

How to Control Tabor AWGs with LabVIEW

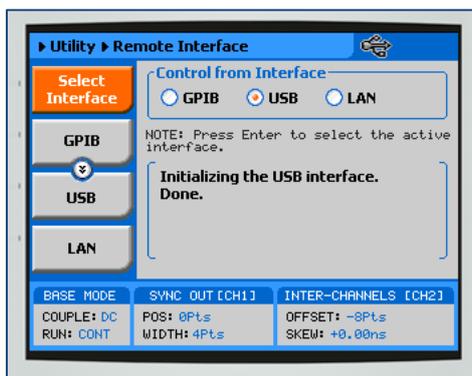
Using SCPI Commands

In this tutorial, we will give a quick start guide on how you can communicate with the Tabor AWG using NI-VISA to send Standard Commands for Programmable Instruments (SCPI). SCPI commands are an ASCII-based set of commands for reading and writing instrument settings.

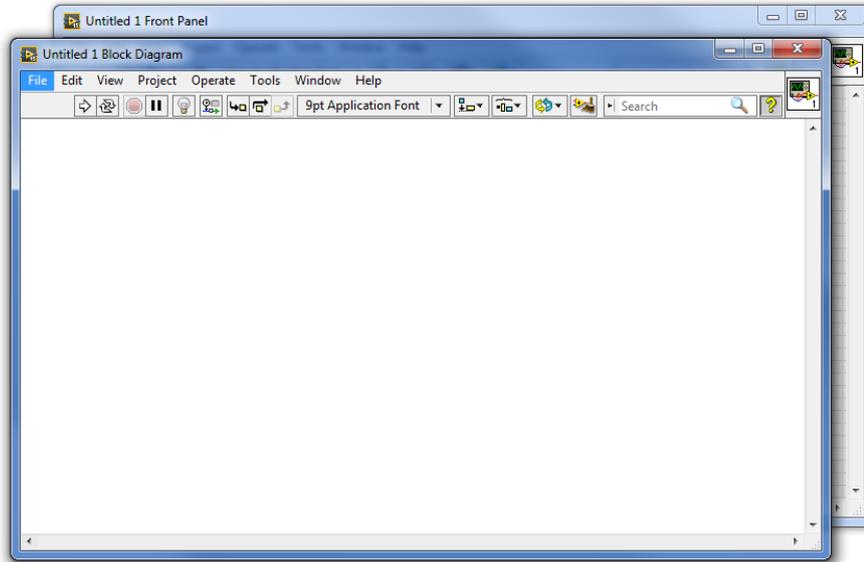
For this tutorial, we will use LabVIEW 2015 32bit and a Tabor WX2184C using USB interface. To ensure you successfully established all the necessary settings for remote control over the Tabor instrument using LAN/USB/GPIB, please make sure you have already installed the latest [NI-VISA](#) from the National Instruments website. Also please go over the [connectivity tutorials](#) on the Tabor's website.

→ To connect and control the Tabor Instrument using SCPI Commands

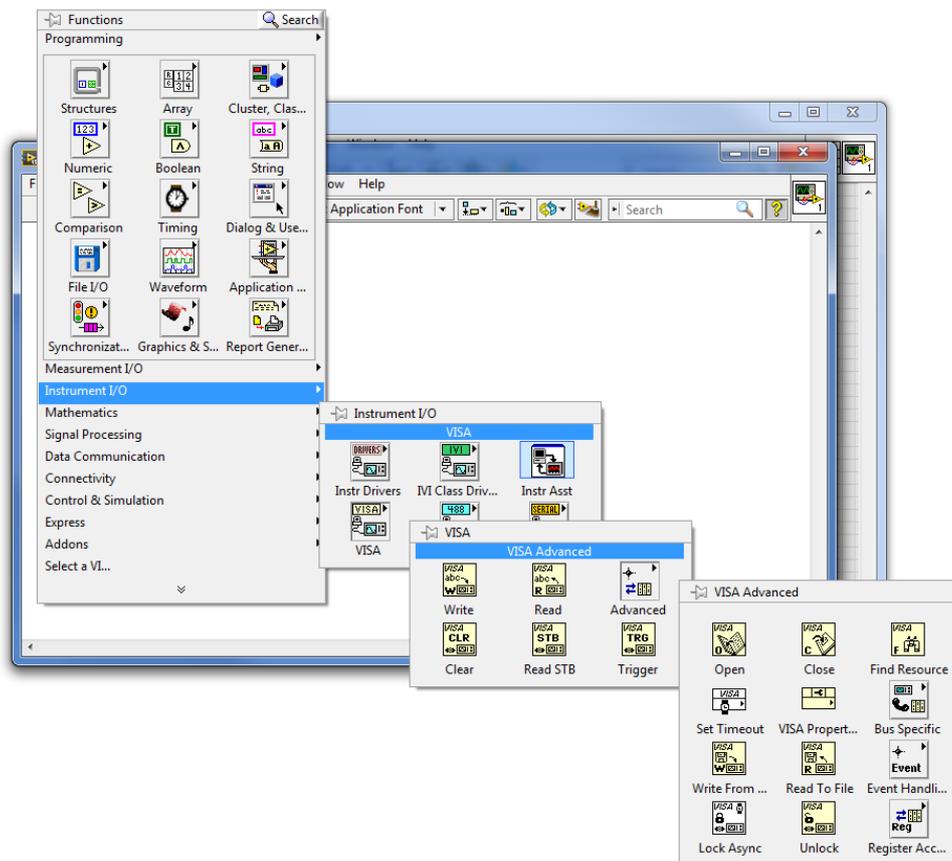
1. Set the USB/LAN/GPIB as the remote interface, using the Tabor's front panel buttons. To do so, go to: "Utility"->"Remote Interface"->"Select Interface"->"Control from Interface". Press Enter to select the active Interface you need. Wait for the answer "Done". We chose to demonstrate using USB.



- Once the LabVIEW is up and running, open a new blank VI:

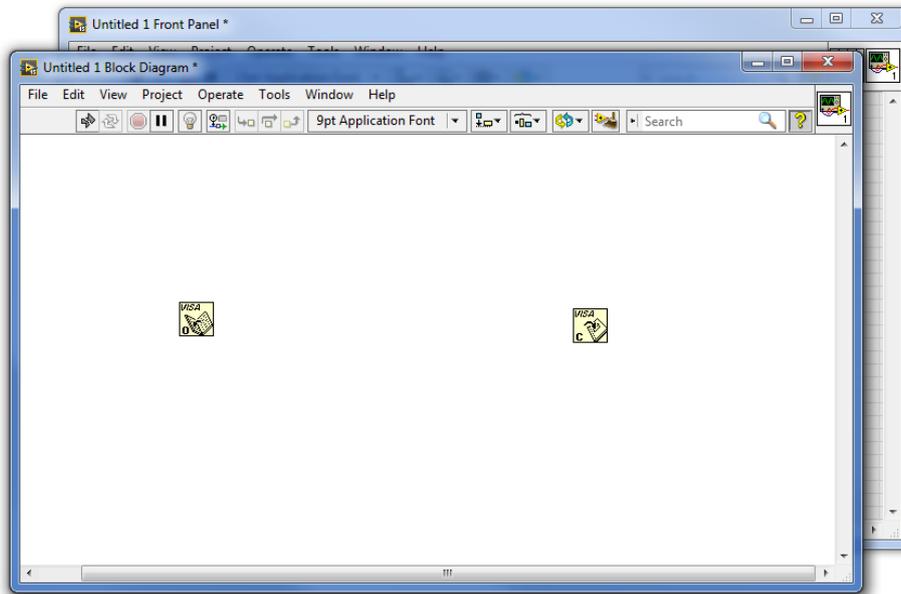


Right click on the block diagram, select Instrument I/O->>VISA->>Advanced:

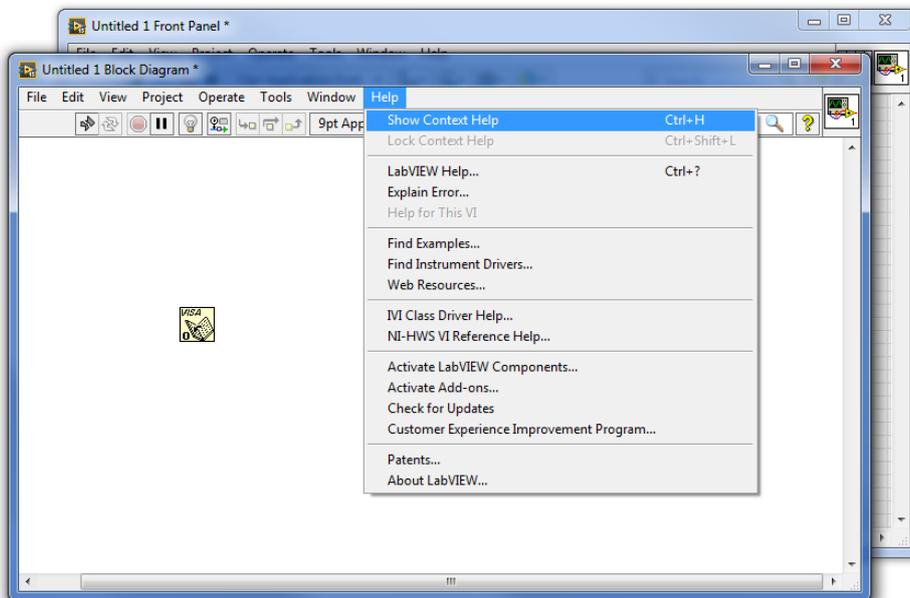


You can now click on the top left of the VISA menu and pin it for future use.

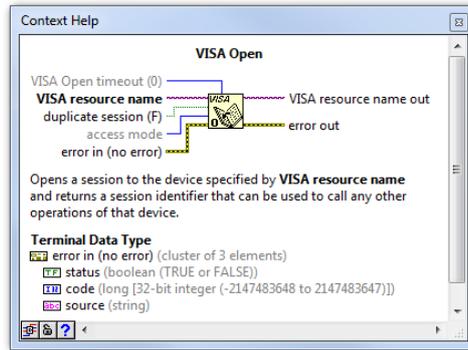
3. Drag and drop the 'Open' and 'Close' VIs to your block diagram:



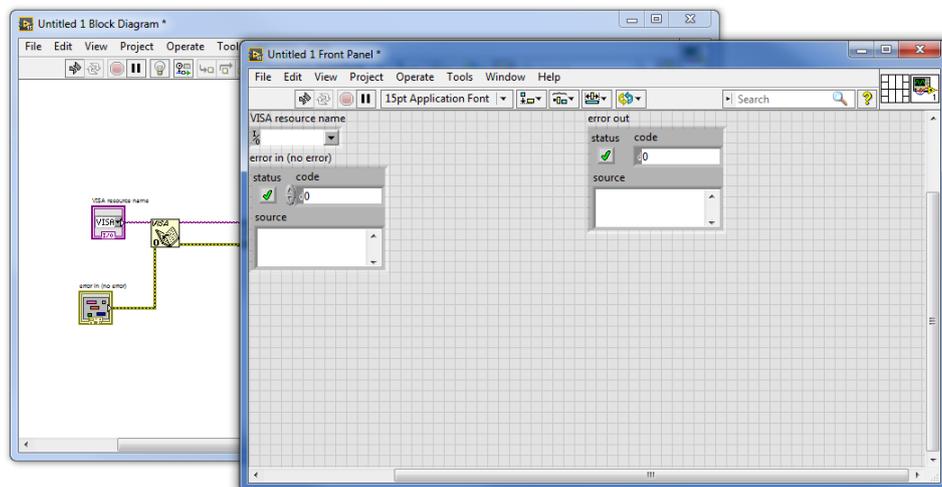
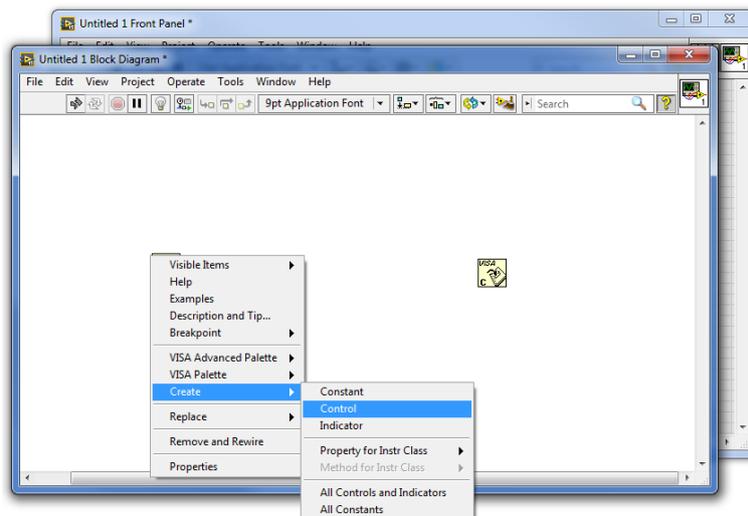
4. Go to Help->>Show Context Help:



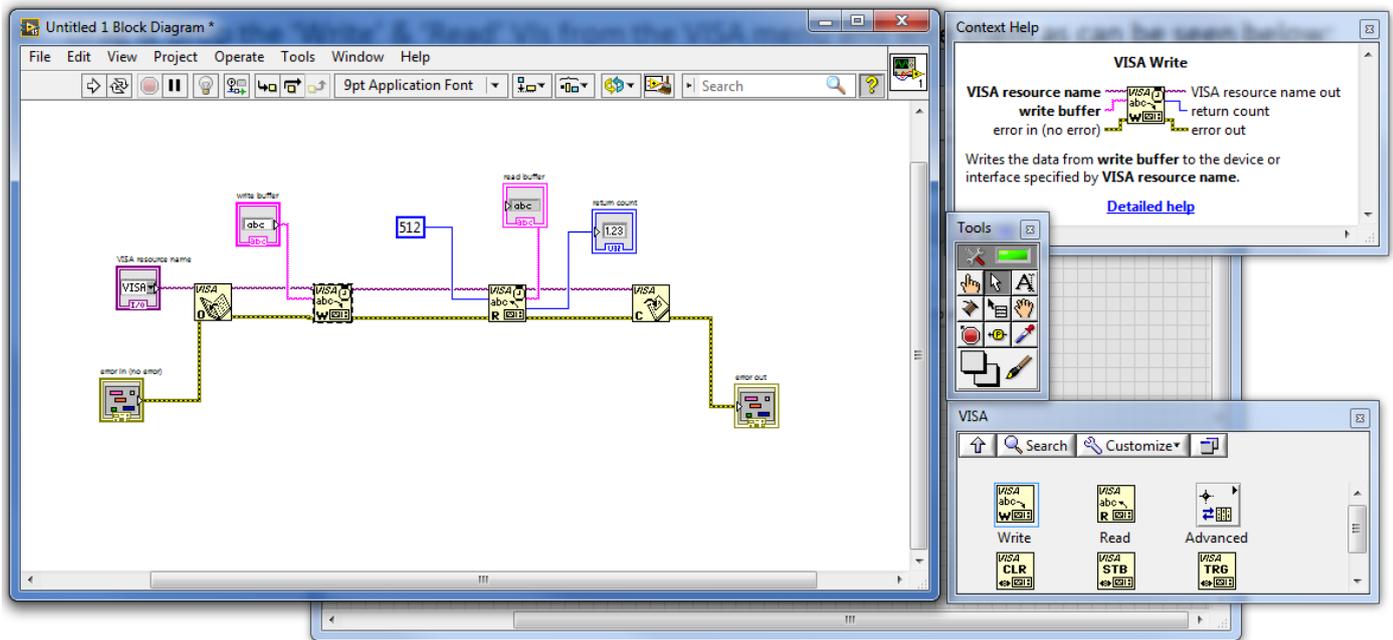
You can now find instructions how to properly connect each specific VI:



5. Create controls and indicators for the VIs to insert the visa resource name and display an error:

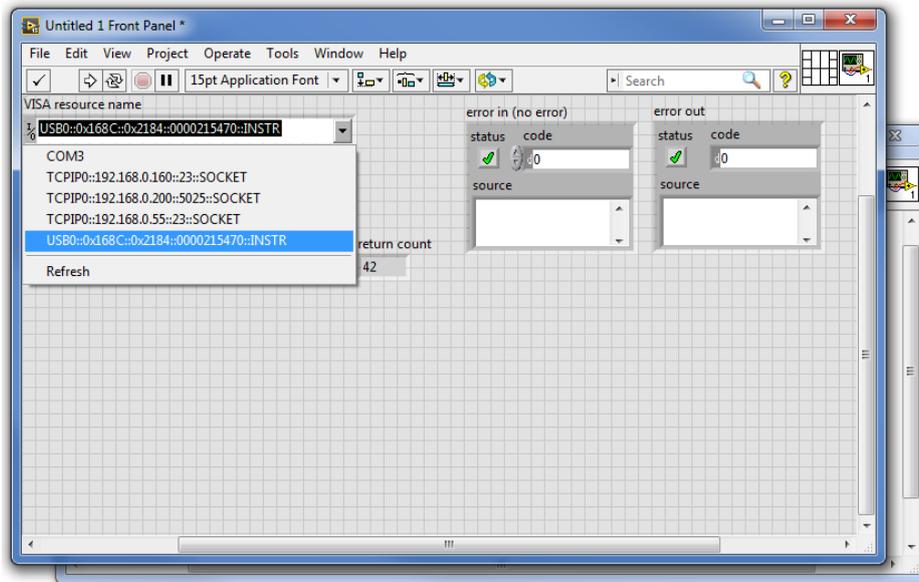


6. Drag & drop the 'Write' & 'Read' VIs from the VISA menu:

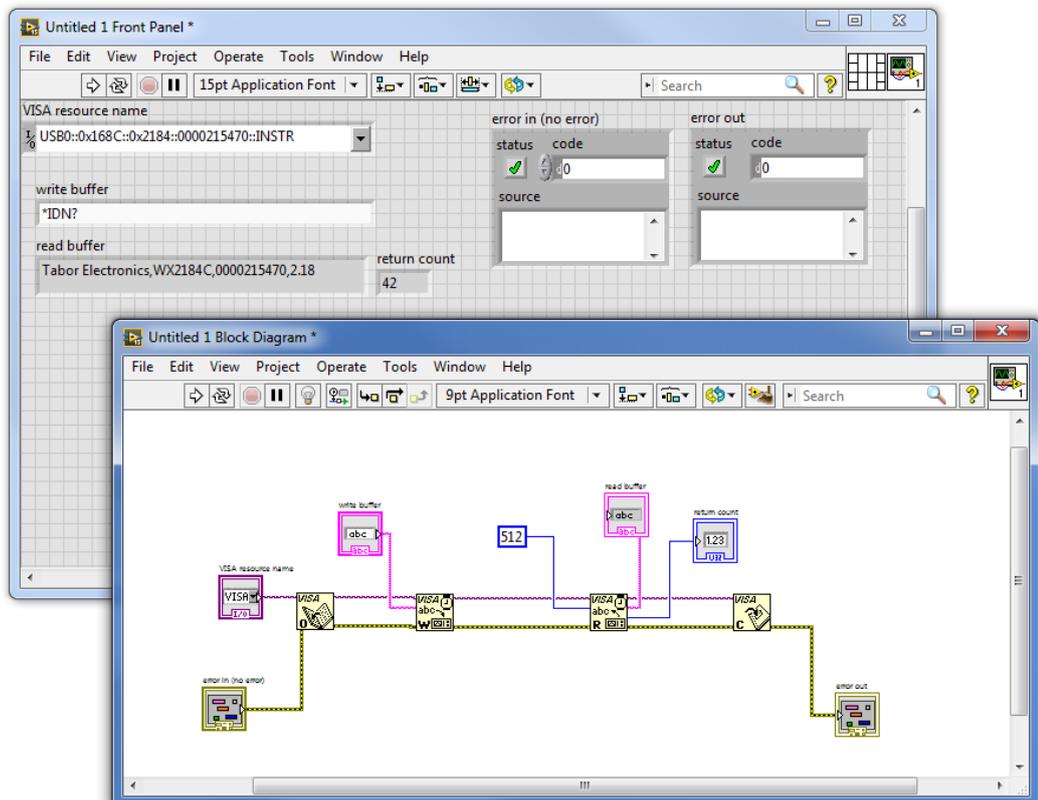


- a. wire them as can be seen above.
- b. Add a 'Write buffer' to the 'Write' VI by right clicking and creating a control.
- c. Add a constant number at the entrance of the 'Read' VI which represents the number of bytes that are being returned. As long as this number is equal to or greater than the number of bytes returned, the read operation will terminate once it will reach the entered number or a read terminator.
- d. Add a 'Read buffer' to the 'Read' VI by right clicking and creating an indicator.

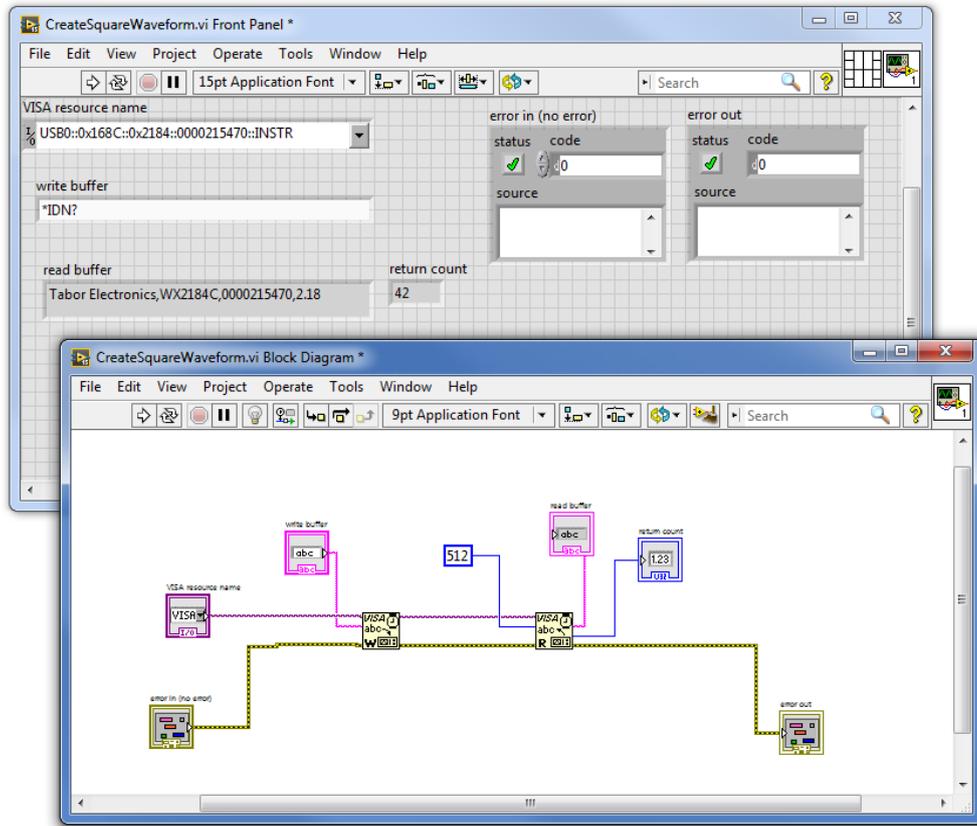
7. Once you'll finish, you should be able to select the correct address(according to your preferred interface) from the 'VISA resource name' options.
 - a. Use NI-MAX (or Arbconnection) to figure out what is the exact AWG address and choose it from the available resources:



- b. Send “*IDN?” Query to check the connection, Identification details of the specific Tabor Model should come up on the read buffer display:

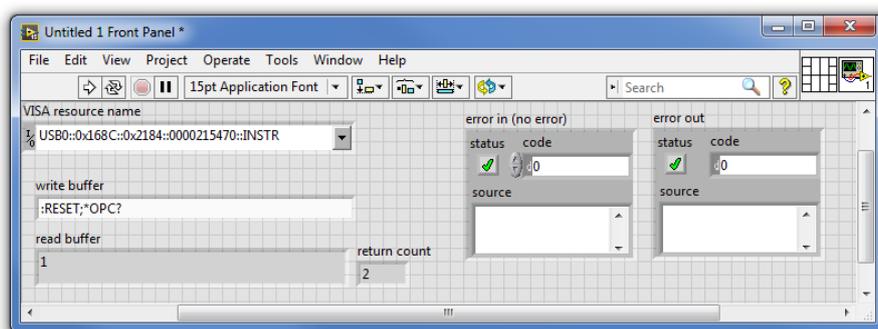


8. Opening a session can be done without using the 'Open' & 'Close' VIs as it is done automatically at the start & end of each run:

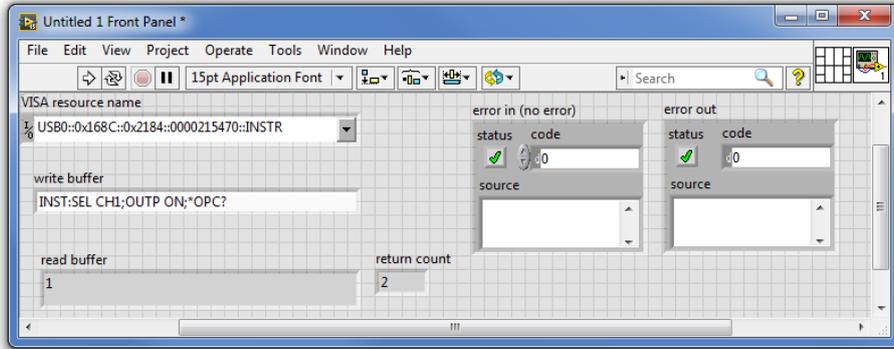


Through all of the interfaces you will communicate with, you will use the same VI with a different resource name. From hereafter, we will demonstrate how to connect & send SCPI commands using the USB interface.

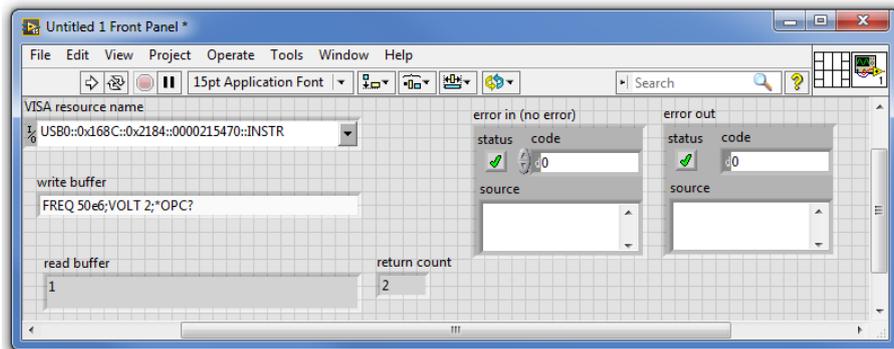
9. Here is a short basic example of how to set a 50MHz, 2Vp-p square waveform in standard mode, just to get the feel of how to communicate using SCPI commands. At the end of each command, we will also send a `"*OPC?"` query. If it returns '1' then it means operation is completed:
 - a. Type `':RESET;*OPC?'` and press the 'Run' button.



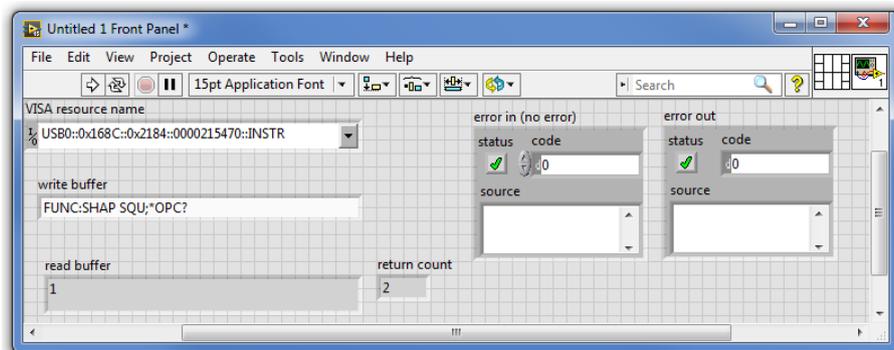
- b. Type ':INST CH1;OUTP ON;*OPC?' and press the 'Run' button, to set Channel 1 as the active channel:



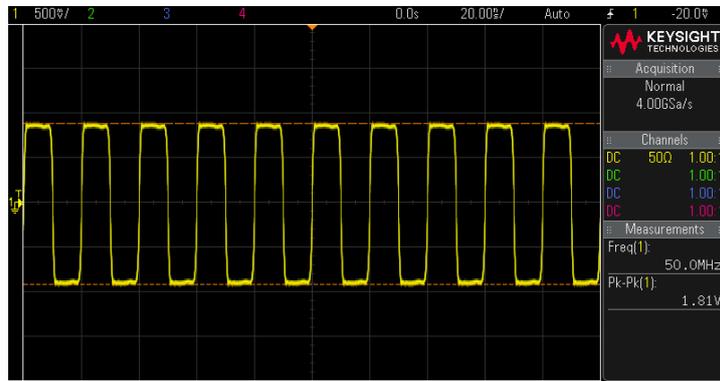
- c. Do the same with ':FREQ 50e6' and 'VOLT 2' to set the frequency and amplitude:



- d. Type ':FUNC:SHAP SQU;*OPC?' and press the 'Write' button, to change to Square waveform.

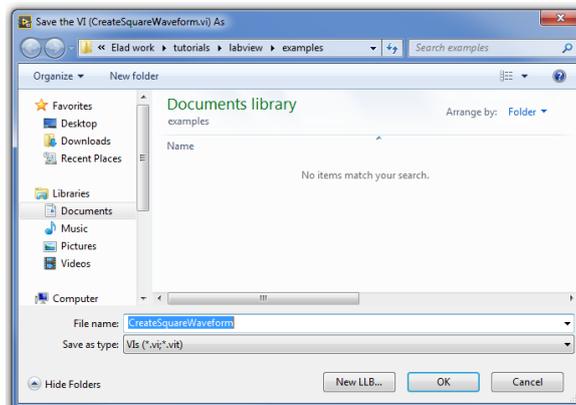
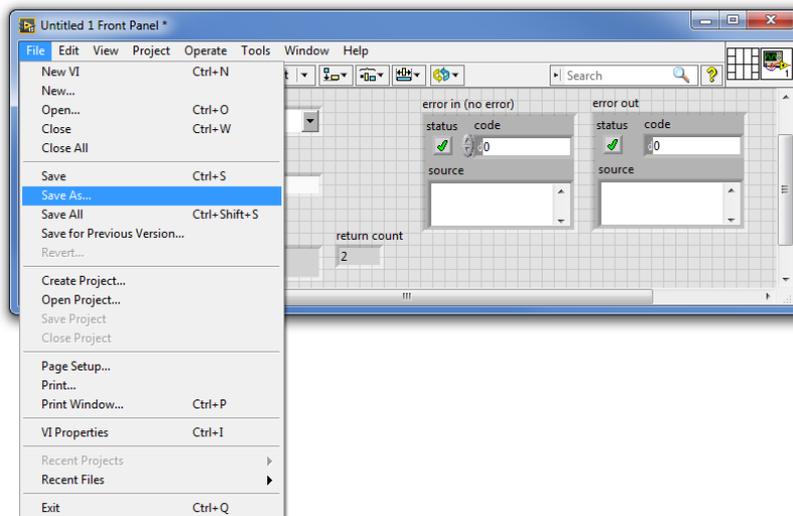


10. As can be seen on scope, a 50MHz 2Vp-p square waveform was created:



The outputted 50MHz 2Vp-p square waveform.

11. In order to save this code in LabVIEW, go to 'File'->>'Save As...' name your VI and save it:

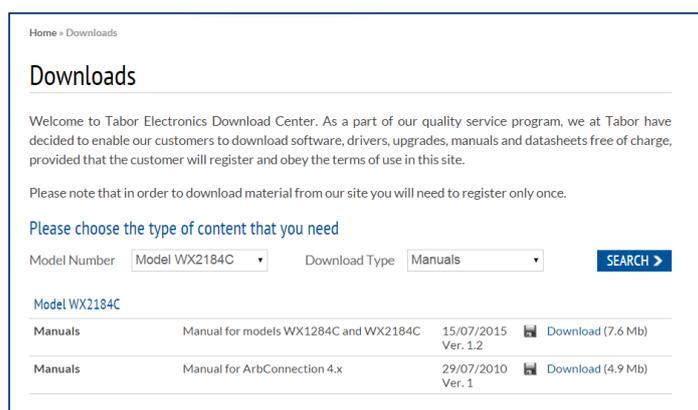


For a list of the SCPI commands, you can use to control the AWG with, go to the Programming Reference chapter in the Tabor AWG's User Manual.

Table 4-1, Model WX2184C Commands List Summary

1. Channel and Group Control Commands			
Keyword	Parameter Form	Default	Notes
:FORMat			
:DATA	SEParate COMMon	SEParate	Common will download the waveform into both of the memories, Arbitrary and Digital
:ARBitrary			
:RESolution	1P 2P	1P	2P will duplicate any arbitrary wave for sync between Arb and Dig frequency
:INSTRument			
[:SElect]	CH1 CH2 CH3 CH4 1 2 3 4	CH1	Select channel for prog
:SKEW	-100e-12 to 100e-12	0	Channels Skew in same part
:COUPle			Couple 1&2 with 3&4
:OFFSet	0 to s/(n-128) (n = waveform length)	0	Course offset adjustment
:SKEW	-3e-9 to 3e-9	0	Fine skew adjustment
:STATe	OFF ON 0 1	0	
:XINSTRument			
:MODE	MASTer SLAVe MSLave	MAST	System configuration
:OFFSet	0 to n (n = waveform length)	0	Multi-instrument offset
:SKEW	-5e-9 to 5e-9	0	
:STATe	OFF ON 0 1	0	

The User Manual can be downloaded from the [Tabor website](#) (you must be registered first):



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In the next tutorials of the series “How to Control Tabor AWGs Using LabVIEW”, we will show how to communicate with the Tabor AWG using the IVI driver functions, followed by some practical LabVIEW coding examples.

For More Information

To learn more about how to remote control Tabor instruments using LabVIEW, visit our website Support & Tutorials zone. If you encounter difficulties with connecting to Tabor units using LabVIEW, please contact us at support@taborelec.com and our support team will gladly help. For more of Tabor's solutions or to schedule a demo, please contact your local Tabor representative or email your request to info@tabor.co.il. More information can be found at our website at www.taborelec.com

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