



# DriveSync / TrimSync Diagnostics Kit Instructions

## Diagnostic Software and Driver Installation

Diagnostic software requires a serial terminal emulator and a USB to Serial driver to enable connectivity to a Windows 7 or later computer. The computer must have at least one available USB port. MDC provides the USB to serial cable that is used for the diagnostics. These instructions apply to DriveSync and TrimSync version 8.0 and later.

### USB to Serial Driver Install (not required when using the Bluetooth Adapter)

Windows 7 and Windows 10 require additional drivers to enable the USB to serial cable interface. Please open the provided USB flash drive and click on "PL2303 Windows Driver Manual v1.23.0.pdf" and follow the Windows instructions. You will need an Adobe Acrobat compatible viewer or browser, which is available as a free download from Adobe, if not already installed. Alternatively, you can download the Windows Prolific USB Serial Driver from the Internet.

### Diagnostic Terminal Software Install

Diagnostics also requires a serial terminal program called RealTerm. This software is open source has been included on the USB flash drive.

1. Insert the MDC flash drive and click on the drive to open it.
2. Double-click on the file named "**Realterm\_3.0.1.44\_Setup.exe**"
3. Windows may ask your permission to allow this app to make changes, please click on YES
4. The Realterm install guide window will open, click NEXT to continue
5. A "Choose Components" window will appear. Please select just MainSection and click on NEXT
6. The "Choose Install Location" window will appear, click on NEXT to use the default location
7. The "Choose Start Menus Folder" window will appear, click on INSTALL to use the default folder
8. Once the installation is complete you can unselect the "readme" box and click on FINISH.
9. A RealTerm Install Tour window will appear, close it by clicking the X in the top right corner.
10. Move the "**MDC Diagnostics.cmd**" file to your desktop.

### Diagnostic Port Connection

Based on the model, the diagnostic port will either be on the PCB itself or can be accessed from an external port. **BE SURE TO POWER OFF DRIVESYNC / TRIMSINC BEFORE CONNECTING THE DIAGNOSTICS CABLE.**

Locate the circular connector, remove the blue protective cap, and attach the diagnostic cable. Close any existing MDC Diagnostics windows and then connect the USB cable to your laptop.

### Diagnostic Software

To access the diagnostics, perform the following steps with the diagnostic cable connected to DriveSync / TrimSync.

1. Plug the diagnostic cable into any available USB port on your computer.
2. Double-click on the "MDC Diagnostics.cmd" file that was previously moved to your desktop.
3. A blank window like below will open.





	will not make any corrections or recall and presets. A power cycle is required to clear this mode. The logs will contain the source of the error. The LED will flash red, once for port, twice for starboard, three times for center.
FAULT	Active fault / no sender data. Could be that the boat has Mercury engines, and the ignitions are turned off. Status will return to normal once the fault is corrected. The LED will flash red, once for port, twice for starboard, three times for center.

**Move your cursor in the black section of the MDC Diagnostic window and click the left mouse button once.** You can now send any of the following commands by just typing the one letter command with no return. If the commands are not recognized, then try clicking the left mouse button again or unplug and re-plug in the USB cable.

## Function Test

After each installation, and prior to attempting a calibration a Function Test should be performed to confirm that DriveSync / TrimSync is properly connected. The Function Test will activate each trim pump in a specific order while monitoring the trim senders to make sure they are responding correctly. Each pump will run for one second in each direction. Prior to entering the command, be sure that the drives are not full up or full down and are free to move with no obstructions. **STAND CLEAR OF THE DRIVES / ENGINES DURING THIS TEST.**

Enter the “t” command to begin the Function Test. Confirm the start of the test by hitting the SPACE BAR. If the SPACE BAR is not entered within twenty seconds the test will be cancelled.

Once the test concludes, the results will be displayed. Any errors will need to be corrected prior to attempting a calibration. This test will report an error if any of the following conditions exist:

- An engine / drive moved in the wrong direction (up instead of down) indicating a wiring issue with trim pump, or improperly indexed sender.
- A sender did not correctly respond when the engine / drive was moved. Potentially a failed sender, indexing, or wiring issue.
- The wrong engine / drive moved indicating that port and starboard wiring may be reversed.

To resume the diagnostics, hit the ESCAPE key and the display will begin scrolling with the live sender values.

## Move Drive Commands

To move the engine / drives for diagnostic purposes, or for calibration, use the following commands. With each command the drive(s) will move incrementally. Please note that while the system is in calibration mode the duration of the moves is doubled. If the system has been calibrated (STATUS=IDLE) and the drives are moved above or below the range of the calibration, then the LED will change to red. This would indicate that the system was not properly calibrated. **BE SURE THERE ARE NO OBSTRUCTIONS OR PEOPLE IN THE PATH OF THE ENGINES / DRIVES.**

- “1” - PORT UP
- “2” - PORT DOWN
  
- “3” – CENTER or PORT CENTER UP
- “4” - CENTER or PORT CENTER DOWN
  
- “5” - STARBOARD CENTER UP
- “4” - STARBOARD CENTER DOWN
  
- “6” - STARBOARD UP
- “7” - STARBOARD DOWN



- “8” - ALL UP (synchronize feature will be activated if calibrated)
- “9” - ALL DOWN (synchronize feature will be activated if calibrated)
- “-” – Synchronize DOWN without first moving the drives
- “+” - Synchronize UP without first moving the drives

## Step Drive Commands

To move the engine / drives in small, increments simply hold down the SHIFT key while entering a move command from above. BE SURE THERE ARE NO OBSTRUCTIONS OR PEOPLE IN THE PATH OF THE ENGINES / DRIVES.

## Calibration Commands

To perform a calibration, use the following process. The LED MUST be flashing green before beginning this procedure. Before attempting a calibration make sure that the sender values with the engines / drives full down are between 200 and 300. Also confirm that the values increase as the engines / drives are moved up. A successful completion of the Function Test is required before a calibration will be possible.

1. Using the Move Commands, move the engines / drives to their full down position. Note that unlike the manual calibration process you can use the “8” command to move both/all at the same time.
2. Type a “n” (negative trim) and you will see a message with the saved values for negative / down.
3. Using the Move Commands, move the drives to their full up position. Once again, you can use the “7” command to move both/all up at the same time.
4. Type a “p” (positive trim) and you will see the saved values for positive / up.
5. Hit the ESCAPE key to exit and store the calibration values. NOTE: the calibration will not properly complete until the ESCAPE command is entered. The status should now be IDLE.

If the calibration completed successfully, then the LED will stop flashing and the status will change to IDLE. If the calibration failed, then the LED will flash error codes for twenty seconds and then return to flashing green. The following errors will prevent a calibration from completing. Refer to the table with the corresponding number of engines.

## TWIN ENGINES

CALIBRATION ERROR	LED STATUS	DESCRIPTION
TRIM ERROR	Solid red for 20 seconds	Up and down values are reversed. Possible causes are trim pump wiring / hydraulics, or improperly indexed senders. Run Function Test to confirm.
PORT RANGE ERROR (range value)	Flash red once every 3 seconds	Port trim sender did not have at least 250 counts between full down and full up.
STRBD RANGE ERROR (range value)	Flash red twice every 3 seconds	Starboard trim sender did not have at least 250 counts between full down and full up.



## TRIPLE ENGINES

CALIBRATION ERROR	LED STATUS	DESCRIPTION
TRIM ERROR	Solid red for 20 seconds	Up and down values are reversed. Possible causes are trim pump wiring / hydraulics, or improperly indexed senders. Run Function Test to confirm.
PORT RANGE ERROR (range value)	Flash red once every 3 seconds	Port trim sender did not have at least 250 counts between full down and full up.
CENTER RANGE ERROR (range value)	Flash red twice every 3 seconds	Center trim sender did not have at least 250 counts between full down and full up.
STARBOARD RANGE ERROR (range value)	Flash red three times every 3 seconds	Starboard trim sender did not have at least 250 counts between full down and full up.

## QUAD ENGINES

CALIBRATION ERROR	LED STATUS	DESCRIPTION
TRIM ERROR	Solid red for 20 seconds	Up and down values are reversed. Possible causes are trim pump wiring / hydraulics, or improperly indexed senders. Run Function Test to confirm.
PORT RANGE ERROR (range value)	Flash red once every 3 seconds	Port trim sender did not have at least 250 counts between full down and full up.
PORT CENTER RANGE ERROR (range value)	Flash red twice every 3 seconds	Port Center trim sender did not have at least 250 counts between full down and full up.
STARBOARD CENTER RANGE ERROR (range value)	Flash red three times every 3 seconds	Starboard Center trim sender did not have at least 250 counts between full down and full up.
STARBOARD RANGE ERROR (range value)	Flash red four times every 3 seconds	Starboard trim sender did not have at least 250 counts between full down and full up.

### Factory Reset & Restore

To perform a factory reset and erase the current calibration enter the “r” command. The LED will begin flashing green and the display will begin to scroll the live sender values. A calibration will be required, and any previously stored presets will need to be re-programmed.

### Clear Offsets

The ‘=’ command will clear any programmed trim offsets. For triple and quad engines only.

### Display Stored Values

Once calibrated and the LED is steady green, the results of the calibration and preset positions (Race Edition Only) can be recalled and displayed using the “v” VIEW command. The View command will also list the software version and factory-defined operating modes, as follows:

- Incremental Mode
- Synchronization Mode
- Fixed Calibration Mode
- Auto Retract Mode



The calibration data includes the digital sender values for full down, full up with their ranges and preset values for Race Edition. The system will not be operational while the View command is active but will automatically resume after twenty seconds. To resume operation sooner, hit the ESCAPE key.

## Preset Learn & Recall

For Race Editions versions the presets can be stored and recalled using the diagnostic port. To recall a preset, be sure the engines / drives are free of obstacles and type the corresponding position command (a,b,c,d) and they will move to the previously stored recall position.

To store a preset, move the engines / drives to their desired position using either the manual trim buttons or the Move Drive Commands.

1. Type "L" (learn) and the status will change to LEARN.
2. Type a "a", "b", "c" or "d" to assign the preset. The status will return to IDLE and the LED will flash rapidly for three seconds. NOTE: presets "c" & "d" are only available in Race Edition+ systems.

## Trim Offset Learn & Recall

Trim Offset is a factory-activated optional feature of TrimSync for triple and quad engine applications. The purpose is to have the trim for the center engine(s) offset from the outside ones to compensate for hull shape / propeller height.

Once programmed the offset will be applied whenever the engines are trimmed within the Trim Zone, which by default is +/- 5 degrees from the trim angle the outside engines were when the offset was programmed. The offsets can be programmed and cleared using the Learn Button (see the TrimSync operating instructions for this procedure), but the Trim Zone can only be changed by using the diagnostic software.

When Trim Offset is activated the Trim Zone, Trim Offset and direction (positive or negative) will appear when the Display Values "V" command is entered.

### Offset Learn

1. TrimSync must be calibrated and Status = IDLE before the offset can be programmed.
2. Move the engines to the desired trim angle (typically neutral trim) that the offset will be active and then manually adjust the center engine(s) to have a negative, or positive trim offset.
3. Enter the "o" command to program the offset. A message will appear in the diagnostic window indicating the parameters of the programmed offset.

### Clear Offset

The offsets are erased whenever a Factory Reset is performed. Alternatively, the offsets can be cleared by entering the "X" command when Status = IDLE, A message will appear to indicate the offsets have been cleared. Please note that entering the Learn command while the engines are even will also clear the offsets.

### Trim Zone Adjust

By default, the Trim Zone is +/- 5 degrees, centered around the trim angle the engines were at when the offset was programmed. The Trim Zone can be adjusted in 2 degree increments to be either larger, or smaller but using the ">" for increasing the zone and "<" to decrease the zone. A message will appear after entering the command with the new zone range in degrees and in sender counts.



## Hold Display

At times there are messages such as correction parameters and targets that scroll past the on the diagnostic window. To temporarily stop the display from scrolling enter the “h” command. The messages will stop scrolling and the LED will rapidly flash green. To resume operation, enter the “x” (escape) command. NOTE: The hold command also halts operation of the system until the escape command is entered, or twenty seconds passes.

## Error Logs

The system tracks five different error conditions for each engine / drive. The system uses the severity, frequency, and total count of the errors to determine if normal operation can continue. If an error(s) exceeds a predetermined threshold the system will enter into Standby Mode and all operations will be halted until the error condition is resolved and, in some cases, the power is cycled. To display the current error logs, enter “E” and to clear the logs enter “Q”.

To resume operation, hit the ESC (escape) key. NOTE: The display error logs command also halts operation of the system until the escape command is entered, or twenty seconds passes.

NOTES: Clearing the logs will not return normal operation if the system is in StandBy Mode.

ERROR TYPE	DESCRIPTION
LOW	One count for each time a sender value was LOWER than was recorded during the calibration for full down. This error condition will be logged once each time the ignitions are switched off on a boat with Mercury engines. This error will typically not force the system into StandBy Mode unless there are a significant number (100+) of errors between power cycles, which would indicate a sender issue.
HIGH	One count for each time a sender value was HIGHER than was recorded during the calibration for full up. This error condition will be logged once each time the ignitions are switched off on a boat with Mercury engines. This error will typically not force the system into StandBy Mode unless there are a significant number (100+) of errors between power cycles, which would indicate a sender issue.
CHANGE	Each time DriveSync / TrimSync activates a trim pump and the engine does not move quickly enough, or at all. If the number of occurrences exceed the programmed threshold then the system will enter StandBy Mode and will cease operation until the power is cycled. Normal boat trim operation will NOT be affected. Potential causes are air in the hydraulic lines, mechanical issues, weak batteries or charging system issues.
MOVE	DriveSync / TrimSync monitors the sender values whenever the system activates a trim pump. A MOVE error occurs when a sender value does not change in a direction that coincides with the trim pump that was activated. Once the error threshold is exceeded the system will enter StandBy Mode. Possible cause are hydraulic leaks or mechanical failure.
TARGET	The number of times a move did not reach its exact target. A significant number (100+) of missed targets during a single session will put the system in StandBy Mode. The total number of errors are logged but the threshold is reset each time the power is cycled.



## Command Help

A list of all available commands can be displayed by typing "?".

### DIAGNOSTIC COMMANDS

- 1 – Port Down
- 2 – Port Up
  
- 3 – Center or Port Center Up
- 4 – Center or Port Center Down
  
- 5 – Starboard Center Up
- 6 – Starboard Center Down
  
- 7 – Starboard Up
- 8 – Starboard Down
  
- 9 – All Up
- 0 – All Down
  
- + – Correct Up
- - – Correct Down
  
- a – Preset A
- b – Preset B
- c – Preset C
- d – Preset D
  
- h – Hold Display
  
- L – Preset Learn Mode
  
- n – Calibrate Down / Negative Position
- p – Calibrate Up / Positive Position
  
- R - Factory Reset
  
- t – Function Test
  
- v - Display Values
  
- E – Display Error Logs
  
- Q - Clear Error Logs
  
- ? – Command Help
  
- O – Offset Learn Mode
- X - Clear Offsets
- > - Increase Offset
- < - Decrease Offset



### LED StatuZ

LED Indicator	Operation / Condition
Constant Green	Normal operation
Slow Flashing Green	Calibration required
Constant Rapid Flashing Green	System is in hold mode, use escape(x) command from diagnostic port, or power cycle to return to normal operation.
Momentary Rapid Flashing Green after holding down the learn button and pressing a preset button	Preset Learn Accepted, position successfully stored.
Three quick Green Flashes after a Correction / Move	Target was missed, adaptive target has been adjusted.
Constant Red	If the LED turns red immediately following a calibration attempt, then the port and starboard trim pump connections are reversed. A power cycle is required to clear the fault.
Flashing Red NOTE: it is possible to have multiple errors. The flashing pattern will cycle every six seconds.	<b><u>Standby Mode Enabled</u></b> The LED will flash once for the Port engine and then add one flash for each engine.  For example, on a twin engine boat with a starboard trim failure the LED will flash twice, on a triple it will flash three times and on a quad it will flash four times.



## Calibration Issues

- The LED must be flashing green before attempting a calibration. If not, then a calibration can be forced by executing the “r” (factory reset) command.
- ALWAYS confirm that the trim pumps are properly wired using the “t” (test) command before attempting a calibration.
- Confirm that the digital sender values are greater than 150 at full down and more than 350 full up. If not, refer to the Trim Sender Indexing section. Please note that the system will not accept a calibration that has a range (full UP – full DOWN) of less than 250 counts.
- The sender values DO NOT need to be equal side-to-side for DriveSync / TrimSync to operate properly.
- While watching the trim sender values in the diagnostics window, use the Move Commands to move each engine and make sure that the port values change when you move the port drive and then check the starboard drive.
- Sterndrive trim senders do not have windings for 360 degrees, so it is important to confirm that there is a signal when the drives are moved to full UP. It is possible to have a signal at full down and none when they are moved up. If so, then it is likely the sender was installed 180 degrees off.
- If the LED turns solid red immediately after a calibration attempt, then both port & starboard trim pump solenoid connections have the UP & DOWN connections reversed. Typically, the solenoid with the BLUE trim pump wire is UP but that is not always the case, even with the trim operating normally. Use a test light to confirm the UP and DOWN solenoids.
- If the LED stays flashing green after pressing both UP or DOWN during a calibration then either the port or starboard trim solenoid connections have their UP / DOWN connections reversed. Confirm using a test light, correct the wiring and run through the calibration process again.
- NOTE: if the port and starboard trim solenoid connections are reversed side-to-side it is possible for the calibration to complete and have the LED turn solid green. In this case the LED will start flashing red the first time a correction is required. After three moves the system will be in standby mode and will require a power cycle to clear the fault.

## Post-Calibration Issues

- LED is Flashing Red.
  - Once every six seconds is a port trim issue.
  - Twice every six seconds is a starboard trim issue.
  - Three times every six seconds is center trim issue.
- Possible causes for a flashing red LED
  - Engine / drive not moving properly during a correction attempt. Could be air in the hydraulic lines, low voltage, mechanical issue. Diagnostic message will be MOVE\_ERROR or CHANGE\_ERROR.
  - No signal from the trim sender. Diagnostic message will be SENDER\_LOW or SENDER\_HIGH.
  - Trim sender output is outside the range of the calibration (failed sender, short or open connection).



## Trim Sender Indexing – Sterndrives Only

Manually indexing the senders will be required using the following procedure:

1. Move the drives to their full DOWN position
2. Connect your diagnostic interface cable and launch RealTerm.
3. Remove the trim sender.
4. Supply power to DriveSync. It will not matter if the LED is red.
5. With the grey hex facing you, slowly rotate the trim sender counter-clockwise until you see the trim sender value at 200.
6. Continue turning counter-clockwise until the reading reaches greater than 800.
7. If the values do not rise steadily between your two readings, then keep rotating the hex until you find another spot that will give you the 200 – 800 range. The sender does not have windings 360 degrees, so we are looking for the section that is wired. The total sweep will be approximately 40 degrees.
8. Once the proper sweep is found, move the hex back to 200 +/- 20 position and re-install it.
9. Repeat the above process for the starboard side.
10. Execute a ‘r’ Reset Command and then follow the process for the ‘p’ & ‘n’ Calibration Command