DPR650$^{\text{tm}}$ Single and Dual Pulser-Receiver System

Operator Manual

JSR
DPR650 Dual Pulser-Receiver
Channel A
Status
Pulse
Channel B
Status
Pulse

9-Dec-2024

The information in this document is applicable to all models of DPR650™ Pulser-Receiver Instruments and accessories.

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Safety and Caution Advisories

CAUTION ⚠	**English** The DPR650 is designed for manufacturing, laboratory, and office use. **Français /French** Le système DPR650 est conçu pour la fabrication, les laboratoires et les bureaux. **Español /Spanish** El sistema DPR650 está diseñado para uso en fabricación, laboratorio y oficina. **Deutsch /German** Das DPR650 ist für den Einsatz in der Fertigung, im Labor und im Büro konzipiert. **汉语 /Chinese** DPR650 系统专为制造，实验室和办公室使用而设计。 **日本語 /Japanese** DPR650 システムは、製造、実験室、およびオフィスでの使用のために設計されています。 **Italiano /Italian** Il sistema DPR650 è progettato per la produzione, il laboratorio e l'uso in ufficio. **Português /Portuguese** O sistema DPR650 foi projetado para uso em fabricação, laboratório e escritório. **Русско /Russian** Система DPR650 предназначена для производства, лабораторного и офисного использования. **한국어 /Korean** DPR650 시스템은 제조, 실험실 및 사무용으로 설계되었습니다.

CAUTION

⚠

English

Use the DPR650 instrumentation as directed by the manufacturer. If you do not use as directed, overall safety could potentially be compromised.

Français /French

Si les instruments DPR650 ne sont pas employés selon les prescriptions du fabricant, la sécurité globale peut en être affectée.

Español /Spanish

Utilice la instrumentación del DPR650 según lo dirigido por el fabricante. Si usted no utiliza según lo dirigido, la seguridad total podría potencialmente ser comprometida.

Deutsch /German

Verwenden Sie die DPR650 Instrumentenausrüstung, wie durch den Hersteller verwiesen. Wenn Sie verwenden nicht, wie verwiesen, könnte Gesamtsicherheit möglicherweise gekompromittiert werden.

汉语 /Chinese

使用 DPR650 仪器工作如指挥的是由制造商。 如果您不使用如被指挥，整体安全可能潜在地减弱。

日本語 /Japanese

製造業者によって指示されるように DPR650 の器械使用を使用しなさい。 指示されるように使用しなかったら、全面的な安全は可能性としては妥協されてもよい。

Italiano /Italian

Usi la strumentazione del DPR650 come diretta dal fornitore. Se non usate come diretto, la sicurezza generale potrebbe potenzialmente essere compromessa.

Português /Portuguese

Use a instrumentação do DPR650 como dirigida pelo fabricante. Se você não se usa como dirigido, a segurança total poderia potencial ser comprometida.

Pycckо /Russian

Используйте измерительное оборудование DPR650 как сразу изготовлением. Если вы не используете как сразу, то общая безопасность смогла потенциально быть скомпрометирована.

한국어 /Korean

제조자에 의해 지시되는 것과 같이 DPR650 기계 사용을 사용하십시오. 당신이 지시되는 것과 같이 사용하지 않는 경우에, 전반적인 안전은 잠재적으로 손상될 수있었다.

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Hardware Limited Warranty

BYK-Gardner USA warrants that DPR650 instrumentation will be free from defects in materials and workmanship for a period of one year from the date of purchase. BYK-Gardner USA will, at its option, repair or replace any DPR650 products that prove to be defective during the warranty period without charge for parts and labor.

This warranty does not apply to any defect, failure, or damage caused by improper use, handling, care, or tampering such as damage to the finish or bent or broken connectors. Neither will this warranty apply to any equipment damaged from attempts by personnel other than BYK-Gardner USA to repair or modify the product.

BYK-Gardner USA disclaims any warranty, either expressed or implied, as to the merchantability or fitness of its hardware, software, or services for a particular purpose or application. BYK-Gardner USA will not be liable for any indirect, incidental, or consequential damages, irrespective of whether BYK-Gardner USA received any advance notice of the possibility of such damages.

To obtain service under this warranty, the customer must contact BYK-Gardner USA to obtain a Return Material Authorization (RMA) number. Once the customer has obtained an RMA number, they must ship the defective product to BYK-Gardner USA. The RMA number must be clearly marked on the outside of the shipping package. The customer is responsible for the costs associated with shipping, packaging, and insurance of the defective product. When BYK-Gardner USA repairs or replaces a product, the warranty term is not extended.

Software Limited Warranty and License Agreement

Please refer to the JSR .Net Control Panel software documentation for warranty and licensing terms.

Application Disclaimer

This product is neither intended nor designed for use in medical, life support, or other devices or systems where malfunction of this product can reasonably be expected to result in personal injury. Any person or entity using this product in or selling it into such applications does so at their own risk and liability and thereby agrees to fully indemnify BYK-Gardner USA Inc. against any damages resulting from such improper use or sale.

Powering DPR650 Instruments

The DPR650 is a line-powered instrument that can accept line voltages from 100-250VAC. The power inlet module accepts international IEC power cords. The unit is fused from the factory for 250VAC, 0.5A overdraw protection. See the Physical Specification section for more detail.

Product Package Contents

The following items are typically included in the DPR650 shipping box:

1. DPR650 Single or Dual Channel Main Unit.
2. Remote pulser(s).
3. Remote Pulser Interface Cable(s).
4. USB A to Mini-B cable for interface with a PC.
5. IEC-type line cord suitable for the customer location.

Additional Equipment Required (Customer Supplied)

1. Windows Computer with an available USB port (see PC Setup section for details).
2. Ultrasound Transducer(s).
3. Oscilloscope or waveform digitizer (for waveform capture).
4. 50Ω coaxial cable(s) for connecting the DPR650 Remote Pulser(s) to Transducer(s). The DPR650 Remote Pulser coaxial connectors are SMA type.
5. Trigger-signal source (if external triggering of the DPR650 is desired).

Product Installation

The DPR650 Main Unit can be operated as a tabletop unit or a rack mount unit. The Main Unit is 1/2-rack width and includes mounting features on the encasement sides. Mounting holes are located on the sides of the Main Unit for mounting with standard rack mount hardware.

The Main Unit should be positioned to allow easy access to the power disconnect. Power disconnect can be through removal of the power cord plug or through a separate power disconnect device coupled to the unit power cord.

Overview

The DPR650 Pulser-Receiver is a USB-controlled instrument that is available in various Single and Dual Channel models. The Single Channel models provide one Receiver and support one Remote Pulser while the Dual Channel models provide two Receivers and support two Remote Pulsers. A number of Receiver models and Remote Pulser models are available that cover a wide range of performance characteristics enabling DPR650 hardware to be configured for a broad range of ultrasound system configurations. The DPR650 configurations span a broad range of transducer frequencies and transducer-excitation energies that enable a correspondingly broad range of ultrasound system applications.

User control of a DPR650 instrument is achieved through the DPR650 USB interface and a control software application on a Windows PC. A user can employ the JSR .Net (Dot Net) Control Panel application which provides control over the DPR650 as well as other JSR instruments. Alternatively, the supplied Software Developers Kit (SDK) and Programmer's Manual allow a user to develop custom control software programs.

DPR650 Receiver models differ in their Receiver gain range and high-pass and low-pass filter values. Six high-pass and six low-pass filters are provided which allows the Receiver bandwidth to be rapidly configured for many transducer frequencies and different types of testing.

DPR650 Remote Pulsers are hot-swappable which provides for rapid hardware reconfiguration and makes the DPR650 an excellent choice for ultrasound systems requiring broad functionality. DPR650 Remote Pulsers are easily connected to the DPR650 Main Unit via bayonet-mount Remote Pulser cables. Transducers are connected to the Remote Pulser using a short coaxial cable.

The DPR650 system is line powered and supports all common line voltages. DPR650 Interface and control is via its USB interface. The DPR650 can be combined with various A/D Boards and/or other signal detection and processing instrumentation which provides system integrators with maximal flexibility for optimizing system configurability, cost and performance.

Theory of Operation

Communication with a DPR650 Pulser-Receiver provides a user with control over each receiver's input signal (Echo or Through on the attached Pulser), receiver gain, receiver's low-pass and high pass filter settings, Pulser repetition frequency (PRF), transducer damping value, enable/disable control of the Pulser's power supply, the Pulser power supply value, and selection of internal or external Pulser triggering. LEDs on the DPR650 Main Unit and Pulser(s) provide indications of power, status, and triggering.

A Pulser-Receiver has two typical modes of operation, Pulse-Echo and Through. In a typical Pulse-Echo application, the DPR650 Remote Pulser produces an excitation pulse on its Echo connector. A DPR650 Pulser typically provides two pulse energy values for adjusting the energy of this excitation pulse. An ultrasound transducer is connected to the Echo connector via a short length of 50Ω coaxial cable, and the transducer converts the electrical excitation pulse into an ultrasonic pulse that is propagated into a test material or item. Depending on the Remote Pulser model, up to eight discrete damping levels allow adjustment of the transducer's damping. Ultrasound echoes reflected from the test material or item are converted by the transducer into electrical signals that are amplified by a preamplifier in the Remote Pulser and are then conveyed through the Pulser cable to the DPR650 receiver where they are amplified further by the adjustable-gain low-noise Receiver in the DPR650 Main Unit. The amplified and filtered signals are then available on the instrument's Receiver Output connector.

The DPR650 may also be used in Transmission Mode operation wherein one transducer is connected to the Echo connector and emits an ultrasound pulse, and a second (receiving) transducer is used to detect acoustic pulses that have either propagated through a test material or been reflected from the test material in the direction of the second transducer. This second transducer is connected to the DPR650 Remote Pulser's Through connector and the DPR650 Receiver receives signals from this second transducer when the Receiver Input selection is set to Through.

The DPR650 also allows external equipment such as A/D digitizer boards or oscilloscopes to be synchronized to the Remote Pulser operation in both Internal Trigger and External Trigger modes of operation. In Internal Trigger Mode, a narrow pulse is output on the DPR650 Trig/Sync connector synchronously with the transducer excitation pulse. This Sync pulse can be used to trigger an oscilloscope or A/D board but please note that the Sync signal will not be produced at exactly the same moment that the Pulser fires. In External Trigger mode, the DPR650 fires its pulser when an external trigger signal is received on its Trig/Sync connector. The input impedance of the Trig/Sync connector can be set to 50-Ohms to properly terminate a signal received on a 50-Ohm coaxial cable, or the impedance can be set to the high impedance value. The high impedance setting would be used when a trigger signal generator needs to be connected via 50-ohm coaxial cables to multiple devices such as the DPR650 and an A/D board, and for proper termination only the last instrument in the chain should be set to 50-Ohms in order to properly terminate the cable.

DPR650 Instrument Functional Blocks

A DPR650 Pulser-Receiver System is composed of the functional blocks shown in the following Block Diagram.

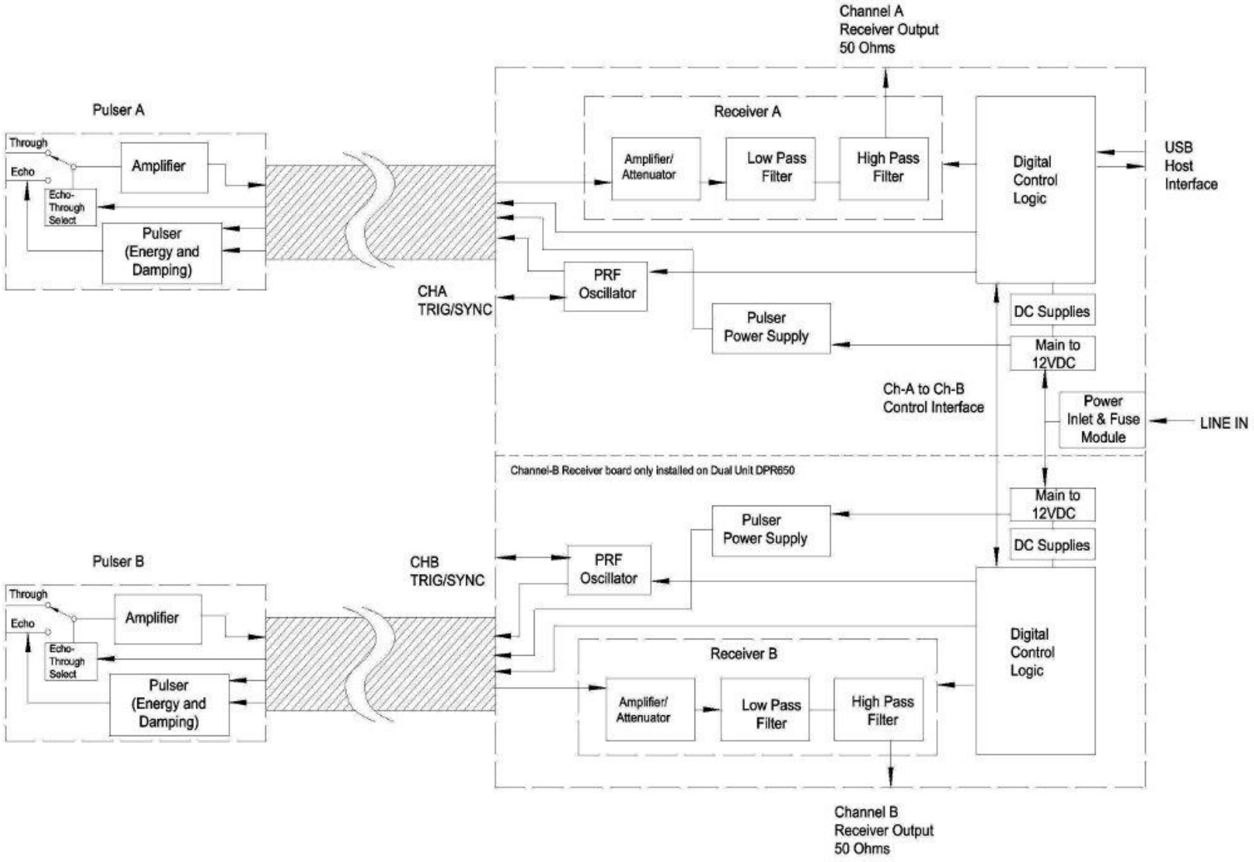

Channel A
Receiver Output
50 Ohms
Pulser A
Through
Echo
Echo-Through Select
Amplifier
Pulser (Energy and Damping)
Receiver A
Amplifier/ Attenuator
Low Pass Filter
High Pass Filter
Digital Control Logic
USB Host Interface
PRF Oscillator
CHA TRIG/SYNC
Pulser Power Supply
DC Supplies
Main to 12VDC
Ch-A to Ch-B Control Interface
Power Inlet & Fuse Module
LINE IN
Channel-B Receiver board only installed on Dual Unit DPR650
Pulser B
CHB TRIG/SYNC
Receiver B
Channel B
Receiver Output
50 Ohms

Figure 1: DPR650 System Block Diagram

JSR Control Panel Software and USB Interface

Dual Channel and Single Channel DPR650 Units each have a single USB port for controlling the instrument. The provided JSR Control Panel Software can be installed on a Windows computer for user control of the instrument. For users that wish to develop custom instrument control applications, programming information and examples and an SDK (software developer's kit) are provided.

The control functions described below can be set independently for each channel of a DPR650 unit.

Remote Pulser Energy and Damping

The Remote Pulser accessory generates a transducer-excitation pulse upon receipt of a trigger signal from a selected source, either internal or external. The Pulser energy and damping controls allow for adjustment of the excitation pulse. There may be multiple energy values depending on the model of remote pulser. The damping control allows the damping impedance at the pulser output to be set to a number of discrete values. The pulser produces transducer excitation pulses over the specified range of pulse repetition frequency.

Pulser Trigger Control

This control selects the signal source for triggering the Pulser on a channel. Available trigger source options are 1) the internal PRF oscillator for that channel, 2) an external trigger signal applied to the DPR650 Trig/Sync connector for the channel, and 3) an Aux trigger signal provided by the other channel in a dual channel DPR650 unit (see the Aux Pulser Trigger Control section below).

Aux Pulser Trigger Control

This trigger option is available only in Dual Channel DPR650 Instruments. This option allows the trigger selection for a channel to be set to Aux which means that it synchronizes (follows) the trigger of the other channel in a dual channel unit.

PRF Oscillator Control

This sets the frequency of triggering the Pulser when Internal Trigger mode is selected.

Pulser Power Supply

The precision-regulated pulser voltage supply provides power to the Remote Pulser circuitry for generating a transducer excitation pulse. This pulser voltage may also be enabled or disabled which can be useful for test system debugging by allowing a user to analyze signals that are present in a test system both with and without a transducer excitation pulse actually being produced.

Echo and Through Select

Selecting the 'Echo' mode (also referred to as 'T/R' input) connects the Receiver input to the Pulser's Echo connector. This configures the instrument for performing Transmit/Receive measurements using a single transducer.

Selecting the 'Through' input connects the Receiver input to the Pulser's Through connector. This configures the instrument to receive signals from a receiving transducer that is not being excited by the Pulser. This transducer can thus receive signals from any ultrasound source such as a Transmitting transducer.

Receiver Amplifier

This functional block provides control over the DPR650 Receiver gain. The Receiver gain can be incremented in 0.5dB increments across the gain range of -21dB to +68db.

Low Pass Filters

Low-pass filters enable a user to reduce the bandwidth of the receiver to improve the system signal to noise ratio or to eliminate out-of-band signal content in applications that do not require the full receiver bandwidth. Six user-selectable low-pass filter values are available for each Receiver model.

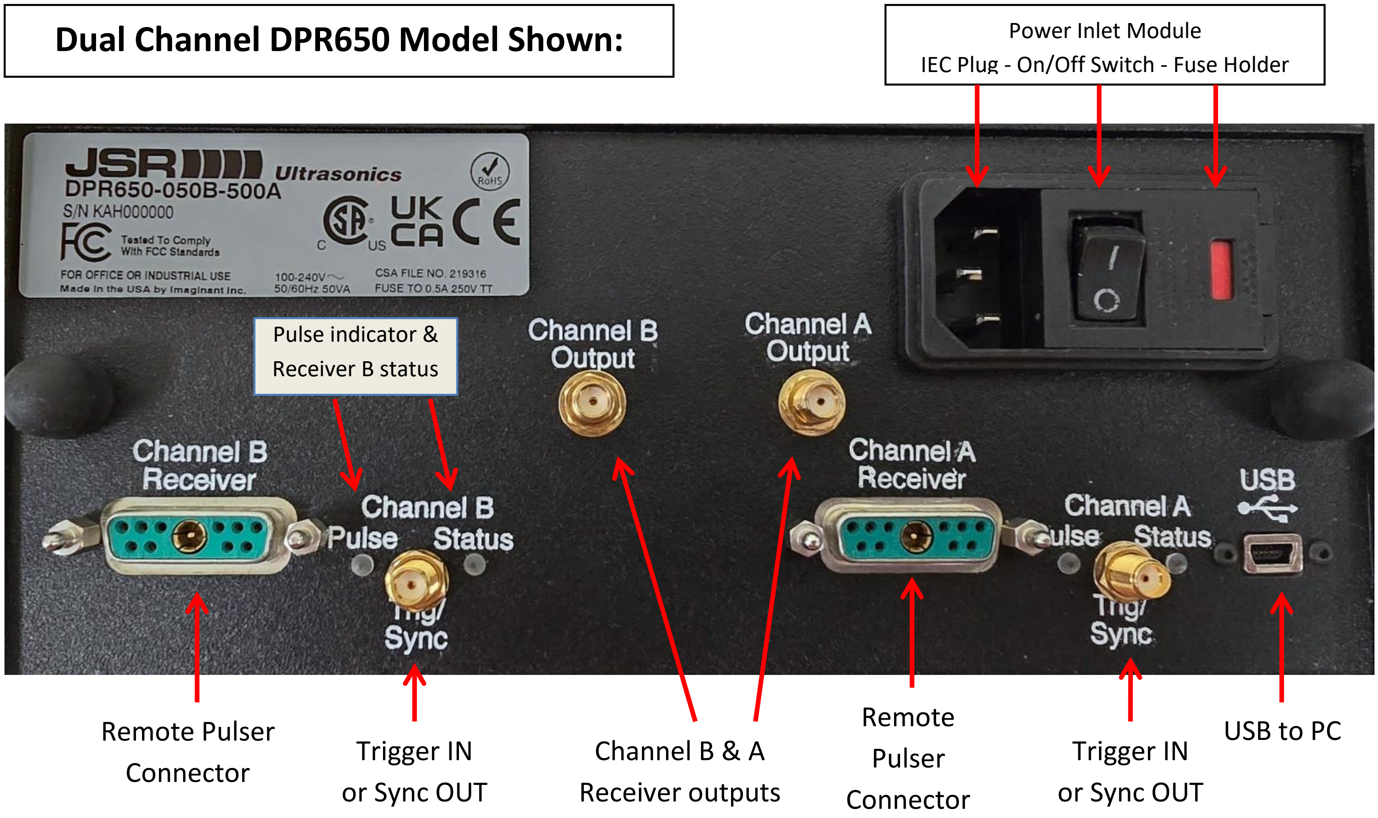
High Pass Filters

High-pass filters enable a user to eliminate low frequency energy from the receiver signal and to improve the rate at which the Receiver output returns to its baseline level after the Pulser excites the transducer. Six user-selectable high pass filter values are available for each Receiver model.

DPR650 Rear Panel Interface Connectors and Status Indicators

All DPR650 Main Units have a single USB port for connection to a Windows PC. Each DPR650 channel has one D-style Remote Pulser interface connector, two SMA coax connectors, one LED status indicator, and one LED pulse indicator.

Dual Channel DPR650 Model Shown:


Power Inlet Module
IEC Plug - On/Off Switch - Fuse Holder
JSR Ultrasonics
DPR650-050B-500A
S/N KAH000000
Pulse indicator &
Receiver B status
Channel B Output
Channel A Output
Channel B Receiver
Channel B Pulse Status
Trig/Sync
Channel A Receiver
Channel A Pulse Status
Trig/Sync
USB
Remote Pulser Connector
Trigger IN or Sync OUT
Channel B & A Receiver outputs
Remote Pulser Connector
Trigger IN or Sync OUT
USB to PC

Main Power

The power inlet module supports an IEC mains-power cable, a power on/off switch, and a removable fuse module. The inlet module accepts 100-250Vac mains power. Fuses are factory installed for 250V, 0.5A.

NOTE: All Channel B references are for Dual-Channel DR650 models. Control for Channel A and Channel B are identical (other than Aux Trigger) and all functions are controlled from the software application through the single USB port.

USB

A Mini-B USB socket which enables control of the DR650 from a Windows PC via the included USB A to Mini-B interface cable.

Channel A/Channel B Receiver

This D-connector provides an interface to a Remote Pulser via the included Remote Pulser Cable. A cable connected to this D-connector provides a Remote Pulser with power, control, and a 50Ω coaxial interface to the receiver input.

Channel A/Channel B Output (Receiver Output)

The Receiver-Output SMA receptacles provide the Receiver output signals to the user. Each receiver output signal line should be connected to 50Ω coaxial cable that is terminated in a 50Ω load.

Channel A/Channel B Trig/Sync

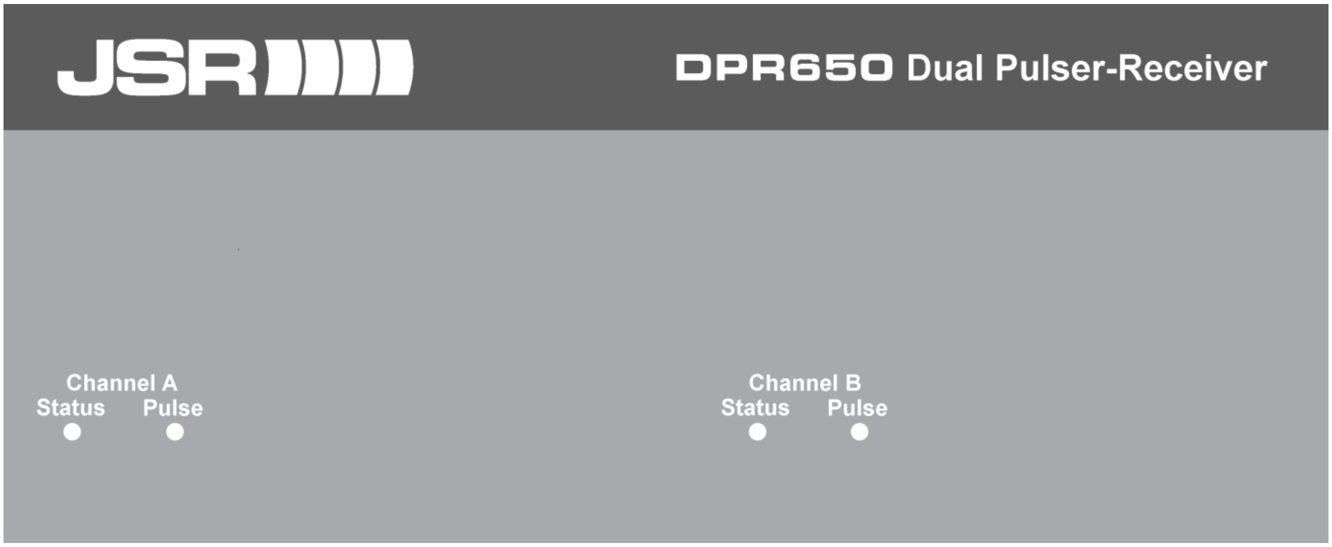
This connector provides a positive-polarity synchronization pulse that can be used to trigger an oscilloscope or other signal monitoring/recording instrument when the DPR650 is set to internal triggering of the Pulser. When in internal trigger mode, this Trig/Sync connector should be loaded with a 50Ω coaxial cable that is itself terminated with a 50Ω terminating resistance.

If the DPR650 is set to external trigger mode, then the Trig / Sync connector is used for receiving a positive-going 3-5 V trigger pulse generated by an external source from an A/D Board or a signal generator. Pulser Triggering will occur on the rising edge of the applied trigger signal.

The internal impedance of the DPR650 at the Trig/Sync connector can be set to 50Ω to properly terminate a 50Ω coaxial cable, or can be set to high impedance when a 50Ω termination is not required. This high impedance setting allows a trigger signal to be generated by a weak source that is not capable of driving a signal into a 50Ω load. Alternatively, the high impedance setting allows a trigger signal to be applied to multiple DPR650 Trig / Sync inputs with only one of them set to 50Ω to properly terminate the coax signal (and the others set to high impedance).

When triggering the DPR650 pulser from an external source, it is important to ensure that the pulse repetition frequency does not exceed the maximum PRF of the attached pulser.

DPR650 Front Panel Indicators



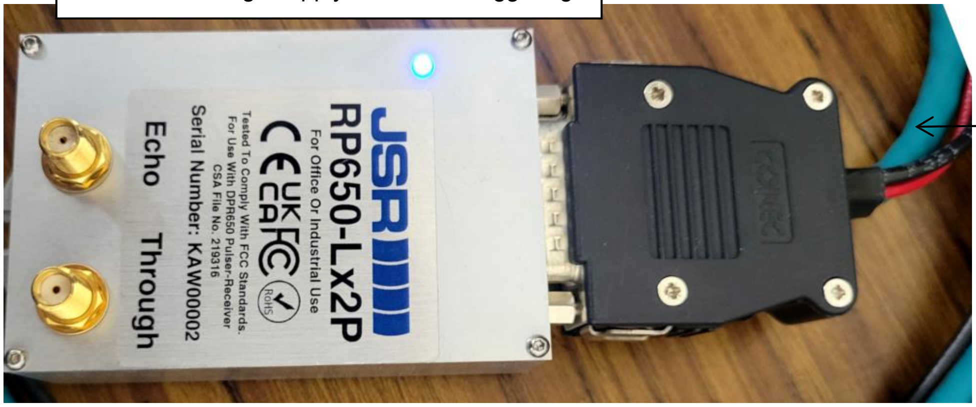
The Dual Channel Front Panel shown provides Status and Pulse LED indicators. See the **Typical Operating Session** section for details on the LED indicator details.

Connecting DPR650 Remote Pulsers

DPR650 Fixed-Gain Remote Pulsers

DPR650 Remote Pulser models have two coaxial SMA connectors labeled Echo and Through. These connectors are used for interfacing the Pulser to ultrasound transducers.

The Pulser LED color indicates the status of the Pulser voltage supply and Pulser triggering.


JSR
RP650-Lx2P
For Office Or Industrial Use
Tested To Comply With FCC Standards.
For Use With DPR650 Pulser-Receiver
CSA File No. 219316
Serial Number: KAW00002
Echo
Through

Remote Pulser Cable provides connection to DPR650 Receiver

Pulse-Echo Mode Configuration

In the Pulse-Echo mode of operation a single transducer is connected to the Echo coaxial connector, preferably via a very short length of low-attenuation coaxial cable. The remote pulser generates a transducer-excitation pulse on the Echo connector so as to excite the transducer to produce an ultrasound pulse. The ultrasound pulse propagates into a test material or item, and echoes that are reflected from within the test material are received by the same transducer and conveyed to the DPR650 receiver for amplification and filtering. A schematic of Pulse-Echo mode operation and configuration is shown in the following figure.

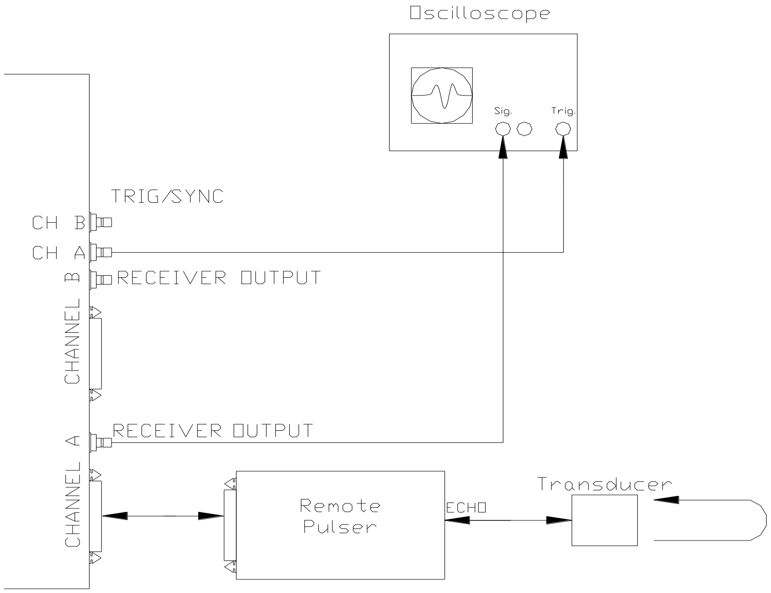

Oscilloscope
Sig.
Trig.
TRIG/SYNC
CH B
CH A
RECEIVER OUTPUT
CHANNEL B
RECEIVER OUTPUT
CHANNEL A
Remote Pulser
ECHO
Transducer

Figure 2 - Pulse Echo Mode Operation

Through Mode Configuration

In the Through mode of operation, a transmitting transducer is connected to the Echo connector and a separate receiving transducer is connected to the Through connector. This second transducer detects signals that have propagated to it from the Echo transducer, usually after passing through a test material located between the two transducers. The signals received by the second transducer are presented to the receiver input via the Through connector for amplification and filtering. A schematic of Through mode operation and configuration is shown in the following figure.

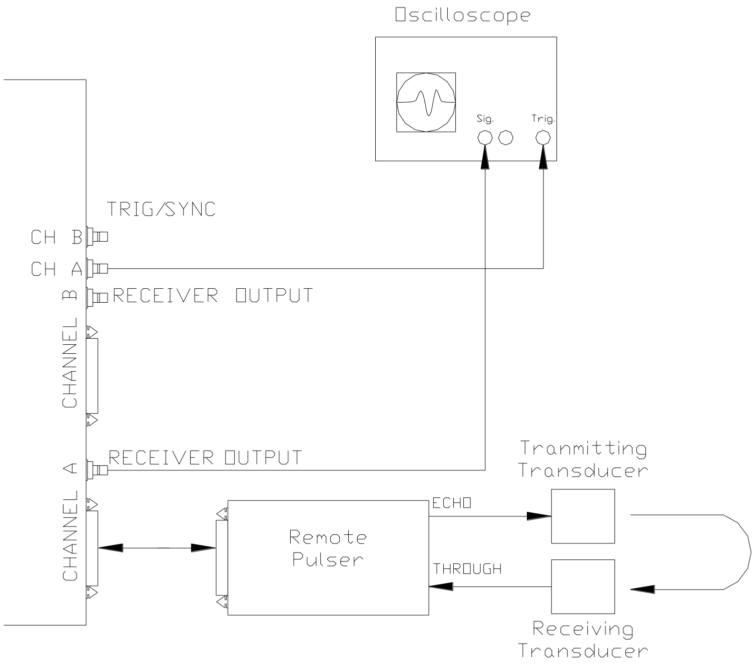

Oscilloscope
Sig.
Trig.
TRIG/SYNC
CH B
CH A
B
RECEIVER OUTPUT
CHANNEL
A
RECEIVER OUTPUT
CHANNEL
Tranmitting
Transducer
ECHO
Remote
Pulser
THROUGH
Receiving
Transducer

Figure 3 - Through Mode Operation

PC Setup

JSR .Net Control Panel software is a Windows application created and distributed by BYK-Gardner USA Inc. You may install this software on a PC running the Windows® operating system versions 10 or 11. The application and the Software Development Kit (SDK) are available for download from http://www.imaginant.com/ or distributed through other media upon request.

With JSR .Net Control Panel installed, you can connect the DPR650 instrument to the PC using the supplied USB cable.

To configure the DP650 system from a Windows PC:

1. Download JSR .Net Control Panel onto the PC or insert the included software CD.
2. On the PC, locate the software installer package and double-click the Setup.exe icon. The JSR .Net Control Panel software will be installed. Depending on the PC configuration and Windows version, administrator account permissions may be required for installation. Once it has been installed, Admin privileges are not required to run the application.
3. Run the JSR .NET Control Panel program by selecting the desktop icon or through the Start Menu. The Control Panel software will run without a DPR650 connected to the PC.

JSR .NET
Control Panel

DPR650 System Configuration and Setup

1. Plug the included IEC power cord into the power inlet module on the DPR650 rear panel and plug the other end of the cord into an AC power outlet. The power cord must be is an IEC power cord rated to 40 Watts.
2. Locate the USB connector on the DPR650 rear panel. Plug the included USB cable into the DPR650 USB port and the other end to an available USB port on the host PC.
3. Plug the Remote Pulser Interface cable(s) into the channel A receiver connector and the Channel B receiver connector (for Dual-Channel DPR650 Models). The cable will snap and lock in position. The cable is non-polarized so either cable end can be connected to the DPR650. (To remove the cable, squeeze the metal tabs on the edge of the connectors firmly to release the bayonet latch.)
4. Connect the other end of the Remote Pulser Interface cable to the desired remote pulser. (To remove the cable, squeeze the metal tabs on the edge of the connectors firmly to release the bayonet latch.)
5. Turn on power to the DPR650 by way of the power switch on the rear panel. The Channel A Pulse LED (Red) and Status LED (Blue) will blink for several seconds. Once the DPR650 is detected by the PC through its USB connection, the Pulse LED will extinguish and the Status LED color will change to a constant blue. The LED color on the connected Remote Pulser will also be a constant blue.
6. Run the JSR .NET Control Program that was installed as described in the previous section. The connected DPR650 will be listed in the status menu together with its Channel(s) and Remote Pulser(s) if any Pulser is connected to the DPR650.

Refer to the previous figures for DPR650 configuration in a test system.

Power-On Default Settings

- Trigger source: Disabled, External Aux Out
- Trigger Input Imped: High Z (>17K ohms)
- Receiver Mode: Echo
- Damping: 100 ohms (max)
- High Pass: Minimum, model dependent
- Low Pass: Maximum, model dependent
- Pulse Energy Level: Low
- PRF: 1000 Hz
- Receiver Gain: -16.5 dB
- High Voltage: Disabled at Minimum, Remote Pulser model dependent
- Fine Gain Offset: 0 dB, no offset
- Power LED: On

Typical DPR650 Operating Session

The following sequence describes typical actions taken when working with a DPR650.

1. Configure the PC as described in the ‘PC Setup’ section and the ‘System Configuration’ sections above.
2. Connect a transmit/receive transducer or separate transmit and receive transducers to the DPR650 remote pulser(s). The transducer’s ultrasound signal will not pass through air so a suitable acoustic couplant (such as water or glycerin) must be present between the transducer and the sample that is to be tested.
3. Use the JSR Control Panel software to configure the instrument for the desired operation by selecting Internal or External Triggering, Echo or Through mode Input selection, Triggering Rate, Receiver Gain, etc.
4. The Red Pulse indicator LED for a channel on the DPR650 Main Unit will illuminate to indicate that the Remote Pulser connected to that channel is being triggered. Note that the color of the Status LED on the remote pulser will turn from Blue to either Red or Yellow when trigger pulses are being received by the Pulser. If the Pulser Voltage is enabled, the LED will turn Red to indicate that transducer excitation pulses are being generated. Otherwise the LED will turn Yellow to indicate that the Pulser is receiving trigger signals but that the Pulser is not firing.
5. Enable the pulser to produce transducer excitation pulses. These pulses will appear on the Pulser’s Echo connector. The remote pulser status LED will turn RED when the Pulser is generating excitation pulses.
6. Adjust the frequency of pulser triggering (PRF). Ideally a trigger rate should be selected such that all echoes from one excitation pulse have subsided before a new excitation pulse is generated.
7. Adjust the Damping and Energy controls to obtain the desired transducer damping and signal characteristics.
8. Adjust the receiver gain control so that signals of interest on the Channel A or B Output connectors do not exceed the range of +500mV to - 500mV into a 50Ω termination.
9. Adjust the high and low pass filter cutoff frequencies as desired. The High pass filters can be used to eliminate low-frequency energy from signals of interest. The low pass filter can be used to reduce the receiver bandwidth and improve the signal to noise ratio.

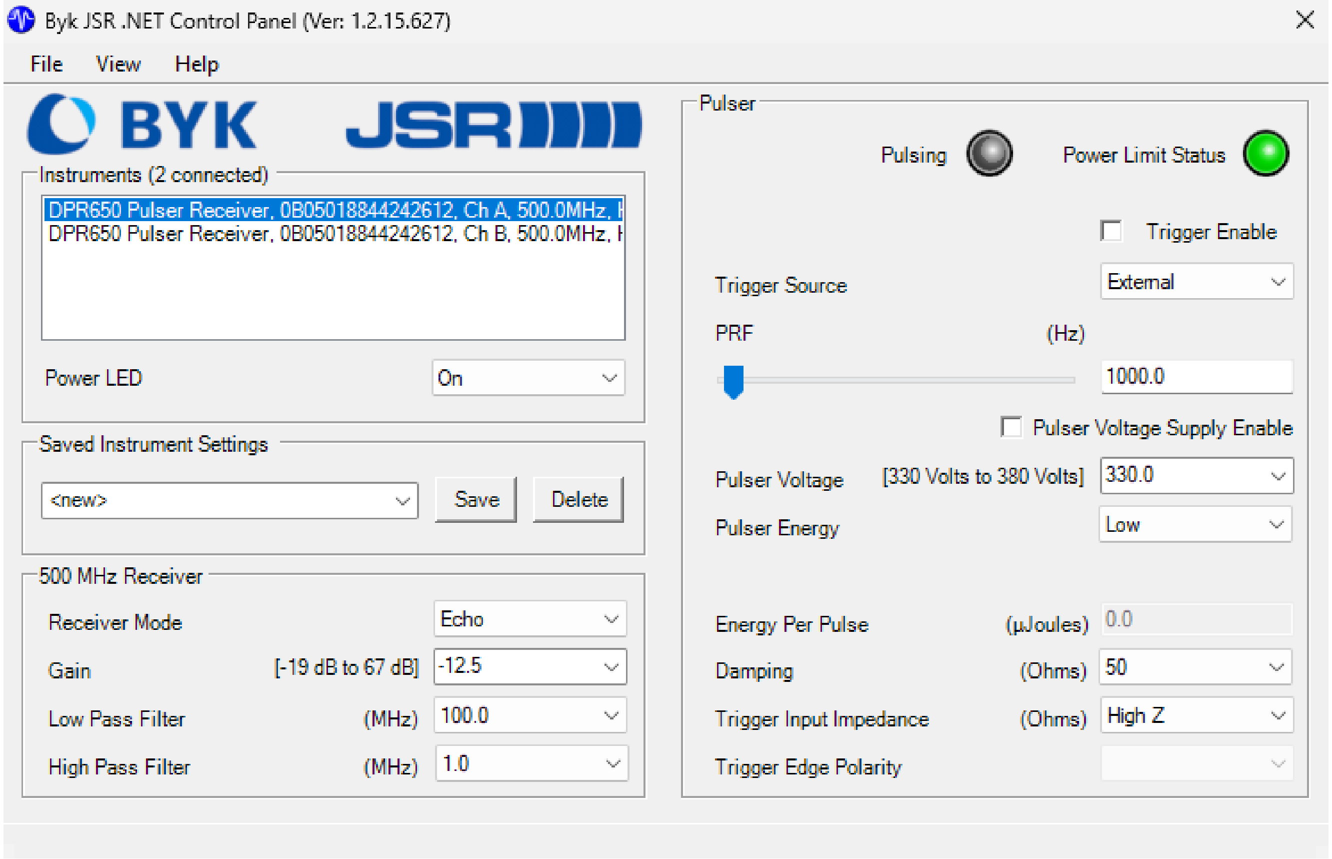
DPR650 Receiver Channel A and B Status LED Indicators

1. Channel A Status LED color is Blue and blinking in short bursts: unit is powered but no USB connection to a PC is detected.
2. Channel A Status LED color is solid Blue: USB connection to PC is detected and Channel A is ready.
3. Channel B Status LED color is solid Blue: Channel B is ready.
4. Channel A Pulse LED color is Red: Trigger pulses are being sent to the Channel A Pulser.
5. Channel B Pulse LED color Is Red: Trigger pulses are being sent to the Channel B Pulser.

DPR650 Remote Pulser Status LED Indicator

1. Blue: The Pulser is powered on, the Pulser HV is disabled, and the Pulser is not receiving trigger pulses from the DPR650 Main unit.
2. Yellow: The Pulser HV is enabled and the Pulser is not receiving trigger pulses from the DPR650 unit.
3. Green: The Pulser HV is disabled and the Pulser is receiving trigger pulses from the DPR650 Main Unit.
4. Red: The Pulser HV is enabled and the Pulser is receiving trigger pulses from the DPR650 Main Unit.

Using JSR .Net Control Panel Software



Byk JSR .NET Control Panel (Ver: 1.2.15.627)

Instruments (2 connected)

DPR650 Pulser Receiver, 0B05018844242612, Ch A, 500.0MHz,
DPR650 Pulser Receiver, 0B05018844242612, Ch B, 500.0MHz,

Power LED: On

Saved Instrument Settings: <new>

500 MHz Receiver

Receiver Mode: Echo
Gain [-19 dB to 67 dB]: -12.5
Low Pass Filter (MHz): 100.0
High Pass Filter (MHz): 1.0

Pulser

☐ Trigger Enable
Trigger Source: External
PRF (Hz): 1000.0
☐ Pulser Voltage Supply Enable
Pulser Voltage [330 Volts to 380 Volts]: 330.0
Pulser Energy: Low
Energy Per Pulse (μJoules): 0.0
Damping (Ohms): 50
Trigger Input Impedance (Ohms): High Z
Trigger Edge Polarity:

For installation of the JSR .Net Control software, refer to the 'PC Setup' section of this manual.

The JSR .Net Control Panel software enables a user to control the DPR650 Unit and Remote Pulsers from a host computer running the MS Windows operating system. In addition to the JSR .Net Control Panel application, the SDK is available for users that wish to develop custom instrument control software.

Instrument control is provided through commands sent to the DPR650 receiver via the USB interface. The available control functions are given below.

Receiver Controls in JSR .Net Control Panel

Power LED

This is a Blue-colored LED that functions as a constantly-on power indicator or as a blinking indicator to identify a particular DPR650 Unit or a DPR650 Channel.

Receiver Mode

This control selects the source of the Receiver's input signal to be either the Echo or Through connector on a connected Remote Pulser.

Gain

This allows a user to set the Receiver gain from -11.5dB to +70dB in steps of 0.5dB.

Low Pass Filter

This control selects a Receiver low-pass filter from 6 values provided. The provided filter values vary with the Receiver model.

High Pass Filter

This control selects a Receiver high-pass filter from 6 values provided. The provided filter values vary with the Receiver model.

Pulser Controls in JSR .Net Control Panel

Trigger Enable

This control allows a user to enable or disable trigger signals from being sent to the Pulser.
Note: Trigger pulses will still appear on the Sync Output even when Trigger Enable is "off". However, the Pulser will not fire.

Trigger Source

This control selects one of three trigger modes for generating Pulser trigger signals: Internal, External, or Auxiliary (Aux).

Internal Trigger: The pulser is triggered at the rate set by the PRF control described below. A positive-going Sync pulse is produced on the Trig / Sync connector in synchronization with the pulser firing.

External Trigger: The pulser is triggered by the rising edge of a Trigger Input Signal applied to the Trig / Sync connector.

Aux Trigger: The pulser will trigger using the trigger signal from the other channel. The trigger signal will also be produced on the Trig / Sync connector. Care must be taken to ensure the Pulser receiving the Aux trigger can run at the PRF rate of the other Pulser (see PRF section for details).

If the trigger rate exceeds the maximum pulse repetition frequency (PRF) specification for a specific Pulser model, especially at its highest energy and highest voltage settings, the Pulser will shut down for safety if its internal temperature rises too high.

PRF

The Pulse Repetition Frequency (PRF) sets the rate of pulser triggering when the unit is set for internal trigger mode. The range of available PRF values indicated in the PRF pull-down menu is dependent on the Remote Pulser model. When using external or secondary triggering, the trigger frequency should be limited so as not to exceed the maximum PRF for the connected remote pulser.
NOTE – The bottom side of the pulser encasement body (the side opposite the T/R and Echo connectors) is designed to be placed in contact with a metal plate that can act as a heat sink.
Without such a heat sink, some pulser models will not be able to sustain operation at their maximum PRF rating, especially at their highest energy and highest voltage settings, and will shut down for safety if their internal temperature rises too high.

Pulser-Supply-Voltage Enable

This checkbox enables or disables the Remote Pulser power supply. Disabling (unchecking) this control will allow all Pulser-Receiver functions to run but the Pulser will not generate transducer excitation pulses. This control can be useful for debugging DPR650-based test systems. The status of this setting is indicated by DPR650 Pulse LED and by the Remote Pulser LED.

Pulser Voltage

This control allows the Remote Pulser power supply voltage to be adjusted across the range allowed by each model of remote pulser.

HV Droop Compensation

This custom property can be used to enable / disable High Voltage Droop Compensation for the Remote Pulser Voltage Supply. Enabling Droop Compensation will automatically sense and maintain the pulser voltage at the desired level within 0.5% for a constant Pulser triggering rate. See the DPR650 Software and SDK documentation for details.

Pulser Energy

This control selects the Remote Pulser energy level.

Damping

This control allows the user to select between transducer-damping values. DPR650 models can support a range of damping values from 25Ω to 100Ω depending on model.

Trigger Input Impedance

This control is used when the DPR is set to External Trigger mode, especially when the external trigger signal is provided via a 50Ω coaxial cable. The 'Trigger Zin' control allows a user to set the input impedance of the Trig / Sync connector to 50Ω or to High Z (~18kΩ). Selecting a value of 50Ω connects an internal 50Ω terminating impedance to the Trig / Sync connector so as to properly terminate a 50Ω coaxial cable.

You may set the Trigger Zin control to 'High Z' to provide high impedance (~18kΩ) to the Trig / Sync connector. This would be appropriate for trigger signals originating from a high-impedance source.

Instrument Status Indicators in JSR .Net Control Panel

Pulsing

The Status LED indicator in the JSR .Net Control Panel software will illuminate red when the pulser is actively pulsing, and will be grey otherwise. This status is also indicated by the hardware via the DPR650 Pulse LED and the Remote Pulser LED.

Power Limit Status

The Power Limit Status indicator will be green when the Pulser power supply voltage is nominal. High pulser firing rates (PRF rates) may cause the Pulser voltage to droop in which case the Power Limit Status indicator will turn red. Enabling Droop Compensation will reduce droop in the Pulser voltage at high PRF values.

Instrument Care

The DPR650 Remote Pulser encasements are water resistant but are not waterproof. Do not immerse the pulsers in liquids or operate them in an environment where they are sprayed by liquids. Should the Pulsers or the DPR650 Main Unit become wet, carefully dry them.

Gentle cleaning of the DPR650 Receiver and the Remote Pulser modules may be performed using a clean cloth dampened with water. Do not use cloths dampened with solvents. Do not use aggressive pressure when cleaning.

Be careful not to drop the DPR650 instrument as this will damage its coaxial connectors and internal circuitry.

Do not disassemble the DPR650. There are no user-serviceable components inside. Opening the case will void the product warranty.

The DPR650 system is intended for use in a static-free environment.

Equipment Repair

If the DPR650 system or Remote pulsers require repair, contact your Technical Support Representative. The Representative will be able to recommend whether the unit should be returned to the factory for repair. If a return is recommended, the Representative will ask for details regarding the repair issue and will issue an RMA number. If possible, when returning equipment to BYK-Gardner USA, please package the equipment in its original shipping materials with the RMA number noted on the shipping documentation.

Technical Support

The answers to most questions regarding the use of the equipment are contained in this manual. If you cannot find an answer in this manual, please contact the BYK-Gardner USA Technical Service Team.

Toll Free:	+1 888 577 8587
Telephone:	+1 585 264 0480
Fax:	+1 585 264 9642

Please have the following information available before contacting Technical Support.

- DPR650 and/or Remote Pulser model type(s) and serial number(s) from the label on the unit.
- JSR .Net Control Panel software version, found on the JSR .Net Control Panel menu item: Help → About JSR .Net Control Panel screen.
- Detailed nature of the problem.

Pulser/Receivers Sales and Support
Sales - E-mail: Sales@altana.com
Technical Support - Email: TechSupport@altana.com

DPR650 Instruments are designed and manufactured by:

BYK-Gardner USA
320 Macedon Center Road
Fairport, NY 14450 USA
www.byk-instruments.com

Appendix A - Specifications

Pulser

Excitation Pulse	See separate remote pulser data sheets for specifications on interchangeable remote pulsers.
Pulser Trigger Source	Internal, external, or AUX. Selectable from the host computer.
Ext. Trigger Input	3-5V positive going pulse. Triggering will occur on leading edge. TTL and CMOS compatible.
Sync Output	+4V into 50Ω (typ), Tr < 10ns, TW = 40ns min.
Thermal Consideration	The bottom side of the pulser encasement body (the side opposite the T/R and Echo connectors) is designed to be placed in contact with a metal plate that can act as a heat sink. Without such a heat sink, some pulser models will not be able to sustain operation at their maximum PRF rating, especially at their highest energy and highest voltage settings, and will shut down for safety if their internal temperature rises too high.

Receiver

The DPR650 is configured with a combination of one or two of the following receivers:

	500 MHz	**800 MHz**	**50 MHz**
Gain	-11 to 68dB in 0.5dB steps	-11 to 68dB in 0.5dB steps	-11 to 68dB in 0.5dB steps
Phase	0° (noninverting)	0° (noninverting)	0° (noninverting)
Input Referred Noise	112uVp-p typ. (500MHz BW, 50dB gain)	101uVp-p typ. (300MHz BW, 50dB gain)	80uVp-p typ. (50MHz BW, 60dB gain)
Bandwidth	1-500 MHz	1 – 800 MHz	0.06 – 50 MHz
High Pass Filter	1, 5, 30, 75, 150, 300 MHz	1, 5, 30, 75, 150, 300 MHz	0.06 , 1, 2, 5, 7, 12 MHz
Low Pass Filter	75, 100, 150, 220, 300, 500 MHz	75, 100, 150, 300, 500, 800 MHz	3, 7, 10, 15, 35, 50 MHz
Input Impedance	50 Ohms	50 Ohms	50 Ohms
Output Impedance	50 Ohms	50 Ohms	50 Ohms
Maximum Receiver Output Power	5.5 dBm	5.5 dBm	5.2 dBm
Linear Output Voltage Range	+/- 500mV into 50 Ohms	+/- 500mV into 50 Ohms	+/- 500mV into 50 Ohms

Miscellaneous

Physical

Power	100 - 240 VAC, 50/60 Hz, 50VA max., overvoltage category II. Power fluctuations are not to exceed +/-10% of nominal supply voltage.
Receiver Dimensions	3.5" High, 8.5" Wide, 8.0" Deep (88.9 x 216 x 203mm)
Receiver Weight	3lbs 8oz (1.6 Kg)
Remote Pulser Dimensions	1.0” High, 2.0” Wide, 3.05” Deep (254 x 50.8 x 77.5mm)
Remote Pulser Weight	4oz (112g)

Note: specifications are typical at 25C

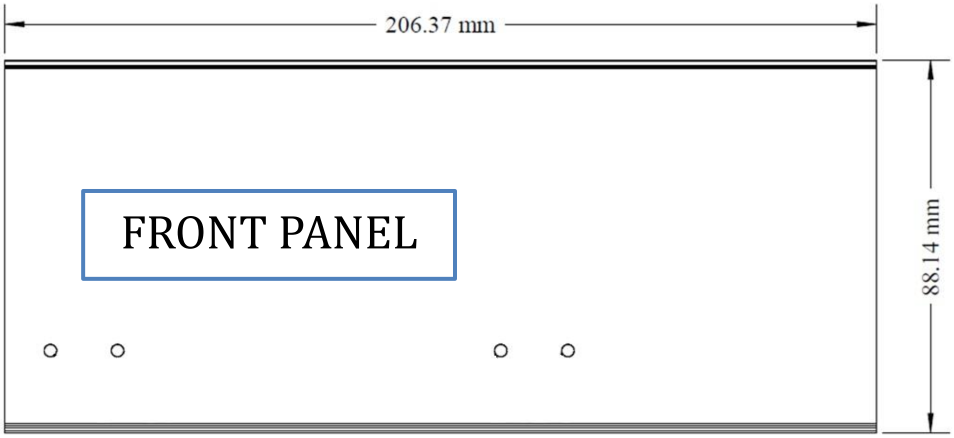
Environmental

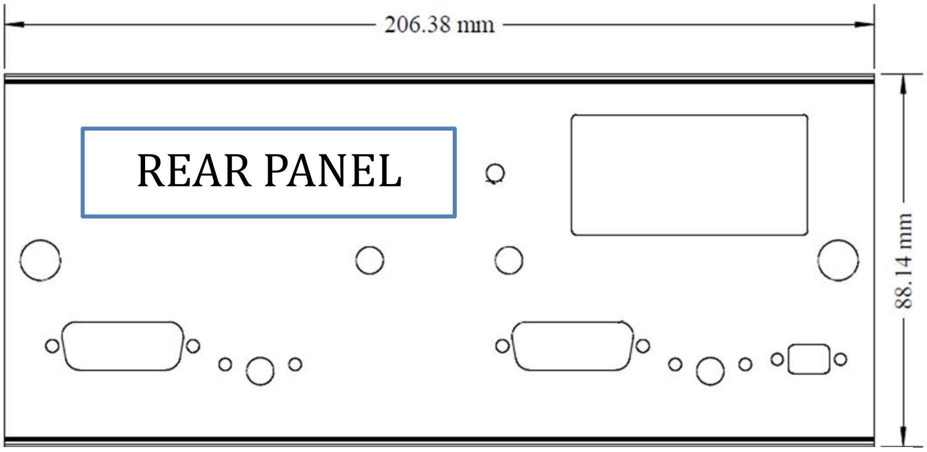
Operating Temperature	5 to 40 ^{O}C, Indoor use only.
Storage Temperature	-10 to 50 ^{O}C
Operating Humidity	<80% RH, non-condensing.
Operating Altitude	<2000m
Pollution Degree	2

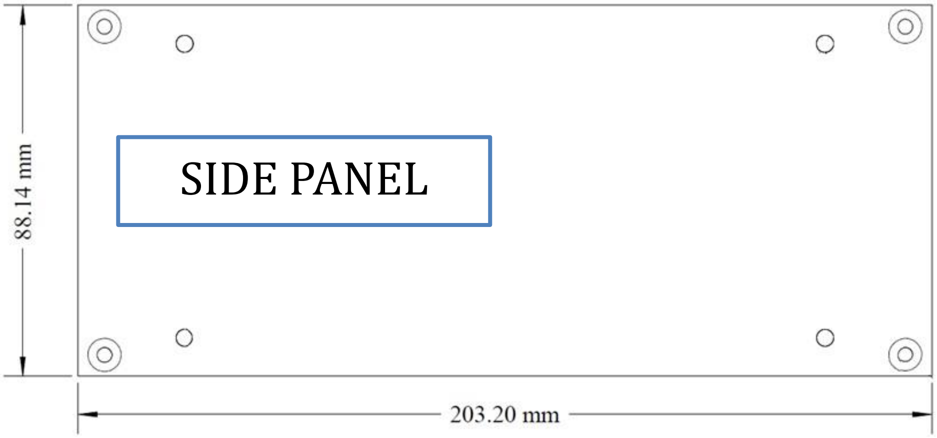
Product Recycling

BYK-Gardner USA is committed to protecting the environment through recycling of its electronic products. If you are no longer using electronic equipment purchased from BYK-Gardner USA, you may return it for recycling. Contact your BYK-Gardner sales representative for return instructions.

Mechanical Dimensions


206.37 mm
FRONT PANEL
88.14 mm


206.38 mm
REAR PANEL
88.14 mm


88.14 mm
SIDE PANEL
203.20 mm