Scanmaster 3
for First Generation DSM and 3000GT/Stealth
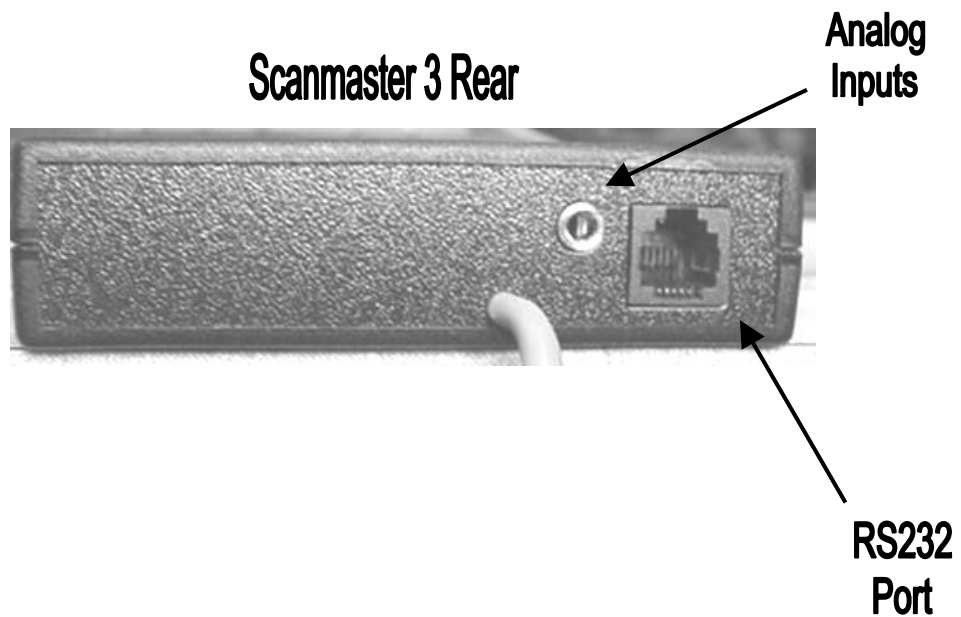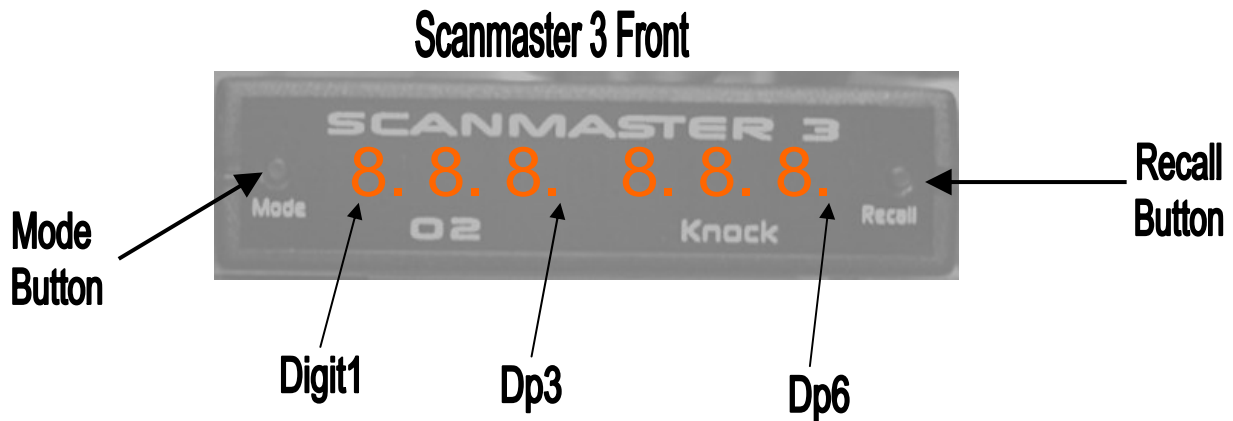
Table of Contents:

Kit contents

1. Scanmaster 3 unit
2. External logging cable
3. External logging adapter for PC
4. External logging adapter for PDA
5. Diskette with support software:
   MMCd logger software
   SCMCOMM Scanmaster Reflash program
   SCM3.BIN   Scanmaster 3 Flash file v1.0
   manual.pdf   This manual

Available accessories
 Analog cable: direct plug in for LM1 wideband AFR sensor
 Boost logging harness (for egrt input to ECU, fed spec cars only)
 Boost (MAP) sensor, 3 BAR (30 psi)

Description:

The Scanmaster is a portable scan tool for monitoring data that is retrieved from the ECU (Engine Control Unit) The unit is intended to be permanently mounted so that it is always available for monitoring the state of tune of the engine.

Scanmaster 3 Front

Recall Button

Mode Button

Digit1

Dp3

Dp6

Analog Inputs

Scanmaster 3 Rear

RS232 Port

Special Features: The Scanmaster 3 has many advanced features that set it apart from the competition.

Priority Scan™: The Scanmaster retrieves data from the ECU as fast as the ECU can send it, however some data is more critical since it changes rapidly (e.g. O2 voltage) and is scanned more often. There are many data items that change slowly, but are very important to monitor (coolant temperature, trim values) and can be scanned less often. The Scanmaster Priority Scan™ handles this and provides large amounts of data without sacrificing the update speed of the critical data. Priority Scan™ is user configurable.

Serial output. The Scanmaster 3 provides a serial port for logging data to a PDA or laptop PC. The protocol emulates the stock ECU, so all available dataloggers (we use and recommend MMCd) are compatible. For those dataloggers that allow higher baud rates, the Scanmaster 3 can be set for higher baud rates (9600, 19.2k, 38.4k, 57.6k) for large amounts of loggable data.

Analog inputs: On the rear of the unit is a 3.5mm jack for connecting two 0-5 volt external signals. These signals can be displayed on the Scanmaster as well as logged to a PDA/PC. If a wideband Air/Fuel signal is connected, the Scanmaster 3 can be configured to display Air/Fuel ratio as the default display. The analog data can be displayed as boost (2 bar, 2.5 bar, 3 bar) and Air/Fuel ratio.

ECU/EGRT input. This input to the ECU is not used in Federal Spec (non-California) vehicles and can be connected to a MAP sensor or other 0-5 volt signal. The Scanmaster 3 can retrieve and display this data in the same way as the Scanmaster analog inputs. This data is limited by the Scanmaster scan rate to about 20 samples/sec, which is still more than adequate to monitor boost. The EGRT display is configured exactly like the analog inputs.

Vehicle speed. The Scanmaster 3 reads the vehicle speed sensor and calculates vehicle speed, acceleration, and performance from the data.

Diag Mode Control. The Scanmaster 3 fully controls the vehicle Diag Signal, preventing the ANTILOCK light from staying on and disabling the ABS.

Alarms. Display will flash if knock retard goes above user configured limit.

PeakCapture: At WOT the peak knock count and minimum O2 values are saved, along with the respective vehicle speeds. To recall these values, press and hold the RECALL button, and the saved values will be displayed (Decimal6 will blink), while holding the RECALL button, press and hold the MODE button and the vehicle speeds that each value was captured.

Installation:

The unit can be mounted almost anywhere but should be easily viewed while driving. This way a quick glance is all that is necessary to verify the car is not knocking or running too lean while accelerating. The attached cable plugs directly into the diagnostic connector under the dashboard, to the driver's left.   See below. The red wire is plugged into an open slot in the fuseblock to provide power for the Scanmaster.

Talon/Laser/Eclipse
Fuseblock Detail

3000/Stealth
Fuseblock detail
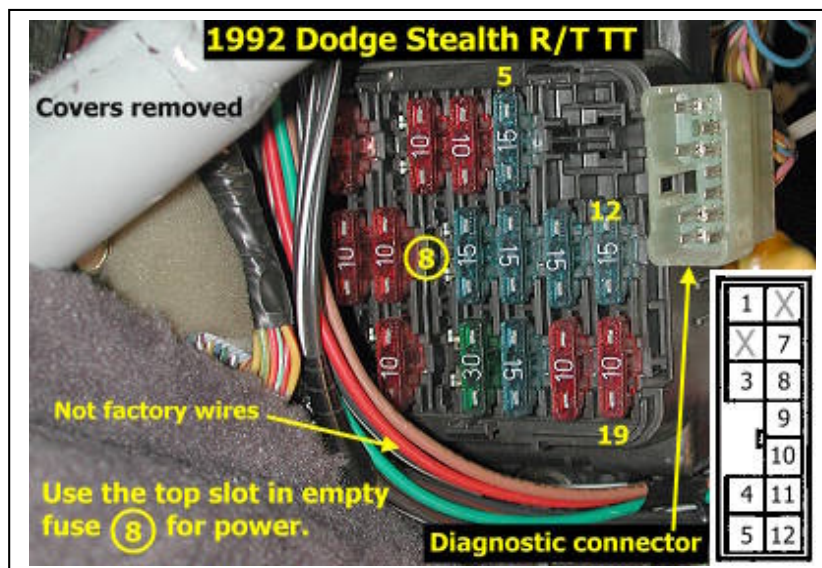
Operation

Default mode: When the unit powers up, it is operating in default mode. This mode displays the O2 sensor voltage on the left side of the display, and the knocksum value on the right side. After a full throttle run, pressing the recall button will display the highest knock value and lowest O2 value in their respective locations. While holding the recall button, pressing the mode button will display the vehicle speeds that the recorded events occurred. Peak capture is enabled by high throttle, airflow, and O2 volts.

Expanded modes: Pressing the mode button will step the display thru the expended modes, allowing viewing of many engine parameters. The available modes are shown below. *Many modes are user enabled via config parameters, see the config section.

Expanded modes

*AD0 Analog/EGRT	See config section for enabling this parameter
*AD1 Analog 1 from J1	See config
*AD2 Analog 2 from J1	See config
O2t	Oxygen sensor trim, fluctuates around 100 as O2 sensor varies
Lt	Low Trim, long term air/fuel learning, at low airflows.
Mt	Mid Trim, long term air/fuel learning, at medium airflows.
Ht	High Trim, long term air/fuel learning, at high airflows.
AF	Engine Airflow, in Hz, this is the engine airflow sensor signal.
R	Engine RPM
InJ	Injector Pulsewidth, in Milliseconds.
Idc	Injector dutycycle, a measure of injector flow, 0-100%
TPS	Throttle Position Sensor, percent.
SP	Spark Advance, degrees.
MPH	Vehicle speed,
Acc	Acceleration (Scaled +2.55/-.99 G)
*Et	0-60 or QuarterMile Elapsed Time 0-19.99 sec
CLt	Coolant Temperature, degrees F
CEL	Check Engine Light (Diagnostic trouble codes, see appendix)
BAt	Battery Voltage
iSc	Idle speed control, 0-255, the ECU uses the iSc to control idle speed
AtS	Air Temperature, this sensor is located in the airflow sensor.
BAr	Barometric Pressure, this sensor is located in the airflow sensor.

Configurable display features:
The following elements of the display are user configurable.

Default O2 display. The OS config parameter controls the substitution of an analog input, scaled as A/F ratio, in place of the O2 sensor voltage display on the default screen. 0=normal mode 1=EGRT input, 2= A/D input 1, 3 = A/D input 2.

Analog displays: Each Analog input can be displayed as A/F ratio or boost and will appear as an expanded mode. 1- 0/255 display 2- Boost (3 bar) 3- Boost (2.5bar) 4- Boost (2 bar) 5- AirFuel ratio

Elapsed Time mode. The Scanmaster can measure 0-60 time, eighth-mile, or quartermile ET. To enable this feature set the Et parameter as follows: 0=off, 1=0-60mph time, 2=eighth mile time and mph, 3=quarter mile time and mph. The ET mode can be reset using the recall button when the ET mode is displayed and vehicle speed is 0. A WOT stab (full throttle) with vehicle speed of zero will also reset the timers. The 0-60 timer runs to 9.99 sec. Eighth mile runs to 19.99 sec. Quartermile timer runs to 29.99 sec. Once the time has captured, the recall button will display the MPH at the end of the measured distance (eighth and quarter only)

External Logging: The Scanmaster has an RS232 port on the rear panel to connect to a PC or PDA to allow external logging. MMCd is included with the Scanmaster for PALM OS PDA's. The included cables and connectors allow connection to the PDA serial sync cable. Set the baud rate in the config bdr parameter to match the logger in use. The Scanmaster emulates the communication of the ECU, so any logger that is compatible with the ECU can be used. MMCd allows high baudrates to facilitate large amounts of data logging.

Configurable logging features: MMCd has configurable features to allow logging of the Scanmaster analog inputs. For other loggers, Data Substitution allows viewing of these items. Configure the Scanmaster as follows.

- dSA - allows the logger to display boost on its airflow volume display, 0-25.5 psi.
  0=off, 1=EGRT input, 2=Analog1 input, 3 = Analog2 input.
- dSb - allows the logger to display A/F ratio on its Battery Volts display 0-18.6:1
  0=off, 1=EGRT input, 2=Analog1 input, 3 = Analog2 input.
- dSc - allows the logger to display Acceleration as AcclE, 0-100% = 2.55G
  0=off, 1=on
- dSi - allows the logger to display Vehicle Speed as ISC 0-255 MPH.
  0=off, 1=on

Clear Codes: The ECU will not allow clearing of trouble codes with the engine running. To clear codes, turn the key off, and hold the MODE button while turning the key back on. The Scanmaster will display CLr CEL. Press the recall button and the Scanmaster will request a code clear from the ECU, and then power up normally. If the problem is still present, the code may not clear, or may reoccur.

Trouble codes are as follows:

11	Oxygen sensor
12	Intake air flow sensor
13	Intake air temperature sensor
14	Throttle position sensor
15	ISC motor position sensor
21	Engine coolant temperature sensor
22	Engine speed sensor
23	TDC sensor
24	Vehicle speed sensor
25	Barometric pressure sensor
31	Knock sensor
36	Ignition circuit
41	Injector circuit
42	Fuel pump relay
43	EGR
44	Ignition coil

Config Procedure

Config mode. This mode is for setting the options of the Scanmaster. To enter config mode hold both buttons depressed while the unit is powering up (at key on) until the display reads "CFG" and then release the buttons. Pressing the left button will step thru the configuration parameters. Once the desired parameter is displayed, press the right button to adjust it to the new desired value (displayed value will flash at this time indicating the value has been changed, but NOT YET SAVED. Press the left button to save the value, the display will stop flashing. Once the configuration options have been set, turn the unit off and back on to return to normal operation. See table below for a list of configuration parameters.

(Config mode can be entered by holding the MODE button for 15 sec, to return to normal mode, hold the MODE button for 10 sec)

Configuration Parameters

CLr LOG	Clears internal log (for future implementation)
LE	Log Enable. 1-enable internal logging for later playback to PC or PDA. (for future implementation)
Opt	Options program with the total of the values from table one. Display revert = 1, analog filtering = 6 (display revert resets the display to default at WOT)
Car	1- display spark advance scaled for 3000GT/Stealth
ND	Number of expanded modes enabled, (controls the number of available data displays)
NH	Number of high priority items in priority scan, can be changed to alter update rates, but is best left alone.
NL	Number of low priority items in priority scan, can be changed to alter update rates, but is best left alone.
ReF	ReFlash, pressing the right button will prepare the unit for new software download.
OS	O2 Substitution- display analog data in place of the default O2 sensor volts 0-normal 1-EGRT input scaled as Air/fuel, 2-Analog1 scaled as Air/Fuel, 3 – Analog2 scaled as AirFuel.
MC	MPH calibration, used to adjust for tire size changes or speedometer errors. 2%/step
Ad0	Analog 0 (ECU EGRT) display. (Boost display shows as (-) inches under vacuum.) 1- 0/255 display 2- Boost (3 bar) 3- Boost (2.5bar) 4- Boost (2 bar) 5- AirFuel ratio
Ad1	Analog 1 display. .
Ad2	Analog 2 display. .
DSA	Data Substitution – AirFlow. Displays Boost on external loggers AIR VOLUME, scaled in PSI 0-25.5
DSb	Data Substitution – Battery. Displays AirFuel Ratio data on external loggers BATTERY VOLTS
DSc	Data Substitution – AcclE - displays data on external loggers AccelE
DSi	Data Substitution ISC – displays MPH data on external loggers ISC display
Brt	Display briteness setting (for future implementation)
Bdr	Baudrate to external logger. 0-standard 1-9600 2- 19.2k 3- 38.4k 4- 57.6k 5 – 115.2k 6- custom
AL1	Setting for knock level that causes the display blink/warning.
AL2	(for future implementation)
Et	Elapsed Time mode. 0=off, 1=0-60mph time, 2=eighth mile time and mph, 3=quarter mile time and mph

Revision history
1.0 July 14, 2004