New Ridge

Technologies

NRT-2500 DLL version 1.0

Released – June 7, 2012

Purpose:

The NRT-2500 driver allows the user to control the Polarization Controller using applications such as C, C++, LabWindows/CVI, Visual C++, Visual Basic etc. The user can access all the modes of operation; Polarization Tracking, Scrambling, Spinner, Randomizer and Paddles. A status command allows the user to read the current mode and control parameters.

Before You Start:

Before attempting to use the driver, copy the calibration files to the System folder in your active FPC-Driver folder. There may be more than one file with the extension TEF (for tracking error function) found in the System folder; however, there must be only a single file with the extension PSC (for polarization controller calibration) in the System Folder. Make sure not to change this file and use only the file sent to you with your unit.

Calling the DLL from LabVIEW:

The following paragraph shows the required steps in order to use the DLL in LabVIEW:

1) While in the Block-Diagram, from the **Functions palette**, select the **Connectivity - Libraries & Executables** tab, and click on the **Call Library Function Node** (see Figure 1a). The library node shown in figure 1b will show up on the Block-Diagram.
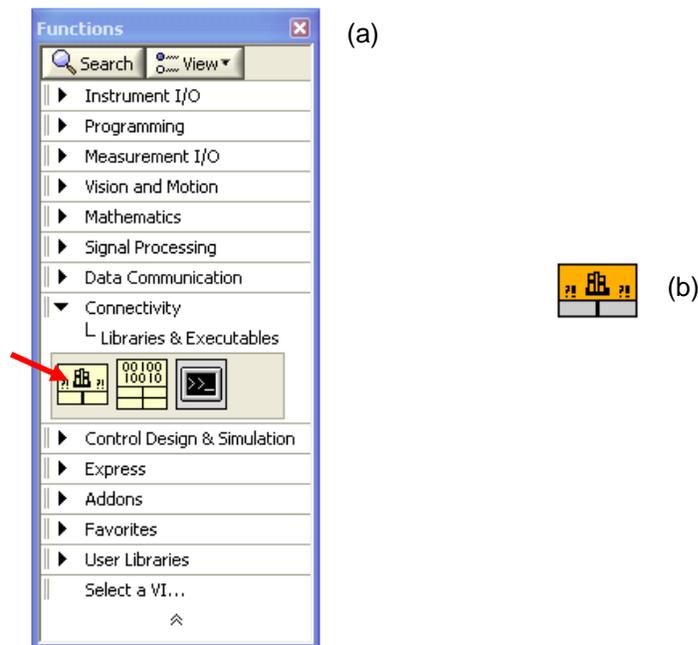

Figure 1. (a) the Functions palette, the **Call Library Function Node** is shown with a red arrow. (b) The Library function node icon as it shows up on the Block-Diagram.

2) Point your cursor on the library node, click on the Right mouse button and select **Configure** (see Figure 2). Enter the Library name or path by browsing to the library folder, and select the Function name from the scroll-down list. Select the thread option; Select **Run in UI** if you call only a single instance of the DLL. If you want to call the DLL more than once simultaneously, select **Run in Any Thread**. Press the OK button to continue.
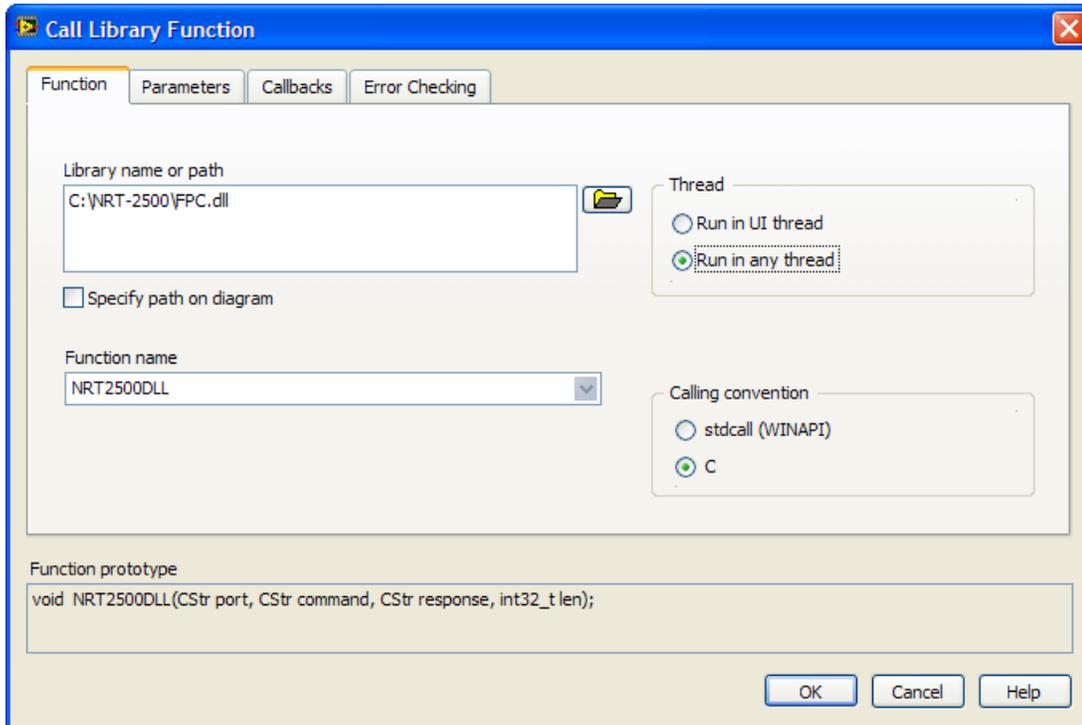

Figure 2. Setting up the parameters for calling the Library Function

3) The driver is now configured to work in LabVIEW. The icon on the Block-Diagram will change and show all the connectors required for the proper operation of the driver (see Figure 3). The controls and indicators can now be created as shown in Figure 4.
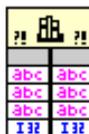
Figure 3. The configured driver icon, showing all the connectors, as seen on the Block-Diagram.
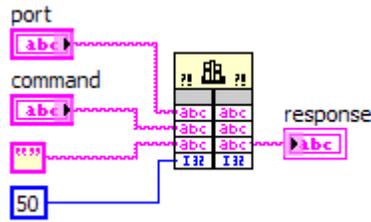
Figure 4. The driver connector diagram as it will show in LabVIEW. The 4 inputs are on the left and the 4 outputs are on the right. The port (top left) is a string (for example COM5). The command input is also a string, The next input is a constant (the empty string constant in this case) and the last input is a 32-bit integer (set to 50 in this case. The only connected output is the response (string). Any response from the device will be directed to this output.

4) The following section will describe the driver list of commands and driver usage.

List of Commands:

All the commands are case independent. When a command is followed by an argument, a colon (:) is used as a delimiter. When more than one argument is sent to the PMDS, a comma (,) is used as a delimiter.

A command can be entered in full, including all of the associated control parameters, or with only a partial parameters list. When skipping a control parameter, an extra comma has to be used, as explained in the following example:

COMMAND:*P1,P2,P3*

will set parameters 1 through 3, while:

COMMAND:*P1,,P3*

will set only parameters 1 and 3, parameter 2 will remain unchanged.

When entering only the **COMMAND**, without any control parameters, the unit will set the new mode of operation restoring the last set of control parameters used. If the mode was not in use before, a default set of parameters will be used. Use the **STATUS** command to read the mode of operation, including all the control parameters.

General Commands

INIT   Initial hand-shake. The command will initialize the device, set the communication parameters, and execute a command mode to set the device in tracker mode using default parameters.

CLOSE   Terminates the communication.

STATUS   Returns the unit status, mode and parameters in syntax identical to the command syntax.

IDLE   Idle Mode. The unit will stay in stand-by until a new command is initiated. If only the command name is sent, the unit will resume the mode of operation with the last set of parameters used (or the default parameters if the command was not used before). Sending a command including all the parameters for the command will initiate the new mode.

New Ridge Technologies, LLC

Tracker Mode Commands

TRCKR   Tracker Mode syntax:

TRCKR*:Algorithm,P1,P2,P3,P4,Averages,Threshold,Delay*

Algorithm	1 = General tracking using P1 and P2 only.
	2 = NRT proprietary algorithm using P1 through P4.
P1-P4	Algorithm parameters values.
Averages	Number of averages per update.
Threshold	Threshold value in mV.
Delay	Time delay in μs.

LDPAR   Load all default parameters from the non-volatile memory.

SAVPAR   Save the current parameters as the default parameters in the non-volatile memory.

LDTEF   Load a Tracking Error Function file from the **System** folder. A new error function evaluation will start. A new TEF file can be generated only through the Graphic User Interface.

LDTEF*:FileName*

FileName   File name only, with no extension.

Spinner Mode Commands

SPINR   Spinner Mode syntax:

SPINR*:Speed,P1,P2,P3,P4,P5,P6*

Speed	rotation in KHz, 0.001 to 52 KHz. When setting a speed, the controller will default to the closest value possible.
P1-P3	polarization controller at the spinner input, a set of ¼ - ½ - ¼ waveplates, value 0-1000
P4-P6	polarization controller after the spinner, a set of ¼ - ½ - ¼ waveplates, value 0-1000

Scrambler Mode Commands

SCRMBL   Scrambler Mode syntax:

SCRMBL*:Speed*

Speed	The scrambler mode follows the Rayleigh distribution. The scrambling speed is defined as the speed at the peak of the distribution, in radians per second (value 1-3400).

Randomizer Mode Commands

RAND   Randomizer Mode syntax:

        RAND:*Mode,Trigger*

Mode   0 = Internal trigger
               1 - 4 = External trigger, trigger source is the analog input corresponding to the number entered as *source*.

Trigger   for Internal Trigger, *Trigger* value is the time delay between generated SOP changes. The delay is measured in microseconds, and the range is 200-32000000.
               For External Trigger, *Trigger* value is the voltage of the externally applied signal at which a new SOP will be generated.

PADLS   Paddles Mode syntax:

        PADLS:*P1,P2,P3,P4,P5*

P1,P2,P4,P5   ¼ wave plate, value 0-1000
P3   ½ wave plate, value 0-1000

Driver usage:

The driver has 4 inputs: port (string), command (string), response (string) and length (int32). In the Input side the response should be set to an empty string, and the length to 50 characters, in order to allow for the whole response string to be read from the driver. See Figure 4 for a graphical illustration.

The driver has 4 outputs corresponding to each one of the 4 inputs. Only the response output is used in the driver output. All communications from the controller to the computer will be received through the response output (see Figure 4).

The calibration files should be placed in a folder named SYSTEM at the same location as the driver software. Failing to do so will result in error.

The INIT command should be sent first to initialize the communication with the controller, and set it at the tracking mode with the default parameters.

The CLOSE command closes the communication with the controller and releases the communication port.

The INIT command should be used once at the beginning of the process. The CLOSE command should be used once at the end of the process.

Issue the Mode Command for the mode you would like to set. At the end of the mode command execution the controller will response with a string stating the mode that was executed. Use the STATUS command to check the mode status, including all the mode parameters.

Technical Support:

For technical assistance please contact us at support@newridgetech.com or call us at +1 (410) 753-3055