

Pason WITS User Guide

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1 Overview

The Wellsite Information Transfer Specification (WITS) is a communication protocol used to transfer wellsite data between computer systems. The WITS specification is an industry-wide standard used by companies involved in petroleum exploration and production.

The Pason Electronic Drilling Recorder (EDR) can use WITS to communicate with another service company's equipment. Service companies, referred to as a third parties in this document, may only need to receive specific data, or send specific data to the EDR, but in most cases, they want to both send and receive data. Using WITS is a proven and reliable way to accomplish these goals.

2 Understanding Pason WITS

2.1 Setting Up

Setting up and using WITS with a Pason EDR involves these general steps:

1. Physically connecting third-party hardware to the Pason system
2. Establishing WITS communication between the third-party device and the EDR, often called handshaking
3. Setting up the EDR for WITS communication
4. Setting up the third-party device for WITS communication

The second step, establishing WITS communication, is typically where most problems occur. To avoid WITS-related problems, consider the information below about WITS in a Pason system.

2.2 Duplex Communication

Pason recommends full duplex communication when using WITS. With full duplex communication, data can travel in two directions simultaneously. This is different than half duplex communication, which allows data to travel in one direction at a time, like voices on walkie-talkie radios.

2.3 Handshaking

Establishing and maintaining WITS communication between connected WITS devices and the EDR requires a handshaking procedure. For details about how to complete the handshaking process, see [About Handshaking](#) on page 17.

2.4 About WITS Levels and Packets

The Pason system uses WITS Level 0 for communications. In Send and Receive mode, the EDR transmits a number of WITS Level 0 packets (1 packet in Half WITS mode, approximately 8 packets in Full WITS mode) each time it receives a valid WITS Level 0 packet.

2.5 What is the 1984PASON/EDR Header

Every WITS record the Pason EDR sends includes a 1984PASON/EDR header. This does not exactly meet the WITS specification, which specifies that items from different

records should be in different packets. However, this item is required due to the half duplex nature of our communication cables. The EDR uses this header to distinguish between sent data and received data.

If a WITS device requires the removal of the 1984PASON/EDR header, ensure that the device is connected to the EDR via a COMM022, and that its EDR comm port is set to Send Only. Refer to [Setting the Send/Receive Mode](#) on page 20 for step-by-step instructions.

3 Connecting Hardware for WITS Communication

WITS communication requires a physical connection between Pason and third-party systems. This section includes information about how to complete the required hardware connections.

3.1 Connection Instructions for Third-Party Users (Ethernet)

To send or receive WITS TCP (ethernet), a Pason LAN router is required. Contact Pason Technical Support before using this feature.

3.2 Connection Instructions for Third-Party Users (Serial)

Third parties can connect their systems to Pason systems using one of these methods:

- Connect to a Pason Workstation computer (TPC and VSP systems).
- Connect to the toolpush connection box (TPC systems) or network panel (VSP systems). On VSP systems with a Network Panel 3, if the panel's RS-422 port is being used, connect to an RS-422 port on the back of the Gateway.
- Connect to a Pason Doghouse Computer (DHC), SideKick, or Universal Junction Box (UJB) (TPC and VSP systems).

Important:

Pason only supports the above methods to connect WITS devices to our system. Here are some additional notes on connection limitations:

- The 19-inch Pason Rig Displays (including PRD001 and PRD003) **do not** support direct WITS connections to any of their ports. The Aux port can be used for troubleshooting purposes only.
- RS-232 ports on trailer access points (TAPs) **do not** support WITS connections. WITS connections to TAPs haven't been fully tested and their reliability is unknown.
- Connecting a WITS device to a DHC or SideKick can in some cases adversely affect wireless communications between the DHC and the network.

Once third parties connect their hardware, Pason recommends that a Pason field technician inspect the connections and complete the initial WITS set up in the EDR.

Connecting a WITS Device via a Pason Workstation

Connecting a WITS device via a Pason Workstation is the most common connection method. Follow these steps to connect a WITS device to the EDR via a Pason Workstation:

1. Ensure that the Pason Workstation is powered on.
2. Use a Pason Send to Hub cable (CBLASS155), or a generic DB9 9-pin serial null modem cable, to connect the WITS device to comm port 1 on the Pason Workstation as shown in Figure .

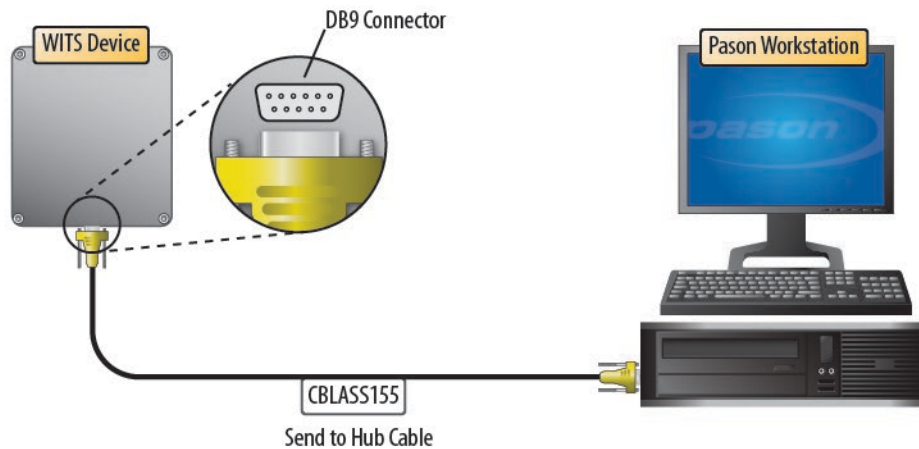


Figure 1: Connecting a WITS device to a Pason Workstation

Connecting a WITS Device via a Pason Indoor Rig Display (PRD011)

Connecting a WITS device via a Pason Indoor Rig Display (PRD011) can be achieved in the same manner as connecting a WITS device via a Pason Workstation:

1. If there is a cover over the required ports on the bottom of the Indoor Rig Display, remove the cover using an appropriate tool (a small Phillips screwdriver).

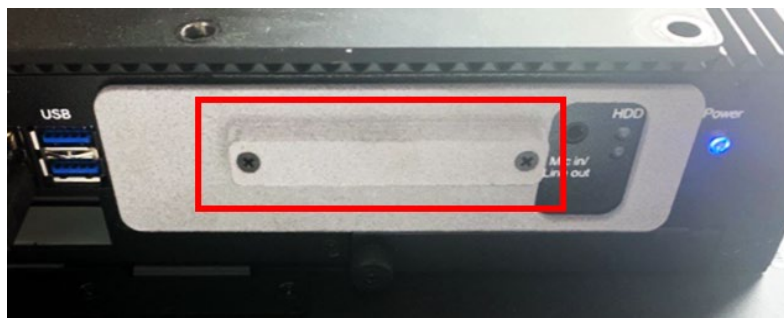


Figure 2: Location of the port cover on the bottom of the Indoor Rig Display.

- Use a Pason Send to Hub cable (CBLASS155) or a generic DB9 9-pin serial null modem cable to connect the WITS device to the COM1 port on the PRD011.

Note:

You must use the port labelled COM1 on the Indoor Rig Display (PRD011). The COM2 port doesn't work for WITS connections.

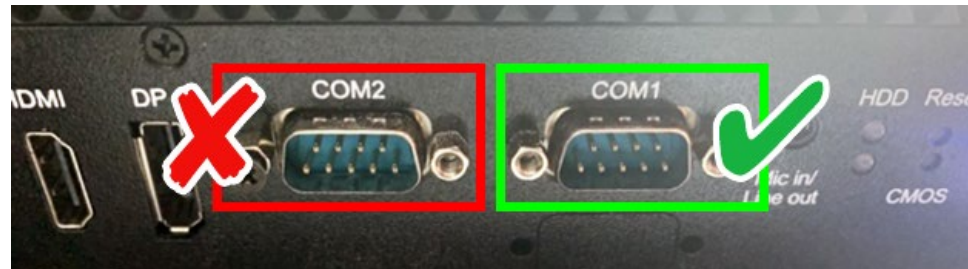
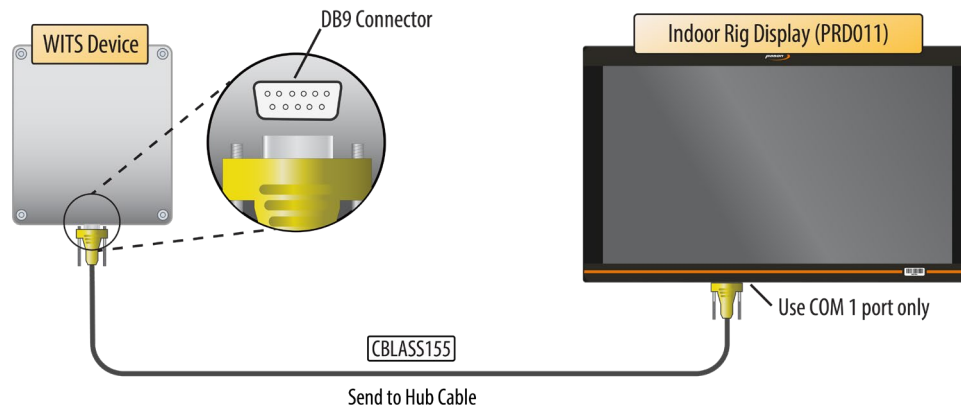


Figure 3: Connecting a WITS device to a Pason Indoor Rig Display (PRD011).

- From the desktop of the Indoor Rig Display, open the Workstation Utilities application, select the **Features** tab and ensure the CommProxy Auto Launch option is enabled.

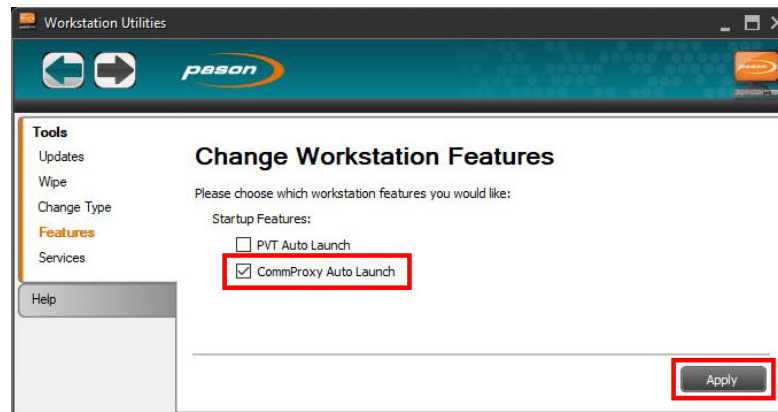


Figure 4: The Change Workstation Features tab in Workstation Utilities

Connecting a WITS Device via the Toolpush Connection Box or Network Panel using a COMM022

This method involves using an RS-232 to RS-422 communication box (COMM022) to connect the WITS device. Toolpush connection boxes and network panels are typically located on an outside wall of the rig manager's trailer. Look over the illustrations below to see the connections to the different types of panels. [Figure 8](#) on page 14 shows a COMM022 in more detail.

Note:

Pason COMM022 communication (comm) boxes ship with full duplex communication enabled. COMM022 comm boxes have a jumper that enables you to choose half or full duplex, but Pason recommends using the default full duplex setting.

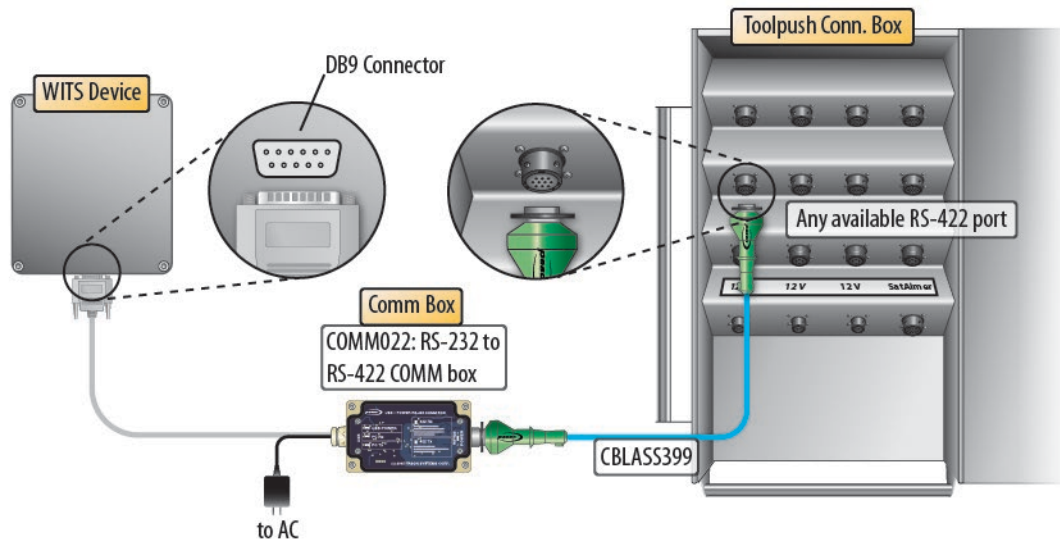


Figure 5: Connecting a WITS device to a toolpush connection box

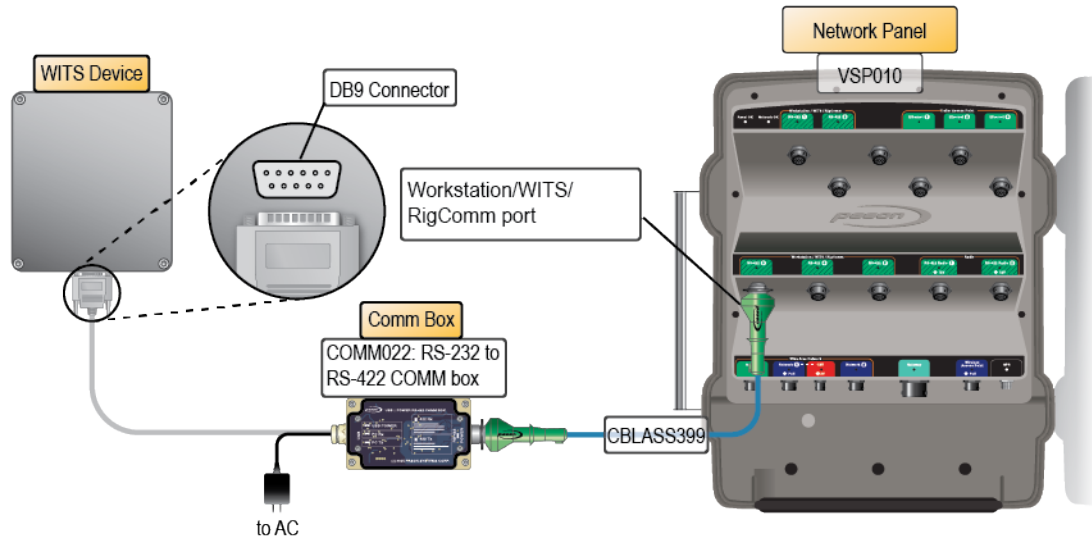


Figure 6: Connecting a WITS device to a Network Panel

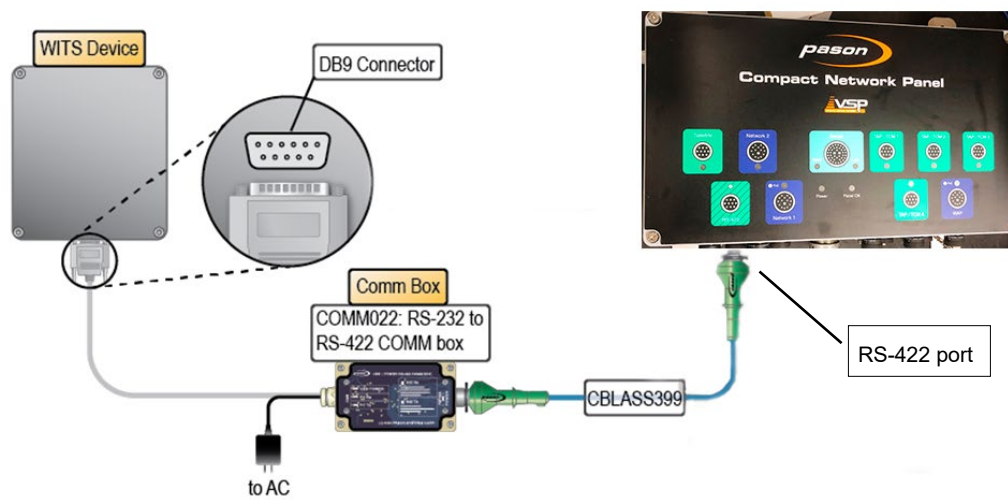


Figure 7: Connecting a WITS device to a Network Panel 3

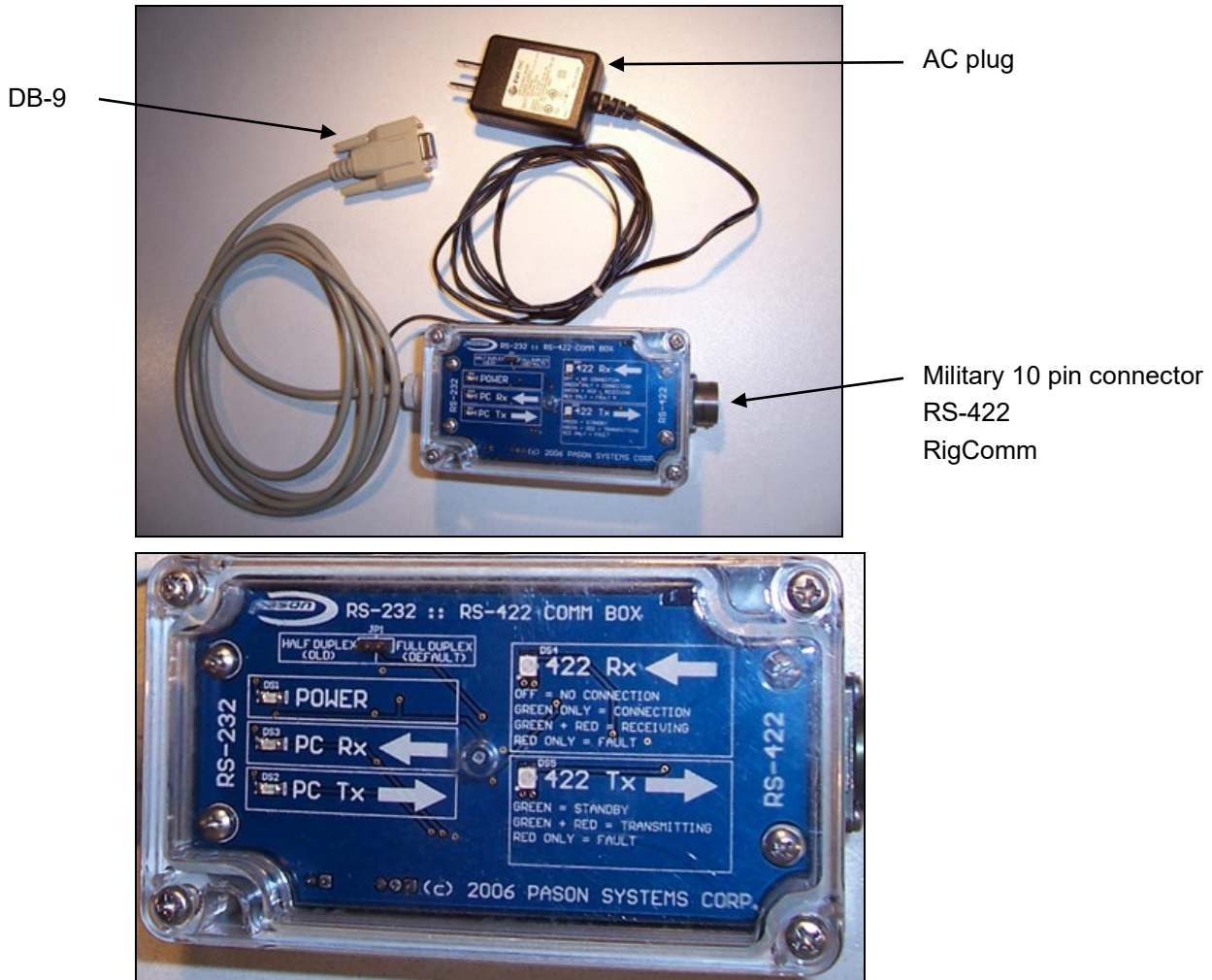


Figure 8: COMM022 comm box and components



Figure 5.1: Optional Wall Mounting Bracket (SUBASS317) for COMM022 comm box

To install the wall mount:

1. Remove the two top screws from COMM022 (opposite of the barcode).
2. Align the bracket as shown (Figure 5.1).
3. Install the bracket by tightening the two M4-0.7mm x 25mm screws (HDWR3138) provided in the kit.

Connecting a WITS Device via a Pason DHC, SideKick, or UJB

When connecting a WITS device in potentially hazardous areas, use the Hazardous Area WITS Interface Assembly (COMM087) instead of COMM022. COMM087 is certified for Class 1 Division 2 areas. Follow these steps to connect COMM087 to the EDR via a Pason DHC, SideKick, or UJB:

1. Ensure that the DHC, SideKick, or UJB is powered on.
2. Secure the WITS to RS232, 6 ft. cable (CBLASS390) to the WITS Device port on the Hazardous Area WITS Interface Assembly (COMM087). Secure the female DB-9 end to the WITS device.

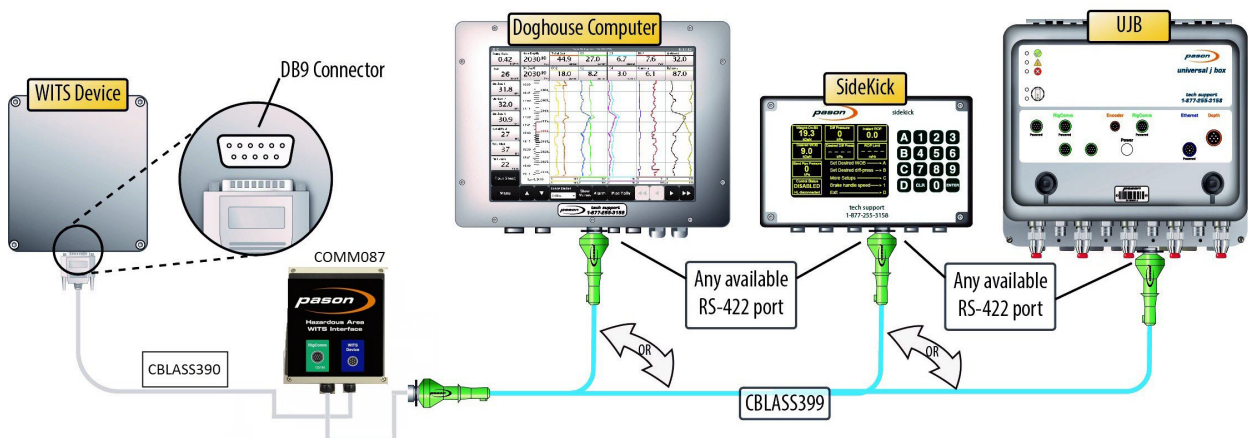


Figure 9: Connecting a WITS device to a DHC, SideKick, or UJB

3. Connect a RigComm RS-422 cable to the RigComm port on COMM087. Connect the other end to any available powered RS-422 port on the DHC, SideKick, or UJB, as shown in Figure 9. If connecting to a SideKick, use the 1ft Power Rignet Adapter cable (CBLASS862) to create the powered port.
4. If connecting to a SideKick, ensure that the port you're using is set to Auto (**Port Info > Port Setup** from the SideKick's main screen).

5. If connecting to a UJB, you need to go to the UJB local interface to set up the UJB port for WITS (the EDR WITS setup screen doesn't support this). Scroll to **Setup Ports**, select the port you're connecting WITS to, and change the second line to either **WITS 9600** or **WITS 19200**.



Figure 10: UJB RigComm port numbering

3.3 Testing WITS Connections

If you are having problems with WITS communication, a Pason field technician can test WITS connections using the proprietary Pason WITS RSVP application. For help testing your WITS connections, contact Pason Technical Support at 1-877-255-3158.

4 Setting Up WITS in the EDR

After connecting the hardware, you need to use the EDR to set up WITS communication. Set up procedures vary depending on whether you connected the WITS device to the EDR via a comm box or via a Workstation, DHC, SideKick, or UJB. The following sections describe the required procedures.

4.1 About Handshaking

Setting up and maintaining WITS communication between a WITS device and the EDR requires the use of a handshake. The handshake is important because it prompts the EDR to recognize that a WITS device has been connected to the system, and is necessary for the EDR to keep WITS communication active. If you connected the WITS device via a toolpush connection box or a network panel, handshaking also prompts the EDR to display a WITS protocol in the Comm Port Setup screen, so handshaking is useful for determining which ports are connected to WITS devices.

Important:

Failure to continuously send at least one packet to the EDR every 30 seconds causes the EDR's communication engine to time out, stopping WITS communication. This is a major cause of WITS communication problems.

Establishing and Maintaining WITS Communication

To establish and maintain WITS communication with the EDR, the third-party WITS device must send at least one WITS packet to the EDR continuously every 30 seconds, *even if the third-party has no other need to send WITS packets*. The only exception to this requirement is when the WITS device is connected via a toolpush connection box or a network panel, and the EDR comm port is set to Send Only. The handshaking requirement can be met in one of the following two ways:

- The third-party WITS device continuously sends at least one WITS packet to the EDR every 30 seconds as part of the desired operation, or
- The third-party WITS device is set up to continuously send a handshaking packet to the EDR every 30 seconds. Pason recommends continuously sending a TVD WITS packet configured as shown in Figure 11. The EDR is coded to recognize and use this specific packet for maintaining WITS communication, but can also receive TVD WITS packets with actual values from other WITS devices at the

same time. The EDR is capable of receiving this handshaking packet from multiple WITS devices simultaneously.

Be sure to include all of the carriage return and line feed characters shown below.

```
&&<cr><lf>  
0111-9999<cr><lf>  
!!<cr><lf>
```

Figure 11: Recommended WITS handshaking packet

4.2 Setting up the EDR Comm Port

Setting up an EDR Comm Port for WITS Connections via a DHC, Workstation, SideKick, or UJB

If you connected the WITS device to the EDR via a DHC, Workstation, SideKick, or UJB, the device doesn't appear in the EDR Comm Port list. In these cases, you do not need to set up a comm port. To determine if WITS is working in these setups, check the WITS monitor, check the EDR for WITS traces sent by the third-party device, or check the third-party device for WITS values sent by the EDR.

Important:

As a best practice, Pason recommends connecting WITS devices *before* setting up comm ports and configuring WITS in the EDR.

Setting up the EDR Comm Port for WITS Connections via Toolpush Connection Box or Network Panel

If you connected the WITS device to one of these panels with a COMM022, the EDR assigns the device a comm port. The EDR also enables you to select a transmission speed (in bits per second) for connected comm ports, but Pason strongly recommends using the default Auto setting.

To set up the EDR comm port, you need to determine the assigned comm port and then configure it.

Determining the Assigned Comm Port for WITS Connections via Toolpush Connection Box or Network Panel

The EDR uses several comm ports for communicating, so you need to determine which port the EDR uses for WITS.

Follow the steps below to find the assigned port if you connected the WITS device to the TPC via a COMM022:

1. Connect the WITS device and have it send any WITS value to the EDR.
2. From the EDR main screen click **Menu > Setup > Comm Ports**. The Comm Port Setup screen opens.
3. Use the navigation buttons to scroll through the comm ports list until you see a comm port showing one of the following under New Protocol: WITS 9600 (8,N,1), WITS 115200 (8,N,1), WITS 230400 (8,N,1), WITS 460800 (8,N,1), or WITS 921600 (8,N,1). Comm ports connected to WITS devices display one of these WITS protocols.

PORT NUM	CURRENT PROTOCOL	NEW PROTOCOL
1C	AUTO	INACTIVE
2C	AUTO	INACTIVE
3C	AUTO	INACTIVE
4C	AUTO	INACTIVE
1A	AUTO	BLUEHEAT PPP 921600 (8,N,1)
2A	AUTO	BLUEHEAT PPP 921600 (8,N,1)
3A	AUTO	INACTIVE
4A	AUTO	INACTIVE
1B	AUTO	DHC LINK 921600 (8,N,1)
2B	AUTO	INACTIVE
3B	AUTO	WITS 9600 (8,N,1)
4B	AUTO	BLUEHEAT PPP 921600 (8,N,1)
1D	AUTO	INACTIVE

Figure 12: Comm port with a WITS connection

Setting the Assigned Comm Port's Transmission Speed for WITS Connections via Toolpush Connection Box or Network Panel

Every EDR comm port has a protocol that defines transmission speed (in bits per second) and serial port parameters. All EDR WITS protocols use serial port parameters of 8,N,1, but each protocol includes a unique transmission speed. For example, the protocol labelled "WITS 9600 (8,N,1)," uses a transmission speed of 9600 bits per

second. To change the transmission speed, select a protocol that uses the desired speed.

Important:

High speed settings are a major cause of WITS transmission errors. For WITS, Pason recommends using a speed of 9600 bits per second. If you experience errors when using WITS, try decreasing the transmission speed.

Follow the steps below to configure the assigned WITS comm port protocol if you connected the WITS device to the TPC via a COMM022:

1. From the EDR main screen click **Menu > Setup > Comm Ports**. The Comm Port Setup screen opens.
2. Select the assigned comm port and use the **Toggle Next** button to scroll through the list of available protocols until the desired protocol is listed under Configured Protocol.
3. Click **Exit** to save the settings.

4.3 Setting the Send/Receive Mode

How you connect the WITS device to the Pason system determines which Send/Receive options are available.

Send/Receive Options for WITS Connections to a DHC, Workstation, SideKick, or UJB

DHC, Workstation, SideKick, and UJB hardware is hard-coded to send and receive, so you cannot use send only mode or receive only mode when you connect to a WITS device via these devices. With these setups, the handshaking procedure on page 17 instructs the EDR how to communicate with the WITS device.

Send/Receive Options for WITS Connections via Toolpush Connection Box or Network Panel

If you connected the WITS device to one of these panels with a COMM022, you can set the EDR to send WITS data, to receive WITS data, or to send and receive WITS data.

Once you have connected to the TPC via a comm box and have established a handshake as described in [Establishing and Maintaining WITS Communication](#) on page 17, follow the procedure below to set up whether the EDR sends, receives, or sends and receives WITS data through the assigned comm port:

1. From the EDR main screen on the RMPC, click **Menu > Setup > Comm Ports**.

The Comm Port Setup screen opens.

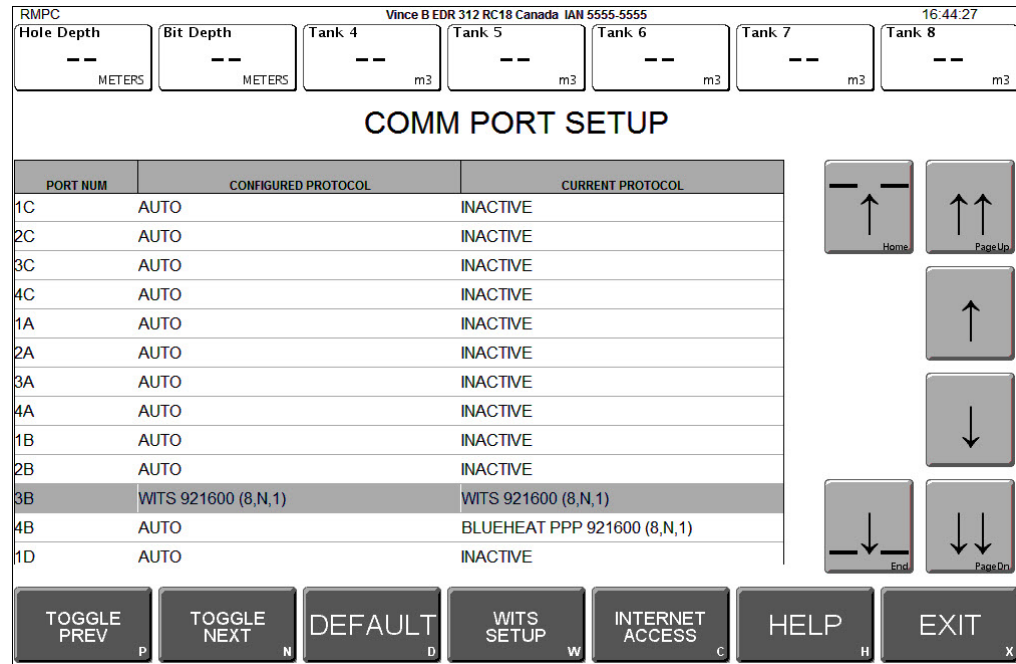


Figure 13: Comm Port Setup screen

2. Select the assigned WITS comm port as described in [Determining the Assigned Comm Port](#) on page 19.
3. Click either **Toggle Next** or **Toggle Prev** to turn off the Auto setting and toggle through the additional protocols.
4. Click **WITS Setup**. The WITS Comm Options screen opens.

- In the WITS Mode box, click the **Change** button to toggle to the mode you want to use (Send and Receive, Send Only, or Receive Only). If you select Send Only mode, the EDR displays a Use 1984 Header box that enables you to add or remove Pason's 1984PASON/EDR header (refer to [What is the 1984PASON/EDR Header](#) on page 7)

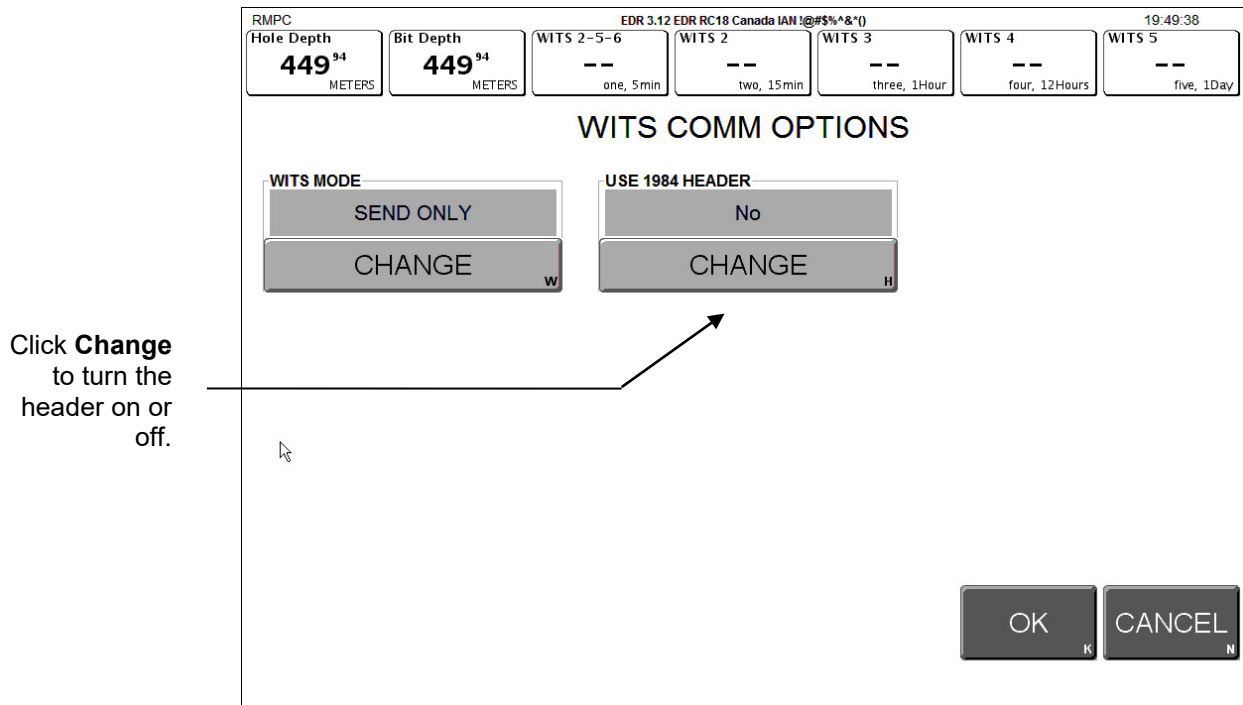


Figure 14: WITS Comm Options screen

- When you are finished, click **OK**. The EDR returns to the **Comm Port Setup** screen.
- Click **Exit** to return to the EDR main screen.

4.4 Selecting WITS Codes

There are several ways to specify which WITS codes the EDR sends, as described below, but the EDR is hard-coded to receive specific codes. The EDR can receive WITS record 01, 02, 07, 08, 09, 11, 12, 17, 18, and 63 packets, plus custom WITS codes (see the full table of valid WITS codes in [Default Pason WITS Codes](#) on page 37). If you need the EDR to receive a code not listed in the table, you need to set up a custom WITS code as described in [Configuring Custom WITS in the EDR](#) on page 27.

Depending on the type of workstation you are logged on to, the WITS setup screen in [Figure 15](#) on page 26 includes the elements in the table below.

Element	Function
WITS Sent by Pason RMPC (Previously WITS Out From RMPC; WITS Out RMPC)	On the RMPC, use this tab to set up WITS codes being sent to devices connected to the RMPC.
WITS Sent by Pason Server (Previously WITS Out From EDR Server; WITS Out TPC Server)	On the RMPC, use this tab to set up WITS codes being sent to devices connected to the system server (TPC or Gateway).
WITS Sent by Pason DHC/UJB/SideKick (Previously WITS Out From DHC/SideKick/UJB; WITS Out DHC/SideKick)	On the RMPC, use this tab to set up WITS codes being sent to devices connected to the DHC, SideKick, or UJB.
WITS Sent by Pason EDR Ethernet	On any Workstation, use this tab to set up WITS codes being sent to any device connected via a TPC/Gateway Ethernet connection.
WITS Sent by Pason Operator Workstation (Previously WITS Out From Operator; WITS Out Operator)	On an Operator Workstation, use this tab to set up WITS codes being sent to devices connected to the Operator Workstation. This feature is only available on US Operator Workstations. To see this tab, the operator must have WITS editing privileges for the well.
WITS Sent by Pason Workstation (Previously WITS Out From Workstation; WITS Out Workstation)	On a Workstation, use this tab to set up WITS codes being sent to devices connected to the Workstation.
WITS Received by Pason from Others (Previously WITS Into EDR Server – All; WITS In All)	On the RMPC, use this tab to set up incoming WITS codes for all Pason computers connected to WITS devices.
WITS Monitor	Diagnostic tool for troubleshooting.

WITS Event History	<p>This tab displays a log of changes made to WITS settings. It's intended for troubleshooting or performance analysis.</p>
Transmission and Interval	<p>These settings are used together to determine the period between sent WITS codes. They apply to all the WITS codes in the group you select. Use the Transmission drop-down list to select the type of transmission the interval is based on. Depending on which WITS record group you are in, you can choose Time Based, Depth Based, or Request-Response.</p> <p>Time Based means that the Pason computer you are configuring sends the record group's enabled WITS codes at the time interval you select.</p> <p>Depth Based means that the Pason computer you are configuring sends the record group's enabled WITS codes at the depth interval you select.</p> <p>Request-Response means that the Pason computer you are configuring sends the record group's enabled WITS codes only when a response is requested by a third-party WITS device.</p> <p>Use the Interval drop-down list to select a time- or depth-based interval.</p> <p>The transmission and interval settings you select are applied to all the WITS codes in a record group.</p> <hr/> <p>Important:</p> <p>For WITS devices connected to a toolpush connection box or network panel, conflicts between transmission settings and the EDR's comm port settings can cause problems. For example, if you select Request-Response, but the comm port is set to Send Only, then the EDR will fail to receive the third party's data, and it will not respond.</p>
Unit	<p>Use this drop-down to select the display units for the WITS value.</p>
Data Summary	<p>Use this drop-down list to select how the EDR calculates the WITS value.</p>
Import and Export	<p>See Sending Gamma and Gamma Lag Calc</p> <p>When sending Gamma (code 0824) and Gamma Lag Calc (code 0821) data to the EDR, make sure you</p>

	<p>meet these packet and frequency requirements:</p> <ul style="list-style-type: none"> • Send both codes in the same WITS packet. Problems occur when Pason receives one or the other, but not both. • Send the packet at a minimum 0.2 m (1 ft) interval. <p>A well-formed gamma packet looks like this:</p> <pre> && 1984PASON/EDR 08211780.2 082463.8 !! </pre> <p>Importing and Exporting Your WITS Settings on page 36.</p>
Factory Reset	Clears all your selections and returns the settings to the defaults.

Table 1: WITS setup screen elements

In addition to choosing individual WITS codes, the EDR provides the option of using preconfigured Full WITS or Half WITS settings to determine which WITS codes it sends. These modes include pre-selected sets of WITS codes, described in [Default Pason WITS Codes](#) on page 37.

Tip:

Use the search box on the WITS setup screen to quickly jump to a specific WITS code.

To select standard WITS codes for a Pason computer to send, follow this procedure:

1. From the EDR main screen, click **Menu > Setup > WITS**. The WITS setup screen opens.
2. Click the tab of the Pason computer you want to send the WITS codes, and ensure that the **Standard** button is selected.

Important:

The tab labeled *WITS Sent by Pason Network (Ethernet)* requires a LAN router. Contact Pason Technical Support before using this feature.

3. To select a preconfigured setting, click **Full WITS** or **Half WITS**. OR:
4. To select outgoing WITS codes individually, click on an unselected WITS code's **Enable** check box.

5. Select the **Transmission** type and **Interval** for the selected group of WITS codes. The transmission type and interval apply to all WITS codes in the group.
6. Select the display **Unit**, and type of **Data Summary** from the drop-down lists. See [Table 1](#) above for more information about these selections.
7. If desired, you can click in a code's row, and enter a new WITS code for that row. Any standard WITS code that you have changed displays a Reset button. If you enter a WITS code that is already in use, click the **Reset** button to change back to the default Pason WITS code.
8. When you are finished, click **Save > Exit** to return to the Setup Menu. The Pason computer starts sending the selected WITS codes.

To enable an outgoing WITS code, select its check box.

Enable	Code	Name	Unit	Data Summary
<input type="checkbox"/>	0105	Date	--	--
<input type="checkbox"/>	0106	Time	--	--
<input checked="" type="checkbox"/>	0108	Bit Depth	FEET	Average
<input checked="" type="checkbox"/>	0110	Hole Depth	FEET	Average
<input type="checkbox"/>	0112	EDR Block Position	FEET	Average
<input checked="" type="checkbox"/>	0113	ROP	FT/HR	Average
<input type="checkbox"/>	0115	Hook Load	KLBS	Average
<input type="checkbox"/>	0117	Weight On Bit	KLBS	Average
<input type="checkbox"/>	0119	Torque	KFT-LBS	Average
<input type="checkbox"/>	0120	Rotary	RPM	Average

Figure 15: WITS setup screen

Selecting Pason Traces for the EDR to Send

Use this feature to send Pason traces that aren't included with the standard WITS codes.

To select Pason traces to send, follow these steps from the EDR main screen on the RMPC:

1. Click **Menu > Setup > WITS**. The WITS setup screen opens.
2. Click the tab of the Pason computer you want to send the WITS codes.
3. Click the **Pason EDR Traces** button. The screen displays all available EDR traces not currently included as a standard WITS code.
4. Check the **Enable** check box of the traces you want to send.

5. Select a transmission type. The transmission type applies to all the Pason traces you've selected.
6. If you're using a time-based transmission type, choose a time interval. The time interval applies to all the Pason traces you've selected.
7. For each of your selections, enter the following information:
 - **Code:** Enter a WITS code for the trace by clicking under Code in the trace's row. If the code you enter conflicts with a code already in use, the EDR displays an error message in the Status Message box and doesn't allow you to save the changes.
 - **Units:** Click under Unit in the trace's row and choose the units from the drop-down list. Note that these are display units only—with the exception of torque, the EDR doesn't perform conversions based on the units you select.

Important:

In EDR version 20.10 and higher, the EDR converts both incoming and outgoing WITS torque values. Note that if the torque unit is amps or PSI, then no conversion can be done.

For incoming to Pason: the system converts to match torque's EDR calibration units. For outgoing from Pason: the system converts to match the units specified in the WITS settings.

- **Data Summary:** If you've chosen a depth or time-based transmission type, use the Data Summary drop-down list to select how the EDR calculates the WITS value.
8. When you are finished configuring, click **Save > Exit** to return to the Setup Menu.

4.5 Configuring Custom WITS in the EDR

If you need to send or receive data not listed in the table of [Default Pason WITS Codes](#) on page 37, you must set up a custom WITS code. Once a custom WITS code is set up, the EDR can receive it from any connected WITS device, but you need to follow the computer to send custom WITS codes.

Setting up Custom WITS Codes

To set up a custom WITS code, use the following procedure:

1. From the EDR main screen on the RMPC, click **Menu > Setup > WITS**. The WITS setup screen opens.
2. On the **WITS Received by Pason from Others** tab, click the **Custom** button.

The Custom WITS setup screen opens. This screen displays 99 editable custom WITS codes, names, units, adjustable decimal spaces, and shelf lives.

Select a row to enter your codes, names, and units.

#	Enable	Code	Name	Unit	Decimals	Shelf Life	Enable Lag	Operator Enforced
1	<input checked="" type="checkbox"/>	0139	3rd Party LagD	feet	0	5 Mins	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>		WITS #2		0	5 Mins	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>		WITS #3		0	5 Mins	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>		WITS #4		0	5 Mins	<input type="checkbox"/>	<input type="checkbox"/>
5	<input type="checkbox"/>		WITS #5		0	5 Mins	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="checkbox"/>		WITS #6		0	5 Mins	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="checkbox"/>		WITS #7		0	5 Mins	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="checkbox"/>		WITS #8		0	5 Mins	<input type="checkbox"/>	<input type="checkbox"/>
9	<input type="checkbox"/>		WITS #9		0	5 Mins	<input type="checkbox"/>	<input type="checkbox"/>

Figure 16: Highlighted custom WITS row

3. Click in a code's row. The EDR highlights the row.
4. Within the highlighted row, enter the following custom code information:
 - **Code**
Enter a WITS code for the trace by clicking under Code in the highlighted row, and entering a four digit WITS code. Ensure that this code is different from the existing WITS codes. If the code you enter conflicts with a current EDR WITS code, the EDR highlights your entry in red and does not allow you to save your settings.
 - **Name**
To enter a name for the custom WITS code, click under Name in the highlighted row and enter a name.
 - **Unit**
To select the display units, click under **Unit** in the highlighted row and enter the name of the display units. Note that these are display units only—the EDR *does not* perform conversions based on the units you enter.
 - **Decimals**
To select the number of decimal places the EDR uses for the WITS value,

click the **Decimals** drop-down box in the highlighted row and select 0, 1, 2, or 3 decimal places.

- **Shelf Life**

To select the length of time the EDR displays the WITS data, click the **Shelf Life** drop-down list and choose **5 Mins** (minutes), **15 Mins**, **1 Hour**, **12 Hours**, **1 Day**, or **Never Expires**. Once the shelf life period is exceeded, the EDR changes the value of the trace to null, represented by two dashes (—).

Important:

Shelf life is an important selection for time sensitive data. The EDR displays the last received WITS value until the sender transmits a new value, or until it reaches the end of the shelf life period. WITS data with a long shelf life can be misleading if users don't know the data's age.

5. To enable your custom code to be sent or received, click on the code's **Enable** check box.
6. Click **Save > Exit** to return to the Setup Menu.

When you are finished, click **Save > Exit**. The EDR can now receive the custom WITS code. To send this code, follow the directions in [Selecting Custom WITS Codes to Send](#) below.

You can return all custom WITS settings to default at any time by clicking the **Factory Reset** button.

Selecting Custom WITS Codes to Send

After you have set up a custom WITS code, follow the steps below to instruct a Pason computer to send the code.

1. From the EDR main screen on the RMPC, click **Menu > Setup > WITS**. The WITS setup screen opens.
2. On the WITS out tab of the Pason computer you want to send the custom WITS code, click the **Custom** button.
3. From the Transmission drop-down list, select the transmission type for the custom WITS group.
4. Click the custom code's **Enable** checkbox.
5. Click **Save > Exit** to return to the Setup Menu. The Pason computer starts sending the custom WITS codes you selected.

Receiving a Custom WITS Code and Sending it as a Different Custom Code

The EDR supports receiving a custom WITS value using one custom code and then sending it using a different custom code. Use this feature if a third party on the rig is sending a WITS code to Pason that they **can't change**, but that code is unusable by another party who wants to receive it from Pason. For example, Acme Drive Consulting could be sending top drive RPM to the Pason system as 4002, but General Directional Associates needs to get top drive RPM from Pason as 0120.

If you need to do this, follow the steps in [Selecting Custom WITS Codes to Send](#) above, but before you save:

1. Click in a code's row and delete the WITS code listed. This deletion doesn't affect the incoming code—it only prepares you for the next step.
2. Enter the custom four-digit WITS code you want to use to send the value. Use a code that's different from the existing WITS codes. If the code you enter conflicts with a current EDR WITS code, the EDR highlights your entry in red and does not allow you to save your settings.

The example below shows an incoming custom WITS code of 4002 ready to be deleted and given a new code used for sending.

RMPC

Hole Depth 12524³ FEET	Bit Depth 12524³ FEET	Hook Load 42.2 kLBS	Weight On Bit 25.4 kLBS
--	---	----------------------------------	--------------------------------------

WITS Sent by Pason RMPC (Serial) WITS Sent by Pason Server (Serial) WITS Sent by Pason DHC/UJB/SideKick (Serial) WITS Sent by Pason Network (Ethernet) WITS Received by Pason From Others (Serial or Ethernet) WITS Monitor WITS Event History

Custom Standard Pason EDR Traces

Custom WITS Transmission: Request-Response

Enable	Code	Name	Un
<input checked="" type="checkbox"/>	4002	TD RPM	

Figure 17: Changing a custom WITS code used for sending

4.6 Setting Up WITS Codes for Custom Sensors

The EDR enables you to physically connect custom sensors. If you enter a name for the custom sensor when you set it up in the EDR's Custom Calibration Menu, you can also assign it a custom WITS code, which you can instruct a Pason computer to send.

Follow these steps to set up a Pason computer to send a custom WITS code for a connected custom sensor:

1. Ensure that the custom sensor is connected, and assigned a name in the EDR's Custom Calibration Menu.
2. From the EDR main screen on the RMPC, click **Menu > Setup > WITS**. The WITS setup screen opens.
3. On the WITS out tab of the Pason computer you want to send the custom WITS code, click the **Custom** button.
4. Scroll down to the Custom Analog Port section. You should see the name of the custom sensor listed.
5. Click in the custom code's row. The EDR highlights the row.
6. Click under Code in the highlighted row, and enter a four digit WITS code. Ensure that the code is different from existing WITS codes. If the code you enter conflicts with a current EDR WITS code, the EDR highlights your entry in red and does not allow you to save your settings.
7. Select a transmission type from the Transmission drop-down list.
8. To enable the selected Pason computer to send your custom code, click on the code's **Enable** check box.
9. To include a lag value, click on the code's **Enable Lag** check box and select a lag value. Custom lag depth is explained in the section below.
10. Click **Save > Exit**. The Pason computer starts sending the custom WITS codes you selected.

Note:

If you do not see any custom sensors listed in the Custom Analog Port section, ensure that you assigned your custom sensor a name in the EDR's Custom Calibration Menu. The EDR will not list any custom sensors in the Custom Analog Port section unless you have assigned a name to at least one of them.

4.7 Setting Up a Custom WITS Lag Depth

In EDR 21.4 and higher, you can send lag depth to Pason and associate it with other custom WITS codes that you're sending. This works like our WITS gamma and resistivity lag calcs, but for custom WITS.

Notes:

You must use WITS code 6352 to send the lag depth to Pason. Code 6352 is disabled by default, so you need to enable it in the EDR.

You can only send one lag depth on 6352, but you can associate it with multiple custom WITS traces.

You can't rename the lag depth trace: the EDR displays it as WITS Custom LagD.

Follow these steps to send and associate a custom lag depth:

1. Set up the third-party system to send lag depth to Pason via WITS code 6352.
2. From the EDR main screen on any workstation, click **Menu > Setup > WITS**. The WITS setup screen opens.
3. On the **WITS Received by Pason from Others** tab, click the **Standard** button. The Custom WITS setup screen opens.
4. Scroll to code 6352 (WITS Custom Lag Calc) and check the box to enable it.

Important:

WITS Custom Lag Calc and WITS Custom LagD are the same thing—just remember that WITS Custom LagD is the name of the trace the EDR displays.

5. Enter units for the lag depth you're sending (the EDR will convert units as required).
6. Click **Save** then click **Custom**.
7. Click in the row of the WITS code(s) you want to associate with the lag depth. The EDR highlights the row. If it's a new code, set it up according to [Setting Up WITS Codes for Custom Sensors](#) above.
8. Check the row's **Enable Lag** check box. The Add Lag Calc menu opens.

Weight On Bit 0.0 kLBS	Rotary 44 RPM	Torque 20.152 kFT-LBS	ROP 7.0 FT/HR	
WITS Received by Pason From Others (Serial or Ethernet)	WITS Monitor	WITS Event History		
Search...			Clear	
Unit	Decimals	Shelf Life	Enable Lag	Operator Enforced
feet	0	5 Mins	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	0	5 Mins	<input type="checkbox"/>	<input type="checkbox"/>
	0	5 Mins	<input type="checkbox"/>	<input type="checkbox"/>

- 9. Select **WITS Custom Lag Calc** from the drop-down list.
- 10. Click **Save** then **Exit** when done. The EDR starts applying the calculation.

4.8 Sending WITS 01 Codes to the Pason EDR

The EDR can receive the WITS 01 codes noted in the [Default Pason WITS Codes](#) table on page 37, but it's an advanced EDR feature that you need to use with caution. Before you set up the EDR to receive these codes, think about these important points:

- Contact your Pason representative for assistance before you set this up. If not properly configured, WITS 01 code data can cause the EDR to display incorrect values and negatively impact other applications.
- You'll find the *WITS Received by Pason from Others* tab on the WITS setup screen in the EDR ([Figure 18](#)).
- The EDR *receives* diff. pressure on code 0150 (even though it *sends* diff. pressure on code 0171).
- If you send diff. pressure to the EDR, you must also send standpipe pressure (0121).

Follow these steps to set up the EDR to receive WITS 01 codes:

1. From the EDR main screen, click **Menu > Setup > WITS**. The WITS setup screen opens.
2. Click the **WITS Received by Pason From Others** tab and ensure that the **Standard** button is selected.
3. Click the **Edit** button and enter the Pason daily password when prompted. Once you enter the password, you're able to select the 01 codes you want Pason to receive.

The screenshot shows the WITS setup interface. At the top, there are several data fields: Hole Depth (142' FEET), Bit Depth (142' FEET), Hook Load (85.3 kLBS), Weight On Bit (0.0 kLBS), and Rotary. Below these are tabs for WITS Sent by Pason RMPC, Pason Server, Pason DHC/UJB/SideKick, Pason Network, Pason Received by Pason From Others (selected), and WITS Monitor. Underneath are 'Custom' and 'Standard' buttons. A table titled '01: General Time Based' is shown with an 'Edit' button above it. The table has columns for Enable, Code, Name, and Unit.

Enable	Code	Name	Unit
<input type="checkbox"/>	0108	Bit Depth	FEET
<input type="checkbox"/>	0110	Hole Depth	FEET
<input checked="" type="checkbox"/>	0111	T.V.Depth	FEET
<input type="checkbox"/>	0112	EDR Block Position	FEET
<input type="checkbox"/>	0113	ROP	FT/HF

Figure 18: WITS Received by Pason from Others tab

Important:

The EDR doesn't perform unit conversions with the exception of torque. In EDR version 20.10 and higher, the EDR converts both incoming and outgoing WITS torque values. Note that if the torque unit is amps or PSI, then no conversion can be done.

For incoming to Pason: the system converts to match torque's EDR calibration units.

For outgoing from Pason: the system converts to match the units specified in the WITS settings.

4.9 Sending Gamma and Gamma Lag Calc

When sending Gamma (code 0824) and Gamma Lag Calc (code 0821) data to the EDR, make sure you meet these packet and frequency requirements:

- Send both codes in the same WITS packet. Problems occur when Pason receives one or the other, but not both.
- Send the packet at a minimum 0.2 m (1 ft) interval.

A well-formed gamma packet looks like this:

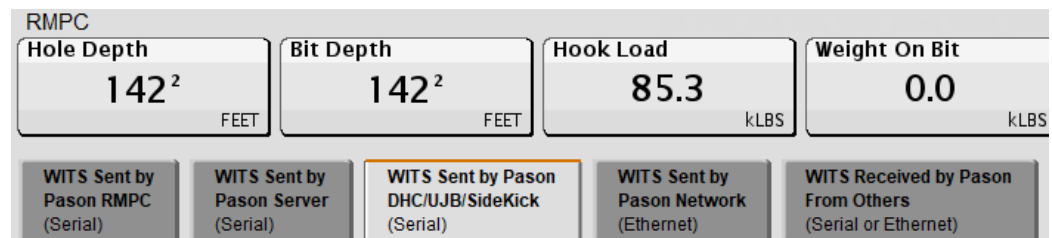
```
&&
1984PASON/EDR
08211780.2
082463.8
!!
```

4.10 Importing and Exporting Your WITS Settings

The EDR enables you to import and export saved WITS settings, for sharing via email or USB memory stick.

Follow these steps to export WITS settings:

1. Select the WITS tab for the settings you want to export. In the example below, *WITS Sent by Pason DHC/UJB/SideKick* settings are selected for export.



RMPC				
Hole Depth 142 ² FEET	Bit Depth 142 ² FEET	Hook Load 85.3 kLBS	Weight On Bit 0.0 kLBS	
WITS Sent by Pason RMPC (Serial)	WITS Sent by Pason Server (Serial)	WITS Sent by Pason DHC/UJB/SideKick (Serial)	WITS Sent by Pason Network (Ethernet)	WITS Received by Pason From Others (Serial or Ethernet)

2. Click the **Export** button.
3. Select a save location from the Save In drop-down list.
4. Enter a name for the saved settings file. The default file name includes the name of the Pason computer the settings are currently applied to, which is useful.
5. Leave the file type at the default of WITS Out Template Files.
6. Click **Save**.

Follow these steps to import WITS settings:

1. Select the WITS tab you want to apply the imported settings to.
2. Click **Import**.
3. Navigate to and select the settings file you want to import. This file must have a .wto file extension.
4. Click **Open**. The EDR applies the saved WITS settings you selected, and refreshes the WITS setup screen.

Note:

When you import WITS settings, the EDR overwrites your existing settings, including any custom codes you have set up. Custom codes not included in the import file are deleted.

4.11 Operator Templates

EDR version 20.10 and higher supports operator templates to specify and lock the settings for WITS Received by Pason from Others (a.k.a. “WITS-in”). This feature’s purpose is to stop rig personnel from changing an operator’s preferred settings.

If you’re interested in using an operator template, contact Pason.

4.12 Default Pason WITS Codes

The following table lists the default Pason WITS names and codes, whether the EDR can receive the code, and which codes are sent in the different EDR WITS modes. In addition, the EDR can be configured to receive up to 99 additional custom WITS codes.

Note:

All data values sent via WITS are in float format (e.g. “#####.##”).

Note:

When sending gamma and gamma depth values to the EDR via WITS, both values need to be in the same WITS packet.

Record 01: General Time Based				
Available Transmission Types: Time Based or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
Well ID	0101			
Date	0105			
Time	0106			
Bit Depth	0108	Y	Y	Y
Hole Depth	0110	Y	Y	Y
True Vertical Depth	0111	Y		
EDR Block Position	0112	Y	Y	
On Bottom ROP	0113	Y	Y	Y
Hook Load (maximum)	0115	Y	Y	
Weight on Bit	0117	Y	Y	
Rotary Torque	0119	Y	Y	
Rotary Rpm	0120	Y	Y	
Standpipe Pressure	0121	Y	Y	
Casing Pressure	0122	Y	Y	
Pump 1 strokes/min	0123	Y	Y	Y
Pump 2 strokes/min	0124	Y	Y	Y
Pump 3 strokes/min	0125	Y	Y	Y
Total Mud Volume	0126		Y	
PVT Total Mud Gain/Loss	0127		Y	
Flow	0128		Y	
Pump Rate	0130	Y	Y	
Total Strokes P1+P2+P3+P4	0137		Y	Y
3 rd Party LagD	0139	Y	Y	
3 rd Party Gas	0140	Y	Y	
Mechanical Specific Energy	0141		Y	
TotalPumpDisplacement	0142		Y	Y
Pump 1 total strokes	0143		Y	Y
Pump 2 total strokes	0144		Y	Y
Pump 3 total strokes	0145		Y	Y
Differential Pressure	0150	Y		
Pason Lag Depth	0169		Y	
Pason Gas	0170		Y	
Differential Pressure	0171		Y	Y

Record 02: Drilling – Depth Based				
Available Transmission Types: Depth Based, or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
Date	0205			
Time	0206			
Hole Depth	0208		Y	Y
On Bottom ROP	0210		Y	Y
Weight on Bit	0211		Y	Y
Hook Load	0212		Y	Y
Standpipe Pressure	0213		Y	Y
Rotary Torque	0214		Y	Y
Rotary Rpm	0215		Y	Y
Total Pump Output	0219		Y	Y
Flow	0221		Y	Y
Total Mud Volume	0222		Y	Y

Record 07: Survey/Directional				
Available Transmission Types: Time Based, Depth Based, or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
Date	0705			
Time	0706			
Sensor Depth	0708	Y	Y	
Inclination	0713	Y	Y	
Azimuth	0715	Y	Y	
Magnetic Toolface	0716	Y	Y	
Gravity Toolface	0717	Y	Y	
Toolface Threshold	0722	Y	Y	
MWD Continuous Inc	0723	Y	Y	
MWD Continuous Azi	0724	Y	Y	

Record 08: MWD Formation Evaluation				
Available Transmission Types: Time Based, Depth Based, or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
Date	0805			
Time	0806			
Resistivity 1 Lag Calc	0813	Y	Y	
Resistivity 1	0816	Y	Y	
Resistivity 2 Lag Calc	0817	Y	Y	
Resistivity 2	0820	Y	Y	
Gamma Lag Calc	0821	Y	Y	
Gamma	0824	Y	Y	
Porosity 1 Lag Calc	0829	Y	Y	
Porosity 1	0831	Y	Y	
Porosity 2 Lag Calc	0832	Y	Y	
Porosity 2	0834	Y	Y	
Formation Density Lag Cal	0839	Y	Y	
Formation Density	0841	Y	Y	

Record 09: MWD Mechanical				
Available Transmission Types: Time Based, Depth Based, or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
Date	0905			
Time	0906			
Downhole Pressure 1	0913	Y	Y	

Record 11: Mud Tank Volume				
Available Transmission Types: Time Based, Depth Based, or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
Date	1105			
Time	1106			
Hole Depth	1108		Y	
Total Mud Volume	1111		Y	
Mud Tank 1 Volume	1115		Y	
Mud Tank 2 Volume	1116		Y	
Mud Tank 3 Volume	1117		Y	
Mud Tank 4 Volume	1118		Y	
Mud Tank 5 Volume	1119		Y	
Mud Tank 6 Volume	1120		Y	
Mud Tank 7 Volume	1121		Y	
Mud Tank 8 Volume	1122		Y	
Trip Tank Mud Volume	1129		Y	

Record 12: Chromatograph Cycle Based				
Available Transmission Types: Time Based, Depth Based, or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
Date	1205			
Time	1206			
chr Methane C1	1212	Y	Y	
chr Ethane C2	1213	Y	Y	
chr Propane C3	1214	Y	Y	
chr Iso-Butane IC4	1215	Y	Y	
chr Nor-Butane NC4	1216	Y		
chr Iso-Pentane NC5	1217	Y		
chr Nor-Pentane NC5	1218	Y		
chr Neo-Pentane NC5	1219	Y		
chr Iso-Hexane IC6	1220	Y		
chr Nor-Hexane NC6	1221	Y		
chr Carbon Dioxide CO2	1222	Y		
chr Acetylene	1223	Y		
chr Oxygen O2	1225	Y		
chr Gas Specific GravityM	1226	Y		
chr Total Gas	1229	Y	Y	

Record 17: Cementing				
Available Transmission Types: Time Based, Depth Based, or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
Cement Date	1705	Y		
Cement Time	1706	Y	Y	
Cement Pump Pressure	1712	Y	Y	
Cement Slurry Rate	1716	Y	Y	
Slurry Density	1719	Y	Y	
Cement Fluid Temp	1722	Y	Y	
Event Number	1724	Y	Y	
Cement Stage Volume	1728	Y	Y	
Cement Total Stage Volume	1730	Y	Y	
Cement Water Rate	1734	Y	Y	
Annulus Pressure	1735	Y	Y	
N2 Rate	1736	Y	Y	
Cement Date	1745			
Cement Time	1746			

Record 18: Drill Stem Testing				
Available Transmission Types: Time Based, Depth Based, or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
Date	1805			
Time	1806			
Nitrogen Pressure In	1815	Y	Y	
UBD Flow Pressure	1816	Y		
UBD Flow Temperature	1817	Y		
Downhole Pressure 1	1818	Y	Y	
Downhole Temperature	1819	Y	Y	
Condensate Out	1820	Y	Y	
Hydrocarbon Flow	1821	Y	Y	
H2S	1826	Y		
Nitrogen Volume In	1827	Y	Y	
Total Gas Return	1828	Y	Y	
Nitrogen Volume Out	1829	Y	Y	
Water Out	1830	Y	Y	
Water Nozzle	1831	Y	Y	

Record 63: Pason				
Available Transmission Types: Time Based, Depth Based, or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
Date	6305			
Time	6306			
Magnetic Toolface	6310	Y	Y	
Gravity Toolface	6311	Y	Y	
Magnetic Toolface	6339	Y	Y	
Gravity Toolface	6340	Y	Y	

Record 64: MWD Downhole Measurements				
Available Transmission Types: Time Based, Depth Based, or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
MWD Shock Avg	6412	Y		
MWD Shock Risk	6413	Y		
MWD Shock Peak	6426	Y		
MWD Vib Lateral Avg	6414	Y		
MWD Vib Lateral Risk	6415	Y		
MWD Vib Lateral Peak	6427	Y		
MWD Vib Axial Avg	6416	Y		
MWD Vib Axial Risk	6417	Y		
MWD Vib Axial Peak	6428	Y		
MWD Vib Torsional Avg	6418	Y		
MWD Vib Torsional Risk	6419	Y		
MWD Vib Torsional Peak	6429	Y		
MWD Stick Slip	6420	Y		
MWD Stick Slip Risk	6421	Y		
MWD Whirl Risk	6422	Y		
MWD RPM Max	6423	Y		
MWD RPM Avg	6424	Y		
MWD RPM Min	6425	Y		

Record 65: RSS Downhole Measurements				
Available Transmission Types: Time Based, Depth Based, or Request-Response				
Name	WITS Code	EDR can Receive	EDR Sends in Full WITS Mode	EDR Sends in Half WITS Mode
RSS Shock Avg	6512	Y		
RSS Shock Risk	6513	Y		
RSS Shock Peak	6530	Y		
RSS Vib Lateral Avg	6514	Y		
RSS Vib Lateral Risk	6515	Y		
RSS Vib Lateral Peak	6531	Y		
RSS Vib Axial Avg	6516	Y		
RSS Vib Axial Risk	6517	Y		
RSS Vib Axial Peak	6532	Y		
RSS Vib Torsional Avg	6518	Y		
RSS Vib Torsional Risk	6519	Y		
RSS Vib Torsional Peak	6533	Y		
RSS Stick Slip	6520	Y		
RSS Stick Slip Risk	6521	Y		
RSS Whirl Risk	6522	Y		
RSS RPM Max	6523	Y		
RSS RPM Avg	6524	Y		
RSS RPM Min	6525	Y		
RSS Target Inclination	6526	Y		
RSS Target Azimuth	6527	Y		
RSS Continuous Inc	6528	Y		
RSS Continuous Azi	6529	Y		

4.13 Typical WITS Packets sent to Pason

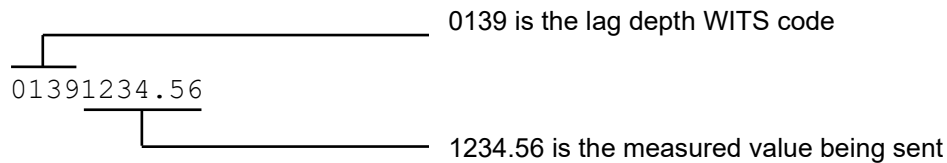
A typical packet from a total gas detection system includes the following lines:

```
&&  
01691234.56  
01705.43  
!!
```

The first four digits in a packet make up the WITS code. The digits that follow the WITS code represent the measured value being sent. The WITS specification also includes the carriage return and line feed control characters, <cr><lf>, at the end of each line.

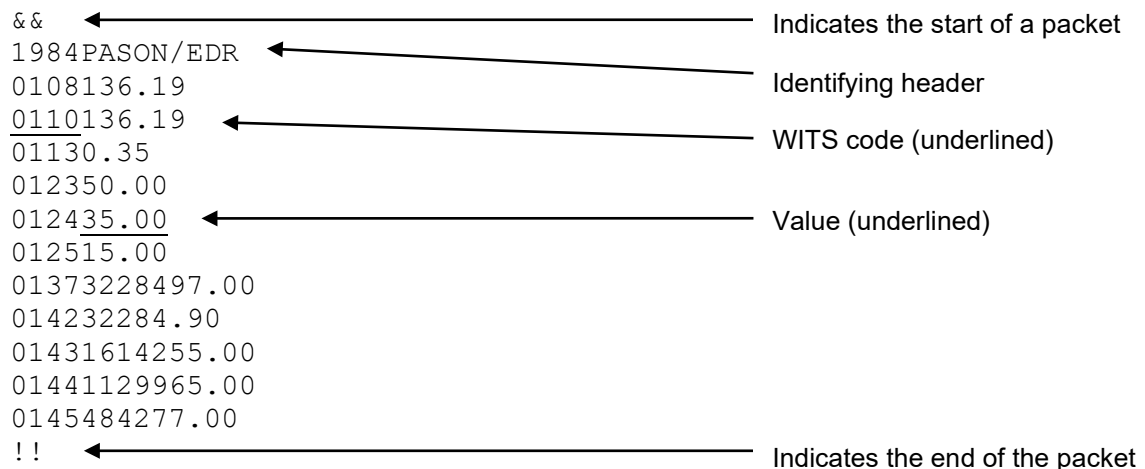
Whether or not these control characters are visible depends on the application you use to view WITS packets.

The second line of the example includes the following information:



4.14 Sample Half WITS Data Sent by Pason

A typical Half WITS packet would be as follows:



4.15 Sample Full WITS Data Sent by Pason

A typical Full WITS packet is as follows:

```
&&  
1984PASON/EDR  
0108136.17  
0110136.17  
01120.00
```

01130.35
0115123.90
011721.60
0119501.00
0120160.00
01215510.00
01225088.75
012350.00
012435.00
012515.00
0126800.00
012871.00
01373228151.00
01390.00
01400.00
01410.00
014232281.50
01431614081.00
01441129845.00
0145484225.00
01500.00
!!
&&
1984PASON/EDR
18150.00
18180.00
18190.00
18270.00
18210.00
18290.00
18280.00
18300.00
18200.00
18310.00
!!
&&
1984PASON/EDR
1108136.17
1110800.00
1111800.00
1115100.00
1116100.00
1117100.00
1118100.00
1119100.00
1120100.00
1121100.00
1122100.00
11295.00
!!
&&
1984PASON/EDR

09130.00
!!
&&
1984PASON/EDR
07130.00
07150.00
!!
&&
1984PASON/EDR
12120.00
12130.00
12140.00
12150.00
12160.00
12170.00
12180.00
12190.00
12200.00
12210.00
12220.00
12230.00
12250.00
12260.00
!!
&&
1984PASON/EDR
08210.00
08240.00
!!

Important:

Pason does not guarantee packet order or the order in which the EDR sends each channel within the packets.

4.16 Using the WITS Monitor

Starting in EDR version 14.12, the EDR includes a WITS monitor ([Figure 20](#)). The WITS monitor is a simple diagnostic tool included in the EDR on every Pason Workstation. It's intended for rig personnel who have a good understanding of WITS and packet communications. Use it to troubleshoot WITS issues at the rig.

To access the WITS monitor, follow these steps from the EDR main screen on any Pason Workstation:

1. Click **Menu > Setup > WITS**. The WITS setup screen opens.
2. Click the **WITS Monitor** tab.

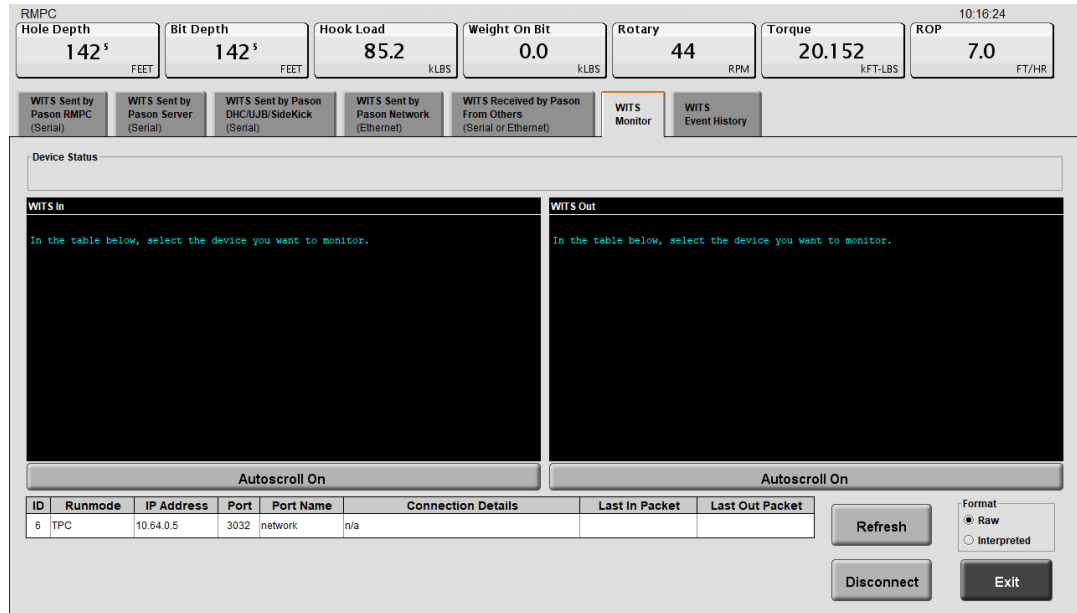


Figure 19: WITS Monitor screen

3. In the table at the bottom, click to select the connected device you want to monitor—look for the workstation type in the Runmode column. Or, to find the specific IP address of the connected device, type `ipconfig` on the connected device's command prompt screen. Use the IP address displayed at the top of the command prompt screen to find the device on the WITS monitor screen. The EDR starts displaying the packet information in the WITS In and WITS Out boxes.
4. Select **Raw** or **Interpreted** in the Format box. The Raw format gives you only WITS packet information; the Interpreted format adds more detail as shown in [Figure 20](#) below.
5. Select **Disconnect** if you want to choose a different device to monitor.
6. Click **Exit** to return to the setup screen.

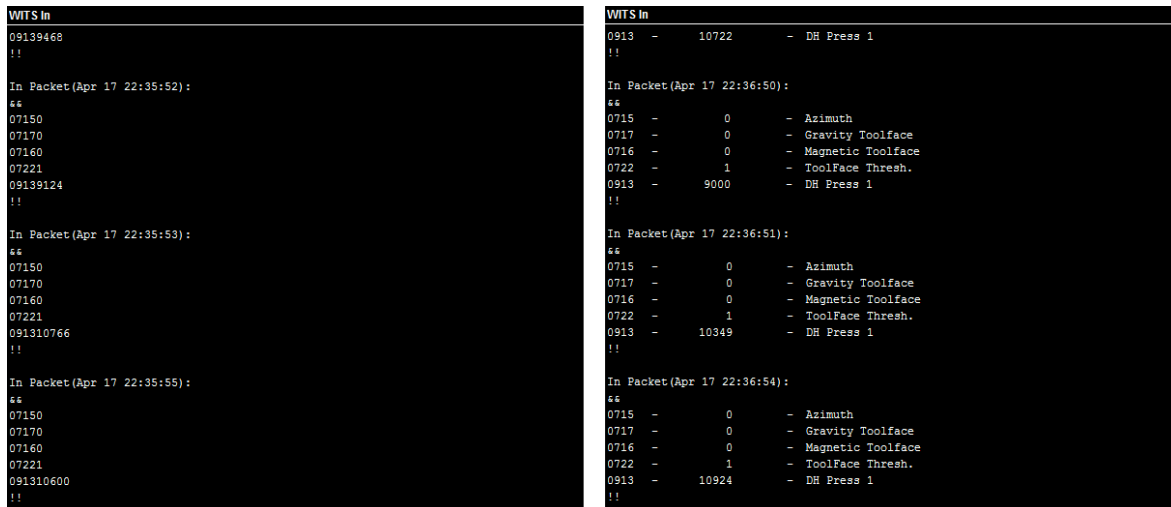


Figure 20: WITS monitor raw data (left) versus interpreted data (right)

Tip:

Use the times logged on the WITS monitor to determine WITS transmission rates. The monitor displays WITS packets in the order the EDR receives or sends them.

Note:

If a Pason technician needs to troubleshoot WITS communications using CommEngine log files, they can use the Port and Port Name details to identify the CommEngine to work on. Each WITS device is represented by its own CommEngine process. WITS CommEngine troubleshooting information is available to Pason personnel in KBase 1125 *Debugging WITS Data Using CommEngine Log Files*.

4.17 Viewing WITS Event History

Starting in EDR version 20.10, the EDR includes a WITS event viewer to help with troubleshooting and analysis. It provides a universal and chronological log of changes to WITS settings displayed in the EDR. The log doesn't filter out devices—it shows changes made by all Pason workstations.

To access the viewer, go to **Menu > Setup > WITS** on any Pason workstation and click the *WITS Event History* tab. The table below lists the events logged by this feature:

WITS Event	Example Message	Event Source
WITS item enabled/disabled	STATE toggled from Disabled to Enabled	WITS sent from Pason: Standard, Custom WITS received by Pason: Standard, Custom, Pason EDR Traces
WITS item code set, modified or cleared	CODE set to 9000	WITS received by Pason: Standard, Custom WITS sent from Pason: Standard, Custom, Pason EDR Traces
	CODE modified from 1000 to 2000	WITS received by Pason: Standard, Custom WITS sent from Pason: Standard, Custom, Pason EDR Traces
	CODE cleared from 9000	WITS received by Pason: Custom WITS sent from Pason: Pason EDR Traces
WITS item data summary modified	DATA SUMMARY modified from Average to Minimum	WITS sent from Pason: Standard
WITS item decimals modified	DECIMALS modified from 1 to 2	WITS received by Pason: Custom
WITS item name modified	NAME modified from Wits Custom# 1 to Cement In Barrels	WITS received by Pason: Custom
WITS item shelf life modified	SHELF LIFE modified from 5 minutes to Never Expires	WITS received by Pason: Custom
WITS item units set, modified, or cleared	UNIT set to metres	WITS received by Pason: Custom
	UNIT modified from KDan to KG	WITS received by Pason: Standard, Custom WITS sent from Pason: Standard, Custom, Pason EDR Traces

WITS Event	Example Message	Event Source
	UNIT cleared from metres	WITS received by Pason: Custom
WITS record transmission type modified	TRANSMISSION modified from Time-based to Request-Response	WITS sent from Pason: Standard, Custom, Pason EDR Traces
WITS record transmission interval modified	INTERVAL modified from 5 to 10	WITS sent from Pason: Standard, Custom, Pason EDR Traces
WITS record transmission unit modified	INTERVAL UNIT modified from Feet to Metres	WITS sent from Pason: Standard, Custom, Pason EDR Traces

5 About WITS Port Pin-Outs

This section contains pin-outs to guide you as you design a product interface that is compatible with the Pason system. Consult the information below if you are connecting a third-party device that uses RS232 or RS422 communications.

5.1 RS232 Port Pin-Outs

Pason provides two communications boxes for use by third parties interested in setting up WITS communications between an RS232 device and the EDR system: COMM022 and COMM018. Both of these comm boxes convert RS232 to RS422, which the EDR can accept.

COMM022 RS232 Pin-Outs

COMM022 provides a DB9 connector on the third-party side. The table below lists pins and descriptions for the COMM022 pin-outs:

DB9 Pin	Description
2	TX
3	RX
5	GND
all other pins	unused

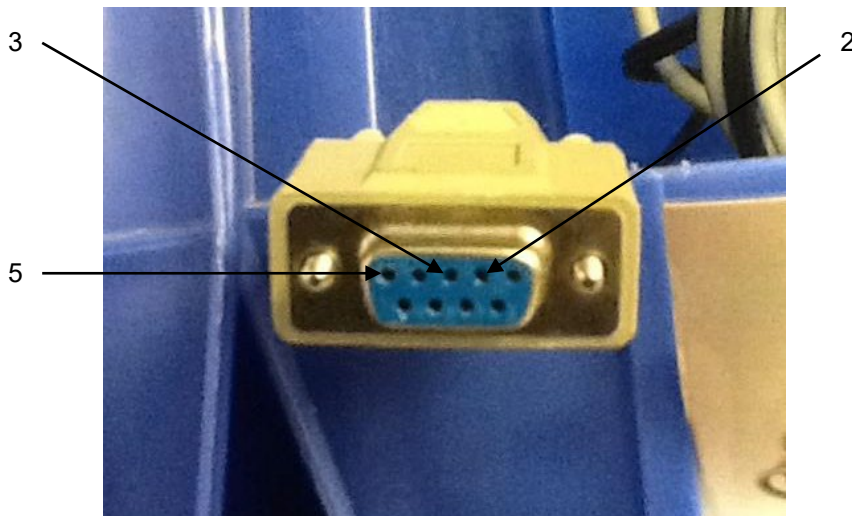


Figure 21: COMM022 RS232 pin-outs

COMM018 RS232 Pin-Outs

COMM018 provides a military connector on the third-party side. The table below lists pins and descriptions for the COMM018 pin-outs:

Mil.con Pin	Description
A	RX
B	TX
E	12 VDC
G	GND
all other pins	unused

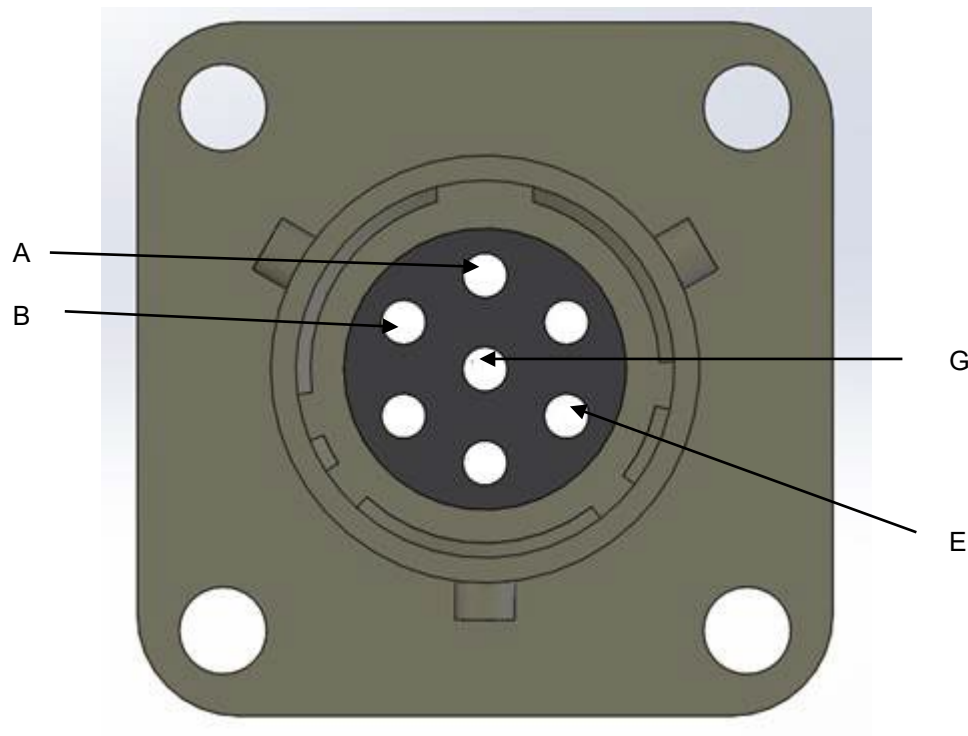


Figure 22: COMM018 RS232 pin-outs

5.2 RS422 Port Pin-Outs

Conversion via a communications box is not required if your third-party device has RS422 communication, because RS422 communication is what the EDR accepts. You can use a cable to connect your device directly to the RS422 port on a DHC or SideKick.

Note:

Be aware that not all RS422 ports are powered.

The RS422 ports on the DHC and SideKick have the following properties:

- Receptacle: Female, Amphenol PT07E12-10S or equivalent
- Accepts: Plug, male, Amphenol PT06E12-10P or equivalent

The table below lists pins and descriptions for the RS422 port pin-out.

Pin	Description
A	TX+
B	TX-
D	RX+
E	RX-
J	GND
H	+12V
G	GND
all other pins	unused

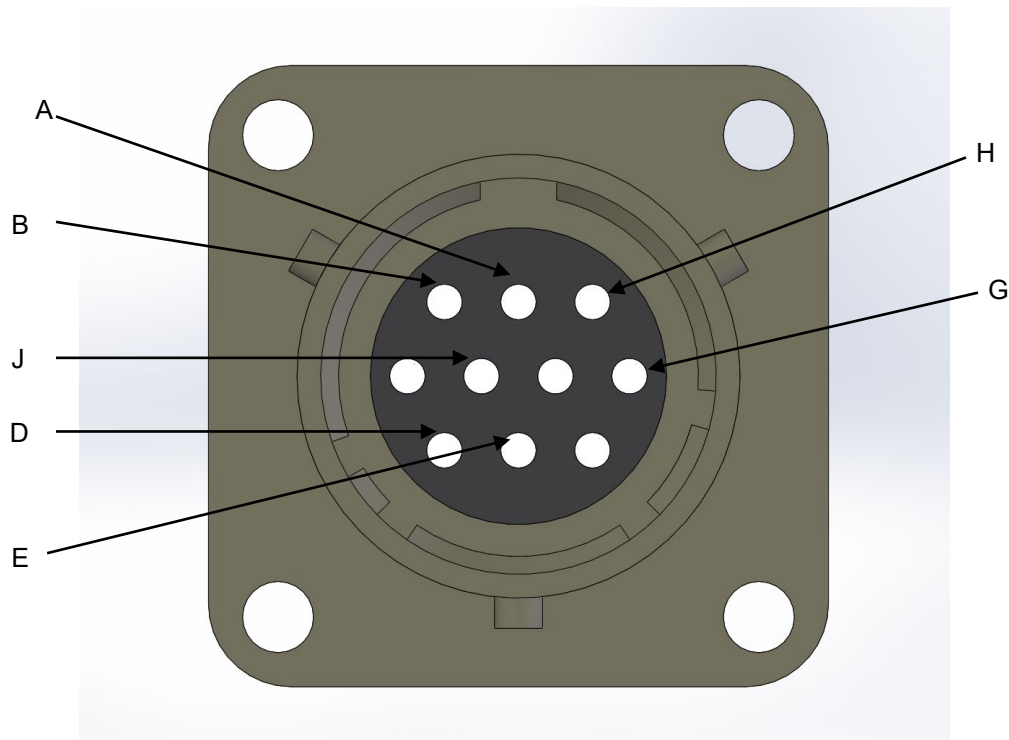


Figure 23: RS422 ports pin-outs