HART Communicator Conversion for Android (COM-Droid) User Manual

Table of Contents

Quick Start Guide

The following steps will allow you to install and quickly begin using your Android Phone/Tablet as a Handheld HART Comunicator. This quick start guide is for experienced HART users, full instructions are provided later in this manual for non-experienced users.

Step 1: Setup your Android Device to allow the App install

To install the HART Communicator App we must configure the Android device to allow installation of apps from sources other than the Play Store.
Note: Below is for Samsung Galaxy 4, your Android device may have different key sequences.
a) Press bottom left button on your Android device (Menu Button)
b) Select Settings
c) Select More
d) Select Security
e) Enable Unknown sources
2. Turn on Bluetooth
3. Connect the Android device to a PC via the USB cable.

Step 2: Install the HART Communicator App (DevCom)

Copy the file “com.procomsol.devcom.apk” to your device. Find it using a File Browser App and click on it to launch the Install App. See Section 4.2.1 & 4.2.2 for details.

Step 3: Install the DD library

Launch the DevComDroid App. Once launched, license the software and then select “Install DD Library” to begin library installation. When done exit the App. See Section 4.2.3 for details.

Step 4: Connect to the Bluetooth HART Modem

On initial start the DevCom App will prompt you to select the Bluetooth HART modem to use. Make sure your Bluetooth HART Modem (HM-BT-BAT-ER or HM-BLE) is turned on and press the “Scan for Bluetooth Devices” button in DevCom. If using HM-BT-BAT-ER it is assumed you have already performed the Bluetooth pairing procedure (see the HM-BT-BAT-ER documentation for details). If using HM-BLE no pairing is required. Select your HART Modem and perform the Pairing operation.

Step 5: Connect your Bluetooth HART Modem to the HART device

For communications you must have a suitable load resistance, or a 250Ω Shunt/Loop resistor must be placed in series with the device. Using the clips of the HART Modem connect either: across the loop load resistor (A – B), or across the HART transmitter terminals (C – D). See the relevant Figure 1a, 1b or 1c below.

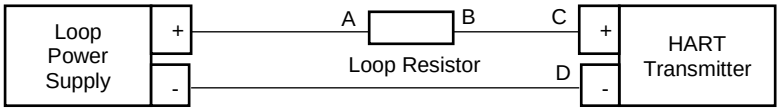


Figure 1a. Loop Powered HART Transmitter Connection

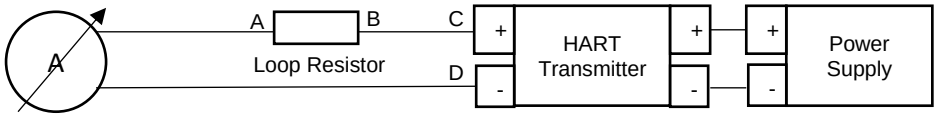


Figure 1b. 4-Wire HART Transmitter Connection

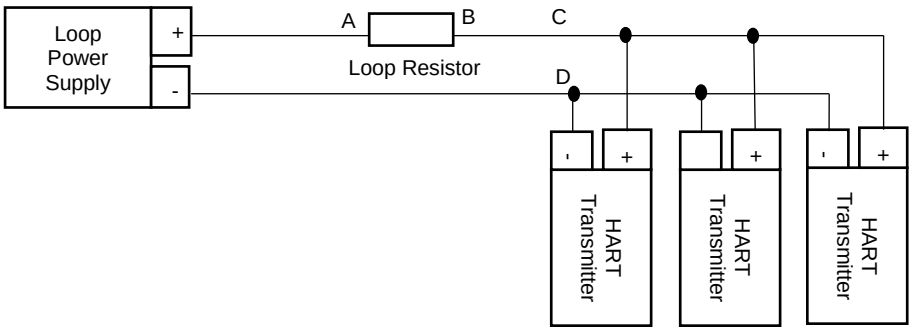


Figure 1c. Multi-drop HART Transmitter Connection

Step 6: Activate DevCom (not required for the first 10 days) or select "Evaluation"

If you have not already licensed DevComDroid, when the App opens you will be shown the number of days you can use the program before activation is required. You can use it for up to 10 days before you need to activate it. Activation only needs to occur once. If you want to use the 10 day free trial period select "Evaluation".

If you are Activating DevComDroid you will be asked to enter the Activation Codes. Once entered, DevComDroid will connect to the Internet to verify the Activation codes. If you do not have an internet connection, you can activate it by email or phone using the Manual Activation method. See Section 4.3 for details.

Step 7: Browsing a HART Device

On initial start, DevCom sends a command to the field device, establishes a connection, and learns its identity. Once DevCom knows the device identity, it locates the device's DD in the library and loads it. From this point forward operation of DevCom is determined by the DD provided by the device manufacturer. If a DD for the device is not present, a generic DD will be used.

Menus and data are presented using a tree scheme. The organization of the data in the display window is dictated by the device DD. The display shows menus and data. To navigate to a different menu simply select it. To return to the previous menu, press the "Back" key on the device.

Step 8: Modifying the HART Device's Configuration

The Menu tree allows access to all of the data exactly as described by the device manufacturer's DD. When you find elements of the field device's configuration you want to change, simply click and edit the data. Once you have changed the configuration to suit your needs, press the "Commit" button to send the new data to the HART field device.

Step 9: Performing Maintenance and Testing the HART Device

Many devices have Methods or Standard Operating Procedures (SOPs) that may need to be performed to ensure the device is in peak condition. These Methods may include calibrating the loop current, trimming the transducer values or performing some diagnostic test on the field device. Methods appear on the screen just like menus, but have a blue background. Click on the Method and it will start running in a new window. The Method will guide you through the process ensuring the procedure is completely and consistently performed. When the Method is complete the window will disappear.

Step 10: Exit

When you are through working on the field device simply exit DevCom. Once the App exits, you can then turn off the Bluetooth HART Modem and disconnect it from the HART device/network

If you have any questions please do contact HART Expert Ltd, advice and support is free.

HART Expert Ltd
14 St. Patricks Court,
Brockworth
Gloucester
GL3 4NT
United Kingdom

Telephone: +44(0)7966233639
Email: info@hart-expert.co.uk
Web: www.hart-expert.co.uk

1 INTRODUCTION

This Handheld HART Communicator conversion package (COM-Droid) allows access to and management of HART device's configuration and calibration. This manual provides the information about the hardware setup, communication with Smart devices, and functions of DevComDroid (also called DevCom) which is the software component of this Handheld HART Communicator conversion package.

DevCom is unique in that it uses the DD of the connected device to determine what information to display, what variables are available for edit, and what procedures to follow for calibration, setup, and maintenance.

These DDs are developed by device manufacturers for their products and, in turn, distributed by the HART® Communication Foundation (HCF) worldwide. The latest DDs are included as part of the DevCom2000 installation, and you are automatically sent new DD releases for the first year. At any time (e.g. after the automatic updates have ceased) you can download new DD files from the HCF website (www.hartcomm.org).

1.1 Acronyms and Definitions

Acronym	Definition
COTS	Commercial-off-the-Shelf
DD	Device Description file, this contains the device information
DDL	Device Description Language
FCG	FieldComm Group, formerly the HART Communication Foundation (HCF)
HCF	HART Communication Foundation (now called FieldComm Group)
DevCom (DevComDroid)	HART Device Communicator Software for Android phones/tablets

1.2 Conventions Used in This Manual

Following formatting conventions are used in this guide:

Convention	Description
Words in **bold** type	Field names including buttons in the display, or important phrases
→Arrow	Windows pull down menus and their options are separated by → For example, click **Device** → **New Device** to connect to a new device
`Courier font`	Information that you type, parts of the code quoted for explanations or as examples
UPPERCASE	Acronyms
UPPERCASE within angle brackets	Command keys For example, press <ENTER>
“Parenthesis”	Names of onscreen elements, e.g. “OK”

1.3 Document Organization

This user manual is organized into the following sections:

Section 1	Describes the scope and objective of DevComDroid user manual along with the organization of the remaining part of the manual
Section 2	Provides an overview of the DevComDroid application and its architecture
Section 3	Provides the information pertaining to hardware and software requirements for the DevComDroid application
Section 4	Provides the steps to install, activate, and uninstall the DevComDroid application
Section 5	Provides the steps to start the DevComDroid application and connecting to field devices
Section 6	This section explains different aspects of the DevComDroid application and its functionalities

1.4 Getting Help

If you need help or encounter problems when using COM-Droid or this guide, please contact HART Expert Ltd. See Appendix B for contact information. Please provide the following information.

Create a text description of the problem. If possible, provide the text in event sequence, which will enable the duplication of the problem. Provide information about the system. This information must include:

- DevComDroid version and License ID
- Android device (Phone/Tablet) information: make, model, and Android version
- HART Device information: make, model, and device revision
- Point of contact: complete mailing address, telephone number, and e-mail address,
- The date and time of the problem occurrence

2 OVERVIEW OF DEVCOMDROID

Field devices such as flow, pressure, level, temperature transmitters, and valve positioners provide the physical connection to the process. These devices allow the control system to monitor and manipulate process conditions. HART devices maintain a real-time database of process, configuration, identification, and diagnostic information. This information can be accessed using the HART Field Communications Protocol.

HART devices are capable of providing functions and features far beyond the basic task of providing a process input or accepting a control output to manipulate process conditions. Many HART compatible device manufactures create a DD (Device Description) describing all of these functions and features specific to that device. The DD also provides information essential to the successful configuration and calibration of the device.

DevComDroid uses these DD's to access the data stored in a device, providing full configuration and setup support for all registered HART DD's.

DevComDroid accesses and presents field device data based solely on its DD. No other files, information or custom drivers are required. DevComDroid is intended to monitor and configure a single device at a time, it is directly connected to the current loop of the particular device and:

- Provides user interface to configure the HART field device,
- Provides a means to configure and view all the parameters related to HART field device, and
- Provides an option to view the detailed status and diagnostic capability of the device.

DevComDroid allows viewing and modifying of field device parameters based on the DD. Using the device's DD, DevComDroid performs various tests to verify the proper operation of the HART device. DevComDroid runs as a standalone software application and must have either a Bluetooth HART Modem paired to the Android device to interrogate HART devices, or a WiFi access point for HART-IP and *Wireless*HART devices.

3 SYSTEM REQUIREMENTS

The following minimum system requirements are recommended for operation of DevComDroid.

Mobile Device	Memory RAM: 1 GB Memory ROM: 2 GB Screen Resolution: 960x540 qHD
SD Card	Optional
Communication Port	Bluetooth 2.0 for HM-BT-BAT-ER* Bluetooth 4.0 for HM-BLE*
Operating System	Android Jelly Bean (4.3)
*HART Modem	COM-Droid is supplied with a Bluetooth HART modem HM-BT-BAT-ER or HM-BLE. However, it is possible to use more than one Bluetooth HART Modem with DevComDroid software. DevComDroid supports all Bluetooth HART Modems

4 DEVCOMDROID INSTALLATION

4.1 Prerequisites

You need to be familiar with the basic functions of the following when installing DevComDroid:

- Android operating system
- HART Modem, e.g. a Bluetooth HART Modem
- A HART field device (e.g. a HART Transmitter such as Pressure, Temperature, Flow, etc)

4.2 Installing the DevComDroid Application

4.2.1 Install DevCom Application

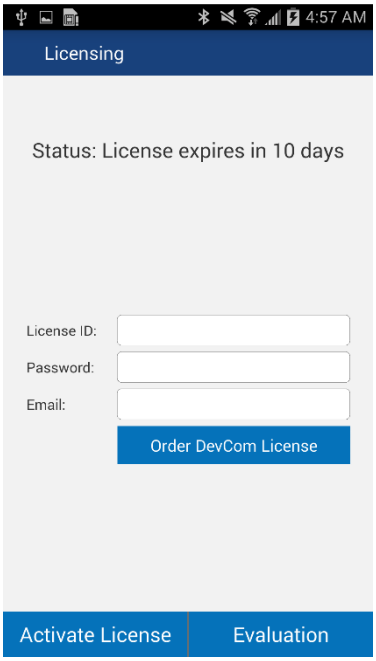
To install the DevCom application, perform the following steps:

1) Copy the file “com.procomsol.devcom.apk” to your device. It is recommended to put it in the “Download” folder
2) On the Android device, launch the “MyFiles” app or equivalent
3) Navigate to the directory where you saved the file in Step 1
4) Click on the file “com.procomsol.devcom.apk”
5) At the “Do you want to install this application?” select “Install”

4.2.2 Activating DevCom

DevCom must be activated for use after 10 days. The following procedure will activate the software (this only needs to occur one time):

1) Launch the DevCom App. The following Licensing Window is displayed after accepting the License Agreement:



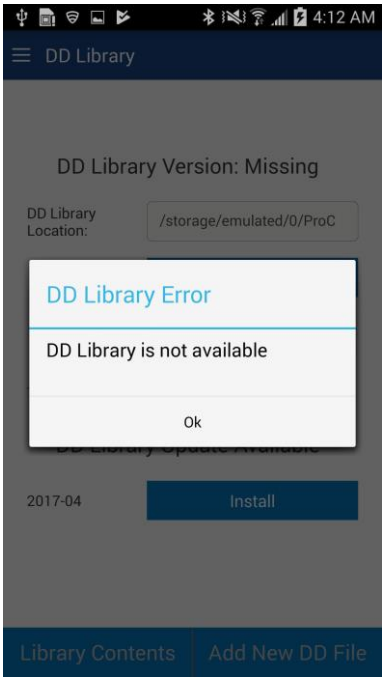
2) To activate your license: Enter the provided License ID and Password from your order. Also enter your Email address if you wish to receive update notifications. Then press “Activate License”. Once activated, this window will not appear during start up.

3) To proceed in Evaluation mode, press “Evaluation”. You can use the App for 10 days before activation is required
4) If you need to purchase a license, press Order DevCom License and you will be sent to the DevCom page on the ProComSol website

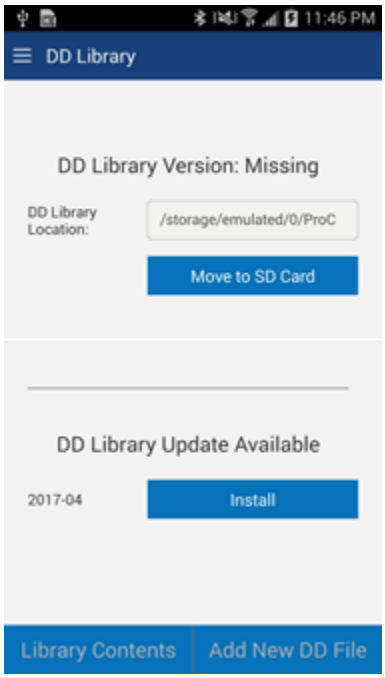
4.2.3 Installing the DD Library

The DD Library is required for App function. Perform the following to download the latest DD Library to your device:

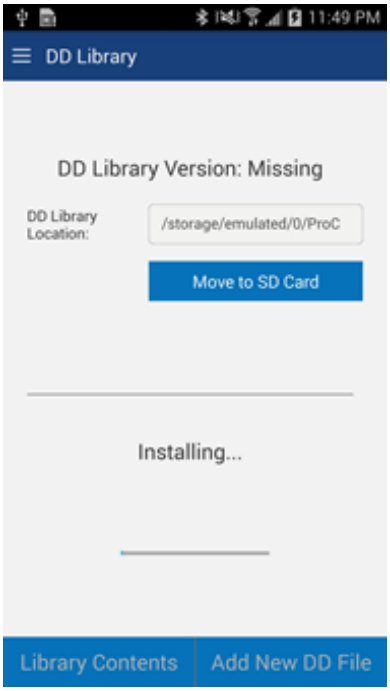
1) The following Window is shown after the Licensing Window:



2) Tap “OK” to continue, you will then see the screen below



3) Tap “Install” to continue and the following screen will appear. Note that the full DD Library download takes about 15 minutes. Do not close this screen!



4) The following screen will appear when the DD Library install is successfully completed:

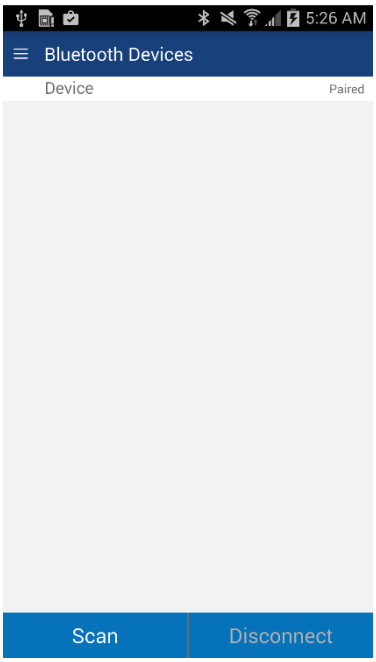
4.2.4 Selecting a HART Modem

DevCom application communicates with the HART Field Devices through either a Bluetooth HART Modem, or for HART-IP and *Wireless*HART devices through a WiFi connection to the HART Gateway device. Using these communication methods, you will transmit real-time HART data between DevCom and connected HART compatible field device(s).

There are a wide variety of HART compatible interfaces. Please follow the manufacturer's instruction for connecting your interface to the Mobile (Smartphone). This manual assumes use of the HART modem manufactured by ProComSol, Ltd, either HM-BT-BAT-ER or HM-BLE. It uses the Bluetooth interface.

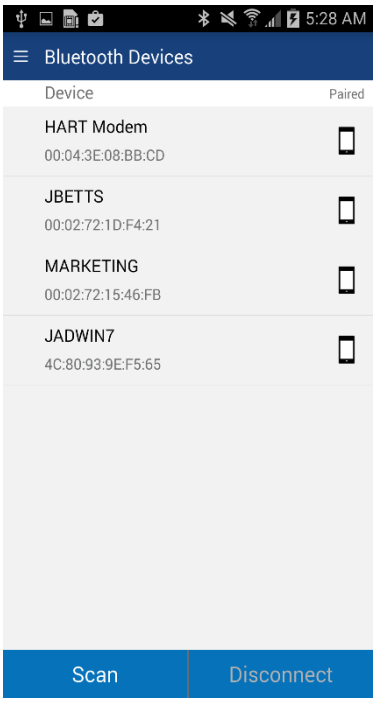
Turn the Bluetooth HART Modem on. If using HM-BT-BAT-ER it is assumed you have already performed the Bluetooth pairing procedure (see the HM-BT-BAT-ER documentation for details). If using HM-BLE no pairing is required. The following procedure is used to select the modem (this only needs to occur one time):

1) The following Window is shown after the DD Library Window:



2) Ensure your Bluetooth HART modem is on and press "Scan"

3) The Window will show all available Bluetooth devices



4) Tap your HART Modem. Once a modem is selected, this Window will not appear during start up

4.3 Connecting to the HART Network

For communications you must have a suitable load resistance, or a 250Ω Shunt/Loop resistor must be placed in series with the device power supply. Using the clips on the wires of the HART Modem connect either: across the loop load resistor (A – B), or across the HART transmitter terminals (C – D). See the relevant Figure 1a, 1b or 1c below.

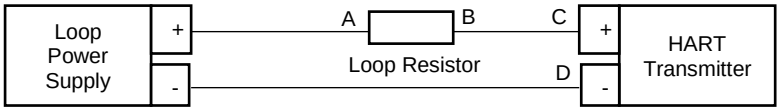


Figure 1a. Loop Powered HART Transmitter Connection

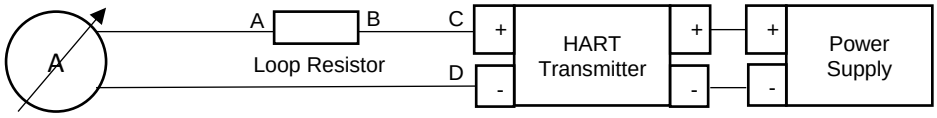


Figure 1b. 4-Wire HART Transmitter Connection

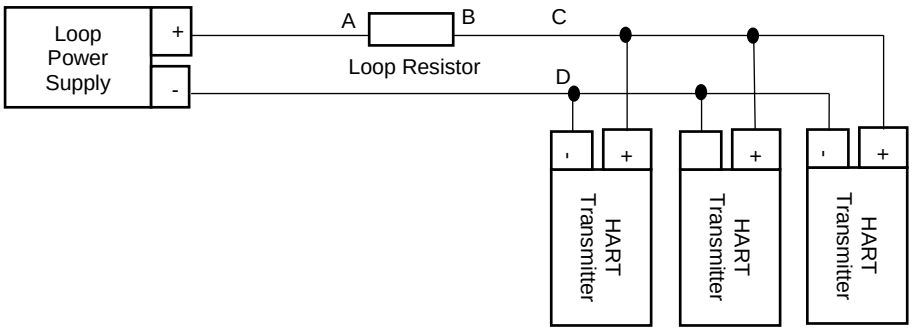


Figure 1c. Multi-drop HART Transmitter Connection

4.4 Uninstalling the DevCom Application

To uninstall the DevCom application, perform the following steps on the Android Device:

1) Go to the Application Manager (or equivalent) screen
2) Select “DevCom”
3) Select “Uninstall”
4) Select “OK”

4.5 Recharging the Bluetooth HART Modem

The Bluetooth HART Modem (HM-BT-BAT-ER and HM-BLE) uses a built in rechargeable Lithium Ion battery. When needed it can be recharged by connecting the modem to a powered USB port using a the supplied USB cable. The time it takes to recharge will depend on the maximum power output of the USB port it is connected to, however approximately 1 hour is typical.

While actively charging the “Charge On” LED will illuminate, when completely charged the LED will turn off. When the battery is almost full the “Charge On” LED may blink. If the “Charge Error” LED illuminates, disconnect the Bluetooth modem and allow it to cool down. The normal cause for “Charge Error” is an excessively hot battery. If when you connect the modem the “Charge On” led blinks once and then stays off, your modem is already fully charged.

Rechargeable Lithium Ion batteries are very reliable so long as they are not abused. They maintain charge very well, after 1 year of storage they typically have 75% of the charge remaining. Hence you can use and recharge them without worries associated with many other battery technologies, e.g. Lithium Ion batteries do not suffer from battery memory. As an engineer you may be interested in how to optimise battery life/performance, if so all the normal recommendations for lithium batteries (Li-Ion, Li-Po) apply:

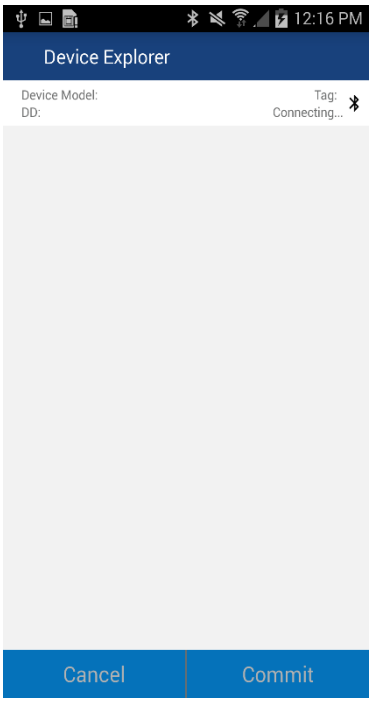
1) Do not expose to flames or excessive heat (>85 deg.c)
2) Do not charge by any method other than that described above
3) Lithium Batteries do not have a “memory” therefore they can be partially used and partially charged at any time, in fact they prefer partial charge/discharge. Unlike NiCad batteries, you do not need to fully discharge and then fully charge Lithium based rechargeables. **Lithium batteries have a longer life if you only partially discharge them.**
4) Store away from heat sources. A cool room (10 – 20 deg.c) is ideal, but do not store Lithium batteries at fridge or freezer temperatures!
5) Do not leave lithium batteries fully discharged for long periods of time (weeks/months). If they are fully discharged they should be recharged as soon as possible.

5 USING DEVCOM

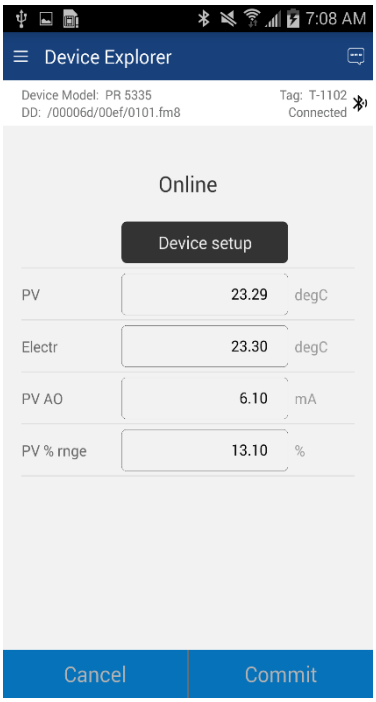
5.1 Starting DevCom

Establish the physical connection between the field device and the HART Modem. With the physical connection established, launch DevCom by pressing the DevCom icon on your device screen.

1) Start the DevCom App. The following application window is displayed and DevCom will then automatically identify the field device and begin communicating with the field device



2) When the field device is successfully connected to DevCom, the Device Explorer window appears with the root menu of the device DD shown.



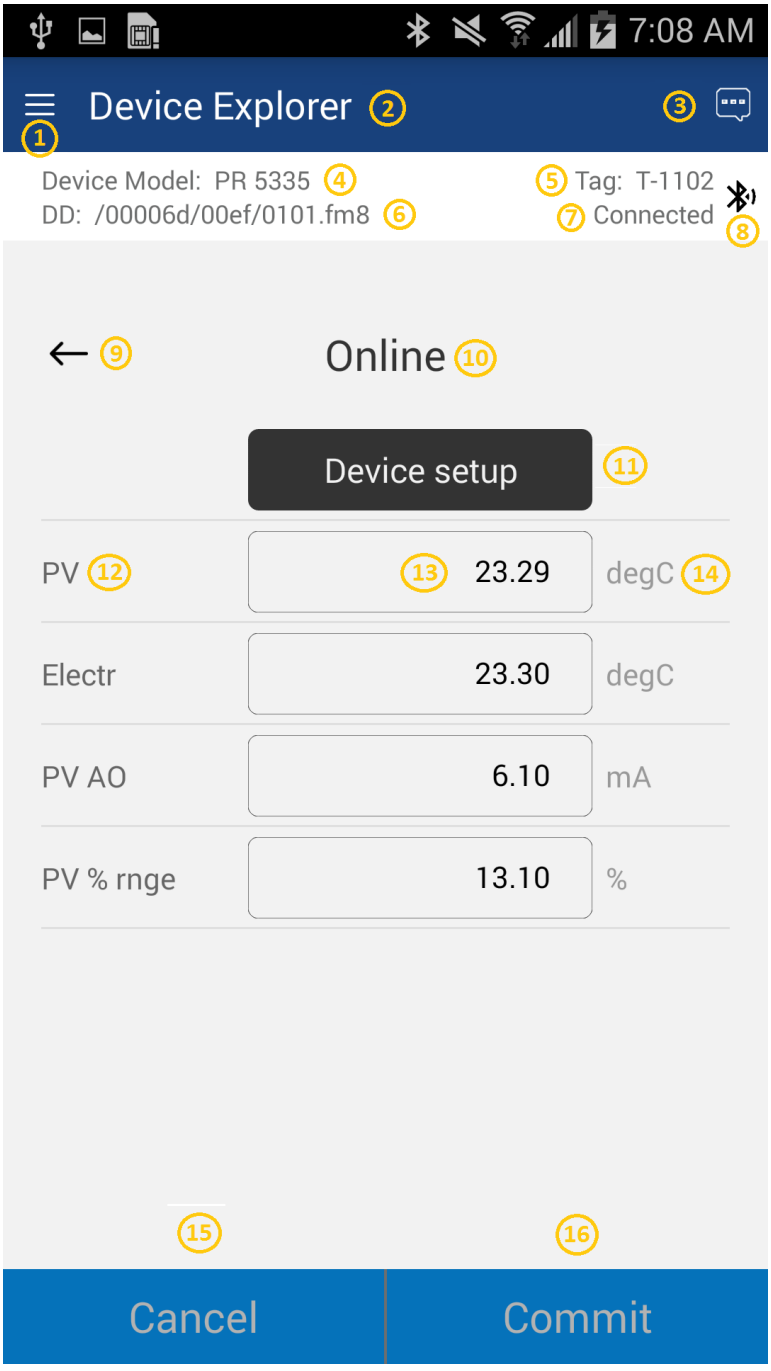
The DevCom windows shown in this document are only an example of what you may see when connected to your field device. What you will see is controlled by the DD and the device. The menus, data, status and configurations displayed are specified by the device's manufacturer in the DD itself.

3) Select the required menu to configure or review the field device's data

5.2 Getting Familiarized with DevCom

5.2.1 The Device Explorer Window Fields

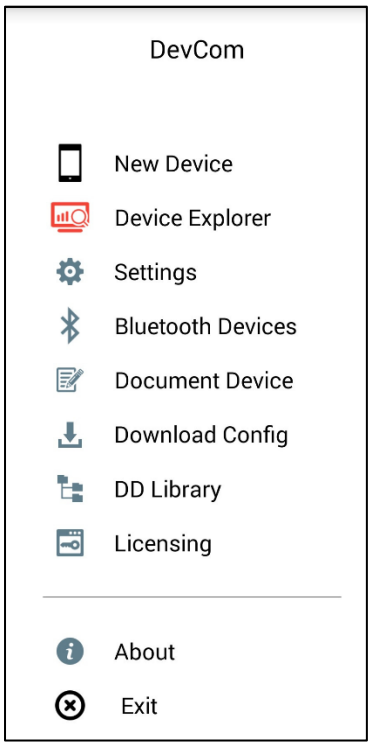
The DevCom Device Explorer window is designed to provide the operator with valuable information in order to make work quick and easy. Below is a typical Device Explorer window with each field described:



1 - Window Navigation icon, aka “Hamburger” icon
2 - Window name
3 - Device Status Icon
4 - Device model of connected HART device
5 - Tag name of connected HART device
6 - DD loaded for connected HART device
7 - Modem status
8 - Communication indication
9 - Back softkey for menu navigation
10 - Menu title for current menu
11 - Sub menu
12 - Label
13 - Data
14 - Units
15 - Commit, save edit changes to connected HART device
16 - Cancel, return edit changes to original value

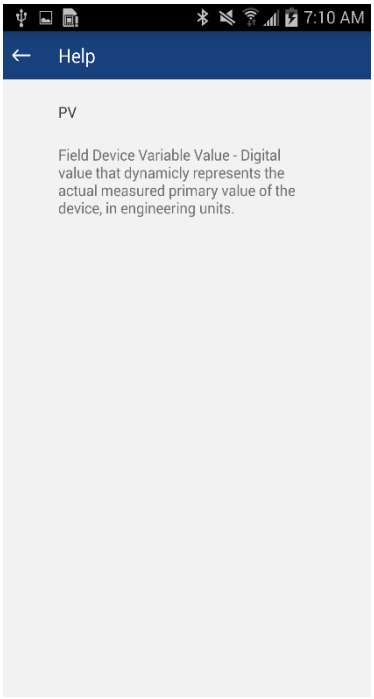
5.2.2 Navigating the Window Menus using the ≡ icon (aka "Hamburger")

DevCom has several windows with specialized information. Press the Hamburger icon and the following Window appears, details in Section 6.5: Note that the red icon indicates the active Window when the Hamburger icon was pressed. This helps the user return to the previous window.

Menu	Explanation
	= DevCom – App name = Connect to a new device or reconnect to the same device. = Main device window with device data = Launches Settings Window = Launches Bluetooth Selection Window = Launches the Document Device Window = Launches the Saved Configurations Window = Launches the DD Library Window = Launches the License Window = About – Shows copyright, support information, and Serial Number = Exit - Exit DevCom.

5.2.3 Using the Help Menus

When you select a parameter label, a window will appear with information about the parameter. Below is an example:



5.2.4 Menu Colour Scheme

DevCom application uses different colours to represent different elements of the application. The following table lists the colours and their meanings:

Colour Example	Meaning
<Menu Name>	Indicates a menu in the navigation tree
<Label> <Data>	Indicates an “Enumerated Variable” item (Note the triangle)
<Label> <Data>	Indicates a Read Only “Variable” item (Note the data background is gray)
<Label> <Data>	Indicates an Editable “Variable” item (Note the data background is white)
<Method Name>	Indicates a “Method” (Standard Operating Procedure) item
<Edit Display Name>	Indicates an “Edit Display” item

6 FUNCTIONS AND BASIC OPERATIONS

6.1 Overview

DevCom allows the user to monitor and configure a single device at a time in the field. Each device had a DD that determines what device information is present. A DD may contain any of the following parameters/elements:

Variable

A variable is defined as the data contained in the device (e.g. Device Firmware Version). There are three types of variables:

Numeric – Variable data consists of numbers
Text – Variable data consists of text and/or numbers
Enumerated – Variable data is from a list of valid data points.

The above variables are further definable as follows:

Editable Variable – It allows the operator to modify the value and download it to the device.
Non-Editable Variable – It is a read-only data from the device.

Edit Display

This option is used to view a group of parameters. You can also modify a single parameter from this group, based on which other parameters of the device get altered.

For example, if the Engineering Unit of the device is modified, the corresponding Low Limits and High Limits change as per the Engineering Unit set.

Method / Standard Operating Procedure (SOP)

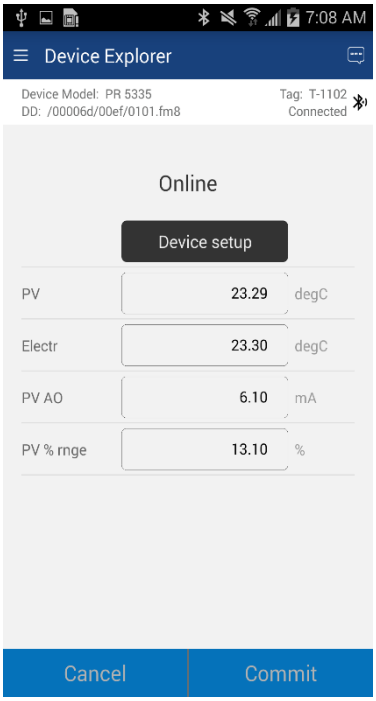
This option helps to perform various tests on the device for instance, Self Test and Loop Test. A Method or SOP is a series of steps that are executed in a sequence results in the completion of some device related tasks. When a method gets invoked, it gives various warning messages and options to the user, by which the user can thoroughly test the device. If a test is aborted by operator command at any stage of the sequence, the method invokes additional steps to bring the device back to its original state before the test.

6.2 Configuring Device Information

6.2.1 Overview

DevCom allows you to view and configure the field device parameters based on the device description (DD). The related variables are grouped under various menus of different levels as defined in the DD file. The following table describes the details about the device configuration:

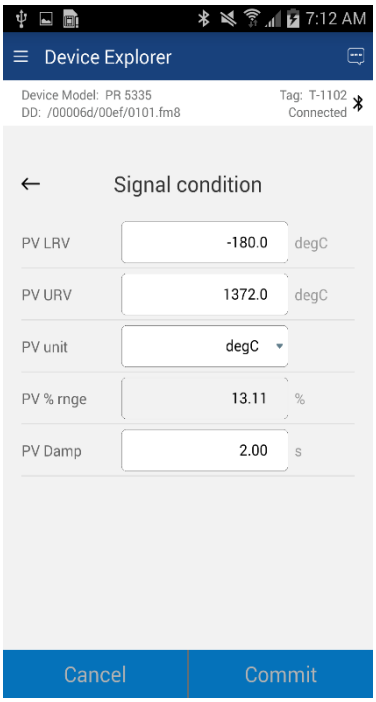
1) Ensure that the application is running and communications have been established:



2) There are three types of variables: Numeric, Text, and Enumerated. In turn these variables can be read/write and read only. Dynamic variables are also read only.

The following points and screenshot describe how the device parameters represents their status when connected to DevCom:

White Data Background: Modifiable Values
Gray Data Background: Read only Values
Data field with gray triangle: Enumerated data

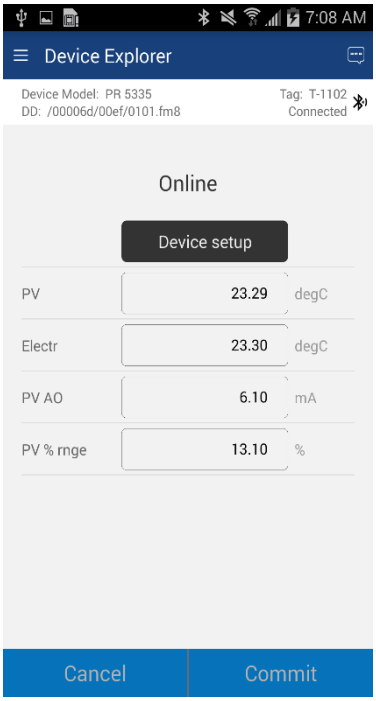


3) Select the parameter and configure the values, as required.
4) The subsequent topics explain how to configure device parameters.

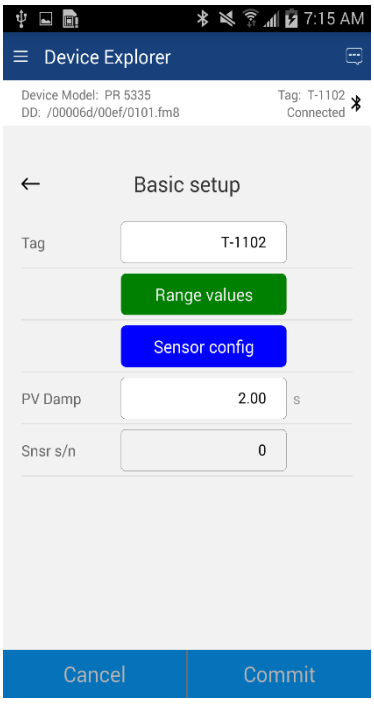
6.2.2 Variable Edit

To edit a parameter of the connected device, perform the following steps:

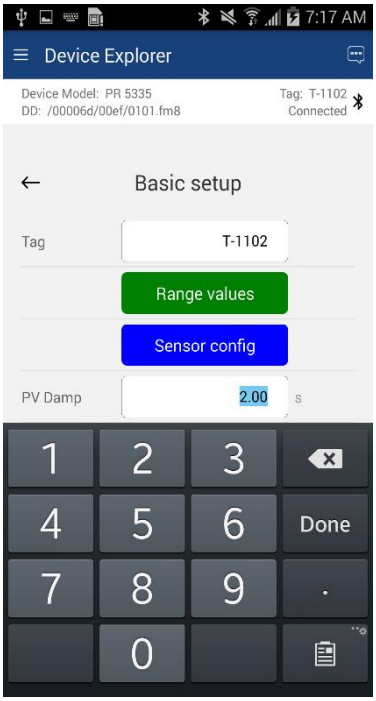
1) Ensure that the application is running and communications have been established:



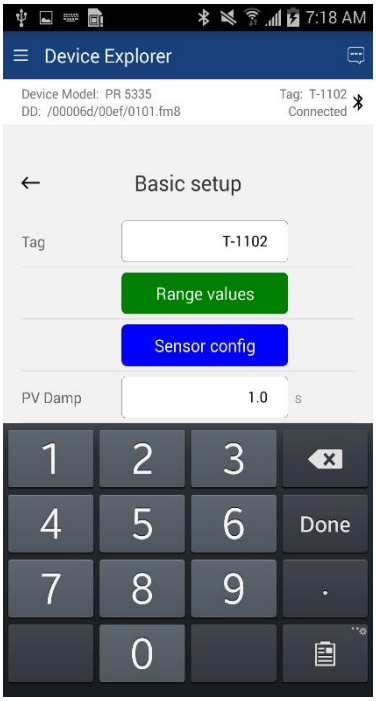
2) Select the menu where the editable parameter is present as shown below. For this example we are editing PV Damp:



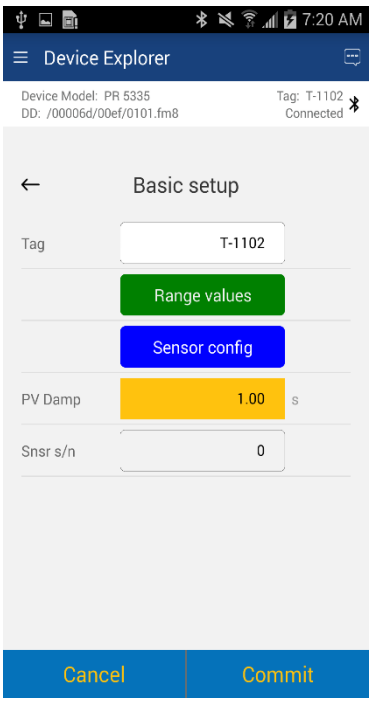
3) Select the variable data to edit it. The existing data will be highlighted and an appropriate soft keyboard will appear:



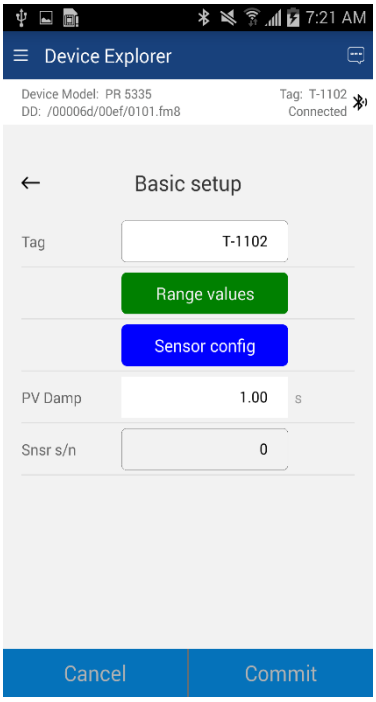
4) Make the changes to the parameter value, as required.



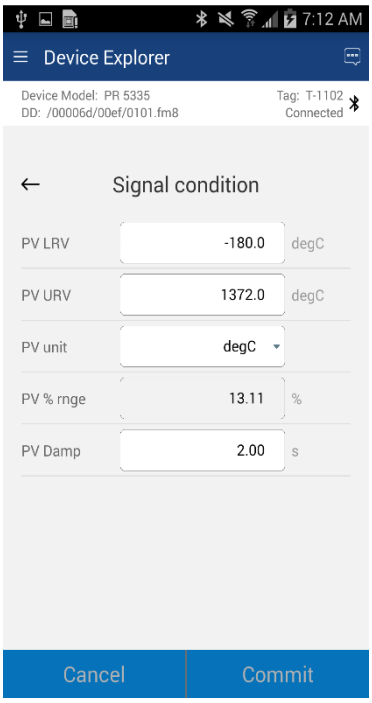
5) Use the Back key or “Done” button to remove the keyboard.
Note that the changed variable data background is now Yellow and the “Commit” and “Cancel” buttons are also Yellow:



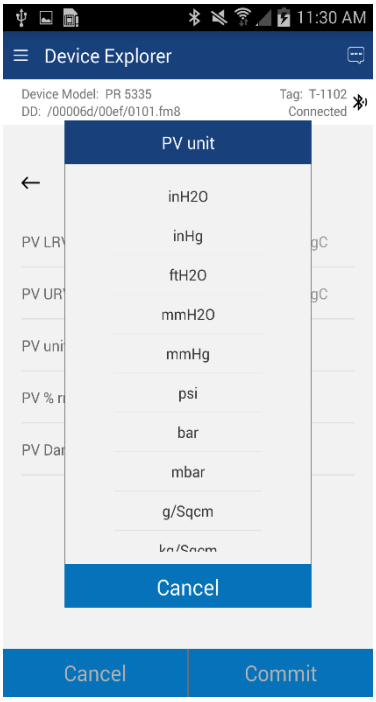
6) Click on the “Commit” button to send the new value to the device. The buttons and data return to white when complete:



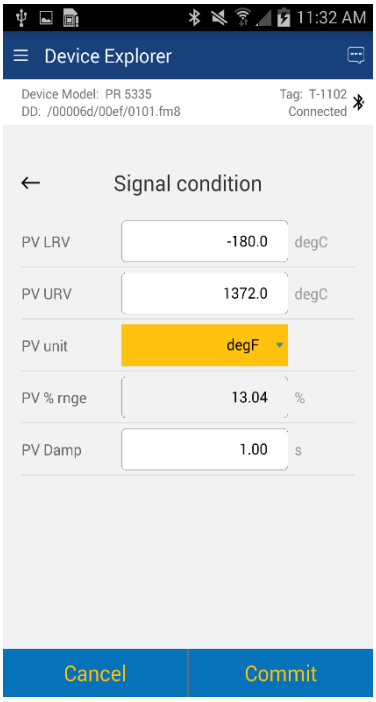
7) For Enumerated variables, the process is very similar. Start by selecting the menu where the desired parameter is located:



8) Select the variable data to edit it. A list will appear with the valid values to use:



9) Select the value you wish to use.
10) Once selected, the list will disappear and the new value will be inserted into the data field. Note that the changed variable background is now Yellow and the “Commit” and “Cancel” buttons are also Yellow:



11) Click on the “Commit” button to send the new value to the device:

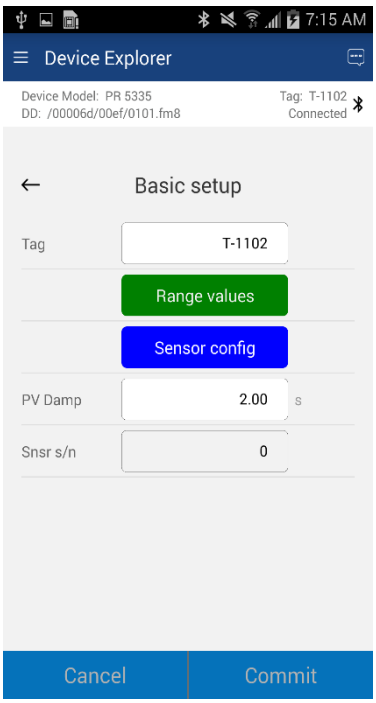
6.2.3 Edit Display

The Edit Display is a variation on the Variable edit. An additional window helps the user view a group of parameters based on the DD. You can also modify a single parameter from this group. Parameters linked to the edited field will be updated automatically

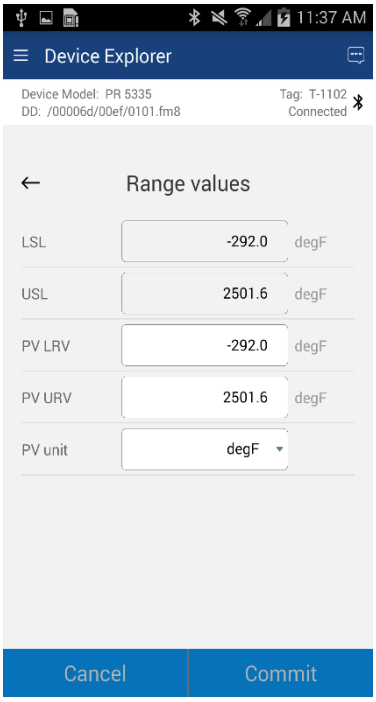
To view and configure these variables, perform the following steps:

1) Ensure that the application is running and communications have been established:

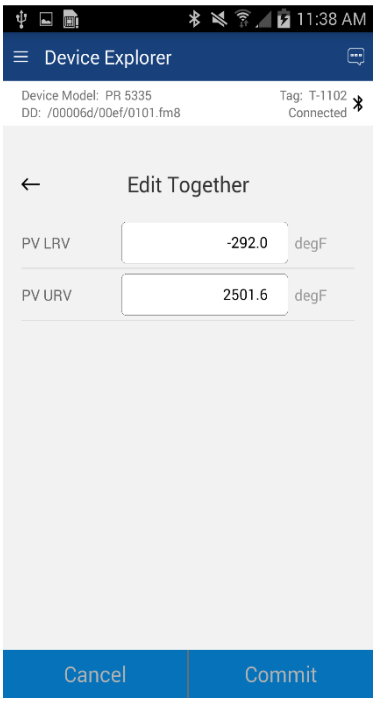
2) Select the menu where the editable parameter is present as shown below. For this example we want to edit URV from the Range Values Edit Display:



3) Once selected, the Edit Display looks like a regular menu as seen here:



4) Select the parameter you wish to edit from within the Edit Display box. The following dialog box appears on the screen:



5) Make the change to the value, as required.
6) Click on the “Commit” button to send the new value to the device.

6.2.4 Executing Methods or Standard Operating Procedures

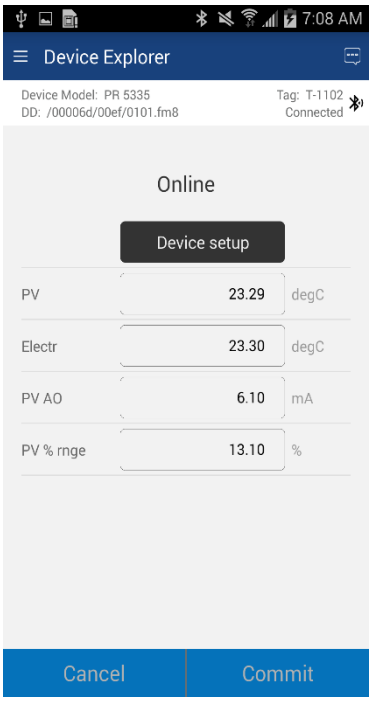
Methods are defined in the DD file for the device that DevCom is connected to. You can select the Method and execute it for calibrating the device, trouble shooting, etc. Method execution leads you through a number of steps, like in a wizard.

A few examples of methods include,

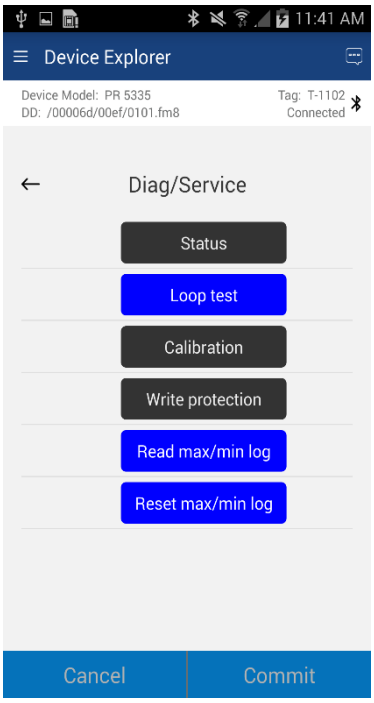
Set high and low range calibration points
Calibrate the device
Run the advanced diagnostic test procedure
Execute tests to gather information on device operation.

To execute a Method, perform the following steps:

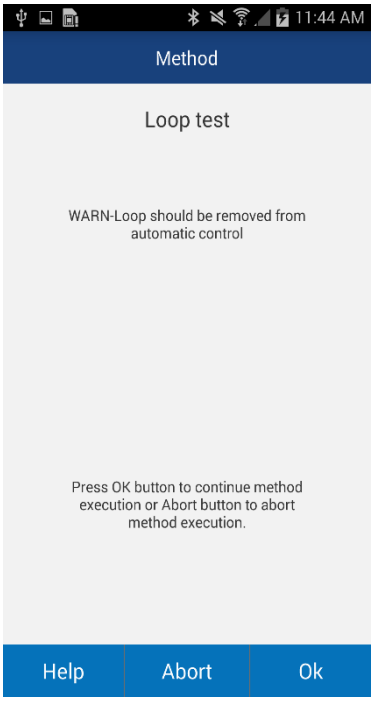
1) Ensure that the application is running and communications have been established:



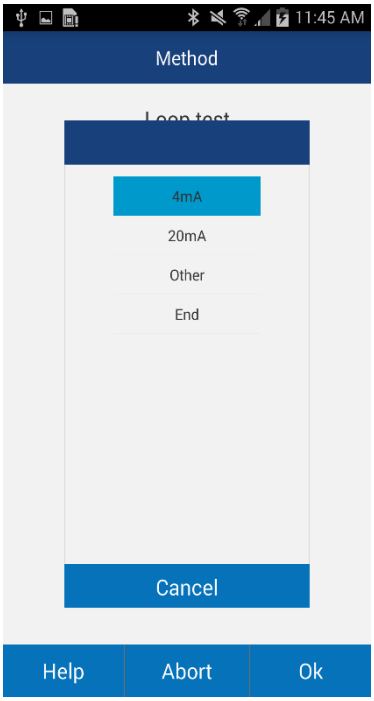
2) Select the menu where the method is present and select the desired Method:



3) Below is an example of a Method window:



4) Click “OK” to move to the next dialog in the Method sequence.
Some methods require more user input such as selecting an enumerated value as below:



5) Click “Abort” to cancel the Method execution.
6) Click “Help” to get specific help for that step of the Method. This Help information is provided by the device DD.

6.3 Calibrating HART Field Devices

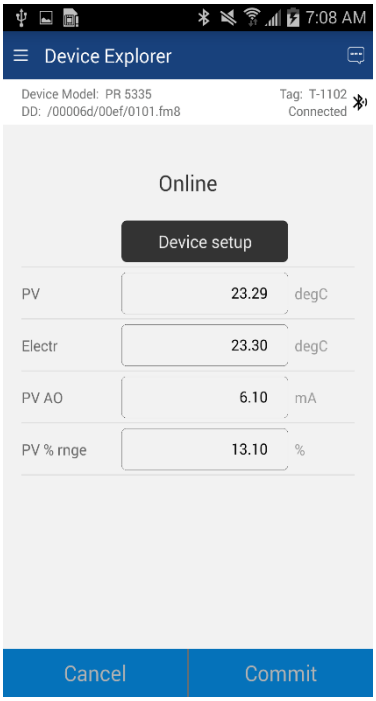
Calibration of field devices and loop test are achieved by executing the Methods or Standard Operating Procedures that are specific to device. Methods are defined based on the test parameters specific to the device, providing information for the calibration of that device.

See the previous section for Method execution.

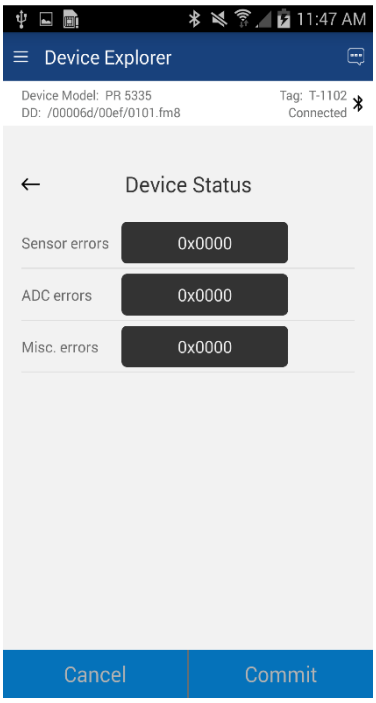
6.4 Viewing the Device Status

DevCom provides the user with the ability to monitor the device specific status of the device. To view the device and status, perform the following steps:

1) Ensure that the application is running and communications have been established:

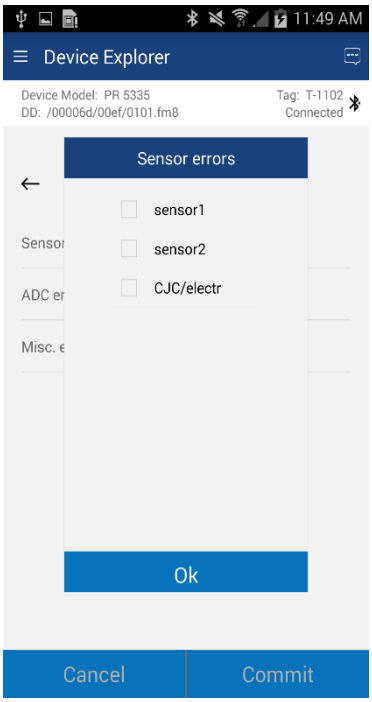


2) Select the Device Status icon. The following window is displayed:



Note the status byte is shown for each status point.

3) To see more details on which status point is active, select the status data. Here is a sample:



4) Click the Back hardware button to close the Device Status window. Or you can press the ← soft key.

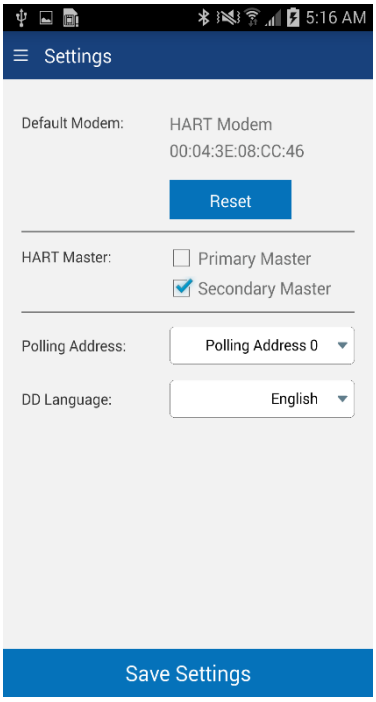
6.5 Window Detailed Description

6.5.1 Settings

There are several Settings that may need to be changed by the user to perform a desired activity. Below is a description of what Settings are available:

1) Ensure that the application is running. Communications do NOT need to have been established.

2) Select ≡ **Settings** from the main window. The Settings window is displayed:



Each setting is explained below.

6.5.1.1 Default Modem

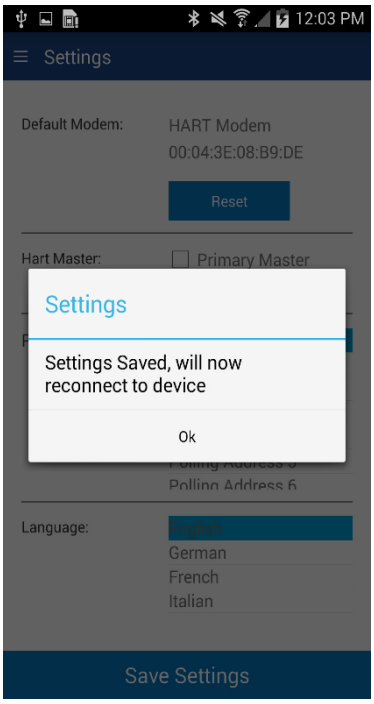
This option allows the user to disconnect the modem. Press “Reset” to clear the modem from App memory.

6.5.1.2 HART Master

This option allows the user to select Primary Master or Secondary Master for Multi-master systems.

1) Select desired HART Master.

2) Press “Save Settings”, if a new HART Master was selected the following message will be shown:

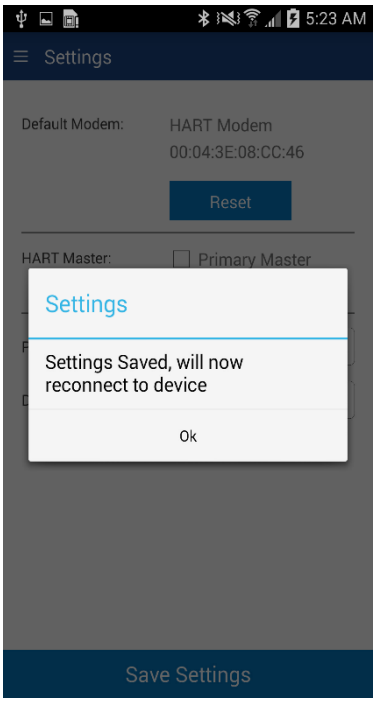


3) Press “OK” to return to the Device Explorer window.

6.5.1.3 Polling Address

This option allows the user to set the address to look for devices on Multi-drop networks. The default is address 0.

1) Press the triangle next to the current Polling Address selection. A drop down list will appear with all the valid Polling Addresses. You may need to scroll to view the address you want.
2) Press the desired Polling Address.
3) Press “Save Settings”. If a new Polling Address was selected the following message will be shown:

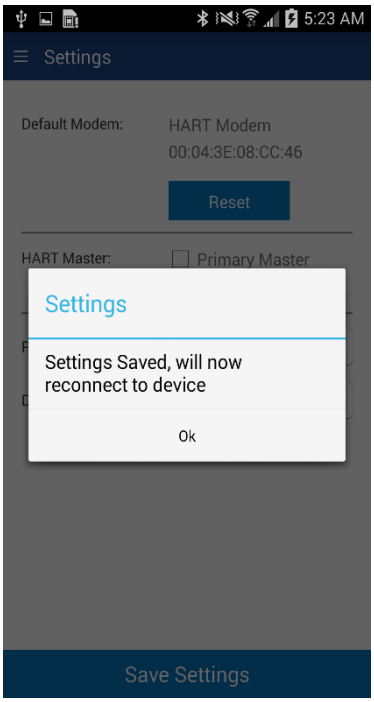


4) Press “OK” to return to the Device Explorer window.

6.5.1.4 DD Language

This option allows the user to select which language the DD data will be presented. Note that all DD's do not have each of these languages. In this case, English will be used. Also note that only the DD data is affected (currently), DevCom specific items will always be English.

1) Press the triangle next to the current DD Language. A drop down list will appear with all the valid DD Languages. You may need to scroll to view the language you want.
2) Press the desired DD Language.
3) Press "Save Settings". If a new DD Language was selected the following message will be shown:

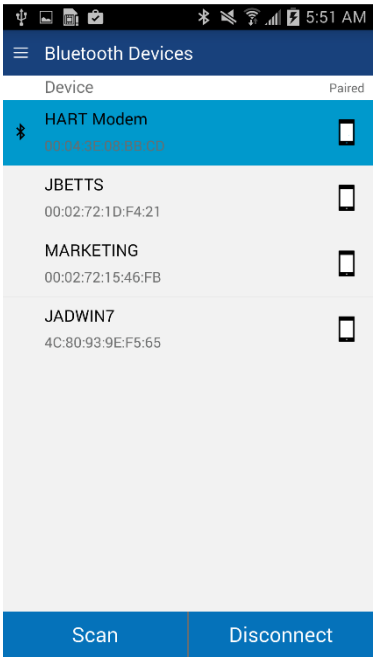


4) Press "OK" to return to the Device Explorer window.

6.5.2 Bluetooth Devices

This window allows the user to view the current modem or to change what modem to use for communications.

1) The Window will show all available Bluetooth devices with the current selected modem highlighted and/or marked with the Bluetooth icon.



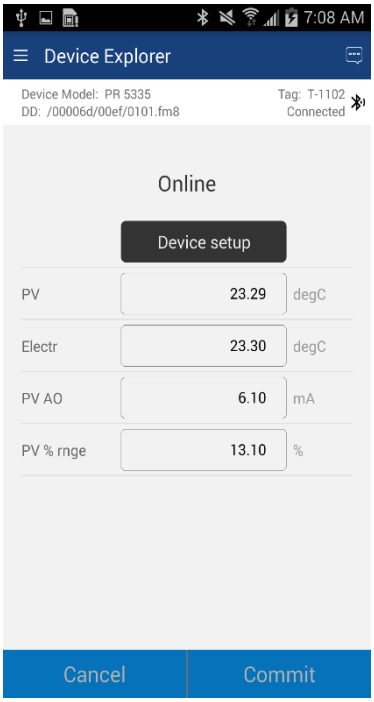
2) Tapping the current HART Modem will restart the connection.
3) Tapping “Scan” will look for nearby Bluetooth devices.
4) Tapping “Disconnect” will remove the connection to the current HART Modem.

6.5.3 Document Device

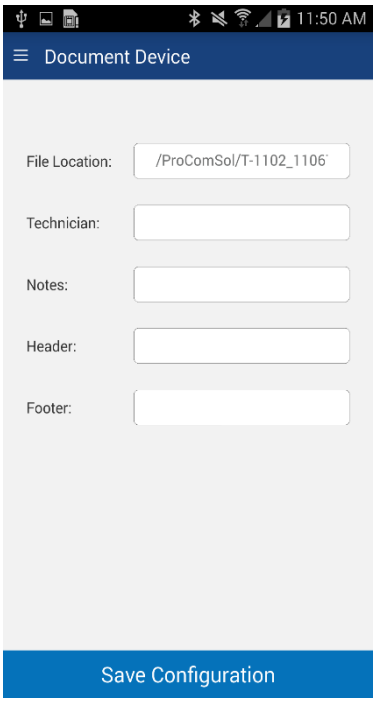
HART Device configurations can be saved to memory as a comma delimited text file and formatted PDF file to document the device.

To save device configurations to disk, perform the following steps:

1) Ensure that the application is running and communications have been established:



2) Select ≡ **Document Device** from the main window. The Document Device window is displayed:

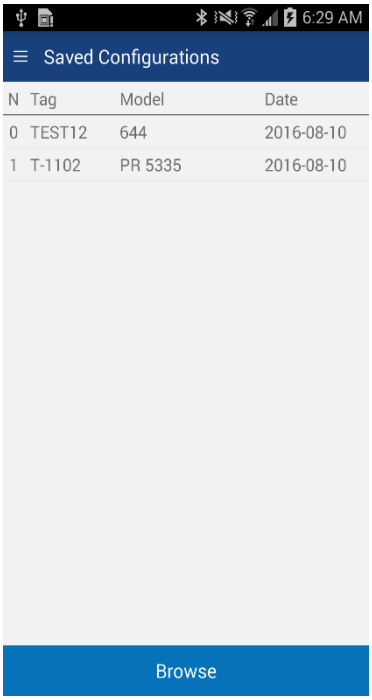


3) The default directory is \ProComSol. The default file name is Tag_Device ID. The filename can be changed by the user. Edit the directory and filename as needed.
4) Enter Notes in the Notes field if desired. Enter Technician name in the Technician field if desired.
5) Enter Header and Footer information for the PDF file if desired.
6) Press the "Save Configuration" button to save device configuration to text file and pdf file.
7) When complete, the pdf file will be displayed. You may need to select which App you want to use to display the file.

6.5.4 Download Config

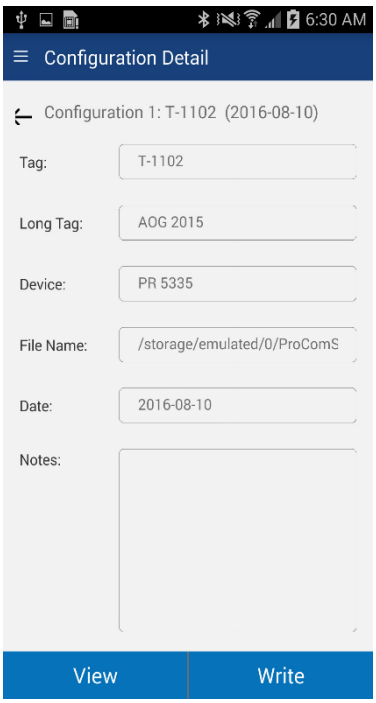
The saved HART Device configurations can be viewed and even downloaded to other devices. To view saved device configurations, perform the following steps:

1) Select ≡ **Download Config** from the main window. The Saved Configurations window is displayed:



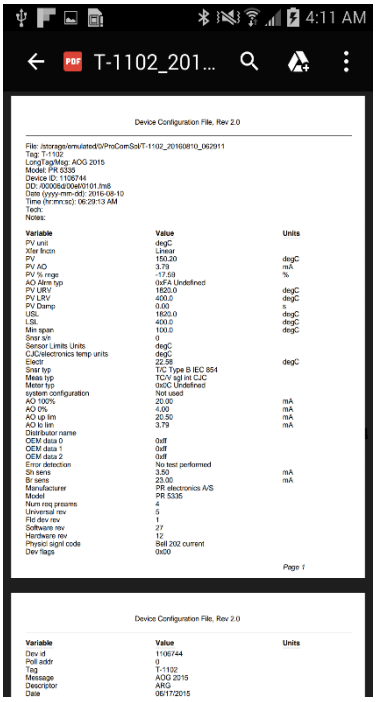
2) The saved configurations are shown in the order they were created. You can scroll up and down the list if necessary.

3) Tap a configuration to view details of the configuration. When N1 is tapped, the Configuration Detail window is displayed and shows the details of the saved configuration:



6.5.4.1 View Saved Configuration

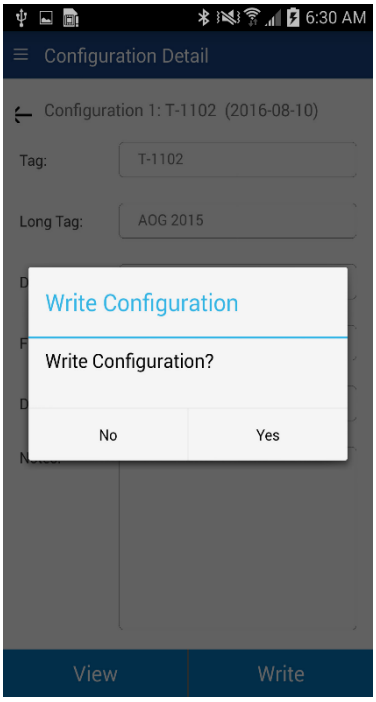
1) From the Configuration Detail window, press View.
2) The PDF file for the saved configuration is shown using the Android device PDF viewer:



3) Press the Back key to dismiss

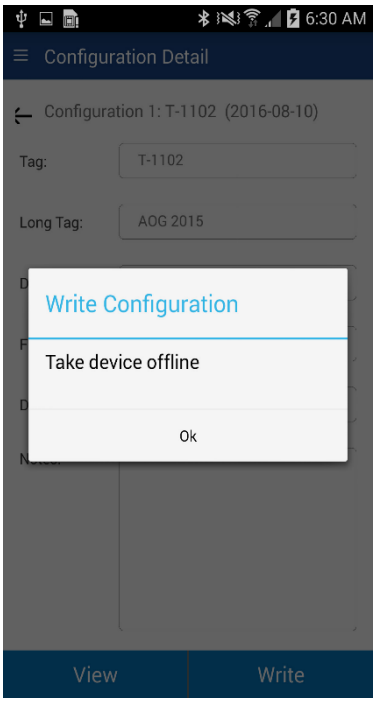
6.5.4.2 Configuration Write

1) Ensure that the application is running and communications have been established.
2) From the Configuration Detail window, press Write. The following Prompt is displayed:



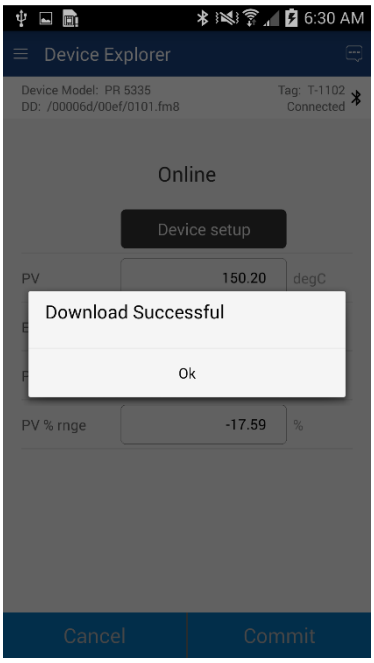
3) Press Yes to continue or No to go back to the Configuration Detail window.

4) If Yes, pressed, the following prompt appears:



This alerts the user that a configuration change can upset the process and the device should not be connected to the process.

5) Press OK when device is not connected to the process.
6) When the configuration write is complete, the following prompt will be displayed:

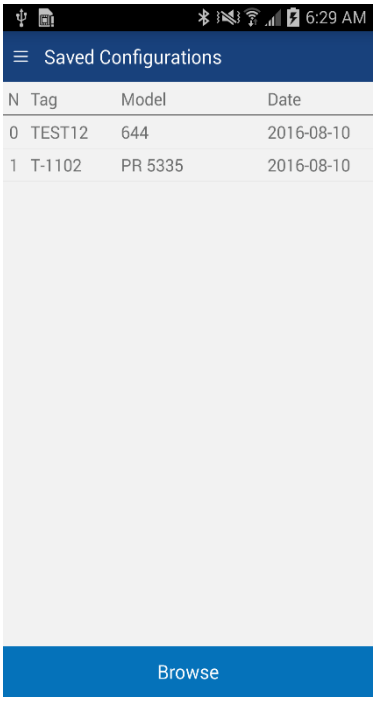


Also note that the connection to the device has been reinitialized in order to refresh the data in the App memory.

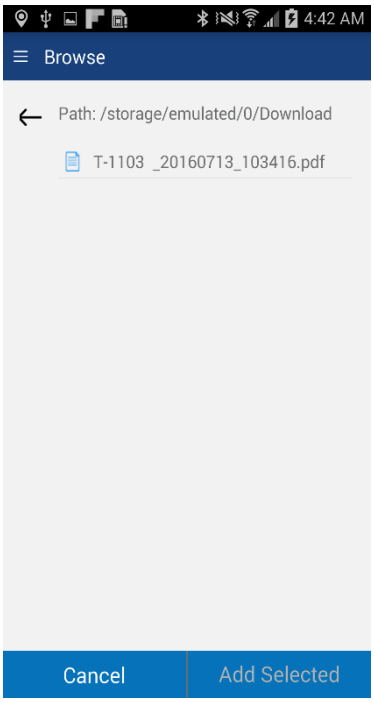
6.5.4.3 Configuration Browse

This function allows the user to bring configurations saved from another source into their device. The other source can be other DevComDroid users or even DevCom2000 users.

1) Copy the zzz.pdf, zzz.dc, and zzz.txt (where zzz is the configuration root file name) files to the Android device. The recommended directory is the /Download directory
2) Select ≡ **Download Config** from the main window. The Saved Configurations window is displayed:

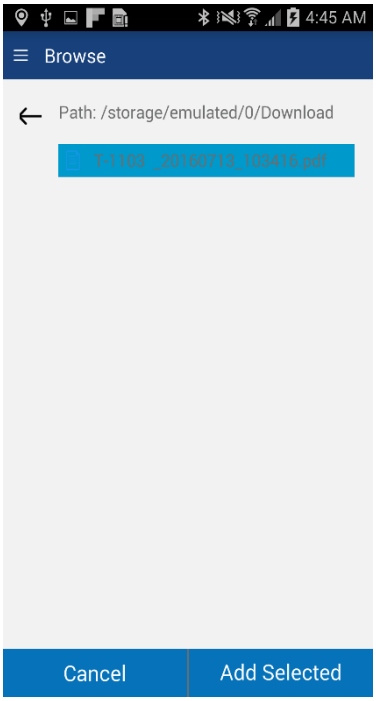


3) Press Browse. The Browse window is displayed:

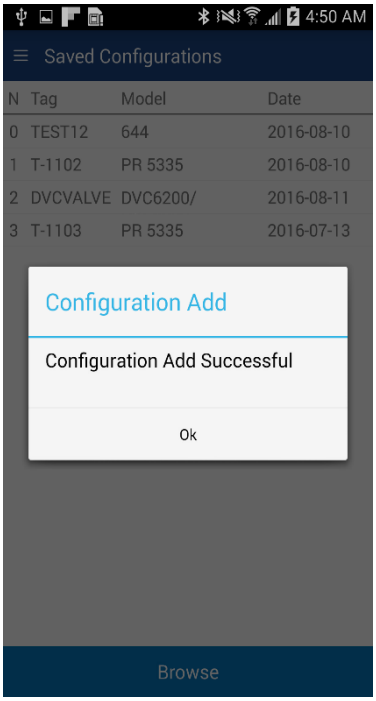


This window will just show the .pdf files. You can navigate to other directories using the Back key.

4) Select the desired configuration to add to the device. Once selected the Add Selected button becomes active:



5) Press Add Selected, and the following prompt appears when the Configuration Add is complete:

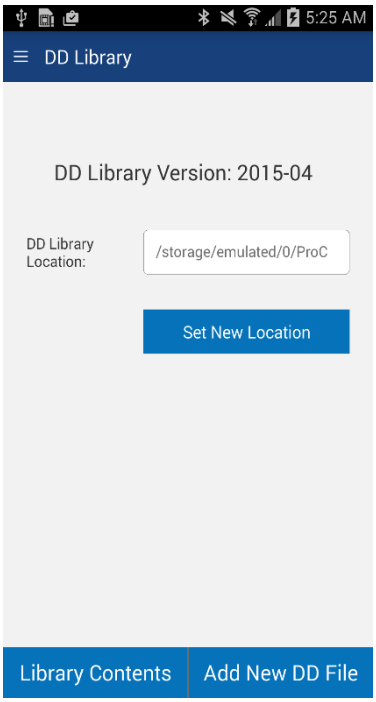

4:50 AM
Saved Configurations
N Tag Model Date
0 TEST12 644 2016-08-10
1 T-1102 PR 5335 2016-08-10
2 DVCVALVE DVC6200/ 2016-08-11
3 T-1103 PR 5335 2016-07-13
Configuration Add
Configuration Add Successful
Ok
Browse

6.5.5 DD Library

This window allows the user to move the DD Library location, view the library contents, and even add new DD files to the library.

6.5.5.1 Move DD Library

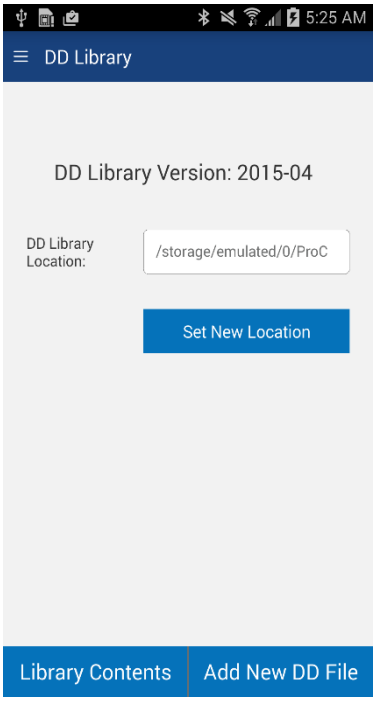
1) Ensure that the application is running. Communications do NOT need to have been established.
2) Select ≡ **DD Library**. The DD Library Window is displayed:



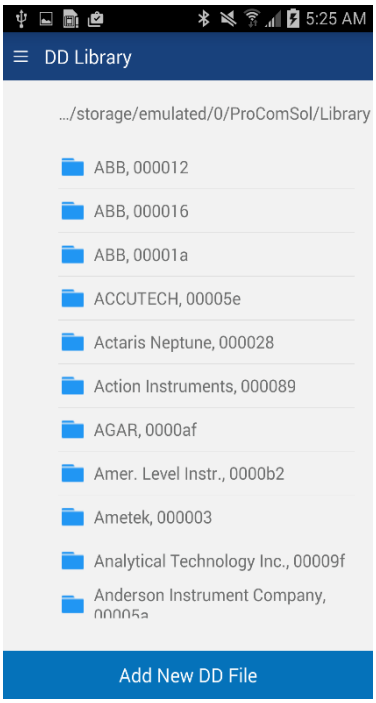
3) Enter the new DD Library location in the “DD Library Location Box.” This could be an SD Card for example.
4) Press a “Set New Location”. The App will now look for the DD Library at the new location.

6.5.5.2 View DD Library

1) Ensure that the application is running. Communications do NOT need to have been established.
2) Select ≡ **DD Library**. The DD Library Window is displayed:

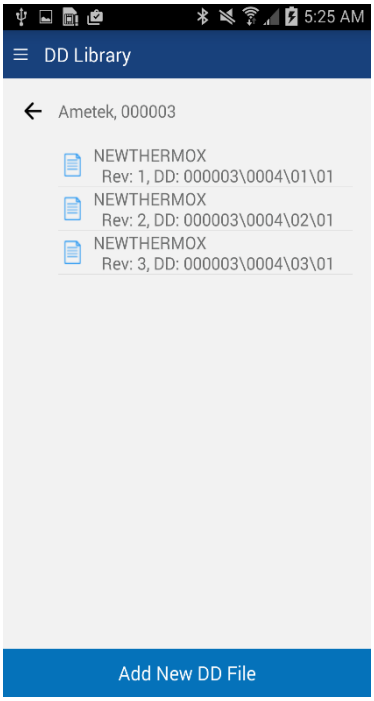


3) Tap “Library Contents”, the following Window is displayed:



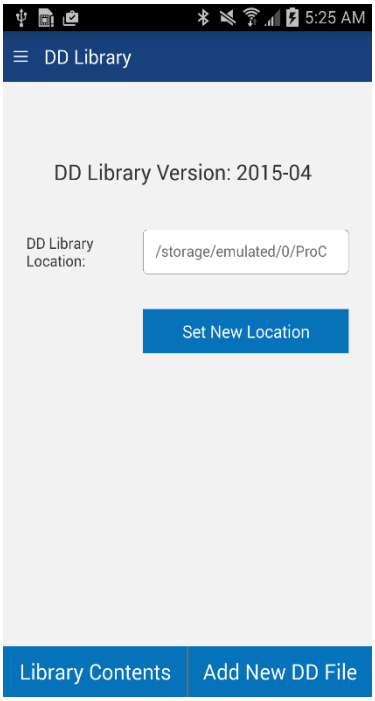
The list of manufacturers is shown in alphabetic order.

4) Select a manufacture and the list of devices for that manufacturer are displayed:

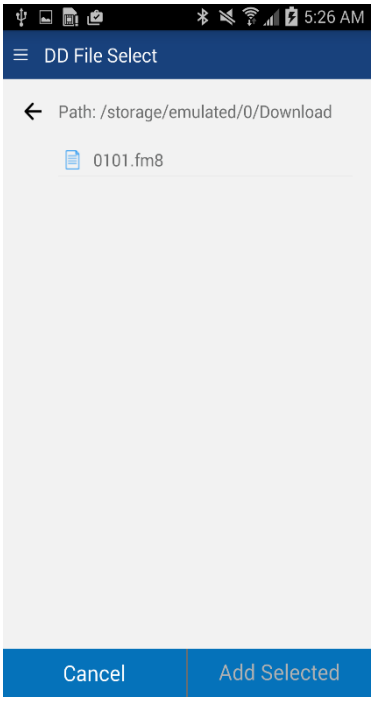


6.5.5.3 Add File to DD Library

1) Ensure that the application is running. Communications do NOT need to have been established.
2) Select ≡ **DD Library**. The DD Library Window is displayed:

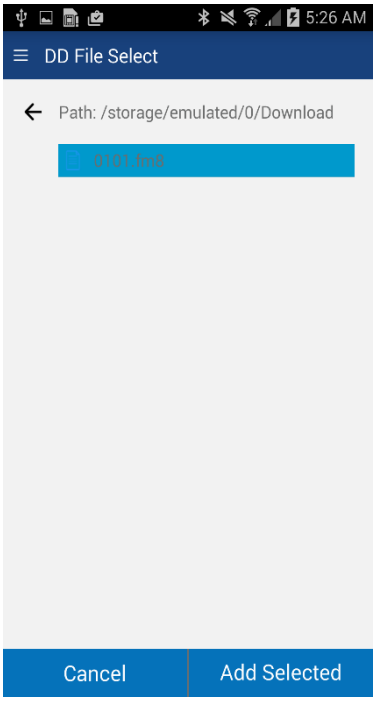


3) Tap “Add New DD File” The following file selection Window is displayed:



Use the <- key to navigate the device file structure until you find the file you would like to add.

4) Once the desired file is found, select it to activate the “Add Selected” Button.

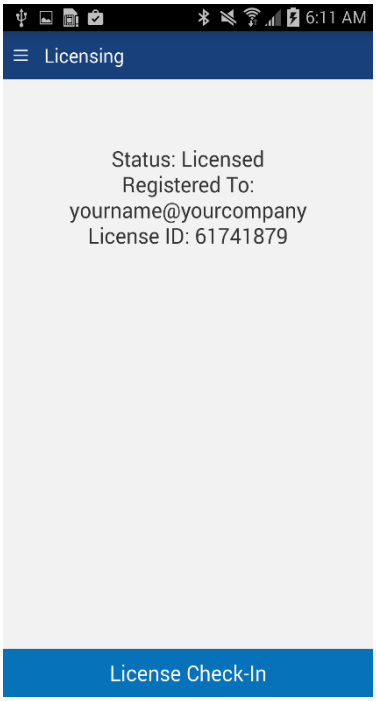


Tap “Add Selected” to add the file to the DD Library.

6.5.6 Licensing

The user may need to review license status to get the number of days left in the evaluation for example. This window shows License details.

1) Ensure that the application is running. Communications do NOT need to have been established.
2) Select ≡ **Licensing**, the Licensing Window is displayed:



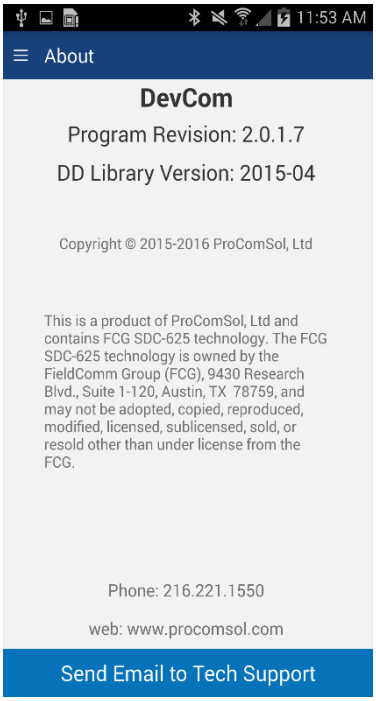
This image shows an Activated license.

3) Press the "License Check-In" to send the license back to our server. It can then be used on another Android device. This makes sharing licenses easy and convenient.

6.5.7 About

This window summarizes revision status and provides support contact information for the DevCom App:

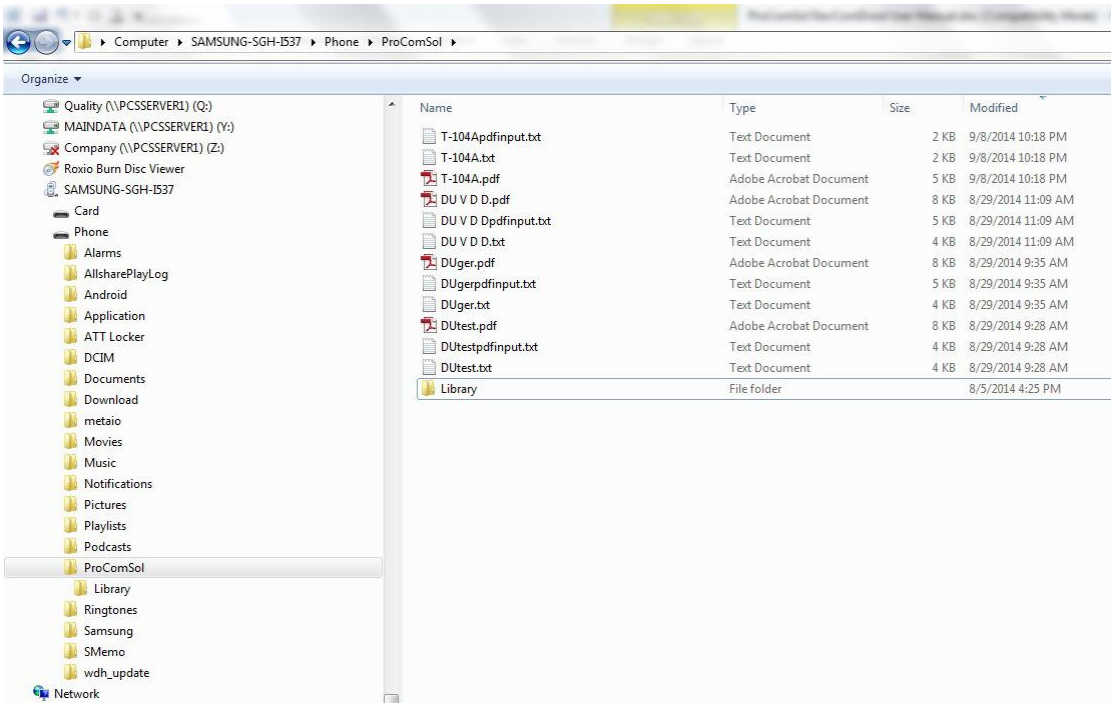
1) Ensure that the application is running. Communications do NOT need to have been established.
2) Select ≡ **About** from the main window. The About window is displayed:



3) Press the “Send email to Tech Support” to bring up your Email App which you can then send to ProComSol to get help for your issue.

6.6 PC Interface to Mobile Device

The Windows Explorer program is a convenient way to copy configuration files back to the PC for archiving and storage. The Android device looks like a disk to the Windows file system. Below is an example screen shot:



The default location for the saved configuration files is the directory "\ProComSol". Simply highlight the desired files and copy to your PC. Once on the PC, they can be viewed or imported to many different software packages.

6.7 DD Library Updates

Users who provide their Email address to ProComSol will be notified when DD Library Updates are available. The Email will provide detailed instructions on how to obtain the update. To update the DD Library, follow Section 4.2.1, Install DD Library.

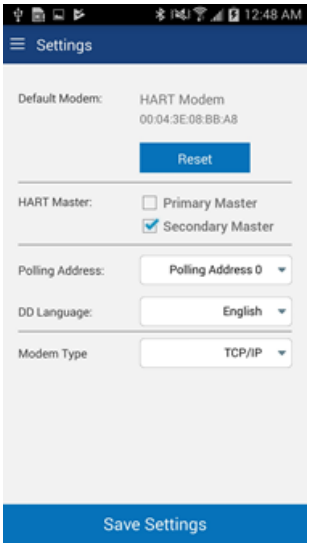
6.8 HART-IP Interface

DevCom allows you to connect to your WirelessHART network using HART-IP over an Ethernet connection to the networks WirelessHART Gateway. Once connected to a device, DevCom behaves just like it is connected via a modem. You can view data, edit parameters, etc.

6.8.1 HART-IP Setup

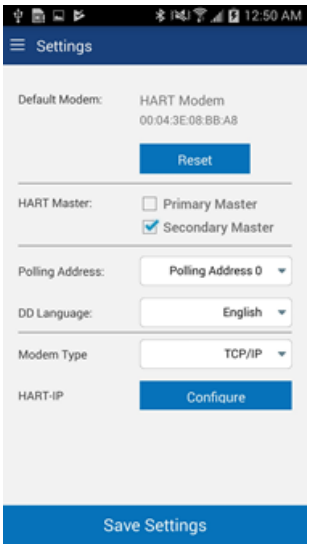
Below is the procedure for setting DevCom to use HART-IP and for connecting to a HART device:

1) Go to the Settings Menu and change the Modem Type to TCP/IP:



2) Press “Save Settings” to make the setting change.

3) The default network IP address is our demo WirelessHART network. It is used to demonstrate the HART-IP features of the DevCom App. If you would like to connect to your network, go to the Settings Menu again. You will then see the following:



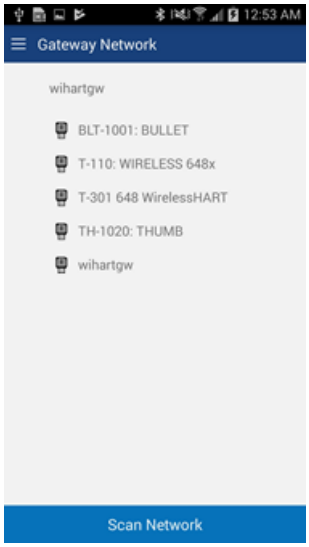
4) Tap “Configure” to bring up the HART-IP Setup Menu:

5) Make the necessary edits for your WirelessHART Gateway and press “Save Settings”.

6.8.2 Connecting to a Device

Once the connection to the WirelessHART Gateway is configured, restart DevCom. The App will then connect to the WirelessHART Gateway and retrieve network hierarchy information. This section describes how to then connect to the desired device.

1) Once the network hierarchy information is retrieved, it is displayed in the Gateway Network Menu. Note that the example below if for the ProComSol Demo network and that your network will look different:



Item description:
Wihartgw – is the Tag for the WirelessHART Gateway
BLT-1001:BULLET and others are devices on the WirelessHART network that have sub devices.

2) Press “Scan Network” if you want to refresh the Gateway Network Menu.
3) Tap a device to show the sub-devices connected to it. Note that native WirelessHART devices will have itself as a sub-device. Below is the screen that shows after BLT-1001:BULLET is tapped. Again this is on our Demo network:

Item description:
BLT-1001:BULLET – is the root device
P-1011: 3095 and others are the sub-devices connected to the root device.

4) Tap any of the sub-devices to connect to that device. The display then looks just like a modem connected device. The only difference is that the Bluetooth Activity icon is now the Wireless Activity icon as seen here:

5) You are now connected to the device and can perform any DevCom function you like as if you were connected locally through a modem.

Specifications (DevComDroid Software):

System Requirements (minimums)

Operating System	Android 4.0.3 or later
Processor Speed	ARM or Atom
Memory RAM	1 GB
Memory ROM	2 GB
Screen	960x540 (qHD) or better
Communication Port	Bluetooth v2 (HM-BT-BAT-ER), Bluetooth v4 (HM-BLE)
HART Modem	Bluetooth HART Modem, e.g. HM-BT-BAT-ER, HM-BLE

Device Descriptions (DD's)

DD Library	Includes HART Communication Foundation's latest release
Generic DD	Included
Number of devices	>1382 (call for latest information if details required)
DD Updates	Quarterly updates are sent to you automatically for 1 year. Thereafter updates are manually available free of charge from www.hartcomm.org

Functions

Monitor PV
Monitor Multi-variables
Monitor Device Status
View and Edit Variables
Save complete device configuration to text file and PDF file
Write saved configurations to devices
Sample Execute Methods:
- Trims
- Calibrations
- Loop Tests
- Zero and Span

Specifications (Bluetooth HART Modem HM-BT-BAT-ER):

Enclosure & Cables

Material	High strength ABS Plastic
Dimensions	50mm x 70mm x 20mm
Total Unit Weight	170 g
HART Cable Length	1.2 m
HART Cable Connectors	Mini-Grabber

HART

Interface	Capacitive coupling
Output	600 mVpp
Leakage	< 10 uA
Connections	Across loop resistor or HART field device
Specifications	HART 4, HART 5, HART 6, HART 7, Physical Layer Spec HCF_SPEC-54

Bluetooth

Version	Bluetooth v2 compatible
Class	Class 1 (up to 83.8 meters), or Class 2 (up to 10 meters)*

* To be able to achieve the full Bluetooth range (83m) your PC/Laptop/Tablet/Smart-phone must also be Class 1. If it is a Class 2 Bluetooth device (up to 10m) you could upgrade it to Class 1 by either replacing its internal Bluetooth module or using an external Class 1 Bluetooth USB dongle.

Battery

Type	Rechargeable Li-Ion
Life	19 hours continuous use (perfect conditions), 14 hours typical

Environmental

Operating Temperature	0 deg.C to 50 deg.C
Storage Temperature	-40 deg.C to 85 deg.C
Humidity	0% to 99% (non-condensing)

Compliances

CE Certification	EN 61326 (EMC), Directive 2011/65/EU (RoHS)

Notice of FCC Compliance

This product contains a radio module that has been tested and found to comply with the FCC Part15 Rules. These limits are designed to provide reasonable protection against harmful interference in approved installations. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Modifications or changes to this equipment not expressly approved by ProComSol, Ltd may void the user's authority to operate this equipment.

Contains Transmitter Module FCC ID: X3ZBTMOD1

Appendix A

Problem: Will not communicate

Hardware Check:
Verify the following

1) Bluetooth HART Modem battery is charged
2) Paired to correct HART Modem
3) Loop power supply is on
4) Loop resistance between 250 ohms and 1Kohms
5) Loop current within HART limits
6) If multi drop configuration, all transmitters in loop have unique addresses
7) Bluetooth HART Modem is connected across loop resistor or across transmitter terminals
8) If all of the above does not resolve the issue try restarting your Android device

Problem: Communication is unreliable

Verify the following:

1) You are within radio range of the master transmitter, for Class 1 devices = 83 meters unobstructed, for Class 2 devices = 10 meters unobstructed. HM-BT-BAT-ER and HM-BLE are Class 1 Bluetooth devices, check what class your PC/Laptop/Tablet/Smartphone is. For 83m both devices must be Class 1
2) Vary the orientation of the master transmitter or the Bluetooth Modem to improve radio link strength
3) Bluetooth HART Modem battery is charged
4) HART connections made before power turned on (both Modem and HART device)
5) HART Transmitter is not in Burst mode. Communications can occur in Burst mode, but more retries will be necessary for success
6) In some applications, a connection can be lost, which looks like a communication lock-up. Perform the “Pair” process again to re-establish the link without the need to restart your application

Appendix B

Contact Information for HART Expert Ltd

HART Expert Ltd
125 Greenways,
Gloucester,
Gloucestershire,
GL4 3SA
United Kingdom

Telephone: +44(0)7966233639
Email: info@hart-expert.co.uk
Web: www.hart-expert.co.uk

Contact Information for ProComSol Ltd

ProComSol, Ltd
Process Communications Solutions
13001 Athens Ave
Suite 220
Lakewood, OH 44107
USA

Phone: 216.221.1550
Fax: 216.221.1554
Email: sales@procomsol.com support@procomsol.com
Web: www.procomsol.com