

# Pulser/Receiver

## Model 6006PR PLUS

### Programmer's Reference for LabVIEW

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5 F., No. 31, Sintai Road, Jhubei City, Hsinchu County 30252, Taiwan (R.O.C.)  
Tel: 886-3-5539868 Fax: 886-3-5539808 <http://www.broadsound.com.tw>

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# 1 Overview

The API provides a LabVIEW programming interface to control the Pulser/Receiver 6006PR PLUS. The VI functions are installed by default into the C:\Broadsound Corporation\Pulser-Receiver Model 6006PR PLUS\API\LabVIEW 15\Vis\. The BS6006PRPLUS\_DLL.dll has to be in the directory of application.

The VI functions are available for use with LabVIEW with version 15, 16, 17, 18, 19, 20, 21, and 23. The VI functions only support the 32-bit LabVIEW. This manual does not show you how to solve every possible programming problem. Specific questions should be directed to Broadsound's application engineers.

## 2 Functions

### 2.1 PR Check Device Connected

#### Description

The function checks the connection of the pulser/receiver.

#### Returns

True: the pulser/receiver has been connected.

False: the pulser/receiver is not connected.

### 2.2 PR Check General Power

#### Description

The function checks the powers of pulser/receiver.

#### Return

True: the powers of the pulser/receiver are normal.

False: the powers of the pulser/receiver would be damage. You can use PR Error Code to get detail information.

### 2.3 PR Check Voltage Of Pulser

#### Description

The function checks the voltage of pulser.

#### Parameters

[In] VoltLevel: the voltage of pulser. The VoltLevel could be -25, -45, -75, -120, or -190.

#### Returns

True: the voltage of pulser is normal.

False: the voltage of pulser is failed.

### 2.4 PR Connect Device

#### Description

The function creates a handle for the driver of pulser/receiver and returns true if the pulser/receiver is connected. When the return value is true, the pulser/receiver is ready to perform operations via other functions of BS6006PRPLUS.lvlb.

#### Returns

True: the pulser/receiver is connected successfully.

False: the pulser/receiver is not connected.

## 2.5 PR Current No Acq Signal

### Description

The function returns the actual number of acquired signals.

### Returns

1 ~ 256: the actual number of signals has been acquired.

## 2.6 PR Current PRF

### Description

The function gets the current pulse repetition frequency.

### Returns

100, 200, 500, 1000, 2000, 5000, or 10000: current pulse repetition frequency (Hz).

## 2.7 PR Current Pulse Index

### Description

The function gets the current index of pulse setting.

### Returns

0 ~ 13: current index of pulse setting. The index corresponds to the level of pulse as shown as follows:

Index	Level of Pulse
0	-25 V, 0.1 μJ, DC–20 MHz
1	-45 V, 0.4 μJ, DC–30 MHz
2	-75 V, 1.0 μJ, DC–35 MHz
3	-120 V, 2.4 μJ, DC–45 MHz
4	-190 V, 5.0 μJ, DC–50 MHz
5	-190 V, 11 μJ, DC–25 MHz
6	-190 V, 15 μJ, DC–20 MHz
7	-190 V, 20 μJ, DC–15 MHz
8	-190 V, 25 μJ, DC–12 MHz
9	-190 V, 30 μJ, DC–10 MHz
10	-190 V, 35 μJ, DC–9 MHz
11	-190 V, 40 μJ, DC–8 MHz
12	-190 V, 45 μJ, DC–7 MHz
13	-190 V, 50 μJ, DC–6 MHz

## 2.8 PR Current Receiver Gain

### Description

The function gets the current gain of receiver.

### Returns

-28 ~ 70: current gain of receiver (dB).

## 2.9 PR Current Sampling Frequency

### Description

The function gets the current sampling frequency.

### Returns

48, 80, or 240: current sampling frequency (MHz).

## 2.10 PR Current Trigger Delay

### Description

The function gets the trigger delay for acquiring signals.

### Returns

0 ~ 65535: the current trigger delay ( $\mu$ s).

## 2.11 PR Current Trigger Source

### Description

The function gets the current index of trigger source.

### Returns

0: internal

1: external

## 2.12 PR Enable Acquire Signal

### Description

The function sets the status of the function of the analog-to-digital converter of pulser/receiver.

### Parameters

[In] Enable: status of the analog-to-digital converter of pulser/receiver. If the bEnabled is true, the analog-to-digital converter of pulser/receiver is ready to work.

## 2.13 PR Error Code

### Description

The function gets the error code of the pulser/receiver.

### Parameters

[Out] bErrorCode: error code of the pulser/receiver. The size of array of bErrorCode should be 13. If the bErrorCode[] returns true, the pulser/receiver has error. The bErrorCode corresponds to the status of pulser/receiver is shown as follows:

bErrorCode[]	Status of Pulser/Receiver
bErrorCode[0]	EEPROM error
bErrorCode[1]	Serial number is not acquired
bErrorCode[2]	Serial number is not correct
bErrorCode[3]	Calibration data of Receiver is corrupted
bErrorCode[4]	Power of 10.5 V is error
bErrorCode[5]	Power of -10.5 V is error
bErrorCode[6]	Power of 5 V is error
bErrorCode[7]	Timeout
bErrorCode[8]	Voltage of -190 pulser is error
bErrorCode[9]	Voltage of -120 pulser is error
bErrorCode[10]	Voltage of -75 pulse is error
bErrorCode[11]	Voltage of -45 pulse is error
bErrorCode[12]	Voltage of -25 pulse is error

## 2.14 PR Get Length of Signal Setting

### Description

The function gets current length of each signal has been set.

### Returns

The length of each signal has been set.

## 2.15 PR Get No Acq Signal Setting

### Description

The function gets the setting of number of signal acquisition.

### Returns

The setting of number of signal acquisition.

## 2.16 PR LED Action

### Description

The function sets the LED of action on the pulser/receiver.

### Parameters

[In] Enable: status of the LED of action.

## 2.17 PR Run And Acquire Signal

### Description

The function triggers the pulser/receiver starts to generate pulse and acquire the received signals. When the trigger source is internal, the number of pulses would be generated according to the setting of number of signals to be acquired.

### Parameters

[Out] DataArray: acquired signals. The size of DataArray should equal the product of Length, which is the input parameter of PR Set Length Of Signal , and Number, which is the input parameter of PR Set No Acq Signal.

### Returns

True: the signal is acquired successfully.

False: the signal acquisition is failed.

## 2.18 PR Run

### Description

When the status of analog-to-digital converter is disabled, the function would trigger the pulser/Receiver starts to generate the pulse according to the pulse repetition frequency until the PR Stop is performed.

## 2.19 PR Serial Number

### Description

The function gets the serial number of the pulser/receiver which is connected.

### Parameters

[Out] SN: serial number of the pulser/receiver.

## 2.20 PR Set Length Of Signal

### Description

The function sets the length of each signal to be acquired. The product of Length and Number, which is the input parameter of PR Set No Acq Signal, should be less

than 262144.

#### Parameters

[In] Length: the length of each signal to be acquired. The Length should be a multiple of 1024.

#### Returns

1024 ~ 262144: the actual length of each signal has been set.

## 2.21 PR Set No Acq Signal

#### Description

The function sets the number of signals to be acquired. The product of Number and Length, which is the input parameter of PR Set Length Of Signal, should be less than 262144.

#### Parameters

[In] Number: the number of signals to be acquired. The number ranges from 1 to 256.

#### Returns

1 ~ 256: the number of signals has been set.

## 2.22 PR Set PRF

#### Description

The function sets the pulse repetition frequency of pulser. When the index of pulse is set to be greater than 11, the PRF should be less than 5000.

#### Parameter

[In] PRF: the input parameter of PRF corresponds to the pulse repetition frequency as shown as follows:

PRF	Pulse Repetition Frequency
100	100 Hz
200	200 Hz
500	500 Hz
1000	1 kHz
2000	2 kHz
5000	5 kHz
10000	10 kHz

#### Returns

True: the pulse repetition frequency of pulser is set successfully.

False: the setting of pulse repetition frequency is failed.

## 2.23 PR Set Pulse

### Description

The function sets the level of pulser of Pulser/Receiver. When the pulse repetition frequency is set to be higher than 5 kHz, the PulseIndex should be less than 12.

### Parameters

[In] PulseIndex: the PulseIndex corresponds to the level of pulse as shown as follows:

PulseIndex	Level of Pulse
0	-25 V, 0.1 μJ, DC-20 MHz
1	-45 V, 0.4 μJ, DC-30 MHz
2	-75 V, 1.0 μJ, DC-35 MHz
3	-120 V, 2.4 μJ, DC-45 MHz
4	-190 V, 5.0 μJ, DC-50 MHz
5	-190 V, 11 μJ, DC-25 MHz
6	-190 V, 15 μJ, DC-20 MHz
7	-190 V, 20 μJ, DC-15 MHz
8	-190 V, 25 μJ, DC-12 MHz
9	-190 V, 30 μJ, DC-10 MHz
10	-190 V, 35 μJ, DC-9 MHz
11	-190 V, 40 μJ, DC-8 MHz
12	-190 V, 45 μJ, DC-7 MHz
13	-190 V, 50 μJ, DC-6 MHz

### Returns

True: the level of pulse is set successfully.

False: the setting of pulse is failed.

## 2.24 PR Set Receiver Gain

### Description

The function sets the gain of receiver.

### Parameters

[In] Gain: the gain of receiver. The gain ranges from -28 to 70 (dB).

## 2.25 PR Set Sampling Frequency

### Description

The function sets the sampling frequency of analog-to-digital converter.

#### Parameters

[In] Freq: the sampling frequency of analog-to-digital converter. The Freq corresponds to the sampling frequency as shown as follows:

Freq	Sampling Frequency
48	48 MHz
80	80 MHz
240	240 MHz

## 2.26 PR Set Time Out

#### Description

The function sets the timeout for acquiring signals.

#### Parameters

[In] Seconds: timeout for acquiring signals. The unit of Seconds is second.

## 2.27 PR Set Trigger Delay

#### Description

The function sets the trigger delay for acquiring signals. Trigger delay is the amount of time that elapses between when a trigger occurs and when the analog-to-digital converter triggers.

#### Parameters

[In] Delay: the trigger delay for acquiring signals. The Delay ranges from 0 to 65535. The unit of Delay is  $\mu$ s.

## 2.28 PR Set Trigger Source

#### Description

The function sets the trigger source of pulser/receiver.

#### Parameters

[In] TriggerSource: the index of trigger source of pulser/receiver.

TriggerSource	Status of Trigger Source
0	Internal
1	External

## **2.29 PR Stop**

### **Description**

The function stops the pulser/receiver to generate the pulse.

## **2.30 PR Switch To Pulse Echo Mode**

### **Description**

The function sets the mode of Pulser/Receiver is ECHO mode for pulse-echo testing.

## **2.31 PR Switch To Thru Mode**

### **Description**

The function sets the mode of Pulser/Receiver is THRU mode for pitch-catch testing.