Figure 8-48 ***Sample DLC Connection Diagram***

- **To open and set the DLC channel**

1. Tap the right column of the channel D button at the bottom of the screen to open the setting dialog box.
2. Select the **DLC Channel** in the left column of the dialog box.
3. Swipe the **Enable DLC channel** to **ON**. Select the appropriate pins.

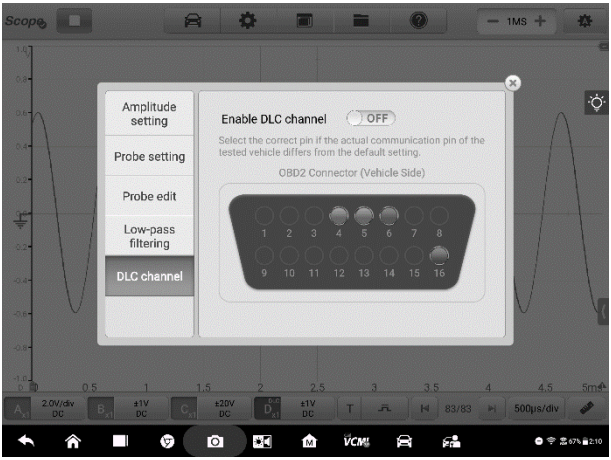


Figure 8-49 ***Sample DLC Channel Setting Screen 1***

4. Close the dialog box, the selected result is displayed on the screen. Tap the amplitude setting button on the bottom of the screen to adjust the value for the DLC channel.

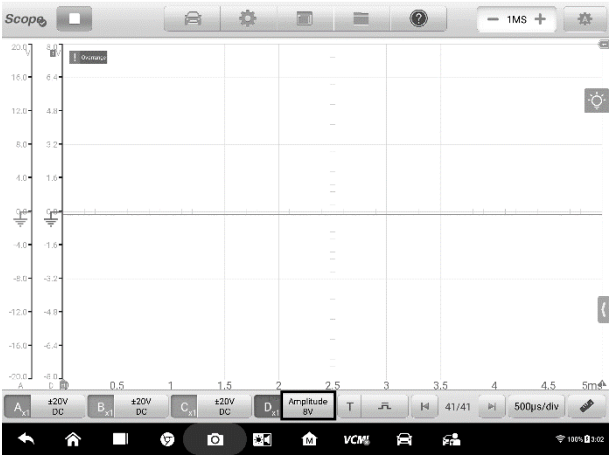


Figure 8-50 ***Sample DLC Channel Setting Screen 2***

Figure 8-51 ***Sample DLC Channel Setting Screen 3***

5. Tap the DLC icon in the lower left corner of the screen to close the DLC channel.

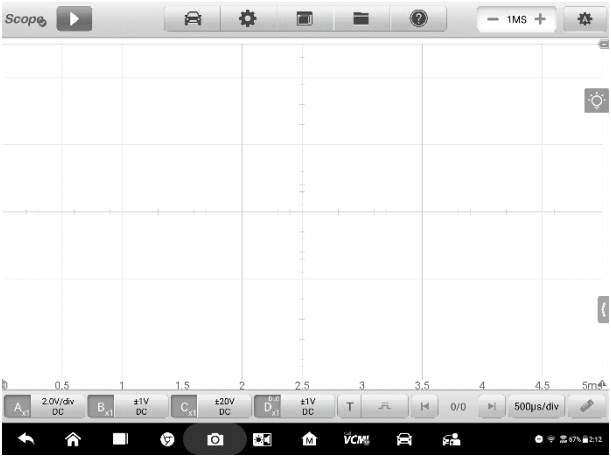


Figure 8-52 ***Sample DLC Channel Setting Screen***

Trigger

The trigger feature is used to stabilize repetitive waveforms to obtain a clear signal characterization.

A trigger is activated when a signal crosses set thresholds. Trigger points can also be set manually as the user views a waveform.

When the oscilloscope is capturing the signal, tap the left column of the **Trigger** button to activate the trigger function. A **trigger point** displays as a blue point.

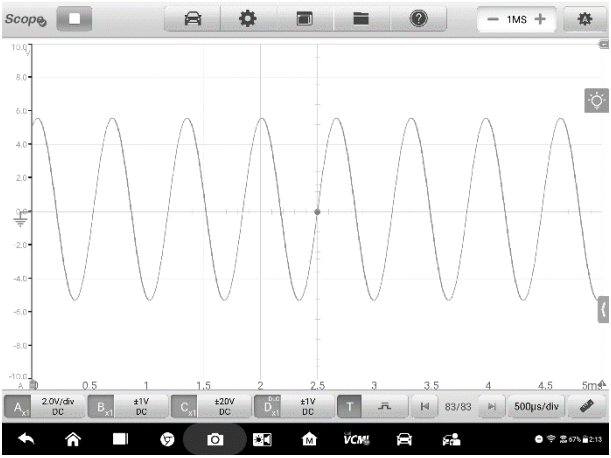


Figure 8-53 *Sample Trigger Point Screen*

When the oscilloscope is capturing the signal, tap the right column of the **Trigger** button to open the trigger settings dialog box.

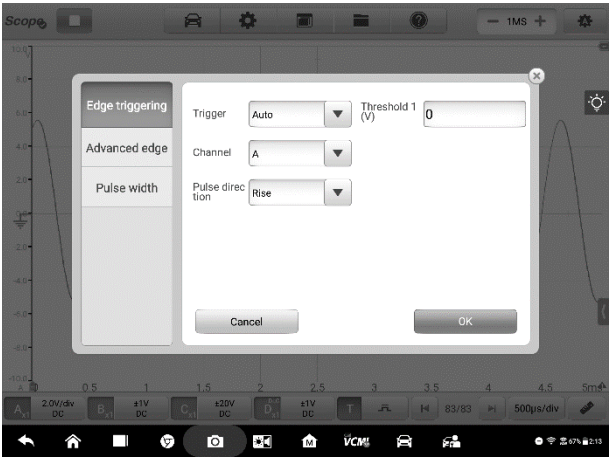


Figure 8-54 *Sample Trigger Settings Screen*

Edge Triggering

The edge trigger is one of the most common trigger modes and is activated when voltage rises above or falls below a preset threshold. This trigger type allows you to

configure the trigger mode, threshold, trigger channel and pulse direction settings. Tap **Done** to save the settings or tap **Cancel** to exit without saving.

- **Trigger Mode**

Four trigger modes are available: **None, Auto, Repeat and Single**.

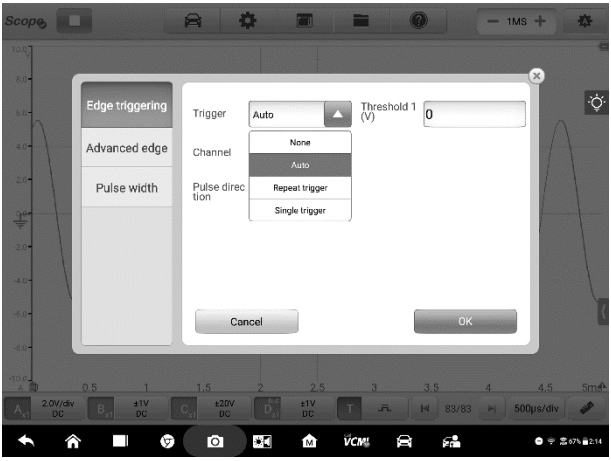


Figure 8-55 *Sample Trigger Mode Screen*

The table below offers brief descriptions for each trigger mode.

Table 8-4 *Trigger Mode Table*

Trigger Mode	Description
None	In this trigger mode, the oscilloscope can continuously capture data, without waiting for a trigger event.
Auto	In this trigger mode, the oscilloscope will wait for a trigger before capturing data. It can automatically update after a short period, even if the signal does not across the trigger point.
Repeat	In this trigger mode, the oscilloscope waits until a trigger event occurs. If there is no trigger event, nothing will be displayed on the screen.
Single	In this trigger mode, the oscilloscope stops capturing data once a trigger event occurs.

- **Channel**

Select the applicable trigger channel from the dropdown menu. The selected channel is the one that the oscilloscope monitors for the trigger condition.

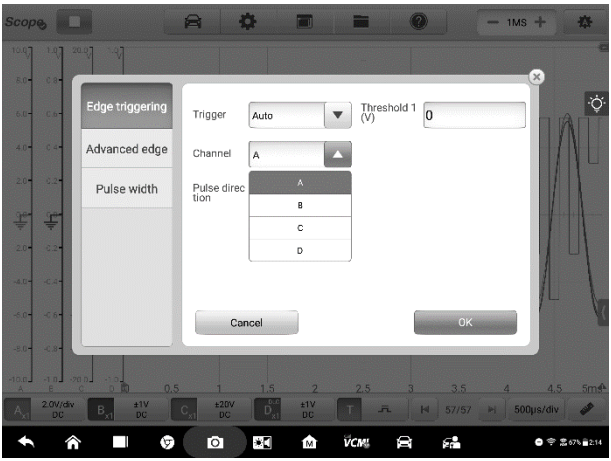


Figure 8-56 ***Sample Trigger Channel Screen***

- **Pulse Direction**

Two pulse direction settings are available: **Rise** and **Fall**.

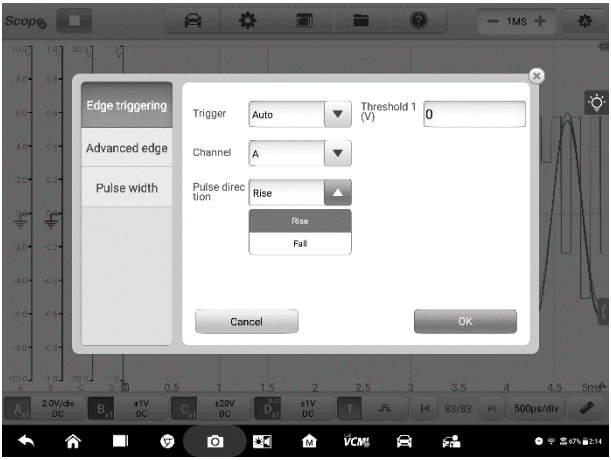


Figure 8-57 ***Sample Pulse Direction Screen***

✧ **Rising Edge Trigger** - Indicates trigger is turned on to start the trace on the rising edge of the waveform.

- ✧ **Falling Edge Trigger** – Indicates trigger is turned on to start the trace on the falling edge of the waveform

- **Threshold**

The **Threshold** allows you to set the voltage threshold for the trigger.

- ✧ To precisely position the trigger point, input the value in the Threshold field in the trigger settings dialog box.
- ✧ To roughly position the trigger point, drag the trigger point to a desired position.

➢ **To configure the trigger settings**

1. Tap the right column of the **Trigger** button to open the trigger settings dialog box.
2. Select the trigger mode, trigger channel and pulse direction in the dropdown list.
3. Input the value in the Threshold field in the trigger settings dialog box.
4. Tap **Done** to save settings or tap **Cancel** to exit without saving.

Advanced Edge

This trigger type includes all the functions of the edge trigger type, plus two additional options: **the Rising or Falling option** and **the hysteresis option**.

Rising or Falling option in the dropdown menu of the pulse direction: Dual edges of a waveform can be triggered. This mode is especially useful for monitoring pulses of both polarities at once.

Hysteresis option: It is used to reduce false triggering on noisy signals. When hysteresis is enabled, a second trigger threshold voltage is used in addition to the main trigger threshold. The trigger fires only when the signal crosses the two thresholds in the correct order. The first threshold arms the trigger, and the second causes it to fire.

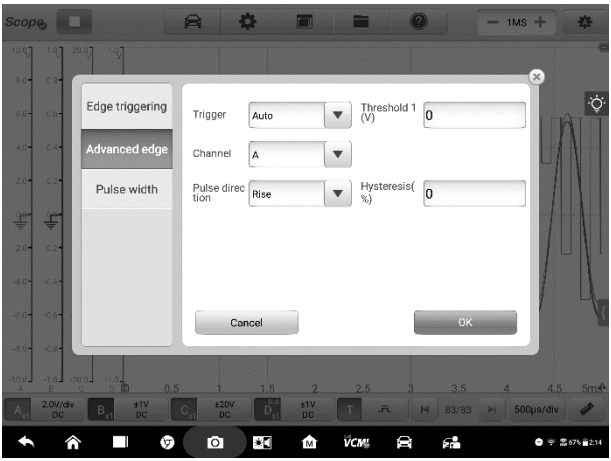


Figure 8-58 ***Sample Advanced Edge Screen***

Pulse Width

This trigger type allows you to monitor pulses of a specified width.

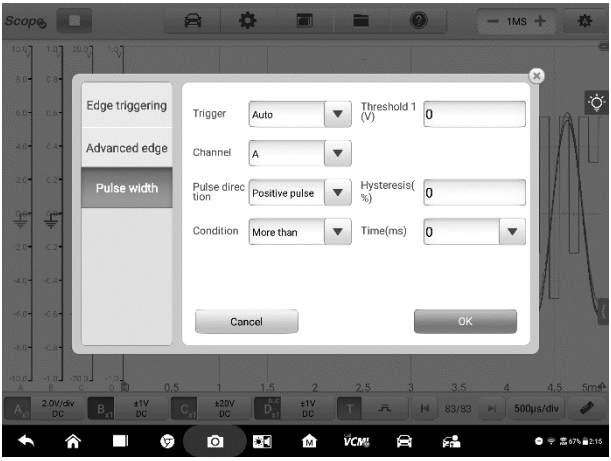


Figure 8-59 ***Sample Pulse Width Settings Screen***

➢ **To set the pulse width**

1. Tap the **Trigger** button at the bottom of the screen to open the Trigger Settings dialog box.

2. Select the **Pulse Width** in the left column of the dialog box.
3. Select the desired trigger mode and channel mode.
4. Set the pulse direction to either Positive pulse or Negative pulse according to the polarity of the pulse.
5. Select one of the four Conditions:
   - **More than:** triggers on pulses wider than the specified time.
   - **Less than:** triggers on pulses narrower than the specified time.
   - **In the time range**: triggers on pulses wider than Time 1 but narrower than Time 2.
   - **Out of the time range:** triggers on pulses narrower than Time 1 but wider than Time 2.
6. Set the trigger **Threshold** and **Hysteresis**.
7. Set the **Time 1** or **Time 2** in minutes (if available) to define the pulse width.
8. Tap **Done** to save settings or tap **Cancel** to exit without saving.

Buffer

The waveform buffer shows which signal waveform is displayed on the current screen and how many signal waveforms are captured and stored in the buffer memory.

The oscilloscope can capture and store up to 32 waveforms. Select a waveform from the waveform buffer by tapping the **Previous** or **Next** button.

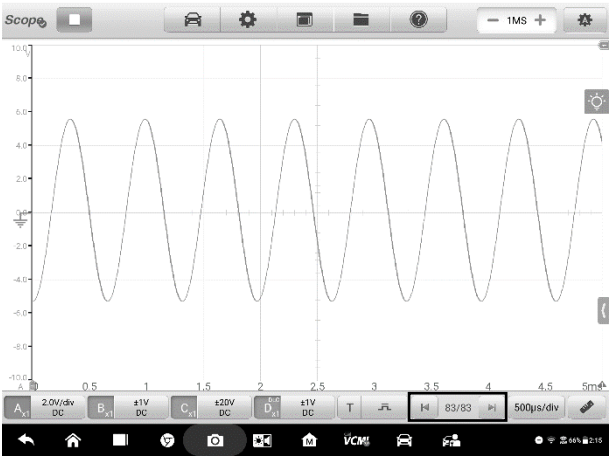


Figure 8-60 *Sample Buffer Screen*

Name	Button	Description
Previous		Tap to display the previous waveform in the buffer.
Buffer Index		Displays the number of the waveform currently displayed onscreen out of the total number of buffered waveforms.
Next		Tap to display the next waveform in the buffer.

Time Base

The time base controls the time interval across the oscilloscope display. Tap the Time Base button at the bottom to open the setting dialog box.

Continuous Mode: if the time base is set to more than or equal to 200ms/div, the oscilloscope switches to the continuous mode. In this mode, the oscilloscope updates the trace continuously as each capture progresses, rather than waiting for a complete capture before updating the trace.

Figure 8-61 *Sample Time Base Screen*

Measurement

The available measurements for each channel are (from left to right):

Figure 8-62 ***Sample Measurement Screen***

- **Maximum** – the highest level that the signal reaches
- **Minimum** – the lowest level that the signal reaches
- **Peak To Peak** – the difference between maximum and minimum
- **Amplitude** – the top value minus the bottom value
- **Period** – the duration of one cycle in a repeated pattern in the waveform
- **Frequency** – the number of signal occurrences per second
- **Positive Duty Ratio** – the ratio of positive pulse width to period width
- **Negative Duty Ratio** –the ratio of negative pulse width to period width
- **Positive Pulse Width** – the amount of time that the signal spends above its average value
- **Negative Pulse Width** – the amount of time that the signal spends below its average value
- **AC RMS** – the root mean square (RMS) value of the waveform minus the DC Average
- **True RMS** – the root mean square (RMS) value of the waveform, including the DC component
- **DC Average** – the average value of the waveform

- **Rising Rate** – the rate at which the signal level rises
- **Falling Rate** – the rate at which the signal level falls
- **Rise Time** – the time the signal takes to rise from the lower threshold to the upper threshold
- **Fall Time** – the time the signal takes to fall from the upper threshold to the lower threshold
- **X@Max** – the corresponding value of X axis when the amplitude is the maximum
- **X@Min** – the corresponding value of X axis when the amplitude is the minimum
- **Positive Acreage** – the waveform acreage measured above the zero baseline
- **Negative Acreage** – the waveform acreage measured below the zero baseline
- **Full Acreage** – the positive acreage plus negative acreage
- **Top Value** – 90% of the waveform maximum value
- **Bottom Value** – 10% of the waveform minimum value
- **Positive Overshoot** – the ratio of the difference between the maximum value and the top value and the amplitude
- **Negative Overshoot** – the ratio of the difference between the bottom value and the minimum value and the amplitude
- **Positive Pre-shoot** – the ratio of the difference between the bottom value and the minimum value and the amplitude
- **Negative Pre-shoot** –the ratio of the difference between the maximum value and the top value and the amplitude

➢ **To set the measurements**

1. Tap the **Measure** button at the bottom of the screen to open the measurement dialog box.
2. Select the channel to be measured.
3. Select the appropriate measurement options. The **Whole Track** and **Ruler Track** can be toggled through the **Edit** icon in the upper corner of the option.

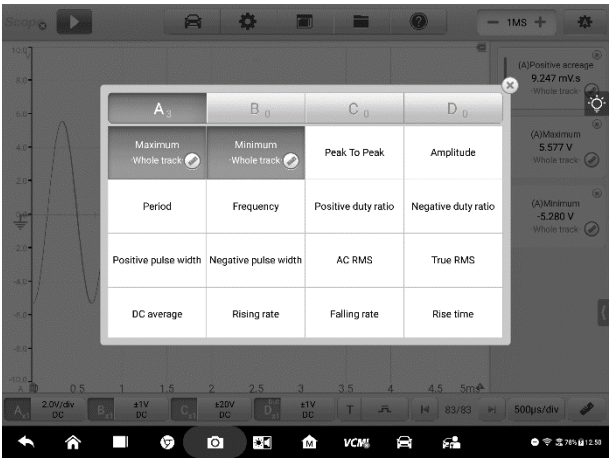


Figure 8-63 *Sample Measurement Setting Screen*

4. Close the dialog box, and the corresponding measurement readings are displayed on the right-hand side of the screen. Adjust the whole track or ruler track on the displayed screen or delete the measurement directly by tapping the **X** button.

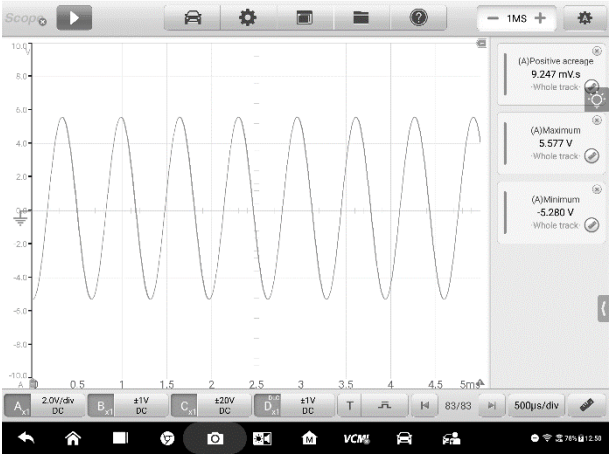


Figure 8-64 *Sample Measurement Display Screen*

8.1.6 Troubleshooting

A. If the oscilloscope cannot communicate with the MaxiSys Tablet:

- Ensure the VCMI device is properly connected to the MaxiSys Tablet via Wi-Fi or with the supplied USB cable.
- Restart the MaxiSys Tablet and reconnect the VCMI device if communication between the two continues to fail.

B. If unwanted signals are displayed or signals are distorted:

- Use only the supplied test leads or probes to connect with the input channels.
- Check the test leads or probes for damage.
- Ensure the polarity of the test leads connections are correct.
- Ensure the signal and ground connections are clean and secure.
- Ensure the ground lead is providing a direct ground from the circuit to the input channel.
- Isolate the test leads from other components, leads, or systems that may induct unwanted noise into the signal being tested including the electric motors, secondary ignition components, relays, alternators.

8.1.7 Glossary

AC/DC Control

Each channel can be set to either AC coupling or DC coupling. With DC coupling, the voltage displayed onscreen is equal to the true voltage of the signal with respect to ground. With AC coupling, any DC component of the signal is filtered out, leaving only the variations in the signal for the AC component.

Aliasing

When the signal frequency gets higher than half the scope's maximum sampling rate and exceeds the limit, a distorted waveform displays. This distortion is called aliasing.

Amplitude

The maximum voltage generated from the zero volts line of the oscilloscope.

Analog Bandwidth

The frequency at which a displayed sine wave has half the power of the input sine wave (about 71% of the amplitude).

Buffer Size/Cache Size

The size of the oscilloscope's buffer memory. The buffer memory is used by the oscilloscope to temporarily store data. This helps to compensate for the differences in data transfer rate from one device to another.

Frequency

The number of signal occurrences per second. Frequency is measured in Hz (hertz).

Peak to peak voltage

The difference in voltage between the minimum and maximum voltages occurring in the waveform.

Time Base

The time interval across the scope display.

Voltage Range

The range between the maximum and minimum voltages that can be accurately captured by the oscilloscope.

Sampling Rate

The number of samples per second captured by the oscilloscope. The faster the sampling rate of the scope, the more frequently it measures the signal voltage, and so the more detailed will be the trace that appears on the scope screen.

8.2 Multimeter Operation

A multimeter is an electronic measuring instrument that is used to measure voltage, resistance, frequency, diode, duty cycle and pulse width and continuity test. The VCMI (Vehicle Communication and Measurement Interface) working with MaxiSys Ultra can function as a multimeter to provide precise measurements.

8.2.1 Safety Information

Follow the instructions below to reduce the risk of injury from electric shock and prevent equipment damage.

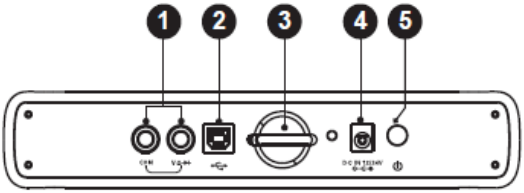
- Use the multimeter only as specified in this manual.
- Do not apply more than the rated voltage between terminals or between any terminal and earth ground.
- Do not input a value beyond the range when measuring. Remember that the limit value range of this multimeter is ±200V.
- To prevent injury or death, do not use the multimeter if it appears to be damaged in any way, and stop use immediately if you are concerned with any abnormal operations.
- To prevent injury or death, never ground yourself when taking electrical measurements. Isolate yourself from ground by using dry rubber insulating mats to cover all exposed/grounded metal. Ensure all clothing including gloves are dry. Stand on rubber mats when using tool.
- Use the test leads or probes supplied with the product, or proper and applicable terminals. Inspect the test leads or probes for damage before use.
- When using probes, keep fingers behind the finger guards on the probes.
- Use the supplied replacement fuses or specified replacement parts.
- Always consider electrical and electronic equipment to be energized (live). Never assume any equipment is de-energized.
- When making electrical connections, connect the common test lead before connecting the live test lead; when disconnecting, disconnect the live test lead before disconnecting the common test lead.
- When measuring current, turn off circuit power before connecting the multimeter to the circuit. Remember to place the multimeter in series with the circuit.
- After current measurement is finished, turn off the power to the circuit before removing the test leads and before reconnecting any disconnected wires or devices.

- Do not add voltage to the input terminal when measuring resistance.
- To avoid electric shock, turn off the power to the component before connecting.
- To prevent damage, always use and store your multimeter in appropriate environments.
- Do not use in wet or damp conditions, or around explosive gas or vapor.
- Do not tamper with or disassemble the multimeter, connectors or accessories. Internal damage will affect performance.
- Before carrying out maintenance and cleaning of the multimeter, make sure the unit is NOT connected to a power source, vehicle or computer.
- When cleaning the multimeter, use a damp, soft cloth with mild detergent. Do not allow water to enter the multimeter casing.

8.2.2 General Introduction

8.2.2.1 Component Locations

The multimeter jacks are located on the top of the VCMI device while the input channels are located on the bottom.



VCMI Top View

1. Multimeter Jacks – for ground and signal cables
2. USB Port
3. Hook
4. DC Power Supply Input Port
5. Power Button

IMPORTANT

When using the multimeter function, please insert the supplied multimeter probes to the multimeter probe jacks. The input channel A is assigned when measuring current.

8.2.2.2 Technical Specifications

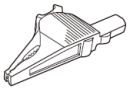
Item	Description
Voltage Range	±200V
Resistance Range	1Ω to 10MΩ
Diode	2V
Frequency Range	1Hz to 1MHz
Duty Cycle Range	%1 to 99%
Pulse Width Range	10us to 1000ms
Current Range	● 0 to 65A (65A current clamp) ● 0 to 650A (650A current clamp)

8.2.2.3 Accessories

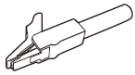
The following accessories are compatible with the multimeter and oscilloscope. Please refer to *Accessories* on page 107 for details.

65A current clamp

650A current clamp



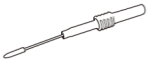
Large Dolphin Clip



Small Crocodile Clip

Multimeter Probe

Back-pinning Probe



Flexible Back-pinning Probe

Breakout Lead

Battery Clip

The two multimeter test leads (Red: SA015 / Black: SA016) are standard for the multimeter and signal generator.

Multimeter Test Lead

Used to connect the multimeter and multimeter probe.

8.2.3 Getting Started

Before opening the Multimeter application, ensure the VCMI device is connected to the tablet Wi-Fi or with the supplied USB cable. For more information, see *Establish Vehicle Communication* on page 20.

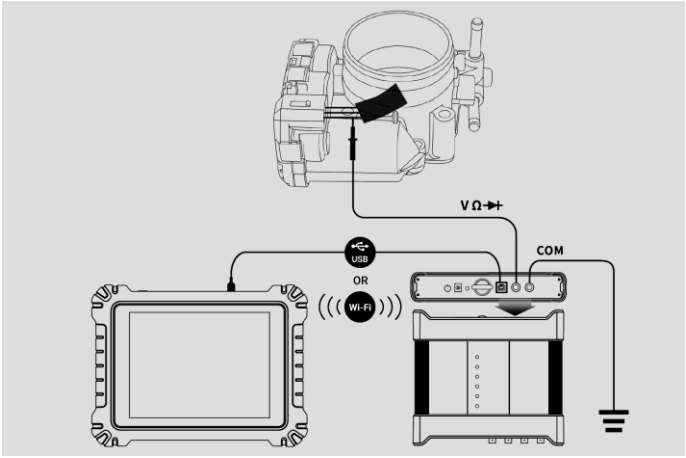


Figure 8-1 *Sample Connection Diagram*

➢ **To open the multimeter application**

1. Insert the applicable test leads or probe terminal ends into the multimeter jacks to complete the connection.
2. Tap the **Measure** icon on the Home screen of the MaxiSys Ultra Tablet. The Measurement screen opens.
3. Tap the **Multimeter** icon to open the Multimeter Menu.
4. Select a test to continue.

NOTE

Please check the multimeter LED status indicator on the front panel of VCMI device. The multimeter LED lights green when operating in the multimeter mode.

8.2.4 Multimeter Update

The operating software of the multimeter is continually optimized. Tap the Help button in the upper half of the screen to update.

Before update the multimeter software, please ensure the tablet has a stable Internet connection.

8.2.4.1 APK Update

NOTE

The acronym APK (Android Package Kit) is used on the tablet and in this manual. This file contains all the assets of a particular app. To update the APK, is to install the latest version of the app on your tablet.

➢ **To update the APK**

1. Tap the **Help** button on the upper half of the screen. A dropdown menu displays.

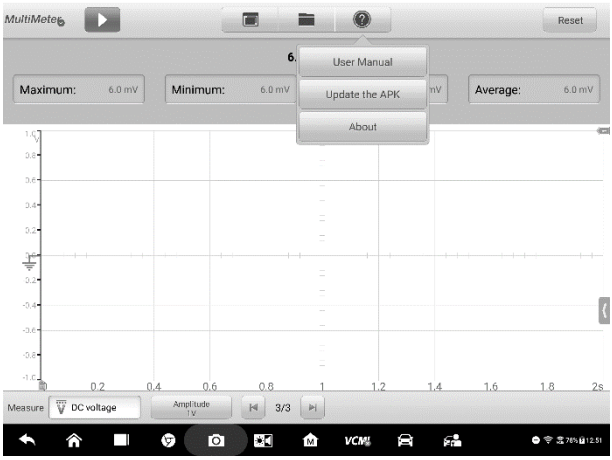


Figure 8-2 *Sample Help Screen*

2. Tap the **Update the APK** in the dropdown menu. A confirmation message displays.

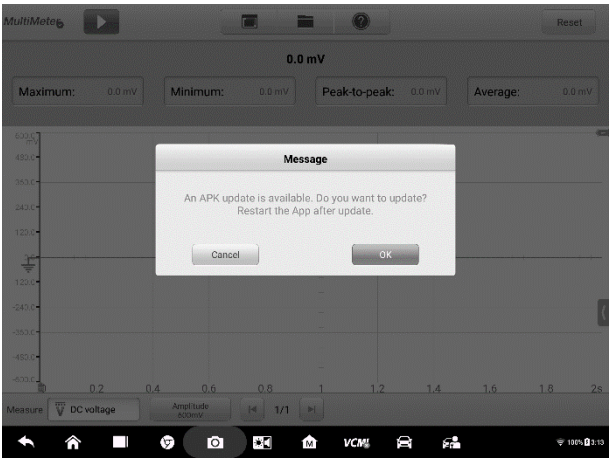


Figure 8-3 *Sample Update Confirmation Screen*

3. Tap **OK** to update the software or tap **Cancel** to exit.

8.2.5 Screen Layout and Operations

Tap the **Measurement** icon on the home screen then tap the **Multimeter** icon in the menu, the multimeter page displays. The screen typically includes the following button sections.

NOTE

The Multimeter application can also be opened via the Android home screen. Tap the **Measure** icon at the top of the Android home screen. Tap **Multimeter** icon.

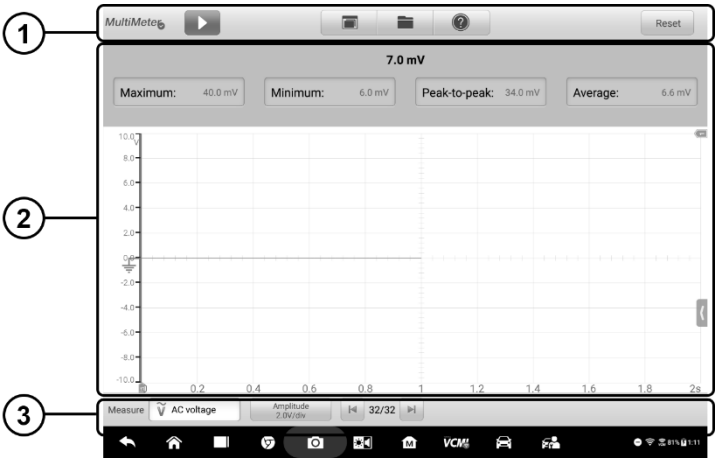


Figure 8-4 *Sample Multimeter Menu Screen*

1. Upper Toolbar Buttons - see *8.2.5.1 Upper Toolbar Buttons* on page 172 for details.

2. Main View Section – see *8.2.5.2 Main View Section* on page 177 for details.

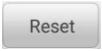
3. Lower Toolbar Buttons - see *8.2.5.3 Lower Toolbar Buttons* on page 181 for details.

8.2.5.1 Upper Toolbar Buttons

The upper toolbar buttons are used for configurations of various settings and operations. The following table provides brief descriptions of each button:

Table 8-1 *Upper Toolbar Buttons*

Name	Button	Description
Multimeter Icon		Displays the multimeter connection status. See *Multimeter Button* on page 173 for more information.
Start/Stop		Start or stop the multimeter device. See *Start/Stop Button* on page 173 for more information.
Display Mode		Set the display mode. See *Display Mode Menu* on page 173 for more information.

Name	Button	Description
File		Print, open and save the waveform data. See *File Menu* on page 174 for more information.
Help		View the user manual, update the APK and firmware. See *Help Menu* on page 176 for more information.
Reset		Reset the digital readouts displayed in the figure mode.

Multimeter Button

This **Multimeter status button** displays the multimeter connection status. A **green** check mark means the tablet and the Multimeter are connected; a **red X** means the device and the tablet are not connected.

Start/Stop Button

Press this **Start/Stop Button** icon to start and stop the multimeter device.

Name	Button	Description
Start		Tap to start the multimeter.
Stop		Tap to stop the multimeter.

Display Mode Menu

The position of the digital readouts and waveform in the main view section can be selected in the Display Mode Menu.

➢ **To set the display mode**

1. Tap the **Display Mode** button in the top navigation bar. A submenu opens.

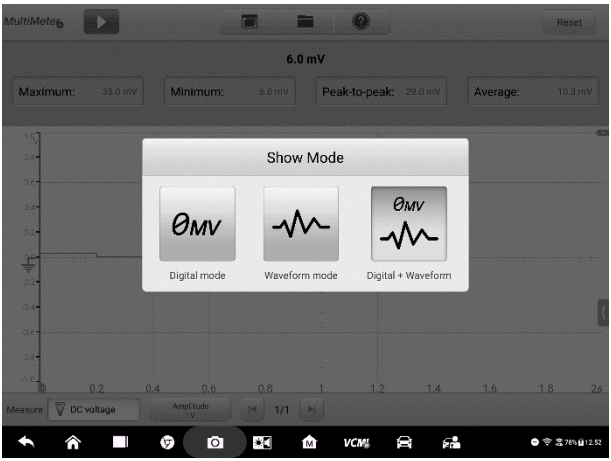


Figure 8-5 *Sample Display Mode Menu Screen*

2. Select one of the three display modes.
3. The corresponding display mode will be shown on the screen.

Table 8-2 *Display Mode Table*

Icon	Mode	Description
	Digital Mode	Displays the digital readouts only.
	Waveform Mode	Displays the waveform only.
	Digital + Waveform Mode	Displays both the digital readouts and waveform.

File Menu

The file menu supports the following functions.

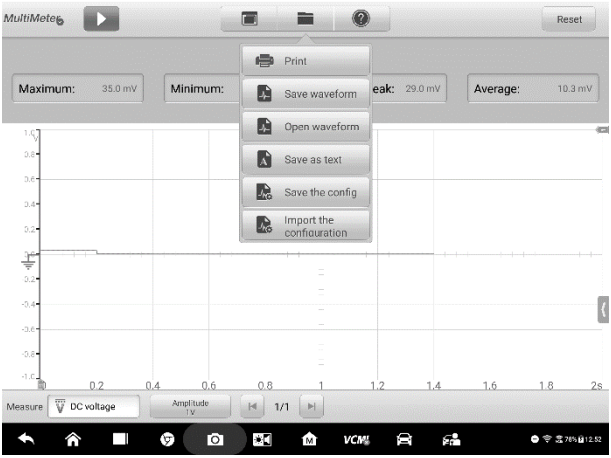


Figure 8-6 *Sample File Menu Screen*

- **Print –** Tap to create and print a temporary JPG picture of the current waveforms.

NOTE

Ensure the tablet is configure to print (see Printer setup instructions) and is connected to the printer. Ensure the tablet and printer share the same network.

- **Waveform File Operation**

Save and open the waveform files in this section. Only **Waveform** mode and **Digital + Waveform** mode support this operation.

Save Waveform – Tap to capture and save the current waveforms. On the Save File screen, tap each item to input the corresponding information and then tap **Save** or **Save Default** to finish.

NOTE

The file name is required when saving waveforms.

Open Waveform – Tap to retrieve the saved waveforms. Tap the **Edit** button in the upper right corner of the screen to select and/or delete the saved waveform.

Save as text – Tap to save the current waveform data to a text file. Use the ES File Explorer app on the Android home screen to review file: **Home > ES File Explorer > Local > Internal Storage > Scan > Data > Scope > txt.**

- **Configuration Operation**

The configurations can be saved and imported.

Save the Configuration – Tap to save the configuration settings (i.e., the amplitude, the time base, the number of samples) of waveforms on the current screen.

Import the Configuration – Tap to import the saved configuration settings for waveforms.

Help Menu

The Help Menu allows you to view the user manual, update the software, and view versions of the device.

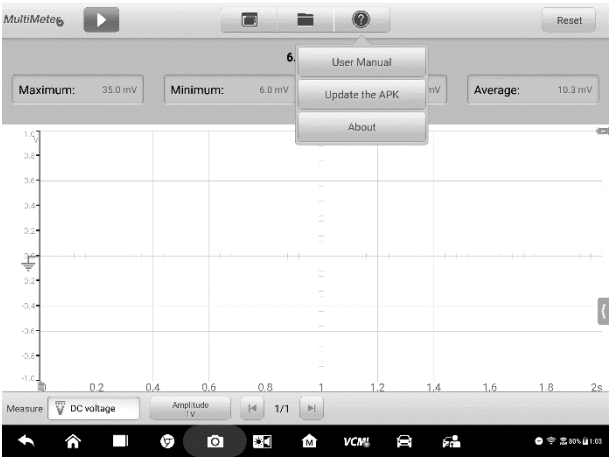


Figure 8-7 ***Sample Help Menu Screen***

User Manual – displays instruction for the prosper use of the multimeter.

Update the APK – connects to the Autel server to check for latest application software.

About – displays the model number of the multimeter and version numbers of the installed software and firmware.

8.2.5.2 Main View Section

The main view section displays differently depending on the selected mode.

Digital Mode

The main view section in the digital mode displays only the digital readouts such as values of current measurement, maximum measurement, minimum measurement, peak to peak measurement and average measurement.

Figure 8-8 ***Sample Main View Section Screen (Digital Mode)***

- **Current Value**: the current value can be the AC voltage, DC voltage, resistance, frequency, or duty cycle
- **Maximum:** the recorded maximum value of the measurement
- **Minimum**: the recorded minimum value of the measurement
- **Peak to Peak:** the difference between the maximum and minimum values
- **Average:** the average value of the measurements

Waveform Mode

The main view section in the scope mode only displays the waveform.

Figure 8-9 ***Sample Main View Section Screen (Waveform Mode)***

The main view section features a coordinate grid with the **X-axis** representing the time duration and the **Y-axis** representing the voltage level.

The voltage level on the Y-axis can be configured in the Amplitude Settings while the time duration on the X-axis can be set in the Time Base Settings.

Channel Selection

In the main view section, a channel has two conditions: selected and unselected. A channel must be selected in order for the waveform to be movement, to use the zoom-in or to add voltage rulers.

- **To select and unselect the channel**

  1. Tap the zero baseline marker or the Y-axis (the line thickens when selected).
  2. Tap the zero baseline marker or the Y-axis again to exit the channel selection.

Waveform Zooming

The zooming function allows you to change the size and position of a signal during or after capturing a waveform to examine it in greater details. It does not change the stored data, but the way it displays.

The X-axis and Y-axis can be zoomed using your fingertips. The waveform can be zoomed during or after capturing the signal.

Measurement Rulers

In the coordinate grid, there are two kinds of **measurement rulers**, which allow the voltage and time duration of a waveform to be measured precisely. They are useful when determining signal characteristics such as amplitude at specific points, the cycle time (duration) and frequency.

The vertical **Time Ruler** - Tap the **Ruler Activator** in the bottom left corner of the grid and drag it across the screen to the desired position. A **Time Ruler** is generated.

The horizontal **Y-axis Ruler** - The **Ruler** can be generated in the similar way by tapping the **Ruler Activator** in the upper right corner and dragging it downwards.

NOTE

The horizontal Y-axis ruler varies according to the settings of the voltage, current, frequency, duty cycle, etc.

When Measurement Rulers are generated, a **Ruler Table** showing time and voltage values for the corresponding channels will be displayed. The **Delta** icon refers to the absolute difference between the values of the rulers, which can be locked by tapping the **Lock** icon. Tap the **X** button in the upper right corner of the ruler table to delete all rulers.

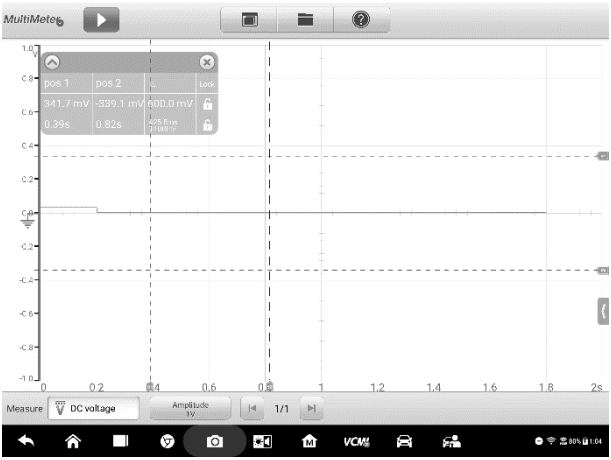


Figure 8-10 *Sample Measurement Rulers Screen*

Zero Baseline

The zero baseline is marked the 0 value in the Y-axis, showing the ground level of each channel waveform. After the channel is selected, the zero baseline can be adjusted by dragging the baseline marker up/down along the Y-axis, or dragging the waveform up/down or moving the screen up/down in the grid.

NOTE

Tap the baseline marker to make the vertical scale line thinner. In this case, the waveform is unselected and cannot be dragged. Tap the baseline marker again to select.

Figure 8-11 *Sample Zero Baseline Screen*

Wiring Diagram and Help

Tap the arrow button in the lower right corner of the screen to open the Wiring Diagram and Help window.

The **Wiring Diagram** function provides the connection diagram, operation steps and operation notes.

The **Help** function provides the content-sensitive help, displaying information relevant to the procedure, operation or instructions.

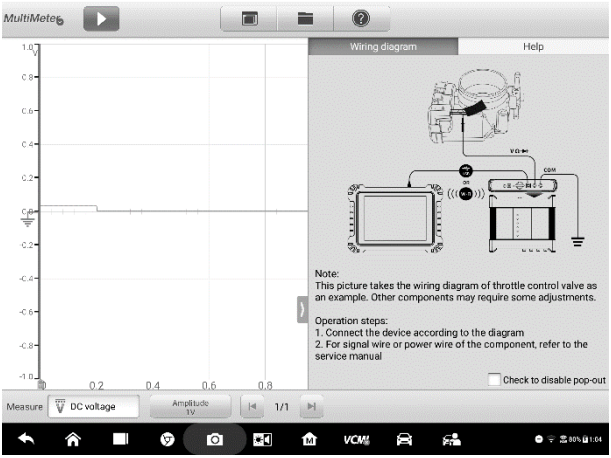


Figure 8-12 ***Sample Wiring Diagram and Help Screen***

- **To open and close the Wiring Diagram and Help window**

1. Tap the arrow button on the right-hand side of the screen.

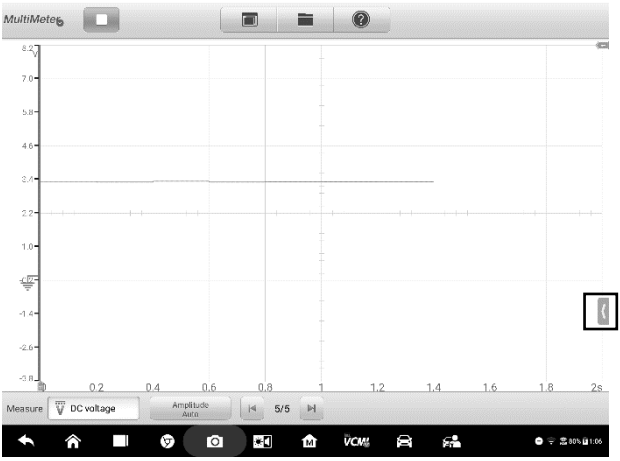


Figure 8-13 ***Arrow Button Position Screen***

2. The **Wiring Diagram and Help** window displays.
3. Tap the arrow button again or tap any space outside of the window.

Digital + Waveform Mode

In this mode, the main view section displays the digital readouts on the top and the waveform in the grid.

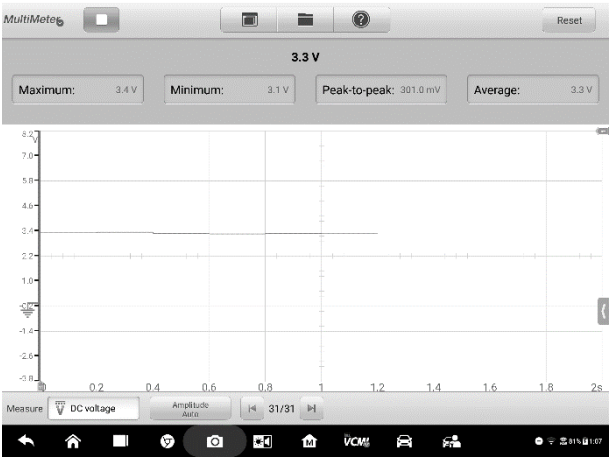


Figure 8-14 ***Sample Main View Section Screen (Digital + Waveform Mode)***

8.2.5.3 Lower Toolbar Buttons

The measurement, buffer and time base can be configured in the lower toolbar.

Table 8-3 ***Lower Toolbar Buttons***

Name	Button	Description
Measure	Measure V AC voltage	Tap to select an appropriate measurement. See *Measure Setting* on page 181 for more information.
Amplitude	Amplitude 1V	Tap to select an appropriate amplitude value. See *Amplitude Setting* on page 183 for more information.
Buffer	32/32	Tap the Previous or Next button to switch to the previous or the next waveform. See *Buffer* on page 187 for more information.

Measure Setting

This multimeter can be used to measure or test AC voltage, DC voltage, resistance, AC electricity, DC electricity, diode, frequency, duty cycle, pulse width, continuity and period.

The measurement types include:

- **AC/DC voltage**: measures the voltage in the electrical circuit
- **Resistance**: measures the resistance of the electrical circuit or the component
- **AC/DC electricity:** measures current amperage through the input channel A by using the optional current clamp

Note
The type of current clamp can be selected in the dropdown list.

- **Diode:** conducts the diode test of the electrical circuit
- **Frequency:** measures the frequency of the input signal
- **Duty Cycle (+)/(-)**: measures the (+) and (-) duty of the input signal
- **Continuity**: determines whether a low impedance exists two points in the electrical circuit. If the impedance is less than 10 ohms, the circuit is “closed”, otherwise, the circuit is “open”.
- **Period**: measures the amount the time that one complete cycle of the input signal endures
- **Pulse Width (+)/(-)**: measures the pulse width of the input signal

➢ **To set the measure setting**

1. Tap the **Measure Setting** button in the lower left corner of the screen. A dialog box appears.

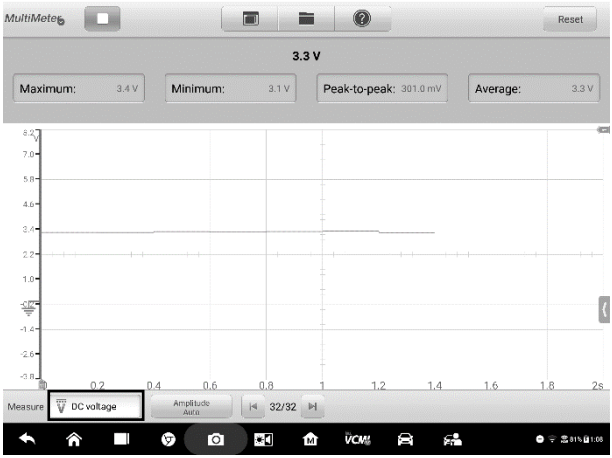


Figure 8-15 ***Sample Measure Setting Position Screen***

2. Select the **measure type** you want to measure or test in the right column of the dialog box. The blue color indicates the option is selected.

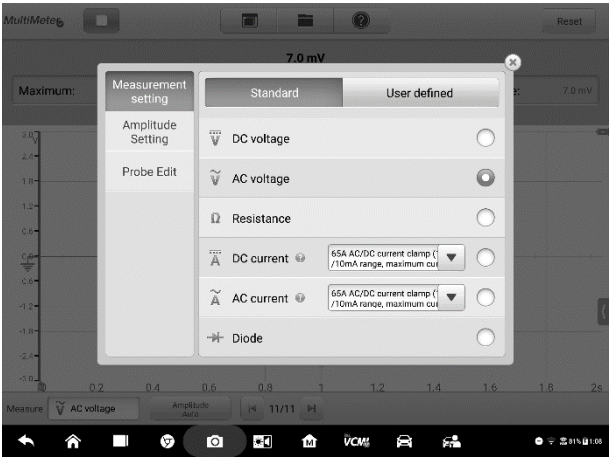


Figure 8-16 ***Sample Measure Setting Screen***

3. Close the dialog box, the measure type you set displays on the screen.

Amplitude Setting

Amplitude value can be configured for the selected measurement type excluding resistance measurement.

The amplitude settings allow you to set up the multimeter to capture signals within the specified range. If the input signal exceeds the selected range, an over-range indicator will be displayed. Select **Auto** to enable the device to adjust the vertical scale automatically.

There are two modes available to set the amplitude value.

Mode 1: For example, selecting AC 1V sets the amplitude to **Voltage 1V** (displays on the amplitude button). The vertical scale range is from -1V to +1V. As the vertical scale is divided into 10 segments, each segment increases by 0.2V.

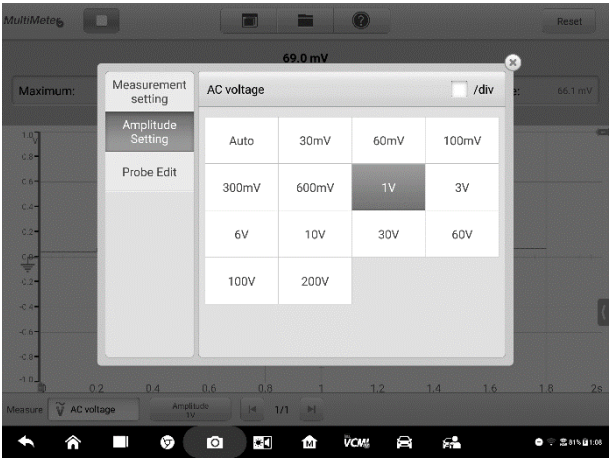


Figure 8-17 ***Channel Setting Dialog Box Screen (AC 1V)***

Mode 2: Select the **## /div** button to adjust the value increments of each division. For example, selecting AC 2.0V/div, sets the amplitude to **Voltage 2.0V/div** (displays on the amplitude button). Each segment increases by 2V. As the vertical scale is divided into 10 segments, the entire vertical scale range is from -10V to +10V.

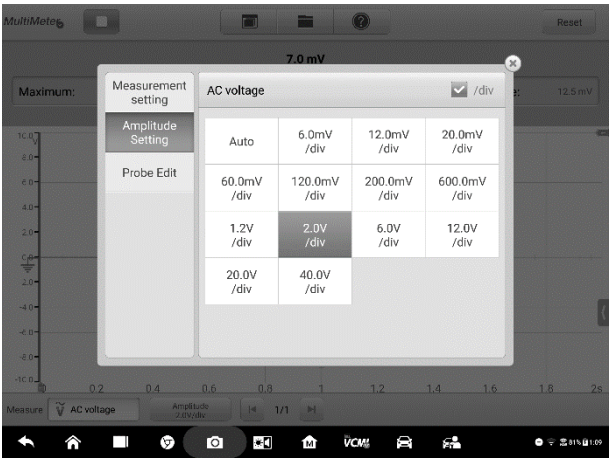


Figure 8-18 ***Sample Amplitude Setting Screen (AC 2.0V/div)***

Testing Procedures

The following section describes how to use the multimeter. The testing procedures are the same for each measurement type.

The following directions are for measuring AC voltage.

➢ **To measure AC voltage**

1. Tap the **Measure Setting** button in the lower left corner of the screen to open the setting dialog box. Select **AC voltage** in the dialog box.
2. Set the proper amplitude value in the **Amplitude Setting** menu in the same dialog box.
3. Insert the supplied multimeter probes into the VCMI multimeter jacks.
4. Measure the AC voltage by holding the probes to the correct points of the circuit.
5. The voltage displays onscreen.

Note

Use the optional current clamp connected to the input channel A when measuring currents. Use the supplied multimeter probes to connect with the multimeter jacks for other measurement types.

Probe Edit

Use the probe edit menu to add the not included robes into the probe menu.

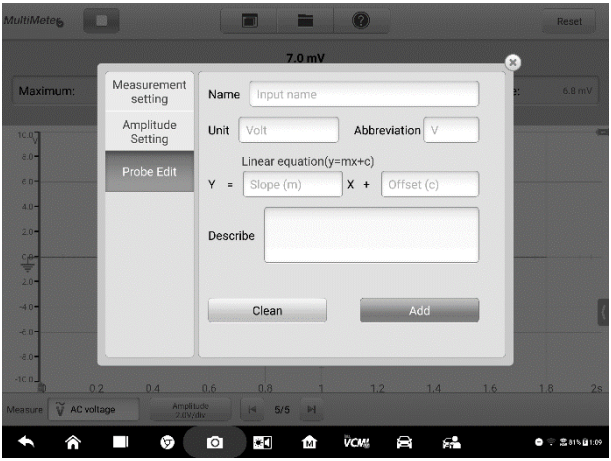


Figure 8-19 ***Sample Probe Edit Screen 1***

- **To add custom probes**

1. Tap the **Measure Setting** button in the lower left corner of the screen to open the setting dialog box.
2. Select the **Probe Edit** option in the left column of the dialog box.
3. Tap each field to open the virtual keyboard and input the required information.

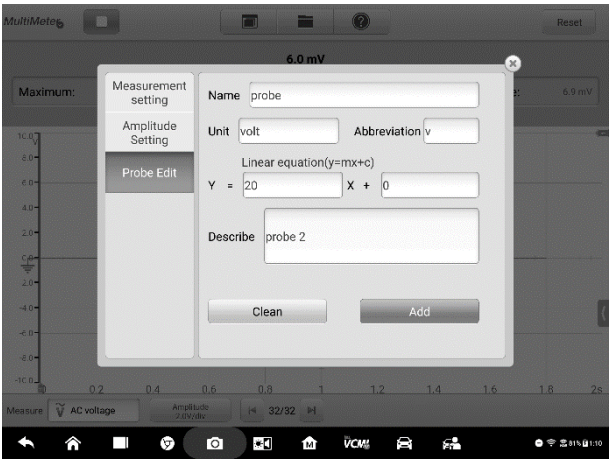


Figure 8-20 *Sample Probe Edit Screen 2*

4. Tap **Add** to save the settings, or tap **Clear** to exit without saving.
5. The added probe will be listed in the Measure Settings window.

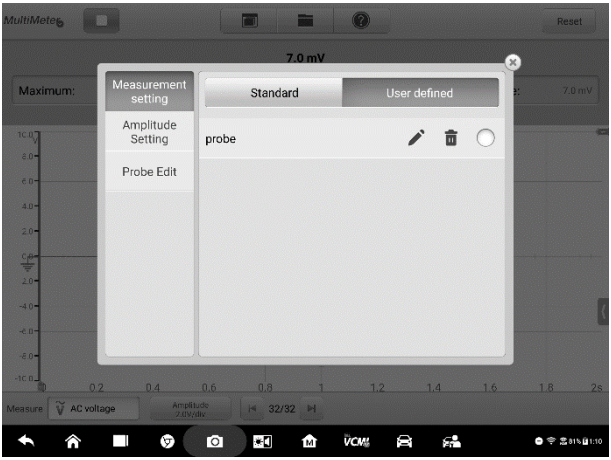


Figure 8-21 *Sample Probe Edit Screen 3*

Buffer

The waveform buffer displays the number of the waveform currently displayed on-screen out of the total number of stored waveforms.

The multimeter can capture and store up to 32 waveforms. Tap the **Previous** or **Next** button to review waveforms.

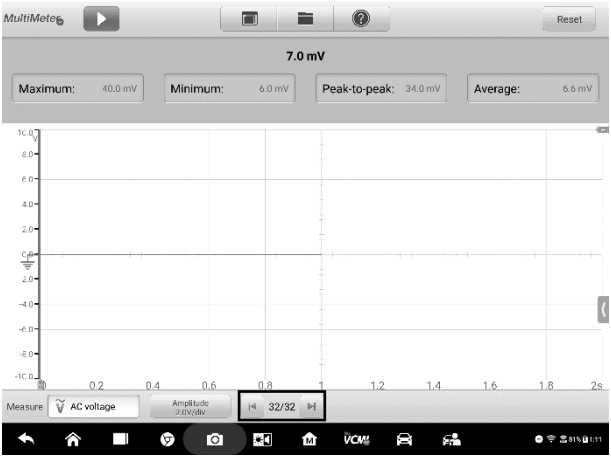


Figure 8-22 *Sample Buffer Screen*

Name	Button	Description
Previous		Tap to display the previous waveform in the buffer.
Buffer Index		Displays the number of the waveform currently displayed onscreen out of the total number of buffered waveforms.
Next		Tap to display the next waveform in the buffer.

8.2.6 Troubleshooting

If the multimeter cannot communicate with the MaxiSys Tablet:

- Check if the VCMI device is properly connected to the MaxiSys Tablet via Wi-Fi or the supplied USB cable.
- If the communication between the VCMI device and the MaxiSys still fails, restart the MaxiSys Tablet and reconnect the VCMI device.

8.2.7 Glossary

AC

Alternating Current - electrical current that switches polarity at regular intervals.

DC

Direct Current - electrical current that flows in one direction only.

Amperage

The strength of an electric current, expressed in amperes.

Amplitude

The maximum voltage generated from the zero volts line of the multimeter.

Frequency

The number of signal occurrences per second. Frequency is measured in Hz (hertz).

Duty Cycle

The length of a signals on time. Specified as a percentage (ratio), of the total cycle time.

Peak to Peak

The difference between maximum and minimum value.

Cursor

The onscreen markers used to measure time and amplitude.

Diode

A semiconductor device that allows current flow only in one direction.

Grid

A network of horizontal and vertical scales displayed on the scope screen that aids in the measuring of signal characteristics.

8.3 Signal Generator Operation

The VCMI (Vehicle Communication and Measurement Interface) working with MaxiSys Ultra can function as a signal generator to send out electric signals to the vehicle's sensor or actuator for testing or measuring.

8.3.1 Safety Information

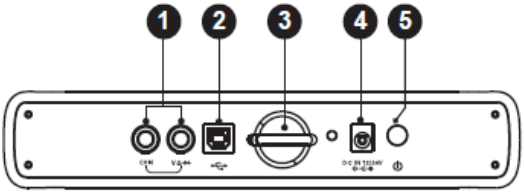
Follow the instructions below to reduce the risk of injury from electric shock and prevent equipment damage.

- Use the signal generator only as specified in this manual.
- Do not apply more than the rated voltage between terminals or between any terminal and earth ground.
- To minimize shock hazard, please connect the device ground input (chassis) to an electrical ground.
- Do not alter the ground connection. Without the protective ground connection, all accessible conductive parts can render an electric shock.
- To avoid electric shock hazard, disconnect power cable before removing covers.
- To prevent injury or death, do not use the signal generator if it appears to be damaged in any way, and stop use immediately if you are concerned any abnormal operations.
- Inspect the test leads or probes for damage before use.
- Use the accessories supplied with the product.
- Use the supplied replacement fuses or specified replacement parts.
- To prevent damage, always use and store your signal generator in appropriate environments.
- Do not place the signal generator in an area that is directly exposed to sunlight or under high humidity.
- Do not tamper with or disassemble the signal generator, connectors or accessories. Internal damage will affect performance.
- Disconnect multimeter from power source, vehicle and tablet before cleaning.
- When cleaning the signal generator, use a damp, soft cloth with mild detergent. Do not allow water to enter the multimeter casing

8.3.2 General Introduction

8.3.2.1 Component Locations

The multimeter jacks are used when operating the signal generator. The two multimeter jacks are located on the top of the VCMI device.



VCMI Top View

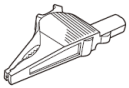
1. Multimeter Jacks – for ground and signal cables
2. USB Port
3. Hook
4. DC Power Supply Input Port
5. Power Button

8.3.2.2 Technical Specifications

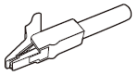
Item	Description
Voltage Range	0.1 to 12V
Frequency Output	1Hz to 30KHz
Duty Cycle Range	1% to 99% (1Hz to 30KHz)
Accuracy	3%

8.3.2.3 Accessories

The following accessories are compatible with the signal generator and oscilloscope. Please refer to *Accessories* on page 107 for details.



Large Dolphin Clip



Small Crocodile Clip

Multimeter Probe

Back-pinning Probe

Flexible Back-pinning Probe

Breakout Lead

Battery Clip

The multimeter test leads (Red: SA015 / Black: SA016) are standard for the signal generator and multimeter.

Multimeter Test Lead

Used to connect the signal generator and the probe.

8.3.3 Getting Started

Before opening the Signal Generator application, the VCMI device must be connected to the Tablet via the provided USB cable or Wi-Fi network. For more information, see *Establish Vehicle Communication* on page 20.

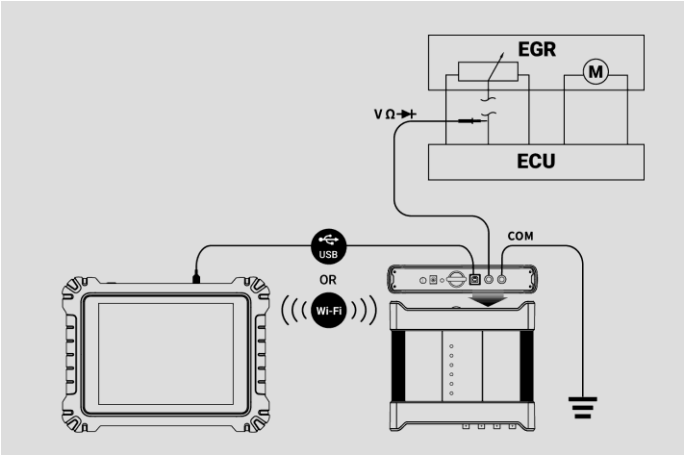


Figure 8-1 *Sample Connection Diagram*

➢ **To open the signal generator application**

1. Insert the multimeter test lead ends into the multimeter jacks on the top of the VCMI device to compete the connection.
2. Tap the **Measure** icon on the Home screen of the MaxiSys Ultra Tablet. The Measurement screen displays.
3. Tap the **Signal Generator** icon to open the signal generator Menu.
4. Select a test to continue.

NOTE

Please check the signal generator LED status indicator on the front panel of VCMI device. The signal generator LED lights green when operating in the signal generator mode.

8.3.4 Signal Generator Update

The operating software of the signal generator is continually optimized. Tap the Help button in the upper half of the screen to update.

8.3.4.1 APK Update

NOTE

The acronym APK (Android Package Kit) is used on the tablet and in this manual. This file contains all the assets of a particular app. To update the APK, is to install the latest version of the app on your tablet.

➢ **To update the APK**

1. Tap the **Help** button on the upper half of the screen. A dropdown menu displays.

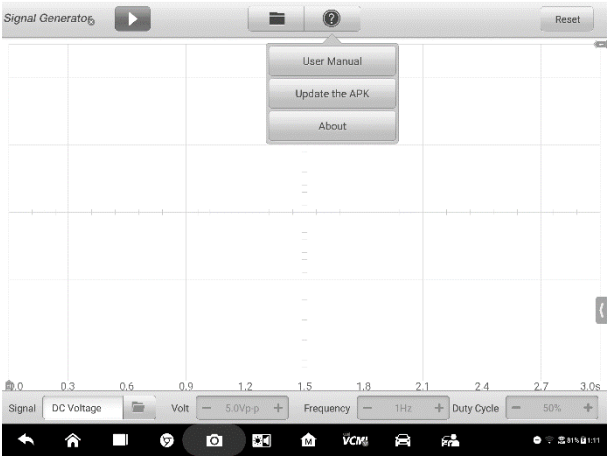


Figure 8-2 *Sample Help Screen*

2. Tap the **Update the APK** in the dropdown menu. A confirmation message displays.

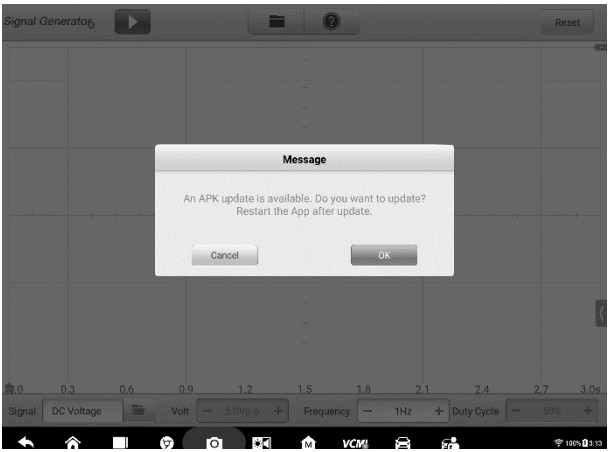


Figure 8-3 *Sample Update Confirmation Screen*

3. Tap **OK** to update the software or tap **Cancel** to exit.

8.3.5 Screen Layout and Operations

Tap the **Measurement** icon on the home screen and select **Signal Generator** from the menu, the signal generator page displays. The screen typically includes the following button sections.

NOTE

The **Signal Generator** application can also be opened via the Android home screen. Tap the **Measure** icon at the top of the Android home screen. Tap **Signal Generator** icon.

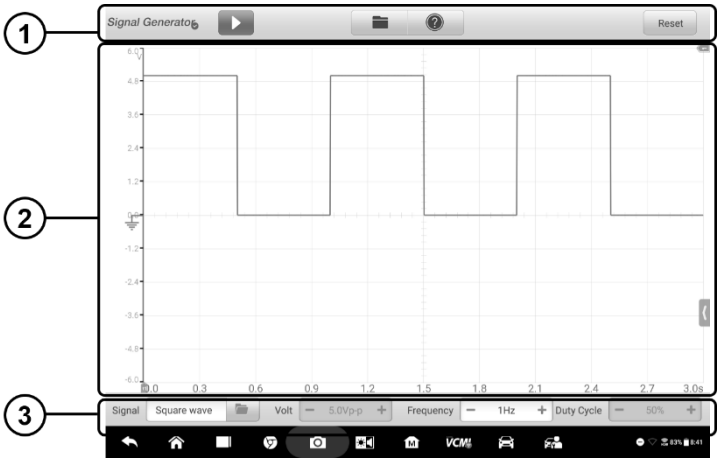


Figure 8-4 *Sample Signal Generator Menu Screen*

1. Upper Toolbar Buttons - see *8.3.5.1 Upper Toolbar Buttons* on page 196 for details.

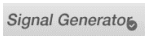
2. Main View Section – see *8.3.5.2 Main View Section* on page 199 for details.

3. Lower Toolbar Buttons - see *8.3.5.3 Lower Toolbar Buttons* on page 202 for details.

8.3.5.1 Upper Toolbar Buttons

The upper toolbar buttons are used to configure settings and operations. The following table provides brief descriptions of each button.

Table 8-1 *Upper Toolbar Buttons*

Name	Button	Description
Signal Generator Icon		Displays the signal generator connection status. See *Signal Generator Button* on page 197 for more information.
Start/Stop		Start and stop the signal generator device. See *Start/Stop Button* on page 197 for more information.
File		Print, open and save the waveform data. See *File* on page 197 for more information.

Name	Button	Description
Help		View the user manual, update the software and view version numbers. See *Help* on page 198 for more information.
Reset		Reset the configurations and refresh the screen.

Signal Generator Button

This **Signal Generator Icon** displays the signal generator connection status. A **green** check mark means the tablet and the signal generator are connected; a **red X** means the device and the tablet are not connected.

Start/Stop Button

You can tap the **Start/Stop Button** icon to start or stop the signal generator device.

Name	Button	Description
Start		Tap to start the signal generator.
Stop		Tap to stop the signal generator.

File Menu

The file menu supports the following functions.

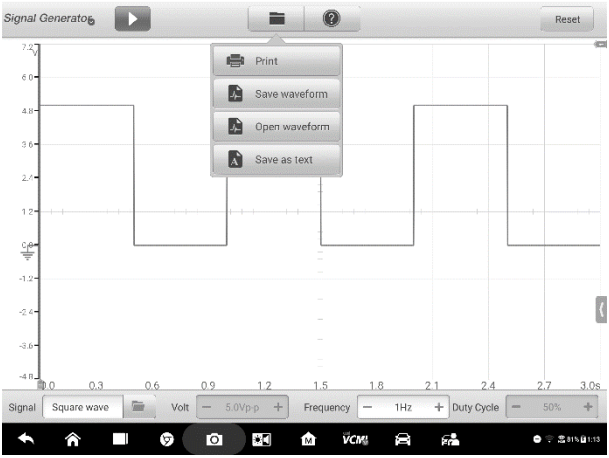


Figure 8-5 Sample File Menu Screen

- **Print –** Tap to create and print a temporary JPG picture of the current waveforms.

NOTE

Ensure the tablet is configure to print (see Printer setup instructions) and is connected to the printer. Ensure the tablet and printer share the same network.

- **Save Waveform** – Tap to capture and save the current waveform. On the Save File screen, tap each item to input the corresponding information and then tap **Save** or **Save Default** to finish.

NOTE

You must name the file to save the waveform.

- **Open Waveform** – Tap to retrieve the saved waveforms. Tap the **Edit** button in the upper right corner of the screen to select and/or delete the saved waveform.
- **Save as text** – Tap to save the current waveform data to a text file. Use the ES File Explorer app on the Android home screen to review file: **Home > ES File Explorer > Local > Internal Storage > Scan > Data > Scope > txt.**

Help Menu

The Help Menu allows you to view the user manual, update the software, and view versions of the device.

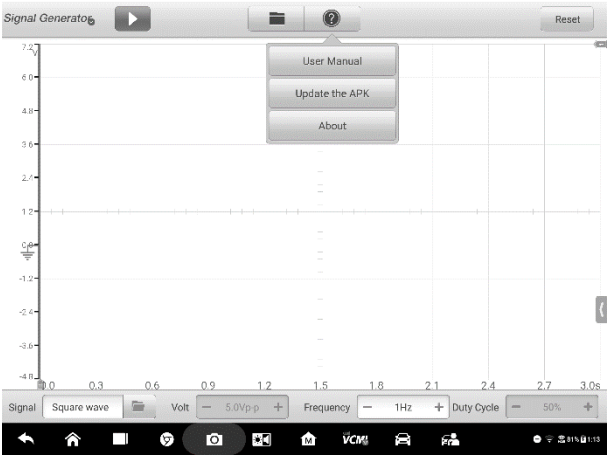


Figure 8-6 Sample Help Menu Screen

User Manual – displays instruction for the prosper use of the signal generator.

Update the APK – connects to the Autel server and check for latest application software.

About – displays the model numbers of the signal generator and the installed versions of the software and firmware.

8.3.5.2 Main View Section

The main view section screen displays as a coordinate grid with **X-axis** and **Y-axis**, representing the duration and voltage level respectively.

Channel Selection

In the main view section, a channel has two conditions: selected and unselected. A channel must be selected in order for the waveform to be movement, to use the zoom-in or to add voltage rulers.

- **To select and unselect the channel**

1. Tap the zero baseline marker or the Y-axis (the line thickens when selected).
2. Tap the zero baseline marker or the Y-axis again to exit the channel selection.

Waveform Zooming

The zooming function allows you to change the size and position of a signal during or after capturing a waveform to examine it in greater details. It does not change the stored data, only the way it displays.

The X-axis and Y-axis can be zoomed using your fingertips. The waveform can be zoomed during or after capturing the signal.

Measurement Ruler

In the coordinate grid, there are two types of **measurement rulers**, which allow the voltage and duration of a waveform to be measured precisely. They are useful when determining signal characteristics such as amplitude at specific points, and the cycle time (duration).

The vertical **Time Ruler** - Tap the **Ruler Activator** in the lower left corner of the grid and drag it across the screen to the desired position. A **Time Ruler** is generated.

The horizontal **Voltage Ruler** - The **Voltage Ruler** can be generated in the similar way by clicking the **Ruler Activator** in the upper right corner and dragging it downwards.

When Measurement Rulers are generated, a **Ruler Table** showing time and voltage values will be displayed. The **Delta** icon refers to the absolute difference between the values of the rulers, which can be locked by tapping the **Lock** icon. Tap the **X** button in the upper right corner of the ruler table to delete all rulers.

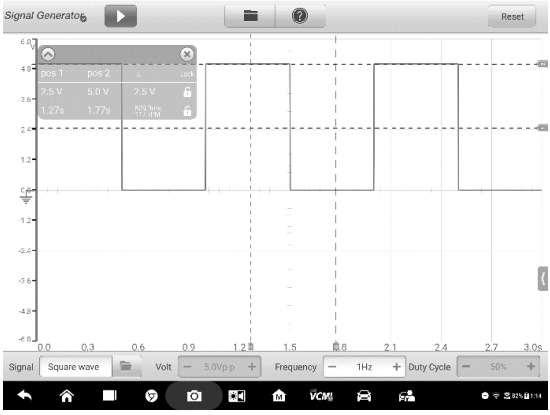


Figure 8-7 ***Sample Measurement Rulers Screen***

Zero Baseline

The zero baseline is marked as the 0 value in the Y-axis, showing the ground level of each channel waveform. After the channel is selected, the Zero Baseline can be adjusted by dragging the zero baseline marker up/down along the Y-axis.

Wiring Diagram and Help

Tap the arrow button in the lower right corner of the screen to open the Wiring Diagram and Help window.

The **Wiring Diagram** function provides the connection diagram, operation steps and operation notes.

The **Help** function provides the content-sensitive help, displaying information relevant to the procedure, operation or instructions.

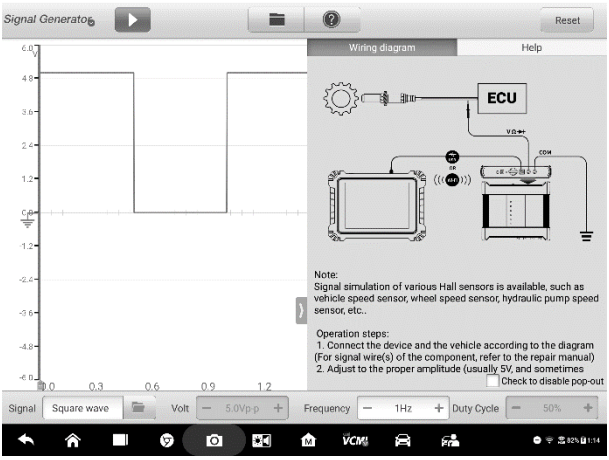


Figure 8-8 ***Sample Wiring Diagram and Help Screen***

- **To open and close the Wiring Diagram and Help window**

1. Tap the arrow button on the right-hand side of the screen.

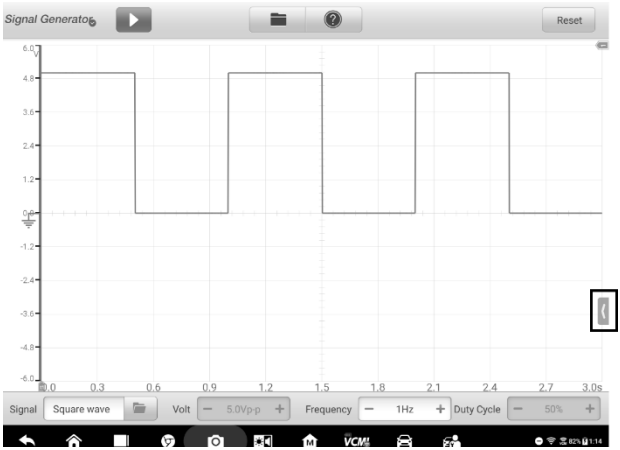


Figure 8-9 *Arrow Button Position Screen*

2. The Wiring Diagram and Help window displays.
3. Tap the arrow button again or tap any space outside of the window.

8.3.5.3 Lower Toolbar Buttons

The waveform mode, voltage, frequency and duty cycle can be configured via the lower toolbar buttons.

Table 8-2 *Lower Toolbar Buttons*

Name	Button	Description
Waveform Mode Setting	Mode DC Voltage	Tap to select an appropriate waveform mode. See *Waveform Mode Setting* on page 203 for more information.
Voltage Setting	Voltage − 5.0Vp-p +	Tap to select an appropriate voltage value. See *Voltage Setting* on page 208 for more information.
Frequency Setting	Frequency − 2Hz +	Tap to select an appropriate frequency value. See *Frequency Setting* on page 211 for more information.
Duty Cycle Setting	Duty Cycle − 50% +	Tap to select an appropriate duty cycle value. See *Duty Cycle Setting* on page 214 for more information.

Waveform Mode Setting

The signal generator supports numerous waveform modes including the DC voltage, square wave, square wave (X+Y), triangle wave, and actuators drive, and arbitrary waveform.

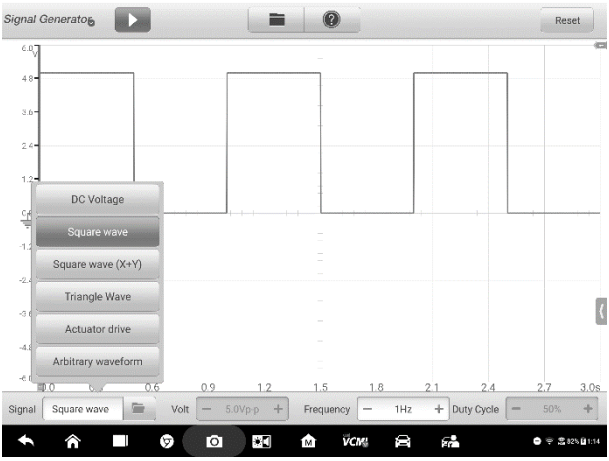


Figure 8-10 ***Waveform Mode Setting Screen***

DC Voltage

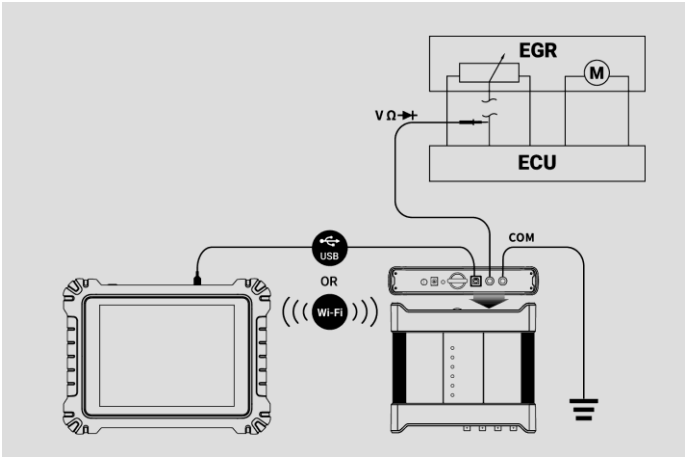


Figure 8-11 ***Sample DC Voltage Connection Diagram***

Set the DC voltage in the signal generator interface. The signal generator can simulate the signals of numerous sensors including the water temperature sensor, oil pressure sensor and position sensor and then feed back to the engine ECU.

Actuator Drive

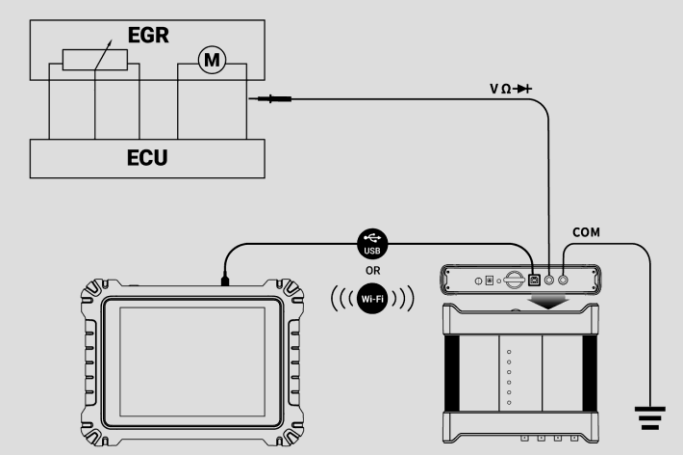


Figure 8-12 ***Sample Actuator Drive Connection Diagram***

This function can drive 2-wire solenoid valve, solenoid coil and low-power motor, including the canister solenoid valve, injector solenoid valve, transmission hydraulic valve, hydraulic control valve, ignition coil, idle motor, and throttle motor.

It can change the operation speed and working time of the actuator by setting the frequency and duty cycle. The higher the frequency, the faster the speed, and the higher the duty cycle, the longer the working time, and vice versa.

NOTE

To avoid damaging the actuator, do not actuate it for a long time, and do not set too high a frequency.

This function needs to be tested on the car. If the actuator is removed, it cannot be driven individually.

Square Wave

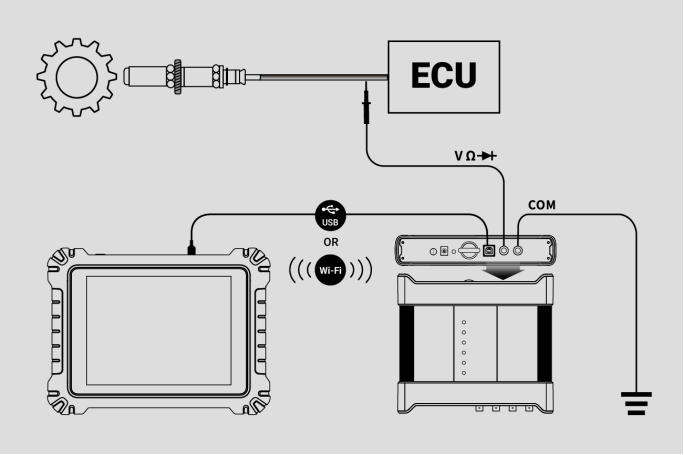


Figure 8-13 ***Sample Square Wave Connection Diagram***

Once the voltage and frequency are set in the signal generator interface, the square wave signals simulate the signals of various Hall sensors.

Square Wave (X+Y)

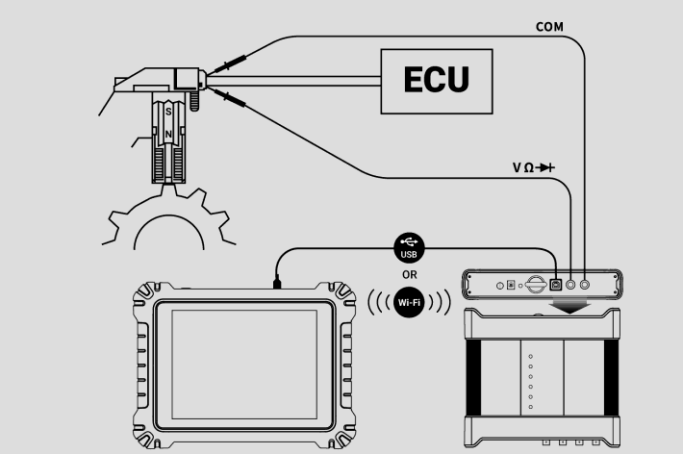


Figure 8-14 ***Sample Square Wave (X+Y) Connection Diagram***

This function is mainly used to simulate the missing tooth signals of Hall-type crankshafts and camshafts. The X value represents the normal tooth signal and the Y represents the missing tooth signal. The default setting is 58+2, which can be adjusted as needed.

Triangle Waveform

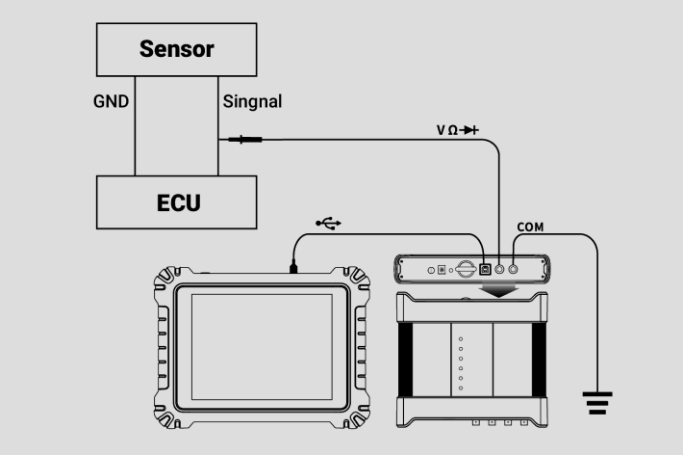


Figure 8-15 ***Sample Triangle Waveform Connection Diagram***

This is a symmetrical triangular waveform, which is mainly used to simulate the triangle wave signals. The amplitude and frequency can be configured in this waveform.

Arbitrary Waveform

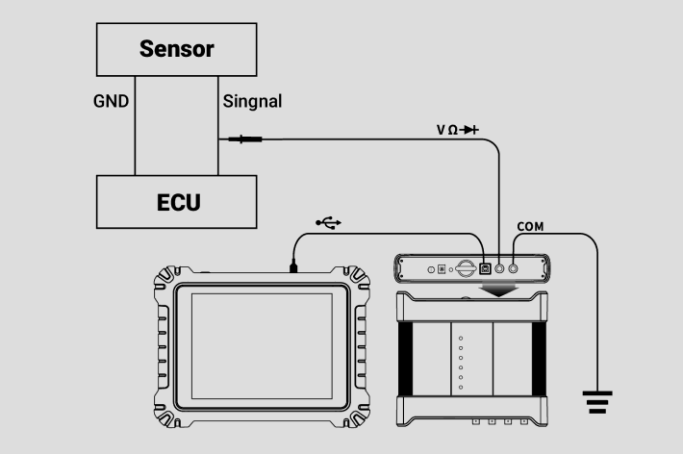


Figure 8-16 ***Sample Arbitrary Waveform Connection Diagram***

Any type of the mentioned waveforms can be loaded again after the waveform and parameter settings are saved.

Voltage Setting

After you select the waveform mode, you can also set the amplitude value for that mode.

There are **three methods** to adjust the voltage value:

Method 1: Tap the **"+" and "-" buttons** on the bottom of the screen in the Voltage Setting.

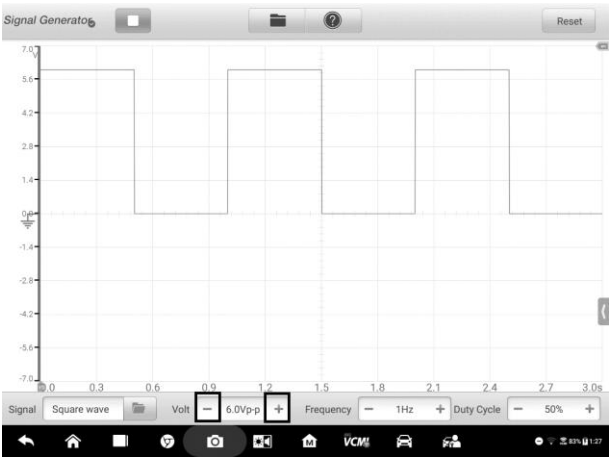


Figure 8-17 ***Sample Voltage Setting Screen 1***

Range	Button	Description
0.1V to 0.9V	+	Raises the voltage by 0.1V
	−	Lowers the voltage by 0.1V
1V to 12V	+	Raises the voltage by 1V
	−	Lowers the voltage by 1V

Method 2: Tap the **Voltage Setting** button at the bottom of the screen to open a dialog box. Adjust the voltage value by tapping the **positive or negative value** at the bottom of the dialog box. Then tap **OK** to confirm or **Cancel** to exit without saving.

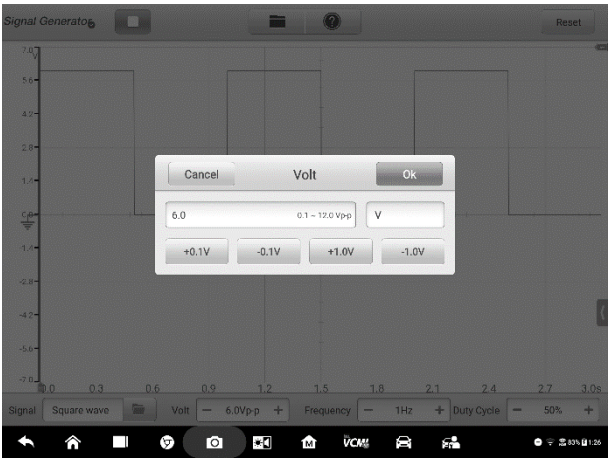


Figure 8-18 ***Sample Voltage Setting Screen 2***

Value	Description
+0.1V	Raises the voltage by 0.1V
-0.1V	Lowers the voltage by 0.1V
+1.0V	Raises the voltage by 1V
-1.0V	Lowers the voltage by 1V

Method 3: Input the voltage value using the virtual keyboard. Tap the voltage field to clear the current value and input the new value. Tap **OK** to confirm or **Cancel** to exit without saving.

Figure 8-19 ***Sample Voltage Setting Screen 3***

Frequency Setting

When the waveform mode is selected and the signal generator is operating, you can also set the frequency value for that mode.

There are also three methods to adjust the frequency value:

Method 1: Tap the **"+" and "-" buttons** on the bottom of the screen in the Frequency Setting.

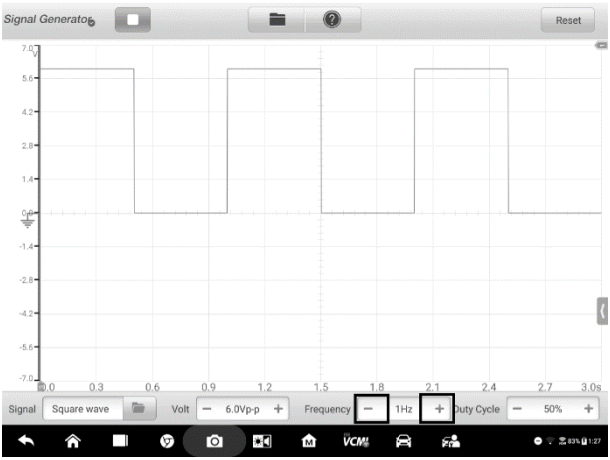


Figure 8-20 ***Sample Frequency Setting Screen 1***

Range	Button	Description
1Hz to 10Hz	+	Raises the frequency by 1Hz
	−	Lowers the frequency by 1Hz
10Hz to 100Hz	+	Raises the frequency by 10Hz
	−	Lowers the frequency by 10Hz
100Hz to 1000Hz	+	Raises the frequency by 100Hz
	−	Lowers the frequency by 100Hz
1.0KHz to 30.0KHz	+	Raises the frequency by 1KHz
	−	Lowers the frequency by 1KHz

Method 2: Tap the **Frequency Setting** button at the bottom of the screen to open a dialog box. Adjust the frequency value by tapping the **positive or negative value** at the bottom of the dialog box. The unit of the frequency can be switched Hz to KHz. Tap **OK** to confirm or **Cancel** to exit without saving.

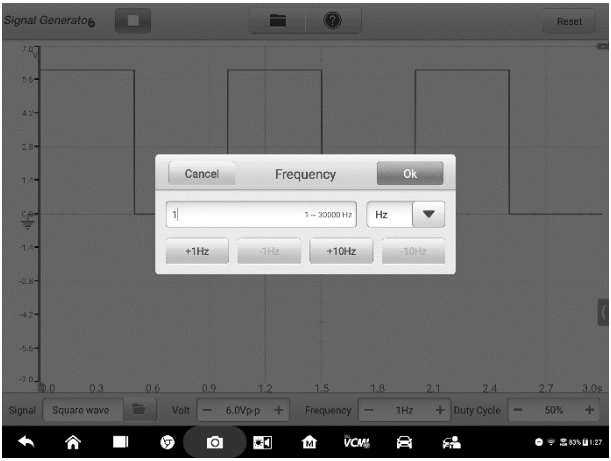


Figure 8-21 ***Sample Frequency Setting Screen 2***

Value	Description
+1.0Hz	Raises the frequency by 1Hz
-1.0Hz	Lowers the frequency by 1Hz
+10.0Hz	Raises the frequency by 10Hz
-10.0Hz	Lowers the frequency by 10Hz
+1.0KHz	Raises the frequency by 1KHz
-1.0KHz	Lowers the frequency by 1KHz
+10.0KHz	Raises the frequency by 10KHz
-10.0KHz	Lowers the frequency by 10KHz

Method 3: Input the frequency value using the virtual keyboard. Tap the frequency field to clear the current value and input the new value. Tap **OK** to confirm or **Cancel** to exit without saving.

Figure 8-22 ***Sample Frequency Setting Screen 3***

Duty Cycle Setting

When the waveform mode is set, you can also set the duty cycle ratio for that mode.

There are three methods to adjust the duty cycle ratio:

Method 1: Tap the **"+" and "-" buttons** on the bottom of the screen in the Duty Cycle Setting.

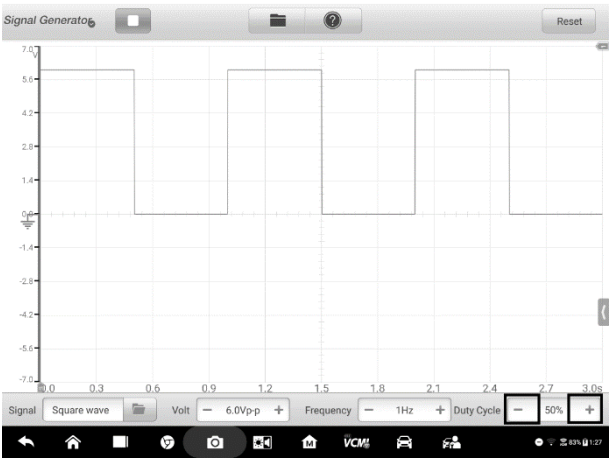


Figure 8-23 ***Sample Duty Cycle Setting Screen 1***

Range	Button	Description
1% to 99%	+	Raises the duty cycle ratio by 1%
	−	Lowers the duty cycle ratio by 1%

Method 2: Tap the **Duty Cycle Setting** button at the bottom of the screen to open a dialog box. Adjust the duty cycle by tapping the **positive or negative ratio** at the bottom of the dialog box. Tap **OK** to confirm or **Cancel** to exit without saving.

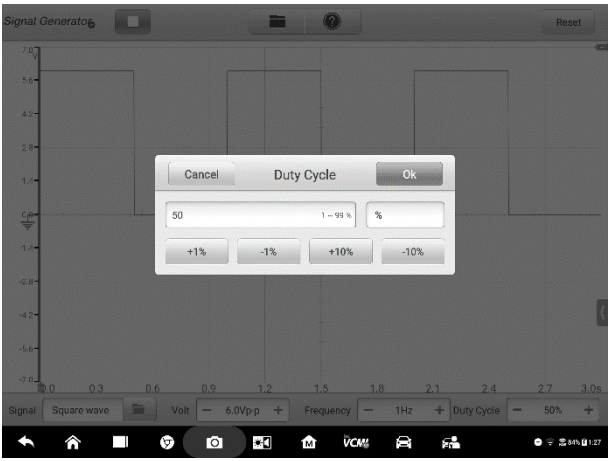


Figure 8-24 ***Sample Duty Cycle Setting Screen 2***

Value	Description
+1.0%	Raises the duty cycle ratio by 1.0%
-1.0%	Lowers the duty cycle ratio by 1.0%
+10.0%	Raises the duty cycle ratio by 10%
-10.0%	Lowers the duty cycle ratio by 10%

Method 3: Input the duty cycle ratio using the virtual keyboard. Tap the duty cycle field to clear the current value and input the new value. Tap **OK** to confirm or **Cancel** to exit without saving.

Figure 8-25 *Sample Duty Cycle Setting Screen 3*

8.3.6 Troubleshooting

If the signal generator cannot communicate with the MaxiSys Tablet:

- Check if the VCMI device is properly connected to the MaxiSys Tablet through the supplied USB cable.

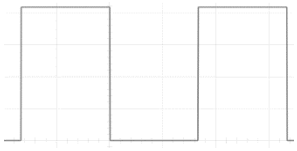
IMPORTANT

To avoid damaging the vehicle and/or the equipment, all vehicle communications must be terminated before resetting the connection. The Internet connection may be aborted during resetting.

- If the communication between the VCMI device and the MaxiSys Tablet still fails, restart the MaxiSys Tablet and reconnect the VCMI device.

8.3.7 Glossary

Waveform Type	Description	Sample Waveform
DC Voltage	A waveform with constant voltage	

Waveform Type	Description	Sample Waveform
Square Wave	A non-sinusoidal periodic waveform with the duty cycle of 50%	
Square Wave (X+Y)	A special square waveform with normal and missing teeth signals	
Triangle Wave	A asymmetrical triangular waveform	

8.4 OBDII Communication Line Inspection Operation

The VCMI (Vehicle Communication and Measurement Interface) working with MaxiSys Ultra is designed with the OBDII communication line inspection function by checking the ON-OFF lamps on the tablet screen.

Generally, the vehicle's electronic control systems are designed to comply with the specific communication protocols. The control units in the electronic control systems communicate with the Tablet through the OBDII (DLC) adapter.

With the OBD communication line inspection function, you can check whether the control units in vehicle's electronic control systems work properly or not by illuminating ON-OFF lamps according to the condition of sending out the communication signals.

8.4.1 Safety Information

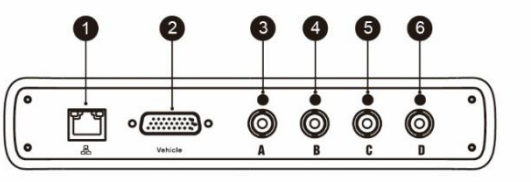
Follow the instructions below to ensure proper communication line inspection performance.

- Different preconditions for different functions. Before inspection, please read the inspection guides carefully.
- The pin number for OBDII vary by vehicle modes. Please check and confirm for correct pin number and then proceed inspection.
- Select OBDII connector's signal pins manually if the test vehicle's actual communication signal pins are assigned differently.
- Ensure the DLC main cable is connected to the vehicle before inspection.
- Ensure the ignition key is in ON position when testing the vehicle's communication line.
- If the inspection fails due to no signal input, consult vehicle circuit diagram to ensure correct communications are being tested.
- Do not use in wet or damp conditions, or around explosive gas or vapor.
- Do not tamper with or disassemble the product, connectors or accessories. Internal damage will affect performance.
- Disconnect the product from power source, vehicle and tablet before cleaning.
- When cleaning the product, use a damp, soft cloth with mild detergent. Do not allow water to enter the product casing, as this will cause damage to the electronics inside.

8.4.2 General Introduction

8.4.2.1 Component Locations

The main connectors are located on the bottom of the VCMI device.



1. Ethernet Connector
2. Vehicle Data Connector
3. Input Channel A
4. Input Channel B
5. Input Channel C
6. Input Channel D

8.4.3 Getting Started

Before opening the OBDII Communication Line Inspection application, you have to complete three steps below:

1) Connect the VCMI device to the Tablet via Wi-Fi or the supplied USB, see *Establish Vehicle Communication* on page 20.
2) Connect the VCMI device to the vehicle's OBDII connector.
3) Place the ignition in the key on position.

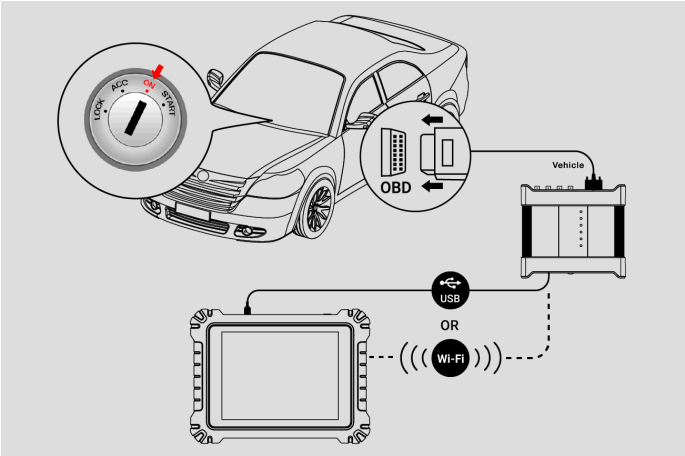


Figure 8-1 *Sample Connection Diagram*

➢ **To open the OBDII Communication Line Inspection application**

1. Please refer to *Figure 8-1 Sample Connection Diagram* to complete the connection. Place the ignition in the key on position.
2. Tap the **Measure** icon on the Home screen of the MaxiSys Ultra Tablet. The Measurement screen opens.
3. Tap the **OBD** icon to open the OBDII Communication Line Inspection Menu.
4. Select a communication protocol to test.

8.4.4 Update

The operating software of the device is continually optimized. Tap the **Help** button in the upper half of the screen.

8.4.4.1 APK Update

NOTE

The acronym APK (Android Package Kit) is used on the tablet and in this manual. This file contains all the assets of a particular app. To update the APK, is to install the latest version of the app on your tablet.

➢ **To update the APK**

1. Tap the **Help** button on the upper half of the screen. A dropdown menu displays.