

MODIS™

Component Tests User Manual

February 2009

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Safety Information

For your own safety and the safety of others, and to prevent damage to the equipment and vehicles upon which it is used, it is important that the accompanying *Safety Information* be read and understood by all persons operating, or coming into contact with, the equipment. We suggest you store a copy the book near the unit in sight of the operator.

This product is intended for use by properly trained and skilled professional automotive technicians. The safety messages presented throughout this manual are reminders to the operator to exercise extreme care when using this test instrument.

There are many variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the individual doing the work. Because of the vast number of test applications and variations in the products that can be tested with this instrument, we cannot possibly anticipate or provide advice or safety messages to cover every situation. It is the automotive technician's responsibility to be knowledgeable of the system being tested. It is essential to use proper service methods and test procedures. It is important to perform tests in an appropriate and acceptable manner that does not endanger your safety, the safety of others in the work area, the equipment being used, or the vehicle being tested.

It is assumed that the operator has a thorough understanding of vehicle systems before using this product. Understanding of these system principles and operating theories is necessary for competent, safe and accurate use of this instrument.

Before using the equipment, always refer to and follow the safety messages and applicable test procedures provided by the manufacturer of the vehicle or equipment being tested. Use the equipment only as described in this manual.

Read, understand and follow all safety messages and instructions in this manual, the accompanying safety manual, and on the test equipment.

Safety Message Conventions

Safety messages are provided to help prevent personal injury and equipment damage. All safety messages are introduced by a signal word indicating the hazard level.

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or to bystanders.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or to bystanders.

⚠ CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury to the operator or to bystanders.

Safety messages contain three different type styles.

- Normal type states the hazard.
- Bold type states how to avoid the hazard.
- Italic type states the possible consequences of not avoiding the hazard.

An icon, when present, gives a graphical description of the potential hazard.

Example:

⚠ WARNING

Risk of unexpected vehicle movement.

- **Block drive wheels before performing a test with engine running.**
A moving vehicle can cause injury.

Important Safety Instructions

For a complete list of safety messages, refer to the accompanying safety manual.

SAVE THESE INSTRUCTIONS

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This manual contains tool usage instructions.

Some of the illustrations shown in this manual may contain modules and optional equipment that are not included on your system. Contact a sales representative for availability of other modules and optional equipment.

The following conventions are used.

1.1 Conventions

1.1.1 Bold Text

Bold emphasis is used in procedures to highlight selectable items such as buttons and menu options.

Example:

- Press the **Y/✓** button.

1.1.2 Symbols

The following types of arrows are used.

The “greater than” arrow (>) indicates an abbreviated set of selection instructions.

Example:

- Select **Utilities > Tool Setup > Date**.

The above statement abbreviates the following procedure:

1. Navigate to the **Utilities** button.
2. Use the Thumb Pad to navigate to and highlight the **Tool Setup** submenu.
3. Use the Thumb Pad to navigate to and highlight the **Date** option from the submenu.
4. Press **Y/✓** to confirm the selection.

The solid arrows (◀, ▶, ▼, ▲) are navigational instructions referring to the four directions of the Thumb Pad.

Example:

- Press the down ▼ arrow.

1.1.3 Terminology

The term “select” means highlighting a button or menu item using the Thumb Pad and pressing the **Y/✓** button to confirm the selection.

Example:

- Select **Reset**.

The above statement abbreviates the following procedure:

1. Navigate to and highlight the **Reset** button.
2. Press the **Y/✓** button.

1.1.4 Note and Important Messages

The following messages are used.

Note

A NOTE provides helpful information such as additional explanations, tips, and comments.

Example:



NOTE:

For additional information refer to...

Important

IMPORTANT indicates a situation which, if not avoided, may result in damage to the test equipment or vehicle.

Example:

IMPORTANT:

Do not force the CompactFlash[®] card into the slot.

1.1.5 Procedures

An arrow icon indicates a procedure.

Example:



To change screen views:

1. Select **View**.
The drop-down menu displays.
2. Select an option from the menu.
The screen layout changes to the format you selected.

1.2 Additional Manuals

Tools that work in conjunction with various hardware and software modules have separate manuals available for each of the modules.

1.3 Tool Help

Your unit has Tool Help containing reference and procedural information found in this and other tool related user's manuals. From the main menu, access Tool Help on the Utilities menu.

The MODIS™ Component Tests module combines the strength of your MODIS™ Lab Scope and Graphing Multimeter with a powerful diagnostic database. This software provides component tests and automatically configures the tool for a selected test.

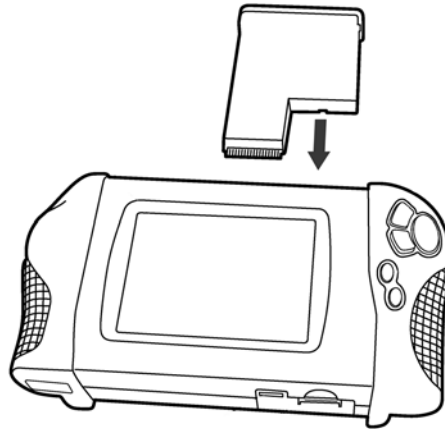


Figure 2-1 MODIS™ display device with Lab Scope Plug-in

The Component Tests module operates from the Lab Scope Plug-in, which uses standard safety banana jacks and is compatible with commonly available accessories.

The following chapters of this manual will cover navigation through the software module, software operation, accessories, and replacement part.

This section provides MODIS™ Component Tests navigation information.

For information about navigating the MODIS™ unit, refer to the *MODIS™ Display User Manual*.

3.1 Screen Layout

The Component Tests button on the main menu opens a Component Testing menu. Selecting from the menu opens a submenu (Figure 3-1).

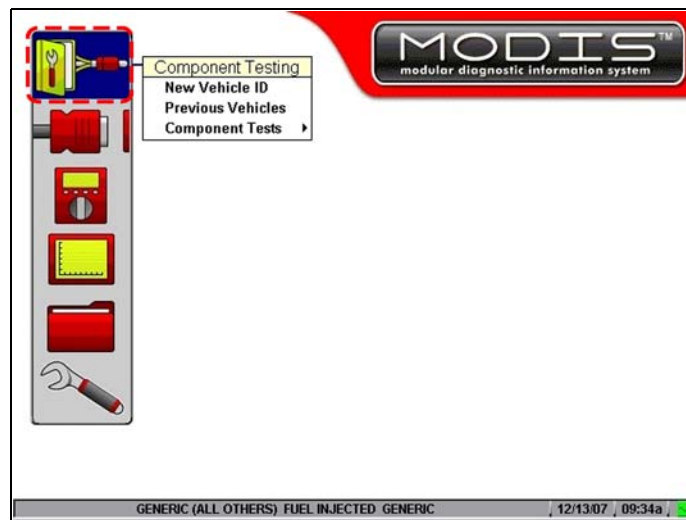


Figure 3-1 Sample screen selection

3.1.1 Tests Screen

The Tests screen (Figure 3-2) consists of the following sections:

- Upper toolbar
- Main body
- Lower toolbar
- Status Bar

The main body of the Tests screen consists of three sections:

- **Test Procedure window** (upper-left) contains connection and testing procedures.
- **Support window** (upper-right) contains support information, such as waveforms and connector illustrations.
- **Test Meter window** (bottom) functions either as a Graphing Meter, Digital Meter, or Lab Scope depending on the test you choose. This window cannot be selected.

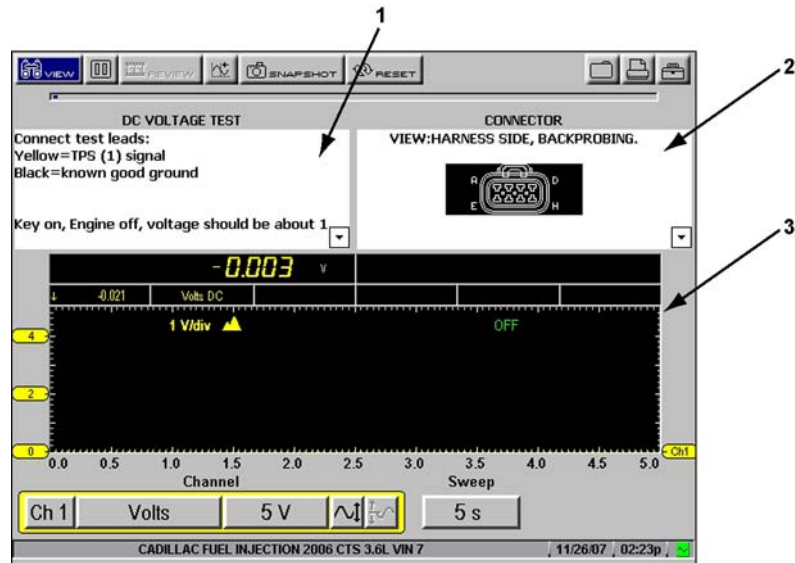


Figure 3-2 Sample test screen

- 1— Test Procedure window
- 2— Support window
- 3— Test Meter window

3.1.2 Toolbars

Upper and lower toolbars contain test controls that vary depending on the stage of operations.



To navigate toolbars:

1. Press the left ◀ and right ▶ arrows to move between buttons.
2. Press the up ▲ and down ▼ arrows or press the **N/X** button to move between the upper and lower toolbars.

When Easy Scroll is active, press the **N/X** button to move to the upper toolbar.

Upper Toolbar

The upper toolbar (Figure 3-3 and Figure 3-4) controls vary depending on your mode and stage of operation (Table 3-1).














Figure 3-3 Sample "live-screen" upper toolbar



Figure 3-4 Sample "frozen-screen" upper toolbar

Table 3-1 Upper toolbar controls

Name	Button	Description
View		Lets you change the way data displays
Pause		Pauses data collection and lets you review the buffered data
Play		Continuously captures data and stores it in the Data Buffer
Cursors		Lets you make measurements of test data
Review		Lets you adjust paused data
Snapshot		Lets you capture data before and after a problem occurs while testing
Zoom		Lets you change the magnification of the frozen data
Reset		Lets you clear the Min/Max data for all digital gauges
Save		Lets you store data and settings in memory
Print		Lets you print the selected screen information
Setup		Lets you: change the way information appears, change where it saves, and enter vehicle system information

Data Buffer

The Data Buffer (Figure 3-5) is located just below the upper toolbar buttons and indicates how much test data is stored.



Figure 3-5 Sample Data Buffer

1— Pause button

2— Data Buffer

When the screen is frozen, the position indicator displays the current frame number (Figure 3-6).



Figure 3-6 Sample Scroll Control with Position Indicator

1— Play button

2— Position Indicator

The Data Buffer cannot be highlighted or selected.



To manually scroll through stored frames:

1. When the screen is frozen, select **REVIEW**.
2. Press the left ◀ and right ▶ arrows.

Lower Toolbar

The lower toolbar (Figure 3-7 and Table 3-2) controls vary depending on the active mode and stage of operation.





Figure 3-7 Sample lower toolbar

Table 3-2 Lower toolbar controls (sheet 1 of 2)

Name	Button	Description
Channel number		Lets you select the channel to adjust
Probe		Displays the current test connection for the channel
Scale		Displays the current units of measurement for the channel
calibrate		Indicates channel calibration
Signal Zero Offset		Moves the selected channel zero (0) position up or down within the test area
Threshold		Changes the reference point on the waveform when calculating measurements
Sweep		Sets the amount of time displayed across the screen
Trigger Type		Sets the criteria used to start the display of data—there are three types of Trigger settings: None, Channel, and Cyl

Table 3-2 Lower toolbar controls (sheet 2 of 2)

Name	Button	Description
Slope		Lets you change the Trigger edge for the specified channel from rising to falling
Trigger Position		Moves the trigger point for the specified channel—it can be moved up, down, left, or right

3.1.3 Main Body

The main body of the screen generally contains the test meter and/or test information. Content will vary depending on the module you are using.

- Component Tests
- Component Information
- Multimeter and Scope

3.1.4 Status Bar

The status bar is located at the bottom of the screen. This non-selectable display area contains the test vehicle identification, battery/power status, date and time.

3.2 Making Selections

Use the following instructions to navigate the interface and make selections.

For related information, see “Toolbars” on page 6.



To make selections:

1. Highlight a button, menu option or window.
2. Press **Y/✓** to select.



To navigate the main body of a screen:

- Press the Thumb Pad arrows.



To exit a selection

- Press **N/X**.

3.3 Navigating Multi-Window Screens

The main body of the screens for both Component Tests and Component Information are divided into multiple windows.

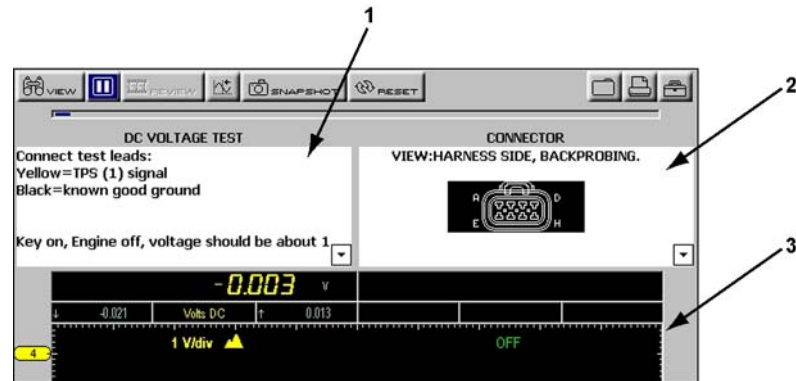


Figure 3-8 Sample Component Tests Screen

- 1— Test Procedure window
- 2— Support window
- 3— Test Meter window



To select a window:

1. Use the down ▼ arrow to move from the upper toolbar.
2. Select a main body window.

When selected, the background and title text of the window change colors (Figure 3-9)

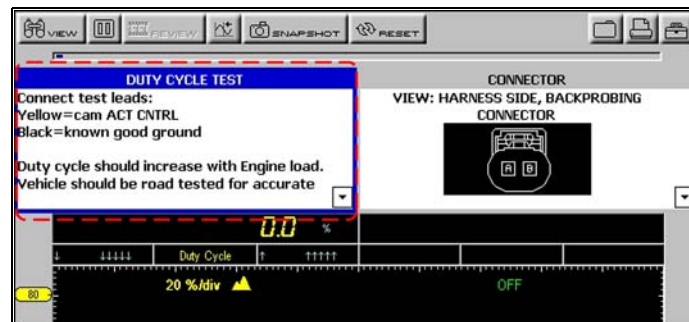


Figure 3-9 Sample selected test window



To deselect a window:

- Press **N/X**.

When deselected, the background and title text of the deselected window change colors.



To view additional information:

- Press the up ▲ or down ▼ arrow in the selected window (Figure 3-10) to display more information.

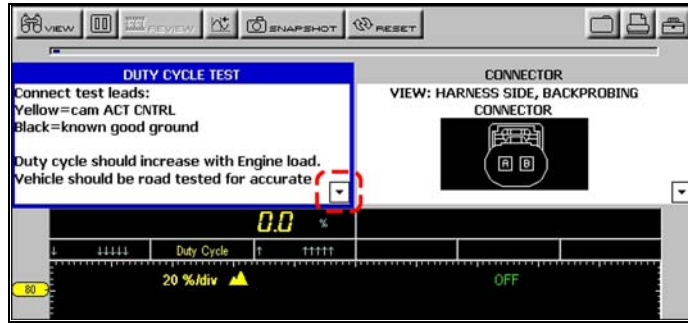


Figure 3-10 Thumb Pad instruction indicating more information



NOTE:

When the arrow button displays in some windows, selecting it expands the window vertically (Figure 3-11).

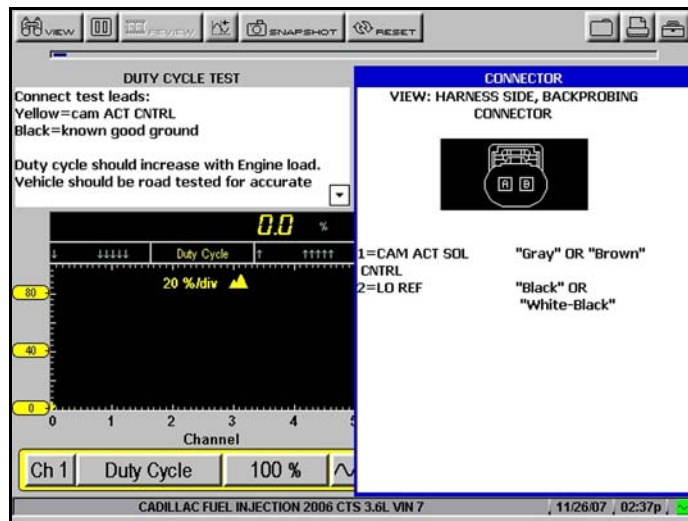


Figure 3-11 Sample Support window expanded



To exit a screen:

- Press **N/X** from any window until you return to the main menu.

This section describes features that are accessible from the **Component Tests** button.

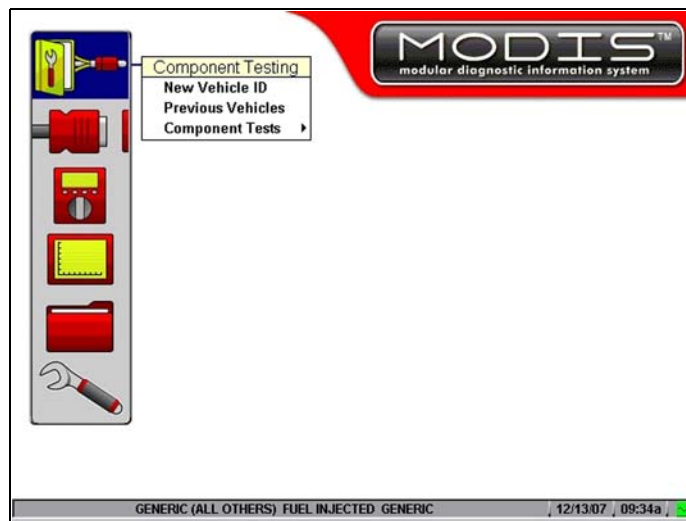


Figure 4-1 Sample main menu

The Component Testing menu (Figure 4-1) provides the following options:

- Previous Vehicles
- Component Tests
- New Vehicle ID

4.1 Component Tests

The following is an outline of basic component testing operations.

1. **Identify the vehicle**—Identify the test vehicle or select from a list of previously-identified vehicles. See “Identifying the Test Vehicle” on page 13.
2. **Select a component test**—Select a vehicle-specific component for testing. See “Selecting a Component Test” on page 15.
3. **Connect to the vehicle**—Follow the on-screen instructions to connect the MODIS™ unit to the vehicle. See “Connecting to a Test Vehicle” on page 17.
4. **Perform the test**—Follow the on-screen instructions to set up, test, and evaluate test results. See “Performing Tests” on page 17.

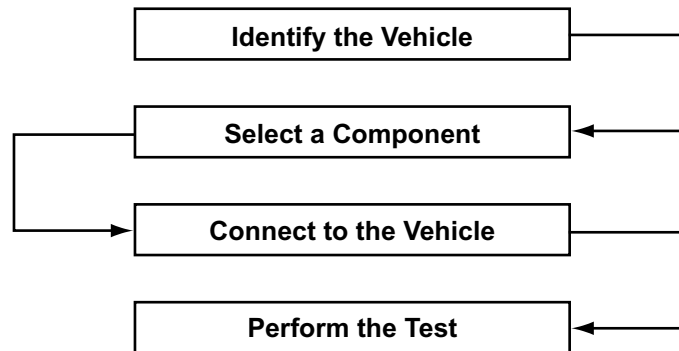


Figure 4-2 Basic operations

4.2 Identifying the Test Vehicle

Component tests vary according to vehicle and system. Before you can a list of available component tests, you must identify a specific vehicle system.

Two options are available for identifying a vehicle:

- New Vehicle ID
- Previous Vehicles

4.2.1 New Vehicle ID

The **New Vehicle ID** option requires that you make selections from a series of menus to identify the vehicle to be tested.



To identify a new test vehicle:

1. From the main menu, select **Component Tests > Component Testing > New Vehicle ID** (Figure 4-2).

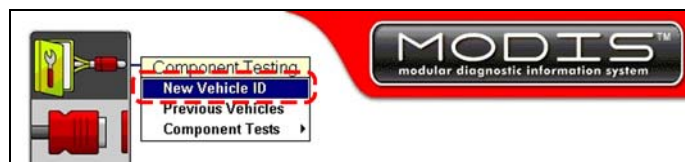


Figure 4-3 Sample New Vehicle ID selected

The Region menu displays (Figure 4-3).



Figure 4-4 Sample Region menu

2. Select the region.
3. Select a manufacturer.
The System Type menu displays (Figure 4-5).

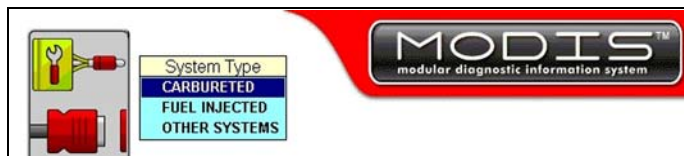


Figure 4-5 Sample System menu

4. Select a system.
5. Continue to select from the menus to complete the vehicle identification.
If you need to change a selection, press the left ◀ arrow to go back one step at a time.



NOTE:

As you make selections, vehicle identification data displays in the Status bar (Figure 4-6) at the bottom of the screen.

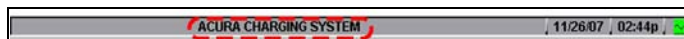


Figure 4-6 Sample Vehicle Identification data

When you have finished identifying the vehicle, a confirmation message displays (Figure 4-7).

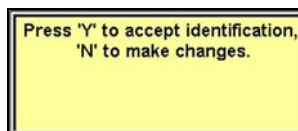


Figure 4-7 Sample Vehicle ID confirmation message

6. Follow the on-screen instruction.



To exit New Vehicle ID:

- Press Y/✓ anytime during the ID process to return to the main menu.

4.2.2 Previous Vehicles

When testing a vehicle that has already been identified, the **Previous Vehicles** menu option provides access to the Load Vehicle Identification screen. The MODIS™ unit automatically saves the last ten vehicle identifications and lists them on this screen.



To load a previously-identified vehicle:

1. Select **Component Tests > Component Testing> Previous Vehicles**.
The Load Vehicle Identification screen displays (Figure 4-8).

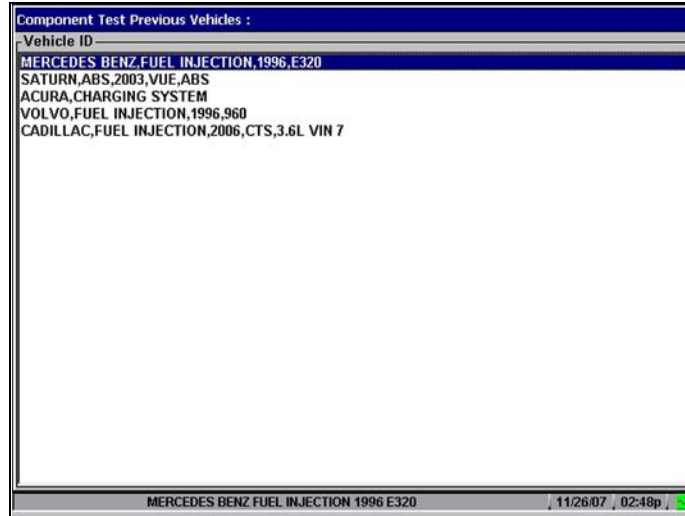


Figure 4-8 Sample Load Vehicle Identification screen

2. Select an **ID** from the list.



To exit the Load Vehicle Identification screen:

- Press **N/X** to return to the main menu and keep the current vehicle identification setting.

4.3 Selecting a Component Test

Once a test vehicle is identified, you can select from the Component Tests menu.

The main body (Figure 4-11) of the test screen can contain the following sections:

- **Test Procedure window**—contains connection and testing procedures.
- **Support window**—contains support information, such as connector illustrations.
- **Test Meter window**—functions as a Graphing Meter, Digital Meter, or Lab Scope, depending on the selected test.



To select a component test:

1. Select **Component Tests > Component Testing> Component Tests**.
The Component Tests menu displays the available components for the identified test vehicle (Figure 4-9).

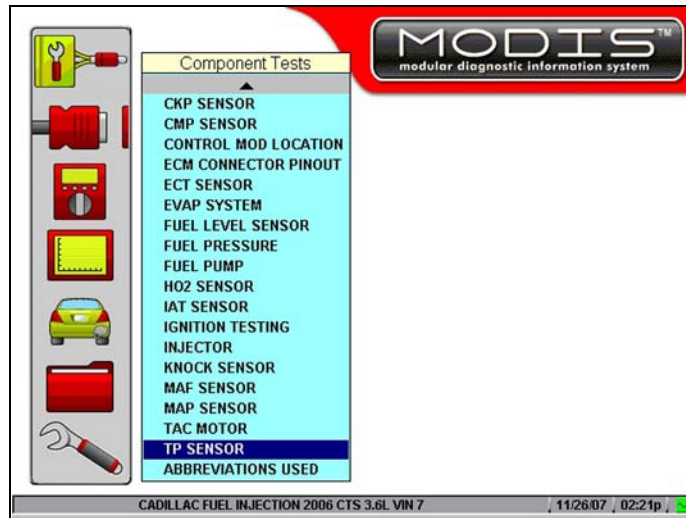


Figure 4-9 Sample Component Tests menu

2. Select a component.
A Tests menu displays (Figure 4-10).

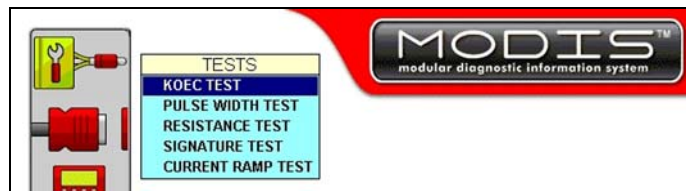


Figure 4-10 Sample TESTS menu

3. Select a test.
The Test screen displays (Figure 4-11).

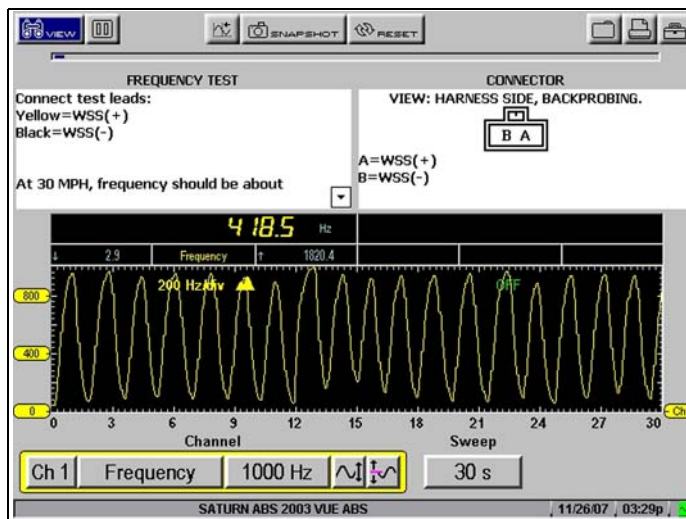


Figure 4-11 Sample Component Test screen

**To exit Component Tests:**

- Press **N/X** anytime during the Components Test selection process to return to the main menu.

4.4 Connecting to a Test Vehicle

Certain component tests require the use of specific leads that connect your MODIS™ unit to a component on the test vehicle.

**NOTE:**

For additional leads and connection information refer to your *Lab Scope Plug-in User Manual*.

The initial test screen displays connection information.

**To connect to a test vehicle:**

- Follow the on-screen connection instructions (Figure 4-12).

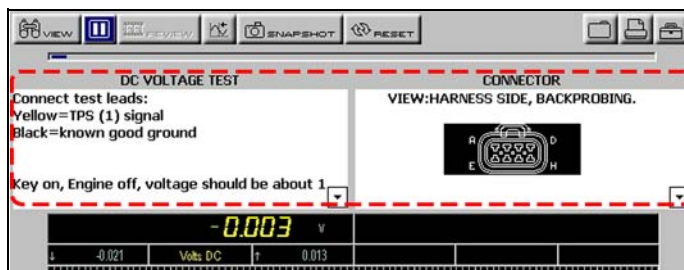


Figure 4-12 Sample connection instructions

4.5 Performing Tests

After connecting the MODIS™ unit to the test vehicle, proceed with component tests.

**To perform component tests:**

1. Select the Test Procedure window.
2. Use the Thumb Pad to scroll through the setup instructions.

Instructions display in the Text Procedure window, accompanied by illustrations in the Support window (Figure 4-13).

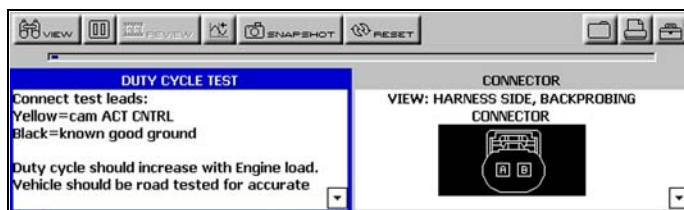


Figure 4-13 Sample setup instructions

3. Press the down ▼ arrow to advance to the next panel of instruction as needed.

4. Follow the on-screen procedures as needed.
5. View and verify the test results as explained on-screen (Figure 4-14).

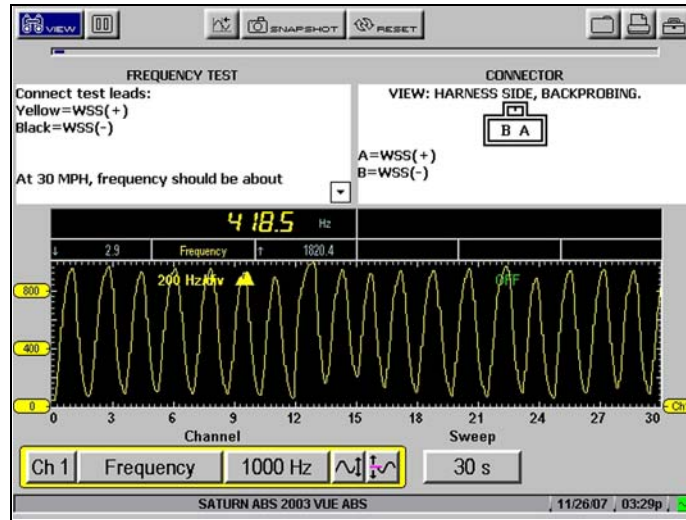


Figure 4-14 Sample test results

4.5.1 Changing Views

The **VIEW** button lets you change the way data displays. Available menu options depend on the selected test.



To change screen views:

1. Select **VIEW**.
A dropdown menu displays (Figure 4-15).



Figure 4-15 Sample VIEW menu

Menu selections vary by test and include either:

- **RPM, Digital, and Full Screen,**
or
- **Full Digital, Full Graph, Split Screen, and Full Screen.**

2. Select an option from the drop-down menu.
The screen changes to reflect your selection (Figure 4-18 through Figure 4-21).

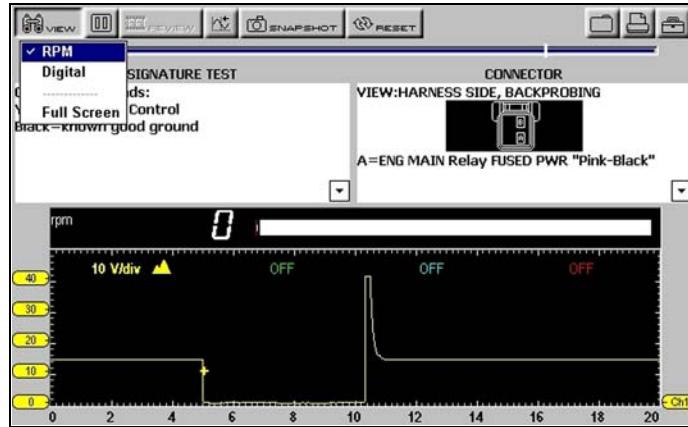


Figure 4-16 Sample RPM view

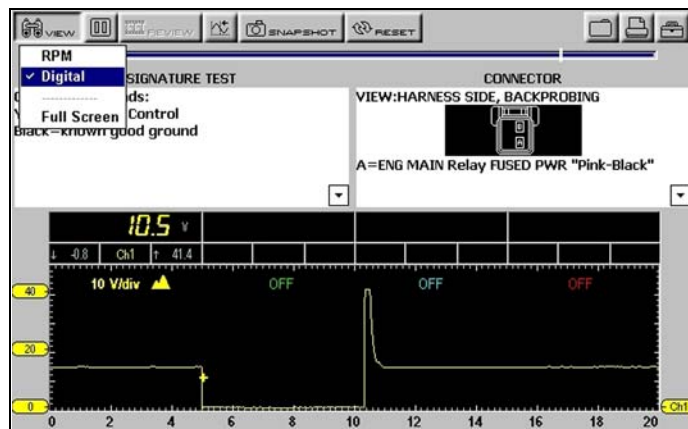


Figure 4-17 Sample Digital view

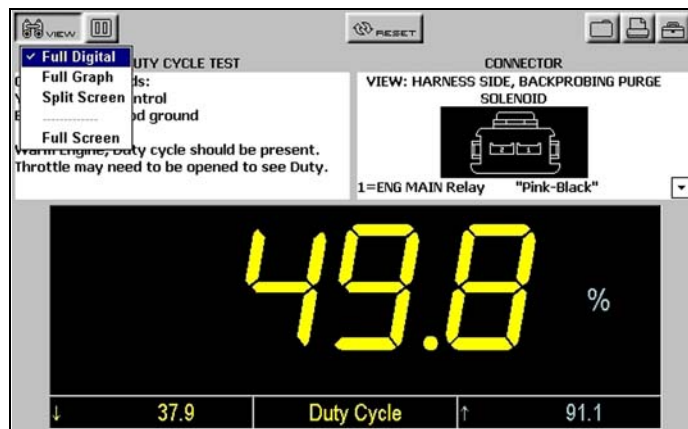


Figure 4-18 Sample Full Digital view

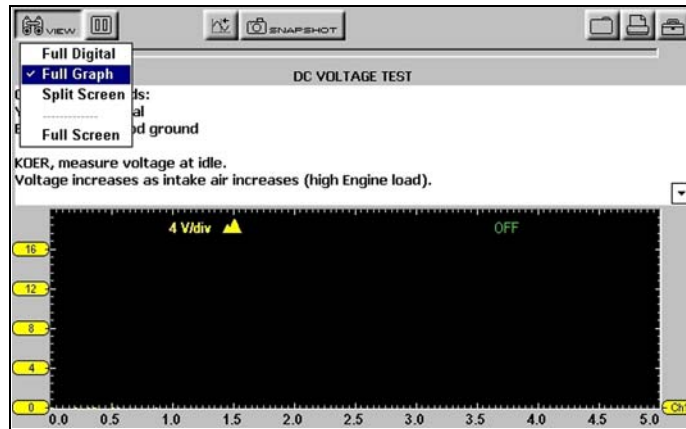


Figure 4-19 Sample Full Graph view

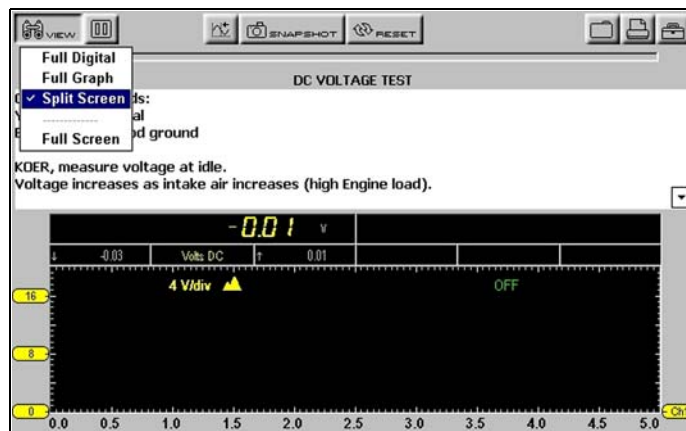


Figure 4-20 Sample Split Screen view

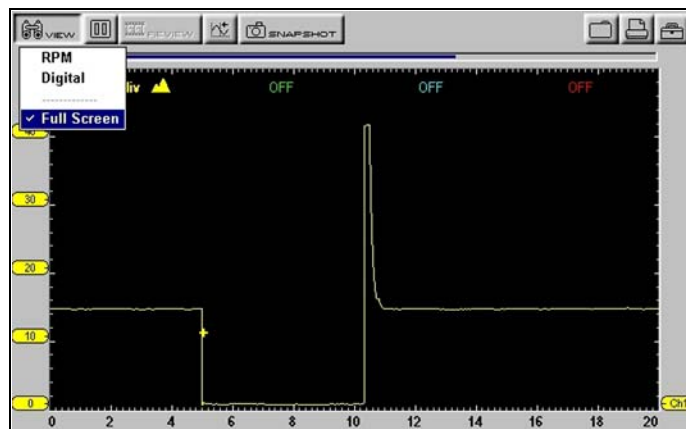


Figure 4-21 Sample Full Screen view

4.5.2 Pausing Data

The **Pause** button (Figure 4-22) stops data collection and lets you review data. The screen can be paused at any time.



Figure 4-22 Freeze button

**To pause test screen data:**

- Press the **Pause** button (Figure 4-22).

The data is paused on-screen for review, and the following three upper toolbar controls also change (Figure 4-23):

- The **Play** button replaces the **Pause** button.
- The **REVIEW** button is active.
- The **ZOOM** button replaces the **SNAPSHOT** button.
- The Position Indicator displays in the Data Buffer.



Figure 4-23 Sample “frozen” upper toolbar

- 1— Play button
- 2— REVIEW button
- 3— ZOOM button
- 4— Position Indicator

**To release paused data:**

- Press the **Play** button.

Live data displays and the toolbar controls revert to their original state.

4.5.3 Reviewing Data

The **REVIEW** button is used with the Thumb Pad to review paused data.

The Position Indicator (Figure 4-23) displays the position of the current frame.

- Zero denotes the frame when the data was paused.
- Frames captured before pausing are negative (–); frames captured after are positive (+).

There are two ways to review frozen data:

- Manually
- Automatically

**To manually review data:**

1. Select the **Pause** button.
2. Select the **REVIEW** button.
3. Use the right ► and left ◀ arrows to review data one frame at a time.
4. Use the up ▲ and down ▼ arrows to review data a fraction of a frame at a time when possible.

**NOTE:**

You can not review fractions of frames in the Ignition Scope.

**To automatically scroll paused data:**

1. With the **REVIEW** button selected, press **Y/✓** again to display the menu of scroll options. (Figure 4-24)

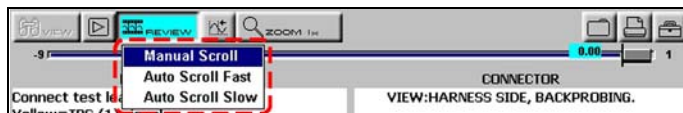


Figure 4-24 Sample scroll options

2. From the **REVIEW** menu, select an **Auto** option.
 - Auto Scroll Fast automatically scrolls the paused data at full-speed.
 - Auto Scroll Slow automatically scrolls the paused data at half-speed.
3. Press **N/X** to close the menu.

The Position Indicator (Figure 4-23) displays the position of the current frame. Zero (0) represents the frame when data collection was paused. Frames captured before pausing are negative (-); frames captured after pausing are positive (+).

4.5.4 Using Zoom

The **ZOOM** button (Figure 4-25) lets you change the magnification of frozen data and appears in place of the **SNAPSHOT** button when data collection is paused.

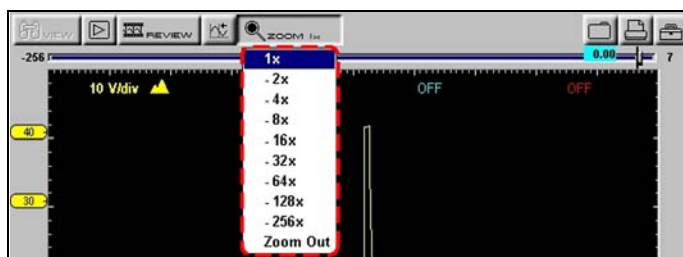


Figure 4-25 Sample zoom drop-down menu

**To zoom frozen test screens:**

1. Select **ZOOM**.
A dropdown menu displays (Figure 4-25).
2. Select an option from the menu.
The screen changes to reflect your selection and the on-screen Zoom Cursor Line displays (Figure 4-26).

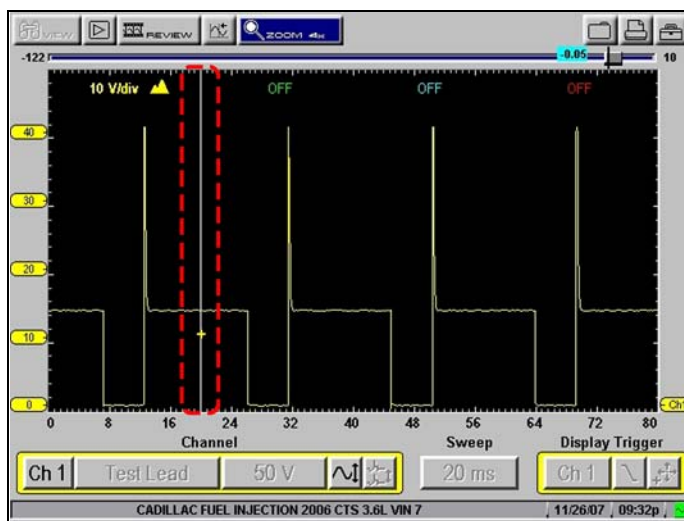


Figure 4-26 Zoom cursor line

3. To see a point of interest in detail:
 - a. Select **REVIEW**.
 - b. Use the left ◀ and right ▶ arrows move the Zoom Cursor Line to the point of interest.
 - c. Select **ZOOM** > 1x.

4.5.5 Using Cursors

The **Cursors** button (Figure 4-27) lets you make digital amplitude, frequency, and time measurements of frozen waveforms. On live data, cursors can be used as reference points and to make frequency and time measurements.



Figure 4-27 CURSORS button



To use the cursors:

1. Select **Cursors**.
Two vertical cursor lines display on-screen (Figure 4-28).

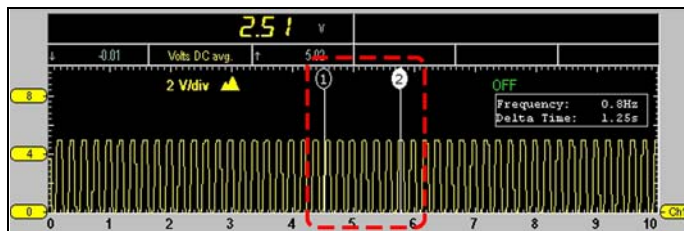


Figure 4-28 Sample cursors

2. Press the right ▶ and left ◀ arrows to move the selected cursor line.
3. Press **Y/✓** to change the active cursor.

4. Press **N/X** when you are finished setting cursors.
A confirmation message displays asking how you want to proceed using cursors.
5. Press **Y/✓** or **N/X** as desired.

**NOTE:**

Digital amplitude measurements only display when the screen is in pause mode.

**To turn cursors off:**

1. Select **Cursors**.
2. Press **N/X** twice.
The cursor lines disappear.

4.5.6 Taking Snapshots

The **SNAPSHOT** button lets you capture data before and after a problem occurs while driving.

**To take a snapshot:**

1. Select the **SNAPSHOT** button.
A dropdown menu displays (Figure 4-29).



Figure 4-29 Sample **SNAPSHOT** menu

2. Select **Manual**.
The **SNAPSHOT** button blinks, indicating that Manual Snapshot mode is ready for use.
3. Press **Y/✓** to take a snapshot.
The Collecting Snapshot message displays, indicating that Snapshot data is being collected (Figure 4-30).



Figure 4-30 Sample Collecting Snapshot message

When the Snapshot finishes saving, a final confirmation message displays.

When the confirmation message disappears, you are returned to the test screen with the blinking **SNAPSHOT** button still armed.

4. Stop using **SNAPSHOT** by pressing **N/X**.

**NOTE:**

The saved snapshot can be retrieved from Saved Data. Refer to the *MODIS™ Display User Manual* for Saved Data operating details.

Changing Snapshot Settings

You can set up a snapshot in the following ways:

- **Adjust the size**—snapshots can store a lot of frames and use a lot of memory, or store fewer frames and use less memory.
- **Adjust the percentage after trigger**—snapshots can be between 10% and 90% data captured after triggering.
- **Save to different locations**—snapshots can be saved to the MODIS™ internal memory or to the CF card in the top slot.



To change snapshot settings:

1. From the main menu, select **Utilities > Tool Setup > Save Data**.
The Save Data dialog box displays (Figure 4-31).



Figure 4-31 Sample Save Data dialog box

2. Select the **% After Trigger** drop-down menu.
The lower the percentage selected, the smaller the file size.
3. Open the **My Data** drop-down menu and select a location to save the file to.
4. Open the **File Type** drop-down menu and select the format for saving image files.
5. Press **N/X** to close the dialog box.

4.5.7 Resetting Gauges

The **RESET** button (Figure 4-32) returns the recorded digital gauge minimum and maximum values to zero.



Figure 4-32 Sample RESET button

Use the **RESET** button to do the following:

- Track the variation in a component or circuit under a certain condition. If the condition changes, **RESET** lets you start tracking again to see the change.
- Verify a connection problem is fixed by looking for a dropout or spike in the min/max values.

▶ **To reset the min/max digital values:**

- Select **RESET**.
A confirmation message displays (Figure 4-33).

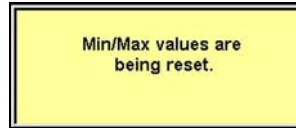


Figure 4-33 Sample Reset confirmation message

When the reset is complete, the confirmation message disappears.

4.5.8 Saving Data

The **Save** button lets you store data in memory.

▶ **To save data:**

1. Select the **Save** button to open a dropdown menu (Figure 4-34).



Figure 4-34 Sample TESTS screen SAVE menu

2. Select an option:
 - **Save Movie**—saves all data in the buffer.
 - **Save Frame**—saves only the visible screen data.
 - **Save Preset**—saves only Scope tool screen configurations used for future testing.
 - **Save Image**—saves the visible screen as a graphic image.

The Setup Saved Data Notation dialog box displays (Figure 4-35).

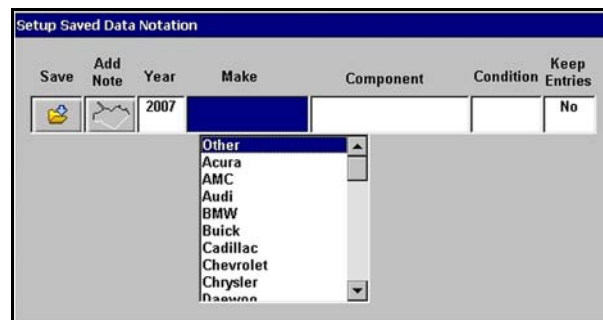


Figure 4-35 Sample Setup Saved Data Notation dialog box

3. Select from the menus to set preferences as necessary.

The Setup Saved Data Notation dialog box works the same as the Edit Saved Data Notation dialog box found in the Saved Data mode. Refer to the *MODIS™ Display User Manual* for operating details.

**NOTE:**

If you plan to save many screens from the same vehicle, select **Yes** for **Keep Entries**. This preference retains your settings the next time you select **Save**.

- When you are finished setting preferences, select the **Save** icon.
A confirmation message displays with saved data retrieval instructions (Figure 4-36).

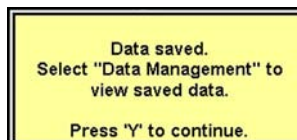


Figure 4-36 Sample Data saved confirmation message

- Press **Y/✓** to close the confirmation message.

4.5.9 Printing

The **Print** button lets you print the displayed screen. Print menu options vary depending on your selected component and mode. You can print the full screen or individual sections in full screen format (Figure 4-37).



Figure 4-37 Sample test screen print menu

**NOTE:**

Selecting Inverse Colors from the Setup button menu before selecting a print option reduces the amount of ink used by your printer.

**To print:**

- Select the **Print** button (Figure 4-37).
A drop-down menu displays.
- Select a print option and press **Y/✓**.
The screen prints according to your printer settings. Refer to the *MODIS™ Display User Manual* for printer setup details.

**NOTE:**

If you print using the infrared output on the top of the MODIS™ unit, make sure it is pointed at the infrared input of the printer and that there is nothing in between them.

4.5.10 Using Setup

The **Setup** button (Figure 4-38) lets you change the way information displays.

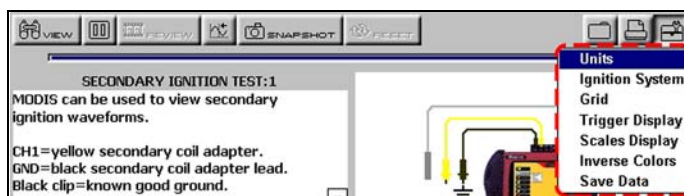


Figure 4-38 Setup button menu sample



To use setup:

1. Select the **Setup** button.
A dropdown menu displays.
2. Select one of the following options:
 - Units
 - Grid
 - Trigger Display
 - Scales Display
 - Inverse Colors

Units

Selecting **Units** opens the Units dialog box (Figure 4-39) which lets you change the displayed units of measurement for vacuum, pressure, and gas concentration.

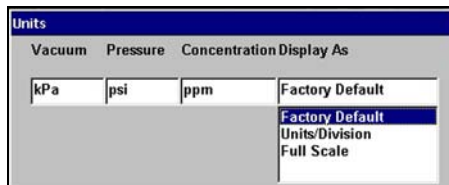


Figure 4-39 Sample Units dialog box

The **Display As** dropdown menu sets how the scale units display on the Scale button and in the Channel Status area.

There are three Display As scale unit options:

- **Factory Default**—the Channel Status area displays the Units/Division for all active channels and the Scale button displays the full scale value.
- **Units/Division**—the scale value for a major grid division is displayed in the Channel Status Area and the Scale button.
- **Full Scale**—the scale value for the whole grid is displayed in the Channel Status Area and the Scale button.



NOTE:

The Units dialog box can also be accessed from the Utilities menu located on the Tool Setup submenu as described in the *MODIS™ Display User Manual*.



To change units:

1. Select **Setup > Units**.
The Units dialog box displays.
2. Change the unit values as needed.
3. Press **N/X** to close the dialog box.

Grid

Select **Grid** to displays the background grid pattern on all graphing test screens.



To turn the grid on:

- Select **Setup > Grid**.
A grid appears in the background of the test area (Figure 4-40).

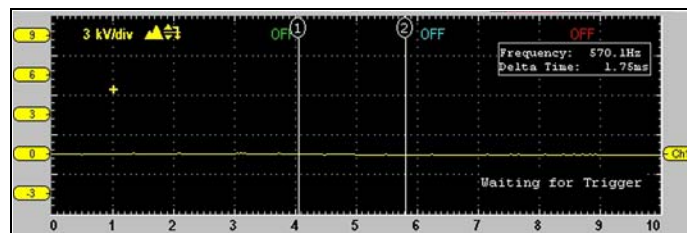


Figure 4-40 Sample grid

Trigger Display

Select **Trigger Display** to turn on the Trigger position values located in the bottom right corner of the test area (Figure 4-41).



NOTE:

The Trigger Display option is not available in all tests.

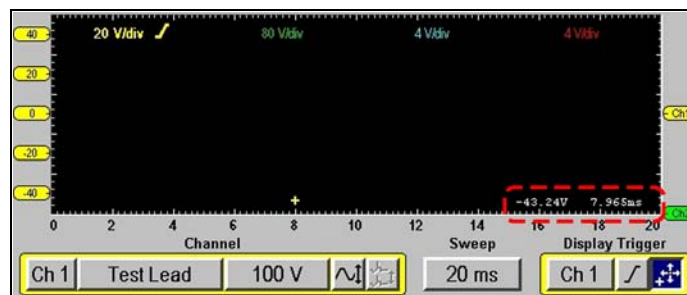


Figure 4-41 Sample Trigger Display

When Trigger Display is not selected, trigger position values only display when the trigger position button is selected on the lower toolbar.



To display trigger values:

- Select **Setup > Trigger Display**.

The Trigger values display in the bottom right corner of the test area (Figure 4-41).

Scales Display

Select **Scales Display** to display the scale values on the graph.



To turn Scales Display on:

- Select **Setup > Scales Display** (Figure 4-42).

The scale values appear along the X (horizontal) and Y (vertical) axis of the graph (Figure 4-42).

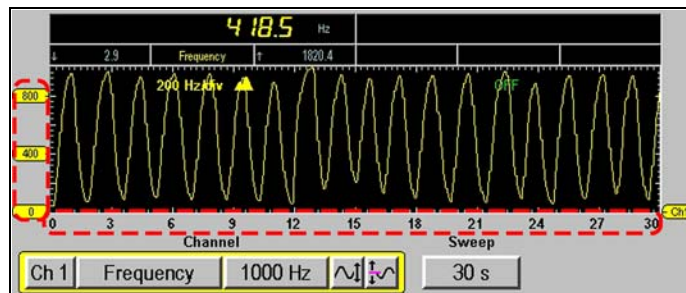


Figure 4-42 Scales Display menu selection sample

Inverse Colors

Selecting **Inverse Colors** changes the color scheme. This feature is useful for reducing the amount of ink used when printing.



To change the color scheme:

- Select **Setup > Inverse Colors**.

The color scheme changes (Figure 4-43).

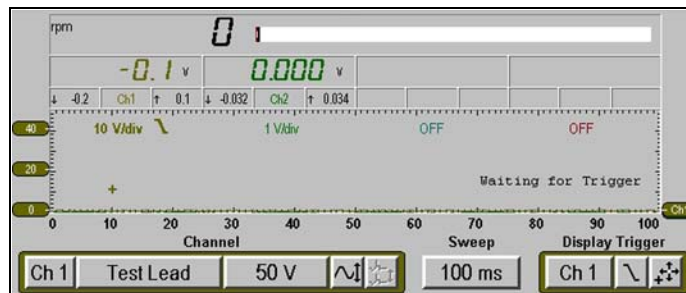


Figure 4-43 Inverse Colors menu selection sample

4.5.11 Calibration LED

When you select a Diode, Continuity, Ohms or Pressure transducers test, a message displays with calibration instructions (Figure 4-44).

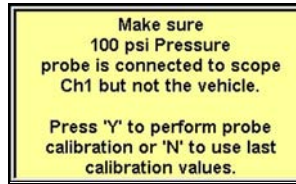


Figure 4-44 Sample calibration procedure message

When the test screen displays, the **LED** (Figure 4-45) on the toolbar indicates the channel calibration status:

- **Green**—calibrated
- **Red**—not calibrated (using previous calibration values)



Figure 4-45 Sample calibration LED

4.5.12 Adjusting Channel Settings

The Channel control bar (Figure 4-46) lets you adjust channel settings and viewing characteristics for the selected trace.

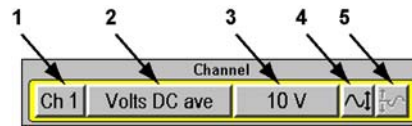


Figure 4-46 Sample Channel control bar

- 1— Channel Number
- 2— Probe
- 3— Scale
- 4— Signal Zero Offset
- 5— Threshold

Channel Number

The **Channel Number** button lets you select channel options.

- Channel One (1) is automatically displayed and cannot be turned off.
- Channel Two through Four (2-4) can be manually selected for display.

The following channel options are available:

- **Displayed** makes a channel's signal visible.
- **Inverted** flips the selected waveform upside-down. This is typically used when testing secondary ignition or displaying waveforms from the Low Amps Probe.

- **Coupling AC** subtracts the average value of a waveform to see small variations, which is ideal for viewing alternator ripple or fuel pump amps. This blocks the DC portions of an input signal in order to amplify the AC portions without driving them off the center of the screen.
- **Peak Detect** captures fast events, spikes and glitches for signals going in both positive and negative directions.
- **Filter** minimizes unwanted noise in the Graphing Meter.
- **Auto Find** picks the best scale to fit the selected signal pattern on the screen. If run on the same channel as the trigger, the trigger level is set halfway between the minimum and maximum values of the waveform.

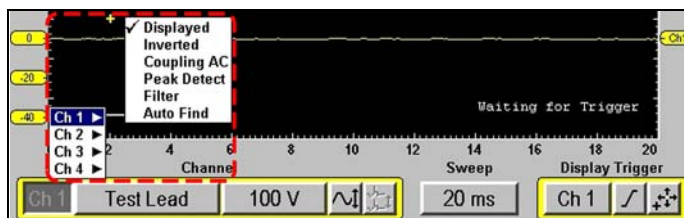


Figure 4-47 Sample Channel Number menus



NOTE:

When testing with the Single Cylinder Ignition scope, the Channel 1 Peak Detect option cannot be turned off.



To display a different Channel:

1. Select the **Channel Number** button from the Channel control bar.
The channel setup menu displays.
2. Select **Ch 2 (or Ch3, or Ch4) > Displayed**.
The Channel Two (Channel Three, or Channel Four) trace displays on-screen and a check mark displays next to the Displayed option in the Channel attribute menu. The check mark indicates that channel is on.
3. Select additional channels and a corresponding Displayed attribute, when available.
4. Press **N/X** to close the menu.



To change channel setup:

1. Press the **Channel Number**.
The channel setup menu displays.
2. Select the channel you want to change (**Ch 1–Ch 4**).
3. Select the Peak Detect or Filter channel setup option.

Probe

The **Probe** button lets you select a different test (Figure 4-48).

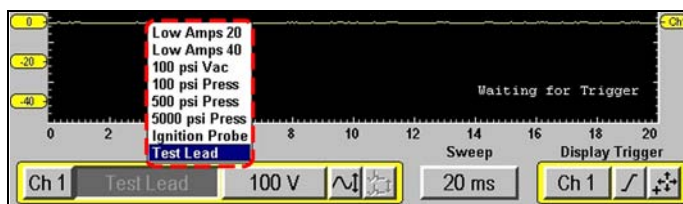


Figure 4-48 Sample Probe menu

**To select a different test:**

1. Select the **Probe** button.
The Probe menu displays.
2. Select an option.
The **Probe** button changes to indicate your selection.

Scale

The **Scale** button displays the current units of measurement for the channel. Scales can be adjusted for each channel.

**To select a measurement scale:**

1. Select the **Scale** button.
The Scale menu displays (Figure 4-49).

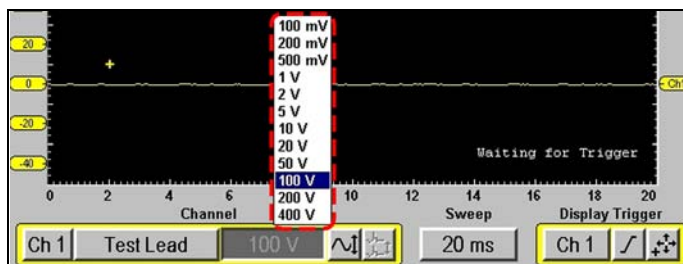


Figure 4-49 Scale menu sample

2. Select an option.
The **Scale** button and the waveforms on-screen change to reflect your selection.

Signal Zero Offset

The **Signal Zero Offset** button moves the selected channel's zero (0) position up or down within the test display area.

**To move a channel's zero position:**

1. Select the **Signal Zero Offset**.
The button changes appearance to indicate that the function is selected (Figure 4-50).

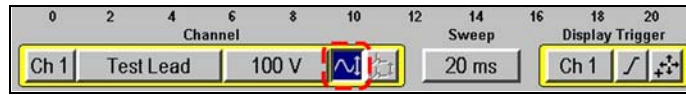


Figure 4-50 Sample Signal Zero Offset selection

2. Press the up ▲ or down ▼ arrows as needed to move the zero point.
If you have the Scales Display setting on, you see the scale move along the left side of the screen along with your selected channel waveform; otherwise, you only see your selected channel waveform move on-screen.
3. Press **N/X** to exit the Signal Zero Offset function.

Threshold

The **Threshold** button changes the reference point on the waveform and is only used for calculating measurements like Frequency, Duty Cycle, MC Dwell and Pulse Width.

There are two threshold options:

- **Auto Threshold Select (ATS)**—automatically picks a threshold level in the middle of the range in which the waveform travels. ATS defaults to a falling edge.
- **Manual Threshold Select (MTS)**—lets you manually pick a signal level and direction (rising or falling) to be used as a reference point. This is typically used if ATS picks a level that does not give the desired result.



To change the threshold level:

1. Select **Threshold**.
The Threshold menu displays (Figure 4-51).

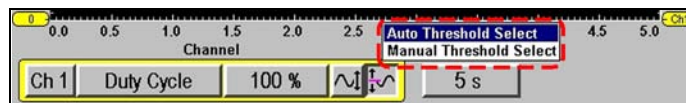


Figure 4-51 Threshold menu sample

2. Select an option.



To use the Manual Threshold option:

1. Select **Threshold > Manual Threshold Select**.
The Manual Threshold Select dialog box displays (Figure 4-52).

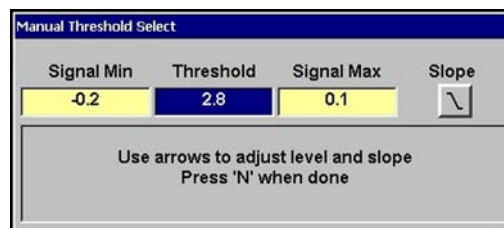


Figure 4-52 Sample Manual Threshold Select dialog box

The Signal Min and Max display to the left and right of the Threshold value for reference. Measuring the Min and Max may take a few seconds.

2. Change the Threshold value and the Slope, as needed.



NOTE:

Threshold can only be changed to a value that is between the Min and Max of the signal.

3. Press **N/X** to exit the dialog box.

4.5.13 Setting the Sweep Time

The **Sweep** button on the lower toolbar sets the amount of time data displays across the screen from left to right.



To set the sweep time:

1. Select **Sweep**.
A dropdown menu displays (Figure 4-53).

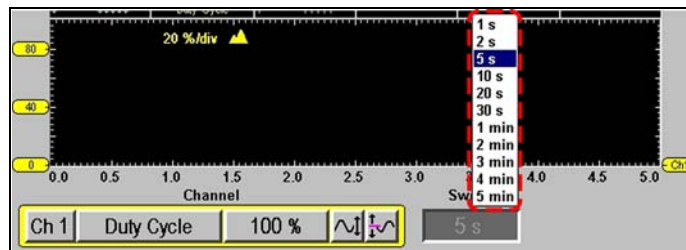


Figure 4-53 Sample Sweep menu

2. Select an option.



NOTE:

Sweeps shorter than 1 second will collect some frames after the **Pause** button is selected. The faster the Sweep, the more frames will be collected.

4.5.14 Setting the Trigger

Use the Trigger control bar (Figure 4-54) to set the criteria to start the display of data.

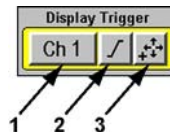


Figure 4-54 Sample Display Trigger control bar

- 1— Trigger Type
- 2— Slope
- 3— Trigger Position

Trigger Type

Select **Trigger Type** to set the criteria used to start the display of data. Available Trigger Type menu options include the following:

- **None** displays data as it is collected.
- **Ch 1-4** triggers the display based on the signal from the selected channel. Available submenu options include:
 - **Ch 1-4** triggers the display based on the signal from the selected channel. Available submenu options include:
 - **Auto** updates the screen when the signal crosses the trigger threshold in the selected direction (rising or falling).
Even if the signal does not cross the trigger threshold, the screen automatically updates after a short period so you can see the waveform, which lets you set a threshold to optimize viewing.
 - **Normal** updates the screen when the signal crosses the trigger threshold in the selected direction (rising or falling).
If the signal does not cross the trigger threshold, the screen does not update, which lets you capture intermittent events. The screen only updates when the signal meets your trigger selection.
 - **Cyl** triggers the Lab Scope from the RPM lead signal. You can only adjust the time offset for this trigger type.



To select a trigger type:

1. Select the **Trigger Type** button.
A dropdown menu displays (Figure 4-55).

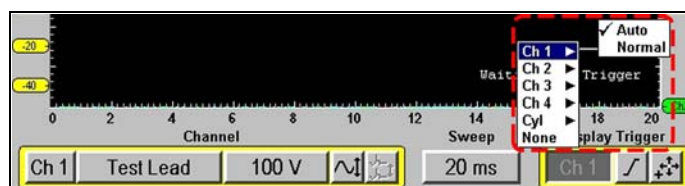


Figure 4-55 Sample Trigger Mode menu

2. Select an option.
With the exception of **None**, a submenu displays.
3. Select **Auto** or **Normal** from the submenu.
 - If a Channel trigger (Ch1–4) is selected, a plus-sign (+) colored according to the channel it represents displays in the graph area (Figure 4-56).

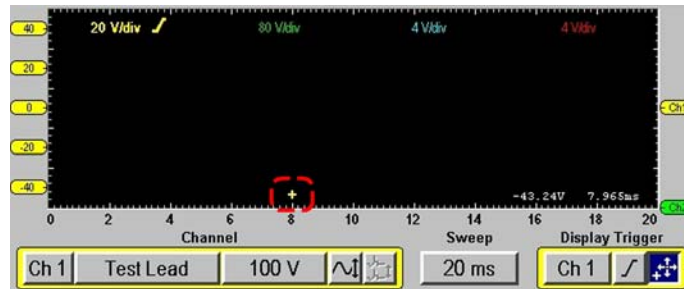


Figure 4-56 Sample channel trigger position marker

- If the Cyl trigger is selected, a white plus-sign (+) displays along the bottom of the graph area which represents the point in time and the level at which a cylinder will be triggered (Figure 4-57).

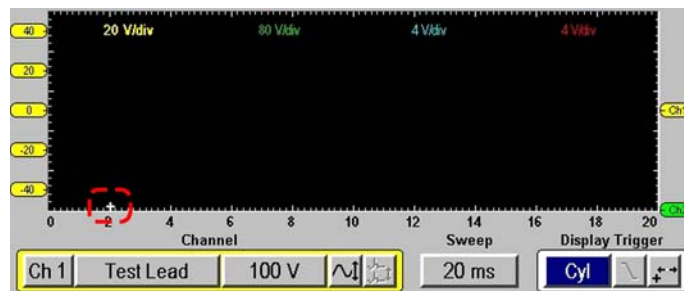


Figure 4-57 Sample Cyl Trigger Position marker

4. When you are finished setting the trigger modes, press **N/X** to close the menu.



NOTE:

If you want to save the triggered event displayed on-screen, do not press Pause because that will show you data in the data buffer and the triggered event you are looking at may no longer be there if the buffer has wrapped.



To save a triggered event:

1. Make sure a Display Trigger is set.
2. Wait for a triggered event to display.
3. Select **Save > Screen**.

Trigger Slope

The **Trigger Slope** button selects the direction the waveform must be going (rising or falling) when crossing the trigger point.



NOTE:

This button is only available when a **Channel** is the active trigger type.

Trigger Position

The **Trigger Position** (Figure 4-58) button is used for moving the trigger point for a specified channel either along the X (horizontal) or Y (vertical) axis of the display.



To move the trigger point:

1. Select **Trigger Position**.

The trigger point marker becomes active (Figure 4-58).



Figure 4-58 Sample Trigger Position button

2. Use the Thumb Pad to move the on-screen marker and select a new Trigger point.
3. When you are finished, press **N/X** to release the button
The button reverts to its original state to indicate that the button function is inactive.

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