



X1 Data Logger Manual

v 1.2

Performance Data Systems

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What's in the Kit

The X1 Data Logger Kit provides you with everything you need to start recording data for your race vehicle. Below is a list of everything that is contained in the box.

X1 Data Logger
Mounting feet (x4)
RPM Module
RPM Module Input Cable (18")
Engine RPM Cable
Engine RPM Tach Splitter
Drive Shaft RPM Cable
Drive Shaft RPM Sensor
Drive Shaft RPM Sensor Mount Bracket
Power Cable
XBus Adapter Cable
XBus Male Terminator Cap
Micro SD card with Adapter
USB Card Reader
USB Programming Cable

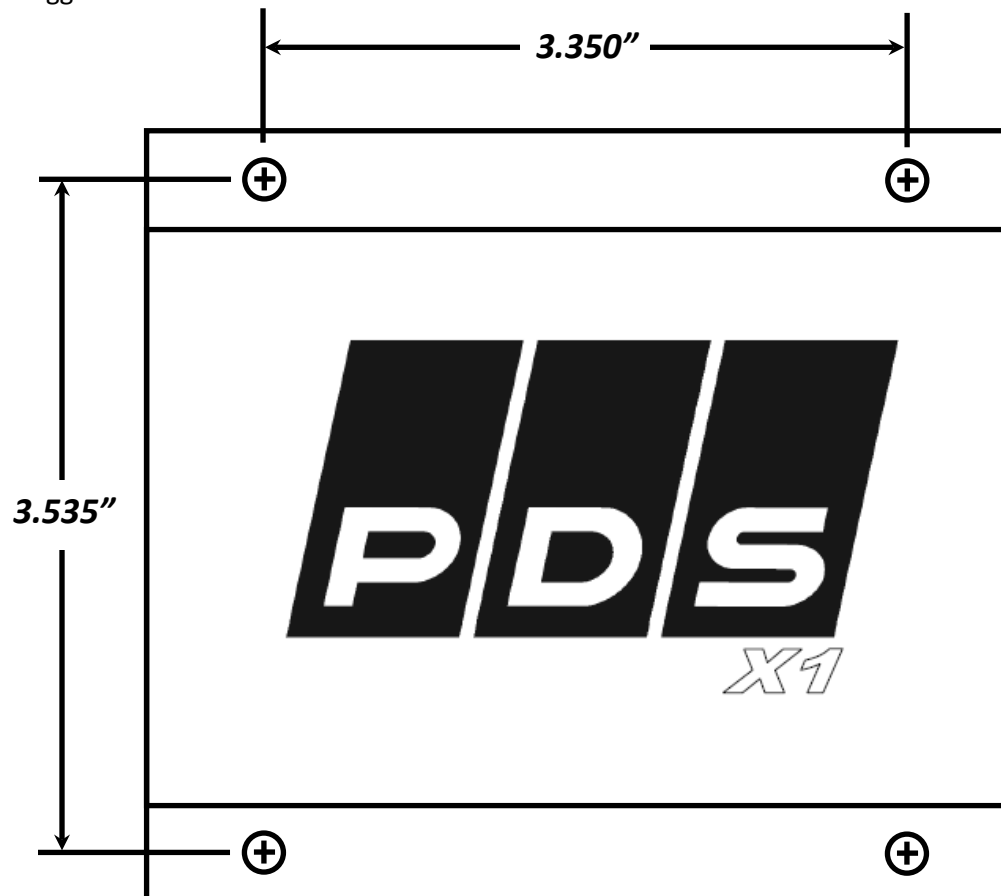
MT-FT
XMD-X1-RPM
CA-8M8M-018
CA-M8-BK144
CA-IGN3
CA-M8-GY072
SN-DS-3P
MT-SS-5
CA-M8-RD132
CA-XB-M8-012
CA-XB-TCAPM
SD-MICRO
SD-RDR
CA-USBMINI



Installing the Data Logger

When choosing a mounting location for the X1 data logger, please maintain sufficient space to allow the necessary cables to connect to the end plate without any sharp bends that might put unnecessary strain on the connectors or cables going to the unit. Also, leave at least 2" on the other end of the logger to allow for easy access to the door covering the USB communication port and the MicroSD card.

Please refer to the mounting template shown below to accurately determine the mounting location of the X1 data logger:



Aligning the Internal G-meters

The X1 data logger features two internal G-meters; one which is designed to measure Acceleration, and the other to measure Lateral or side-to-side movement. For these G-meters to work correctly, we recommend mounting the data logger flat, with the PDS logo facing upward and the access door facing the front of the vehicle, if possible. If the unit is installed with the access door facing the rear of the vehicle, the Acceleration G readings will be reversed, indicating a negative value when the vehicle launches. If the access door is facing either the left or right side of the vehicle, the Lateral G-Meter will indicate acceleration while the Acceleration G-Meter will indicate the lateral movement of the vehicle instead. In these instances, you should reprogram the G-Meters using the Caliper software to ensure correct G-meter readings. Additional information is available under the Help tab for both the Accel and Lateral G-meter channels in your data logger's configuration file.

Connecting the Data Logger

Power Supply

Connect the power cable to the 'PWR' input on the end plate as shown (right). 12-18v power can be supplied to the unit by installing the power wire directly to the battery and installing the supplied switch. Alternatively, you may connect the power straight to the battery without any connection provided you want to have the X1 data logger turn on when master power is supplied to the vehicle.



RPM Module

The RPM module features five different inputs. The module is connected to the data logger with an 18" cable which connects to the "RPM" port on the data logger. It is labeled with five available inputs:

- **TACH** - Engine RPM
- **DS** - Drive shaft RPM
- **RPM 3** - Typically used for clutch or converter speed
- **RPM 4** - Typically used for flow meter input
- **REC** - Record button



Engine RPM

Engine RPM can be picked up by connecting the black Engine RPM wire to the tach output from your ignition system. Some systems using a magneto will have to purchase the additional inductive RPM pickup to allow RPM to be read from the ignition coil or points box.

Drive Shaft RPM

The gray Drive Shaft RPM cable connects to the drive shaft sensor supplied in the kit to the RPM module. Depending on your application, you may be using a magnetic collar on the coupler or a sensor counting teeth on the ring gear or a toothed steel wheel.

RPM 3

RPM 3 is commonly used for either Clutch or Converter RPM. If installed, this upgrade provides a yellow RPM cable and the appropriate sensor. Typically, Clutch RPM is set for one pulse per revolution as there is usually one magnet installed in the input shaft, while Converter or Input Speed RPM on automatic cars typically have this set to four pulses per revolution for the hall effect sensor.

RPM 4

RPM 4 can be used for a variety of inputs including, but not limited to, Flow Meter, Front Wheel RPM or any other type of digital input. Depending on the input, consult the source documentation that came with your sensor for the proper programming settings including pulses per Revolution, linear conversion values, etc. On systems monitoring ignition timing, this is typically the TDC RPM input.

Record Button

Record button function provides a digital input for a ground triggered event if you wish to start recording off the button. By default, the unit is set to begin recording when the Engine RPM exceeds 2000 RPM. Alternatively, you can use the supplied record button to change it to record by briefly pressing the momentary button. The Data Logger is set for a maximum record time of 7200 seconds. This is also adjustable in the settings for the device.

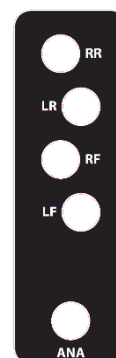
The Record Button input may also be used as the Cam Sync input on systems monitoring ignition timing to provide individual cylinder timing data.

Analog module

The available analog module provides up to four high-speed inputs. The module is connected to the data logger with an 18" cable which connects to the "ANA" port on the data logger. These are commonly used for monitoring shock travels and suspension movement.

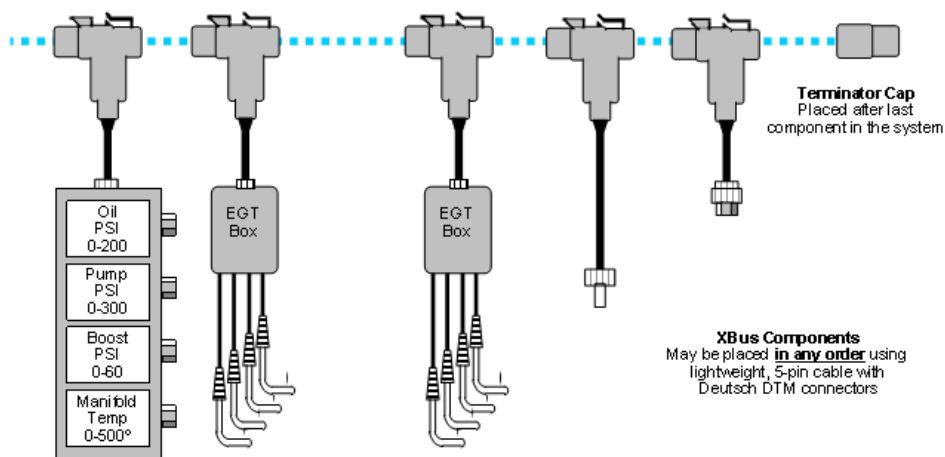
You can connect the shock travel sensors directly to the module via the cable. You will note that the four positions on the module refer to the actual physical locations of each sensor. These inputs are not dedicated to just shock travel. Any 5-volt sensor can be connected to these via the cable. The channels are programmed with the following layout:

- **RR** - Right Rear Shock, or Analog Channel #1
- **LR** – Left Rear Shock, or Analog Channel #2
- **RF** - Right Front Shock, or Analog Channel #3
- **LF** - Left Front Shock, or Analog Channel #4



XBUS Input

The XBus Port is used to connect all XBus modules including the XBus EGT pressure temperature and other modules. The unit comes with a 9-inch XBus adapter featuring a 6-pin DTM plug. You may connect an XBus module directly to the end of this plug and then be sure to use the XBus Terminator cap supplied with the kit. The XBus Terminator cap should be installed at the end of your XBus network. Please refer to the diagram below:



CAN2 Input

Additionally, the X1 features a secondary can port which allows users to connect to a secondary can bus system, such as an ECU or other third party can bus sensors and modules. This is set in the configuration file by right clicking on the logger tab and selecting the can from the list of available dropdowns.

When connecting a secondary can device such as an ECU or other third-party can bus modules, be sure to select the proper terminating resistor value in the setup. The options are '0' for no terminating resistor and '1' for terminating resistor. This will allow the unit to communicate correctly with the devices connected to the can bus port. If your can bus device or secondary Network came with a terminating resistor be sure to use that with the X1 Data Logger and the supplied connection.

X1 Access Door

The access door on the X1 data logger protects the USB mini communication Port (USB B) and Micro SD card. You can access them by releasing the latch to open the door at the end of the logger by rotating it counterclockwise. To secure it, rotate it clockwise until it clicks into place.

To the right of the access door is the status LED, which displays several different colors and patterns, depending on the status of the X1 data logger. Please refer to "Status LED Behavior" later in this manual for more details.



Reading from Device

Reading the configuration from the data logger is easily accomplished inserting the USB communication cable into the mini-USB port on the X1 and then by selecting 'File' from the menu bar in Caliper and selecting "Read from Device ...". A small window will come up with a status bar indicating once it goes to 100% you will notice that it says device from configuration read from device with a small check mark in the lower left-hand corner of the dialog window.

Once you have read from the device, you may save the configuration by selecting 'Save' under the 'File' menu. You may also click on the save icon in the toolbar on the left side of the Caliper screen.



Downloading From the Data Logger

To download from the data logger, carefully remove the Micro SD card from the unit and insert it into the supplied adapter. Plug this SD card adapter into the laptop or PC to download the data file using the Caliper software. Please refer to the Caliper user manual to download correctly.

Once you have downloaded from the Micro SD card, be sure to carefully reinsert the Micro SD card back into the unit and securely latch the access door. Be sure that the Micro SD card is inserted with the gold contacts facing down.

Although the X1 datalogger can record one session without the Micro SD card present, it is always recommended to make a run with the Micro SD card installed in the unit.

Status LED Behavior

 Solid Red	Card inserted with no errors detected and waiting to trigger a recording.
 Flashing Orange	Card error or card not inserted. Also indicates card error with a recording in internal memory waiting to be copied to a card.
 Flashing Blue	Recording in progress with or without card error.
 Flashing White	Recording will stop when the stop recording delay time has expired.
 Flashing Green	Firmware update in progress (slow flash initially).
 Flashing Red	Stuck in bootloader with no firmware detected on the card or no card.
 Blue/Orange alternating	Stuck in bootloader with error while attempting to update the firmware.

Additional Information and Technical Support

For further information on the Caliper software program or interpreting the data, please refer to the Caliper Instruction Manual that came with your X1 data logger or call Performance Data Systems at (949) 652-6300. You may also find additional information including product updates by visiting our website at <https://racepds.com>.