Allegro
Field Data PC

Allegro MX v7.1.2

User Guide

American Innovations

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Getting Started

This guide explains how to set up and use American Innovations software installed on the Allegro MX. This chapter includes the following topics:

Equipment List

Your Allegro MX ships with the following items:

- Rechargeable battery pack
- AC wall charger
- USB cable
- Mini stylus and pen-style stylus
- Hand strap and shoulder strap
- Screen protector
- AI Allegro CD with copies of AI software, user guide, release notes, and upgrade procedures
- Microsoft *Getting Started CD* with Windows Mobile Device Center and ActiveSync
- Juniper Systems CD with owner's manual and quick start guide

Several optional add-ons are available for purchase. For a complete list of add-ons and accessories, contact AI Sales at 1-800-229-3404.

Preparing the Allegro MX for Use

When you first receive the Allegro MX from AI, perform the following tasks to prepare the device for service:

- Install the Battery Pack
- *Set Display Properties for a Monochrome Display on page 4*
- *Set Regional Settings, Time Zone, and Date/Time on page 4*
- *Transfer Utility Files to PCS on page 6*

Install the Battery Pack

Complete the following steps to install and charge the battery pack. Charge the battery pack for at least six hours.

1. Push the sliding latches up on the sides of the Allegro to open the battery compartment door.

Figure 1-1. Slide Latches

2. Place the battery pack in the battery compartment with the small arrow pointing to the right. Push the battery pack down and then slide it to the right to secure it in place.

Figure 1-2. Install Battery Pack

3. Push the battery door closed until slide latches click into place. If slide latches are not securely in place, the unit is no longer water tight.
4. Plug the battery charger into a wall outlet, then the Allegro. The *Power* window automatically displays after applying power.

Connect Battery Charger

5. Complete the following settings in the *Settings / Power* window:
    a. Select **Enter percentage and capacity**.
    b. Set **Charge Percentage** to `10%`.
    c. Set **Battery Capacity** to `4000`.

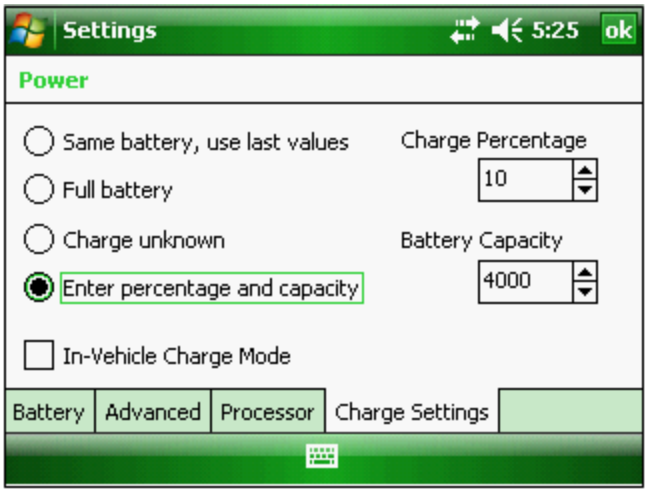


Figure 1-3. Power

Set Display Properties for a Monochrome Display

If the Allegro includes a monochrome display, complete the following steps to set display properties:

1. Tap **Start** > **Settings** > **Today** icon to display the *Today Settings* window.

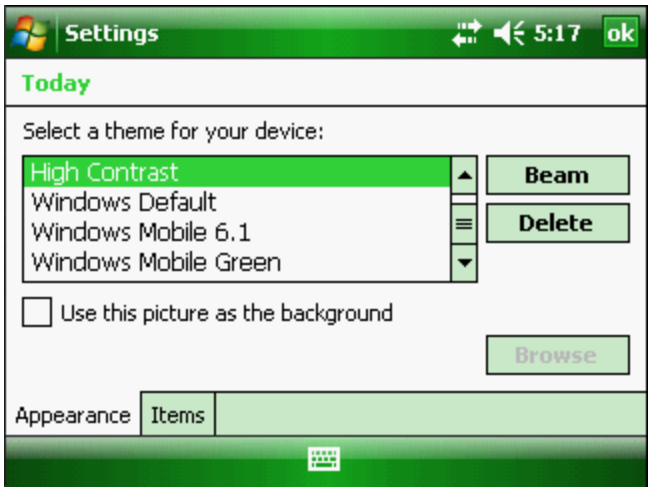


Figure 1-1. Today

2. In the *Appearance* tab, select **High Contrast** in *Select a theme for your device*. Tap **OK** and then the Close icon (**X**) to return to the *Today* screen.

Set Regional Settings, Time Zone, and Date/Time

Regional settings specify the style that date/time, numbers, and currency are displayed. After selecting a display style, set up the Allegro with your preferred time zone, date, and time.

Complete the following steps:

1. Tap **Start** > **Settings** > **System** tab > **Regional Settings** to display the *Regional Settings* window.
2. Set your preferred language in the *Region* tab. Use the remaining tabs to set the display style for *Number*, *Currency*, *Time*, and *Date*. Click **OK** to return to the *Settings* window.

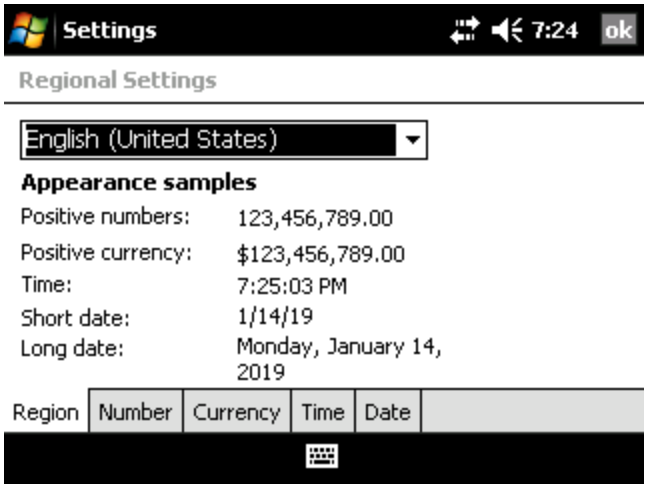


Figure 1-1. Regional Settings

3. Tap the **Clock & Alarms** icon in the *Settings* window and set up the time zone, current time, and current date.

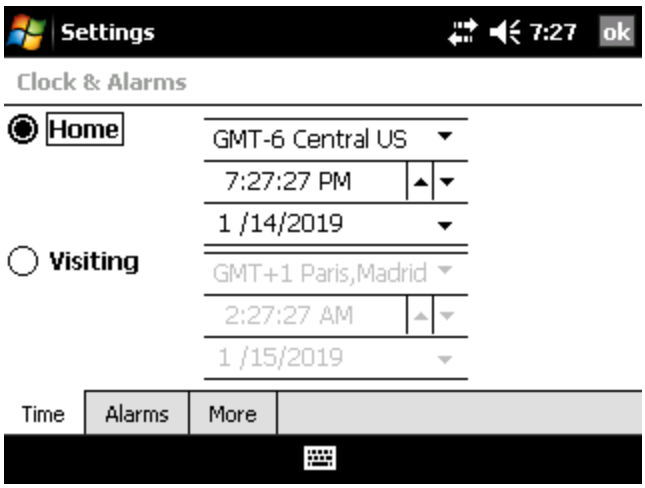


Figure 1-2. Time Zone and Date/Time

4. Tap **OK** to apply settings. Tap **Yes** to save settings and close the window. Tap the Close icon (**X**) to return to the previous screen.

Transfer Utility Files to PCS

Updated utility files are included with the Allegro MX installation to facilitate PCS integration. If you use PCS software with the Allegro MX, the utility files (*wToCmd.exe* and *CeFileXfer.exe*) need to be transferred from the Allegro MX device to the PCS executable directory on your computer.

Complete the following steps:

1. Navigate to your PCS executable folder. To find your PCS executable folder, right-click on the PCS shortcut in the Start Menu and select **Properties**. Click on the **Shortcut** tab and find the path to the PCS executable in the Target field. Click **Open File Location** to quickly navigate to the executable folder.
2. Connect the Allegro MX to your computer. Once successfully connected, browse the contents of the Allegro device using Windows Explorer.
3. Navigate to the folder `\AI\PCS Interface Files` on the Allegro device.
4. Copy the two files in the `PCS Interface Files` folder (`wToCmd.exe` and `CeFileXfer.exe`) and paste them in the PCS executable folder on your computer.

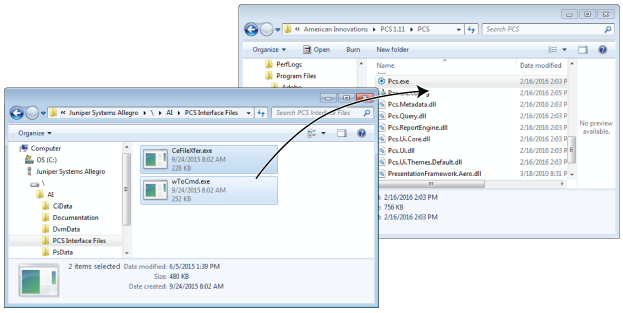


Figure 1-1. PCS Executable Folder

5. If prompted, click the option to **replace** and overwrite existing files.

Overview of the Allegro MX Hardware

The Allegro MX includes a connector panel, touchscreen display, keypad, and function keys. Optional add-ons, including a GPS expansion pod with GPS antenna and a Trimble GPS receiver, are available for purchase. Contact AI Sales at 1-800-229-3404 for more information.

Figure 1-1. Allegro MX Components

Refer to the following topics for more information about the Allegro hardware components:

- *Connector Panel*
- *Chainer/Stick Adapter Switch*

Connector Panel

The connector panel is located at the top of the Allegro MX.

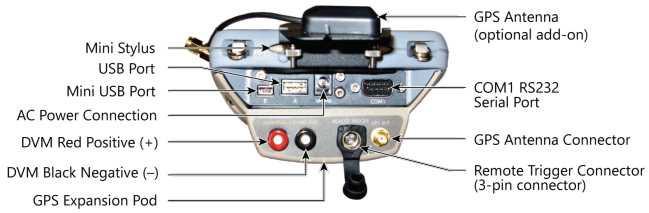


Figure 1-1. Allegro MX Connector Panel

The connector panel supports the following connections:

- DVM positive and negative test leads
- Remote trigger for data cane or wire counter (3-pin connector)
- Communication ports with the following characteristics:
  - USB port for connecting the Allegro to a computer
  - USB port for connecting to other USB devices

  - One 9-pin serial communication port labeled COM1

- AC power adapter
- GPS expansion pod (optional add-on)
- GPS antenna (optional add-on)

Chainer/Stick Adapter Switch

A hardware switch inside the Allegro must be set before taking survey readings. Use the procedure below to set the switch in **Stick Adapter** mode if using a data cane to take survey readings. If using a wire counter instead, set the switch in **Chainer** mode.

To set the Allegro in either **Chainer** or **Stick Adapter** mode, follow these steps:

1. If the Allegro is on, press the power button to turn **Off** the device.
2. If a GPS antenna cable is connected to the Allegro, disconnect the cable.
3. Use a coin or flathead screwdriver to loosen two screws securing the card slot door on the back of the Allegro. Turn screws counter-clockwise ¼ of a turn to release the door.
4. Open the card slot door and set the switch in one of the following positions. When you finish, close and fasten the door.
   - **Chainer:** if using a wire counter, select **Chainer**.
   - **Stick Adapter:** if using a data cane, select **Stick Adapter**.

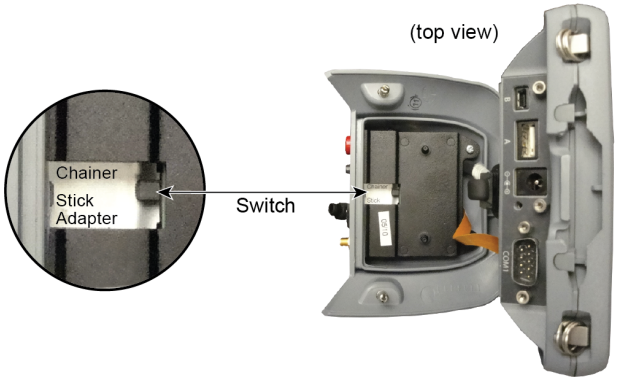


Figure 1-1. Set Chainer/Stick Adapter Switch Position

Overview of AI Allegro MX Software

The Allegro MX ships with the following AI Allegro MX applications factory-installed. AI Allegro MX software version 7.1.2 is compatible with PCS software versions 7 and newer.

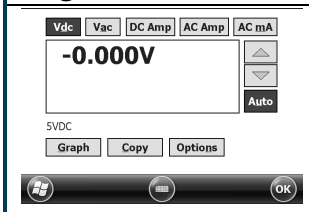
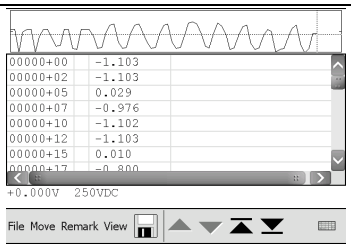
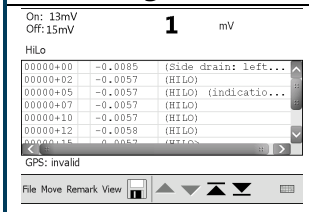
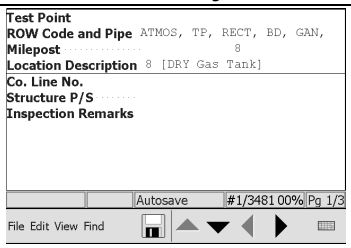
Digital Voltmeter (AiDvm)	**Close Interval (CeCi)**
	
Measures voltage and current.	Records potential readings for close interval (CI) surveys.
DC Voltage Gradient (DCVG)	**Periodic Survey**
	
Records indications of pipeline coating defects.	Records voltage readings for annual and periodic surveys.

Figure 1-1. AI Allegro MX Software Applications Overview

Navigating an Allegro

- *Touchscreen Display*
- *Keypad and Shortcut Keys*
- *Allegro MX Icons and Soft Keys*

Touchscreen Display

Use the provided stylus to tap the touchscreen and activate a software program or make a selection. Several system icons are available for selection that allow you to navigate to applications or perform actions.

IMPORTANT: Avoid using sharp objects that may scratch or puncture the touchscreen display.

The Allegro MX includes a high-contrast, pressure-sensitive display with an adjustable backlight. The touchscreen can be toggled on/off as necessary, especially when working in harsh conditions such as a rainstorm or in high brush. Press the **BLUE** shift and TS keys to enable or disable the touchscreen.

Realign the Touchscreen Display

If the touchscreen does not respond accurately to stylus or finger taps, complete the following steps:

1. Tap **Start** > **Settings** > **System** > **Screen**.
2. Tap **Align Screen**.

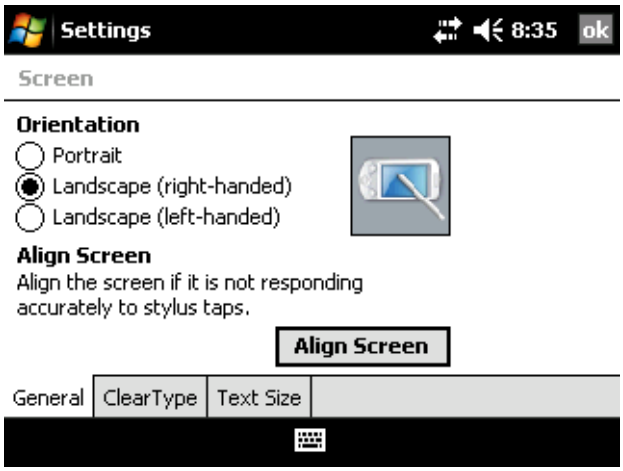


Figure 1-1. Realign Touchscreen

3. Follow on-screen prompts to realign the touchscreen.
4. When the process completes, tap **OK** to close the current screen; tap the Close icon (**X**) to return to the *Today* screen.

Keypad and Shortcut Keys

The Allegro MX keypad is similar to a computer keyboard. The keypad provides the following functionality:

- Alphanumeric and symbol keys for data entry on a QWERTY keypad.
- Left and Right Tab keys, Enter key, Space bar, and Circular keys for moving the cursor.
- F1 through F5 keys to perform softkey operations in certain software programs.
- Blue and Orange keys that allow other keys on the keypad to perform special functions.

Figure 1-1. Allegro MX Keypad

Refer to Global Shortcuts for a list of common keyboard shortcuts.

Function Keys

Function keys **F1** through **F5** are pre-assigned on the Allegro MX. The function keys are assigned with a `Key Redirect` file, which is installed on the Allegro before it is shipped. If the `Key Redirect` file is deleted from the Allegro `Startup` folder, **F1** through **F5** can then be set up to start any AI application. After these keys are assigned to an AI application, you can toggle from one application to another using a single key press. For more information about deleting the Key Redirect shortcut, see *Key Redirect on page 74*.

Complete the following steps to assign an AI software to any **F1** through **F5** function key:

1. Tap **Start** to display the Start menu.

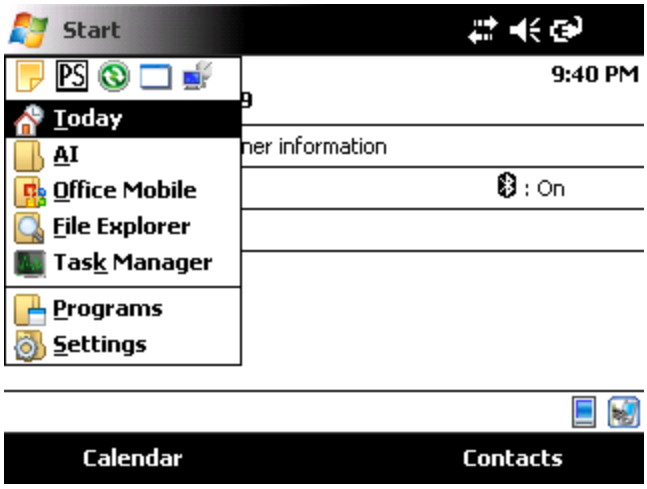


Figure 1-1. Start Menu

2. Tap **Settings** > **Buttons** > **Program Buttons** tab.
3. Select any **F1** through **F5** function button listed in the **Select a button** field.

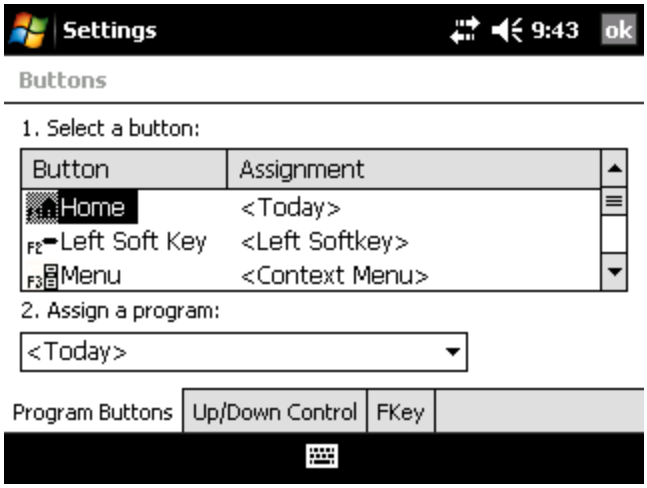


Figure 1-2. Function Buttons (F1-F5)

4. Click the drop-down arrow in **Assign a program** and select an AI software from the list.
5. Repeat these steps as needed. When you finish, click **OK** and then the Close icon (**X**) to return to the *Start* screen.

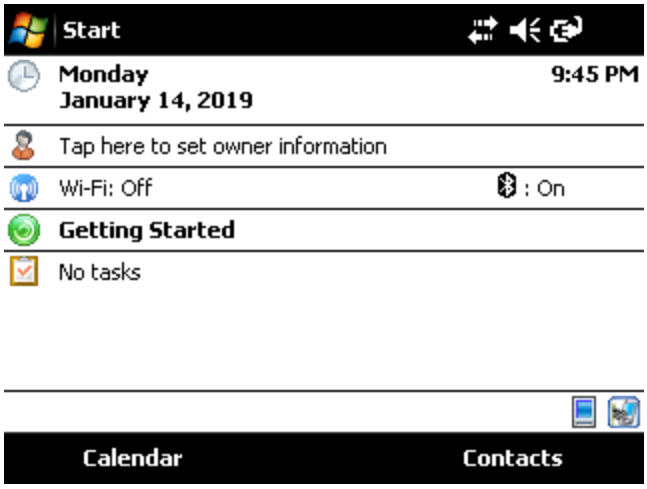
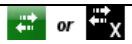


Figure 1-3. Start Screen

Allegro MX Icons and Soft Keys

The Allegro MX uses icons and soft keys for shortcuts to provide an alternate method for navigation during an Allegro MX session. Certain system icons regularly display when running software. For example, the **Windows logo** icon, **OK**, **Menu**, and keyboard icons all display when running any software. Other types of system icons are used to notify you of current operating status conditions, such as battery power status and software currently running on the Allegro MX.

Table 1-1. Windows Mobile Icon Descriptions

Icon / Text	Description
	**Start bar**: tap to display the *Start* menu.
	**Windows logo**: tap to display the *Start* menu.
	**Mini-USB Connection**: status icon indicating current connection status. When connected to a computer it displays without an **X**. When disconnected from the computer, it displays with an **X**. Tap the icon to display the *Connectivity* window, which displays the connection status and provides a link to the *Settings* window.
	**Speaker**: tap icon to display the *Volume* window and adjust the volume or turn the sound on or off.
	**Alarm**: status icon in the *Start bar* indicating an alarm is set. If the icon displays in the desktop, it indicates an alarm is set for the current date. Tap the **Alarm** icon in the desktop to display the *Clock & Alarms* window and adjust settings in the **Time**, **Alarms**, and **More** tabs.
	**Charge Indicator:** displays when device is charging. Tap the icon to open the Power Settings window to view or set up property settings.
	**ActiveSync Remote Display (ASRDisp)**: status icon(s) indicating the number of initiated remote display sessions. Tap the icon to display the *CE Remote Display* window and adjust **Settings, Disconnect,Hide**, or **Exit** ASRDisp.
	**Today**: icon displays in the *Start* menu. When running certain software, such as CeCi, tapping the **Today** icon displays the *Today* screen (Allegro desktop).
	**Bluetooth Connection Status**: icon displays in the *Today* screen indicating when Bluetooth is **On** or **Off**.
Other icons in the *Start Menu* display their respective software when selected. To set which icons display in the *Start Menu,* tap **Start > Settings > Menus**. Software not set to display in the *Start Menu* display in the *Programs* window instead (**Start > Programs**).	

Connecting to an RFID Pen

To connect to a supported RFID pen, do the following:

1. Open the Bluetooth COM application on the Allegro MX.
2. Turn on bluetooth for your RFID pen. For the Microsensys pen, press and hold the power button to turn both the pen and its bluetooth capabilities on.
3. In the Bluetooth COM application, click **Discover Devices** and select the RFID pen from the list. For the Microsensys pen, the name will start with iID PENsolid.
4. Click **Connect**. When the pen has successfully connected, take note of the COM port listed in the Port column.
5. In the Periodic Survey application, open **Options**, found in the View menu. Select the pen and its associated COM port from the drop downs available in the RFID tab.

AI Allegro MX Documentation

An electronic version of this document and the software release notes are included with the software installation files for the Allegro MX and available in the American Innovations Support Site. Use Adobe Reader on a laptop or desktop computer to view the PDF documents.

To access Allegro MX documentation, follow either of these steps:

- **Copy from the Allegro**: If the Allegro MX is not connected to your computer, connect the device. Once successfully connected, browse the contents of the Allegro device using Windows Explorer. Navigate to the folder `\AI\Documentation` and copy the files into a folder on your computer.
- **Access via the Support Site**: Access the Allegro MX section of the Support Site at http://support.aiworldwide.com/products/al1/index.htm.

Contacting Technical Services

AI Technical Support is available to provide assistance with Allegro MX, accept feedback about Allegro MX, or discuss your organization's training needs. Use the following information to contact AI Technical Support:

Telephone:

1-800-229-3404

Email:

techservices@aiworldwide.com

Address:

American Innovations, Ltd.
Attn: AI Technical Support
12211 Technology Blvd.
Austin, TX 78727

2 Digital Voltmeter (AiDvm)

The American Innovations Digital Voltmeter (AiDvm) measures voltage and current as a fully functional digital voltmeter (DVM) and as an integrated DVM to complement the following AI software: CeCi (close interval), DCVG (direct current voltage gradient), and Periodic Survey (annual/periodic survey).

You can view measurements either in the main window of AiDvm or as a waveform graph. Optional settings are available for measuring current interrupter on/off potentials and operating in *GPS Sync* mode when using GPS-synchronized current interrupters.

Tap **Start** > **AiDvm** to display the main DVM window.

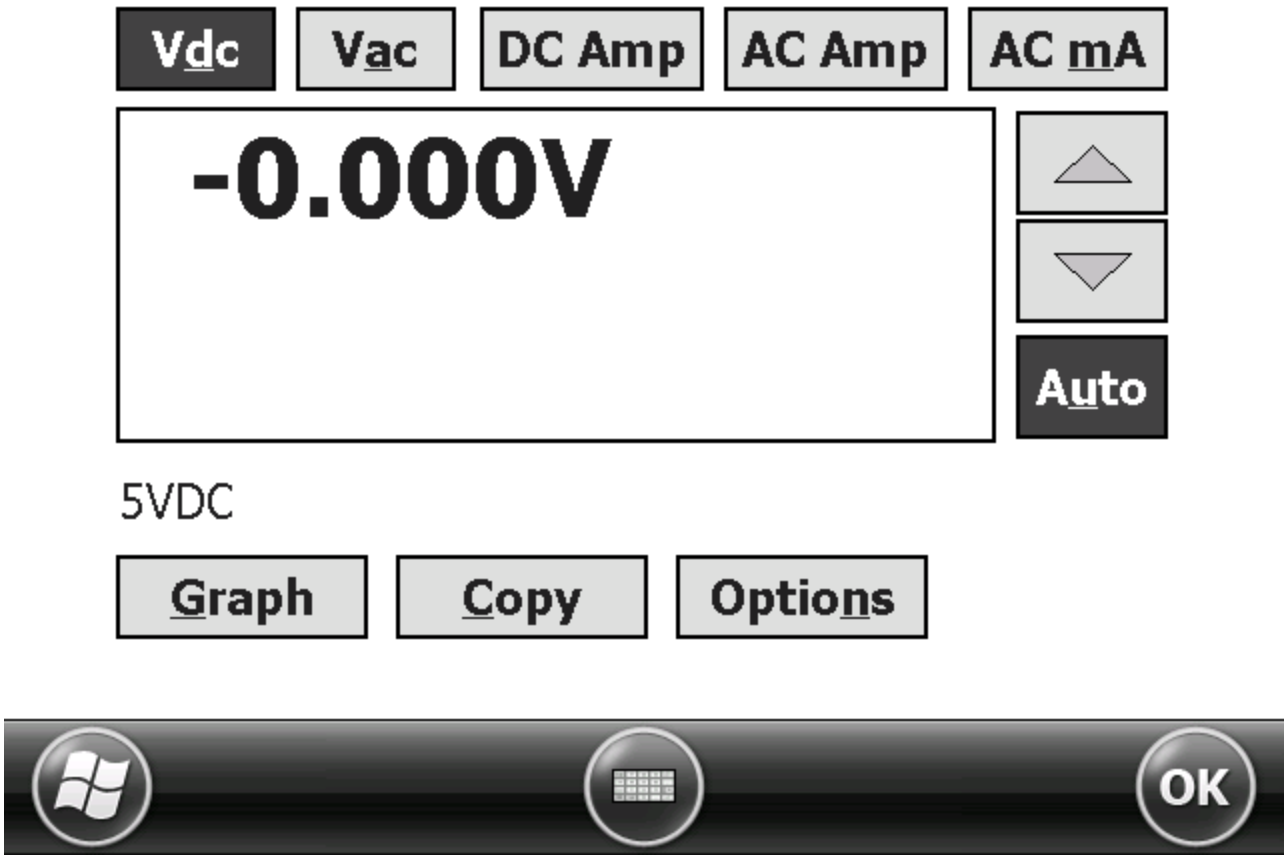


Figure 2-1. DVM Main Window

This chapter includes the following topics:

Safety Precautions

Observe the following safety precautions when using the DVM connected to the Allegro:

- Follow safety procedures for the equipment being tested. Inspect test leads for damaged insulation or exposed metal. Check test lead continuity. Damaged leads should be replaced.
- To avoid electrical shock and damage to the Allegro MX, do not use the Allegro MX when working with voltages greater than that supported by the DAQ (data acquisition) card or measuring current, except across a shunt.
- To avoid electrical shock and damage to the Allegro MX, remove test leads before replacing the Allegro MX battery **or** connecting to a desktop or laptop computer. Set up the Allegro MX with the correct test function and voltage range.
- **BEFORE MAKING ANY VOLTAGE MEASUREMENT GREATER THAN 42 VOLTS AC OR DC:** Disconnect any cable from the **Remote Trigger** input and replace the rubber cap before making voltage measurements using the red and black banana jacks.

Connect Test Leads to the Allegro MX

Plug the tests lead into the red **INPUT** and black **COM** connectors on the DVM.

Figure 2-1. Allegro MX Connections Configuration for DVM

Measure Voltage and Current

Set Test Function, Voltage Range, and Sample Rate

1. Choose a test function by tapping **Vdc**, **Vac**, **DC Amp**, **AC Amp**, or **AC mA**.
2. Set the voltage range either manually by tapping the up or down arrow buttons or, tapping **Auto** to use autoranging instead.
3. Tap **Options**. If using autoranging, tap the drop-down arrow in the *Minimum range* field and select a minimum voltage range.
4. Tap the drop-down arrow in the *Sample rate* field and select either **50 Hz (European Standard)** or **60 Hz (US Standard)**. Tap **Ok** to save settings and return to the main DVM window.

Set DVM Options

To set the properties and other options for the currently selected test function, tap **Options**. The following tabs should be configured for the test function:

Configure the On/Off Tab

On/Off options are only available with the **Vdc** test function.

1. If not already in the Options window, tap **Options**.
2. Tap the **On/Off** tab and tap **Enable On/Off mode**.
3. Select one of the following options in the Method field:
    - **HiLo** — for an interrupted survey using non-GPS synchronized interrupters. An On/off High/low survey will sample 60 times per second and discard the most negative and

least negative values in a cycle based on the On/Off Delays. Of the remaining values in the cycle, the most negative value will be *on* reading and the least negative value will be the *off* reading.

- **Gps-sync** — for an interrupted survey using GPS synchronized interrupter with shorter *on* and *off* intervals.

4. If available, enter on/off times and cycle begins with settings to match those on the current interrupter in the **ON time**, **OFF time**, and **Cycle begins with** fields. The *Cycle begins with* field is not available with HiLo survey types.
5. When available, enter the delay times for the survey. These fields are not available for uninterrupted surveys. The following delay time fields may be available for interrupted surveys:
   - **On Delay** is the amount of time after the *off-to-on* transition occurred. The On Delay determines the number of high (most negative) values that are discarded in a cycle. This field is available for HiLo survey types.
   - **On Setup** is the amount of time before the *on-to-off* transition occurred, at which point the "on" reading is recorded. This field is only available for the Gps Sync survey type.
   - **Off Delay** is the amount of time after the *on-to-off* transition occurred, at which point the "off" reading is recorded. This field is available for all interrupted surveys. For HiLo survey types, the Off Delay determines the number of low (least negative) values that are discarded in a cycle. For Gps Sync survey types, the Off reading is the value that is recorded after the Off Delay time.
6. Tap **Ok** to save settings and return to the main DVM window or tap another tab to set additional properties.

Configure the GPS Tab

1. If not already in the Options window, tap **Options** in the main DVM window.
2. Tap the **GPS** tab.
3. Verify the *Comm Port* is **COM8 (internal)** and *Baudrate* is **115200**.
4. Tap **Ok** to save changes and return to the main DVM window or tap another tab to set additional options.

Configure the Amps Mode Tab

These properties need to be configured to measure current through an external shunt and should be configured when the **DC Amp** or **AC Amp** test function is chosen.

1. If not already in the Options window, tap **Options** in the main DVM window.
2. Tap the **Amps Mode** tab.
3. Complete one of the following steps:
   - Tap **as R value** and enter a shunt resistance value in the *Resistance* field.
   - Tap **as Amp/mV values** and enter a shunt size in the *mV* and *Amps* fields to have the DVM automatically calculate shunt resistance.
4. Tap **Ok** to save changes and return to the main DVM window or tap another tab to set additional options.

Configure the Data Logger Tab

1. If not already in the Options window, tap **Options** in the main DVM window.
2. Tap the **Data Logger** tab.
3. Tap **Enable logging**.
4. Set a time interval by tapping the drop-down arrow in the first **Update interval** field and selecting a value (1-50). Tap the drop-down arrow in the second **Update interval** field and select a measurement of time (seconds, minutes, or hours).

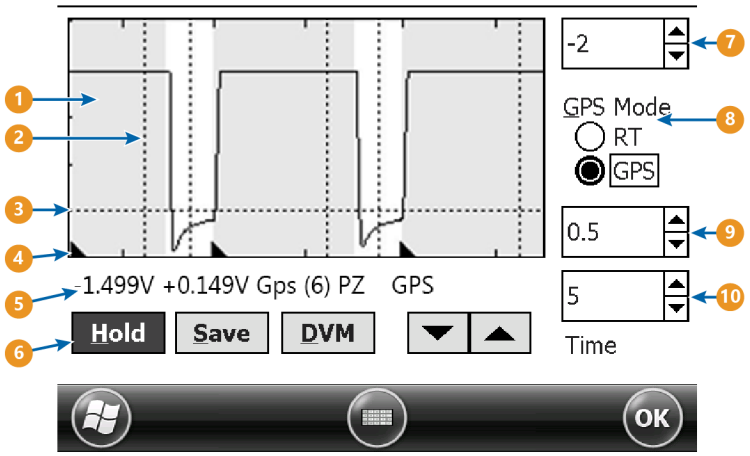
   When recording an hour or more of data, use the external AC power adapter to prevent draining the Allegro MX battery. The automatic power-down feature of the Allegro MX is disabled during data logging.
5. Tap **Browse** to display the *Save As* window and complete the following steps:
   a. Type a name for the file in the **Name** field.
   b. Tap the drop-down arrow in the **Type** field and choose a file format.
   c. Tap **OK** to save settings and close the *Save As* window.
6. Tap **Append** to include all readings in the file with the most recent reading at the end of the file.
7. Tap **Timestamp** to include a time stamp with each reading.
8. Tap **Ok** to save changes and return to the main DVM window or tap another tab to configure additional properties.

When the data logger is active, *DVM - Logging* displays in the AiDvm AI-DVM title bar. To stop the data logging session, tap **Options** > **Data Logger** tab > **Enable logging**.

View the DVM Graph

AiDvm displays the on/off interruption cycle in real-time as a waveform graph in addition to the digital display in the main DVM window.

When using AiDvm during an on/off survey, tap **Graph** to view a waveform graph of the interruption cycle.



1. Shaded area represents *on* cycle; non-shaded area represents *off* cycle.
2. Vertical dotted line indicates recorded reading.
3. Horizontal dotted line indicates zero (0) volts.
4. Black triangles indicate start of the *on* cycle.
5. Status line with current reading, voltage range, and number of GPS satellites in view.
6. **Hold**: Tap to stop or start scrolling data.

   Save: Tap to display Data Remarks window and save graph. Use Data Remarks to add notes in a graph. Graph saves as a text file and includes any added notes.

   DVM: Tap to close graph and return to DVM window.

   Up/Down Arrows: Tap to set the voltage range.
7. Sets upper voltage range.
8. Tap a radio button to change between GPS and real-time settings (if available).
9. Sets lower voltage range.
10. Sets graph X-axis in seconds. Maximum is 60 seconds.

Figure 2-1. DVM Graph

The graph includes a status line below the reading. The status line identifies the voltage range, test function, and on/off method. If setup includes *GPS Sync* mode, the status line also identifies the number of satellites in view.

For example, a status line of *5VDC DGPS (5) PZ* indicates the following information:

- **5VDC**: voltage range and test function
- **DGPS**: differential GPS is available
- **(5)**: number of satellites in view
- **P**: PPS time signal has been received
- **Z**: ZDA message has been received

Other indicators that may appear in the status line include the following:

- **GPS (n)**: indicates GPS and the number of satellites in view
- **HiLo**: indicates high/low readings
- **GPS (n HiLo)**: indicates GPS mode is selected but HiLo is used because the GPS signal is unavailable. The lowercase n represents the number of satellites in view.

View the Data Logger

Unless specified differently during setup, data logger files save in the *DvmData* folder by default. To access the folder, tap **Start** > **File Explorer** > **My Device** > **AI** > **DvmData**. Tap the desired log file. The data logger file includes the following information:

- log file date and time stamp
- reading mode (on/off or single reading)
- readings with date and time stamp
- update interval and voltage range

If AiDvm is setup in *GPS Sync* mode, GPS status is included in the log file. Readings include a lower case *g* next to the time stamp to indicate GPS time.

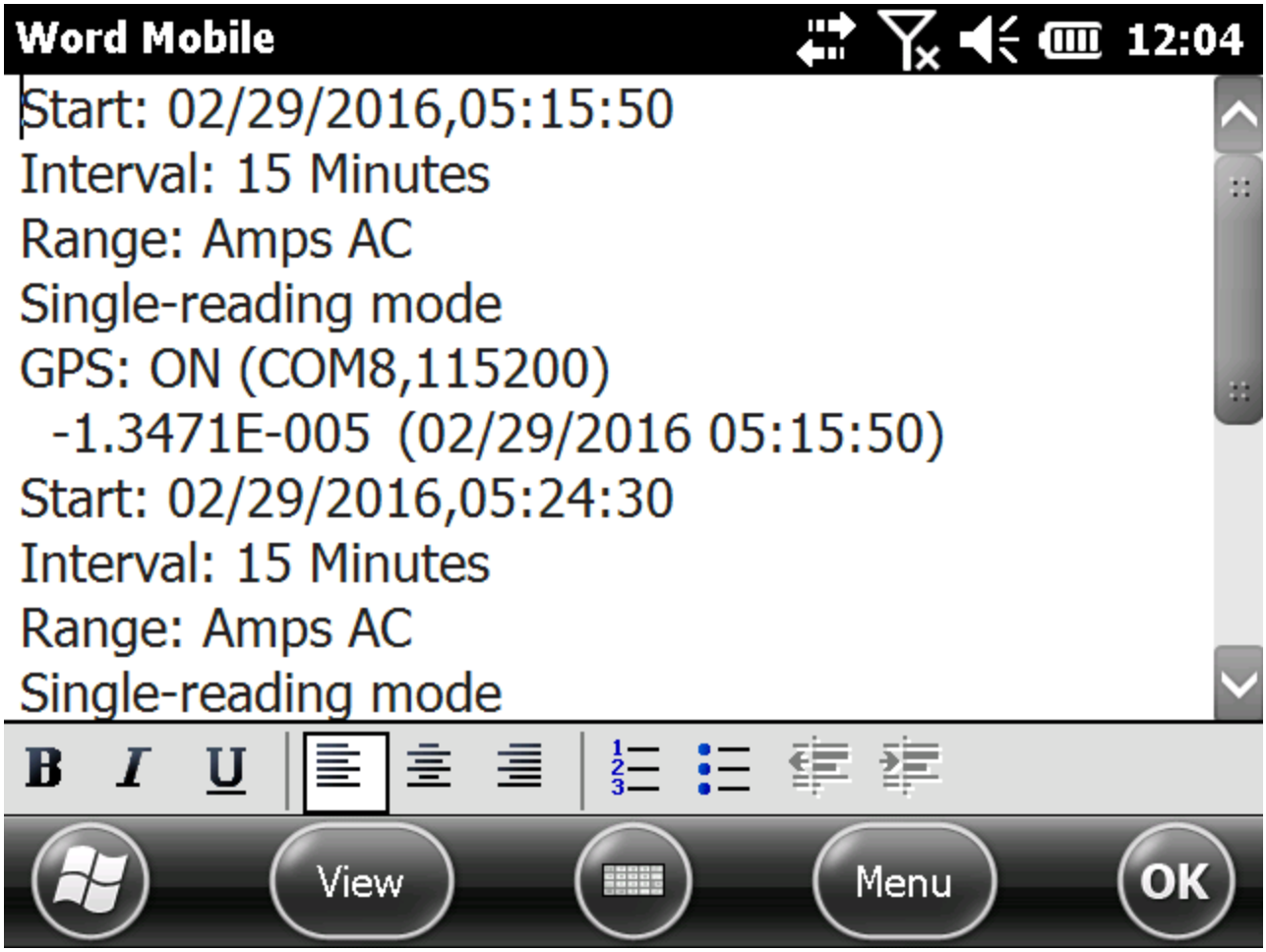


Figure 2-1. Data Logger File

3 Close Interval Survey (CeCi)

CeCi records pipeline potential readings for close interval (CI) surveys. The software collects survey readings from a data cane or wire counter connected to the Allegro MX. CeCi measures voltage using the digital voltmeter (DVM) inside the Allegro MX.

To display the main CeCi window, tap and **CeCi**.

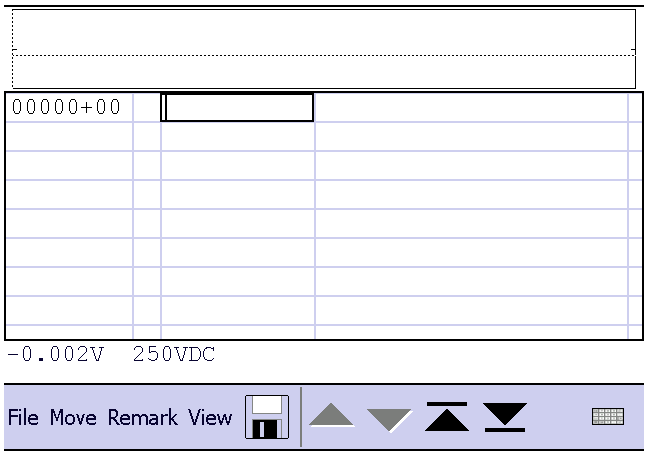


Figure 3-1. CeCi Main Window

This chapter includes the following topics:

Connect Test Leads and Data Canes to Allegro MX

CeCi software records potential readings using the Allegro MX digital voltmeter (DVM) and either a data cane or wire counter connected to the DVM. To set up the Allegro for close interval surveys, connect the test leads and data cane(s) to the DVM.

Test Leads Connection

To connect the test leads, plug test leads in the red **INPUT** and black **COM** jacks on the DVM.

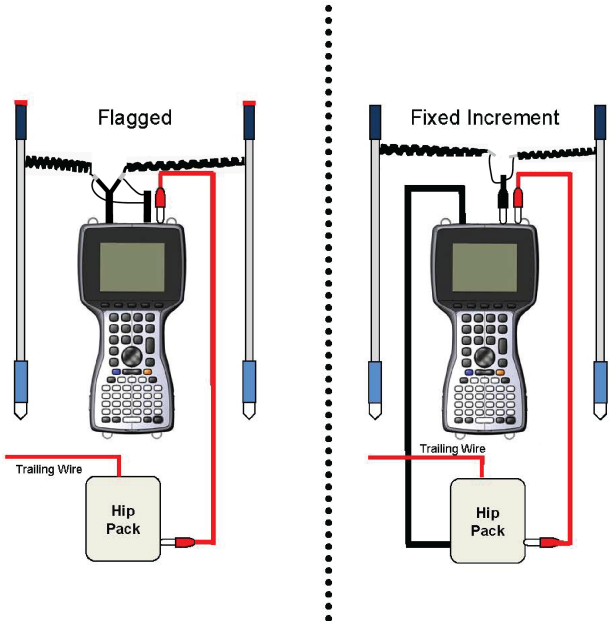


Figure 3-1. Allegro MX Connections Configuration for CeCi

Data Cane Connections

Connect the data cane into the Remote Trigger connection using one of the following configurations:

- *Flagged Surveys Using Both Data Canes*
- *Flagged Surveys Using One Data Cane*
- *Fixed Increment Surveys*

Before using the Allegro MX under one of these configurations, ensure you've set the switch adapter to the correct mode. For more information about the switch adapter, refer to *Chainer/Stick Adapter Switch*.

Flagged Surveys Using Both Data Canes

For *Flagged* surveys using *both* data canes as triggers, use a Y-connector to plug each data cane's 3-pin connector into the **Remote Trigger** connection on the DVM.

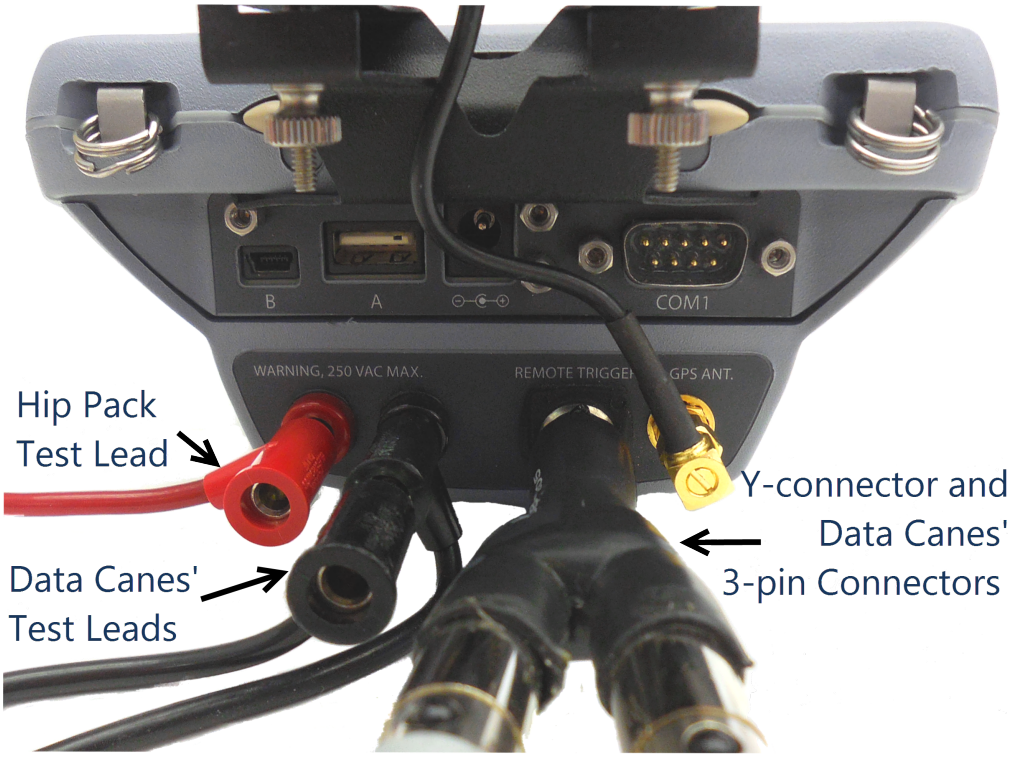


Figure 3-1. Allegro MX on Survey Tray

If using a *survey tray* with data canes, connect the survey tray's 3-pin connector into the **Remote Trigger** connection on the Allegro MX. Connect the data canes' 3-pin connectors to the survey tray junction box.

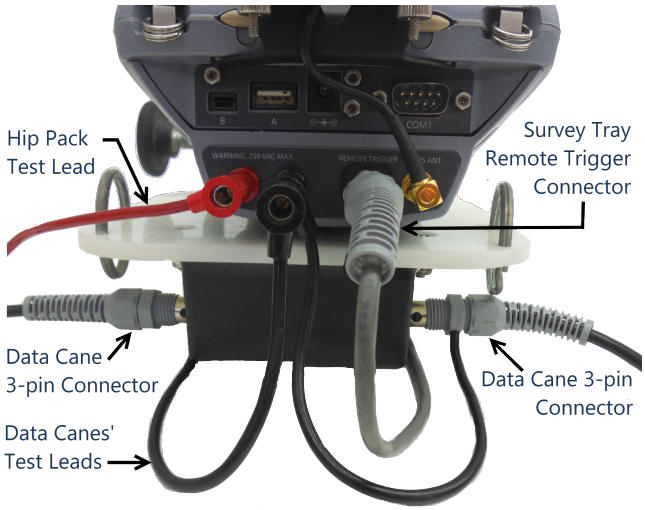


Figure 3-2. Allegro MX Using a Survey Tray to Connect to Two Data Canes

Flagged Surveys Using One Data Cane

For *Flagged* surveys using only *one* data cane as a trigger, plug one connector to the **Remote Trigger** connection on the Allegro MX.

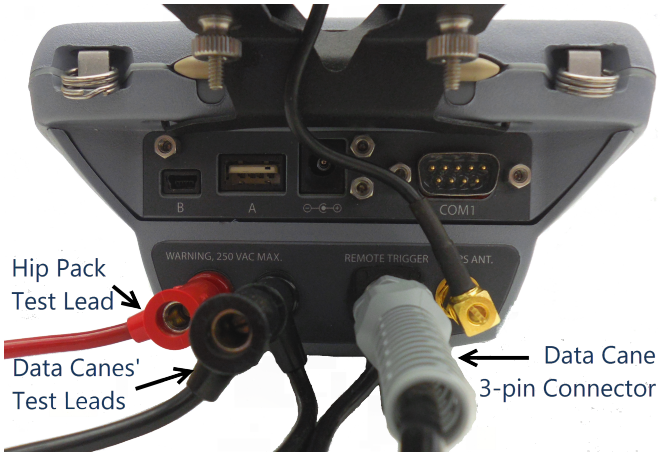


Figure 3-1. Allegro MX Connected to One Data Cane

Fixed Increment Surveys

For *Fixed Increment* survey, connect the data canes and hip pack (chainer).

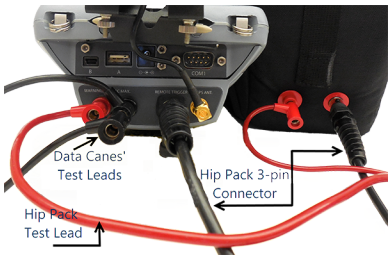


Figure 3-1. Allegro MX with Hip Pack (Chainer)

Set CeCi Options

To set optional features in CeCi, tap **View** > **Options**. The following tabs should be configured for the CeCi application:

- *Configure the Misc Tab* — the fields in the Misc tab set audio and double-click properties.
- *Configure the File Tab on page 29* — the fields in the File tab set auto-backup and skip mode properties.
- *Configure the Gps Tab on page 29* — the fields in the Gps tab set the GPS properties.
- *Configure the Colors Tab on page 30* — the fields in the Colors tab determine the colors of the fields in CeCi. Enabling the colors options will automatically highlight data that exceeds an acceptable voltage value.
- *Configure the Graph Tab on page 30* — the fields in the Graph tab change the display of the graph.

Configure the Misc Tab

1. If not already in the Options window, tap **View** > **Options** to display the *Misc* tab.
2. Select **Beep on every Reading** if you want the Allegro MX to beep each time a reading is taken.
3. If you want the Allegro MX to beep when the voltage value is less negative than a specific value, tap **Beep for voltages less negative than this value** and enter a warning value in the **Voltage level** field.
4. Tap **Beep when overwrite existing data** if you want the Allegro MX to warn you when a survey reading is overwritten.
5. If you want to double-click the data cane to mark a record with a flag in CeCi, tap **Enable double-click detection**.
6. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional options.

Configure the File Tab

1. If not already in the Options window, tap **View** > **Options** to display the Options window.
2. Tap the **File** tab and select **Enable Autosave**.
3. Enter a time interval in the **Interval (minutes)** field to have CeCi automatically save a survey file at regular time intervals.
4. Tap **Retain Skipped records in Skip mode** if you want CeCi to keep the reading for the current record when skipping to another record during *Skip* mode.
5. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional options.

Configure the Gps Tab

1. If not already in the Options window, tap **View** > **Options** to display the Options window.
2. Tap the **Gps** tab.
3. If you want CeCi to remove existing GPS coordinates when updated coordinates are unavailable after a specified amount of time, tap **Clear GPS location after** and enter the number of seconds in the **seconds without updates** field.

   When GPS coordinates are older than 15 seconds, CeCi inserts an asterisk (*) in the bottom right corner of the survey/in the status line.

4. Tap the drop-down arrow in *GPS display Format* and select either **Degrees and Decimal minutes** or **Decimal degrees**. note: always saved as decimal degrees, despite how it's shown here.
5. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional options.

Configure the Colors Tab

1. If not already in the Options window, tap **View** > **Options** to display the Options window.
2. Tap the **Colors** tab and select **Enable color**.
3. Select a field type in the list and then select a color in the color grid to change the color of the selected field. Repeat this step for each item in the list you want to assign a color. The following field types are available:
   - Text — change the font color for a standard survey field.
   - Text Bkgnd — change the background color for a standard survey field.
   - P/S Value — change the font color for a valid pipe-to-soil reading field. A valid reading is determined by the warning value entered in the **Voltage level** field in the Misc tab.
   - P/S Bkgnd — change the background color for a valid pipe-to-soil reading field. A valid reading is determined by the warning value entered in the **Voltage level** field in the Misc tab.
   - Invalid Value — change the font color for an invalid pipe-to-soil reading field. An invalid reading is determined by the warning value entered in the **Voltage level** field in the Misc tab.
   - Invalid Bkgnd — change the background color for An invalid pipe-to-soil reading field. An invalid reading is determined by the warning value entered in the **Voltage level** field in the Misc tab.
4. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional options.

Configure the Graph Tab

1. If not already in the Options window, tap **View** > **Options** to display the Options window or double-tap inside the graph.
2. Tap the **Graph** tab and select **Show Graph**.

3. Set upper voltage by entering a value in the **Upper value** field or tapping the up/down arrows.
4. Set lower voltage by entering a value in the **Lower value** field or tapping the up/down arrows.
5. Indicate how much data to display by entering a value (in feet) in the **Width** field or tapping the up/down arrows.
6. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional options.

Perform a Survey in CeCi

When CeCi first opens, a new blank survey file is displayed. To open an existing survey file for editing, tap **File > Open**. Select the survey file from the list and tap **OK**. To create a new survey file, tap **File > New**. The CeCi properties window displays.

NOTE: It is recommended that you save the survey file before and after entering data.

Once a survey file is created or opened for editing, the following actions can be performed:

- *Set CeCi Survey Properties*
- *Record Inspection Readings*
- *Add Remarks*
- *Save the Survey File*

Set CeCi Survey Properties

To set the properties for the current close interval survey, tap **File** > **Properties**. The following tabs should be configured for a CeCi survey:

- *Configure the Survey Tab on page 32* — the fields in the Survey tab identify the current survey and correspond to PCS ROW Code, Pipeline Code, and Surveyer fields. The Segment field is a required field and must be defined before defining properties in additional tabs or saving the survey file.
- *Configure the Type Tab on page 33* — the fields in the Type tab determine whether the survey is an AC or DC survey.
- *Configure the Modes Tab on page 33* — the fields in the Modes tab determine whether the

survey is a flagged or a fixed increment survey and define the flagged or fixed increment properties.

- *Configure the On/Off Tab on page 34* — the fields in the On/Off tab define the type of survey to be performed and, depending on the defined survey type, the on and off time settings.
- *Configure the GPS Tab on page 35* — the fields in the Gps tab dictate the frequency at which the GPS location should be recorded and GPS details that are associated with that location record.

It is recommended that you save the survey file before entering data.

Configure the Survey Tab

1. If not already in the Properties window, tap **File** > **Properties** to display the *Survey* tab.
2. Provide information in the following fields of the *Survey* tab:
   - **Segment**: Enter the name of the ROW (right-of-way) in this required field. You can enter up to 100 characters.

     If you plan to transfer the survey file to PCS, the name entered in the *Segment* field must match the *ROW Code* in PCS. If these fields do not match, PCS creates a new ROW Code and folder with the label *Unknown* in the hierarchy of PCS.
   - **Pipe**: Enter a pipeline code in this optional field.

     If you plan to transfer the survey file to PCS, *Pipe* in CeCi is equivalent to *Pipeline Code* in PCS. If the *ROW Code* entered earlier in the *Segment* field includes multiple, parallel pipelines with different pipeline codes, enter the appropriate pipeline code. If pipeline codes have not been created in PCS, leave this field empty.
   - **Tech**: Enter the surveyor's name in this optional field. If you plan to transfer the survey file to PCS, the name entered in the *Tech* field populates the *Surveyor* field in the Indirect Survey Manager (ISM) module.
   - **Run**: Enter a unique survey name in this optional field. If transferring the survey file to PCS, data in this field creates a new CI survey folder in ISM. Examples of a unique survey name are: station number, milepost number, date, or a combination of date and station or milepost number.
   - **Date**: Enter a date or use the one automatically entered by CeCi.
3. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Configure the Type Tab

1. If not already in the Properties window, tap **File** > **Properties** to display the survey properties window.
2. To set the survey type, tap the **Type** tab. Tap the drop-down arrow in the **Survey Type** field and select either **AC Survey** or **DC Survey**.

   Once you begin the survey, *Survey Type* cannot be changed.
3. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Configure the Modes Tab

1. If not already in the Properties window, tap **File** > **Properties** to display the survey properties window.
2. Tap the **Modes** tab. Tap the drop-down arrow in the **Mode** field and select either **Flagged** or **Fixed increment**.

   To complete setting the Modes properties, follow the instructions under either *Set Flagged Mode Properties* or *Set Fixed Increment Mode Properties*.

Set Flagged Mode Properties

1. If using a metric data cane to trigger reads, tap **Metric** to record readings in meters.
2. Enter the distance between flags or station markers in the **Flag distance** field.
3. Tap the drop-down arrow in the **Direction** field and select **Ascending** or **Descending** to indicate how station numbers increment in the survey file.
4. If using *Flagged* mode and you want to take timed readings using a data cane, tap **Enable Timed Readings** and then enter the number of reads per minute in the **Readings/minute** field.

   You must also enable double-click detection in the *Misc* tab of *Options* (*View* > *Options* > *Misc* tab). When you double-click the data cane, a survey record is marked with an *F* flag. To pause or resume timed readings, triple-click the data can. You can pause or resume timed readings by pressing **F5** or <**Ctrl**>+<**P**> on the Allegro MX keypad.
5. If using *Flagged* mode and you want to monitor the number of reads per flag, tap **Monitor record count per flag** and then click the drop-down arrow in the **Warn at above average** field and select a percentage value. The Allegro MX beeps 3 times as a warning when the number of reads for the current flag session is more than the average percentage of reads taken for previous flag sessions.

6. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Set Fixed Increment Mode Properties

1. If using a metric wire counter (chainer) to trigger reads, tap **Metric** to record readings in meters.
2. Enter the distance between reads in the **Increment** field. If using a wire counter, the distance should be in increments of 2.5 feet or 1 meter for metric mode.
3. Tap the drop-down arrow in the **Direction** field and select **Ascending** or **Descending** to indicate how station numbers increment in the survey file.
4. Tap **Use wire counter** if survey readings will be taken using a wire counter (chainer).
5. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Configure the On/Off Tab

For suggested on/off settings, see *Interrupted On/Off Settings*.

1. If not already in the Properties window, tap **File** > **Properties** to display the survey properties window.
2. Tap the **On/Off** tab.
3. Tap the drop-down arrow in the Survey Type field and select one of the following options:
   - **On (single reading**) — for an uninterrupted survey, including an *on*, *native*, *static*, or *depolarized* survey.
   - **On/off High/Low** — for an interrupted survey using non-GPS synchronized interrupters. An On/off High/low survey will sample 60 times per second and discard the most negative and least negative values in a cycle based on the On/Off Delays. Of the remaining values in the cycle, the most negative value will be *on* reading and the least negative value will be the *off* reading.
   - **On/off Gps Sync** — for an interrupted survey using GPS synchronized interrupter with shorter *on* and *off* intervals.
   - **On/off GPS Real-time** — for an interrupted survey using GPS synchronized interrupter with longer *on* and *off* intervals.
4. If available, enter on/off times and cycle begins with settings to match those on the current interrupter in the **ON time**, **OFF time**, and **Cycle begins with** fields. These fields are not

available for uninterrupted surveys. The *Cycle begins with* field is not available with On/off High/Low survey types.

5. When available, enter the delay times for the survey. These fields are not available for uninterrupted surveys. The following delay time fields may be available for interrupted surveys:

   - **On Delay** is the amount of time after the *off-to-on* transition occurred. This field is available for On/off High/Low and On/off GPS Real-time survey types.

     For High/Low survey types, the On Delay determines the number of high (most negative) values that are discarded in a cycle. For GPS Real-time survey types, the On reading is the value that is recorded after the On Delay time.

   - **On Setup** is the amount of time before the *on-to-off* transition occurred, at which point the "on" reading is recorded. This field is only available for the On/off Gps Sync survey type.

   - **Off Delay** is the amount of time after the *on-to-off* transition occurred, at which point the "off" reading is recorded. This field is available for all interrupted surveys. For High/Low survey types, the Off Delay determines the number of low (least negative) values that are discarded in a cycle. For Gps Sync and GPS Real-time survey types, the Off reading is the value that is recorded after the Off Delay time.

   - **GPS-RT Setup Time** is the time before the an *on-to-off* or *off-to-on* transition. This field is only available for the On/off GPS Real-time survey type.

   If a reading is recorded during these transition times, the last available reading before the transition is recorded.

6. Tap **One reading per cycle** to limit each cycle to one recorded reading.

7. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Configure the GPS Tab

If you are taking an *On/off Gps Sync* or *On/off GPS Real-time* survey, the GPS settings should be configured in the GPS tab.

1. If not already in the Properties window, tap **File** > **Properties** to display the survey properties window.

2. Tap the **Gps** tab to set up GPS properties.

3. Tap **Record GPS Location** to include coordinates with survey readings. Tap the drop-down arrow in the **Record GPS Location** field and select an interval option that defines how often

coordinates are included with readings.

4. Tap **Record time of reading** to include a GPS time stamp with readings.
5. Tap **Show message when GPS is lost** to show an alert when the GPS signal is not available.
6. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Record Inspection Readings

If using a data cane, press **Enter** on the Allegro MX keypad or single-click the data cane to record readings in the survey file. If using a wire counter (chainer), readings are automatically recorded in the survey file.

Add Remarks

Additional information about the survey record, such as a geographical reference, depth of cover, or facility measurements, can be recorded in the remarks field. Remarks can be added directly in the remarks field, by entering or capturing data in a Test Point Information window, or by selecting an option from a standardized list of remarks.

Add a Remark Directly in the Remarks Field

1. Select the desired survey record and tap the remarks field.
2. Enter text in the field to add a remark to the record.

Select from a Standardized List of Remarks

1. Select a survey record and then tap **Remark** in the main menu.
2. Double-tap a remark or enter the remarks code number. CeCi inserts the remark in the remarks field of the currently selected record.

Add Test Point Information

1. Select a survey record and then tap **View** > **Test Point Info**.
2. Double-tap a test point and take a reading or enter required values when prompted.
3. Tap **OK** to enter the information in the survey record and return to the survey file.

Save the Survey File

Tap the **Save** icon or tap **File** > **Save** to save changes to the survey file. The *Save As* window displays when working with a new survey file that has not previously been saved. Enter a name for the new survey file in the **Name** field and then tap **OK**.

When you save a file, the survey (.svy) file is saved to the root drive under the \AI\CiData folder. A backup of the survey file (.svy) is also saved to the SD Card.

View Survey Records

To open an existing survey file for review, tap **File > Open**. Select the survey file from the list and tap **OK**. You can view survey records either as a list or single record. Tap **View** > **Single record** or **List**.

The following diagram shows the type of information that displays in a survey file.

1. Graph of survey readings (View > Options > Graph tab).

2. Station number (SN); Marker field that may be blank or contain any of the following markers based on the survey setup: *F* (flag), *G* (gap), or *M* (location entered manually); and On/Off readings.

3. Survey remarks field. If the location includes recorded GPS coordinates and you view the survey file in *Single record* mode, coordinates display in the survey remarks field.

4. Current GPS coordinates. If satellite communication has not been established, *GPS invalid* displays. When viewing in *List View* mode, coordinates record in the survey file but do not display.

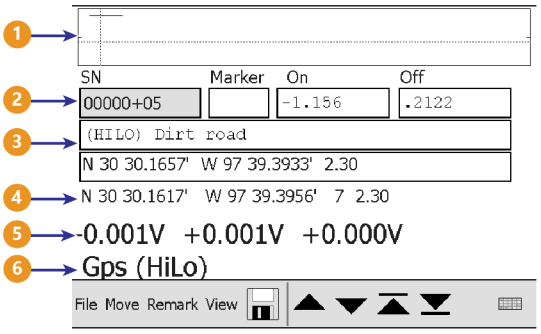
5. On, off, and live DVM reading. *ON* or *OFF* display based on the current cycle position.

6. *GPS* displays when using GPS and satellite communication has been established. If the Allegro loses the GPS signal, *GPS (HiLo)* displays.

   Any of the following status indicators also display when viewing in *List View* mode:

   - *(1)*, *(2)*, or *(3)*: number of satellites in view.
   - *G*: receiving GPS locations from 4 or more satellites.
   - *D*: receiving differential GPS locations.
   - – – –: receiving invalid GPS data.
   - (blank): GPS is unavailable or not currently in use.

Single Record View
(View > Single record)



List View
(View > List)

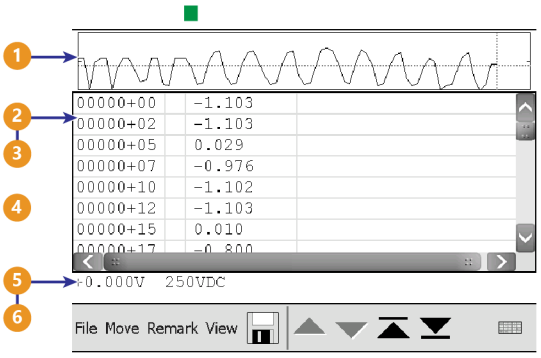


Figure 3-1. CeCi Survey File Features

Show Bearing to Site

When viewing a single record with GPS coordinates, double-tap the GPS field or tap **View** > **Show bearing to site** to display the *Site Locator* window.

The *Site Locator* window shows bearing and distance to a target location. Bearing is blank when the Allegro MX is not receiving a valid GPS fix. The message *Out of Range* displays when the following conditions occur:

- The difference in latitude and longitude is more than 5 degrees.
- Latitude is above 85 degrees north or below 85 degrees south. It is also expressed as 85-90N degrees latitude (northern hemisphere) and 85-90S degrees latitude (southern hemisphere).

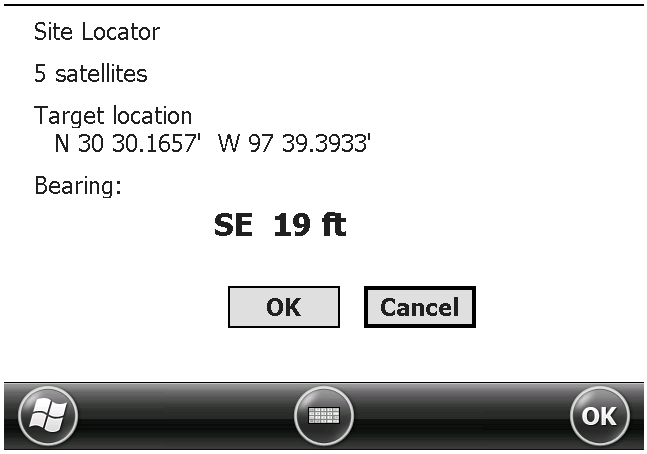


Figure 3-1. Site Locator

Export a Survey File

You can export CeCi survey files as a dBase file (.dbf) or comma separated file (.csv) for use with other software applications, such as Microsoft Excel.

To export a survey file, follow these steps:

1. Tap **File** > **Export**.
2. Tap the **Type** field and select an export format from the list of options. Enter a file name in the field. Ensure that the file extension in your file name matches the type of export file. For example, if exporting as a comma separated file, include the extension *.csv* in your file name.
3. Tap **OK** to close the window.
4. Use Windows Mobile Device Center to move a copy from the Allegro MX *CiData* folder to your computer (*Start* > *File Explorer* > *My Devices* > *AI* > *CiData*).

Transfer a Survey File to PCS

Utility files labeled *wToCmd.exe* and *CeFileXer.exe* must be updated for the current release of Allegro MX software in order for survey files to transfer properly from the Allegro MX to PCS. For more information, refer to *Transfer Utility Files to PCS on page 6*.

To transfer a CeCi survey file to PCS:

1. Connect the provided USB serial cable to your computer and the Allegro MX. If you are using a USB power dock, connect the USB cable to the power dock and your computer.
2. To transfer a survey file to PCS version 1.x, follow these steps:

a. Click **Field Computer** > **Receive** to open the *Field Computer Receive Data* window.

b. Click the options **Receive Cis Data** and Allegro MX.

c. Click **Retrieve File(s)** to display a list of CeCi survey files available for transfer.

d. Select each survey file you want to transfer.

e. Click **Import** to transfer survey files from the Allegro MX to PCS.

f. When the **Mark Native** dialog box opens, click the check box for any *Native Data* survey files and then click **OK** to continue the transfer.

   The *Field Computer Receive Status* window opens showing the status of the file transfer. Refer to the PCS User Guide for information about viewing and managing survey data in ISM.

3. To transfer a survey file to any version of PCS 7, follow these steps:

   a. Click **Field Computer** > **Receive Data**.

   b. Click **Receive CIS Data** and From Allegro MX

   c. Click **Retrieve File Listing** and select the survey files you want to transfer.

   d. Click **Receive** and then click **OK** when the message *Processing file completed* displays. Refer to the PCS 7 manual for information about viewing and managing survey data in ISM.

4 DC Voltage Gradient (DCVG)

DCVG locates indications of pipeline coating defects. The software records the voltage gradient and GPS location for further review and analysis later. DCVG collects data from data canes connected to the Allegro MX.

To display the main DCVG window, tap and **DCVG**.

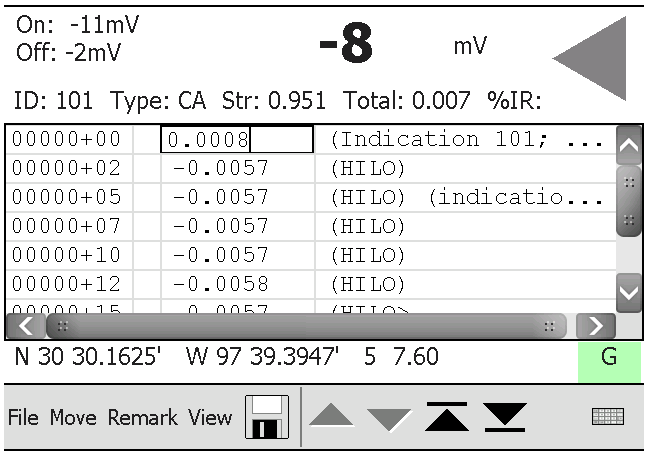


Figure 4-1. DCVG Main Window

The reading area at the top of the DCVG window displays the IR gradient (on reading minus the off reading); millivolt reading (shown as 1 mV in the next example); and polarity if enabled in the DCVG tab of Properties. The polarity arrow displays when readings are greater than 3mV or less than –3mV.

This chapter includes the following topics:

Connect Data Canes to Allegro MX

DCVG collects data using two data canes connected to the red and black jacks on the DVM. When an indication is detected, you can then define the size of the indication. To connect the data canes to the Allegro MX, plug data canes in the red **INPUT** and black **COM** jacks on the DVM.

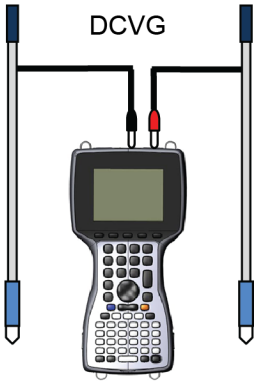


Figure 4-1. DCVG Setup

Set DCVG Options

To set optional features in DCVG, tap **View** > **Options**. The following tabs should be configured for the DCVG application:

- *Configure the Misc Tab*
- *Configure the File Tab on page 43*
- *Configure the Gps Tab on page 43*
- *Configure the Colors Tab on page 43*

Configure the Misc Tab

1. If not already in the Options window, tap **View** > **Options** to display the *Misc* tab.
2. If you want the Allegro MX to beep when the absolute value of the voltage is above a specific value, tap **Beep for voltages above this absolute value**, and enter a warning value in the **Voltage level** field.
3. Tap **Beep when overwrite existing data** if you want the Allegro MX to beep when a survey reading is overwritten.
4. If you want to double-click the data cane to mark a survey record with a flag, tap **Enable double-click detection**.

5. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional options.

Configure the File Tab

1. If not already in the Options window, tap **View** > **Options** to display the Options window.
2. Tap **Enable Autosave**.
3. Enter a time interval in the **Interval (minutes)** field. This allows DCVG to automatically save a survey file at regular time intervals based on the *Interval (minutes)* you specify.
4. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional options.

Configure the Gps Tab

1. If not already in the Options window, tap **View** > **Options** to display the Options window.
2. Tap the **Gps** tab.
3. If you want DCVG to remove existing GPS coordinates when updated coordinates are unavailable after a specified amount of time, tap **Clear GPS location after** and enter the number of seconds in the **seconds without updates** field.

   When GPS coordinates are older than 30 seconds, DCVG displays the time since the last GPS update. When GPS coordinates are older than 15 seconds, DCVG inserts an asterisk (*) after the coordinates.
4. Tap the drop-down arrow in *GPS display Format* and select either **Degrees and Decimal minutes** or **Decimal degrees**.
5. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional options.

Configure the Colors Tab

1. If not already in the Options window, tap **View** > **Options** to display the Options window.
2. Tap the **Colors** tab and select **Enable color**.
3. Select an option in the list and then select a color in the color grid. Repeat this step for each item in the list you want to assign a color.

   For example, to have readings that do not meet criteria display in red text, select **Invalid Value** and the color **red** in the color grid.

4. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional options.

Perform a Survey in DCVG

When DCVG first opens, a new blank survey file is displayed. To open an existing survey file for editing, tap **File > Open**. Select the survey file from the list and tap **OK**. To create a new survey file, tap **File > New**. The DCVG properties window displays.

NOTE: It is recommended that you save the survey file before and after entering data.

Once a survey file is created or opened for editing, the following actions can be performed:

- *Set DCVG Survey Properties*
- *Record Inspection Readings on page 48*
- *Add Remarks on page 48*
- *Save the Survey File on page 50*

Set DCVG Survey Properties

To set the properties for the current close interval survey, tap **File** > **Properties** to display the properties window for the current survey. The following tabs should be configured for a DCVG survey:

- *Configure the Survey Tab on page 45* — the fields in the Survey tab identify the current survey and correspond to PCS ROW Code, Pipeline Code, and Surveyer fields. The Segment field is a required field and must be defined before defining properties in additional tabs or saving the survey file.
- *Configure the Modes Tab on page 45* — the fields in the Modes tab determine whether the survey is a flagged or a fixed increment survey and define the flagged or fixed increment properties.
- *Configure the On/Off Tab on page 46* — the fields in the On/Off tab define the type of survey to be performed and the on and off time settings.
- *Configure the DCVG Tab on page 47* — the fields in the DCVG tab define additional P/S and half-cell calibration settings.
- *Configure the Gps Tab on page 48* — the fields in the Gps tab dictate the frequency at which

the GPS location should be recorded and GPS details that are associated with that location record.

Configure the Survey Tab

The fields in the Survey tab identify the current survey and, if imported into PCS using Bridge, will correspond to PCS ROW Code, Pipeline Code, and Surveyer fields. PCS does not currently support direct import of Allegro MX DCVG survey files (*Field Computer* > *Receive Data*). However, you can use Bridge to import data in PCS. See the PCS User Guide for more information.

1. If not already in the Properties window, tap **File** > **Properties** to display the *Survey* tab.
2. Provide information in the following fields of the *Survey* tab:
   - **Segment**: Enter the name of the ROW (right-of-way) in this required field. You can enter up to 100 characters.

     If you plan to import DCVG data in PCS using Bridge, *Segment* name must match *ROW Code* in PCS. If these fields do not match, a new ROW Code and folder is created with the label *Unknown* in the hierarchy of PCS.
   - **Pipe**: Enter a pipeline code in this optional field.

     If you plan to import DCVG data in using Bridge, *Pipe* is equivalent to *Pipeline Code* in PCS. If the *ROW Code* entered earlier includes multiple, parallel pipelines with different pipeline codes, enter the appropriate pipeline code. If pipeline codes have not been created in PCS, leave this field empty.
   - **Tech**: Enter the surveyor's name in this optional field.

     If you plan to import DCVG data in PCS using Bridge, the name entered in the *Tech* field populates the *Surveyor* field in the Indirect Survey Manager (ISM) module.
   - **Run**: Enter a unique survey name in this optional field.

     For example, include station number, milepost number, date, or a combination of station number and date, or milepost and station number. If you plan to import DCVG data in PCS using Bridge, data in this field creates a new CI survey folder in ISM.
   - **Date**: Enter a date or use the one automatically entered by DCVG.
3. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Configure the Modes Tab

1. If not already in the Properties window, tap **File** > **Properties** to display the survey properties window.

2. Tap the **Modes** tab. Tap the drop-down arrow in the **Mode** field and select either **Flagged** or **Fixed increment**.

   To complete setting the Modes properties, follow the instructions under either *Set Flagged Mode Properties* or *Set Fixed Increment Mode Properties*.

Set Flagged Mode Properties

1. Tap **Metric** if you want readings recorded in meters instead of feet.
2. Enter the distance between flags or station markers in the **Flag distance** field.
3. Tap the drop-down arrow in the **Direction** field and select **Ascending** or **Descending** to indicate how station numbers increment in the survey file.
4. If you want to monitor the number of reads per flag, tap **Monitor record count per flag** and then tap the drop-down arrow in the **Warn at above average** field and select a percentage value. The Allegro MX beeps 3 times as a warning when the number of reads for the current flag session is more than the average percentage of reads taken for previous flag sessions.
5. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Set Fixed Increment Mode Properties

1. Tap **Metric** if you want readings recorded in meters instead of feet.
2. Enter the distance between reads in the **Increment** field.
3. Tap the drop-down arrow in the **Direction** field and select **Ascending** or **Descending** to indicate how station numbers increment in the survey file.
4. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Configure the On/Off Tab

1. If not already in the Properties window, tap **File** > **Properties** to display the survey properties window.
2. Tap the **On/Off** tab.
3. Tap the drop-down arrow in the Survey Type field and select one of the following options:
   - **On/off High/Low** — for an interrupted survey using non-GPS synchronized interrupters. An On/off High/Low survey will sample 60 times per second and discard the most negative and least negative values in a cycle based on the on/off delays. Of the

remaining values in the cycle, the most negative value will be *on* reading and the least negative value will be the *off* reading.

- **On/off Gps Sync** — for an interrupted survey using GPS synchronized interrupter.

4. Enter on/off times and cycle begins with settings to match those on the current interrupter in the **ON time**, **OFF time**, and **Cycle begins with** fields. These fields are not available for uninterrupted surveys. The *Cycle begins with* field is not available with On/off High/Low survey types.
5. When available, enter the delay times for the survey. The following delay time fields may be available:
   - **On Delay** is the amount of time after the *off-to-on* transition occurred. This field is only available for On/off High/Low survey type. The On Delay determines the number of high (most negative) values that are discarded in a cycle.
   - **On Setup** is the amount of time before the *on-to-off* transition occurred, at which point the "on" reading is recorded. This field is only available for the On/off Gps Sync survey type.
   - **Off Delay** is the amount of time after the *on-to-off* transition occurred, at which point the "off" reading is recorded. This field is available for all interrupted surveys. For On/off High/Low survey types, the Off Delay determines the number of low (least negative) values that are discarded in a cycle. For On/off Gps Sync survey types, the Off reading is the value that is recorded after the Off Delay time.

   If a reading is recorded during these transition times, the last available reading before the transition is recorded.
6. Tap **One reading per cycle** to limit each cycle to one recorded reading.
7. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Configure the DCVG Tab

1. If not already in the Properties window, tap **File** > **Properties** to display the survey properties window.
2. Tap the **DCVG** tab.
3. Measure and enter the *on* reading taken at the beginning and end of the survey in the **P/S On Begin** and **P/S On End** fields.
4. Measure the *Off* reading taken at the beginning and end of the survey in the **P/S Off Begin,** and **P/S Off End** fields. Tap the **V** button to view a live voltage reading and then press **Enter**

on the Allegro MX keyboard to save the voltage reading.

5. Take readings at the beginning and end of the survey. Enter the difference in the **Half-cell calibration Begin** and **Half-cell calibration End** fields. Tap the **V** button to view a live voltage reading for either of these fields.
6. Tap **Show DCVG Polarity** if you want a directional arrow to display in the main DCVG window indicating the polarity of the reading during the survey.
7. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Configure the Gps Tab

1. If not already in the Properties window, tap **File** > **Properties** to display the survey properties window.
2. Tap the **Gps** tab.
3. Tap **Record GPS Location** to include coordinates with survey readings. Tap the drop-down arrow in the **Record GPS Location** field and select an interval option that identifies how often coordinates are included with readings.
4. Tap **Record time of reading** to include a GPS time stamp with readings.
5. If you are using a second GPS receiver to record location, complete the following steps:
   a. Tap the drop-down arrow in the **Comm port** field and select the COM port the GPS receiver is connected to.
   b. Tap the drop-down arrow in the **Baudrate** field and select a baud rate supported by the GPS receiver.
6. Tap **Show message when GPS is lost** to show an alert when the GPS signal is not available.
7. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Record Inspection Readings

Press **Enter** on the Allegro MX keypad or single-click the data cane to record readings in the survey file.

Add Remarks

Additional information about the survey record, such as a geographical reference, depth of cover, or facility measurements, can be recorded in the remarks field. Remarks can be added directly in the

remarks field, by entering or capturing data in a Test Point Information window, by adding indication information in a Test Point Information window, or by selecting an option from a standardized list of remarks.

Add a Remark Directly in the Remarks Field

1. Select the desired survey record and tap the remarks field.
2. Enter text in the field to add a remark to the record.

Select from a Standardized List of Remarks

1. Select a survey record and then tap **Remark** in the main menu.
2. Double-tap a remark or enter the code number for the remark. DCVG inserts the remark in the remarks field of the currently selected record.

Add Indication Information

1. Tap **View** > **Test Point Info** when an indication is found during the survey.
2. Double-tap **Indication** to display an indication sizing window.
3. Enter information about the indication in the following fields of the *Summary* tab:
   a. **ID**: Enter an identification number for the indication.
   b. **Type**: Tap the drop-arrow in the **Type** field and select the type of indication. Options include *Unknown*, *Cathodic/Anodic*, *Anodic/Cathodic*, *Anodic/Anodic*, and *Cathodic/Cathodic*.
   c. **Signal Strength**: Enter the signal strength of the indication. DCVG automatically calculates and enters values in the **Total IR** and **% IR** fields.

      Signal strength is the pipe-to-soil *On* reading minus the pipe-to-soil *Off* reading (P/S On – P/S Off).
4. Tap the **IRGradient** tab and complete the following steps:
   a. Take readings at the indication site until you reach remote earth. Press the data cane button to capture readings in DCVG, or press **Enter** on the Allegro MX keypad. DCVG automatically calculates *Total IR*.

      When GPS is available, tap the **GPS Loc** button to record the current GPS location. The **GPS Loc** button is disabled and unavailable for use when GPS is unavailable.
   b. Tap **OK** to return to the survey file.

Add Test Point Information

1. Select a survey record and then tap **View** > **Test Point Info**.
2. Double-tap a test point and enter required values when prompted.
3. Tap **OK** to enter the information in the survey record and return to the survey file.

Save the Survey File

Tap the save icon or **File** > **Save**. The *Save As* window displays when working with a new survey file that has not previously been saved. Enter a name for the new survey file in the **Name** field and then tap **OK**.

When you save a file, the survey (.dvg) file is saved to the root drive under the \AI\CiData folder. A backup of the survey file (.dvg) is also saved to the SD Card.

View Survey Records

To open an existing survey file for review, tap **File > Open**. Select the survey file from the list and tap **OK**. You can view survey records either as a list or single record. Tap **View** > **Single record** or **List**.

The following diagram describes the type of information that displays in a DCVG survey file.

1. Live on/off reading, IR gradient, and polarity arrow.

   Polarity arrow displays when *Show DCVG Polarity* is enabled. Positive (+) is indicated with a right pointing arrow, negative (–) is indicated with a left pointing arrow.

2. Status line with any of the following information:

   - Shows recorded data for a selected record, such as indication number, type, signal strength, and remarks.
   - Shows any of the following when capturing data for a survey record:

     Gps: Receiving satellite signal. Survey file is set up in *On/Off GPS Sync* mode.

     Gps (HiLo): Not receiving satellite signal; data is captured in *HiLo* mode instead. Survey file is set up in *On/Off GPS Sync* mode.

     HiLo: Survey file is set up in *On/Off High/Low* mode.

     F:0: Flag marker and flag count. Survey file is set up in *Flagged* mode and option *Monitor record count per flag* is enabled.

3. Recorded station number (SN), marker, and IR gradient.

4. Remarks field with indication data (number, type, signal strength, and remarks).

5. GPS coordinates for the record, if available, when set up in On/Off GPS Sync mode.

6. Live GPS coordinates, number of satellites in view, and PDOP signal strength.

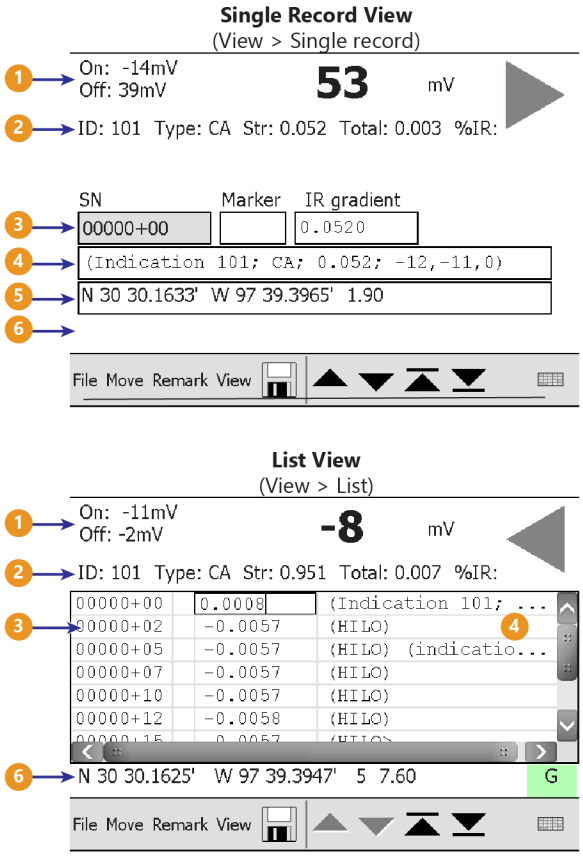


Figure 4-1. DCVG Survey File Features

Show Bearing to Site

When viewing a single record with GPS coordinates, double-tap the GPS field to display the *Site Locator* window. Tapping **View** > **Show bearing to site** also displays the window.

The *Site Locator* window shows bearing and distance to a target location. Bearing is blank when the Allegro MX is not receiving a valid GPS fix. The message *Out of Range* displays when the following conditions occur:

- The difference in latitude and longitude is more than 5 degrees.
- Latitude is above 85 degrees north or below 85 degrees south, which is also expressed as 85-90N degrees latitude (northern hemisphere) and 85-90S degrees latitude (southern hemisphere).

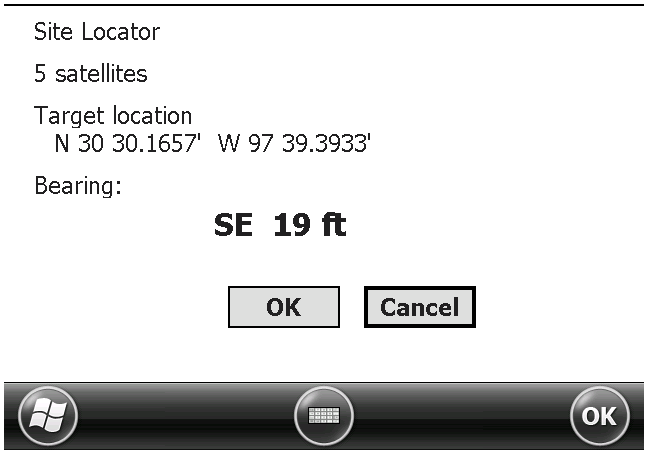


Figure 4-1. Site Locator

Export a Survey File

You can export DCVG survey files as a dBase file (.dbf) or comma separated file (.csv) for use with other software applications, such as Microsoft Excel.

To export a survey file, follow these steps:

1. Tap **File** > **Export**.
2. Tap the **Type** field and select an export format from the list of options. Ensure that the file extension in your file name matches the type of export file. For example, if exporting as a comma separated file, include the extension *.csv* in your file name.
3. Tap **OK** to close the window.
4. Use Windows Mobile Device Center to move a copy from the Allegro MX *CiData* folder to your computer (*Start* > *File Explorer* > *My Devices* > *AI* > *CiData*).

5 Periodic Survey

Periodic Survey (PS) measures voltage readings for annual and periodic surveys. Periodic Survey is used in conjunction with American Innovations PCS software. Facility and inspection fields are established in PCS, then transferred to the Allegro MX. The Periodic Survey collects survey readings from test leads connected to the Allegro MX. After completing a survey, data is transferred from the Allegro MX back to PCS. For information about how to build and transfer a survey file to the Allegro MX, refer to the *PCS User Guide*.

The Periodic Survey application handles up to 2,500 facilities.

Tap **Start** > **PeriodicSurvey** to open the Periodic Survey application. If the application had been accessed previously, Periodic Survey opens the last opened file and returns to your last viewed site. If a previously opened file is not available, Periodic Survey prompts you to open a survey file.

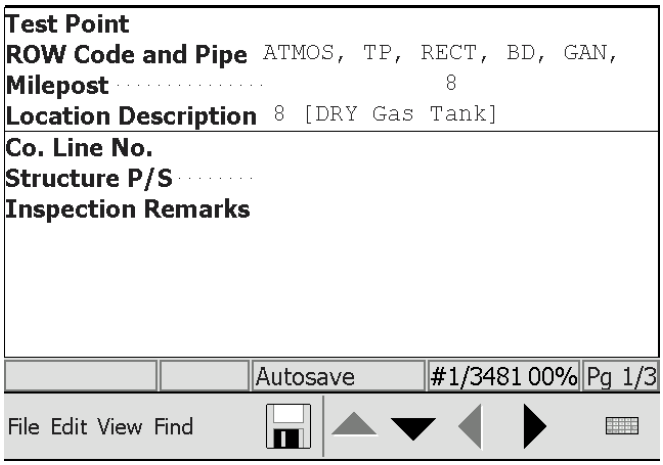


Figure 5-1. Periodic Survey Site Screen.

This chapter includes the following topics:

Connect Test Leads to Allegro MX

Periodic Survey records facility inspection readings using the Allegro MX digital voltmeter (DVM) and a data cane connected to the red and black jacks on the DVM. Plug test leads to the red and black jacks on the DVM according to the diagram.

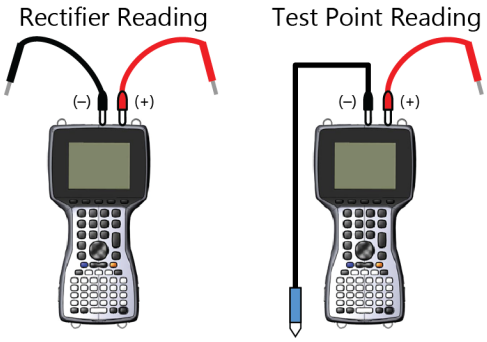


Figure 5-1. Allegro MX Connections Configuration for Periodic Survey

Send Periodic Surveys to the Allegro MX

Utility files labeled *wToCmd.exe* and *CeFileXer.exe* must be updated for the current release of Allegro MX software in order for survey files to transfer properly from PCS to the Allegro MX. For more information, refer to *Transfer Utility Files to PCS on page 6*.

To transfer a Periodic Survey file from PCS, connect the Allegro to your computer and open the appropriate module in PCS. In the *Field Computer Send* window, select the based on mode, facility types, desired prompt theme, layout theme, and sort theme(s). Update the grid and select the data you want to send and press **Send**. For detailed instructions, refer to the *PCS User Guide*.

Open and Configure a Survey File

To perform a periodic/annual survey in Periodic Survey, tap **File** > **Open**. Select a survey file in the *Open* window and then tap **OK**. The survey file opens in Periodic Survey.

Alternatively, you can select a recently opened survey file from the **File** menu. The survey file opens to the last survey record viewed in that survey file.

Once a survey file is opened, the following actions should be performed to configure the file for your survey:

- *Set Periodic Survey Options*
- *Set Additional GPS Properties on page 58*

It is recommended that you save the survey file before and after entering data. Refer to *Save the Survey File on page 68*.

Set Periodic Survey Options

To set the options for the current periodic survey, tap **View** > **Options** to display the options window for the current survey. The following tabs should be configured for a periodic survey:

- *Configure the On/Off Tab* — the fields in the On/Off tab define the type of survey to be performed and on and off time settings.
- *Configure the GPS Tab on page 56* — the fields in the Gps tab dictate the frequency at which the GPS location should be recorded and GPS details that are associated with that location record.
- *Configure the RFID Tab on page 57* — the fields in the RFID tab configure the ports for the attached RFID device.
- *Configure the Fonts Tab on page 57* — the fields in the Fonts tab change the look of the text in the Periodic Survey.
- *Configure the Misc Tab on page 57* — the fields in the Misc tab set auto-backup and miscellaneous display options.

It is recommended that you save the survey file before entering data.

Configure the On/Off Tab

For suggested on/off settings, see *Appendix A, Interrupted On/Off Settings* on page 71.

1. If not already in the Options window, tap **View** > **Options** to display the survey options window.
2. Tap the **On/Off** tab.
3. Tap the drop-down arrow in the Survey Type field and select one of the following options:
   - **High/Low** — for an interrupted survey using non-GPS synchronized interrupters. A High/Low survey will sample 60 times per second and discard the most negative and least negative values in a cycle based on the on/off delays. Of the remaining values in the cycle, the most negative value will be *on* reading and the least negative value will be the *off* reading.
   - **Gps Sync** — for an interrupted survey using GPS synchronized interrupter.
   - **Disable** — Select this option to disable the commands *Insert GPS* in the *Edit* menu and *Turn ON* in the *Edit* > *GPS* submenu.

4. If available, enter on/off times and cycle begins with settings to match those on the current interrupter in the **ON time**, **OFF time**, and **Cycle begins with** fields. The *Cycle begins with* field is not available with High/Low survey types.
5. When available, enter the delay times for the survey. The following delay time fields may be available:
   - **On Delay** is the amount of time after the *off-to-on* transition occurred, at which point the "on" reading is recorded. The On Delay determines the number of high (most negative) values that are discarded in a cycle. This field is only available for High/Low survey types.
   - **Instant On Setup** is the amount of time before the *on-to-off* transition occurred, at which point the "on" reading is recorded. This field is only available for the Gps Sync survey type.
   - **Instant Off Delay** is the amount of time after the *on-to-off* transition occurred, at which point the "off" reading is recorded. This field is available for all interrupted surveys. For High/Low survey types, the Off Delay determines the number of low (least negative) values that are discarded in a cycle. For Gps Sync survey types, the Off reading is the value that is recorded after the Off Delay time.

   If a reading is recorded during these transition times, the last available reading before the transition is recorded.
6. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Configure the GPS Tab

If you are taking a *Gps Sync* survey, the GPS settings should be configured in the GPS tab.

1. If not already in the Options window, tap **View** > **Options** to display the survey options window.
2. Tap the **Gps** tab to set up GPS properties.
3. Tap the drop-down arrow in the **Display Format** field and select either **Degrees and Decimal minutes** or **Decimal degrees**.
4. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

To include GPS coordinates with readings, turn GPS on by tapping **Edit** > **GPS** > **Turn ON**.

Configure the RFID Tab

1. If not already in the Options window, tap **View** > **Options** to display the survey options window.
2. Select the appropriate **Comm Port** from the drop-down list that corresponds to the port that the RFID is attached to.
3. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Configure the Fonts Tab

1. If not already in the Options window, tap **View** > **Options** to display the survey options window.
2. Tap the drop-down arrow in the **Item** field and select **Site List**, **Edit caption**, or **Edit field**.

   Site List is a list of templates for adding a new site in the survey file (View > Site List). *Edit caption* refers to field names and *Edit field* refers to data entered in fields.
3. Tap the drop-down arrow in the **Font** field and select a font type.
4. Tap the drop-down arrow in the **Size** field and select a font size.
5. Repeat these steps to change font properties for another item in the **Item** field.
6. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Configure the Misc Tab

1. If not already in the Options window, tap **View** > **Options** to display the survey options window.
2. Tap **Enable Auto-backup** to automatically saves the survey file at regular intervals.
3. Select a time interval in the **Interval (minutes)** field to define the time interval for the automatic backup.
4. Tap **Show Bearing-distance to site**.
5. Tap **Show Message about DVM input**.
6. Tap **Ok** to save changes and return to the survey file or tap another tab to set additional properties.

Set Additional GPS Properties

If you are using a second GPS receiver (dual GPS), complete the following steps:

1. Tap **Edit** > **GPS** > **Gps Settings** to display the *GPS Port Settings* window.
2. Tap the drop-down arrow in the **Comm port** field and select the COM port the GPS receiver is connected to.
3. Tap the drop-down arrow in the **Baudrate** field and select a baud rate supported by the GPS receiver.
4. Tap **Read PPS from Internal GPS** if you want the Allegro MX internal GPS receiver to provide a time stamp with readings.

To include GPS coordinates with readings, turn GPS on by tapping **Edit** > **GPS** > **Turn ON**.

Manage Sites

Complete the following steps to rearrange the sites, add a new one, delete an added site, or assign a new RFID tag to a site. New sites added on the Allegro MX are marked with a bullet (•) in the *Site List* and can be deleted. The survey file must be set up in PCS to allow for adding and deleting sites in order to add or delete the sites on the Allegro.

To find a specific site's record or view the record information, refer to *Perform a Periodic Survey on page 60*.

Rearrange the Sites

The *Site List* shows all sites available in the current file and allows you to change the order the sites display in Periodic Survey or hide already-surveyed sites. Tap **View** > **Site List** to see all available sites in the current file.

To determine what order sites show in the list and whether some sites should be hidden, tap **Options** and do the following:

1. Tap the drop-down arrow in the **Order site by** field and select the desired sort order. The sort orders available depend what sort themes were included in the prompt sent to the Allegro MX from PCS.
2. Tap the drop-down arrow in the **Show** field and select either **All sites** or **Only unsurveyed sites**.
3. Tap **OK** to return to *Site List*. The sites are rearranged based on the sort order and show

settings defined in *Options*.

4. Tap **OK** or **Cancel** to return to the survey file.

Add a New Site

If the PCS user who created this survey file had permission to create new facilities on the Allegro, you can add new sites in the *Site List* window. Tap **View** > **Site List** to see all available sites in the current file and do the following:

1. Tap **Add site**.
2. Tap a facility type in the list to select a template for the new site.
3. Tap **OK** to close the window and return to the survey file.
4. Tap the drop-down arrow in the **ROW Code** field. Do one of the following to enter a ROW code:
   - Select a **ROW code** from the list.
   - Select **Other** and enter a new ROW code.

     To prevent entering an incorrect ROW code, it is recommended to copy an existing ROW code and paste it into the *Other* field, then edit the ROW code as necessary. Refer to *Global Shortcuts* , page 1 for help with selecting, copying, and pasting text.

     Tap **OK** to return to the survey file.

   If the **ROW Code** field is empty when the survey is transferred to PCS, a new ROW code is created in the PCS hierarchy labeled From Allegro MX.
5. Tap the **Milepost** field and enter the new site's milepost number.
6. Enter data for the new site in the Information fields. Information and Reading fields are separated with a horizontal line. Information fields are above the line and Readings fields are below the line.

Delete a Site

If the survey file was created with permissions to create new facilities on the Allegro, you can delete sites in the *Site List* window. Tap **View** > **Site List** to see all available sites in the current file and do the following:

1. Tap a site marked with a bullet (•) and then tap **Delete**.
2. Tap **Yes** when the message *Delete this site?* displays.

Assign an RFID Tag to a Site

If you have an RFID tag that has not yet been assigned to a site, you can assign the tag to a site in your survey file. Locate the survey record for the site (see *Locate a Specific Survey Record on page 62*) and do the following with the survey record showing:

1. Press the RFID pen's scan button while touching the pen's touch tip to the RFID tag.
2. When the RFID Event dialog displays, press Yes to assign the RFID tag to the current record's site.

The RFID information field updates with the tag's ID. Whenever an RFID pen is used to scan the RFID tag again, Periodic Survey will display the survey record associated with that tag.

Perform a Periodic Survey

In the Periodic Survey *Site* screen you can review a survey record's existing readings or take new ones. To search for a specific record, you can use *Find*, page between records, or jump to a specific record in the *Site List*.

Changes made in a survey record are not saved until you move to a different record, manually save the file, or exit the application from the *File* menu. Backups of the survey file will be saved to the Allegro MX's SD Card, though any images taken as part of a survey are not stored alongside the backup. Prior to resetting the Allegro MX or upgrading the software, it is recommended that you manually back up any PS folder that contains images to the SD Card or a computer.

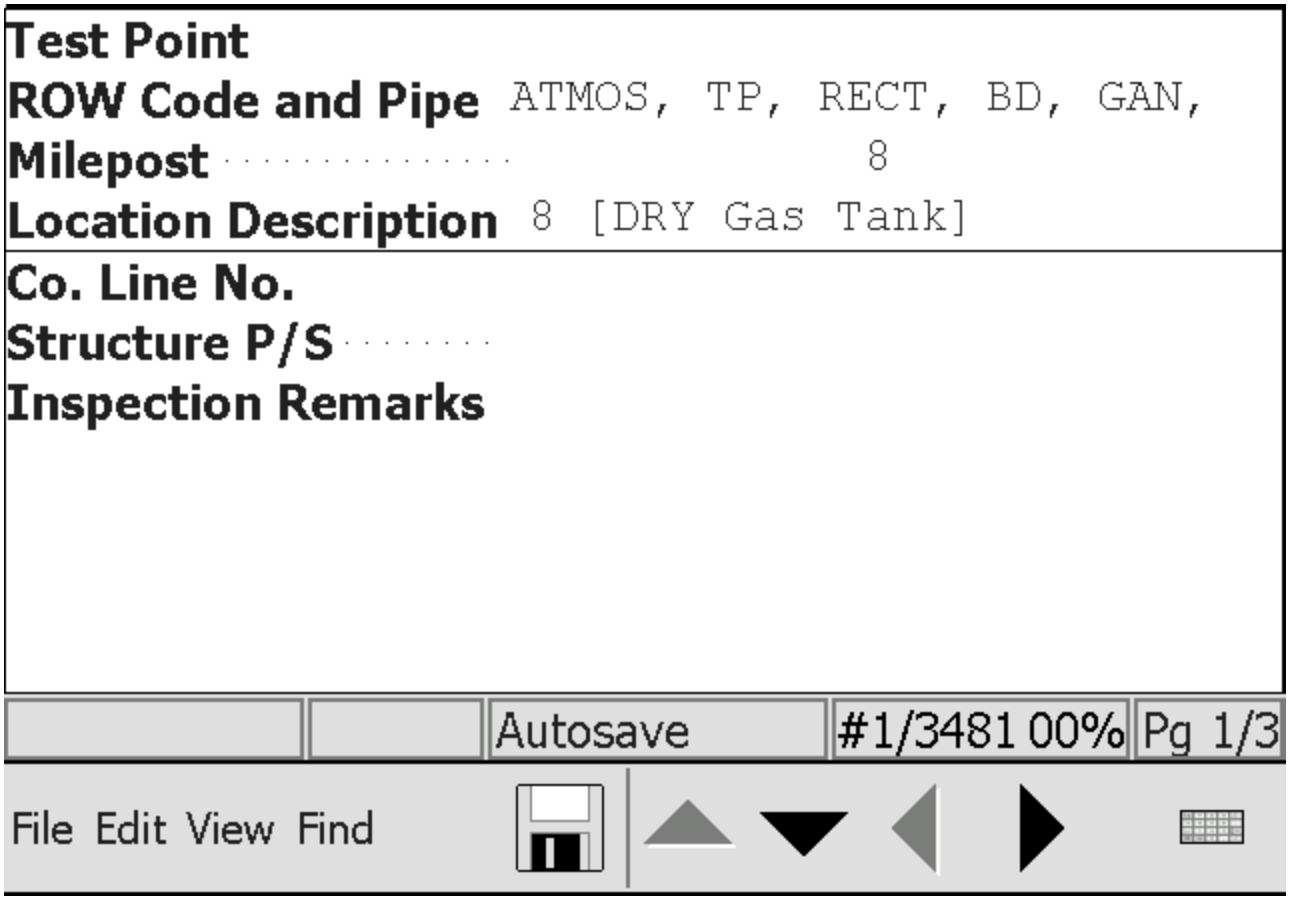


Figure 5-1. Periodic Survey Site Screen

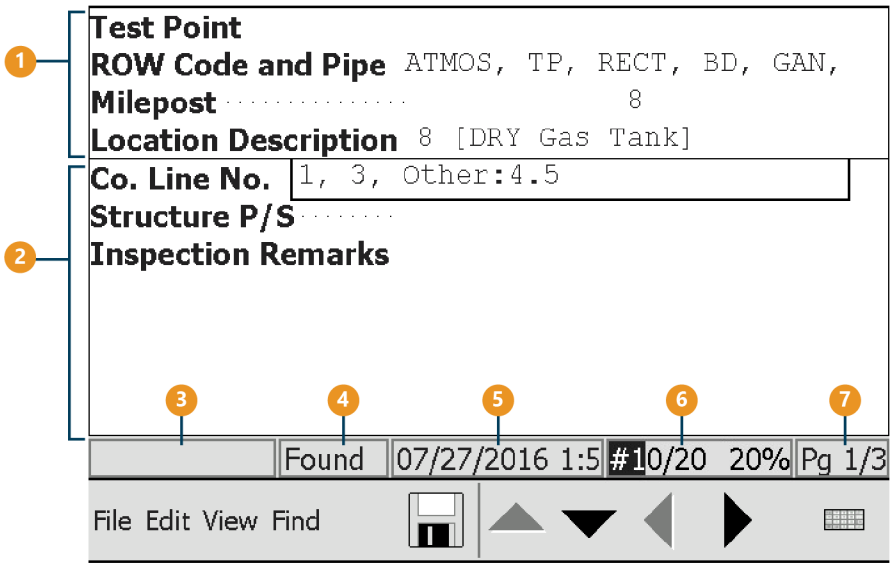
Refer to the following topics for more information:

- *Review a Survey Record* — review existing data in information, inspection, and maintenance fields for an individual record.
- *Locate a Specific Survey Record* — search for a record using *Find*, page between records, or jump to a specific record in the *Site List*.
- *Take Readings for a Specific Record* — manually enter values in a record's fields, record readings from connected devices, and take pictures for images fields with the camera.
- *Save the Survey File* — save changes to your survey file.

Review a Survey Record

A survey record shows record details in three main areas — information fields, reading fields, and status panes. Information fields appear above the horizontal line while inspection and maintenance reading fields display below the horizontal line. The arrangement of these fields is defined in the prompt sent to the Allegro MX from PCS. Refer to the *PCS User Guide* for more information about creating prompt themes for the field computer.

The status panes display information about the current record and/or currently selected field. Depending on the options configured for the Allegro and the information available in the file, the panes' content may vary.



1. Information fields (above horizontal line).
2. Inspection and maintenance reading fields (below horizontal line).
3. The previous reading for the current field, if available.
4. The Found/Not FND status of a recent search or the current GPS, DGPS, HILO, DVM range, or On/Off status.
5. Depending on the information available, contents vary:
   - the bearing-distance to the site, for GPS fields with coordinates.
   - the date and time of previous readings, if available.
   - the Periodic Survey's autosave status.
6. The current record number, the total number of records in the file, and the percentage of facility records that have been marked as surveyed.
7. The current page number and the total number of pages in the record.

Figure 5-1. Survey Record Screen

Click ▶ or ◀ to show the next or previous page in the survey record.

Locate a Specific Survey Record

Survey records are shown in the order determined by the sort order selected in the *Site List Options*. There are many ways to locate specific survey records in *Periodic Survey*: paging through records, finding a record based on values in certain fields, jumping to a record from the *Site List*, and using an RFID pen to jump to a record.

Page Between Records

Survey records are shown in the order determined by the sort order selected in the *Site List Options*. When viewing a survey record, the status bar at the bottom of the screen tells you where within the survey file the current record exists. To move to the next or the previous record in the file, click or , respectively.

Find a Record

Periodic Survey allows you to search for a specific record by specifying exactly where within a survey record you want search terms to be found.

From the *Site Record Screen*, tap **Find** then tap **Find** in the *Find* menu. The *Find* screen shows the fields that were defined as searchable in the prompt sent to the Allegro MX from PCS.

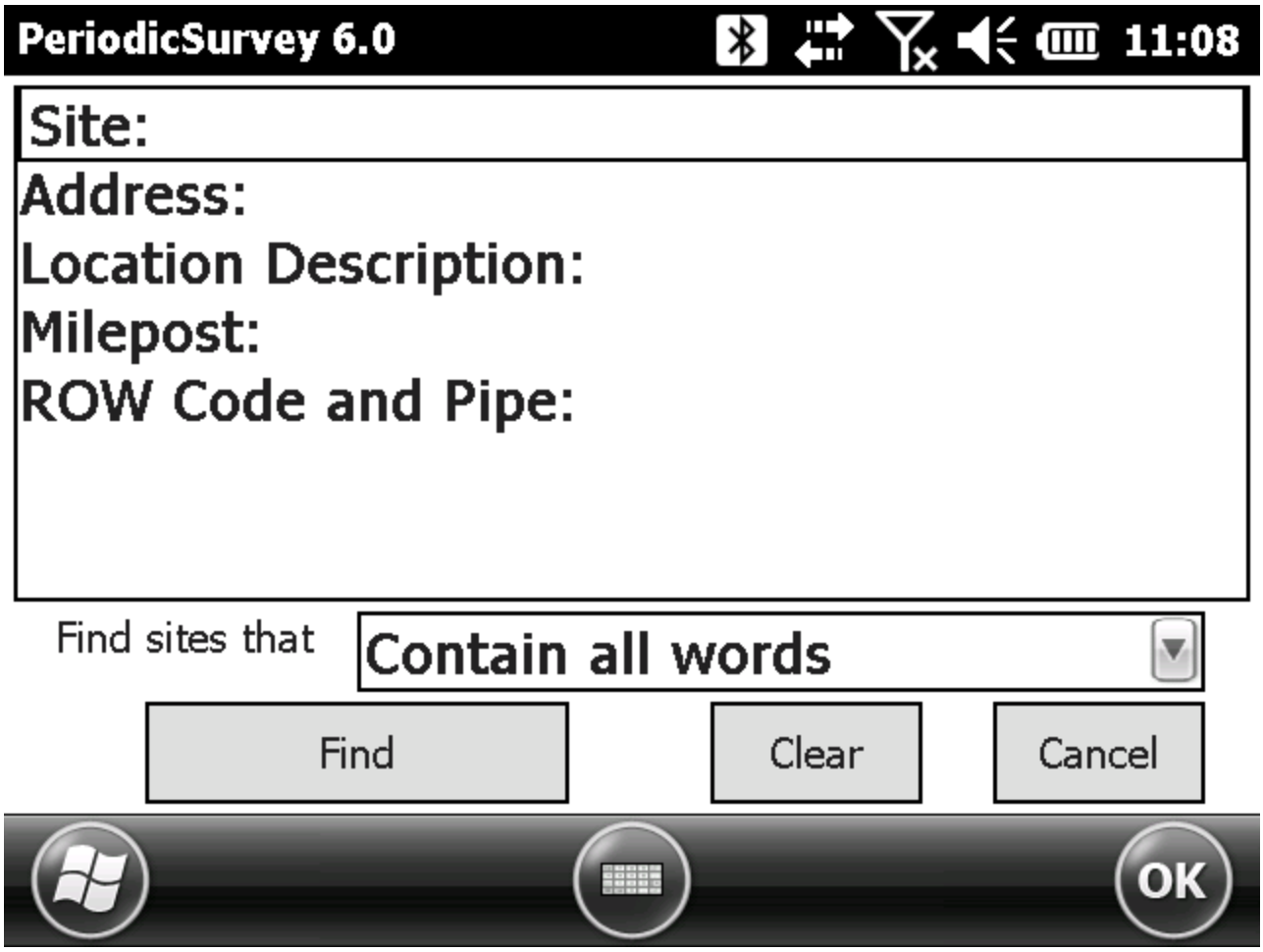


Figure 5-1. Find Screen

Enter the text to find in the desired searchable field(s) and select a search constraint in the **Find sites that** dropdown. Tap **Find** to locate the first survey record that matches the search, tap **Clear** to remove all search terms from the fields, or tap **Cancel** to close the *Find* screen without performing a search.

To find the next survey record that matches the search, tap **Find** then tap **Find Next** in the *Find* menu.

To show the previous survey record that matches the search, tap **Find** then tap **Find Previous** in the *Find* menu.

Jump to a Record with the Site List

The *Site List* shows all sites available in the current file and allows you to quickly jump to a specific survey record. Tap **View** > **Site List** to see all available sites in the current file. Scroll up or down in the list if needed to find the survey record you want to view. Select the desired survey record and tap **OK** to display the selected record.

Jump to a Record with an RFID Pen

If you have RFID tags assigned to specific sites, you can use an RFID pen to quickly jump to the survey record for the site. Simply press the RFID pen's scan button while touching the pen's touch tip to the RFID tag. If the RFID tag is already assigned to a site in your survey, the survey record associated with that site will display.

Take Readings for a Specific Record

Changes made in a survey record are not saved until you move to a different record, manually save the file, or exit the application from the *File* menu. The following field types are available with a prompt.

- **Text fields** — Many fields in a survey accept text input. To enter text in a text field, tap the field and enter text with the keyboard.
- **Picklists** — For picklist fields, tap to select the picklist field, then tap again to display the picklist and select the desired item in the picklist.
- **Multi-Select Picklists** — For picklists that allow you to select more than one value, double-tap in the field to open the multi-select screen and select the values. Refer to *Select a Value for Field with a Multi-Select Picklist* for detailed instructions.
- **Inspection Readings** — For reading fields, tap the field and press **Enter** on the Allegro MX keypad twice. Refer to *Record Inspection Readings* for more information.
- **Timed Readings** — For timed readings, tap the timed reading field and press **Enter** to open the Averaged Reading Survey screen and tap **Start** and **OK** to take the readings. Refer to *Record Timed Readings* for detailed instructions.

  The following fields support timed readings:

- *Min P/S*
- *Max P/S*
- *Average P/S*
- *P/S Sample Time*

Select a Value for Field with a Multi-Select Picklist

If a field was set up in PCS to include a picklist (similar to a drop-down list), complete the following steps to select one or more values for that field.

1. With the cursor in the field, double-tap in the field or press **Enter** to open the multi-select page.

Figure 5-1. Multi-select Page

2. Tap a value or multiple values to add to the field. The value(s) remain highlighted once selected.
3. (Optional) If available, tap **Other** and enter a value in the **Other** field to add a value that is not on the list.
4. Tap **OK** to add the selected values to the field or **Cancel** to return to the survey file without

making changes.

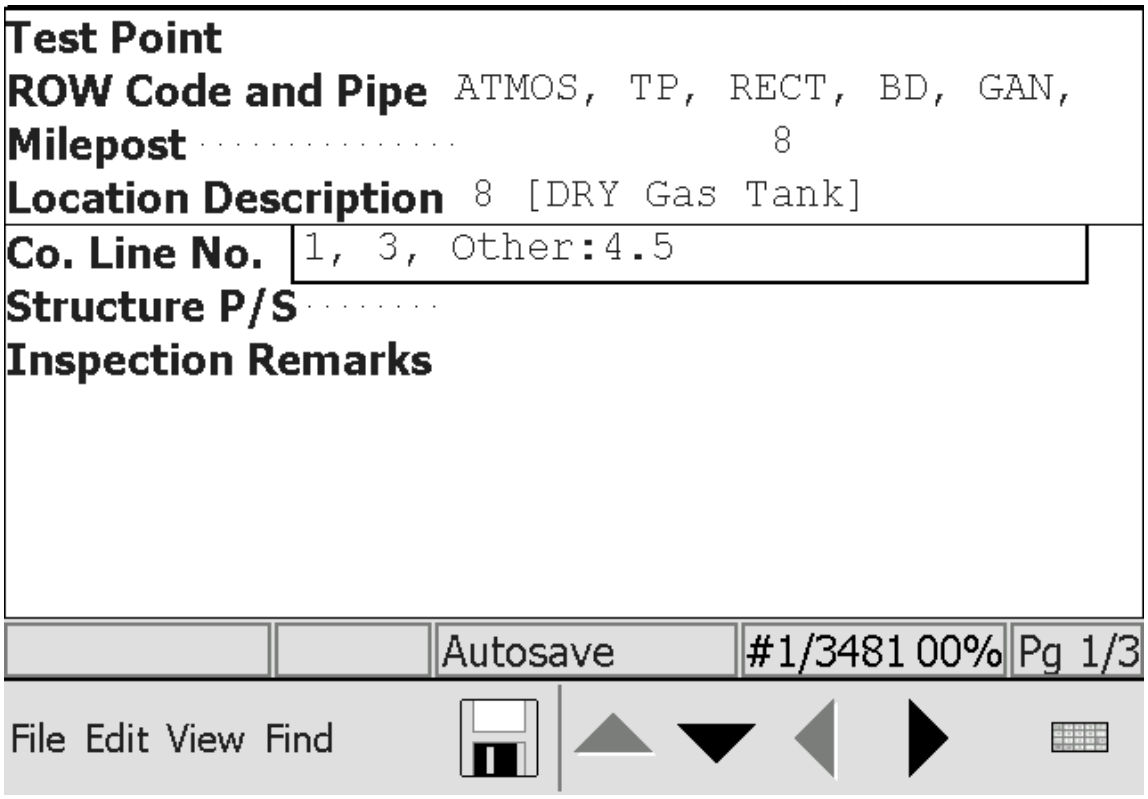


Figure 5-2. Multiple Selection Field

Record Inspection Readings

Select a reading field and then press **Enter** on the Allegro MX keypad to activate the digital voltmeter. Press **Enter** again or single-click the data cane to capture the reading in the survey file.

Record Timed Readings

When the survey is set up in PCS with Allegro MX prompts for the following fields, these same fields are available in PS for timed readings: *Min P/S*, *Max P/S*, *Average P/S*, and *P/S Sample Time*.

To take timed readings, follow these steps:

1. Select a timed reading field and then press **Enter** on the Allegro MX keypad.

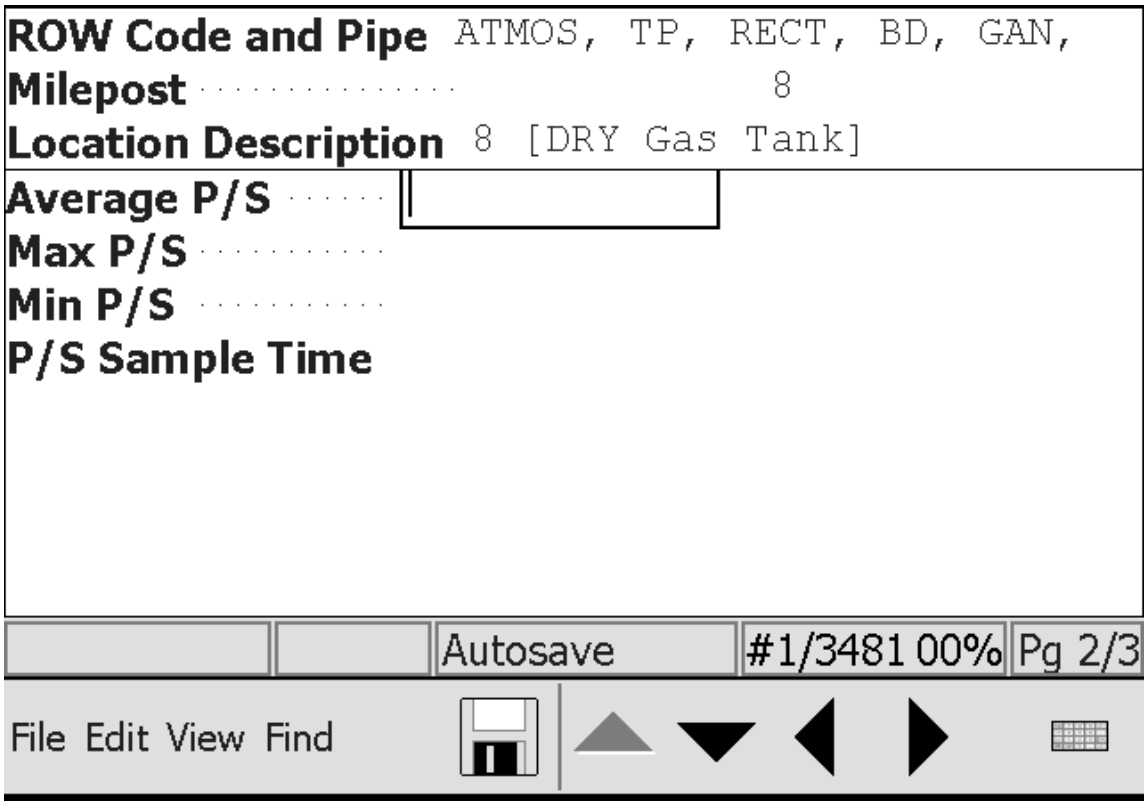


Figure 5-1. Timed Reading Fields

2. When the *Averaged Reading Survey* window displays, tap the arrow in the **Duration** field and select the length of time the Allegro MX should take timed readings.

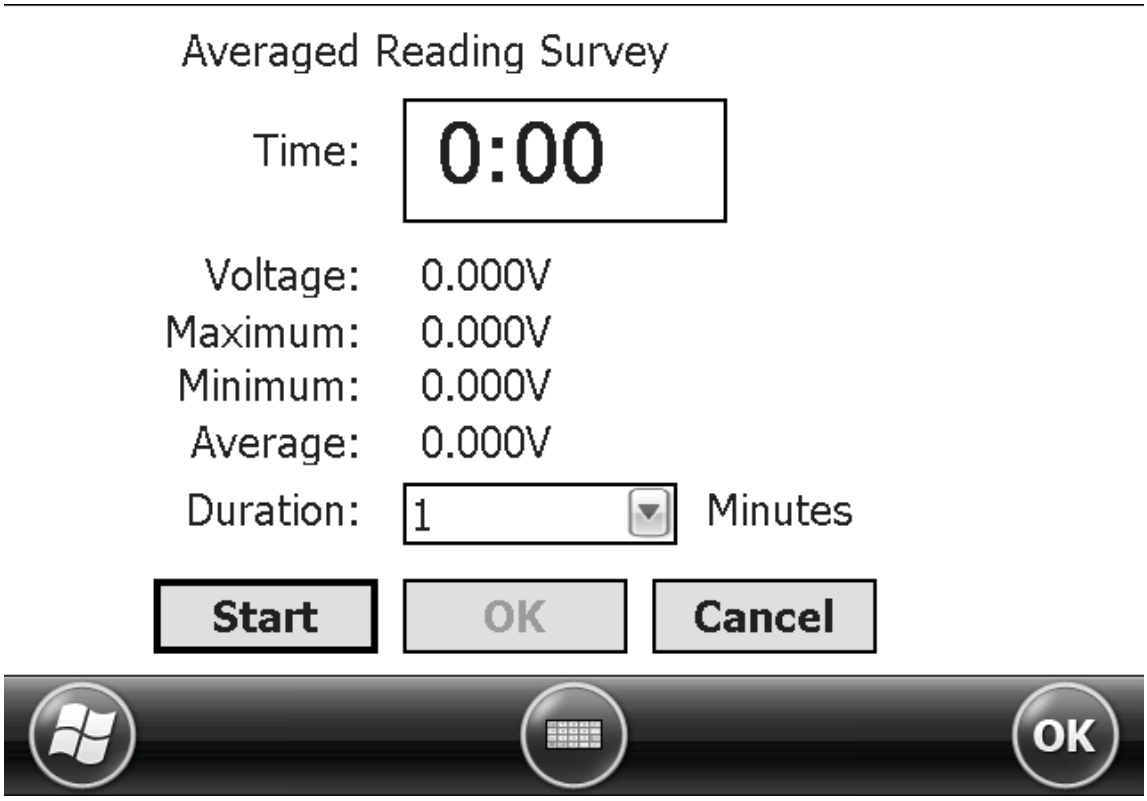


Figure 5-2. Averaged Reading Survey

3. Tap **Start** to begin timed readings. When timed readings finish, tap **OK** to return to the survey file.

   Tapping **Stop** anytime during the cycle stops timed readings.

Save the Survey File

Tap the save icon or tap **File** > **Save** to save changes in the survey file.

Send Periodic Surveys to Your Computer

- *Transfer a Periodic Survey to PCS*
- *Copy a PS Survey to a Computer*

Transfer a Periodic Survey to PCS

Utility files labeled *wToCmd.exe* and *CeFileXer.exe* must be updated for the current release of Allegro MX software in order for survey files to transfer properly from the Allegro MX to PCS. For more information, refer to *Transfer Utility Files to PCS on page 6*.

To transfer a Periodic Survey file to PCS, connect the Allegro to your computer and open the appropriate module in PCS. The Indirect Survey Manager is the only module that will not work with Periodic Surveys. For PCS version 1 or newer, follow the instructions under *Transfer a PS Survey File to PCS Version 1 or Newer*. For PCS version 7, follow the instructions under *Transfer a PS Survey File to PCS 7*.

For detailed instructions transferring survey data to PCS, refer to the *PCS User Guide*.

Transfer a PS Survey File to PCS Version 1 or Newer

1. Click **Field Computer** > **Receive** to open the *Field Computer Receive* window.
2. Click the **Receive Facility Data** option and click the **Allegro** option.
3. Click **Retrieve File(s)**. Click to select the checkbox next to the desired survey file name and click the arrow next to the selected checkbox.
4. Select the desired options and click **Import** to transfer the survey from the Allegro MX. When a message displays confirming the send process is complete, click **OK** to close the message.

Transfer a PS Survey File to PCS 7

1. Click **Field Computer** > **Receive Data** to display the Receive Allegro MX Data window.
2. Click **Receive Facility Data** > **From Allegro MX** > **Retrieve File Listing**.
3. Select the survey file(s) you want to transfer to PCS and then click **Receive**. When the window *Options for Receiving Data* displays, choose an option to assign a survey to Allegro MX data and then click **Continue**.
4. Click **OK** when the message Receive Allegro MX Data displays stating the process is complete.

Copy a PS Survey to a Computer

Complete the following steps to copy one or more PS survey files to a computer:

1. Connect the provided USB serial cable to your computer and the Allegro MX. If you are using a USB power dock, connect the USB cable to the power dock and your computer.
2. At your computer, start Windows Media Device Center (WMDC) or ActiveSync. Follow on-screen prompts to establish communications. For ActiveSync users, click **No** when prompted to create a *Partnership*. This allows you to create a *Guest* connection instead.
3. In WMDC, point the mouse at **File Management** and then click **Browse the contents of your device**.

In ActiveSync, click the **Explore** icon in the tool bar to display the contents of the Allegro MX in Windows Explorer.

4. Click the **AI** folder (located at the root drive \AI\).
5. Double-click the **PsData** folder. Click the **Name** column in Windows Explorer to sort files by name.
6. Select and drag the entire folder whose name matches the name of the survey file.

A Interrupted On/Off Settings

Interrupted surveys are set up and performed in the Allegro MX AiDvm, CeCi, or Periodic Survey applications. Refer to the table in *Suggested On/Off Settings* for recommended on/off settings for interrupted surveys.

When a survey file is set up in *On/Off GPS Sync* or *On/Off GPS Real-time* mode, American Innovations recommends that the survey file is also set up with *On/Off High/Low* settings, which serves as a backup if the satellite signal is lost. In the event that the signal is lost, the Allegro MX defaults to *On/Off High/Low* survey mode until the satellite signal is re-acquired.

Types of Interruption Cycles

- **High/Low**: Filters out a set number of most negative and least negative values. Always reports the last complete on/off pair.
- **GPS Sync**: Captures On and Off potentials, multiplied by milliseconds, before and after the On to Off transition. Always reports the last on/off pair.
- Both **High/Low** and **GPS Sync** work well for fast cycles (complete cycle time of two seconds or less). These two types only refresh the values once per cycle.
- **GPS Real Time** (RT): Designed for slow cycle surveys (greater than a two-second complete cycle time). In the GPS RT mode, each reading trigger event will be added to either the **ON** or **OFF** column, depending on where in the cycle the event occurred.

Suggested On/Off Settings

Table A-1. Suggested On/Off Settings for Interruption Surveys

On/Off High/Low setup for 1 second cycle
A minimum/maximum reading from a sample of readings. Of the remaining 45 readings, the most negative reading is equal to the *on* reading and the least negative reading is equal to the *off* reading. 60 readings per cycle (60 readings per second).

Table A-1. Suggested On/Off Settings for Interruption Surveys cont'd

0.7 on	200 mSec On Delay	Filters out 12 most negative readings
0.3 off	150 mSec Off Delay	Filters out 3 least negative readings
0.8 on	200 mSec On Delay	Filters out 12 most negative readings
0.2 off	150 mSec Off Delay	Filters out 3 least negative readings
On/Off High/Low setup for greater than 1 second cycle		
A minimum/maximum reading from a sample of readings. Of the remaining 99 readings, the most negative reading is equal to the *on* reading and the least negative reading is equal to the *off* reading. 120 readings per cycle (60 readings per second):		
1.5 on	250 mSec On Delay	Filters out 15 most negative readings
0.5 off	150 mSec Off Delay	Filters out 6 least negative readings
On/Off GPS Sync setup for 1 second cycle		
A minimum/maximum reading from a sample of readings. Of the remaining 99 readings, the most negative reading is equal to the *on* reading and the least negative reading is equal to the *off* reading. A snapshot of readings in a certain time period:		
0.7 on	200 mSec On Setup	Takes reading 200 mSec before the *on* > *off*transition.
0.3 off	150 mSec Off Delay	Takes reading 150 mSec after the *on* > *off*transition.
0.8 on	200 mSec On Setup	Takes reading 200 mSec before the *on* > *off*transition.
0.2 off	100 mSec Off Delay	Takes reading 100 mSec after the *on* > *off*transition.
On/Off setup for greater than 1 second cycle		
A minimum/maximum reading from a sample of readings. Of the remaining 45 readings, the most negative reading is equal to the *on* reading and the least negative reading is equal to the *off* reading.		
1.5 on	250 mSec On Setup	Takes reading 200 mSec before the *on* > *off*transition.
0.5 off	250 mSec Off Delay	Takes reading 150 mSec after the *on* > *off*transition.
On/Off GPS Real-time setup for greater than 2-second cycle		
8.0 on 2.0 off	200 mSec On Delay 250 mSec Off Delay	Starts capturing readings 200 mSec after the *on* > *off* transition. Starts capturing readings 250 mSec after the *on* > *off* transition.
GPS-RT Setup Time	50 mSec	No readings 50 mSec before *off* cycle to *Off Delay*. No readings 50 mSec before *on* cycle to *On Delay*.

Table A-1. Suggested On/Off Settings for Interruption Surveys cont'd

GPS Real Time delay
Does not capture any reading for 50 mSec before either the *on* > *off* or the *off* > *on* transition. Recommended *GPS-RT Setup Time* is 50 mSec for Mercury switches and 30 mSec for solid state switches.

Key Redirect

Key Redirect pre-assigns the **F1** through **F5** keys. The Allegro ships with Key Redirect factory-installed. The following table lists how these keys function within CeCi and Periodic Survey.

Table A-1. F1-F5 Functionality with Key Redirect

F1 – F5	CeCi	Periodic Survey
F1	No function.	No function.
F2	When CeCi is set up in **Flagged** mode, press **F2** to display the *Insert Record* menu. This allows you to insert a new record in the survey file.	No function.
F3	When CeCi is set up in **Fixed Increment** mode, press **F3** to toggle between Skip, Lock, and Normal in the currently selected survey record.	No function.
F4	Press **F4** to display the *Remarks* list and select a remark to insert in the `Remarks` field of the currently selected survey record.	Press **F4** to run the **Record Location** command to update or insert GPS coordinates in the currently selected survey record.
F5	When CeCi is set up in **Flagged** mode with **Timed Readings** enabled, press **F5** to toggle between Pause and Resume when taking survey readings.	Press **F5** to run the **Insert GPS** command to insert GPS coordinates in the currently selected survey record.

You can delete the Key Redirect file in the Allegro `Startup` folder to restore original functionality to the Function keys. After the Key Redirect file is deleted, you can assign any of the **F1** through **F5** keys to the AI applications for quicker access.

To delete the Key Redirect file, follow these steps:

1. Tap **Start** > **File Explorer** > **Windows** > **Startup**.
2. Tap and hold the `KeyRedirect.exe` file to display a shortcut menu, and then tap **Delete**.

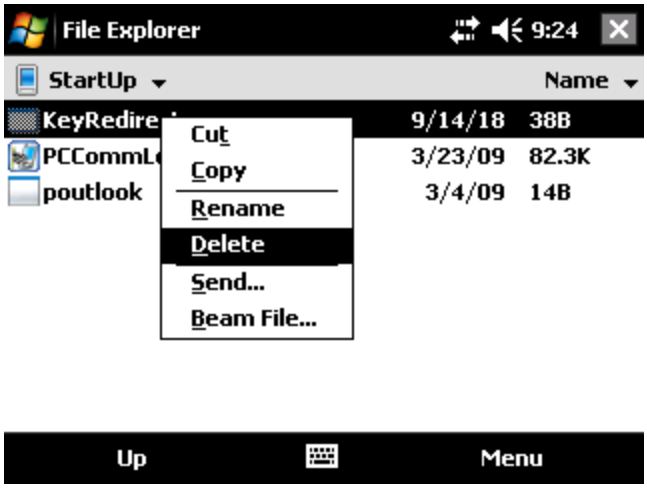


Figure A-1. Key Redirect

3. To assign any AI software to any of the **F1** through **F5** function keys, refer to procedure in *Function Keys on page 11*.

B

Utility Software

Information in this chapter explains how to use and set up the following utility software:

- *GPS Status*
- *GPS Pod Setup*
- *GPS Config Ublox*

GPS Status

Use GPS Status to perform any of the following tasks:

- View current GPS data, such as number of satellites in view, GPS coordinates, amount of time since the last GPS fix, and current GPS time.
- Enable the *Offset* option to view the distance between two points.
- Enable the *Beep* option if you want the Allegro MX to beep when GPS readings update.
- Set a *Display Format* for GPS coordinates (degrees and minutes or decimal degrees).
- Change COM port and baud rate settings for a second GPS receiver (dual GPS).
- Set up the Allegro MX to use the PPS timing signal received by the internal GPS module instead of a second GPS receiver.
- Copy GPS coordinates to the system clipboard or an opened Excel spreadsheet file.

To start GPS Status, tap **Start** > **GpsStatus** to display the *Gps Status* window.

NOTE: If the Allegro MX is unable to open the COM port, the message *Unable to open GPS port COM3 (-2,317)* displays. Exit and then restart GPS Status to allow the Allegro MX to open the port. The value shown in parentheses is an internal code used by AI for troubleshooting purposes.

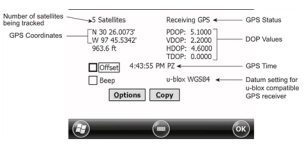


Figure B-1. GPS Status

Table B-1. GPS Status Field Descriptions

Field	Description
Satellites	Current number of satellites tracked by the GPS receiver display in this status line. If using dual-GPS, status line displays the number of satellites as *#/# Satellites in view*. The first number applies to the external GPS receiver, the second number applies to the internal GPS receiver. Three (3) satellites are required for coordinate calculations. Four (4) satellites are required for calculating a 3D position (latitude, longitude, and elevation). The more satellites tracked, the higher accuracy of the GPS receiver.
GPS status	Status line may include any of the following messages: • Receiving GPS • Initializing • Waiting Information about the serial connection displays in parentheses during the startup process, such as *Initializing (V 236)*. It shows a GPS status byte (V or FF) and the number of received characters. GPS status bytes (V and FF) indicate whether or not the receiver is receiving GPS packets. *V* indicates valid GPS packets received and *FF* indicates no GPS packets received. If received characters is zero (0) or does not increase, verify the GPS receiver is securely connected to the Allegro MX and communication settings are correct (COM port and baud rate).
GPS coordinates	Shows longitude, latitude, and elevation coordinates received from a minimum of 3 satellites. Coordinates update every second. With a clear view of the sky, GPS accuracy without differential correction is about 10 meters (32.8 feet). Sub-meter accuracy is reported after applying differential correction when using a second GPS receiver (dual GPS), such as the Trimble GPS Pathfinder Pro XR.

Table B-1. GPS Status Field Descriptions cont'd

Field	Description
DOP values	DOP (dilution of precision) values identify the accuracy of GPS readings. When a DOP value is zero (0), the GPS receiver does not report the value. When the value is between 1 and 3, GPS accuracy is good. *PDOP* refers to position dilution of precision; *VDOP* refers to vertical dilution of precision; *HDOP* refers to horizontal dilution of precision; and *TDOP* refers to time dilution of precision.
Age of fix	Shows the time since the last GPS satellite fix. *Age of fix* appears only when the GPS satellite signal is lost. It appears ten seconds after losing the satellite signal. Information displays in the following manner: • When age is less than 10 seconds, field is empty. • When age is less than 1 minute, number of seconds display as *nn sec*, such as *35 sec*. • When age is less than 60 minutes, number of minutes and seconds display as *mm:ss*, such as *12:14*. • When age is undetermined, an asterisk (*) displays.
GPS time	GPS time displays when a GPS time signal is received and the *Offset* option is disabled. Updates display every second when GPS time is available. GPS time displays in 24-hour format and may include the suffix letters *P* and/or *Z*. *P* indicates a PPS (one pulse-per-second) time signal is being received. *Z* indicates a GPS time packet is being received. When GPS time is unavailable or the GPS time signal is more than 10 minutes old, this area of the GPS Status window is empty. When *Offset* is enabled, offset values (such as 2, 1, 5) or asterisks (*, *, *) display instead of GPS time.

Table B-1. GPS Status Field Descriptions cont'd

Field	Description
Offset	*Offset* shows the distance between two points. To use *Offset*, tap **Offset** and then move to a different location. Offset values display inside parentheses and are calculated as feet or miles. For example, with an offset of (1, 2, 3): • 1 is the east-west offset (W positive) • 2 is the north-south offset (N positive) • 3 is the vertical offset An offset distance higher than 0.1 degree (about six miles) displays as asterisks inside parentheses (*,*,*). When *Offset* is enabled, GPS time does not display.
Beep	If you want the Allegro MX to beep each time GPS readings update, tap **Beep** to enable the option.
u-blox WGS84	Status line showing the current datum setting for a u-blox compatible GPS receiver. This status line does not display for all other GPS receivers, such as a Trimble GPS receiver.
Copy	Tap **Copy** to copy coordinates to the system clipboard or an opened Excel spreadsheet file.

GPS Pod Setup

When a **Power Reset** is performed on the Allegro, the internal GPS pod loses factory settings for communication with AI applications. AI provides two utilities that allow you to reset the communication parameters of the internal GPS pod. If you use a u-blox compatible GPS receiver with the Allegro, reset communication parameters using the *AMXU GPS Pod Setup* utility. For all other GPS receivers (such as a Trimble GPS receiver), set communication parameters using the *GPS Pod Setup* utility.

Each of the following options on the *GPSPodSetup* screen are NMEA sentences that are sent from the satellites:

- **GGA** – latitude, longitude, and elevation.
- **GSA** – the DOP reading (dilution of precision). DOP values identify the accuracy of GPS readings. When a DOP value is zero (0), the GPS receiver does not report the value. When the value is between 1 and 3, GPS accuracy is good; under 2 is excellent. The Allegro records only the PDOP in the CeCi surveys. Readings under 5 are considered good; under 2 is excellent.

- **ZDA** – time.
- **SBAS/WAAS** – separate constellation of satellites that are used to get differentially corrected GPS.

To reset the communication parameters of the internal GPS pod, refer to one of the following topics:

- *Using the AMXU Pod Setup* - for configuring the communication parameters of a u-blox compatible GPS receiver with the Allegro MX
- *Using the GPS Pod Setup Application* - for configuring the communication parameters of a Trimble GPS receiver with the Allegro MX

Using the AMXU Pod Setup

If you use the u-blox compatible GPS receiver with the Allegro, complete the following steps to reset the communication parameters of the internal GPS pod:

1. Tap **Start** > **Programs** > **AMXU Pod Setup** to open the AMXU GPS Pod Setup window.
2. Tap the **AI** button to apply the correct settings for AI applications. Settings are as follows and should match the following image

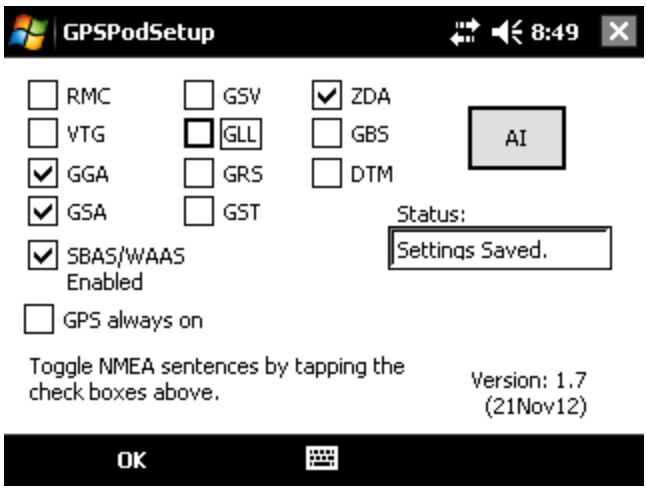


Figure B-1. AMXU GPS Pod Setup

3. Verify the following:

   The following items must be selected:

   - GGA
   - GSA

- ZDA

The following item must be deselected:

- GPS always on

4. Verify the message **Settings Saved** displays in the Status box. If the Status box is empty, tap the **AI** button again to display the message.
5. Tap **OK** to close the utility.

Using the GPS Pod Setup Application

If you use a Trimble GPS receiver with the Allegro MX, complete the following steps to reset the communication parameters of the GPS pod:

1. Tap **Start** > **Programs** > **GPSPodSetup** to open the GPS Receiver Port Settings window.
2. Tap the **AI** button to apply the correct settings for AI applications. Settings are as follows and should match those in the following image:

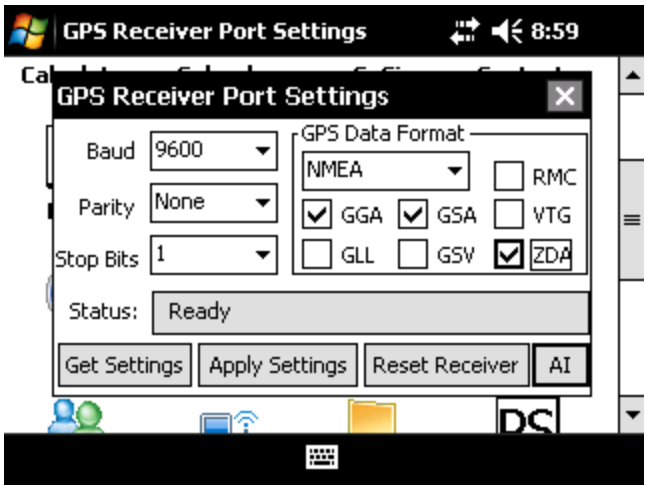


Figure B-1. GPS Receiver Port Settings

3. Verify the following:

   The following items must be selected:

   - GGA
   - GSA
   - ZDA

   The following drop down options should be selected:

- Baud: 9600
- Parity: None
- Stop Bits: 1
- GPS Data Format: NMEA

4. Tap **Apply Settings** and then the Close icon (**X**).

GPS Config Ublox

Use the *GpsConfigUblox* utility to change the default datum for a u-blox compatible GPS receiver.

NOTE: WGS84 is considered the worldwide standard and is typically the default setting for most GPS receivers. If you have any questions or need further assistance, give us a call at 1-800-229-3404 or email us at techservices@aiworldwide.com.

To change the datum, follow these steps:

1. Tap **Start** > **File Explorer** > **My Device** > **Program Files** > **GpsConfigUblox** to open the *Configure GPS for Ublox* window.

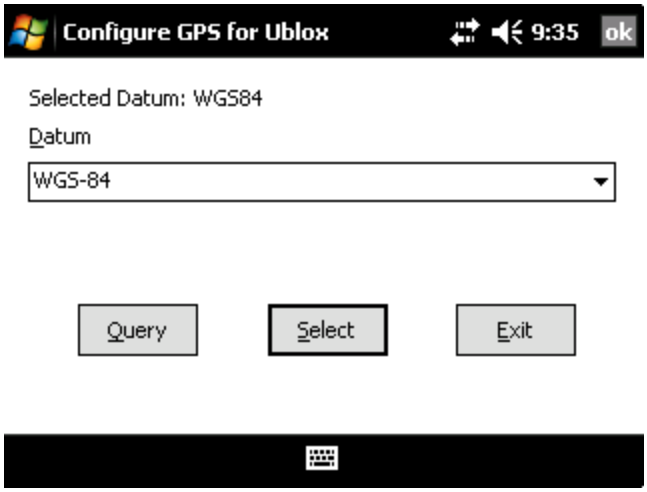


Figure B-1. GpsConfigUblox

2. Click the drop-down arrow in the **Datum** field and select an option in the list.
3. Click **Select**. Then click **OK** to close the window.

Keyboard Shortcuts

These are the default shortcuts and could change if Personal Buttons are modified in Allegro Settings. Many shortcuts only work when the cursor is in a certain field or tab.

Global Shortcuts		
Caps Toggle	<**Blue**><**Caps Lock**>	Toggles caps lock on and off.
Display Backlight	<**Orange**><**F3**>	Toggles backlight on and off.
Display Brighten/Dim	<**Orange**><**F4**> <**Orange**><**F5**>	Brightens or dims the display. Select ORANGE shift key then F4 to dim or F5 to brighten.
Move Between Fields and Buttons	<**TAB**>	Move cursor between fields and buttons. Left tab moves cursor backward; right tab moves cursor forward.
Move from One Tab to Another	<**Ctrl**><**TAB**>	Move from one tab to another in a window with multiple tab pages.
Open Drop-down List	<**Alt**><**Down Arrow**>	Press <Alt> and down arrow to open drop-down list.
Touchscreen	<**Blue**><**TS**>	Enable or disable touchscreen.
Task Manager	<**Blue**><**Esc**>	Open *Task Manager*.
Close Window	<**Esc**>	Close an open window.
Windows Start Menu		Open *Start* menu.

AiDVM		
Graph	<**G**> or <**Alt**><**G**>	Open graph.
Copy / Paste	<**Ctrl**><**C**>	Copy current DVM reading.
	<**Ctrl**><**V**>	Paste DVM reading in an open file, such as Excel.
Option Window	<**N**> or <**Alt**><**N**>	Open *Options* window.
Voltage Range	<**Ctrl**><**Up Arrow**>	Increase voltage range.
	<**Ctrl**><**Down Arrow**>	Decrease voltage range.
	<**U**> or <**Alt**><**U**>	Select autoranging.

VDC Test Function	<**D**> or <**Alt**><**D**>	Select Vdc test function.
VAC Test Function	<**A**> or <**Alt**><**A**>	Select Vac test function.
DC Amp	<**Ctrl**><**D**>	Select DC Amp test function.
AC Amp	<**Ctrl**><**A**>	Select AC Amp test function.
AC mA Test Function	<**M**> or <**Alt**><**M**>	Select Amp test function.
Move Cursor Between Fields	<**TAB**>	Press <TAB> to move cursor from one field to another in DVM *Options*.
Move Cursor in Dropdown List	<**Up/Down Arrows**>	Press up/down arrows to move cursor up and down in a drop-down list in DVM *Options*.
Accept Selection in Drop-down List	<**Enter**>	Accept selection in a drop-down list in DVM *Options*.
Enable or Disable Autoranging	<**A**>	Enable/disable autorange in DVM *Options* window.
Move Cursor to Sample Rate Field	<**S**>	Move cursor to Sample Rate field in DVM *Options*.
Display Graph Remarks	<**Tab**>	Move cursor to *Save* button in DVM graph window, then press <Enter> to display graph remarks window.
	<**Enter**>	Graph remarks window to add a new line; press <Tab> to move cursor to *Ok* or *Cancel* and then press <Enter>.
CeCi		
New	<**Ctrl**><**N**>	Create new survey file.
Open	<**Ctrl**><**O**>	Open *File Open* window.
Save	<**Ctrl**><**S**>	Save survey file.
Flag Marker	<**F**>	Insert flag marker in flagged mode.
Reset Flag Count	<**Ctrl**> <**F**>	Reset flag count.
Gap Marker	<**G**>	Insert gap marker in flagged mode.
Capture Reading	<**Enter>**	Capture a reading.
First Record	<**Ctrl**><**Blue**><**Home**>	Move cursor to first record.
Last Record	<**Ctrl**><**Blue**><**End**>	Move cursor to last record.
Go To	<**Ctrl**><**G**>	Open *Go To Location* window.

Skip	<**Ctrl**><**K**>	Open *Skip Distance* window in Fixed Increment mode.
Insert Record	<**Ctrl**><**Ins**>	Insert new record.
Delete Record	<**Ctrl**><**Del**>	Delete selected record.
Skip/Lock/Normal	<**Ctrl**><**Z**>	Toggles *Skip*, *Lock*, and *Normal* in Fixed Increment mode.
Remark	<**Alt**><**R**>	Open remark window.
Pause/Resume	<**Ctrl**><**P**>	Pause/resume timed readings.
Test Point Information	<**Ctrl**><**T**>	Open *Test Point Information* window.
Open File Menu	<**Alt**> <**F**>	Open *File* menu.
Open Move Menu	<**Alt**> <**M**>	Open *Move* menu.
Open View Menu	<**Alt**> <**V**>	Open *View* window.
Open Remark Window	<**Alt**> <**R**>	Open *Remark* window.
Navigating Misc Tab in Options	<**B**>	Enable or disable *Beep on every Reading*.
	<**V**>	Move cursor to *Voltage level*.
	<**W**>	Enable or disable *Beep when overwrite existing data*.
	<**D**>	Enable or disable *Enable double-click detection*.
Navigating File Tab in Options	<**A**>	Enable or disable *Auto-backup*.
	<**I**>	Move cursor to *Interval (minutes)*.
	<**R**>	Enable or disable *Retain Skipped records in Skip mode*.
Navigating GPS Tab in Options	<**C**>	Enable or disable *Clear GPS Location After*.
	<**S**>	Move cursor to *Seconds Without Updates*.
	<**G**>	Move cursor to *GPS Display Format*.

Navigating Graph Tab in Options	<**G**>	Enable or disable *Show Graph*.
	With *Show Graph* enabled:	
	<**U**>	Move cursor to *Upper Value*.
	<**L**>	Move cursor to *Lower Value*.
	<**W**>	Move cursor to *Width*.
Navigating Colors Tab in Options	<**E**>	Enable or disable *Enable Color*.
	With *Enable Color* enabled:	
	<**Tab**>	Move cursor between field selection list and color grid.
	<**Up**/**DownArrows**> or <**Home**/**EndArrows**>	Move cursor in field selection list or color grid.
Navigating Open and Save As Windows	<**Tab**>	Move cursor between fields.
	<**Up**/**DownArrows**>	Navigate list of files.
DCVG		
New	<**Ctrl**><**N**>	Create new survey file.
Open	<**Ctrl**><**O**>	Open *File Open* window.
Save	<**Ctrl**><**S**>	Save survey file.
Flag Marker	<**F**>	Insert flag marker in flagged mode.
Reset Flag Count	<**Ctrl**> <**F**>	Reset flag count.
Gap Marker	<**G**>	Insert gap marker in flagged mode.
Capture Reading	<**Enter**>	Capture a reading.
First Record	<**Ctrl**><**Blue**><**Home**>	Move cursor to first record.
Last Record	<**Ctrl**><**Blue**><**End**>	Move cursor to last record.
Go To	<**Ctrl**><**G**>	Open *Go To Location* window.
Skip	<**Ctrl**><**K**>	Open *Skip Distance* window in fixed increment mode.
Insert Record	<**Ctrl**><**Ins**>	Insert new record.
Delete Record	<**Ctrl**><**Del**>	Delete record.
Remark	<**Alt**><**R**>	Open *remark* window.
Test Point Information	<**Ctrl**> <**T**>	Open *Test Point Information* window.

Annual/Periodic Survey		
Open	<**Ctrl**> <**O**>	Open *File Open* window.
Save	<**Ctrl**><**S**>	Save survey file.
Copy, Cut, Paste	<**Ctrl**><**C**>	Copy selection to clipboard.
	<**Ctrl**><**X**>	Remove selection and copy to clipboard.
	<**Ctrl**><**V**>	Paste content from clipboard.
Select Data in a Field	<**Shift**><**Blue**><**Home**>	Select data from the current cursor location to the end of the field.
	<**Shift**><**Blue**><**End**>	Select data from the current cursor location to the beginning of the field.
Undo	<**Ctrl**><**Z**>	Undo last change.
Next Page / Previous Page	<**Ctrl**><**Down Arrow**>	Display next page of a multi-page site.
	<**Ctrl**><**Up Arrow**>	Display previous page of a multi-page site.
Next Site / Previous Site	<**Shift**><**Down Arrow**>	Display next site.
	<**Shift**><**Up Arrow**>	Display previous site.
Record GPS Coordinates	<**Ctrl**><**G**>	Records GPS coordinates when cursor is in reading field.
Insert GPS Coordinates	<**Ctrl**><**I**>	Inserts GPS coordinates when cursor is in reading field.
Capture Reading	<**Enter**>	Capture a reading. Options include: •Select reading field and press <Enter> to activate digital voltmeter. Press <Enter> again to capture reading. •Select timed reading field and press <Enter> to set up, start, stop, or cancel timed reading mode.
Navigate Information and Reading Fields	<**Alt**> <**U**>	Move cursor between information and reading fields.
Open File Menu	<**Alt**> <**F**>	Open *File* menu.
Open Edit Menu	<**Alt**> <**E**>	Open *Edit* menu.

Open View Menu	<**Alt**> <**V**>	Open *View* menu.
Cancel Changes	<**Esc**>/<**Cancel**> and <**Enter**>	<Esc> or move cursor to <Cancel> button and press <Enter>.
Apply Changes	<**Enter**>/<**OK**>	<Enter> when in a drop-down list or move cursor to <OK> and then press <Enter>.
Move Cursor in Drop-down List	<**Up**/**Down Arrows**>	Move cursor in a drop-down list.
GPS Status		
Navigating GPS Status Window	<**Tab**> or <**Up**/**Down Arrows**>	Move cursor between fields.
	<**Up**/**Down Arrows**>	Navigate list of files.
	<**Enter**>	Open or close a drop-down list or to select an option from within the list.
Open Options	**<O>**	Open Options.
Enable/Disable Read PPS from Internal GPS	<**P**>	Enable or disable *Read PPS from Internal GPS*.
Apply / Cancel Changes	<**Ok**> / <**Cancel**>	Apply changes or <Cancel> to cancel changes.