

JRS GHOST LabVIEW interaction library

The GHOST LabVIEW interaction library eases the use of GHOST network interface and data files from within LabVIEW scripts. The library functions allow the user to connect to the GHOST application remotely, start and stop measurement, save acquired data to files, load data from GHOST files into a LabVIEW Virtual Instrument (VI). Global variables in the library are available to access internal parameters.

For a detailed description of the GHOST network protocol and in order to setup a GHOST server, please refer to the JRS GHOST application manual.

Library compatibility and installation

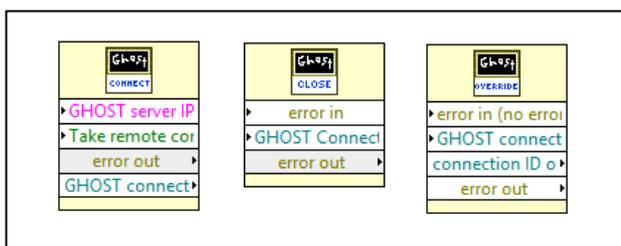
The GHOST LabVIEW library is compatible with LabVIEW 14 or newer. It should be used preferably in connection to GHOST ver. 7.00 or newer. The library is provided in two forms:

- As a packed library file (.lvlibp) that can be included (linked) in a LabVIEW project.
- As a package compatible with the VI Package Manager application (VIPM). The VIPM package can be installed using VI package manager (<http://jki.net/vipm>). If the library is installed through VIPM, it will create command palette in the LabVIEW “block diagram” context menu, making all the commands in the library always accessible.

Library contents

This manual will give a brief description of the contents of the library; several terminals in the included VIs are identical in name and meaning: they will be described only once.

Connection control



In order to issue commands remotely to a GHOST server, it is necessary to open a connection to it and take remote control of the functions.

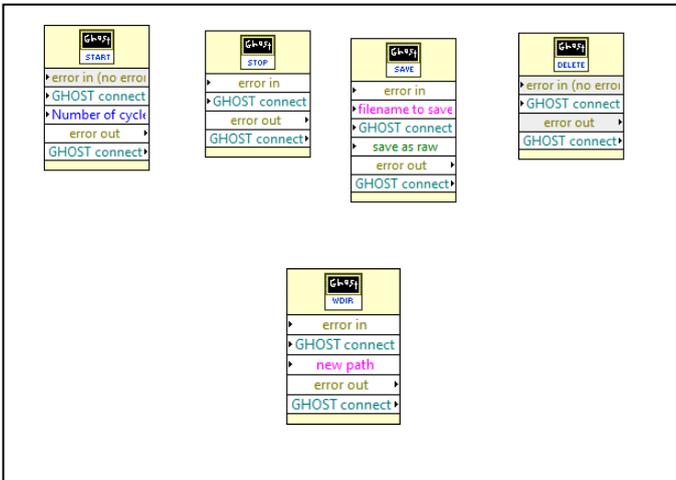
The **CONNECT** VI will create a connection to the GHOST server. The terminals are:

- *GHOST server IP (input)*: the IP of the network server or network name
- *Take remote control (input)*: when set to TRUE, takes remote control of the server immediately at connection. This is the most common mode of operation
- *Error out (output)*: if a network error occurs, it will be present on this terminal. All the terminals with this name are preferably be chained to the “error in” terminal of subsequent GHOST Library VI operations.
- *GHOST connection out (output)*: this terminal contains the connection information to the GHOST server. It must be wired to the “GHOST connection in” terminal of the next GHOST Library VI to be executed.

The **CLOSE** VI closes a connection to GHOST.

The **OVERRIDE** VI takes remote control of a GHOST server, and it is useful only in the case that the “Take remote control” input of the CONNECT VI has been wired to FALSE when opening the connection.

Measurement and data gathering control



After a connection has been opened, a measurement can be started and stopped; the acquired data can be saved to a file and then deleted to gather new data. It is also possible to change the (remote) directory where the acquired data will be saved.

The **START** VI starts a new measurement; the specific terminals are:

- *Number of cycles (input)*: Number of cycles of acquisition to be performed. A zero starts an unterminated acquisition.

The **STOP** VI stops a running acquisition.

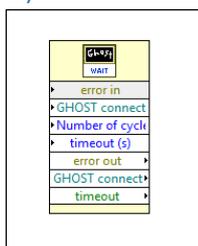
The **SAVE** VI saves data after acquisition. This operation can be performed only after the acquisition has been stopped or completed. Two terminals are of particular interest:

- *Filename to save (input)*: name of the file to save to; the file will be located in the network work directory of GHOST, which defaults to the home directory of the GHOST executable.
- *Save as raw (input)*: if wired to TRUE, the saved file is a two column (frequency shift + count) text file, if FALSE the file format is the GHOST proprietary one.

The **DELETE** VI clears all acquired data.

The **WDIR** VI changes the directory where the remote server will store the acquired data. By default, this directory is “C:\Users\[USERNAME]\AppData\Local\GHOST”, where USERNAME is the local windows user starting the GHOST application. The *new path* terminal is a string representing a subdirectory name, the “..” special directory, a root (i.e. “c:\”) or a fully specified path (i.e. “c:\data\bls”).

Synchronization and status



A single **WAIT** VI is provided to synchronize operation with the GHOST server status. If executed in a sequence, this VI will not exit until the server is not back the IDLE condition (i.e. for example until the current acquisition has not been stopped).

The terminals of particular interest are the following:

- *Number of cycles (input)*: this terminal should be wired to the actual number of cycles of the acquisition being monitored. The VI will simply lock the execution of the script for a time proportional to this number, then a polling activity will be started to detect the termination of the operation.
- *Timeout (s) (input)*: after the time expected for the operation is elapsed, a certain number of seconds are allowed before a timeout occurs. It is advisable to keep this timeout setting to 3 s or more.
- *Timeout (output)*: If the GHOST server does not report to be IDLE within the timeout time, an error is issued and this output is set to TRUE.

Global variables in the library

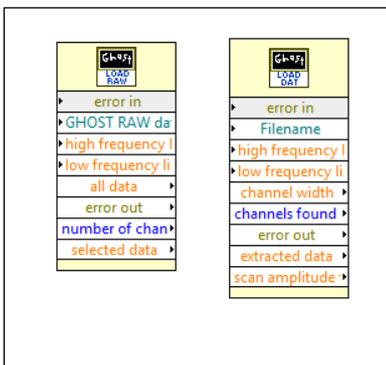


Two global variables are provided in the GHOST LabVIEW library.

The **Busy** global variable is controlled internally by the WAIT VI. When a waiting operation is in progress, the Busy variable will be set to TRUE until the server is not again in the IDLE status. Other LabVIEW operations can be synchronised to this variable status.

The **Network operation timeout (ms)** variable can be used to change the internal timeout used for TCP operation inside the library, in case this could be needed. The default value for this variable, coded in the library, is 5000 (5 seconds).

File loading functions



Two VIs are provided to access GHOST data stored in a file. In both cases, the VIs select a frequency range of interest and outputs an array of double precision floating-point values. Setting a large frequency range causes the output to include all the loaded data.

The **LOAD RAW** VI loads data from a text file in the RAW format (two columns, frequency shift + counts). The terminals are:

- *GHOST RAW data filename (input)*: name of the file to be loaded.
- *high frequency limit and low frequency limit (inputs)*: limiting frequencies of the region of interest
- *all data (output)*: an array containing all the data read.
- *selected data (output)*: the data contained in the region of interest specified.
- *number of channels (output)*: effective number of channels read from the file.

The **LOAD DAT** VI loads data from a GHOST proprietary format file. Further terminals present are:

- *channel width (output)*: frequency width of each channel in the spectrum.
- *channels found (output)*: effective number of channels read from the file.
- *Extracted data (output)*: the data contained in the region of interest specified.