/binaries/TestAndMeasurement.bin
Tutorials	https://github.com/xyphro/UsbGpib/blob/master/Tutorials/README.md