

**PRODUCTS FOR
PROFESSIONALS**
from Vtronix Corporation

masterTech®
PRODUCTS FOR PROFESSIONALS *Series*

MTS 3100 MasterTech® Multi- Function Tester Product Line

The *MTS 3100 MasterTech Multi-Function Tester* is a hand-held tester that gives you the capability to measure the many different signals that are common on today's automobiles.



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PRODUCT OVERVIEW

MTS 3100 Mastertech[®] Multi-Function Tester

In addition to reading vehicle serial data in the ScanTest Mode, the MTS 3100 Mastertech's built-in automotive Oscilloscope function and Digital Multimeter can measure and display automotive analog and digital signals.

The MTS 3100 Mastertech Multi-Function Tester gives you a gateway to measure and view automotive waveforms on the same tool that you can use to read On-Board Diagnostics (OBD) serial data and trouble codes.

The MTS 3100 Mastertech is not limited to Serial Data Diagnostics. Using the built-in oscilloscope, you can mea-

sure automotive sensors actuators to accurately pinpoint electrical failures.

In addition, the MTS 3100 Mastertech greatly improves your diagnostic efficiency by integrating the functional equivalent of a voltmeter, frequency meter, pulse width meter, and duty-cycle meter — all within the same hand-held diagnostic center.

HELP is always just one keypress away. The MTS 3100 Mastertech's HELP feature provides information on the keys available for each particular mode and a description of the function or mode that you are currently using. This should minimize time referring to the operator's manual.

ScanTest Features

- Supports GM, Ford, Chrysler, Asian, and OBD II-equipped vehicles
- Wide range of vehicle system coverage
- Automotive manufacturer validated software
- Works with existing Tech 1 software cartridges
- Easy to read menus
- Built-in HELP Functions
- OBD-II compatible

KEY HELP

- ↑/↓: Change value of the highlighted item:
 1: - Time Scale
 2: - Volt Scale
 3: - Trigger Level
 4: - Ground Level
- 5: Trigger Edge (↑)
 6: Trig Mode (a,s,n)
 7: Freeze Display
 8: Pop-Up Menu

Sample Key Help Screen

Sample Function Menu

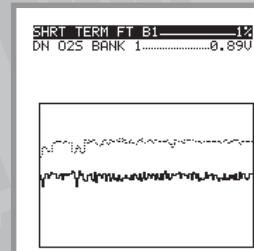
SELECT APPLICATION

GLOBAL OBDII (MT)
GLOBAL OBDII (T1)
GM P/T
GM CHASSIS
GM BODY SYSTEMS
FORD P/T
FORD CHASSIS
CHRYSLER P/T
ACURA
CHRYSLER IMPORTS

Sample Menu Select Application Screen

Enhanced Serial Data Display Options

- 12 or 16 Parameter Display
- Line Plot, Bar Chart, and LED Displays
- Discrete Parameters Toggle LEDs



Line Plot Display

ENGINE RPM.....	1650RPM
THROTTLE POS.....	0.86V
THROT ANGLE.....	6%
COOLANT TEMP.....	93°C
MAP.....	25Kpa
BARO.....	102Kpa
O2 SENSOR.....	200mV
LOOP.....	CLOSED
FUEL INTEGRATOR.....	128
BLK LRN MULT.....	126
INJ PULSE.....	1.00ms
AIR FUEL RATIO.....	14.70
BLOCK LEARN CELL.....	2
BLK LRN ENABLE.....	ON
IDLE AIR CNTL.....	32
BATTERY.....	13.9V

16 Parameter Display

ENGINE RPM.....	2975RPM
THROTTLE POS.....	1.12V
THROT ANGLE.....	13%
COOLANT TEMP.....	94°C
MAP.....	25Kpa
BARO.....	102Kpa

Bar Chart Display

ENGINE SPEED.....	800RPM
SPARK ADVANCE.....	20°
ECT (").....	-38°C
ECT (U).....	4.62U
IAT (").....	-36°C
IAT (U).....	2.28U
CVL HEAD (").....	-44°C
CVL HEAD (U).....	3.45U
LOOP STATUS.....	CLOSED
ENGINE LOAD.....	15%
MAF (U).....	0.94U
BARO (F).....	162.0Hz

LED Display

MTS 3100 Mastertech Multi-Function Tester

*ScanTest, Automotive
Oscilloscope and
Digital Multimeter, all in
one tool.*

DIGITAL MULTIMETER

The MTS 3100 Mastertech includes a built-in digital multimeter. Its measurement capabilities include:

- DC Voltage (1)
- Frequency (2)
- Duty Cycle Measurements (3)
- Pulse Width (4)

The MTS 3100 Mastertech can be used either as a stand-alone multimeter or used in conjunction with the ScanTest functions.

Multimeter Features

- Displays voltage measurements to two decimal places
- Shows serial data and multimeter measurements together on the same display screen
- Measures input signals ± 20 V
- Displays minimum and maximum voltage and frequency readings until reset
- Displays duty cycle high/low duration in either percent or time
- Displays Pulse Width, Time High/Time Low in ms or μ s

INTEGRATED DATA

One of the most powerful features of the MTS 3100 Mastertech is its ability to display OBD serial data (5a) and digital meter data (5b) on the same screen.

Technicians can use this feature in many diagnostic routines, such as to determine whether the voltage indicated by a sensor through the OBD serial data display is the same as the voltage measured using the lead set.



VOLTMETER

4.95

MIN 0.00V MAX 4.95V

(1) Voltmeter Display

FREQUENCY

1.05 KHz

MIN 834Hz MAX 1.05KHz

(2) Frequency Meter Display

DUTY CYCLE

75%

HIGH 240us LOW 730us

(3) Duty Cycle Meter Display

PULSE WIDTH (Time High)

4.54 ms

MIN 4.54ms MAX 146ms

F1:Time Low

(4) Pulse Width

Jul 23, 99 2:10:27 pm

IAT (°) 94°F 34°C
IAT (v) 2.41 VOLTS

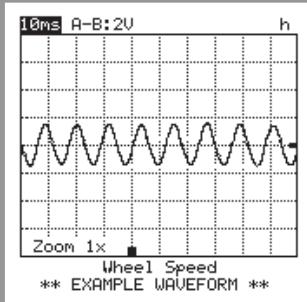
2.42 v
[RCV] FOR ENHANCED
[*EXIT] TO EXIT

Multi-Function Display

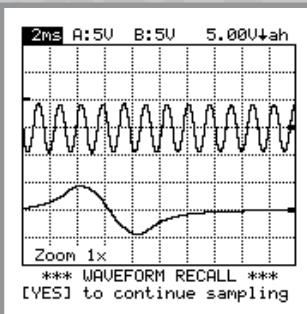


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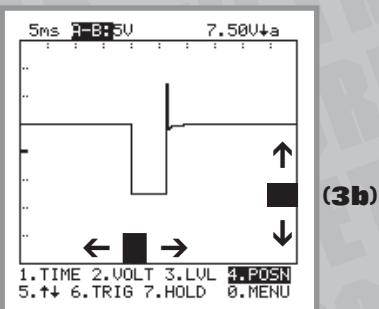
MTS 3100 Mastertech Multi-Function Tester



(1) Single Channel oscilloscope



(2) The oscilloscope in dual channel mode can display Crank and Cam signals together!



(3a)

OSCILLOSCOPE FEATURES

- Single Channel **(1)** — displays a single waveform
 - Auto Setup Feature that automatically sets the time scale, voltage scale, and trigger level based on the input signal
 - Dual channel **(2)** — displayed simultaneously, individually, summed, or differenced
 - Auto, Normal, and Single-shot trigger functions
 - Trigger position adjustment **(3a)**
 - Ground level screen adjustment **(3b)**
 - Waveform zoom for detailed signal analysis
 - Hold Mode for waveform interpretation which can zoom up to 5 times the set resolution
 - Adjustable cursors to measure information that lies within the measured waveform **(4)**
 - Save and recall up to four waveforms for later diagnostic interpretation
- All of this provides increased diagnostic capabilities in your hand-held diagnostic center.

Oscilloscope Specifications

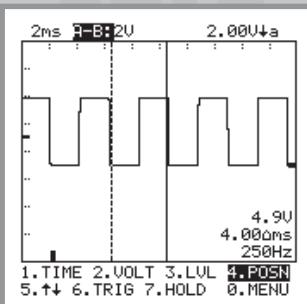
Parameter	Oscilloscope Specification
Channels	1 or 2
Bandwidth	10KHz
Max. Sample Rate	80,000 samples/second
Input Impedance	Up to 1MΩ
Input Coupling	DC
Max. Input Voltage	± 20V DC with circuit protection
DC Accuracy	± 3% (500mS/div) ± 5% (<500mS/div)
Volt/Division	0.1V/div to 5V/div
Time/Division	0.2ms/div to 20S/div
Time Base Accuracy	Down to 1μS
Trigger Mode	Normal/Automatic/Single Shot
Trigger Slope	Rising or Falling Edge
Cursor/Markers	Yes/Yes
Display Zoom	Yes, 2X and 5X
Waveform Hold	Yes
Waveform Display	Yes, up to 4
Zero Axis Adjust	Yes

ENHANCED DIAGNOSTIC LEAD SET

Increase the performance of your MTS 3100 Mastertech oscilloscope with the optional purchase Enhanced Diagnostic Lead Set (EDLS).

The EDLS expands the capabilities of the MTS 3100 Mastertech by enabling you to measure high voltage signals on automotive components and systems, including sensors, actuators and spark ignition systems. You can now measure up to 600V directly, and up to 50kV with a kV pick up probe.

The EDLS broadens the MTS 3100 Mastertech oscilloscope function to display waveforms for all vehicle signals, including fuel injectors, EGR solenoids and secondary ignition patterns. See the EDLS Product information in the following pages.



(4) Adjustable Cursors for Waveform Measurements

MTS 3100 Mastertech Multi-Function Tester

TECH TOOLBOX

The MTS 3100 Mastertech includes a unique feature called the "Tech Toolbox" that contains a number of valuable Math, Timer, and Shop Management functions (4). These functions can be easily accessed while the MTS 3100 is connected to a vehicle, or while the MTS 3100 is running in stand-alone mode.

Math and Timer Functions

The MTS 3100 Mastertech provides a number of useful math and timer functions aimed at enhancing technician productivity.

Math Functions include:

- Standard math calculations (5)
- Ohm's Law and Power calculation (6)
- Parallel resistance calculations
- English/Metric conversions (7)
- Frequency/period calculations

Timer Functions (8) include:

- Stop watch (9)
- Count down timer
- Clock and calendar setup

Shop Management Functions

Allows you to calculate parts and labor estimates, including sales tax and service fees (10). You can enter shop name, customer name, and repair order number information, which can be printed in hardcopy.

Shop Management functions are ideal for service technicians to construct on-the-spot estimates for customers (11).

ADDITIONAL FUNCTIONS

- Print function allows any display to be hard copy printed using the optional purchase VP-411 or VP-414 printers.
- Extensive Self-Test function lets you perform tests to ensure that your tester is operating properly.

TECH TOOLBOX

- F1: MATH FUNCTIONS
- F2: TIMER FUNCTIONS
- F3: SHOP MANAGEMENT

(4) Tech Toolbox Menu

MATH FUNCTIONS

- F1: CALCULATOR
- F2: OHM'S/POWER LAW
- F3: PARALLEL RESIST.
- F4: ENGLISH/METRIC
- F5: FREQUENCY/PERIOD

(5) Math Functions

OHM'S LAW: $V=I \times R$
 $I=V/R$
 $R=V/I$

POWER LAW: $P=V^2/R$
 $P=I^2 \times R$
 $P=V \times I$

V =Volts :
 I =Amps :
 R =Ohms :
 P =Watts :

(6) Ohm's Law Display

ENGLISH/METRIC

40 mph	=	64.4 km/h
10 mile	=	16.1 km
12 ft	=	3.7 m
72 °F	=	22.2 °C
4 gal	=	15.1 l
16 lbs	=	7.3 kg
16 oz	=	453 g
21.0 inHg	=	71.1 kPa

(7) Conversion Display

TIMER FUNCTIONS

- F1: STOP WATCH
- F2: COUNT DOWN TIMER
- F3: CLOCK/CALENDAR

(8) Time Functions

STOP WATCH

00:00:13.6

- F1: START
- F2: STOP
- F3: RESET
- F4: SAVE TIME
- F5: DISPLAY TIMES
- F6: CLEAR TIMES

(9) Stop Watch

COST ESTIMATE

- F1: LABOR ESTIMATE
- F2: PARTS ESTIMATE
- F3: TOTAL ESTIMATE
- F4: TECH. EARNINGS
- F5: SHOP NAME
- F6: CUSTOMER NAME
- F7: REPAIR NUMBER
- F9: SHOP RATE

(10) Cost Estimate Menu

TOTAL ESTIMATE

Labor Est.	\$	54.00
Parts Est.	\$	79.20
Tax %	\$	5.54
Fee	\$	0.00
TOTAL EST.	\$	138.74

(11) Work Estimate Display

PRODUCTS FOR PROFESSIONALS

from **Vetronix Corporation**

PRODUCT OVERVIEW

Global OBD II / MTS 3100 Mastertech

Now You Can Diagnose All OBD-II Certified Vehicles with Your MTS 3100

Vetronix Corporation now provides the most comprehensive diagnostic software available for servicing *all OBD II compliant vehicles* sold in the U.S. The new Global OBD II software supports all OBD II emissions-related systems on today's new vehicles and is a complement to the MTS 3100 Mastertech's already superior Domestic and Asian Imports software. You can maximize productivity as well as your profits with software that lets you tackle those newer vehicles that used to go to the dealership for repair.

OBD II equipped vehicles provide a standard interface to off-board diagnostic test equipment. This interface includes a standard test connector, referred to as the J1962 connector, a standard communication protocol (SAE J1850, ISO 9141-2 and KWP-2000), and a standard set of diagnostic test modes defined by SAE J1979. The MTS 3100 fully supports all of these, including automatic determination of the vehicle's communication protocol. Below is a summary of the basic OBD II functions and the Vetronix enhancements to OBD II. Ask for a demonstration!



GLOBAL OBD II FUNCTIONS

Global OBD II software for the MTS 3100 Mastertech supports all operating modes as defined by the Society of Automotive Engineers (SAE) Recommended Practice J1979. Listed below is a description of all of the OBD II test modes supported by Global OBD II software.

- Automatically determines the communication protocol (J1850, ISO, Keyword)
- Displays OBD II system Readiness Tests status (Mode 1)
- Displays emission-related Current Diagnostic Data (Mode 1)
- Displays Freeze Frame Data saved by the OBD II controller (Mode 2)
- Displays Diagnostic Trouble Codes stored by the OBD II controller (Mode 3)
- Clears Emissions-Related diagnostic information (Mode 4)
- Displays Oxygen Sensor Monitoring Test Results (Mode 5)
- Displays manufacturer specific test results for systems and components (Mode 6)
- Displays Pending Diagnostic Trouble Codes (Mode 7)
- Enables off-board device to control a component of an on-board system (Mode 8)
- Displays vehicle specific information (Mode 9)



ENHANCEMENTS TO OBD II

The Vetronix Global OBD II software has enhancements that go beyond just the basic OBD II functionality. The way diagnostic data is displayed and stored is completely up to you.

- Notifies you when multiple OBD II controllers are reporting different data for the same diagnostic data parameters.
- Supports multiple frames of Freeze Frame Data rather than one frame.
- Selectable Parameter List enables you to balance the amount of data with the data update rate according to your needs.

- Allows you to select the display format for diagnostic data parameters (List, Bar Chart, Line Graph or LED).
- Allows you to print diagnostic data and upload it to a PC.
- Snapshot function with adjustable trigger point and your choice of trigger type.
- Contains extensive HELP functions that enhance usability.



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OBD II PARAMETER HELP

How Often have you wanted more HELP at your finger tips?

OBD II Parameter HELP displays specific information about the highlighted item, such as an expanded parameter description, the minimum and maximum value of the parameter for the test cycle, and the ID of the ECU that reported it.

Key Help and Menu Help

The MTS 3100 Mastertech provides standard Key Help and Menu Help. Key Help displays a list of all active keys for the current mode or screen along with a brief summary of the function that each key performs. In many cases additional information describing the operating mode is displayed. Menu Help describes the function of each item on a menu screen.

DATA LIST

Data List mode retrieves all diagnostic data parameter information that is reported by the vehicle's OBD II controller. The Data List can be user tailored to balance the amount of data displayed with the update rate. If all diagnostic data parameters are displayed, the data will be updated every 3-4 seconds. Switching to the User List mode and then selecting the desired parameters will improve the update rate. For example, you can select a single parameter and get an update rate of approximately 8 times per second. While in Data List mode, you will be allowed to choose from a number of display formats listed below.

OBD II PARAMETER HELP

PARAMETER NAME:
02 Sensor Voltage Bank 1,
Sensor 1

ID #: 20, \$(14)

SUPPORTING ECU'S:
\$10

REPORTING ECU:
\$10 (Engine)
Min Val: 0.080V
Max Val: 0.920V
Cur Val: 0.640V

KEY HELP

ENTER: Trigger Snapshot
*ENTER: Chg reporting ECU
↑/↓: Move marker up/down
YES/
NO: Change marked
parameter to next/
previous parameter

*YES/
*NO: Change marked
parameter to next/
previous parameter
not currently being
displayed

(next/previous: ↑/↓)

Typical Key Help Screen

USER LIST lets
you select any
combination of
parameters to
monitor.

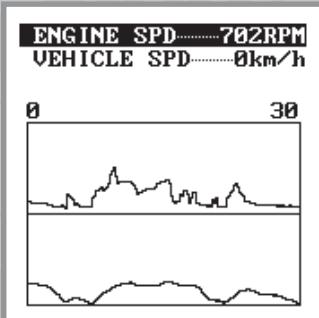
USER SELECT LIST

YES-ENGINE SPD
NO -VEHICLE SPD
NO -ENGINE LOAD
YES-MAP (P)
NO -TPS (%)
NO -FUEL STAT 1
NO -FUEL STAT 2
NO -ST FT 1
NO -LT FT 1
YES-02S B1 S1

DATA LIST FORMATS

In the Data List function, the data can be displayed in any of the following four formats:

ENGINE SPD.....805RPM
ECT (°).....55°C
VEHICLE SPD.....0km/h
IGN. TIMING.....19.5°
ENGINE LOAD.....4.7%
MAP (P).....34kPa
TPS (%).....14.9%
FUEL STAT 1.....CL
FUEL STAT 2.....UNUSED
ST FT 1.....-0.7%
LT FT 1.....7.8%
02S B1 S1.....0.390V



ENGINE SPD.....2560RPM
0 1 2 3 4 5 6 7 8
02S B1 S1.....0.640V
0 .25 .5 .75 1.0 1.25
02S B1 S2.....0.480V
0 .25 .5 .75 1.0 1.25
02S B2 S1.....0.160V
0 .25 .5 .75 1.0 1.25
02S B2 S2.....0.585V
0 .25 .5 .75 1.0 1.25

ENGINE SPD.....2560RPM
ECT (°).....108°F
VEHICLE SPD.....64MPH
TPS (%).....21.9%
MAP (P).....18.9inHg
02S B1 S1.....0.640V
02S B1 S2.....0.480V
02S B2 S1.....0.160V
02S B2 S2.....0.585V
FUEL STAT.....CL
FUEL STATUS.....2
MIL STATUS.....ON

Data List mode displays all of the data available from the ECU, or a user-customized subset of data.

LINE GRAPH plots any two parameters as a function of time.

BAR GRAPH format displays relationships among up to six parameters.

LED List displays discrete parameters on the red & green LED's.

Global OBD II/MTS 3100 Mastertech

=ENGINE SPD.....832RPM
ECT (°).....47°C
VEHICLE SPD.....0km/h
IGN. TIMING.....16.0°
ENGINE LOAD.....5.0%
MAP (P).....33kPa
>TPS (%).....15.2%
FUEL STAT 1.....CL
FUEL STAT 2.....UNUSED
ST FT 1.....-5.4%
LT FT 1.....7.8%
02S B1 S1.....0.135V

Typical Data List screen reporting from multiple ECUs.

DIAG. TROUBLE CODES
ECU: \$10 (Engine)
Number of DTCs: 3
*P0118 Engine Coolant Temperature Circuit High Input

P0201 Injector Circuit Malfunction - Cylinder 1

ENTER = FREEZE FRAME

Typical screen of DTCs saved in the vehicle ECU.

DTC.....P0118
ENGINE SPD...2368RPM
ECT (°).....108°F
VEHICLE SPD.....64MPH
ENGINE LOAD.....18.8%
MAP (P).....14.1inHg
FUEL PRES....34.8psi
FUEL STAT 1.....OL
FUEL STAT 2.....UNUSED
ST FT 1.....3.1%
LT FT 1.....-1.5%
ST FT 2.....12.5%

Freeze Frame Data captured by a triggered DTC.

TRIGGER POINT

From Trigger Point to END: 70%
Use [↑] and [↓] to move Trigger Point.
Press [ENTER]

A Snapshot can be set to trigger at various points.

MULTIPLE ECU SUPPORT

Some vehicles can send OBD II information to the tester from more than one ECU. For example, both an engine and a transmission controller may report engine RPM and throttle position to the tester. When a data parameter is reported by more than one ECU, the MTS 3100 Mastertech will alert the operator. The MTS 3100 will also notify the user whether these parameters have similar (=) or different (>) values as reported by the ECUs.

DIAGNOSTIC TROUBLE CODES

The DTC function displays a list of Diagnostic Trouble Codes (DTCs) and their descriptors, along with the ID of the ECU reporting them and how many codes have been reported. If more than one ECU is present in the vehicle, you can sequence through the code list for each of the ECUs, displaying two DTCs per screen. It will also indicate with an "*" whether there is Freeze Frame Data available for that DTC. Pending DTCs are displayed in a format identical to normal DTCs and are selectable from the DTC menu.

FREEZE DATA

Vehicle ECUs save information about the state of the vehicle when a Diagnostic Trouble Code (DTC) occurs. This data is referred to as Freeze Frame Data and can be read by the tester using the Freeze Data function. This function can be selected from the DTC menu, or it can be invoked from the DTC display mode. Multiple frames of Freeze Frame Data will be displayed for selection if they are supported by the OBD II controller. The data is displayed in the Data List format. The first parameter in the list is the Trouble Code that caused the Freeze Data to be saved.

SNAPSHOT

Snapshot function provides a method of storing diagnostic data parameter information. Data is saved in the Mastertech while the tester is waiting for a trigger condition. Once a manual or DTC trigger occurs, data continues to be saved until the snapshot is complete. This allows data to be saved both before and after the trigger. Users can select the trigger point (how much data is saved after the trigger occurs). The display indicates graphically and numerically where the trigger point is located relative to the start and end of the Snapshot data buffer. Snapshot data can be printed or recalled at a later time even after the tester has been powered down.



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CLEAR DIAGNOSTIC INFORMATION

The Clear Diagnostic Information function is used to clear DTCs from vehicle ECUs along with any other diagnostic information that the controller has saved, such as Freeze Frame Data and Readiness Test information. A prompt screen is displayed to prevent inadvertent clearing of the diagnostic information.

OBD CONTROLS

The OBD Controls mode enables an off-board device to control the operation of an on-board system, test, or component. The support of this test mode is completely dependent on the vehicle under test.

OXYGEN SENSOR TEST RESULTS

The OBD II system can provide Oxygen Sensor (O2S) Test Results for multiple oxygen sensors. The O2S Test Results function queries the ECU to determine which oxygen sensors are present. It displays a list of these sensors so you can select one to examine. The MTS 3100 Mastertech then displays all available parameters for the selected oxygen sensor.

ADDITIONAL TEST RESULTS

The Mastertech supports additional on-board test results that are specific to the vehicle manufacturer. If supported, these tests can provide a pass/fail status of many tests run by the OBD II controller. Test definition can be obtained by the manufacturer.

READINESS TESTS

The Readiness Test function allows you to monitor the status of various on-board tests that are performed by vehicle ECUs. These tests must run for the DTC and Test Results displays to accurately reflect the health of the vehicle's emissions-related components. This function indicates which tests are complete, incomplete, or not available (N/A) for the vehicle being tested.

INFORMATION

The Information mode displays identification information provided by the vehicle's OBD II controller. Information can include the VIN, Calibration ID which uniquely identifies the ECU software, and Calibration Verification Number which determines if emission calibrations in the ECU have been altered.

You can clear all emissions-related DTCs and other diagnostic information from all OBD II controllers.

CLEAR INFO

THIS OPERATION WILL CLEAR ALL DTC, FREEZE FRAME, AND READINESS TEST DATA.

DO YOU WISH TO CONTINUE?

PRESS [YES] OR [NO]

Typical O2 Sensor test results.

R>L O2S V.....	0.450V
L>R O2S V.....	0.450V
LOW SW V.....	0.200V
HIGH SW V.....	0.800V
R>L SW TIM.....	0.048s
L>R SW TIM.....	0.132s
MIN O2S V.....	0.060V
MAX O2S V.....	0.950V
O2S TRANS T.....	0.36s
TID \$30.....	2.76s
TID \$70.....	5CNT

Test results specific to a manufacturer.

TID\$01 CID\$01	FAIL
TID\$01 CID\$02	PASS
TID\$05 CID\$05	PASS
TID\$23 CID\$20	PASS
TID\$88 CID\$44	FAIL

You can monitor the status of ECU on-board readiness tests.

MISFIRE MON.....	COMPL
FUEL SYS MON.....	COMPL
COMP MON.....	COMPL
CAT EVAL.....	INCMPL
HTD CAT EVAL.....	INCMPL
EVAP EVAL.....	INCMPL
2nd AIR EVAL.....	N/A
A/C EVAL.....	COMPL
O2S EVAL.....	COMPL
O2S HTR EVAL.....	N/A
EGR EVAL.....	COMPL

Calibration Verification Numbers calculated by an ECU.

ECU \$10, CVN:01
1719BC82
ECU \$10, CVN:02
16E062BE

[ENTER]

PRODUCTS FOR PROFESSIONALS

from Vtronix Corporation

PRODUCT OVERVIEW

Ignition Scope Kit

The Ignition Scope Kit expands the capabilities of the MTS 3100 Mastertech kit by enabling you to measure high voltage signals on automotive components and systems, including solenoid circuits and spark ignition systems. You can now measure hundreds of volts and make kilovolt measurements with a kV pickup probe.

The MTS 3100 Mastertech oscilloscope functions have been enhanced to display waveforms for all vehicle signals, including fuel injectors and ignition primary and secondary. The pre-select feature lets you view waveforms in as few as four key presses.

Parade/Single Cylinder Display

Ignition patterns on a distributor ignition vehicle can be viewed as a Parade display (all cylinders), or you can select a single cylinder from the firing order and toggle the display to view that cylinder alone.

Secondary Ignition Quick Check

View secondary ignition single cylinder with only one probe connection. This function is supported for conventional and wasted spark EI (DIS) systems. The Ignition Scope automatically determines the polarity of the ignition



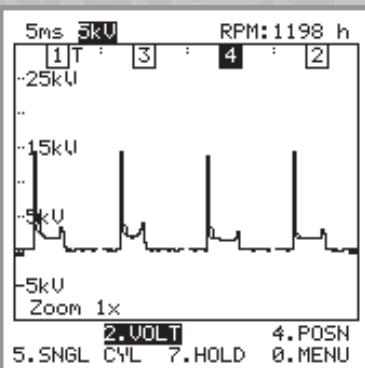
signal and displays it appropriately.

Vehicle Database

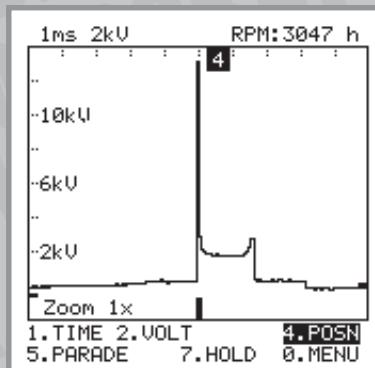
A database of vehicle ignition information makes the Ignition Scope operation and hookup quick and simple.

Glitch Capture

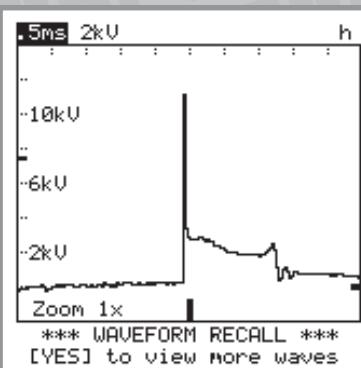
The Glitch Capture function enables you to capture and display events such as spikes and dropouts that occur between two data samples which would otherwise not be visible.



[1] Parade — View all cylinders at once or ...

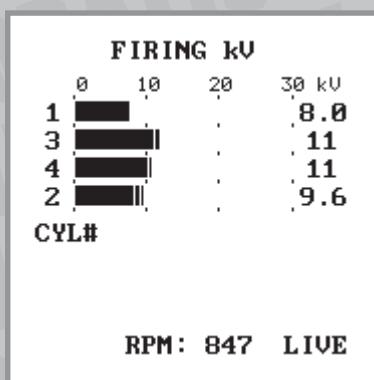


... toggle to display a single cylinder **[2]** for more detail.

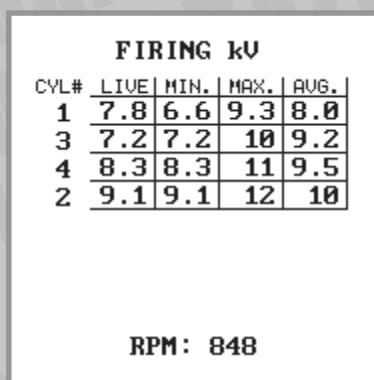


[3] Display Electronic Ignition High Voltage Waveforms.

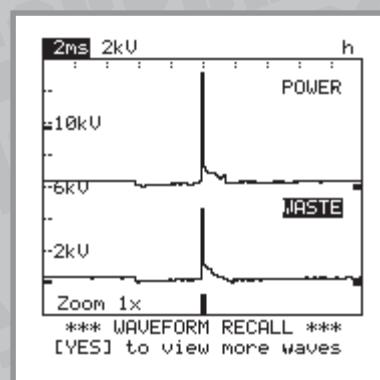
Ignition Scope Kit



[4] Bar Chart — Data bars indicate min., max., and live kV.



[5] Digital Display — Numeric data displays min., max., avg., and live information.



[6] Power/Waste — Power and Waste Spark kV is easily compared on a single cylinder.

Pre-Trigger Data

The trigger position on the tester screen can be moved to the left and right so any portion of the waveform can be easily viewed. Data gathered before the trigger point allows the signal to be displayed so that all the necessary information can be seen. In an ignition waveform, this includes dwell, firing kV, burn time and voltage, and coil oscillations.

Ignition System Support

The Ignition Scope supports the following ignition types: Conventional, Wasted spark EI (DIS), and Integral Coil distributor systems.

Bar Chart and Digital Displays

Ignition parameters can be displayed in Bar Chart or Digital display. These displays make it easy to compare cylinders. For example, either the Bar Chart **[4]** or Digital display **[5]** modes quickly and clearly demonstrate if a particular cylinder's firing kV is different than other cylinders.

High Voltage Measurement Up to 600 Volts / 50kV

Using the MTS 3100's built-in oscilloscope display and Ignition Scope, the technician can measure ± 600 volts signals on two channels.

EI Power/Waste Display

Use the Power/Waste mode **[6]** to view the power and waste spark signals of an EI (DIS) system. Both waveforms for a single cylinder are displayed on the same screen.

IGNITION SCOPE MODULE SPECIFICATIONS

General Specifications	Description
Operating Mode	Accessory to the Mastertech
Size and Weight	Approximately 6" (L) x 3.75" (W) x 1.25" (H) Approximately 8.2 oz.
Measurement Inputs	2 Oscilloscope Inputs; +/- 600 AC RMS, +/- 200 volts DC 2 Secondary Ignition Inputs 1 Trigger Input (Sync Probe)
Power Source	12V DC from Vehicle Battery
Measurement Specifications	Description
Glitch Capture	Minimum Glitch: 250 ns Used in oscilloscope & Ignition Analyzer Peak Detect
Peak Detect	4 MHz.
Bandwidth	10 MHz.
Probes	Description
Standard Probes	3 Shielded General Purpose leads w/Alligator Clips & 2 Pointed Probes for Oscilloscope & Digital Meter Secondary Ignition kV Probe RPM "Sync" Probe I/P-DC Power Cable
Optional Probes	Integral Coil Adapters (GM HEI, Toyota, Denso) Current Probe Temperature Probe



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PRODUCTS FOR PROFESSIONALS

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PRODUCT OVERVIEW

Enhanced Diagnostic Lead Set (EDLS)

Now You Can View Spark Ignition System Information and On-Board Computer Data ALL WITH ONE TOOL !



The Enhanced Diagnostic Lead Set adds High Voltage Display, KV Pickup, RPM Trigger, and Automatic Display Setup to the MTS 3100 Mastertech

How Can I Increase the Power of My MTS 3100?

The Enhanced Diagnostic Lead Set (EDLS) expands the capabilities of the MTS 3100 Mastertech kit by enabling you to measure high voltage signals on automotive components and systems, including solenoid circuits and spark ignition systems. You can now measure hundreds of volts directly, and make kilovolt measurements with a KV pickup probe.

What Can This Product Do?

The MTS 3100 oscilloscope functions have been enhanced to display waveforms for all vehicle signals, including fuel injectors and ignition primary and secondary. The pre-select feature lets you view waveforms in as few as four key presses.

How Easy Is the Oscilloscope Function To Use?

You select the signal from a menu that includes Sensors, Actuators, Fuel Injector, Distributor, Ignition and Battery. The oscilloscope settings will be automatically configured for the signal you select.

When you want to view a vehicle's secondary ignition, just clip the RPM and KV probes to the secondary ignition wires. It's as simple as that.

The MTS 3100 continues to offer its invaluable driveability and intermittent troubleshooting tools, which include single and dual trace oscilloscope functions, voltmeter, frequency, duty cycle meter, pulse width, and optional current and temperature measurements.

FEATURES

HIGH VOLTAGE MEASUREMENT

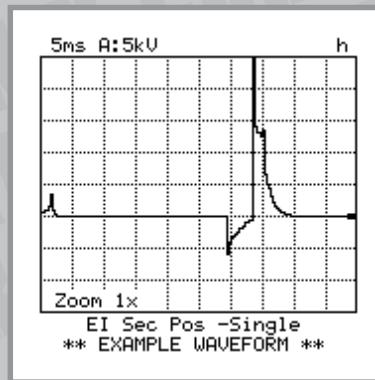
Up to 600 Volts/ 50kV

Use the EDLS with your MTS 3100 Mastertech to test and confirm signals from ignition systems using the MTS 3100's built-in oscilloscope display. The EDLS lets you measure high voltage signals such as ignition secondary and primary, plus fuel injector pulses.

KV PICKUP PROBE

Measure Spark Ignition Voltages

Display and view spark ignition secondary KV waveforms on a portable, hand-held tester in both single or all cylinder modes.



Display Electronic Ignition High Voltage Waveforms.

AUTOMATIC DISPLAY PRE-SELECT

Over 30 Pre-set Functions

The MTS 3100 will automatically display sensor specific waveforms with pre-programmed set ups for faster diagnosis. You still have full control of the settings on the oscilloscope screen. If the device that you wish to test is not on the list, then simply use the single or dual channel oscilloscope mode.

RPM PROBE

Trigger Off Any Cylinder in Engine Firing Order

Adds clip-on inductive pickup for attaching to the trigger cylinder. The RPM probe provides the trigger input for spark ignition signals to ensure stable waveform displays.

PRODUCTS FOR PROFESSIONALS

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PRODUCT OVERVIEW

Waveform Assistant

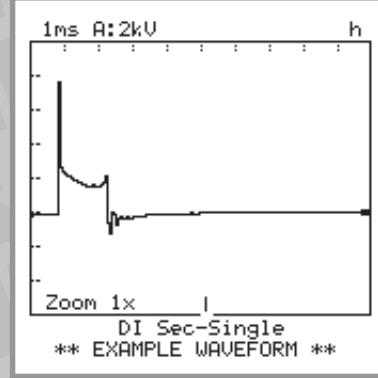
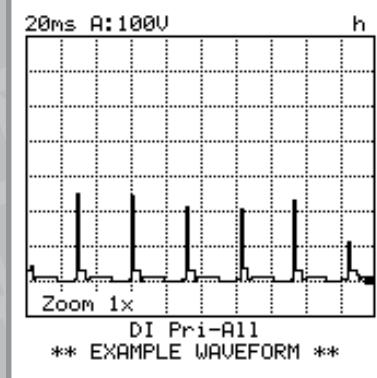
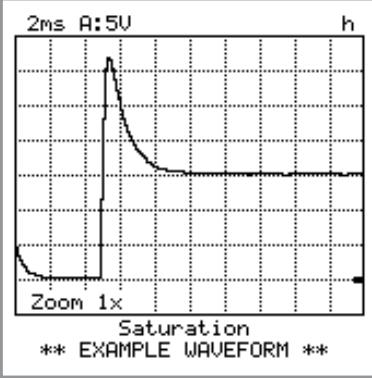
A Vital Companion Product to the Popular Enhanced Diagnostic Lead Set (EDLS)

**How many times have
you been in this
situation —**

**"I wonder what the wave-
form of this component
should look like?"**

The Waveform Assistant includes a *Waveform Library* that holds over 30 known good waveforms, including Oxygen Sensor, Throttle Position Sensor, and Manifold Absolute Pressure Sensor. It may be just what

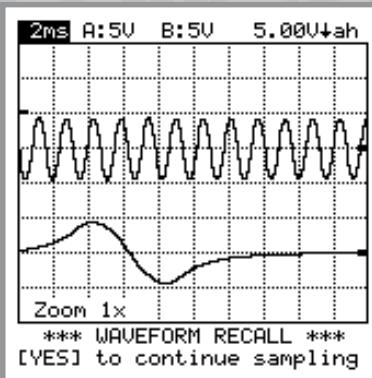
you need to diagnose a stubborn problem. You can display these waveforms whenever you need, such as during a component test. They were captured from real vehicles, like those that you work on every day.



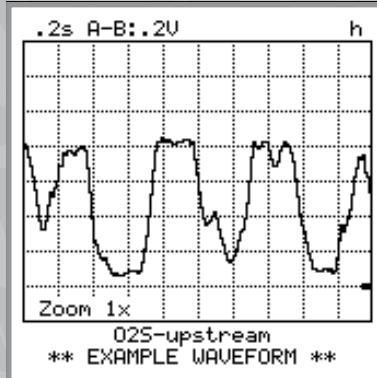
Instant access to known good waveforms saves time and helps accuracy.

Primary Ignition signals are easily reviewed using one of the many waveforms stored in the waveform library.

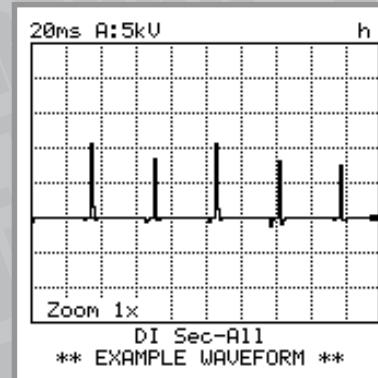
EDLS enables quick view of secondary ignition signals for efficient diagnosis.



The dual channel oscilloscope can display Crank and Cam signals together! Compare yours to the library.



What should a normal oxygen sensor waveform look like? Now you can easily display a known good pattern.



View secondary ignition waveforms (single and all cylinders) to help diagnose troublesome ignition systems.

PRODUCT OVERVIEW

Current and Temperature Probes

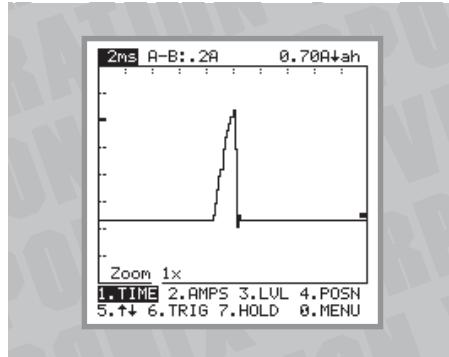
Current Probe



The inductive current probe is designed for use with the Vetronix MTS 3100 Mastertech and accessories and provides accurate, non-intrusive measurement of AC, DC and AC+DC waveform currents. Using advanced Hall Effect technology, the current probe can accurately measure currents from 0.05 Amps to 30 Amps over the frequency range of DC to 100 KHz.

Current Waveform

The ability to display current waveforms of automotive components is



becoming a valuable diagnostic tool on modern vehicle systems. For example, the current probe can quickly and easily display the current waveform of any output component—such as a fuel pump or fuel injector.

The 0-30 Amps Inductive Low Current Probe enables you to measure:

- Battery Parasitic Drain — The static current drain from the battery
- Fuel injector current
- Windshield wiper and washer motor current
- Transmission Pressure Control Solenoid current
- HVAC Blower motor current
- Display current waveform for any vehicle solenoid or actuator.
Example: Electric Fuel Pump current waveform provides current draw of pump and RPM of pump.

Infrared Temperature Probe

The Vetronix temperature probe provides safe, simple, non-contact temperature measurement over a range of

32-1000° Fahrenheit, in 5°F increments. The temperature can be displayed in either Fahrenheit or Celsius. The probe uses infrared technology to measure the temperature of objects without having to touch them and is ideal for many automotive applications particularly when measuring hot, hazardous, or rotating objects.

The 32-1000°F Infrared Temperature Probe enables you to measure:

- Coolant temperature at radiator tanks, thermostat housing, heater core, etc.
- Engine oil temperature at oil pan
- Brake rotor temperature
- Exhaust manifold temperature and cylinder firing condition
- HVAC outlet temperature, evaporator or condenser temperature
- Transmission oil temperature
- Other vehicle component temperatures



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PRODUCT OVERVIEW

MFT 8MB Program Card

The MFT Pro-Card contains the user interface and data display software. This software allows the Mastertech to function as a serial data tester, digital voltage / frequency / duty cycle meter, or oscilloscope.

The card also contains a Tech Toolbox, which supports math functions (calculator, unit conversion, formula computation), clock functions (stop watch, count down timer) and shop functions (parts, labor and total estimates, technician earnings). In addition, the MFT program card contains the Generic OBD II application software.

New products that will be utilizing software residing on this new high capacity MFT 8MB Pro-Card include: the Ignition Scope Analyzer and, the Current and Temperature Probes. In addition, the Pro-Card can contain the aftermarket OEM software for the new Asian Imports Pro-Series. This will include coverage for Honda, Acura, Toyota, Lexus and Kia.

The program card software can be reprogrammed with the addition of each new Pro-Series product. These products may be purchased separately or in combination with the Pro-Card.



The 8MB Pro-Card contains the software that allows the MTS 3100 Mastertech to operate as a multi-function tester or oscilloscope.



The club for leading shop owners and technicians.

"We support what we sell!"

The Mastertech Club has been created to aid technicians and shop owners with product support, information exchange and access to "affinity" opportunities. This Club promotes product specific information on the equipment that you use. Using case studies the Mastertech Club provides everyday examples outlining the preferred way to attack common problems. It is also an opportunity for members to network and exchange ideas that helps everyone execute business more efficiently. Vetronix Corporation provides members with the most up to date information on new products and developments in the industry. The Mastertech Club keeps all members on a first-to-know basis so that you are aware of the latest technology, which has a positive impact on you and your company's bottom line.

- Hands On Product Familiarization
- Real Life Time Saving Tech Tips
- First to Know Status on New Products from Vetronix and others
- Free Program Card Updates
- Informative Bi-Monthly Newsletter
- In Depth Scope Instruction
- Case Studies (Ex. Real Life Customer Complaints and financial benchmarks)
- Learn how to Search TSB's
- Question and Answer Forums
- Discounts On Vetronix and other Company Products
- Knowledgeable Guest Speakers from Industry and Technology Companies



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Powered by Vision • Driven by Technology

2030 Alameda Padre Serra • Santa Barbara, CA 93103
805 / 966-2000 • 800 / 321-4889 • Fax 805 / 965-3497
www.vetronix.com