

How to Control Tabor AWGs with MATLAB

Using SCPI commands

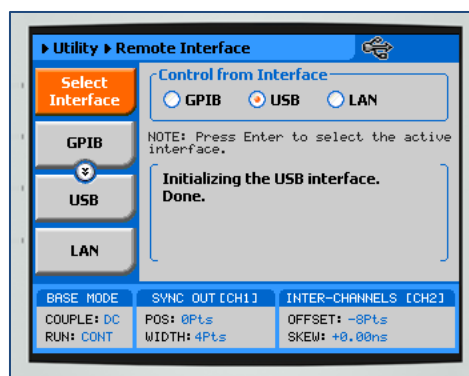
In this tutorial, we will give a quick start guide on how you can communicate with the Tabor AWG using Standard Commands for Programmable Instruments (SCPI). SCPI commands are an ASCII-based set of commands for reading and writing instrument settings.

In order to control instruments using MATLAB, the instrument control toolbox is required. Please note that the Instrument Control Toolbox is an additional application that needs to be added. For more information you can visit the [Mathworks](#) website.

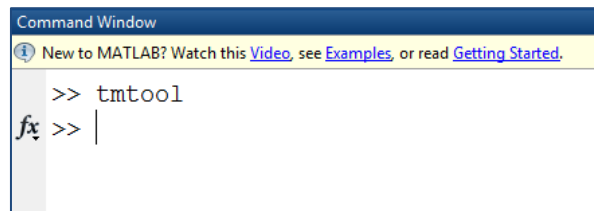
For this tutorial, we will use MATLAB version R2014a 32bit and a USB interface. To ensure you successfully established all the necessary settings for remote control over the Tabor instrument using LAN/USB/GPIB, please go over the [connectivity tutorials](#) on the Tabor's website.

→ To connect and control the Tabor's Instrument using the Test & Measurement Tool

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.



2. Once the MATLAB is up and running, type “tmtool” on the command window to open the Test & Measurement Tool.



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Command Window
New to MATLAB? Watch this Video, see Examples, or read Getting Started.

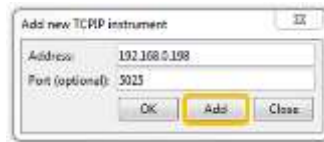
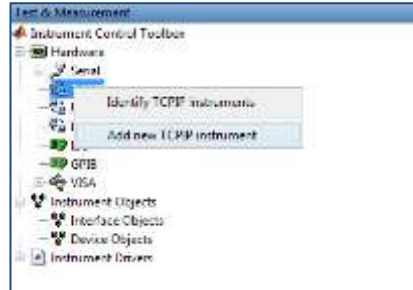
>> tmtool
fx >> |
```

A new Test & Measurement Tool dialog box opens up:

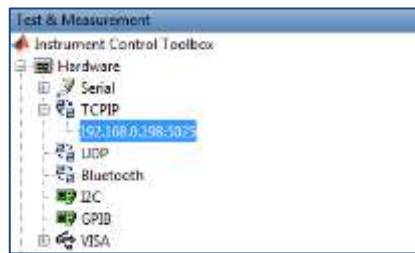


3. On the left window, one may choose which interface to communicate through with the Tabor AWG.

- a. If you would prefer not to work with VISA, you could choose to communicate through TCPIP by right clicking on “TCPIP” and adding new TCPIP instrument:



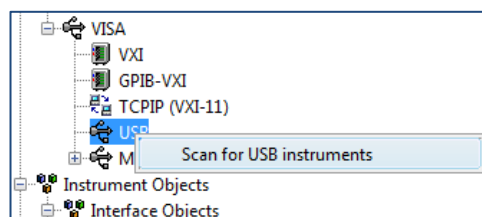
After doing so, extend “TCPIP” and choose the Tabor AWG’s IP address. The communication dialog box will appear.



- b. If you prefer working with VISA, you could connect through TCPIP by extending “VISA”, right click on “TCPIP(VXI-11)” and scan for TCPIP instruments using VXI-11 auto detection.

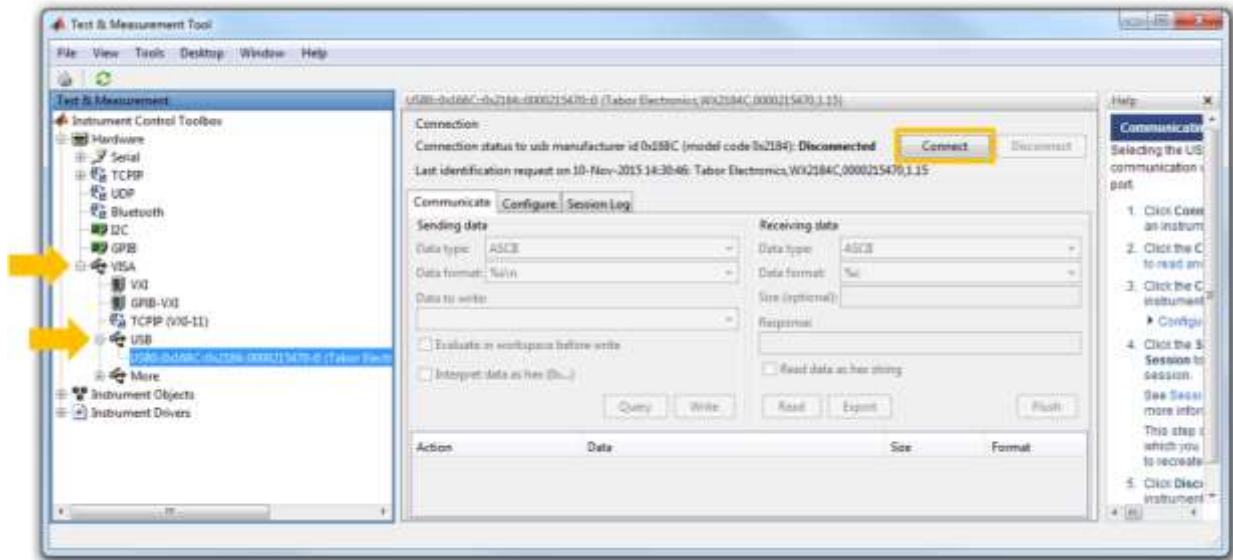


- c. If you would prefer working with VISA through USB, just click on VISA to extend VISA->USB & scan for the USB address of the Tabor device:

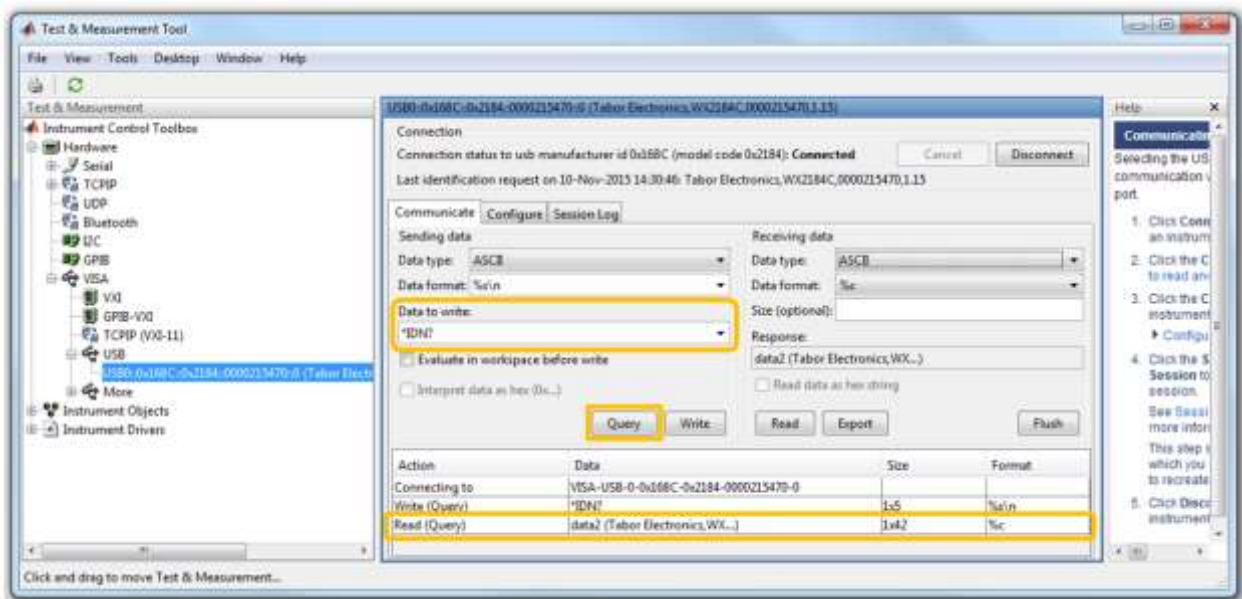


Through all of the interfaces you will communicate with, you will use the same dialog box. From here after, we will demonstrate how to connect & send SCPI commands using the USB interface:

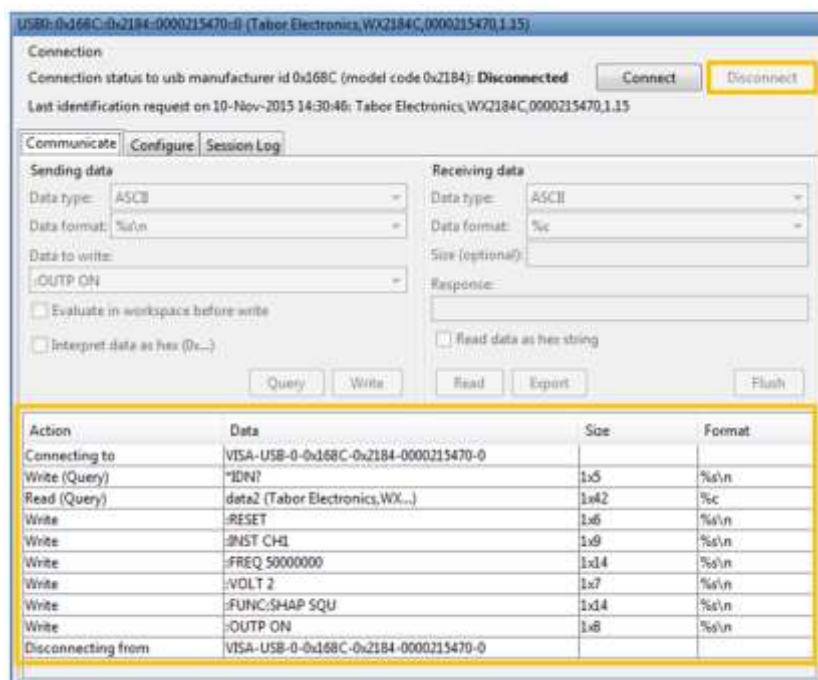
- Click on the Tabor address to open a communication dialog box with the device. Click on the “Connect” button as shown below:



- Send “*IDN?” Query to check the connection, information identify Tabor’s Model should come up as a new action line:

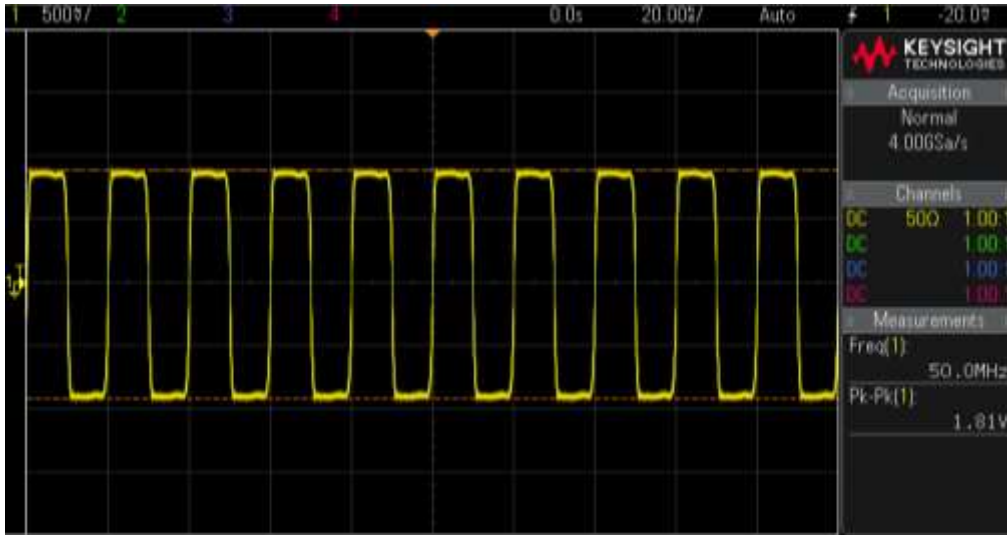


6. Here is a short basic example of how to set a 50MHz, 2Vp-p square waveform in standard mode, just to get the feel of how to communicate using SCPI commands:
 - a. Type ‘:RESET’ and press the ‘Write’ button.
 - b. Type ‘:INST CH1’ and press the ‘Write’ button, to set Channel 1 as the active channel.
 - c. Do the same with ‘:FREQ 50e6’ and ‘:VOLT 2’ to set the frequency and amplitude.
 - d. Type ‘:FUNC:SHAP SQU’ and press the ‘Write’ button, to change to Square waveform.
 - e. Type ‘:OUTP ON’ and press the ‘Write’ button to open channel 1.
 - f. Press the ‘Disconnect’ button.



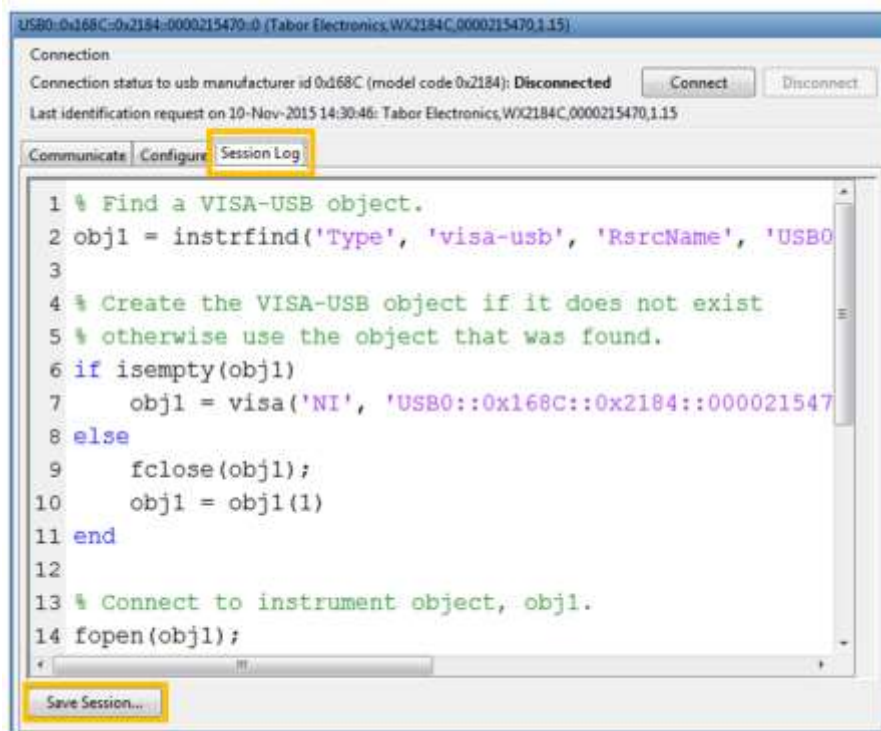
Each time you press the ‘Write’ button, the command you write to the instrument is also saved as an Action line that can be used later as part of a MATLAB script for automation purposes.

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



The outputted 50MHz 2Vp-p square waveform.

- In order to save this process as a MATLAB code, go to 'Session log', where you will see that all the actions you have made were automatically translated into MATLAB code. Press the 'Save Session' button.



```

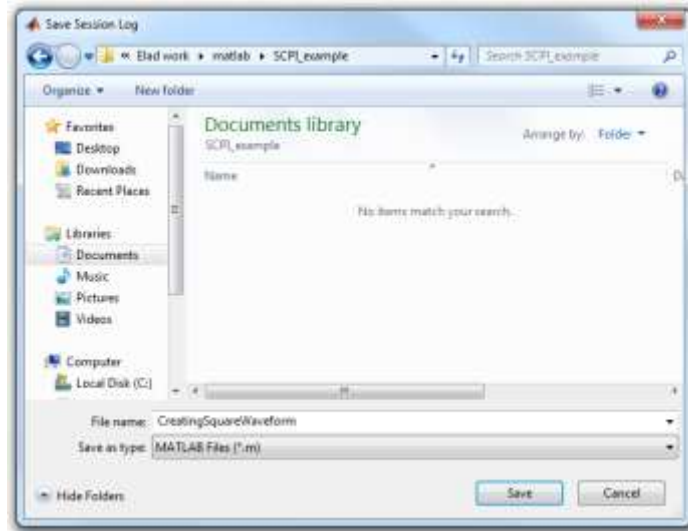
USB0-0x168C-0x2184-0000215470-0 (Tabor Electronics,WX2184C,0000215470,115)
Connection
Connection status to usb manufacturer id 0x168C (model code 0x2184): Disconnected
Last identification request on 10-Nov-2015 14:30:46: Tabor Electronics,WX2184C,0000215470,115

Communicate | Configure | Session Log

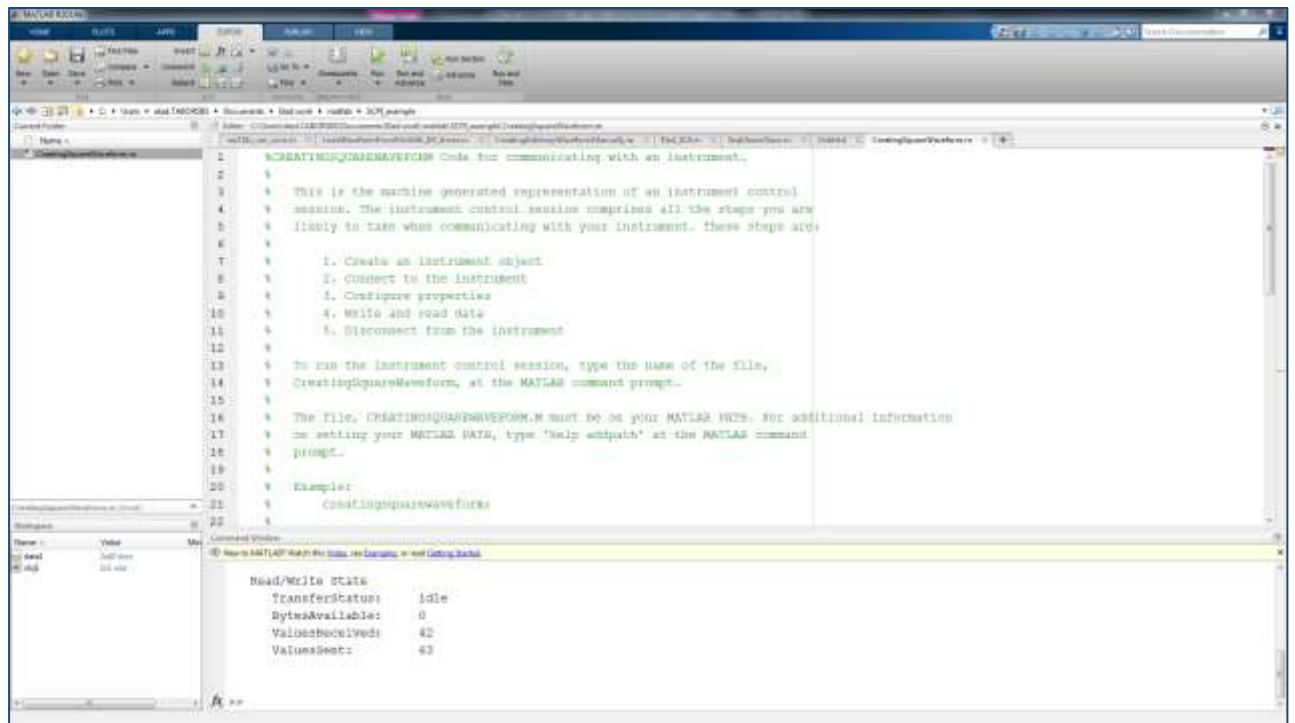
1 % Find a VISA-USB object.
2 obj1 = instrfind('Type', 'visa-usb', 'RsrcName', 'USB0
3
4 % Create the VISA-USB object if it does not exist
5 % otherwise use the object that was found.
6 if isempty(obj1)
7     obj1 = visa('NI', 'USB0::0x168C::0x2184::000021547
8 else
9     fclose(obj1);
10    obj1 = obj1(1)
11 end
12
13 % Connect to instrument object, obj1.
14 fopen(obj1);

Save Session...
    
```

And Save your session as a MATLAB script:



9. After saving the session as a '*.m' file, you can run it through your MATLAB command window as a script.

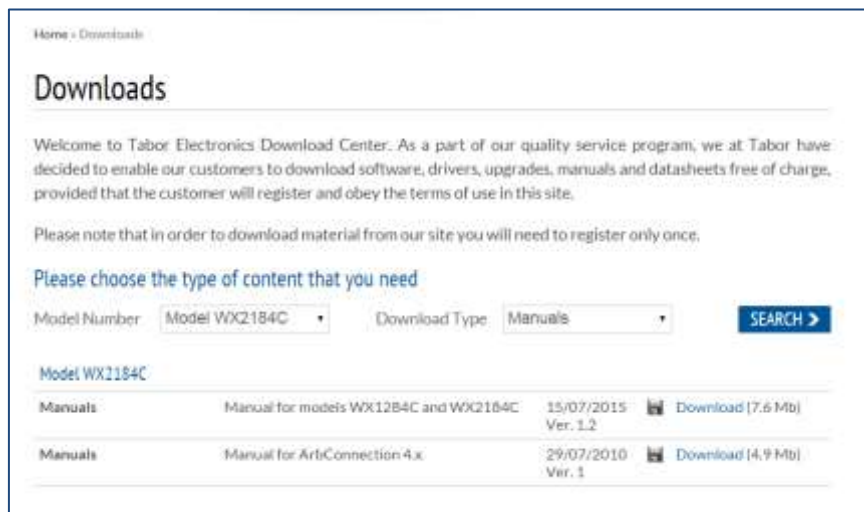


For a list of the SCPI commands, you can use to control the AWG with, go to the Programming Reference chapter in the Tabor AWG's User Manual.

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 ±(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):



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

For More Information

To learn more about how to use MATLAB with Tabor instruments, visit our website Support & Tutorials zone. 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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