MST-9000+ user manual

------------------------Professional Automotive Signal Simulator

------------------------For all of the following six-cylinder car engine
1: Instrument packing list:

Sensor signal simulation 1Set
Data cables 20pcs
Power Line 1pcs
USB data cables 1pcs
Data CD 1pcs

2: Instrument special function:

MST9000+ is an electrician electronic test platform for the general car, is the necessary tool for car and computer repairment.
1. It provides the bent axle signal imitate to car, six channel can make the random waveform output. and it can shape all motorcycle type engine crankshaft, camshaft signal (Hoare, magnetoelectricity, photoelectric signal), also the waveform data is long term stored by computer.
2. The magnetoelectricity crankshaft signal is isolated by transformer, that can refrain the signal from the mutual interruptions.
3. It is the OEM & OES sensor signal imitate proficient, rotate speed signal, speed signal, engine sensor signal, restrictor signal, Air flow meter, intake pressure sensor (imitate, digital), knock sensor signal imitate and so on.
4. The entire car line actuator drive expert: Tachometer, speedometer, a blower control module, fuel injector, ignition coil, ignition module, frequency and pulse width control electromagnetic valve, step motor driver (4 lines, 6 lines), Car audio amplifier and so on.
5. The entire car line actuator simulation expert: The actuator simulation like ignition coil, injector, idle speed step motor as actuator, the ultrasonic generator and so on.

3: the performer's parameter:

1. the driver of command program: driver current 3A, duty cycles 1%~99% continuous adjustment, frequency continuation
2. Sensor signal: electric resistance 100Ω~10000Ω, voltage 0V~5V×4 0V~1.5

3. Output signal: magnetoelcticity signal, Hoare signal, photoelectricity signal

4. Stepping motor driver: current 1A, suitable for all the car with the four wire, six wire stepping motor cycle.

5. Performer imitate driver: 69 channel output at the same time.

4. Scope:

   automotive sensor dynamic diagnosis, engine, transmission, ABS, air-condition, immobilizer etc other ECU diagnose, auto teaching aids model-driven, automotive production and research and development; (ancillary repair ECU principal: Send signals to ECU by MST-9000+, then can determine which part (ECU or sensor) broken; send signals to actuator by MST-9000+, can check whether the problem is ECU or actuator.

5. User Manual

1. Operator Panel Introduction:
**Signal Simulation Output**

C-CTS: temperature sensor signal analog 0 ~ 10K

D-TPS: EGR valve position, throttle position sensor signal analog 0 to 5V

E-MAP: intake air pressure sensor signal analog 0 ~ 5V

F-MAF: air flow meter signal analog 0 ~ 5V

G-O2: oxygen sensor signal simulation ~ ~ 1V (manual adjustment)

T-O2: oxygen sensor signal simulation adjust (signals automatically change)

V-KS1: knock sensor signal simulation

W-KS2: knock sensor signal simulation
Digital signal output

N-CKP: crank signal
R-AC: AC signal
S-DC: DC signal

Actuator drive
O-ISC: idle speed control valve drive
P-PFC: ignition driver

Q-INJ: fuel injector driver

Y1\Y2\Z1\Z2-A1\A2\B1\B2: four wire stepping motor driver
Y1\Y2\Y\Z\Z1\Z2-A\B\+\+\C\D: six wire stepping motor driver

Ignition coil and ignition module simulation (B1-B6)

IG1: one cylinder Ignition coil and ignition module simulation
IG2: two cylinder Ignition coil and ignition module simulation
IG3: three cylinder Ignition coil and ignition module simulation
IG4: four cylinder Ignition coil and ignition module simulation
IG5: five cylinder Ignition coil and ignition module simulation
IG6: six cylinder Ignition coil and ignition module simulation

Magnetic valve simulation:(U1-U6)

SOL1: coil 1
SOL2: coil 2
SOL3: coil 3
SOL4: coil 4
SOL5: coil 5
SOL6: coil 6

**Auto pin prompt**

I-FPR: fuel pump relay simulation

H-RL: relay simulation

J+:+ 12V power supply output

K-NE+: crank shaft signal + output

L-NE-: crank shaft signal - output

M-GND: power supply negative pole

**Channel signal generator**

CH0: HALL (photoelectricity) sensor signal 0 output range adjusting

CH1: HALL (photoelectricity) sensor signal 1 output range adjusting

CH2: HALL (photoelectricity) sensor signal 2 output range adjusting

CH3: magneto electricity sensor signal 1 output

CH4: magneto electricity sensor signal 2 output

CH5: magneto electricity sensor signal 3 output

**Button Function:**
F1: shortcut key: general signal generator

F2: shortcut key: choose by car model

↑: manual UP

↓: Manual DOWN

+: signal strengthen

-: signal weaken

RUN: run

RET: return

READ: read five channel crankshaft signal data

OUT: crankshaft signal output

6. Operational guidelines:

① power on: put MST-9000+ connected to the power source (220v or 110v), all the signal lights will turned on when the power comes on, after
few seconds will become like photo shows:

Screen shows:

② select the first option

shows like

1. DC SIGNAL
2. EXHAUST GAS
3、RPM signal

**Option 1,** DC SIGNAL, press RUN to enter in

Displays on port CTS, TPS MAP, MAF, O2, +B, GND etc. will be blinking on those ports.

Screen shows output voltage numerical, it will shows DC voltage signal when connect CTS, TPS, MAP, MAF, O2 ports (the other end ground joint GND). All the voltage signals can be adjusted by corresponding potentiometer, adjusting range is 0 to 5v.

**Option 2,** EXHAUST GAS, press RUN to enter, it shows GND and O2 port light flashing, the output signal is O2 signal, signal frequency can be change by + and – from keyboard, change range is 0001-0020,Hz.

**Option 3,** RPM signal: enter the engine speed signal simulation, there are 13 selections of ECU type:
Select one ECU type to enter in, display change ECU output frequency (i.e. speed) adjustable range from 0020 to 2160 Hz, adjust by + and —, signal output end is +B (power), GND (ground wire), CKP (crankshaft speed signal), A1, A2, +,+,B1,B2, stepping motor signal output end.

③ Enter option 2  ELEMENT DRIVEN:

Enter ISC VALVE
INJECTOR
SOLENOID
VSS DRIVEN actuator simulation
This one is a computer simulation of ECU the execution of the signal

1, Simulation executive ISC VALVE, ECU ISC operation signal comes out from ISC port, stepping motor received ISC output end, make the motor according to the instrument issued instructions operation. +,- for control of frequency and CYCLE.

2, Simulation execution injection signal, choose INJECT, according to RUN after entering + B, GND, INJ, three port lamp shining, the analog ECU signal is INJ port, it connect to the nozzle, instrument simulation ECU signal control nozzle work, + and – can control injection instrument frequency, in the top of the instrument INJ - INJ6 six screen can display injection pulse width

3, Simulation ignition driving signal output: choose SOLENOID, +B,GND,PFC 3 port lamp shining after press RUN to enter, the analog signal ECU is PFC port, the port PFC signal output to ignition signal port, it can make the ignition drive for ignition, + and – for control of frequency and CYCLE.

4, The speed signal simulation execution, select VSS, enter the speed signal simulation execution, give the car issued instructions by AC/DC signal, execution speed signal, use + and – to adjust.

④ Enter the third option stepping motor
This is a simulation idle stepping motor signal output, in can choose 4 steps and 6 steps stepping motor signal simulation.

The fourth option, the entire vehicle simulation signal AUTO MAIC, select second option universal car signal simulation. (or directly select F1, into the universal car signal simulation)

after enter display:
the data shows that all can regulate LEVEL by different demand. Use upper and lower keys from keyboard and +,— for adjusted SPEED. Use the corresponding point switch to adjust CTS, TPS, MAP, MAF, O2, KS1, KS2, INJ1-INJ6, IG1-IG6, SOL1-SOL6 according to the type of car is choice 4 cylinder or 6 cylinder, in turn connected 1-4 or 1-6.
Due to the crankshaft signal is different for each models, so the signal can be edit waveform by computer.

Crankshaft signal waveform editing method of use:
1 - installation software:
Put disc into computer, find ECU setup, double click to open start for installation.

![ECU Laboratory Equipment Setup](image1.png)

Welcome
Welcome to the installer for ECU Laboratory Equipment 20110101

It is strongly recommended that you exit all Windows programs before continuing with this installation.
If you have any other programs running, please click Cancel, close the programs, and run this setup again.
Otherwise, click Next to continue.

![Welcome screen](image2.png)
4. **Install shortcuts for current user only**

5. **Ready to Install**
   - You are now ready to install ECU Laboratory Equipment 20110101.
   - The installer now has enough information to install ECU Laboratory Equipment on your computer.
   - The following settings will be used:
     - **Install folder**: C:\Program Files\ECU Laboratory Equipment
     - **Shortcut folder**: ECU Laboratory Equipment
   - Please click **Next** to proceed with the installation.
2. Install USB Driver

Turn on MST9000+, and connect to the computer,
This wizard helps you install software for:

USB Device

If your hardware came with an installation CD or floppy disk, insert it now.

What do you want the wizard to do?

- Install the software automatically (Recommended)
- Install from a list or specific location (Advanced)

Click Next to continue.
Found New Hardware Wizard

Please wait while the wizard installs the software...

Setting a system restore point and backing up old files in case your system needs to be restored in the future.

Found New Hardware Wizard

Completing the Found New Hardware Wizard

The wizard has finished installing the software for:

USB 1.0

Click Finish to close the wizard.

Finish
3. Run software

Free to set any of the settings area of the waveform you need, including Channel 1, Channel 2, Channel 3 main

Set to be used for the square wave, sine wave is mainly used for the other three channel settings. After setting the waveform,

In the "End Phase" menu, we set the waveform of the input in the interface "phase diagram" that the End position, and then re-cycle. For example: The following diagram of the output waveform in the "phase diagram" of the three End position and repeat the cycle. We are in the "End phase" menu, enter "3."

After editing, the point file ----- save ---- yes, and then select the path to save the edited waveform.
After saving the file, you can save the data into the machine, click Display menu, click , The edited waveform sent to the machine, and then the instrument selection button. , then click , Edited waveform six channels in the output on CH0-CH5 Out. (Note that the driver must be installed correctly, after installation, to ensure that the lower right corner).
The default analog output signal models,
Select Model: Select the first four options AUTO MAIC, press RUN to enter, and then select
MAKE, press RUN to enter Model List, or directly press F2, and shortcut keys to enter selected models
Optional list
Offers more than 40 kinds of models to choose from, select models, press RUN, you can output the corresponding Models of analog output signals ECU
Attachment: Default Model List: