

Readme

Ophir VIs (Virtual Instruments) For LabVIEW

- 1) Overview
- 2) Installation and Getting Started
- 3) Libraries Contents
- 4) Ophir VIs Error Messages
- 5) Ophir Communication Commands

1) Overview

Ophir VIs Version 5.00 contains libraries that support communication with Ophir's Juno, Nova, LaserStar (both single and dual channel), USBI, Nova-II, and Vega instruments

These libraries contain components (sub-VI's) that drive and query the instruments' measurements. This allows the LabVIEW programmer to concentrate on his application without getting bogged down with Ophir's device dependent commands. Demo applications are provided, as well.

Libraries for Nova and LaserStar were developed in LabVIEW 6.1. These are identical to their Version 2.00 counterparts. They have been tested and found compatible with LabVIEW 7.0 and LabVIEW 8.6 as well.

The library for Nova-II, Vega, USBI, and Juno support (OphirInstr) was developed in LabVIEW 8.6.1 and has been tested with NI-VISA 4.6.2. It also includes support for the Single Channel LaserStar. This has been tested in LabVIEW 2009 as well.

The Nova VIs support Nova 2.92 and above. The LaserStar Single and Dual Channel VIs support LaserStar 1.75 and above. Nova-II is supported from version 1.47. USBI is supported from version 1.37. Vega is supported from version 1.85. Juno is supported from version 1.04.

The VI's of each instrument can be divided into 3 different groups.

- a) Communication Settings and Management
- b) Configuration Query and Control
- c) Measurement Query

A. Communication Settings and Management

1. Choice of RS232 or GPIB (LaserStar) or USB (Nova-II, USBI, Vega, and Juno)
2. USB channel number when more than one USB device is connected
3. RS232 Port Number and Baud Rate
4. GPIB Device Address (Default LaserStar GPIB Address is 10)
5. Send Message to the Device.
6. Receive Message from the Device

B. Configuration Query and Control

1. Query Head's ability to measure power, energy, and frequency
2. Force instrument into Power or Energy measurement mode
3. For LaserStar Dual-Channel it includes dual-channel Comparisons Capabilities (Power Ratio, Energy Ratio, Power Difference, Energy Difference, Dual-Channel Independent)

C. Measurement Query

The measurement VIs returns Value (Number and String) and Units being measured (e.g. "W" for Watts). They also give Device and Head Information like Type and Serial Numbers. For LaserStar they also provide remote range configuration.

2) Installation and Getting Started

Note: LabVIEW must be closed during installation.

2.1 For use with Nova:

1. Download the file **ophnova.exe**
2. Run the file with the following syntax: **ophnova.exe -d**
3. This will create the directory **OphirVi\Ophnova**
4. Copy the directory **OphirVi\Ophnova** to **..\LabVIEW\Instr.lib**

2.2 For use with LaserStar:

1. Download the file **ophlstar.exe**
2. Run the file with the following syntax: **ophlstar.exe -d**
3. This will create the directory **OphirVi\Ophlstar**
4. Copy the directory **OphirVi\Ophlstar** to **..\LabVIEW\Instr.lib**

2.3 For use with LaserStar Dual Channel:

1. Download the file **ophlstrd.exe**
2. Run the file with the following syntax: **ophlstrd.exe -d**
3. This will create the directory **OphirVi\Ophlstrd**
4. Copy the directory **OphirVi\Ophlstrd** to **..\LabVIEW\Instr.lib**

2.4 To use the new Instrument Library (for use with Single Channel LaserStar, Nova-II, Vega, or USBI):

1. Copy OphInstr.lib from your CD-Rom to your target directory
2. Run the **SwapINF** utility
 - o Install the self-extracting "SwapINF Utility" from this CD.
 - o Run the SwapINF utility and follow the on-screen instructions
 - o to configure the USB speaking device (USBI, Nova-II, Vega or Juno) for LabVIEW.
- 3 Note: OphInstr's Juno support is for Thermopile and Photodiode sensors only

2.5. The following documents are also available

ophirvis.pdf : Detailed explanation of Ophir Instrument VIs.
OphirVis_installation.txt:

2.6. Open LabVIEW Application.

Getting Started

As noted above, each instrument library contains a general demo application VI. For those who plan on writing their own LabVIEW applications, we suggest working with our application first to get a "feel" for using our VIs .

3) Libraries Contents

Nova VI Library

The NOVA Library contains 30 VIs. The following is an alphabetic listing of the Nova Library Vis.

1. Oph Nova BuildFrame.vi.
Builds the communication frame to send to the Nova.
2. Oph Nova Capa.vi.
Analyzes head capabilities (the last part of Nova response to "HI" command).
3. Oph Nova CheckVersion.vi.
Checks if Nova's version works with the VIs version (must be 292 or above).
4. Oph Nova ConfigDevice.vi.
Force Configuration: sends "FP" or "FE" command and checks for success.
5. Oph Nova ConfigQuery.vi.
Checks Nova version and returns Head Capabilities.
6. Oph Nova EnergyDemo.vi.
Demo for energy measurement.
7. Oph Nova EnergyFlag.vi.
Returns True when Nova has measured a new energy pulse.
8. Oph Nova EnergyMethod.vi.
Returns appropriate energy-measurement-method.
9. Oph Nova EnergyReady.vi.
Returns True when Nova is ready to measure next energy pulse.
10. Oph Nova Error Message.vi.
Displays text describing present error condition.
11. Oph Nova Extract.vi.
Finds all numbers in the given string and puts them into an array as single-precision numbers.
12. Oph Nova GeneralDemo.vi.
General Demo for power, energy and frequency measurements.
13. Oph Nova HeadCapa.vi.
Analysis of HeadInfo.vi and returns power, energy and frequency head capabilities.
14. Oph Nova HeadInfo.vi.
Returns Nova's response to "HI" command.
15. Oph Nova InfoStrings.vi.
Insertion of HeadInfo.vi and InstrInfo.vi responses in array of Strings.
16. Oph Nova InitCom.vi.
Initializes the VISA Communication session.
17. Oph Nova InitMeasure.vi.
Configures Nova for power or energy measurement.
18. Oph Nova InstrInfo.vi.
Returns Nova response to "II" command.
19. Oph Nova Measure.vi.
Measurement execution: power, energy or frequency.
20. Oph Nova Over.vi.
Returns True if measurement is Overrange.
21. Oph Nova PowerDemo.vi.
Demo for power measurement.
22. Oph Nova PowerMethod.vi.
Returns appropriate power-measurement-method.
23. Oph Nova PyroEnergy.vi.
Send "SE" command and get the Nova's response.
24. Oph Nova PyroPower.vi.
Send "SP" command and get the Nova's response.
25. Oph Nova SendFrequency.vi.
Send "SF" command and get the Nova's response.
26. Oph Nova SendPower.vi.
Send "SP" command and get the Nova's response.

27. Oph Nova SendReceive.vi.
Send command frame to Nova and get the response frame.
28. Oph Nova StringToValue.vi.
Conversion of Value String into Value Number.
29. Oph Nova Terminal.vi.
Terminal Demo: Send and Receive messages.
30. Oph Nova ThermoEnergy.vi.
Send "EF"- "SE" command and get the Nova's response.

Single Channel LaserStar

The Single Channel LaserStar Library contains 30 VIs. The following is an alphabetic listing of the LaserStar Single Channel Library VIs.

1. Oph LaserStar BuildFrame.vi.
Oph LaserStar BuildFrame.vi.
2. Oph LaserStar Capa.vi.
Analyzes head capabilities (the last part of LaserStar response to "HI" command).
3. Oph LaserStar CheckVersion.vi.
Checks if LaserStar's version works with the VIs version (must be 1.75 or above).
4. Oph LaserStar ConfigDevice.vi.
Force Configuration: sends "FP" or "FE" command and checks for success.
5. Oph LaserStar ConfigQuery.vi.
Checks LaserStar Version and returns head capabilities.
6. Oph LaserStar EnergyDemo.vi.
Demo for energy measurement.
7. Oph LaserStar EnergyFlag.vi.
Returns True when LaserStar has measured a new energy pulse.
8. Oph LaserStar EnergyReady.vi.
Returns True when LaserStar is ready to measure next energy pulse.
9. Oph LaserStar Error Message.vi.
Displays text describing present error condition.
10. Oph LaserStar Extract.vi.
Finds all numbers in the given string and puts them into an array as single-precision numbers.
11. Oph LaserStar GeneralDemo.vi.
General Demo for power, energy and frequency measurement.
12. Oph LaserStar HeadCapa.vi.
Analysis of HeadInfo.vi and returns power, energy and frequency head capabilities.
13. Oph LaserStar HeadInfo.vi.
Returns LaserStar's response to "HI" command.
14. Oph LaserStar InfoStrings.vi.
Inserts HeadInfo.vi and InstrInfo.vi responses in array of Strings.
15. Oph LaserStar InitCom.vi.
Initializes the VISA Communication session.
16. Oph LaserStar InitMeasure.vi.
Configures LaserStar for power or energy measurement.
17. Oph LaserStar InstrInfo.vi.
Returns LaserStar response to "II" command.
18. Oph LaserStar Measure.vi.
Measurement execution: power, energy or frequency.
19. Oph LaserStar Over.vi.
Returns True if measurement is Overrange.
20. Oph LaserStar PowerDemo.vi.
Demo for power measurement.
21. Oph LaserStar PowerMethod.vi.
Returns appropriate power-measurement-method.
22. Oph LaserStar PyroPower.vi.
Send "EF"- "SP" command and get the LaserStar's response.

23. Oph LaserStar RangesList.vi.
Get List of ranges and current range.
24. Oph LaserStar RangesModif.vi.
Modify current range.
25. Oph LaserStar SendEnergy.vi.
Send "EF"- "SE" command and get the LaserStar's response.
26. Oph LaserStar SendFrequency.vi.
Send "SF" command and get the LaserStar's response.
27. Oph LaserStar SendPower.vi.
Send "SP" command and get the LaserStar's response.
28. Oph LaserStar SendReceive.vi.
Send command frame to LaserStar and get the response frame.
29. Oph LaserStar StringToValue.vi.
Conversion of Value String into Value Number.
30. Oph LaserStar Terminal.vi.
Terminal Demo: Send and Receive messages.

Dual Channel LaserStar

The LaserStar (Dual Channel) Library contains 34 VIs. The following section is an alphabetic listing of the LaserStar Dual Channel Library VIs:

1. Oph LaserStarD BuildFrame.vi.
Builds the communication frame to send to the LaserStar.
2. Oph LaserStarD Capa.vi.
Analyzes head capabilities (Last part of LaserStar response to "HI" command).
3. Oph LaserStarD ChannelQuery.vi.
Returns the currently Active Channel.
4. Oph LaserStarD CheckVersion.vi.
Checks if LaserStar version works with the VIs (must be 1.75 or above).
5. Oph LaserStarD ConfCommand.vi.
Low Level "FC L A B", "FP" or "FE" command.
6. Oph LaserStarD ConfigDevice.vi.
Prepares LaserStar for single/dual-channel power/energy measurement.
7. Oph LaserStarD ConfigQuery.vi.
Checks LaserStar version and returns head capabilities (for both heads).
8. Oph LaserStarD EnergyFlag.vi.
Returns True when LaserStar has measured a new energy pulse.
9. Oph LaserStarD EnergyReady.vi.
Returns True when LaserStar is ready to measure next energy pulse.
10. Oph LaserStarD Error Message.vi.
Displays text describing present error condition.
11. Oph LaserStarD Extract.vi.
Finds all numbers in the given string and puts them into an array as single-precision numbers.
12. Oph LaserStarD GeneralDemo.vi.
General Demo for single/dual power, energy and frequency measurements.
13. Oph LaserStarD HeadCapa.vi.
Analysis of HeadInfo.vi. Returns power, energy and frequency capabilities.
14. Oph LaserStarD HeadComp.vi.
Low Level 2 heads general capability.
15. Oph LaserStarD HeadInfo.vi.
Returns LaserStar's response to "HI" command.
16. Oph LaserStarD InfoStrings.vi.
Inserts HeadInfo.vi and InstrInfo.vi responses in array of Strings.
17. Oph LaserStarD InitCom.vi.
Initializes the VISA Communication session.
18. Oph LaserStarD InitMeasure.vi.
Configures LaserStar for power or energy measurement.

19. Oph LaserStarD InstrInfo.vi.
Returns LaserStar response to "II" command.
20. Oph LaserStarD Measure.vi.
Measurement Execution: power, energy, frequency, ratio, Difference, etc.
21. Oph LaserStarD NrgCmp.vi.
Low Level 2 Heads energy capability.
22. Oph LaserStarD Over.vi.
Returns True if measurement is Overrange.
23. Oph LaserStarD PowerMethod.vi.
Returns appropriate power-measurement-method.
24. Oph LaserStarD PyroPower.vi.
Send "EF"- "SP" command and get the LaserStar's response.
25. Oph LaserStarD RangesList.vi.
Get List of ranges and current range.
26. Oph LaserStarD RangesModif.vi.
Modify current range.
27. Oph LaserStarD SelectChannel.vi.
Set channel-specific commands to work with Channel A or B.
28. Oph LaserStarD SendBoth.vi.
Send "SB" command and get the LaserStar's response.
29. Oph LaserStarD SendReceive.vi.
Send command frame to LaserStar and get the response frame.
30. Oph LaserStarD SendEnergy.vi.
Send "EF"- "SE" command and get the LaserStar's response.
31. Oph LaserStarD SendFrequency.vi.
Send "SF" command and get the LaserStar's response.
32. Oph LaserStarD SendPower.vi.
Send "SP" command and get the LaserStar's response.
33. Oph LaserStarD StringToValue.vi.
Conversion of Value String into Value Number.
34. Oph LaserStarD Terminal.vi.
Terminal Demo: Send and Receive messages.

Ophir Instrument Library

The Instrument Library contains 29 VIs. The library for Nova-II, Vega, USBI, and Juno support (OphirInstr) was developed in LabVIEW 8.6. It also includes support for the Single Channel LaserStar. This has been tested in LabVIEW 2009 as well. The following is an alphabetic listing of the Instrument Library VIs.

1. Ophir BuildFrame.vi.
Builds the communication frame to send to the instrument
2. Ophir Capa.vi.
Analyzes head capabilities (the last part of the instrument's response to "HI" command).
3. Ophir ConfigDevice.vi.
Force Configuration: sends "FP" or "FE" command and checks for success.
4. Ophir ConfigQuery.vi.
Checks instrument version and returns head capabilities.
5. Ophir EnergyDemo.vi.
Demo for energy measurement.
6. Ophir EnergyFlag.vi.
Returns True when instrument has measured a new energy pulse.
7. Ophir EnergyReady.vi.
Returns True when instrument is ready to measure next energy pulse.
8. Ophir Error Message.vi.
Displays text describing present error condition.

9. Ophir Extract.vi.
Finds all numbers in the given string and puts them into an array as single-precision numbers.
10. Ophir GeneralDemo.vi.
General Demo for power, energy and frequency measurement.
11. Ophir HeadCapa.vi.
Analysis of HeadInfo.vi and returns power, energy and frequency head capabilities.
12. Ophir HeadInfo.vi.
Returns instrument's response to "HI" command.
13. Ophir InfoStrings.vi.
Inserts HeadInfo.vi and InstrInfo.vi responses in array of Strings.
14. Ophir InitCom.vi.
Initializes the VISA Communication session.
15. Ophir InitMeasure.vi.
Configures instrument for power or energy measurement.
16. Ophir InstrInfo.vi.
Returns instrument response to "II" command.
17. Ophir Measure.vi.
Measurement execution: power, energy or frequency.
18. Ophir Over.vi.
Returns True if measurement is Overrange.
19. Ophir PowerDemo.vi.
Demo for power measurement.
20. Ophir PowerMethod.vi.
Returns appropriate power-measurement-method.
21. Ophir PyroPower.vi.
Send "EF"- "SP" command and get the instrument's response.
22. Ophir RangesList.vi.
Get List of ranges and current range.
23. Ophir RangesModif.vi.
Modify current range.
24. Ophir SendEnergy.vi.
Send "EF"- "SE" command and get the instrument's response.
25. Ophir SendFrequency.vi.
Send "SF" command and get the instrument's response.
26. Ophir SendPower.vi.
Send "SP" command and get the instrument's response.
27. Ophir SendReceive.vi.
Send command frame to instrument and get the response frame.
28. Ophir StringToValue.vi.
Conversion of Value String into Value Number.
29. Ophir Terminal.vi.
Terminal Demo: Send and Receive messages.

4) Ophir VIs Error Messages

Error #	Description	Comment
-1301	Instrument Version not Valid for Vis	
-1302	No Head attached to Device	
-1303	No Head plugged in Device Channel A	LaserStar Dual
-1304	No Head plugged in Device Channel B	LaserStar Dual
-1305	No Heads attached to Device	LaserStar Dual
-1310	Head cannot measure power	
-1311	Head cannot measure energy	
-1312	Head cannot measure frequency	
-1313	Head in channel A cannot measure power	LaserStar Dual
-1314	Head in channel A cannot measure energy	LaserStar Dual
-1315	Head in channel A cannot measure frequency	LaserStar Dual
-1316	Head in channel B cannot measure power	LaserStar Dual
-1317	Head in channel B cannot measure energy	LaserStar Dual
-1318	Head in channel B cannot measure frequency	LaserStar Dual
-1319	Cannot measure power ratio	LaserStar Dual
-1320	Cannot measure power difference	LaserStar Dual
-1321	Cannot measure energy ratio	LaserStar Dual
-1322	Cannot measure energy difference	LaserStar Dual
-1325	Invalid Energy-Measurement-Method	Nova
-1326	Invalid Power-Measurement-Method	
-1327	Energy Ready not Valid for this Head	
-1328	Energy Flag Failed	
-1330	"FP" Command Failed	
-1331	"FE" Command Failed	
-1333	Head isn't measuring Frequency	
-1335	"FP" or "FE" Command Failed	
-1336	Force Dual Configuration Failed	LaserStar Dual
-1338	Write Range Failed	Instrument, LaserStar Dual
-1339	Measurement Failed	
-1340	Device not in Dual Channel Mode	LaserStar Dual
-1341	Device not found.	Ophir Instrument

Note: for all Libraries VISA Error Codes -10738077360 to -1073807231

5) Ophir Communication Commands used by the VIs

AR	All Ranges
CH	CHange channel
CR	Channel Read
EF	Energy Flag
ER	Energy Ready
FC	Force Configuration
HI	Head Information
II	Instrument Information
SB	Send Both
SE	Send Energy
SF	Send Frequency
SI	Send units
SP	Send Power
VE	VErsion
WN	Write range

See StarCom User Manual Appendix A for a full description of these and other Ophir Communication Commands.